Appendix O

NHDES Alteration of Terrain Permit Application, July 13, 2015

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Merrimack Valley Reliability Project

Pelham, Windham, Hudson & Londonderry, New Hampshire

PREPARED FOR

New England Power Company d/b/a National Grid
40 Sylvan Road
Waltham, Massachusetts, 02451
781.907.3648

&

Public Service Company of New Hampshire d/b/a Eversource Energy
13 Legends Drive
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603.634.2906

PREPARED BY

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603.391.3900

July 2015

Table of Contents

Letter of Transmittal

July 13, 2015

Ref: 12650.01

Mr. Ridgely Mauck, PE
Program Supervisor
NHDES - Alteration of Terrain Bureau
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

Re: Merrimack Valley Reliability Project
Pelham, Windham, Hudson, and Londonderry
New Hampshire

Mr. Mauck:
On behalf of New England Power Company d/b/a National Grid (NEP) and Public Service Company of New Hampshire d/b/a Eversource Energy (PSNH), Vanasse Hangen Brustlin, Inc. respectfully submits for your consideration the enclosed Alteration of Terrain permit application associated with the Merrimack Valley Reliability Project (MVRP). The MVRP involves the construction of a new overhead 345 kV electric transmission line (to be known as the "3124 Line") within an existing electric transmission right-of-way (ROW) between the NEP-owned Tewksbury 22A Substation in Tewksbury, Massachusetts and the PSNH-owned Scobie Pond 345 kV Substation in Londonderry, New Hampshire. The portion of the MVRP located within New Hampshire that is subject of this permit application is referred to herein as the "Project."

The Project extends from the Massachusetts border in Pelham, New Hampshire to the PSNH-owned Scobie Pond 345 kV Substation in Londonderry, New Hampshire. The Project proposes approximately 17.9 miles of new transmission line (which will be known as "3124 Line") within the Towns of Pelham, Windham, Hudson, and Londonderry as well as relocation of 7.6 miles of an existing NEP-owned 115 kV transmission line (known as "Y-151 line") within the Towns of Pelham, Windham, and Hudson.

The MVRP will significantly enhance the reliability of electrical transmission services to the Merrimack Valley region. The MVRP will eliminate potential overloads on several components of the current transmission system that could be experienced under certain contingency conditions. The MVRP will provide resiliency and increased system flexibility to the region's transmission infrastructure in order to deliver reliable electric service to customers in the area. In doing so, the MVRP will ensure continued compliance with applicable federal and regional transmission system reliability standards.

Land disturbance required for the Project includes:

1. Transmission line structures (H-frame and monopole steel structures direct embed or foundation)
2. Temporary work areas:
    a. Work pads around existing and proposed structure locations (100' x 100')

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b. Pull pad sites (100' x 300')
c. Guard protection areas (50' x 50')
d. Laydown areas (size is site dependent)

3. Accessways (typically 16' wide)

The majority of the required land disturbance is temporary to support the construction phase of the Project. Temporary work areas will be graded only as is necessary to provide safe and stable work areas for men and machinery. Graded temporary work areas will be regraded to match adjacent contours and will be stabilized with an appropriate seed mix and mulch application. Construction access will be graded only as necessary to provide adequate clearance and a stabilized surface to facilitate equipment movement along the ROW. Upgrades to the accessways in upland areas including minor grading, placement of gravel, and/or installation of Best Management Practices (BMPs) to control stormwater along existing access will remain in place following construction. Access along the ROW is necessary to facilitate future maintenance activities due to the number of facilities located within this ROW. New accessways that are required to reach individual pole locations are not required and will be restored to pre-construction condition.

Total land disturbance for the Project is 185.7 acres. The total land disturbance was conservatively estimated by calculating the total footprint of all work areas depicted on the plan set. The actual limits of disturbance required at each location will depend on field conditions (e.g. existing level of disturbance and topography). However, under no conditions will any single disturbance exceed 100,000 square feet or 50,000 square feet within the protected shoreland. Therefore, it is anticipated that the Project will qualify under General Permit by Rule in accordance with Env-Wq 1503.03. An Alteration of Terrain Permit Application has been provided for informational purposes to support a determination by the Alteration of Terrain Bureau that the project qualifies for a General Permit by Rule.

In association with this application, the following documents are enclosed:

- Unbound signed application form, application fee, color USGS location map, and copy of pre-application meeting minutes.
- Alteration of Terrain Application Package
- Site Plans (1 set – 11" x 17")

Please feel free to contact me if you have any questions or comments regarding this Project or any of the enclosed materials.

Sincerely,

Sherrie Trefry

Sherrie Trefry, CSS
Director of Energy Services

CC: Laura Games, Eversource
Josh Holden, National Grid

Application Form & Checklist

NHDES-W-01-003

ALTERATION OF TERRAIN PERMIT APPLICATION

Water Division/ Alteration of Terrain Bureau/ Land Resources Management
Check the Status of your Application: http://des.nh.gov/onestop

RSA/ Rule: RSA 485-A:17, Env-Wq 1500

Administrative Use Only	Administrative Use Only	Administrative Use Only	File Number:
			Check No.
			Amount:
			Initials:

1. PROJECT LOCATION			
PROJECT NAME: **Merrimack Valley Reliability Project**			
ADDRESS: **Existing Electric Transmission Right-of-Way (ROW)**			
TOWN/CITY: **Pelham, Windham, Hudson, Londonderry**	COUNTY: **Rockingham, Hillsborough**	STATE: **NH**	ZIPCODE: **03076, 03087, 03051, 03053**
TAX MAP: **N/A**	BLOCK: **N/A**	LOT NUMBER: **N/A**	UNIT: **N/A**
LOCATION COORDINATES: **Multiple locations along an existing electric transmission ROW in Pelham, Windham, Hudson, and Londonderry**		☐ LATITUDE/LONGITUDE ☐ UTM ☐ STATE PLANE	

2. APPLICANT INFORMATION (DESIRED PERMIT HOLDER)			
APPLICANT NAME: **Joshua Holden (NEP); Laura Games (PSNH)**		CONTACT NAME: **New England Power Company (NEP); Public Service of New Hampshire (PSNH)**	
EMAIL or FAX: **Joshua.holden@nationalgrid.com (NEP); laura.games@eversource.com (PSNH)**	PHONE: **(781) 907-3648 (NEP); (603) 634-2906**		
ADDRESS: **40 Sylvan Road, 3rd Floor, East Wing (NEP); 13 Legends Drive (PSNH)**			
TOWN/CITY: **Waltham (NEP); Hooksett (PSNH)**		STATE: **MA (NEP); NH (PSNH)**	ZIPCODE: **02451-1120 (NEP); 03106 (PSNH)**

3. PROPERTY OWNER INFORMATION (IF DIFFERENT FROM APPLICANT)			
PROPERTY OWNER: **ROW consists of existing easements and fee ownerships**		CONTACT NAME:	
EMAIL:	FAX:	PHONE:	
ADDRESS:			
TOWN/CITY:		STATE:	ZIPCODE:

4. AGENT INFORMATION			
ENGINEERING FIRM: **Vanasse Hangen Brustlin, Inc.**		CONTACT NAME: **Sherrie Trefry**	
EMAIL: **strefry@vhb.com**	FAX: **(603) 518-7495**	PHONE: **(603) 391-3900**	
ADDRESS: **2 Bedford Farms Drive, Suite 200**			
TOWN/CITY: **Bedford**		STATE: **NH**	ZIPCODE: **03110**

5. PROJECT TYPE				
☐ EXCAVATION ☐ RESIDENTIAL	☐ COMMERCIAL ☐ GOLF COURSE	☐ SCHOOL ☐ MUNICIPAL	☐ AGRICULTURAL ☐ LAND CONVERSION	☐ LANDFILL ☒ OTHER

6. BRIEF PROJECT DESCRIPTION (PLEASE DO NOT REPLY "SEE ATTACHED")

The Merrimack Valley Reliability Project (MVRP) involves the construction of a new overhead 345 kV electric transmission line within an existing electric transmission ROW between the New England Power d/b/a National Grid (NEP) owned Tewksbury 22A Substation in Tewksbury, Massachusetts and the Public Service Company of New Hampshire d/b/a Eversource Energy (PSNH) owned Scobie Pond 345 kV Substation in Londonderry, New Hampshire. The portion of the MVRP located within New Hampshire that is subject of this permit application is referred to herein as the "Project." The Project extends from the Massachusetts border in Pelham, New Hampshire to the PSNH-owned Scobie Pond 345 kV Substation in Londonderry, New Hampshire. The Project proposes approximately 17.9 miles of new transmission line (which will be known as "3124 Line") within the Towns of Pelham, Windham, Hudson, and Londonderry as well as relocation of 7.6 miles of an existing NEP-owned 115 kV transmission line (known as "Y-151 line") within the Towns of Pelham, Windham, and Hudson.

The MVRP has been divided into four segments delineated by state, ownership, and line alignment. ***Segment 1 of MVRP (6.5 miles in length) is located in Massachusetts and is not discussed herein.*** Segment 2 is the portion of the Project in New Hampshire to be owned and operated by NEP. Segment 2 runs from the Massachusetts/New Hampshire border continuing north within an existing NEP ROW for 8.1 miles through the Towns of Pelham, Windham, and Hudson to a location in the town of Hudson where the project shifts from the existing NEP ROW to an existing PSNH ROW. Segments 3 and 4 account for the remaining 9.8 miles of the Project in the Towns of Hudson and Londonderry to be owned and operated by PSNH.

To incorporate the new 3124 Line in the majority of Segment 2, the existing NEP-owned Y-151 line (overhead 115 kV transmission line) will need to be relocated within the western edge of the existing NEP ROW and the new 3124 Line will be installed in the original Y-151 alignment. In Segment 3, the new 3124 Line will be installed within the eastern edge of the existing PSNH ROW. In Segment 4, the new 3124 Line will be installed within the center of the existing PSNH ROW.

Refer to the Application Narrative and Attachments for more information.

7. IF APPLICABLE, DESCRIBE ANY WORK STARTED PRIOR TO RECEIVING PERMIT

Not Applicable

8. REQUIRED QUESTIONS (PLEASE DO NOT LEAVE FIELDS BLANK. IF NOT APPLICABLE, STATE "N/A")

A. Date a copy of the *complete* application was sent to the municipality[1]: 7/13/2015. **(Attach proof of delivery)**

B. Total area of disturbance: **8,090,471** square feet **(Conservatively estimated based on total footprint of work areas)**

C. Additional impervious cover as a result of the project: **8,175 sq. ft.** (as a result of 456 pole structures) square feet (use the "-" symbol to indicate a net reduction in impervious coverage). Total impervious cover: **N/A** square feet.

D. Total undisturbed cover: **4,412,628** square feet

E. Number of lots proposed: **N/A**

F. Total length of roadway: **N/A** linear feet

G. Select plan type submitted: ☐ Land Conversion ☒ Detailed Development ☐ Excavation, Grading & Reclamation ☐ Steep Slope

H. Name of receiving waters: **Tony's Brook, Golden Brook, Beaver Brook, Lower Beaver Brook, Robinson Pond, Howard Brook, Chase Brook, Nesenkeag Brook, 3 unnamed perennial streams**

[1] In accordance with Env-Wq 1503.05 (c)(4), *provide proof* that a completed application form, checklist, plans and all other supporting materials have been sent or delivered to the governing body of each municipality in which the project is proposed. Env-Wq 1503.05 (c)(4) also requires the applicant to provide proof that a completed application form, checklist, plans and all other supporting materials have been sent or delivered to the Local River Advisory Committee, if the project is within 1/4 mi of a designated river.

Using NHDES's Web GIS OneStop program (www2.des.state.nh.us/gis/onestop/), with the Surface Water Impairment layer turned on, list the impairments identified: **Dissolved oxygen, Chloride, Chlorophyl, Cyanobacteria, E-coli, Phosporus, Benthic macroinvertebrates**.
(enter "NA" if no pollutants are listed).
For more guidance see: http://des.nh.gov/organization/divisions/water/wmb/tmdl/documents/onestop_gis_wgc_ref_guide.pdf

I. ☐ This project is within ¼ mi of a designated river (**River name:** _____) AND
I have notified the Local River Management Advisory Committee by providing them with a copy of the complete application[1], including all supporting materials, on **Month: __ Day: __ Year: ____ (Attach proof of delivery)**

☒ This project is **not** within ¼ mi of a designated river.

J. Name of species identified by the Natural Heritage Bureau as threatened or endangered or of concern: **Brook Floater (*Alasmidonta varicosa*), bird-foot violet (*Viola pedata*), bulbous bitter-cress *(Cardamine bulbosa*), common star-grass (*Hypoxis hirsuta*), eight-flowered six-weeks grass (*Vulpia octoflora var. tenella*), meadow garlic (*Allium canadense*), palmate violet (*Viola palmata*), perfoliate bellwort (*Uvularia perfoliata),* river birch (*Betula nigra*), round-leaved trailing tick-trefloil (*Desmodium rotundifolium*), smooth forked whitlow-wort (*Paronychia canadensis*), Blanding's turtle (*Emydoidea blandingii*), grasshopper sparrow (*Ammodramus savannarum*), northern black racer (*Coluber constrictor constrictor*), spotted turtle (*Clemmys guttata*), wood turtle (*Glyptemys insculpta*); Medium level fen system, swamp white oak floodplain forest**

K. Cut volume 0 cubic feet and fill volume 630 cubic feet within the 100-year floodplain (enter "NA" if not within the floodplain)

L. Is the project within a Water Supply Intake Protection Area (WSIPA)? YES☐ NO☒
Is the project within a Groundwater Protection Area (GPA)? YES☒ NO☐
Are the well setbacks outlined in Env-Wq 1508.02 being met? YES☒ NO☐

Note: Guidance document titled "*Using DES's OneStop WebGIS to Locate Protection Areas*" is available online. For more details on the restrictions in these areas, read Chapter 3.1 in Volume 2 of the NH Stormwater Manual.

8. REQUIRED QUESTIONS CONTINUED

M. Is the project a High Load area in accordance with Env-Wq 1502.26? YES☐ NO☒
If yes, specify type of high load land use or activity?

N. For each type of approval or permit, check "Yes" if the permit or approval type is required for your project and indicate the permit number / approval date. Indicate "Pending" if the application has been filed, but the permit has not yet been issued. Check "No" to indicate that the permit type is required, but not yet been filed with the Department. Check "N/A" if the permit or approval type is not required for your project.

1. Water Supply Approval	Y☐	N☐	N/A☒	Permit number:	Pending	☐
2. Wetlands Permit	Y☒	N☐	N/A☐	Permit number:	Pending	☒
3. Shoreland Permit	Y☒	N☐	N/A☐	Permit number:	Pending	☒
4. UIC Registration	Y☐	N☐	N/A☒	Registration date:	Pending	☐
5. Large/Small Community Well Approval	Y☐	N☐	N/A☒	Approval letter date:	Pending	☐
6. Large Groundwater Withdrawal Permit	Y☐	N☐	N/A☒	Permit number:	Pending	☐
7. Other: 401 Water Quality Certification	Y☒	N☐	N/A☐	Permit number:	Pending	☒

9. ADDITIONAL INFORMATION

A. If you have had a pre-application meeting with AoT staff, state his or her name(s): **Ridgely Mauck – 2/18/2015**
Attach a copy of the meeting minutes.

B. Will blasting of bedrock be required? YES☐ NO☒ If yes, estimated quantity of blast rock: _____ cubic yards.
If yes, standard blasting BMP notes must be placed on the plans, available at:
http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-10-12.pdf

If greater than 5,000 cubic yards of blast rock will be generated, a groundwater monitoring program must be developed and submitted to DES. Contact the AoT Bureau for additional detail.

C. Indicate if the project will withdraw from, or directly discharge to, any of the following water sources *post-development* and, if "Yes", indicate its purpose*:*

1. Stream or Wetland Purpose:	YES ☐ Withdrawal ☐ Discharge ☐ NO ☒
2. Man-made pond created by impounding a stream or wetland Purpose:	YES ☐ Withdrawal ☐ Discharge ☐ NO ☒
3. Unlined pond dug into the water table Purpose:	YES ☐ Withdrawal ☐ Discharge ☐ NO ☒

10. CHECK ALL APPLICATION ATTACHMENTS THAT APPLY (SUBMIT WITH APPLICATION IN ORDER LISTED)

LOOSE:

☒ Signed application form: des.nh.gov/organization/divisions/water/aot/index.htm (with attached proof(s) of delivery)
☒ Check for the application fee: des.nh.gov/organization/divisions/water/aot/fees.htm
☒ Color copy of a USGS map with the property boundaries outlined (1" = 2,000' scale)
☒ A copy of the pre-application meeting minutes, if you had a pre-application meeting with AoT staff.

BIND IN A REPORT IN THE FOLLOWING ORDER:

☒ Copy of the signed application form & application checklist (des.nh.gov/organization/divisions/water/aot/index.htm)
☒ Copy of the check
☒ Copy of the USGS map with the property boundaries outlined (1" = 2,000' scale)
☒ Narrative of the project with a summary table of the peak discharge rate for the off-site discharge points
☒ Web GIS printout with the "Surface Water Impairments" layer turned on - www2.des.state.nh.us/gis/onestop/
☒ Web GIS printouts with the AoT screening layers turned on - www2.des.state.nh.us/gis/onestop/
☒ NHB letter using DataCheck Tool – www.nhdfl.org/about-forests-and-lands/bureaus/natural-heritage-bureau/
☒ The Web Soil Survey Map with project's watershed outlined – websoilsurvey.nrcs.usda.gov
☒ Aerial photograph (1" = 2,000' scale with the site boundaries outlined)
☒ Photographs representative of the site
N/A ☐ Groundwater Recharge Volume calculations (one worksheet for each permit application):
des.nh.gov/organization/divisions/water/aot/documents/bmp_worksh.xls
N/A ☐ BMP worksheets (one worksheet for each treatment system):
des.nh.gov/organization/divisions/water/aot/documents/bmp_worksh.xls

10. CHECK ALL APPLICATION ATTACHMENTS THAT APPLY (SUBMIT WITH APPLICATION IN ORDER LISTED)

N/A ☐ Drainage analysis, stamped by a professional engineer (see Application Checklist for details)
N/A ☐ Riprap apron or other energy dissipation or stability calculations
N/A ☐ Site Specific Soil Survey report, stamped and with a certification note prepared by the soil scientist that the survey was done in accordance with the Site Specific Soil Mapping standards, *Site-Specific Soil Mapping Standards for NH & VT, SSSNNE Special Publication No. 3.*
N/A ☐ Infiltration Feasibility Report (example online)
N/A ☐ Registration and Notification Form for Storm Water Infiltration to Groundwater (UIC Registration-for underground systems only, including drywells and trenches): (http://des.nh.gov/organization/divisions/water/dwgb/dwspp/gw_discharge)
N/A ☐ Inspection and maintenance manual with, if applicable, long term maintenance agreements
N/A ☐ Source control plan

PLANS:

☒ One set of design plans on 34 - 36" by 22 - 24" white paper (see Application Checklist for details)
N/A ☐ Pre & post-development color coded soil plans on 11" x 17" (see Application Checklist for details)
N/A ☐ Pre & post-development drainage area plans on 34 - 36" by 22 - 24" white paper (see Application Checklist for details)

100-YEAR FLOODPLAIN REPORT:

☒ All information required in Env-Wq 1503.09, submitted as a separate report.

☒ **REVIEW APPLICATION FOR COMPLETENESS & CONFIRM INFORMATION LISTED ON THE APPLICATION IS INCLUDED WITH SUBMITTAL.**

11. REQUIRED SIGNATURES

☐ APPLICANT OR ☒ AGENT: Sherrie Trefry SIGNATURE	Sherrie Trefry PRINT NAME LEGIBLY	7/17/2015 DATE
OWNER OR OWNER'S AGENT (IF DIFFERENT FROM APPLICANT): SIGNATURE	PRINT NAME LEGIBLY	/ / DATE
By initialing here, I understand that in accordance with Env-Wq 1503.20(e), within one week after permit approval, the applicant shall submit a copy of all approved documents to the department in PDF format on a CD.		SLT

ATTACHMENT A:
ALTERATION OF TERRAIN PERMIT APPLICATION CHECKLIST

Check the box to indicate the item has been provided or provide an explanation why the item does not apply.

DESIGN PLANS

☒ Plans printed on 34 - 36" by 22 - 24" white paper

N/A ☐ PE stamp - **Engineered design is limited to the electrical infrastructure and can be provided upon request**

☒ Wetland delineation

☒ Temporary erosion control measures

N/A ☐ Treatment for all stormwater runoff from impervious surfaces such as roadways (including gravel roadways), parking areas, and non-residential roof runoff. Guidance on treatment BMPs can be found in Volume 2, Chapter 4 of the NH Stormwater Management Manual. – **Impervious surfaces requiring stormwater treatment is not proposed**

☒ Pre-existing 2-foot contours

N/A ☐ Proposed 2-foot contours – **Permanent grading for access improvements is not expected to exceed 2-feet**

N/A☐ Drainage easements protecting the drainage/treatment structures – **Drainage/treatment structures not proposed**

☒ Compliance with the Wetlands Bureau, RSA 482- A http://des.nh.gov/organization/divisions/water/wetlands/index.htm. Note that artificial detention in wetlands is not allowed.

☒ Compliance with the Comprehensive Shoreland Protection Act, RSA 483-B. http://des.nh.gov/organization/divisions/water/wetlands/cspa

N/A ☐ Benches. Benching is needed if you have more than 20 feet change in elevation on a 2:1 slope, 30 feet change in elevation on a 3:1 slope, 40 feet change in elevation on a 4:1 slope. – **Significant cut/fill activities not proposed**

N/A ☐ Check to see if any proposed ponds need state Dam permits. – **Ponds not proposed** http://des.nh.gov/organization/divisions/water/dam/documents/damdef.pdf

DETAILS

-

N/A ☐ Typical roadway x-section - **Roadways not proposed**

N/A ☐ Detention basin with inverts noted on the outlet structure – **Detention basins not proposed**

N/A ☐ Stone berm level spreader – **Stone berm level spreaders not proposed**

N/A ☐ Outlet protection – riprap aprons – **Outlets not proposed**

N/A ☐ A general installation detail for an erosion control blanket – **Erosion control blankets not proposed**

☒ Silt fences or mulch berm

N/A ☐ Storm drain inlet protection. Note that since hay bales must be embedded 4 inches into the ground, they are not to be used on hard surfaces such as pavement.- **No existing or proposed storm drains present in ROW**

☒ Hay bale barriers

N/A ☐ Stone check dams – **Stone check dams not proposed**

☒ Gravel construction exit

N/A ☐ The treatment BMP's proposed – **Treatment BMPs not proposed**

N/A ☐ Any innovative BMP's proposed – **Innovative BMPs not proposed**

CONSTRUCTION SEQUENCE/EROSION CONTROL

☒ Note that the project is to be managed in a manner that meets the requirements and intent of RSA 430:53 and Chapter Agr 3800 relative to invasive species.

☒ Note that perimeter controls shall be installed prior to earth moving operations

N/A ☐ Note that ponds and swales shall be installed early on in the construction sequence (before rough grading the site)

N/A ☐ Note that all ditches and swales shall be stabilized prior to directing runoff to them – **None proposed**

N/A ☐ Note that all roadways and parking lots shall be stabilized within 72 hours of achieving finished grade – **None proposed**

☒ Note that all cut and fill slopes shall be seeded/loamed within 72 hours of achieving finished grade

☒ Note that all erosion controls shall be inspected weekly AND after every half-inch of rainfall

☒ Note the limits on the open area allowed, see Env-Wq 1505.02 for detailed information

Example note: The smallest practical area shall be disturbed during construction, but in no case shall exceed 5 acres at any one time before disturbed areas are stabilized

Note the definition of the word "stable"

Example note: An area shall be considered stable if one of the following has occurred:

- Base course gravels have been installed in areas to be paved
- A minimum of 85 percent vegetated growth has been established
- A minimum of 3 inches of non-erosive material such stone or riprap has been installed
- Or, erosion control blankets have been properly installed.

☒ Note the limit of time an area may be exposed
Example note: All areas shall be stabilized within 45 days of initial disturbance

☒ Provide temporary and permanent seeding specifications. (Reed canary grass is listed in the Green Book; however, this is a problematic species according to the Wetlands Bureau and therefore should not be specified)

☒ Provide winter construction notes that meet or exceed our standards.

Standard Winter Notes:

- All proposed vegetated areas that do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, shall be stabilized by seeding and installing erosion control blankets on slopes greater than 3:1, and seeding and placing 3 to 4 tons of mulch per acre, secured with anchored netting,

elsewhere. The installation of erosion control blankets or mulch and netting shall not occur over accumulated snow or on frozen ground and shall be completed in advance of thaw or spring melt events.

- All ditches or swales which do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, shall be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions.

- After November 15, incomplete road or parking surfaces, where work has stopped for the winter season, shall be protected with a minimum of 3 inches of crushed gravel per NHDOT item 304.3.

N/A ☐ Note at the end of the construction sequence that "Lot disturbance, other than that shown on the approved plans, shall not commence until after the roadway has the base course to design elevation and the associated drainage is complete and stable". – This note is applicable to single/duplex family subdivisions, when lot development is not part of the permit. – **Overhead construction of a utility line**

DRAINAGE ANALYSES – **Overhead construction of a utility line**

N/A ☐ Please double-side 8 ½" x 11" sheets where possible but, **do not** reduce the text such that more than one page fits on one side.

N/A ☐ PE stamp

Rainfall amount obtained from the Northeast Regional Climate Center- http://precip.eas.cornell.edu/. Include extreme precipitation table as obtained from the above referenced website.

Drainage analyses, in the following order:

- Pre-development analysis: Drainage diagram
- Pre-development analysis: Area Listing and Soil Listing
- Pre-development analysis: Node listing 1-year (if applicable), 2-year, 10-year and 50-year
- Pre-development analysis: Full summary of the 10-year storm
- Post-development analysis: Drainage diagram
- Post-development analysis: Area Listing and Soil Listing
- Post-development analysis: Node listing for the 2-year, 10-year and 50-year
- Post-development analysis: Full summary of the 10-year storm

N/A☐ Review the Area Listing and Soil Listing reports

- Hydrologic soil groups (HSG) match the HSGs on the soil maps provided
- There is the same or less HSG A soil area after development (check for each HSG)
- There is the same or less "woods" cover in the post-development
- Undeveloped land was assumed to be in "good" condition
- The amount of impervious cover in the analyses is correct

Note: A good check is to subtract the total impervious area used in the pre analysis from the total impervious area used in the post-analysis. For residential projects without demolition occurring, a good check is to take this change in impervious area, subtract out the roadway and divide the remaining by the number of houses/units proposed. Do these numbers make sense?

N/A ☐ Check the storage input used to model the ponds

N/A ☐ Check to see if the artificial berms pass the 50-year storm, i.e., make sure the constructed berms on ponds are not overtopped

N/A ☐ Check the outlet structure proposed and make sure it matches that modeled

N/A ☐ Check to see if the total areas in the pre and post analyses are same

N/A ☐ Confirm the correct NRCS storm type was modeled (Coos, Carroll & Grafton counties are Type II, all others Type III)

PRE AND POST-DEVELOPMENT DRAINAGE AREA PLANS – Overhead construction of a utility line

N/A ☐ Plans printed on 34 - 36" by 22 - 24" on white paper

N/A ☐ Submit these plans separate from the soil plans

N/A ☐ A north arrow

N/A ☐ A scale

N/A ☐ Labeled subcatchments, reaches and ponds

N/A ☐ Tc lines

N/A ☐ A clear delineation of the subcatchment boundaries

N/A ☐ Roadway station numbers

N/A ☐ Culverts and other conveyance structures

PRE AND POST-DEVELOPMENT COLOR-CODED SOIL PLANS – Overhead construction of a utility line

N/A ☐ 11" x 17"sheets suitable, as long as it is readable

N/A ☐ Submit these plans separate from the drainage area plans

N/A ☐ A north arrow

N/A ☐ A scale

N/A ☐ Name of the soil scientist who performed the survey and date the soil survey took place

N/A ☐ 2-foot contours (5-foot contours if application is for a gravel pit) as well as other surveyed features

N/A ☐ Delineation of the soil boundaries and wetland boundaries

N/A ☐ Delineation of the subcatchment boundaries

N/A ☐ Soil series symbols (e.g., 26)

N/A ☐ A key or legend which identifies each soil series symbol and its associated soil series name (e.g., 26 = Windsor)

N/A ☐ The hydrologic soil group color coding (A = Green, B = yellow, C= orange, D=red, Water=blue, & Impervious = gray)

Please note that excavation projects (e.g., gravel pits) have similar requirements to that above, however the following are common exceptions/additions: – Overhead construction of a utility line

N/A ☐ Drainage report is not needed if site does not have off-site flow.

N/A ☐ 5 foot contours allowed rather than 2 foot.

N/A ☐ No PE stamp needed on the plans

N/A ☐ Add a note to the plans that the applicant must submit to the Department of Environmental Services a written update of the project and revised plans documenting the project status every five years from the date of the Alteration of Terrain permit.

N/A ☐ Add reclamation notes.

N/A☐ See NRCS publication titled: *Vegetating New Hampshire Sand and Gravel Pits* for a good resource, it is posted online at: http://des.nh.gov/organization/divisions/water/aot/categories/publications .

Application Fee Calculation & Copy of Check

Project #:	12650		
Project:	Merrimack Valley Reliability Project		
Location:	Pelham, Windham, Hudson, and Londonderry, New Hampshire		
Calculated by:	Daniel Camara	Date:	6/30/2015
Checked by:	Sherrie Trefry	Date:	6/30/2015
Title:	NHDES Alteration of Terrain Fee		

NHDES - Alteration of Terrain Fee

Disturbance Area: 8,090,471 sf
185.7 ac

Unit Fee:

Disturbance (sf)		Fee
50,000	199,999	$ 1,250
200,000	299,999	$ 1,750
300,000	399,999	$ 2,250
400,000	499,999	$ 2,750
500,000	599,999	$ 3,250
600,000	699,999	$ 3,750
700,000	799,999	$ 4,250
800,000	899,999	$ 4,750
900,000	999,999	$ 5,250
1,000,000	1,099,999	$ 5,750

Plus $500/additional 100,000 sf

Total Fee: **$ 38,750**

Check (Payable to): *Treasurer - State of New Hampshire*

296788

VANASSE HANGEN BRUSTLIN, INC.
101 WALNUT STREET • PO BOX 9151
WATERTOWN, MASSACHUSETTS 02471

CITIZENS BANK
MASSACHUSETTS
5-7017/2110

CHECK DATE

July 9, 2015

Thirty Eight Thousand Seven Hundred Fifty and 00/100

AMOUNT

$38,750.00

Treasurer State of New Hampshire
NHDES Alteration of Terrain Bureau
29 Hazan Drive
P.O. Box 95
Concord, NH 03303-0095

AUTHORIZED SIGNATURE

Security Check features included. Details on back.

⑈296788⑈ ⑆211070175⑆ 113016137⑆

VANASSE HANGEN BRUSTLIN, INC.
101 WALNUT STREET • PO BOX 9151
WATERTOWN, MASSACHUSETTS 02471

EMILY BUSINESS FORMS 800.392.6018 VISION

296788

Check Date: 7/9/2015

Invoice Number	Date	Voucher	Amount	Discounts	Previous Pay	Net Amount
Sherrie Trefry	7/8/2015	0800178	$38,750.00			$38,750.00
Treasurer State of New Hampshire		TOTAL	$38,750.00			$38,750.00
Citizens	18	0021364				

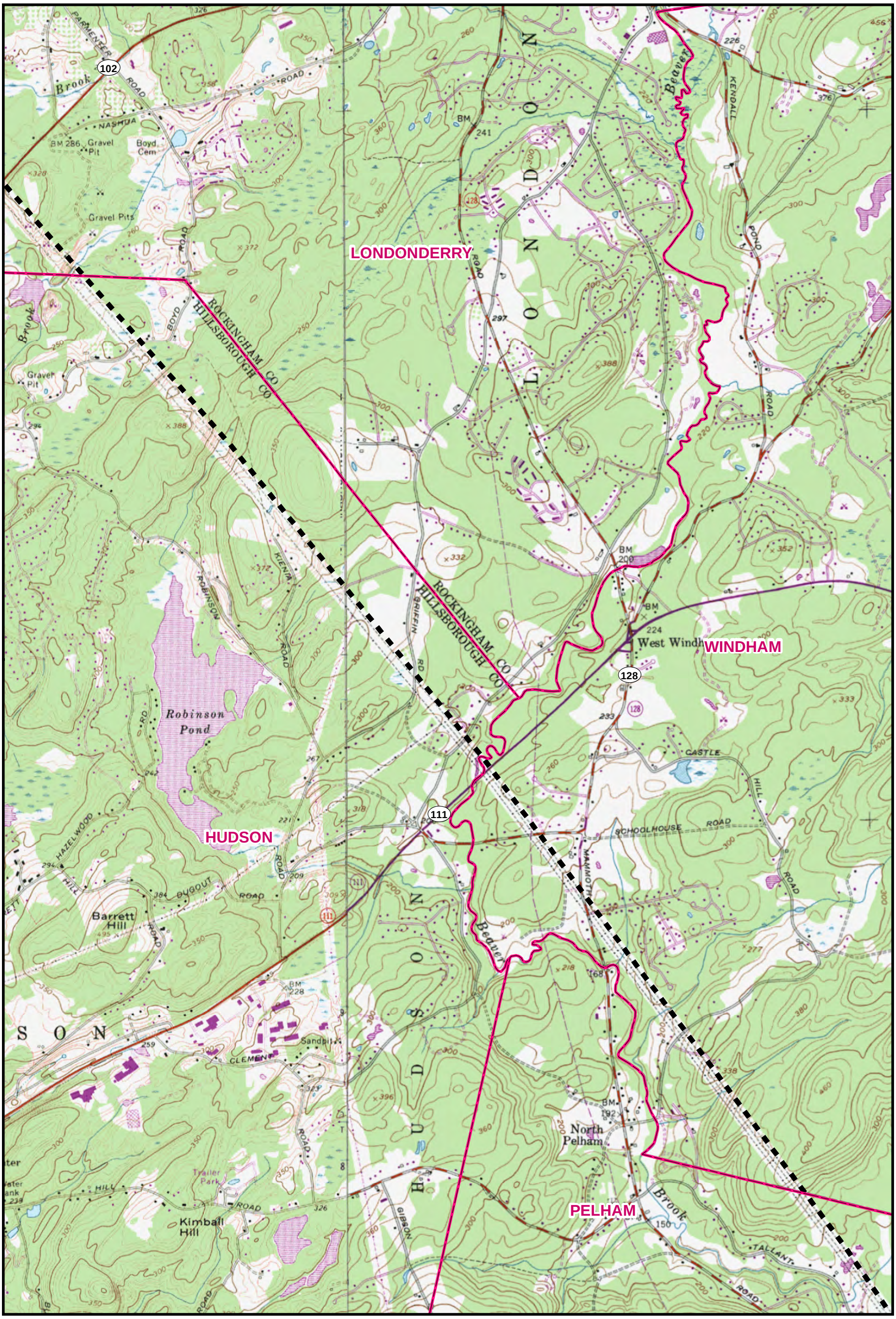
USGS Site Location Map

1 inch = 2,000 feet

Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

USGS Project Overview Map

nationalgrid
EVERSOURCE ENERGY



1 inch = 2,000 feet

Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

USGS Project Overview Map

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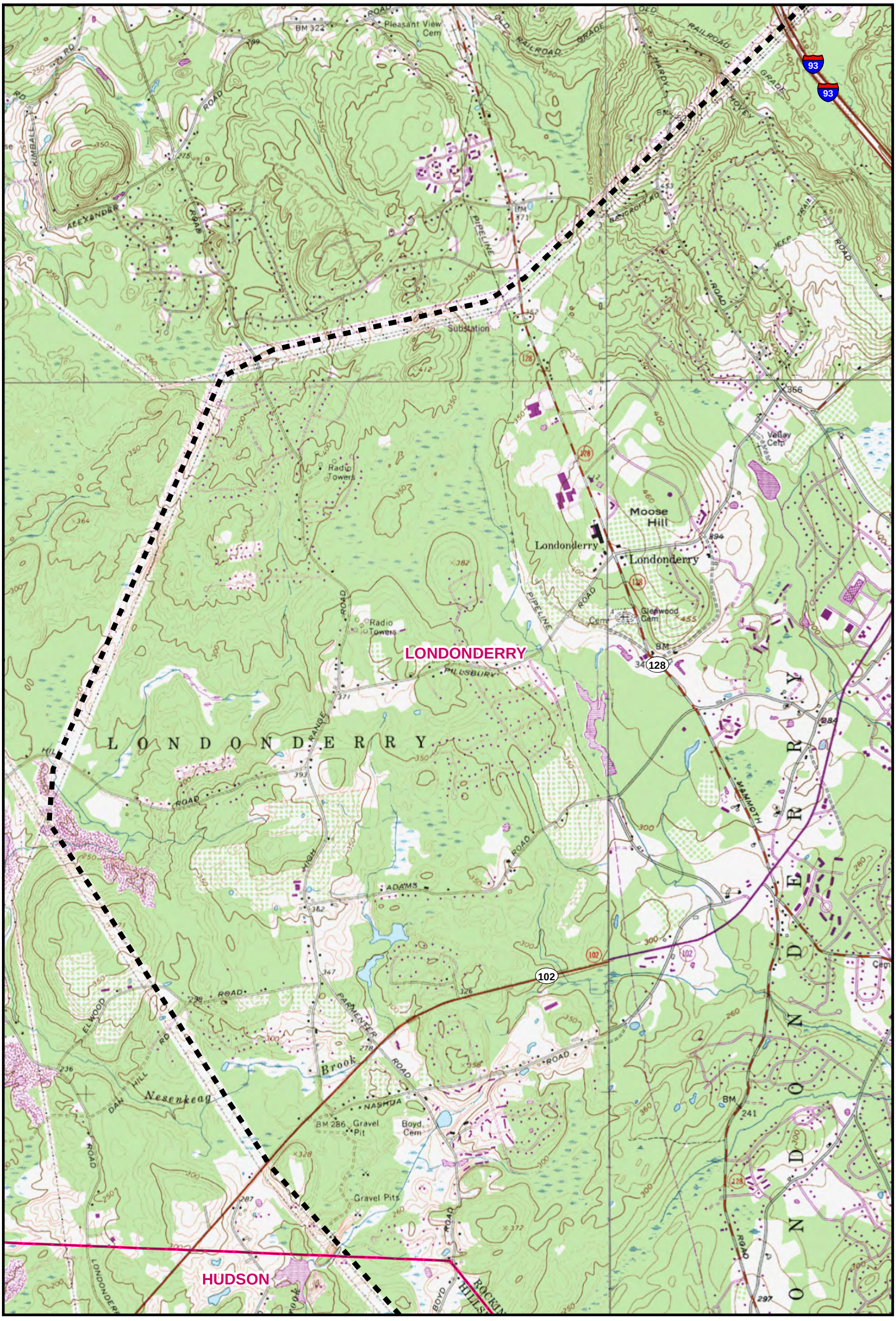
EVERSOURCE ENERGY



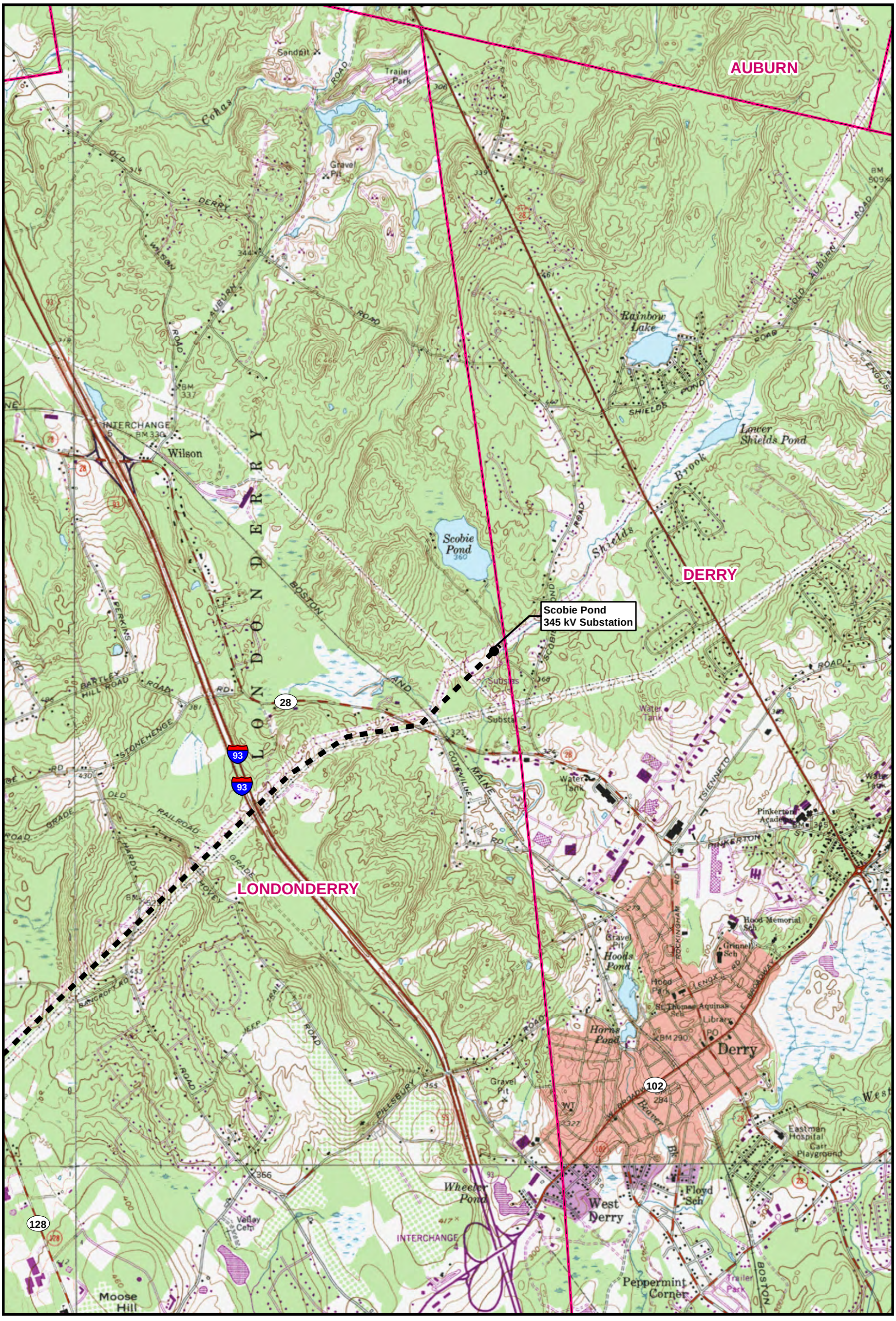
1 inch = 2,000 feet

Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

USGS Project Overview Map

nationalgrid

EVERSOURCE ENERGY



1 inch = 2,000 feet

Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

USGS Project Overview Map

nationalgrid

EVERSOURCE ENERGY

Project Narrative

The New Hampshire portion of the proposed Merrimack Valley Reliability Project (MVRP) will be reviewed by the NH Site Evaluation Committee (NHSEC) under NH RSA 162-H, relative to energy facility siting because the Project involves construction of a new electric transmission line that exceeds 200kV. In preparation of filing an application with the NHSEC, Vanasse Hangen Brustlin, Inc. (VHB) is submitting an Alteration of Terrain Permit Application on behalf of New England Power Company d/b/a National Grid (NEP) and Public Service Company of New Hampshire d/b/a Eversource Energy (PSNH) in accordance with New Hampshire Revised Statutes Annotated (RSA) Chapter 485-A:17, Terrain Alteration, and New Hampshire Code of Administrative Rules, Chapter Env-Wq 1500.

Proposed land disturbance totals 185.7 acres for the installation of new electric transmission utilities within an existing right-of-way (ROW). The total land disturbance was conservatively estimated by calculating the total footprint of all work areas depicted on the plan set. The actual limits of disturbance required at each location will depend on field conditions (e.g. existing level of disturbance and topography). However, under no conditions will any single disturbance exceed 100,000 square feet or 50,000 square feet within the protected shoreland. Therefore, it is anticipated that the Project will qualify under General Permit by Rule in accordance with Env-Wq 1503.03. An Alteration of Terrain Permit Application has been provided for informational purposes to support a determination by the Alteration of Terrain Bureau that the project qualifies for a General Permit by Rule. The majority of the required land disturbance is temporary to support the construction. Total additional impervious cover as a result of the installation of 456 pole structures is 8,175 sq. ft. Construction access will be graded only as necessary to provide adequate clearance and a stabilized surface to facilitate equipment movement along the ROW. The intention is to maintain the existing condition of access roads and not create additional impervious surface.

The Application Narrative describes project purpose and need, current site conditions, the proposed electric utility work, and construction type. Attachments include: Supporting Documentation as required, Alteration of Terrain Permitting Plans, National Grid's Environmental Guidance Document (EG-303NE), and a Construction Access Plan.

1.0 Introduction

The MVRP involves the construction of a new overhead 345 kV electric transmission line within an existing ROW between the NEP-owned Tewksbury 22A Substation in Tewksbury, Massachusetts and the PSNH-owned Scobie Pond 345 kV Substation in Londonderry, New Hampshire. The NH portion of the MVRP (Project) is the subject of this permit application. The Project extends from the Massachusetts border in Pelham, New Hampshire to the PSNH-owned Scobie Pond 345 kV Substation in Londonderry, New Hampshire. The Project proposes approximately 17.9 miles of new 345 kV transmission line (which will be known as "3124 Line") within the Towns of Pelham, Windham, Hudson, and Londonderry as well as relocation of 7.6 miles an existing NEP-owned 115 kV transmission line (known as "Y-151 line").

For purposes of discussion, the MVRP has been divided into four segments (Refer to **USGS Site Location Map**). The four segments are delineated by state, line ownership, and line alignment. ***Segment 1 of MVRP (6.5 miles in length) is located in Massachusetts and is not discussed herein.*** Segment 2 is the portion of the Project in New Hampshire to be owned and operated by NEP. Segments 3 and 4 are the portions of the Project in New Hampshire to be owned and operated by PSNH.

1.1 Project Purpose and Need

The MVRP has been designed to address reliability needs associated with the transmission lines connecting northeastern Massachusetts and southern New Hampshire. The NEP and PSNH transmission systems are integral parts of the regional power system delivering electricity to customers throughout New England. The Companies must maintain their respective systems consistent with the reliability standards and criteria developed by the North American Electric Reliability Corporation (NERC), the Northeast Power Coordinating Council (NPCC) and ISO-NE, as well as their own reliability standards and criteria. These standards and criteria expressly require the Applicants to design their systems to withstand representative contingencies under stressed conditions (e.g., summer peak or minimum load levels, generator unavailability). If the area transmission system does not have the capacity to reliably serve forecasted load under these conditions, the Companies must plan and implement system additions and upgrades to address the identified performance issues.

In 2008, transmission system planners from ISO-NE, Northeast Utilities, National Grid, and NSTAR formed a Working Group to assess transmission

system reliability in northeastern Massachusetts and southern New Hampshire, to identify needs within the study area, and to develop back-stop transmission solutions to address any identified needs. Results of the Updated Needs Assessment, published by ISO-NE in 2014, found that under certain contingencies, key elements of the transmission system in the Merrimack Valley would be overloaded or vulnerable to overloads. It found that at times of peak load, the 115 kV, 230 kV and 345 kV transmission paths between New Hampshire and Massachusetts would overload under certain contingencies, as would some connecting 115 kV and 230 kV lines in both states. The Updated Needs Assessment also found the potential for unacceptably high voltages at certain area substations under minimum load or off-peak contingency conditions. Thus, the existing transmission system does not have sufficient capacity to reliably serve southern New Hampshire and northeastern Massachusetts either at peak or off-peak load under reasonably stressed conditions.

A separate study focusing on New Hampshire and Vermont also identified potential overloads on 345 kV transmission lines between New Hampshire and Massachusetts. ISO-NE's "New Hampshire/Vermont Transmission System 2023 Needs Assessment Report" ('New Hampshire/Vermont Needs Assessment') documented potential thermal violations on the 326 345 kV line between PSNH's Scobie Pond 345 kV Substation in Londonderry, NH and NEP's Sandy Pond Substation in Ayer, MA, as well as on the 394 345 kV line between New Hampshire Transmission's Seabrook Station in Seabrook, NH and NEP's Ward Hill Substation in Haverhill, MA. This report also found that several 345 kV buses in southern New Hampshire could have unacceptably high voltages under certain contingencies during light load conditions with minimal generation on line.

The Project addresses all of these needs by providing an additional 345 kV transmission path between Massachusetts and New Hampshire. This new transmission path will alleviate overloads of 345 kV and 115 kV transmission circuits terminating at New Hampshire substations. It will also address voltage issues in the southern New Hampshire area. In doing so, it ensures continued compliance with applicable federal and regional transmission system reliability standards and criteria and maintains reliable electric service to New Hampshire and Massachusetts electric customers.

The Updated Needs Assessment and the New Hampshire/Vermont Needs Assessment both focused on the ability of the existing transmission system to reliably serve regional electric customers. The Project has been designed to address the specific needs identified in these reports, and not to support the delivery of new generation into the region.

2.0 Site Description and Existing Conditions

Existing conditions along the Project ROW are discussed herein by segment in New Hampshire.

Segment 2 (NEP)

Segment 2 includes that portion of the Project that runs from the Massachusetts/ New Hampshire border continuing north within an existing NEP ROW for 8.1 miles through the Towns of Pelham, Windham and Hudson to a location in the Town of Hudson where the Project shifts from the existing NEP ROW to an existing PSNH ROW. Segment 2 is occupied by three existing transmission lines (two overhead 230 kV transmission line and one overhead 115 kV transmission line) for a majority (7.6 miles) of the length of the NEP-owned ROW.

The ROW width along Segment 2 varies from 350 to 566.5 feet wide. In most locations, the ROW is currently cleared to nearly its full extent. Segment 2 is typical of an existing utility ROW, with both upland and wetland areas maintained in accordance with National Grid's Vegetation Management Plan. Wetlands within the ROW generally consist of scrub-shrub and emergent vegetative cover types, with a relatively small area of forested wetlands along un-cleared borders of the ROW boundary. Golden Brook, Beaver Brook, three other unnamed perennial streams and nine intermittent streams intersect the Project ROW along Segment 2. In addition to the ROW crossing, Beaver Brook also comes within close proximity to the western edge of the Project ROW in one location in Windham. Additionally, the Project ROW crosses Golden Brook Prime Wetland and is adjacent to (west of) Little Island Pond Prime Wetland. The NHNHB has identified records of four threatened or endangered plant species, two threatened or endangered vertebrate species, and one endangered invertebrate species intersecting Segment 2.

Land use adjacent to Segment 2 consists of predominantly residential areas, as well as forested areas, wetlands, and open fields. The ROW crosses four state maintained highways (Route 38, Route 111A, Route 128 and Route 111) and multiple local roadways.

Segment 3 (PSNH)

Segment 3 includes that portion of the Project where ownership of the new 3124 Line transitions from NEP to PSNH, beginning north of Griffin Road in Hudson and running northwesterly within the existing PSNH ROW for approximately 3.9 miles. For this distance, the NEP ROW runs parallel to the

PSNH ROW. In some locations, the NEP ROW will be utilized to gain construction access to the PSNH ROW. The PSNH ROW in Segment 3 is approximately 220 feet wide and contains one existing 345 kV overhead transmission line.

Approximately 130 feet of the 220-foot wide ROW has been cleared and is maintained for the existing 345 kV transmission line. The active portion of the ROW consists of maintained scrub-shrub upland communities with scrub-shrub and emergent wetlands scattered throughout. PSNH conducts vegetation maintenance along Segment 3 in accordance with *Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire*. Several forested wetlands exist within the un-cleared eastern edge of the ROW.

The ROW intersects Howard Brook, Chase Brook, Nesenkeag Brook and two other unnamed perennial streams as well as five intermittent streams. Additionally, several large emergent wetland systems are present along this segment. The NHNHB has identified records of one endangered vertebrate species in Londonderry at the transition from Segment 3 to Segment 4. Land use surrounding the ROW consists of predominantly residential areas with some forested and agricultural areas interspersed throughout. The ROW crosses one state maintained highway (NH Route 102) and multiple local roadways.

Segment 4 (PSNH)

Segment 4, utilizes that portion of the PSNH ROW that diverges from the NEP ROW. It extends 5.9 miles northeasterly towards PSNH's Scobie Pond 345 kV Substation located at 6 Brewster Road in Londonderry, New Hampshire. The ROW in this Segment contains up to five existing overhead transmission lines and, in some locations, additional overhead distribution circuits. The number and arrangement of the existing facilities within the ROW varies over its total length. The ROW varies in width from 460 feet to 635 feet and is cleared except for an approximately 50-foot strip of forested land running down the center of the ROW.

The ROW intersects one unnamed perennial stream and Beaver Brook (classified as 2nd order in this Segment), and six intermittent streams that are tributaries to either Nesenkeag Brook or Beaver Brook, as well as several large emergent wetland systems. The NHNHB has identified records of two threatened or endangered vertebrate species intersecting this segment of the ROW.

Land use adjacent to this Segment of the ROW consists of predominantly residential areas, as well as forested areas and wetlands. The ROW crosses Interstate 93, two other state maintained highways (Route 28 and Route 128) and multiple local roadways.

3.0 Proposed Project Description

The Project involves construction of a new overhead 345 kV transmission line, which will be known as the 3124 Line, and will be located within an existing electric transmission ROW that connects NEP's Tewksbury 22A Substation in Tewksbury, Massachusetts to PSNH's Scobie Pond 345 kV Substation in Londonderry, New Hampshire. For purposes of this filing, the Project is defined as beginning at the Massachusetts/New Hampshire border and continuing to Scobie Pond 345 kV Substation. The 3124 Line is approximately 17.9 miles in length in New Hampshire and will be located in the Towns of Pelham, Windham, Hudson, and Londonderry. NEP will own 8.1 miles of the new line in Pelham, Windham, and Hudson (Segment 2). PSNH will own 9.8 miles of the new line in Hudson and Londonderry (Segments 3 and 4).

To incorporate the new 3124 Line in the majority of Segment 2, the existing NEP-owned Y-151 line (overhead 115 kV transmission line) will need to be relocated within the western edge of the existing NEP ROW and the new 3124 Line will be installed in the original Y-151 alignment. In Segment 3, the new 3124 Line will be installed within the eastern edge of the existing PSNH ROW. In Segment 4, the new 3124 Line will be installed within the center of the existing PSNH ROW. The following describes the Project in greater detail broken out by segment.

Segment 2 (NEP)

Segment 2 of the Project extends from the Massachusetts/New Hampshire border for 8.1 miles to a location in the Town of Hudson where the Project transitions from NEP to PSNH ownership (Refer to Sheets 30 to 64 of **Attachment B**). The new 3124 Line will be installed within an existing NEP-owned ROW located within the Towns of Pelham, Windham, and Hudson.

Currently, 7.6 miles of this Segment contains three existing overhead transmission lines designated as the O-215, Y-151 and N-214, respectively from west to east. The proposed new configuration for this section of Segment 2 from west to east is: Y-151, O-215, 3124, and N-214. To incorporate the new 3124 Line, a series of 115 kV delta davit arm structures will be erected approximately 28.5 feet from the western edge of the ROW. Once completed,

the Y-151 line would be relocated onto this new alignment. The existing Y-151 assets will then be removed from the ROW, creating space for a series of new 345 kV steel H-Frame structures intended to support the new 3124 Line. The new 3124 Line will be located on the centerline of the existing ROW, approximately 91.5 feet to the east of the existing O-215 line and approximately 91.5 feet to the west of the existing N-214 line. At a point north of Bockes Road in Hudson, the Y-151 line diverges from the Project ROW and relocation of this line is no longer part of the Project. The new 3124 Line will maintain its alignment within the center of the ROW, between the O-215 and N-214 lines, for the remaining 0.6 miles of Segment 2 until the Project transitions to PSNH ownership.

Currently, 173 new structures associated with the new 3124 Line and relocated Y-151 line are proposed in this Segment. Depending on the structure type, structures will be either direct embedded or constructed on a caisson foundation. The average height of the 3124 Line structures is approximately 80 feet above grade. The average height of the relocated Y-151 line structures is approximately 75 feet above grade.

In addition to structure installation and relocation, improvements to existing ROW accessways are proposed at four separate wetland crossings in order to provide a safe and stable means of travel for work crews during construction of the project and for future maintenance and repair activities.

Segment 3 (PSNH*)*

Segment 3 of the Project is 3.9 miles long and spans from the point of ownership transition in Hudson to a point in Londonderry where the new 3124 Line will change direction (Refer to Sheets 64 to 79 of **Attachment B**). The 3124 Line will be installed within the un-cleared eastern edge of an existing PSNH ROW.

As noted previously, there is one existing overhead 345 kV transmission line that currently occupies this portion of the ROW along this entire Segment. The new 3124 Line will run parallel to this existing transmission line. In some locations along this Segment, the adjacent NEP ROW will be utilized to gain construction access to the PSNH ROW. The Project design for this Segment consists of 37 new 345 kV steel H-frame structures. Structures will be either direct embedded or constructed on a caisson foundation. The average structure height of the 3124 Line structures is approximately 90 feet above grade. No permanent wetland crossings for accessways are currently proposed along this Segment.

Segment 4 (PSNH)

Segment 4 of the Project begins from the point that the PSNH ROW diverges from running parallel with the NEP ROW and continues to PSNH's Scobie Pond 345 kV Substation (Refer to Sheets 79 to 102 of **Attachment B**). This Segment of the Project is 5.9 miles long and located entirely within the Town of Londonderry. In this Segment, the new 3124 Line will be installed down the center of the existing ROW which has not been previously cleared.

As noted previously, this Segment contains several existing overhead transmission lines and, in some locations, additional overhead distribution circuits. No reconfiguration of the existing transmission or distribution lines is required in this Segment. The Project design for this Segment consists of 51 new 345 kV steel H-frame structures. Structures will be either direct embedded or constructed on a caisson foundation. The average structure height of the 3124 Line structures is approximately 90 feet above grade. No permanent wetland crossings for accessways are currently proposed along this Segment.

4.0 Type of Construction

Transmission Line Construction Activity Sequence

The new 3124 Line and required line reconfigurations will be constructed utilizing conventional overhead electric transmission line construction techniques. The transmission line will be constructed in a progression of activities that will typically proceed as follows:

- Establish marshalling yard and laydown area locations;
- Removal of ROW vegetation and mowing in advance of construction;
- Installation of soil erosion and sedimentation controls;
- Construction of access improvements, as needed
- Construction of work pads and pulling sites;
- Removal and disposal of existing transmission line components;
- Installation of foundations and structures;
- Installation of conductor and shield wire;
- Restoration of the ROW; and
- Testing and Commissioning.

Removal and disposal of existing transmission line components will be necessary only in Segment 2 as existing 115 kV Y-151 line assets will need to be removed from the ROW prior to the new 3124 Line assets being installed.

Each of the transmission line construction activities listed above is described in detail in the following sections.

Establish Marshalling Yard and Laydown Area Locations

Marshalling yards, as the term applies to the Project, are defined as off-ROW locations generally consisting of existing open areas approximately three to five acres in size. Marshalling yards will be selectively located off-ROW along the length of the Project and utilized for material and equipment storage, work force parking and field offices. The Applicants will seek to establish marshalling yards in previously disturbed areas which will be selected, in part, because they will have little to no environmental or community impacts. Marshalling yards will typically be located away from residential areas and will be of sufficient size to accommodate necessary vehicles and equipment and will have a means to restrict access. Typically, marshalling yards will not require tree clearing or extensive grading, will not require any disturbance to wetlands or waterbodies, and are often located on land under control of the Applicants or their contractors, by lease agreement or otherwise. Sites typically chosen include parking lots, gravel pits, and industrial sites.

As necessary, construction BMPs will be implemented at the marshalling yards in accordance with National Grid's Environmental Guidance (EG-303NE) Manual (see Attachment C) and/or the *New Hampshire Department of Resources and Economic Development Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire* to ensure no sediment or erosion from the marshalling yards occurs onto public ways or into any jurisdictional wetlands or water bodies.

The location of marshalling yards will be determined by the Applicants or their contractors prior to construction, and therefore, are not specifically identified in the Application. As part of this Application, and to the extent any other post-decision authorizations are necessary, the Applicants request that the Committee delegate authority to NHDES to issue such approvals. As the need for such post-decision approvals arise, the Applicants will submit the necessary information to NHDES and will identify the appropriate BMPs to be utilized at an individual marshalling yard location and how any potential environmental impacts will be mitigated.

Laydown areas, as this term applies to the Project, are located within the Project ROW and are used for the temporary staging of materials and swamp matting prior to installation. Laydown areas may also be used for equipment staging when the equipment is not in use. Laydown areas within the ROW have been

selected in relatively level upland areas. In most cases, the potential laydown areas have been previously disturbed and have exposed soils or modified vegetation such as a maintained field. If minor grading is required or if soil disturbance occurs in any proposed laydown areas, the laydown area will be restored to pre-existing topography and seeded, as appropriate.

Laydown areas have been designated within the Project ROW and are depicted on the Alteration of Terrain Permitting Plans in Attachment B. Additional laydown areas may be identified, as necessary, during the course of construction. As part of this Application, and to the extent any other environmental approvals are necessary, the Applicants request that the SEC delegate authority to NHDES to issue such approvals.

Removal of Vegetation and Mowing in Advance of Construction

In some areas tree removal, tree pruning, brush cutting or mowing may be required prior to construction. These activities will be limited to what is necessary to provide access to proposed structure locations, to facilitate safe equipment passage, to provide safe work sites for personnel within the ROW and to maintain safe clearances between vegetation and transmission line conductors. Vegetation management-related activities will be carried out in accordance with NEP and PSNH's BMPs.

Tree removal operations, where required, will include the removal of all tall-growing woody species within the targeted portions of the ROW. In Segment 2, any tree removal or pruning will be limited to the western edge of the ROW. In Segment 3 an approximately 90 foot wide area along the entire eastern edge of the ROW will be cleared. In Segment 4, an approximately 50 foot wide area in the middle of the ROW will be cleared.

Generally, trees will be cut close to the ground, leaving the stumps and roots in place to minimize ground disturbance. Stumps will only be removed where required to facilitate structure installations, access, or a safe working environment. Trees are the property of the landowner; and the Applicants will coordinate with each landowner on tree disposal prior to commencing clearing operations. Trees may be stacked at the edge of the ROW or removed from the ROW, depending upon landowners' preference. In all cases, logs and slash will be removed from wetland areas.

Small trees and shrubs within the ROW will be mowed, as necessary, with the intent of preserving roots and low-growing vegetation to the extent practical. Where the ROW crosses streams and brooks, low-growing vegetation along the stream bank will be selectively cut to preserve a riparian buffer that will minimize the disturbance of stream bank soils and reduce the potential for erosion and

sedimentation. In addition, the Applicants will preserve low-growing vegetation in accordance with regulatory guidance or permit conditions, as necessary, to protect rare, threatened, and endangered (RTE) species or habitats. This Project will span more than one growing season; therefore, additional mowing of accessways and work pads may be required as vegetation re-generates in these locations.

Tree removal equipment will utilize existing accessways which may be improved as necessary to facilitate a safe and productive working environment while minimizing overall disturbance. The boundaries of wetlands will be clearly marked prior to equipment mobilization to prevent unauthorized vehicular encroachment into wetland areas. Forestry equipment will be operated from upland areas. Trees within wetland areas that are inaccessible by equipment staged in upland areas will be removed manually.

Impacts to archaeological resources are not anticipated to result from vegetation removal activities. Archaeological resources are not present within Segments 3 and 4, where the majority of clearing will occur. Segment 2, which is maintained to its full width presently, will have minimal vegetation management work done prior to the start of construction and therefore should not impact archaeological resources.

Installation of Soil Erosion and Sedimentation Controls

Soil erosion and sedimentation controls will be implemented as depicted on Alteration of Terrain Permitting Plans included in Attachment B and in accordance with Applicants' BMPs. The environmental controls shown on the Alteration of Terrain Permitting Plans may need to be supplemented due to seasonal work, the work methods proposed and to comply with any additional permit requirements. Any change to established environmental controls in a particular work area would require the approval of the Project's environmental monitor(s).

A Construction Access Plan has been developed that contains additional BMPs for Project areas that have a higher potential to impact water quality, due mostly to steep slopes and proximity to water resources. The Construction Access Plan is found in Attachment D. Temporary erosion and sedimentation controls will be installed to prevent impacts to water quality resulting from land disturbance. In general, the installation of erosion and sedimentation controls will proceed in parallel with the construction of accessway improvements. Temporary and permanent stabilization will occur in accordance with Applicants' guidance documents and Project permits.

Stormwater management controls will be described in the Stormwater Pollution Prevention Plan (SWPPP) for the Project to be completed prior to construction in accordance with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP). Stormwater controls will be installed,

inspected, and maintained during the course of construction in accordance with the requirements of the CGP.

Construction of Accessways, Improvements and Maintenance

Accessways are required within the ROW to access work pads, pulling sites and laydown areas during construction. Construction contractors will use existing accessways, to the extent practical, and will establish new accessways where necessary. Accessways for the Project are depicted on the Alteration of Terrain Permitting Plans.

Existing Accessways

Existing accessways may require maintenance or upgrading to support the proposed construction activities. For example, widening of existing accessways, grading, and placement of clean gravel or trap rock may be necessary to stabilize and level the roads for construction vehicles. Crushed stone aprons will be used at accessway entrances to public roadways to mitigate the potential for construction vehicles to track soil onto public streets and to minimize the migration of soils off-site. Exposed soils on accessways will be wetted and stabilized as necessary during construction to suppress fugitive dust. Accessway improvements and/or maintenance will be carried out in compliance with the conditions and approvals of the appropriate regulatory agencies.

Permanent Upgrades to Existing Accessways along the ROW

Accessway improvements in upland areas will remain in place following construction. Road surfaces will be left as gravel or stone. Water bars and other BMPs will be installed as needed to maintain pre-existing drainage patterns and prevent erosion. The Construction Access Plan contained in Attachment D contains additional BMPs to be employed in areas with steep slopes adjacent to water resources. Edges/shoulders of roads will be stabilized with loam and seeded with a native seed mix, as needed. Crushed stone aprons placed at the intersection of an access road with a public road will remain in place except in agricultural areas, lawns and on private property if the property owner wishes to have the stone apron removed. Gates will be installed to prevent un-authorized access as needed, and with permission of the landowner.

Temporary Accessways to Work Pads and Laydown Areas

In some locations, accessways will be temporary. For temporary construction access to work pads, required work will be limited and will mostly consist of

vegetation maintenance (e.g. mowing) to facilitate access. Temporary accessways to structures will follow the contour of the existing land formation and will have been designed to avoid environmentally sensitive areas to the greatest extent practicable. Temporary construction accessways will be restored to pre-construction condition. Project environmental monitors will oversee restoration activities.

Temporary Accessways in Wetlands and Streams

Where upland access is not available, access across wetlands and streams will be accomplished by the temporary placement of swamp mats. Swamp mats typically consist of timbers that are bolted together and placed over wetland areas so as to distribute equipment loads and minimize disturbance to the wetland and soil substrates. Temporary swamp mat accessways will be removed following completion of construction. Care will be taken to avoid any deposition of soil and other debris into wetlands. If rutting, compaction, or other impacts to the wetland substrate occur during construction, these areas may require minor grading to restore preexisting topography prior to stabilization. Disturbed areas may be seeded with a native wetland seed mix, if necessary. Exposed soils at risk of erosion will be stabilized with straw, tackifier or erosion control blankets as necessary. The use of swamp matting may be reduced during specific ground conditions where the risk of soil disturbance would be minimal (dry or frozen ground).

Permanent Accessways in Wetlands

Four new permanent wetland crossings are proposed, as shown on the Alteration of Terrain Permitting Plans. The crossings have been designed to maintain hydrology of adjacent wetlands and minimize impacts to the natural system to the greatest extent feasible. Stone fords or similarly functioning pre-fabricated crossings have been proposed at permanent wetland crossings, where practical, to minimize wetland impacts. The selected types of permanent crossings allow for vegetation to grow between gaps in the stone or concrete and allow water to seasonally flow over the crossing. The selected permanent crossings do not restrict wetland hydrology.

Additional Off-ROW Accessways

Proposed off-ROW accessways are shown on the Alteration of Terrain Permitting Plans. If additional accessways are needed, the Applicants will select locations that have been previously disturbed, to the extent practicable. As part of this Application, NEP and PSNH request that the Committee delegate the authority to NHDES to issue such approvals. Once the off-ROW accessways are identified, the Applicants will submit the necessary information to NHDES seeking authorization for these additional accessways.

Construction of Work Pads and Pull Pads

Upland work pads and pull pads will be created through minor grading or the addition of gravel or crushed stone to provide a level work surface for crews, equipment, and materials. Work pads are generally 100 feet by 100 feet. In the majority of cases, the location of work pads is centered at the structure location. Pull pads are typically rectangular areas located 300 feet ahead and back of structure locations and are approximately100 feet in width. Most pull pads are located at angle structures and dead ends. Pulling equipment will generally be set up at a 1:3 distance or greater from the highest wire attachment point on the pulling structure as called for in the Institute of Electrical and Electronics Engineers (IEEE) Standard 524.

In certain locations for the Project, work pads were designed off center or pull pad sites were shifted to avoid potential impacts to environmentally sensitive areas. In other locations, the size of works pads and pull pads were reduced to avoid or minimize impacts to wetlands. In locations where wetlands and environmentally sensitive areas cannot be avoided, work pads and pull pads will be created through the temporary placement of swamp mats.

Once construction is complete, the work pad and pull pads will be restored to their pre-construction condition. Restoration efforts, including removal of construction debris and materials, minor grading to match adjacent contours, and stabilization of disturbed soil, will be completed following the construction operations. All disturbed areas around structures and other graded locations will be seeded with an appropriate seed mixture and/or mulched to stabilize the soils in accordance with applicable regulations. In wetlands, swamp mats installed for work pads and pull pads will be removed in their entirety, including pieces that may have broken off during construction. Disturbed areas will be immediately restored and stabilized. Care will be taken to avoid any deposition of soil and other debris into wetlands. If rutting, compaction, or other impacts to the wetland substrate have occurred during construction, these areas may require minor grading to restore preexisting topography prior to stabilization. In disturbed areas, seeding with a native wetland seed mix may be necessary. Exposed soils at risk of erosion will be stabilized with straw, tackifier or erosion control blankets as necessary, and according to the BMPs. Temporary erosion and sediment controls will be removed following the stabilization of disturbed areas.

Removal and Disposal of Existing Transmission Line Components

Construction of the Project will require the removal of approximately 86 existing structures in Segment 2, including wood H-frame structures, wood three pole suspension pull-off structures and wood three pole dead-end structures. Those structures and components that are not re-used for the Project will be removed or salvaged. As much of the removed material as possible will be recycled. Those components not salvaged and any debris that cannot be recycled will be removed from the ROW to an Applicant approved off-site disposal facility. Handling of such materials will be performed in compliance with applicable laws and regulations.

The removal of wood pole structures will involve disassembling the cross-arm, insulator, and hardware structure elements first. Once those elements have been removed, the wood poles will be removed completely. The full length of the wood pole will be removed, inclusive of the embedded section in upland areas only. Once the wood pole has been completely removed, the remaining hole will be backfilled with common backfill. The removal of wood poles in wetland areas will be reviewed on a case-by-case basis to determine if greater disturbance can be avoided by allowing embedded sections of the pole to remain in the wetland. In the majority of locations, the existing wood pole will be cut flush with the existing grade. Where a wood pole cannot be cut flush with existing grade, the embedded section of the pole as well as a four foot section of pole above ground will remain in place to reduce tripping hazard risks and the potential for damage to equipment during future maintenance activities.

Removals of existing transmission line components are not required for Segments 3 and 4.

Installation of Foundations and Structures

Proposed structures include steel pole H-frame, single pole and three pole structures with either direct embedment or caisson foundations.

Excavation for direct embedment structures will be performed using an excavator or soil auger. Excavations will range from approximately five to fifteen feet in depth and of varying diameter, typically three to five feet, based upon the diameter of the base of the steel pole. A steel corrugated metal pipe will be placed vertically in the hole. Direct embed steel pole structures will be installed by placing the bottommost steel pole section or sections into the corrugated metal pipe with suitable backfill material, then assembling the upper portion of the steel pole structure. Where rock is encountered, rock hammering or drilling will be used to extend the excavation to the appropriate depth.

For those structures with bolted flange connections, the assembly of the uppermost section will vary by structure type. Generally speaking, for a single pole structure, the second and third (if necessary) vertical segments of the steel pole will be bolted to the lowest steel pole element, the appropriate structure arms will be installed and lastly the insulators and hardware to connect the conductors to the structure will be attached. In the case of H-Frame structures, a similar process will occur with two vertical poles being erected followed by the installation of the interior cross-arm and outboard arms, then the insulators and associated hardware will be affixed to the cross-arms at the appropriate attachment points.

For those steel pole structures featuring slip joint connections, the assembly of the uppermost sections will involve fitting the second and possibly third and fourth steel pole segments over the smaller diameter top of the lower steel pole element. The appropriate structure arms will be installed and lastly the insulators and hardware will be attached.

Three pole dead-end and angle structures in Segments 3 and 4 are not self-supporting and will require the use of structural guying. This is consistent with other similar existing structures within the ROW. These guys will be affixed to the steel pole structure and anchored to the ground via the use of excavated log anchors (aka dead-men) in upland areas. In wetlands and other environmentally sensitive areas, screw anchors will be utilized to minimize ground disturbance.

NEP dead-end and angle structures and PSNH two pole dead-end H-Frame structures will require reinforced concrete caisson foundations. These foundations will typically be 20 to 30 feet deep, with diameters of between 6 and 10 feet. Caissons will be constructed by drilling a vertical shaft, installing a permanent casing, lifting a steel reinforcement cage into place via a crane, placing steel anchor bolts, pouring concrete, and backfilling as needed. Steel pole elements will then be lifted into place with a crane and built out according to structure type. Should soil conditions, structure loads, or a combination of those considerations warrant, the review of alternate foundations types will be undertaken to ensure that the most appropriate and cost efficient foundation type is being utilized.

Excavated material will be temporarily stockpiled next to the excavation; however, this material will be managed to prevent run off into any resource areas. If the stockpile is in close proximity to wetlands, it will be enclosed by staked straw bales or other erosion and sedimentation controls. Additional controls, such as watertight mud boxes may be used for saturated stockpile management in work areas in wetlands (i.e., swamp mat platforms) where sediment-laden runoff would pose an issue for an adjacent wetland. Following the backfilling operations, excess soil will be spread over upland areas or removed from the site in accordance with each Applicant's policy.

In locations where rock is encountered, the foundation hole will be excavated to the rock depth and the contractor will use approved methods to remove the rock including drilling, ripping and hoe ramming to achieve the required depth.

In certain areas along Segments 3 and 4, blasting may be employed by PSNH where occasional shallow-to-bedrock soil depths and subsurface boulders are encountered that cannot be removed by mechanical means. For transmission line construction any blasting activity, where required, will be limited to the small volume of material needed to be removed to set and plumb the pole structures.

No adverse effects from blasting activity upon either sensitive natural resources or adjacent property owners are anticipated due to the small charges required for this activity. A project specific blasting specification will be included in the requirements for contractors. If a contractor is required to employ blasting during the execution of the work, the contractor must comply with PSNH's standards, as well as all applicable local, state, and federal permitting requirements regarding blasting and the safe handling of explosives. All blasting will be performed by qualified personnel who are licensed by the applicable local, state, and/or federal agencies.

Dewatering may be necessary while excavating or placing concrete for foundations. At all times, dewatering will be performed in accordance with Applicants' guidance documents as well as Project permits and approvals.

Installation of Conductor and Shield Wire

Following the erection of transmission structures and installation of the insulator assemblies, conductors, shield wire, and fiber optic ground wire (OPGW) will then be installed using stringing blocks, wire pulling ropes, and wire stringing equipment. Once the stringing blocks are in place, pulling ropes will be installed by: driving the ropes from structure to structure, walking the ropes from structure to structure or via helicopter.

Once installed, the pulling rope is attached to wire stringing equipment and used to pull the conductors from a wire reel on the ground through stringing blocks attached to the structure. Once the conductor or shield wire has been installed, the wire pulling equipment is then used to sag the wire to obtain the specified conductor tension.

During the stringing operation, temporary guard structures or boom trucks will be placed at road and highway crossings and at crossings of existing utility lines. These guard structures are used to ensure public safety and uninterrupted operation of other utility equipment by keeping the wire off the traveled way and away from

other utility wires at these crossing locations. Shield wires and OPGW will be installed on top of the structure in a similar manner. Helicopters may be used for certain activities during the stringing operation. Swamp mats will be used when temporary guard structures must be located within wetlands.

Restoration of the ROW

Temporary work areas and pre-construction drainage patterns will generally be restored to their pre-existing condition. Restoration efforts, including removal of construction debris, minor grading, and stabilization of disturbed soil, will be completed following the construction operations. Ditches, roads, walls, and fences will generally be restored to their former condition. All disturbed areas around structures and other graded locations will be seeded with an appropriate seed mixture and/or mulched to stabilize the soils in accordance with applicable regulations. Regulated environmental resource areas that are temporarily disturbed by construction will be restored in accordance with applicable permit conditions to pre-existing conditions under the supervision of Project environmental monitors. Temporary sediment control devices will be removed following the stabilization of disturbed areas.

Testing and Commissioning

Following the installation and prior to energization, an extensive electrical testing process begins to confirm that each piece of equipment and all protection and control systems are installed and operating in accordance with Project specifications. The energization is a sequential process that energizes the equipment and facilities in a logical order and coordinates with the system and equipment requirements. Transmission line or equipment outages will be necessary and will require coordination with local control centers and ISO-NE. No interruption to distribution customers is anticipated.

Modifications at Scobie Pond 345 kV Substation

All construction-related activities will occur within the existing footprint of the substation and will begin with survey to lay out the proposed substation structures followed by installation of foundations for the terminal dead end structure, switch stands, coupling capacitor voltage transformer (CCVT) stands, circuit breakers and bus supports. Small excavators will be utilized to excavate the holes for the foundations. The bottom of the excavations are then levelled and compacted at the appropriate grade prior to building the form work required for the footings and piers. Once form work is complete and anchor bolts are in

place, concrete is placed in the forms. The forms are stripped on the following day and the new foundation is backfilled with the soil removed from the initial excavation. Foundation construction will proceed in this fashion until all foundations are complete. Additional excavation to install conduits \ for control and power cables will also occur, with the cables to be installed at later during construction. Once conduit installation is complete, the contractor will install a grid of copper wire at about 20" below grade to provide grounding for the substation. Each piece of equipment in the substation is connected to this ground grid. The contractor then brings in a series of processed gravels and stone to raise the substation surface to finished grade.

Next, cranes and man lifts will be used to erect the steel terminal structure, equipment stands and bus supports, followed by installation of the switches and CCVTs. The contractor will then assemble the 345 kV circuit breakers on their new foundations. These breakers will be adjusted per the manufacturers' recommendations, tested and filled with SF6 insulating gas. Once all of the equipment is installed, the contractor can make up final conduit connections to the equipment, then pull in the power, control and communications cables from the control house to the electrical equipment in the yard. At the same time, the fabrication and installation of the aluminum pipe buswork will be completed.

The line construction contractor can pull in the new 345 kV line conductor to the new terminal structure and complete connections to the line disconnect switch shortly after the structure is erected. This work will be carefully coordinated with the substation construction contractor.

Several new relay and control cabinets will be installed in the existing control house and pull in various cables to interconnect the cabinets to each other and to other control cabinets in the control house, along with the cables previously pulled to the new equipment in the yard.

Following the construction of the major components, the Applicants will begin an intensive process of high voltage electrical testing as well as continuity testing of each and every cable connection that has been installed, followed by functional testing of the equipment to ensure that it performs as designed.

The contractor will then need to connect the new 345 kV bus work to the existing 345 kV bus work. After these connections are made and tested, the contractor will begin the commissioning process, which systematically energizes and tests each component of the new line terminal. After all components are energized, a series of final "load checks" are performed to ensure that the system performs as expected under actual load. The line disconnect switch can then be closed to complete the circuit to Tewksbury. Additional checks are made at this time to verify functionality. The new line and terminal are declared "in service" after completing these final checks.

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City, State, ZIP+4®: 3 North Lowell Road
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City, State, ZIP+4®: Town of Londonderry
268B Mammoth Road
Londonderry, NH 03053

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Street and Apt. No: Town Clerk/Tax Collector
City, State, ZIP+4®: Town of Pelham
6 Village Green
Pelham, NH 03076

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Street and Apt. No: Town of Hudson
City, State, ZIP+4®: 12 School Street
Hudson, NH 03051

PS Form 3800, A

Pre-Application Meeting Minutes

Meeting Notes

Place: NH Department of Environmental Services

Date: February 18, 2015 Notes Taken by: Sherrie Trefry, VHB

Project #: 12650.01 Re: Alteration of Terrain Pre-application Meeting

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ATTENDEES Ridge Mauck, NHDES Alteration of Terrain Bureau; Laura Games, PSNH; and Sherrie Trefry and Allary Braitsch, VHB

---

1. Project Description and Need
    a. LG described the project and project need
    b. ST explained the amount of tree clearing required for the project in the individual project segments
    c. Provided RM with USGS Overview Map and USGS Map Series

2. Land Disturbance Discussion
    a. Land Disturbance Overview – AB
        i. Reviewed the project plans and the type of land disturbing activities required for line construction referencing the prepared memo
            1. Pull sites
            2. Work pads
            3. Road construction upgrades
    b. RM stated that AoT's main concern is maintaining natural flow patterns and hydrology during and post-construction.
        i. RM had questions regarding how Best Management Practices (BMPs) would be indicated
        ii. ST responded that temporary erosion and sediment controls would be added to the plans
        iii. RM indicated that in some locations roadside ditches with level spreaders may be required in discrete small areas along proposed access roads
        iv. RM indicated that if BMPs were indicated by plan that detailed hydraulic analysis may not be necessary
        v. ST questioned whether or not a permit would be required to necessitate submittal to AoT with outlined BMPs and/or detailed hydraulic studies

vi. RM stated that he required more information to understand the scope of land disturbance and may need a compilation of disturbances broken out by subwatershed

vii. AB reviewed examples of land disturbance areas that would require the most work including the area near Golden Brook Prime Wetland (<60,000 SF) and an area of road construction upgrades

viii. RM said that the land disturbance areas could be treated as separate locations to meet the general permit by rule criteria after reviewing the impact areas in more detail and discussing the size of the land disturbance if taken cumulatively.

3. Permitting Overview

i. ST explained that the project will be permitted through the SEC process and the anticipated filing date is June 6th

ii. RM indicated that there would be no submittal to AoT but the project team should consider what may be needed for presentation to the SEC and what would be required during the execution of the work so that problems could be avoided.

iii. LG mentioned that we need to file for the Construction General Permit ("CGP") with the EPA and ST said that a Stormwater Pollution Prevention Plan would be prepared for the Project to satisfy requirements of the CGP.

iv. RM indicated that he would contact Mike Iacopino at SEC to determine the best way to document that a permit would not be required. RM will get back to VHB and PSNH regarding the best way to proceed.

Waiver Requests

ALTERATION OF TERRAIN WAIVER REQUEST FORM

R.S.A. 485-A:17
Department of Environmental Services - Water Division
29 Hazen Drive, PO Box 95
Concord, New Hampshire 03302-0095

Application Date: 07/13/2015

File Number (DES use):

Merrimack Valley Reliability Project
Name of Project

Existing Transmission Line ROW
Map & Lot Number

Pelham, Windham, Hudson, Londonderry
Location of Project (town)

Hillsborough and Rockingham
County

Other
Project Type

1. Owner Information

NEP and PSNH
Name

laura.games@eversource.com
Email address (optional)

Joshua Holden (NEP) and Laura Games (PSNH)
Contact Name

(781) 907-3648 (NEP) and (603) 634-2906 (PSNH)
Telephone Number

40 Sylvan Rd, 3rd Floor (NEP), 13 Legends Dr, (PSNH)
Mailing Address

Fax Number

Waltham (NEP), Hooksett (PSNH)
City/Town

MA 02451-1120 (NEP), NH 03106 (PSNH)
State Zip Code

2. Person Requesting Waiver(s)

Vanasse Hangen Brustlin, Inc.
Name

strefry@vhb.com
Email address (optional)

Sherrie Trefry
Contact Name

(603) 391-3951
Telephone Number

2 Bedford Farms Drive, Suite 200
Mailing Address

(603) 518-7495
Fax Number

Bedford
City/Town

NH 03110
State Zip Code

3. Waiver Request(s)

Rules	Brief Description of Rules
Env-Wq 1504.09	Stormwater Drainage Report, Soils Mapping & Plans

Explanation of Request:	A waiver is being requested from the requirements to prepare a Stormwater Drainage Report, Drainage Area Plans and Hydrologic Soil Group Plans because the individual disturbance areas for the overall project are disconnected. New impervious areas are limited to transmission line structures and, therefore, stormwater treatment practices are not proposed.
Permanent or Temporary:	Permanent
Explanation of Alternative:	Not Applicable
Compliance with Env-Wq 1509.04:	The proposed project involves temporary land disturbance to construct a new overhead transmission line. Site specific soil mapping and drainage analyses would provide no benefit to the public or the environment due to the disconnected nature of the impervious areas. NRCS web soil survey data will be used to provide a general understanding of the types of soils that may be encountered during construction activities such that appropriate erosion control BMPs can be selected. Given that the site is previously disturbed by the installation of the existing electric facilities and other land uses, the NRCS web soil survey data, topographic information, and results of field analyses are anticipated to provide an adequate level of information necessary to construct the Project without impacting water quality as would strict compliance with the rule.

4. Signature(s) Required

(1) The information provided is true, complete, and not misleading to the knowledge and belief or the signer; and

(2) The signer understands that any waiver granted based on false, incomplete, or misleading information shall be subject to revocation.

Signature (owner)

Joshua Holden (NEP), Laura Games (PSNH)
Name (owner)

Signature (person requesting waiver)

Sherrie Trefry (VHB)
Name (person requesting waiver)

100 Year Floodplain Report

Project **Merrimack Valley Reliability Project** Project # 12650.00

Location **Pelham, Windham, Hudson & Londonderry**

Calculated by **M. Verostick** Date **6/30/2015**

Checked by _____ Date _____

Title **100 Year Flood Plain Cut / Fill Calculation**

Computations

Pelham

Structure #	Existing Ground Elevation	Floodplain Elevation	Fill Depth	Impact Area	Fill Volume
33	130	134	4 FT	15 SF	60 CF
34	126	134	8 FT	15 SF	120 CF
98	126	134	8 FT	25 SF	200 CF
99	130	134	4 FT	25 SF	100 CF

Londonderry

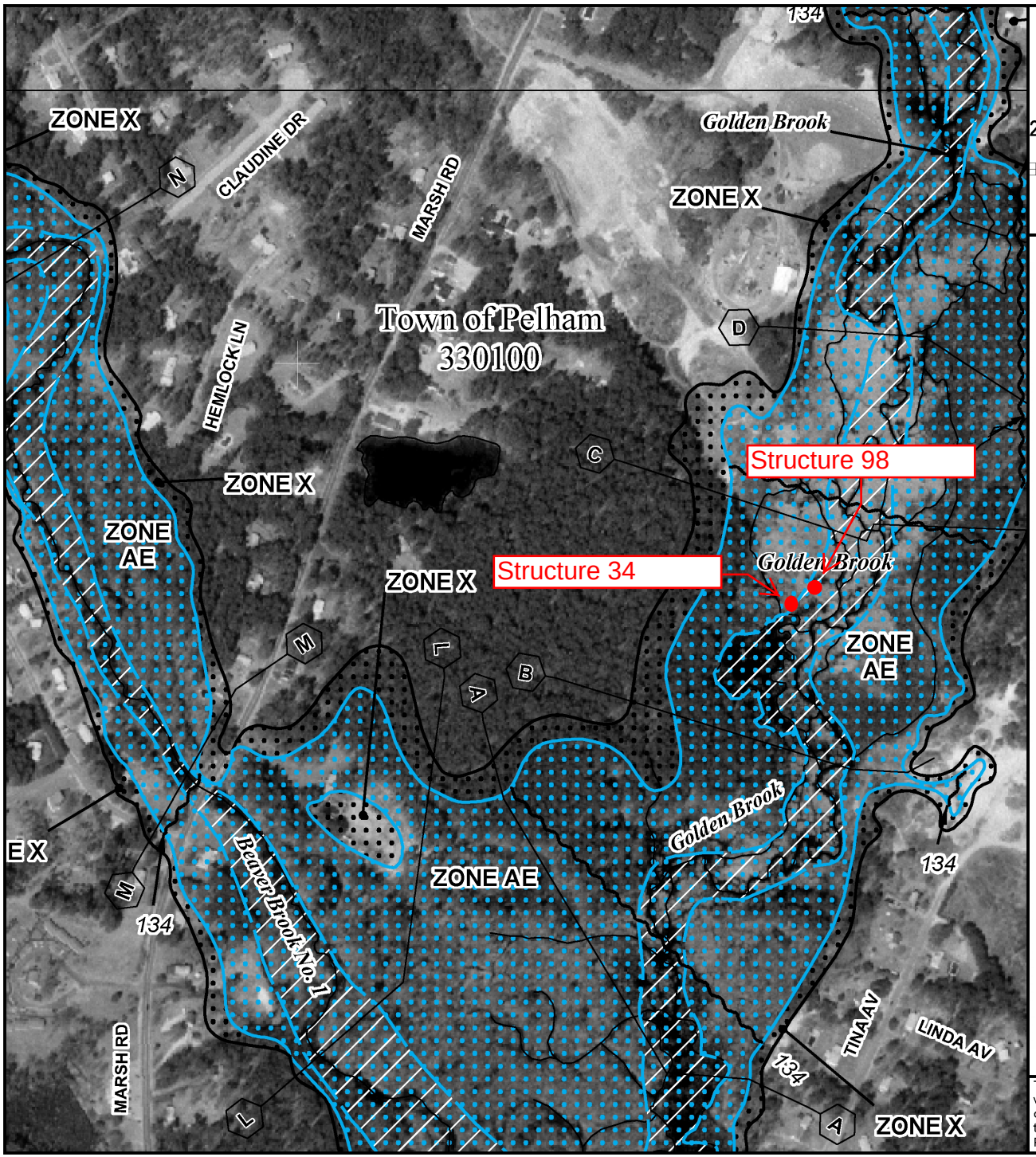
Structure #	Existing Ground Elevation	Floodplain Elevation	Fill Depth	Impact Area	Fill Volume
286	unknown**	318	1 FT	150 SF	150 CF

Total Fill Volume = 630 CF

= 0.01 Ac-Ft

* Permanent flood plain impact is calculated to be the fill volume associated with utility pole foundation from existing grade to the flood plain elevation.

** The fill depth for structure 286 is estimated to be 1 foot for the proposed foundation as the tree canopy in this area prevents an accurate measurement of the existing grade.



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METE 0 150 300

NFIP

PANEL 0677D

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

HILLSBOROUGH COUNTY, NEW HAMPSHIRE

(ALL JURISDICTIONS)

PANEL 677 OF 701

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

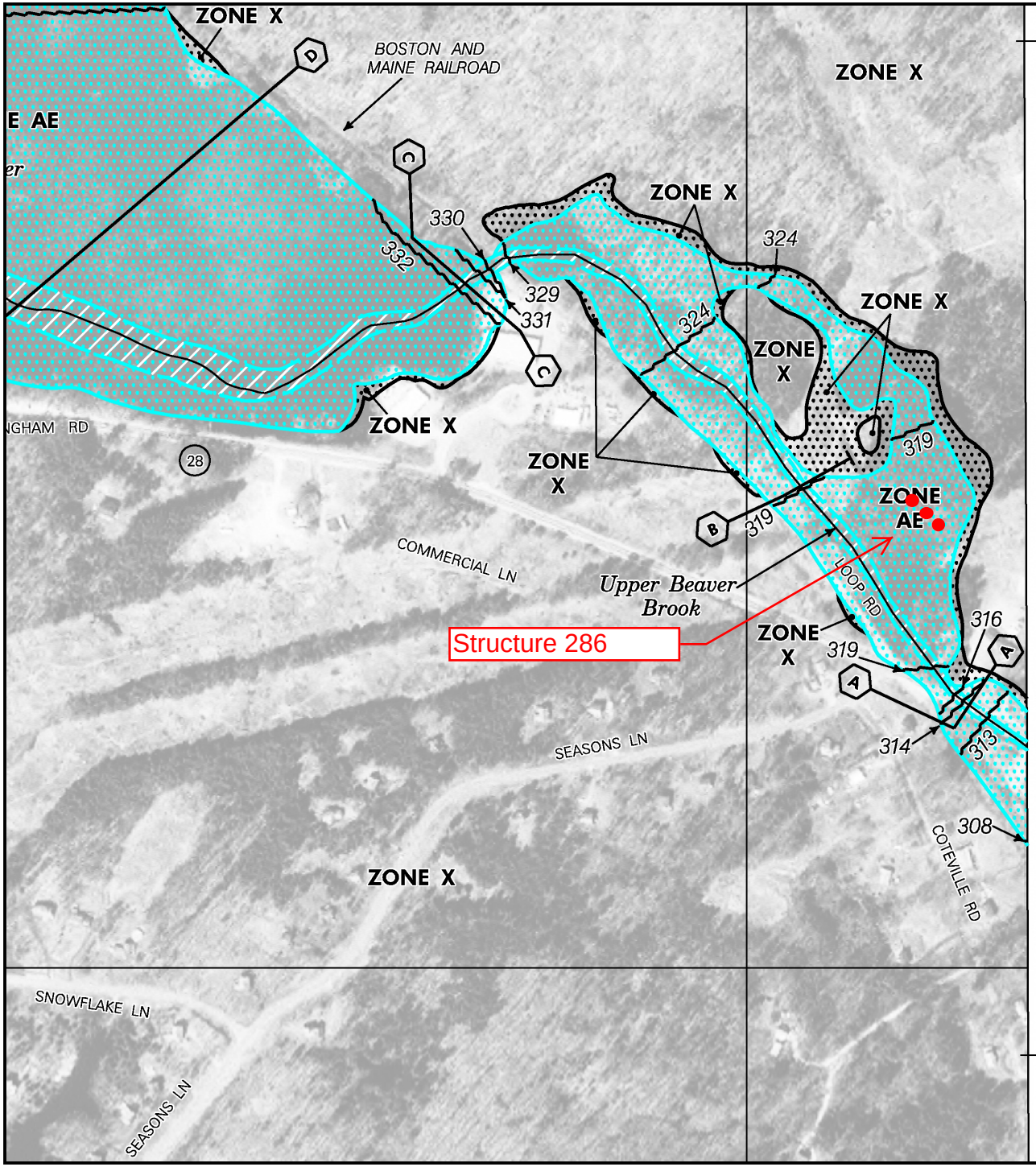
COMMUNITY	NUMBER	PANEL	SUFFIX
PELHAM, TOWN OF	330100	0677	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
33011C0677D

EFFECTIVE DATE
SEPTEMBER 25, 2009

Federal Emergency Management Agency



onal Flood Insurance Program at 1–800–638–6620.

MAP SCALE 1" = 500'

50 0 500 1000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0338E

FIRM

FLOOD INSURANCE RATE MAP

ROCKINGHAM COUNTY, NEW HAMPSHIRE (ALL JURISDICTIONS)

PANEL 338 OF 681

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LONDONDERRY, TOWN OF	330134	0338	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
33015C0338E

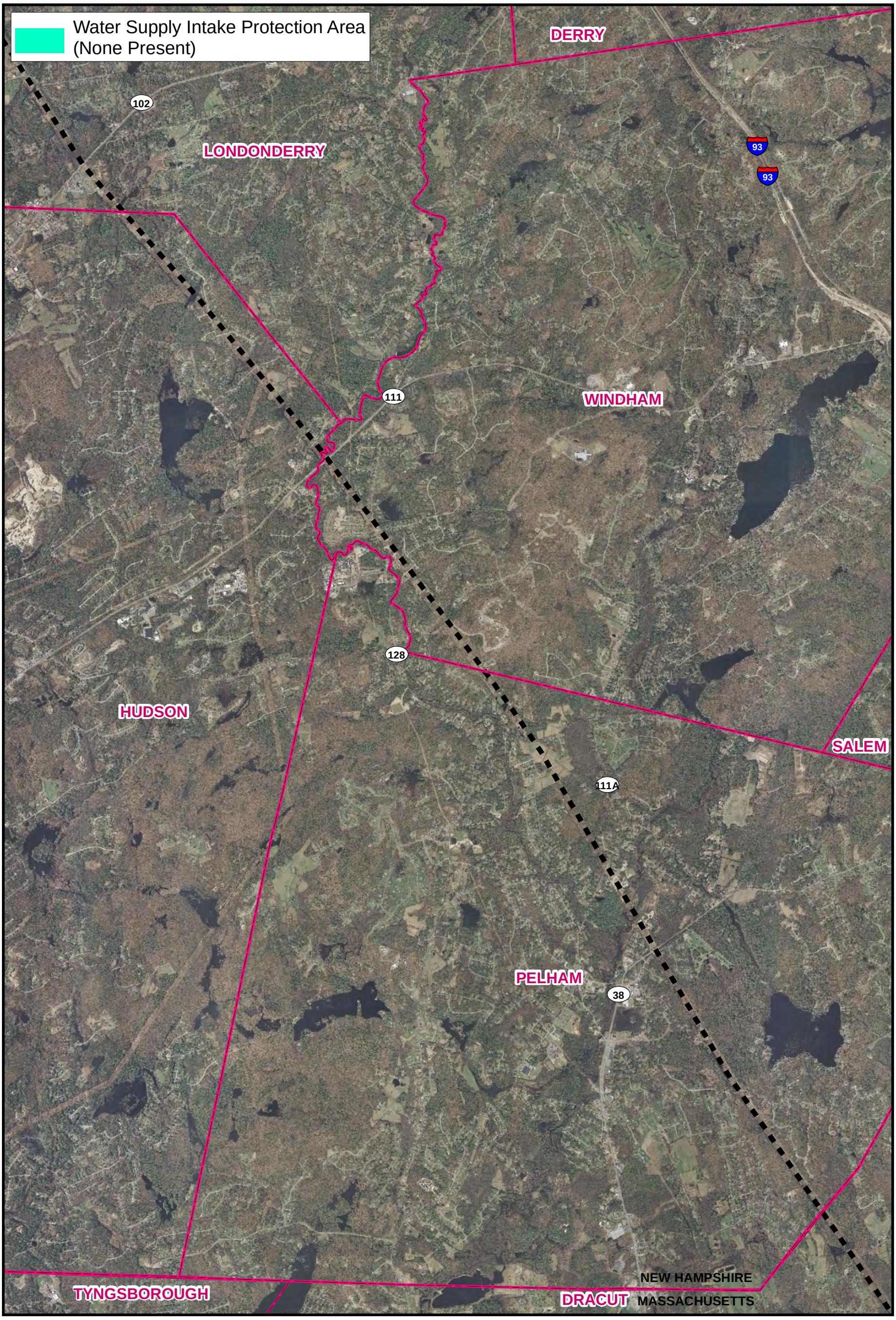
EFFECTIVE DATE
MAY 17, 2005

Federal Emergency Management Agency

Attachment A: Support Data

- Web GIS Printouts
- NHB Letter
- Soils Data
- Aerial Photograph of the Site
- Representative Site Photographs

Web GIS Printouts



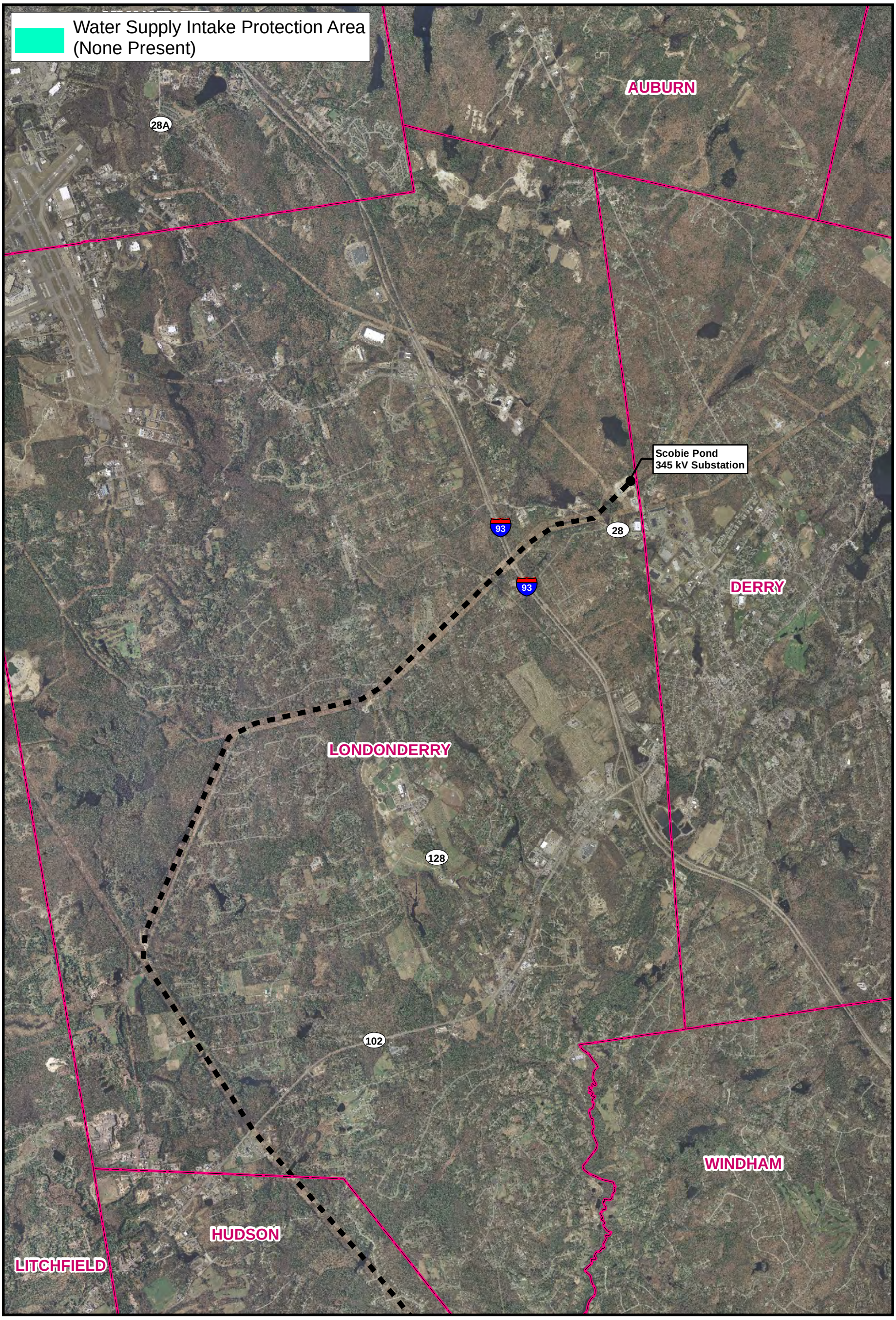
1 inch = 4,000 feet

Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Water Supply Intake Protection Areas

nationalgrid

EVERSOURCE ENERGY



1 inch = 4,000 feet

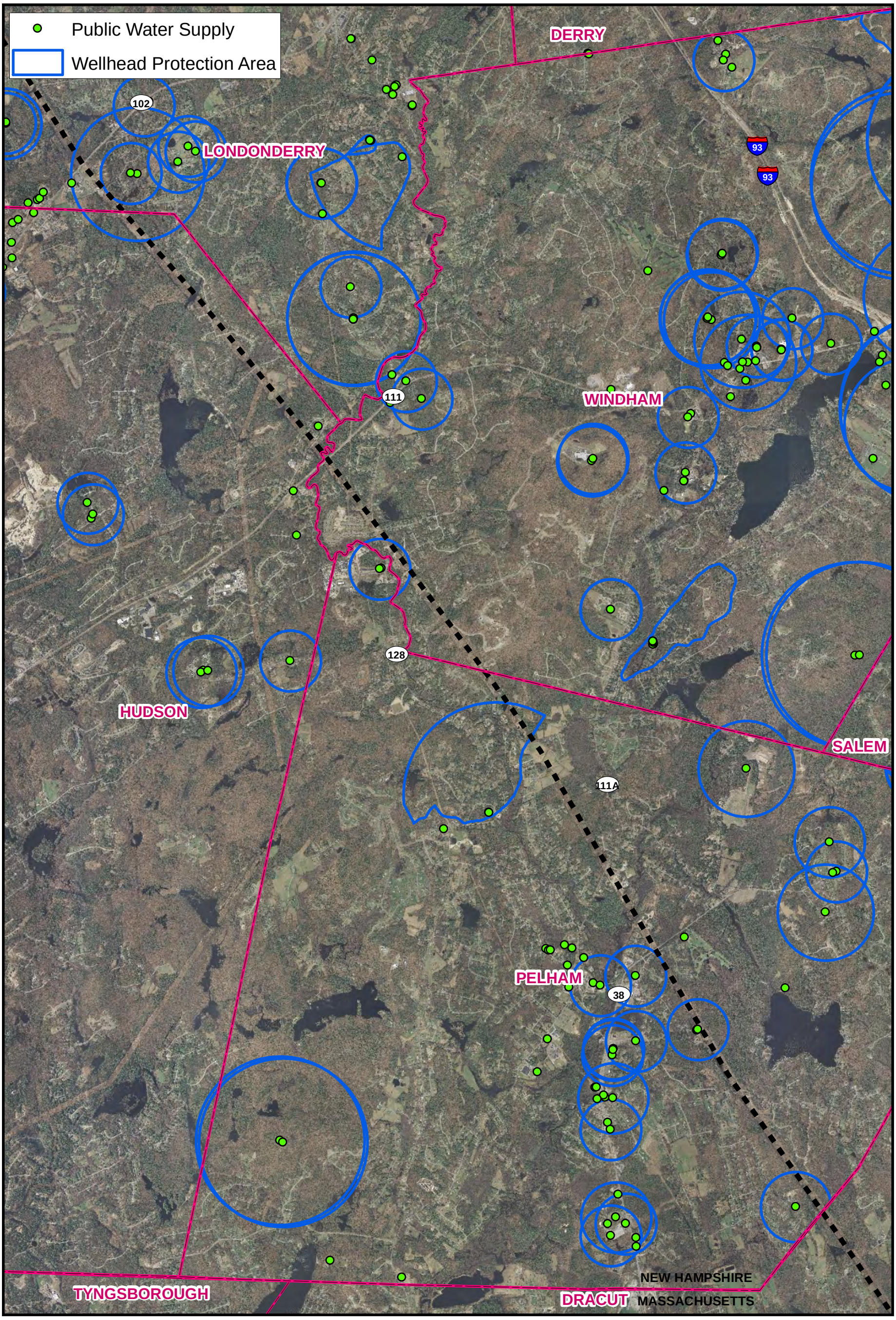
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Water Supply Intake Protection Areas

nationalgrid

EVERSOURCE ENERGY

Project: File: \\nhbedata\checkin\12650.00\GIS\Project\NH_Mapping\AoT\PWS.mxd
Last Updated Date & Revisions: VHB, 4/13/2015



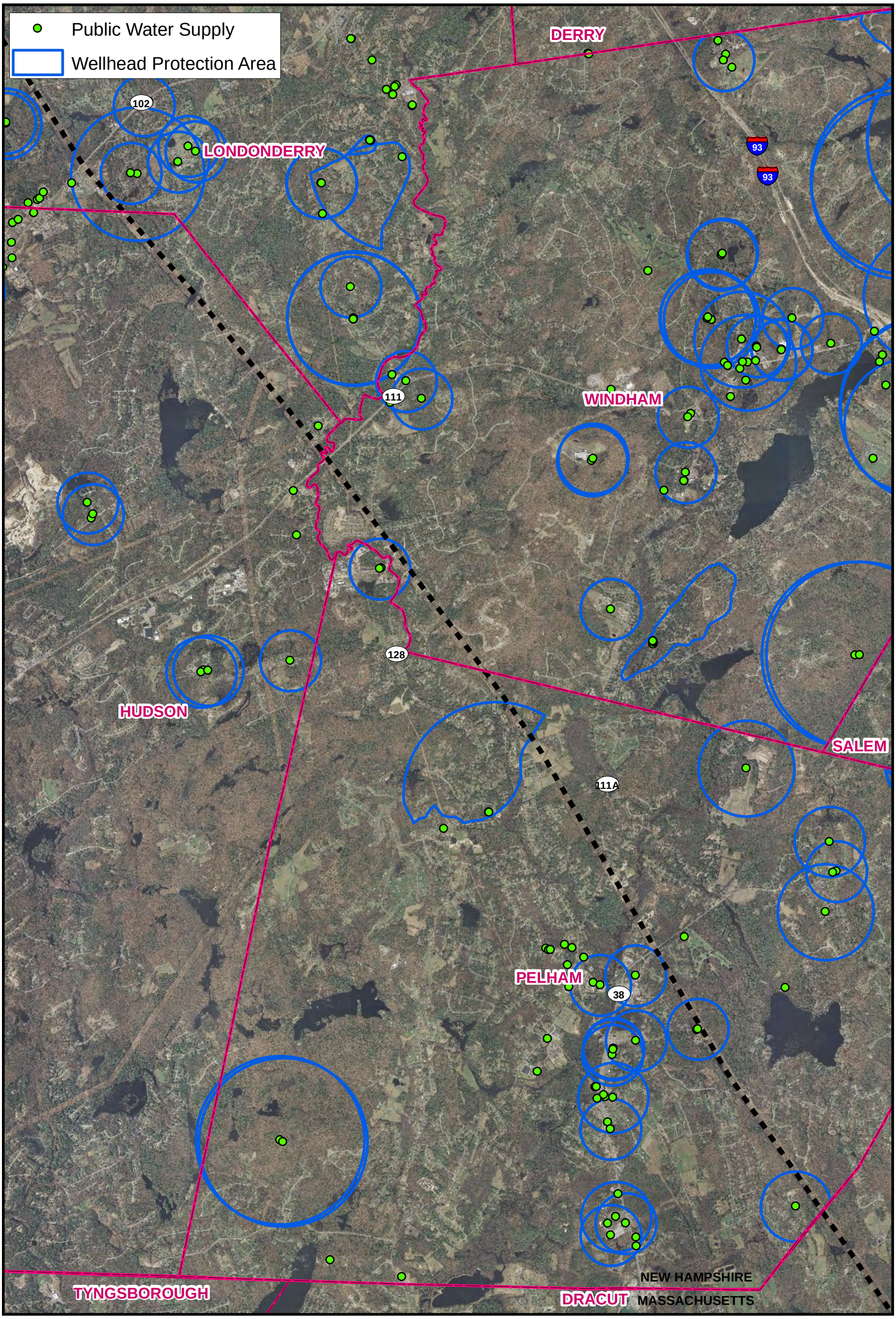
1 inch = 4,000 feet

Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Public Water Supply

nationalgrid

EVERSOURCE ENERGY



1 inch = 4,000 feet

Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Public Water Supply

nationalgrid

EVERSOURCE ENERGY

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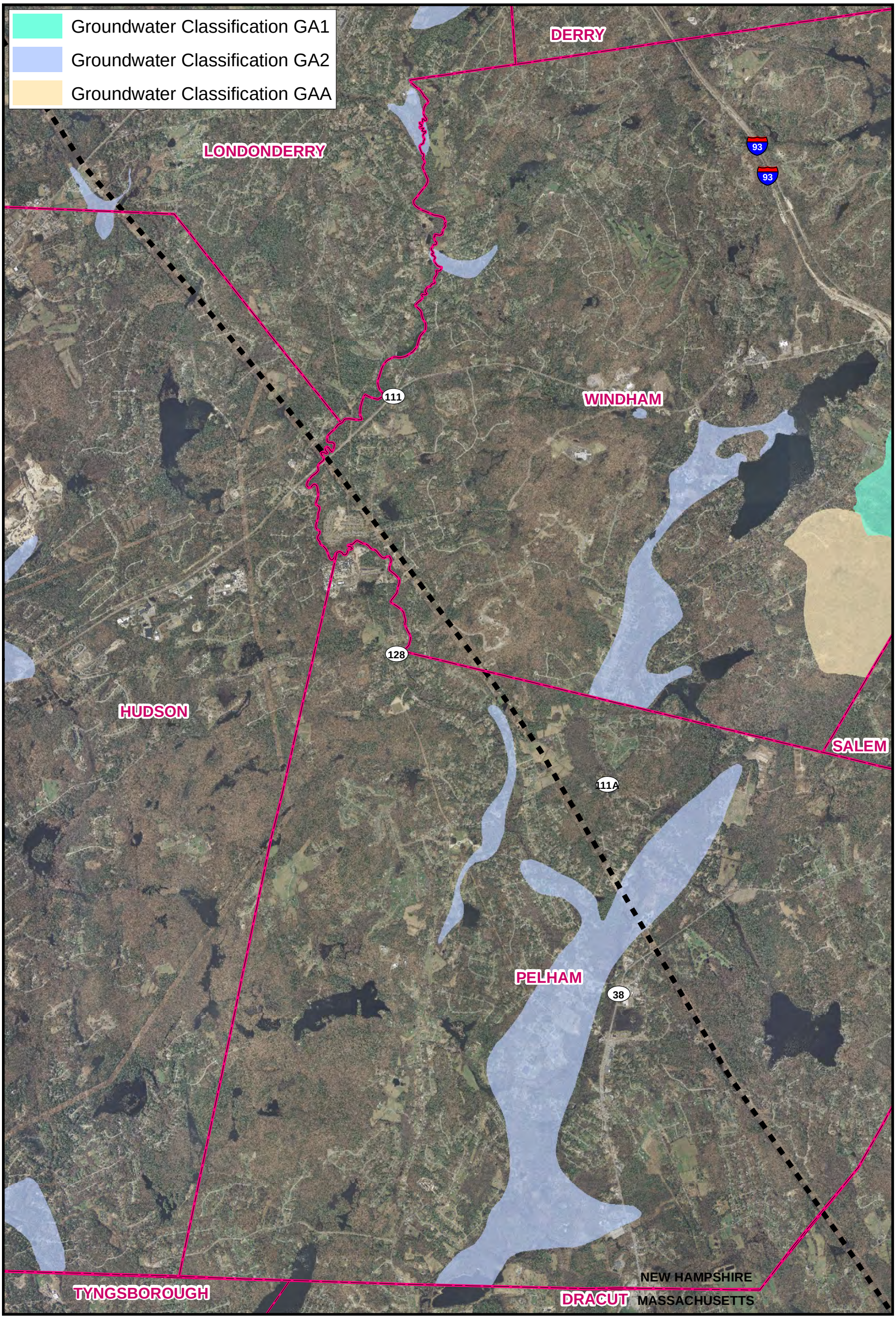
Last Updated Date & Revisions: VHB, 4/13/2015



1 inch = 4,000 feet

Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Groundwater Protection Areas

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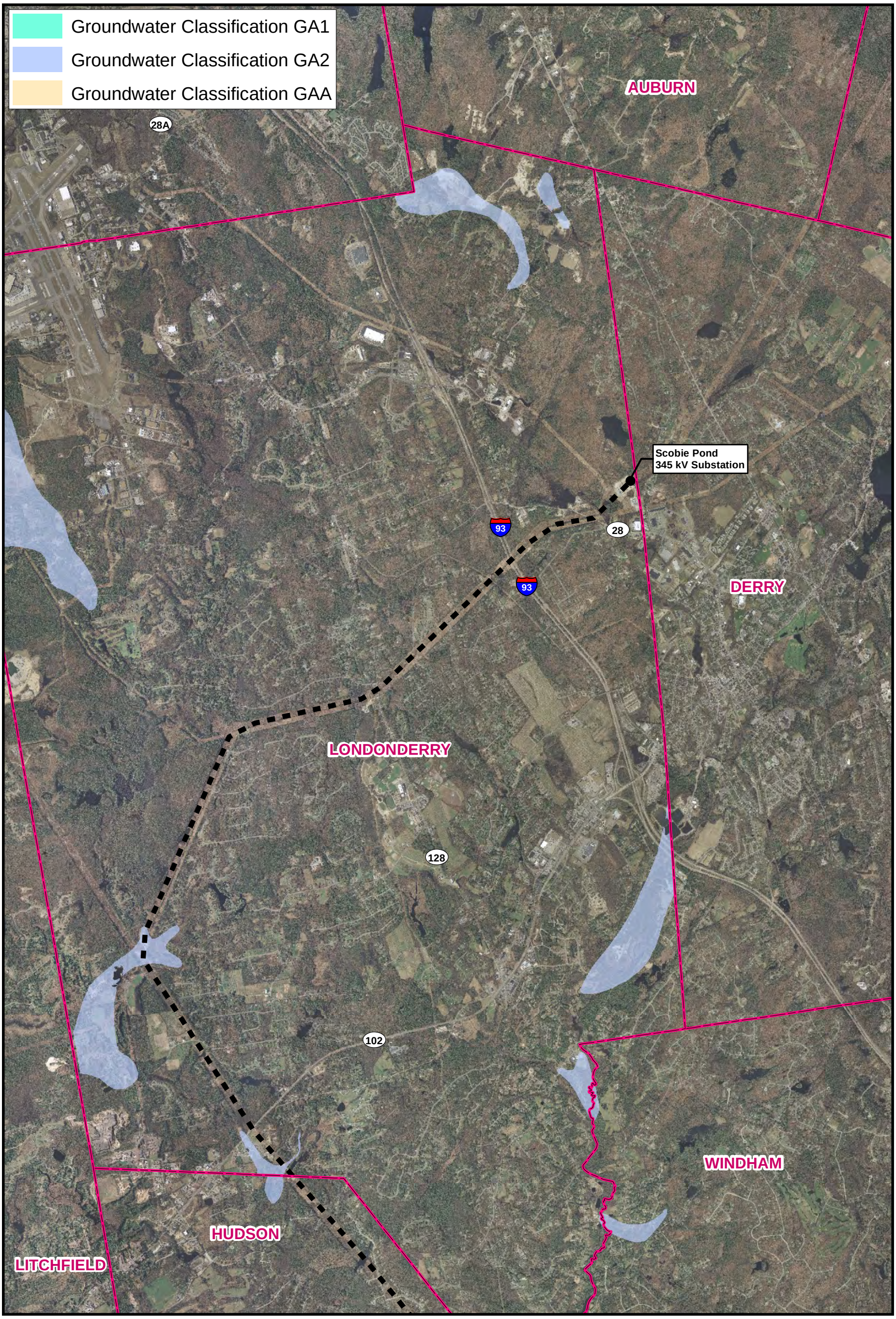

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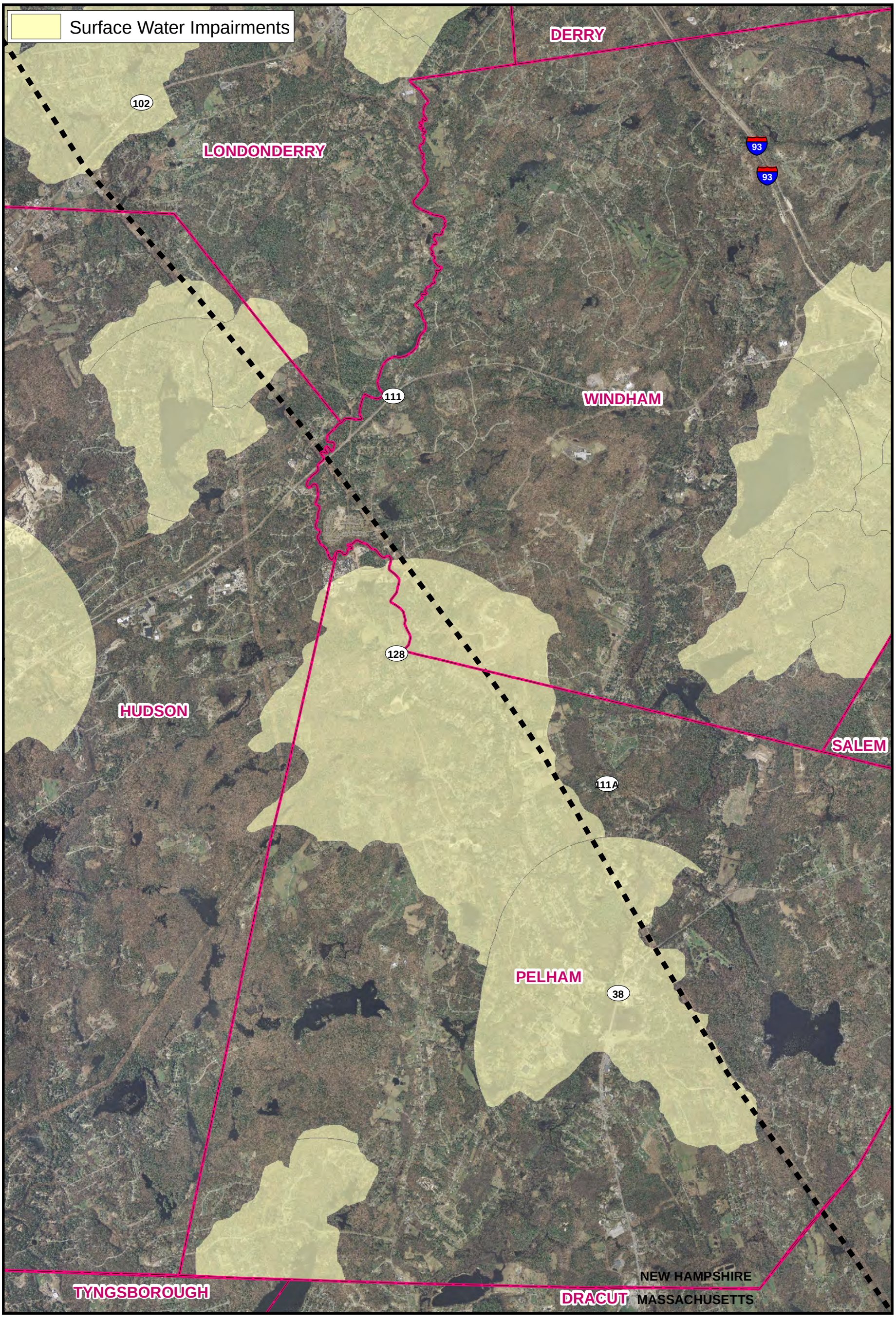

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Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Surface Water Impairments

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Surface Water Impairments

AUBURN
28A
Scobie Pond
345 kV Substation
93
28
93
DERRY
LONDONDERRY
128
102
WINDHAM
HUDSON
LITCHFIELD

1 inch = 4,000 feet

Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Surface Water Impairments

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NHB Letter

Memo

NH Natural Heritage Bureau
NHB Datacheck Results Letter

To: Kristopher Wilkes, Vanasse Hangen Brustlin, Inc.
2 Bedford Farms Dr., Suite 200
Bedford, NH 03110

From: Melissa Coppola, NH Natural Heritage Bureau
Date: 12/17/2014 (valid for one year from this date)
Re: Review by NH Natural Heritage Bureau
NHB File ID: NHB14-4809 Town: Pelham, Windham, Hudson, Derry Location: Tax Maps: Existing Electric Transmission Line Right-of-Way

Description: On behalf of New England Power Company d/b/a National Grid ("NEP") and Public Service Company of New Hampshire ("PSNH") (the "Proponents"), Vanasse Hangen Brustlin, Inc. is submitting the enclosed request for project review for the Merrimack Valley Reliability Project ("MVRP"), a new 345kV electric transmission line ("Line 3124") within an existing right-of-way ("ROW") between NEP's Tewksbury 22A Substation in Tewksbury, Massachusetts and PSNH's Scobie Pond Substation in Londonderry, New Hampshire. The installation of this new line would relieve potential overloads under various conditions on several elements of the area transmission system. In doing so, the MVRP ensures continued compliance with all applicable federal and regional transmission system reliability standards and criteria, and maintains reliable electric service to customers in the area.

The portion of the MVRP located within New Hampshire that is the subject of this project review request is referred to herein as "the Project". The Project proposes approximately 18 miles of new 345-kV transmission line on existing ROW within the Towns of Pelham, Windham, Hudson, and Derry. NEP will own approximately 8.1 miles of the new line in Pelham, Windham, and Hudson. PSNH will own approximately 9.7 miles of the new line in Londonderry and Hudson. No new ROW is anticipated, however, portions of existing ROW that have not been cleared previously will require removal of trees to accommodate portions of the new transmission line and relocated existing lines. The Project requires approval from the NH Site Evaluation Committee (SEC).

There are several existing transmission lines located within the Project ROW. Line 3124 has been designed within the ROW to minimize, to the greatest extent practicable, disruption to existing transmission line alignments. Line 3124 will be constructed within previously uncleared portions of the 10-mile PSNH ROW. Line 3124 will be constructed in the current location of the Y151 transmission line (115kV) within the 8.1-mile NEP ROW. The existing Y151 line will be relocated to the western side of the NEP ROW. New or relocated structures will include wooden H-frame, steel lattice tower and single pole structures. Depending on the structure type, structures will be direct embedded or constructed on a caisson foundation.

Environmental impacts associated with the Project will be limited in nature because the Project will be contained within the existing ROW. Swamp mats will be used to minimize disturbance within wetland resource areas where vehicle access is necessary. To the extent possible, the structures will be accessed directly from existing roads within the ROW corridor. Crews will use public roads intersecting the ROW and other established access points to enter the transmission corridor.

cc: Kim Tuttle

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments: This site is within an area flagged for possible impacts on the state-listed *Alasmidonta varicosa* (brook floater) in the Golden Brook. There will need to be a pre-application meeting to discuss impacts to plants, natural communities, and wildlife.

Invertebrate Species	State[1]	Federal	Notes
Brook Floater (*Alasmidonta varicosa*)	E	--	Contact the NH Fish & Game Dept (see below).

Department of Resources and Economic Development
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DRED/NHB
PO Box 1856
Concord NH 03302-1856

Memo

NH Natural Heritage Bureau
NHB Datacheck Results Letter

Natural Community	State[1]	Federal	Notes
Medium level fen system*	--	--	Level fens are stagnant, and as such are characterized by low nutrient levels, relatively high acidity levels, and accumulations of peat. The primary threats to this community are changes to its hydrology (especially that which causes pooling), increased nutrient input from stormwater runoff, and sedimentation from nearby disturbance.
Swamp white oak floodplain forest	--	--	Threats are primarily changes to the hydrology of the river, land conversion and fragmentation, introduction of invasive species, and increased input of nutrients and pollutants.

Plant species	State[1]	Federal	Notes
bird-foot violet (*Viola pedata*)	T	--	This species occurs in sandplains, disturbed openings, dry forests, and thin woods. Threats would include direct destruction of the plants or major alterations in their habitat.
bulbous bitter-cress (*Cardamine bulbosa*)*	E	--	This species occurs in forested swamps, low floodplain forest, and moist thickets.. Threats to the plants include canopy removal and destruction (draining) of its habitat.
common star-grass (*Hypoxis hirsuta*)	T	--	This species occurs in sandplains, disturbed openings, dry forests, and thin woods. Threats would include direct destruction of the plants or major alterations in their habitat.
Eight-flowered Six-weeks Grass (*Vulpia octoflora var. tenella*)*	E	--	This species occurs in sandplains, disturbed openings, dry forests, and thin woods. Threats would include direct destruction of the plants or major alterations in their habitat.
meadow garlic (*Allium canadense*)	E	--	Threats are primarily those that would affect this plant's habitat (river or streambanks, forested swamps, low floodplain forest/moist thickets, wet meadows), including changes to local hydrology.
Palmate Violet (*Viola palmata*)	E	--	**Recommended for delisting due to taxonomic issues (hybrid)
Perfoliate Bellwort (*Uvularia perfoliata*)	E	--	The habitat of this species is mesic forests, which would be threatened by fragmentation or canopy reduction that led to drying out of the soils.
River Birch (*Betula nigra*)	T	--	The population could be deleteriously affected by any project activities that alter the hydrology of its habitat, by increased sedimentation, and by increased nutrients/pollutants in stormwater runoff.
round-leaved trailing tick-trefoil (*Desmodium rotundifolium*)	T	--	This species occurs in sandplains, disturbed openings, dry forests, and thin woods. Threats would include direct destruction of the plants or major alterations in their

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			habitat.
smooth forked whitlow-wort (*Paronychia canadensis*)*	E	--	Threats include any major changes to its habitat, which includes dry forests and thin woods.

Vertebrate species	**State[1]**	**Federal**	**Notes**
Blanding's Turtle (*Emydoidea blandingii*)	E	--	Contact the NH Fish & Game Dept (see below).
Grasshopper Sparrow (*Ammodramus savannarum*)*	T	--	Contact the NH Fish & Game Dept (see below).
Northern Black Racer (*Coluber constrictor constrictor*)	T	--	Contact the NH Fish & Game Dept (see below).
Spotted Turtle (*Clemmys guttata*)	T	--	Contact the NH Fish & Game Dept (see below).
Wood Turtle (*Glyptemys insculpta*)	SC	--	Contact the NH Fish & Game Dept (see below).

[1]Codes: "E" = Endangered, "T" = Threatened, "SC" = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

Contact for all animal reviews: Kim Tuttle, NH F&G, (603) 271-6544.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

Department of Resources and Economic Development
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Soils Data

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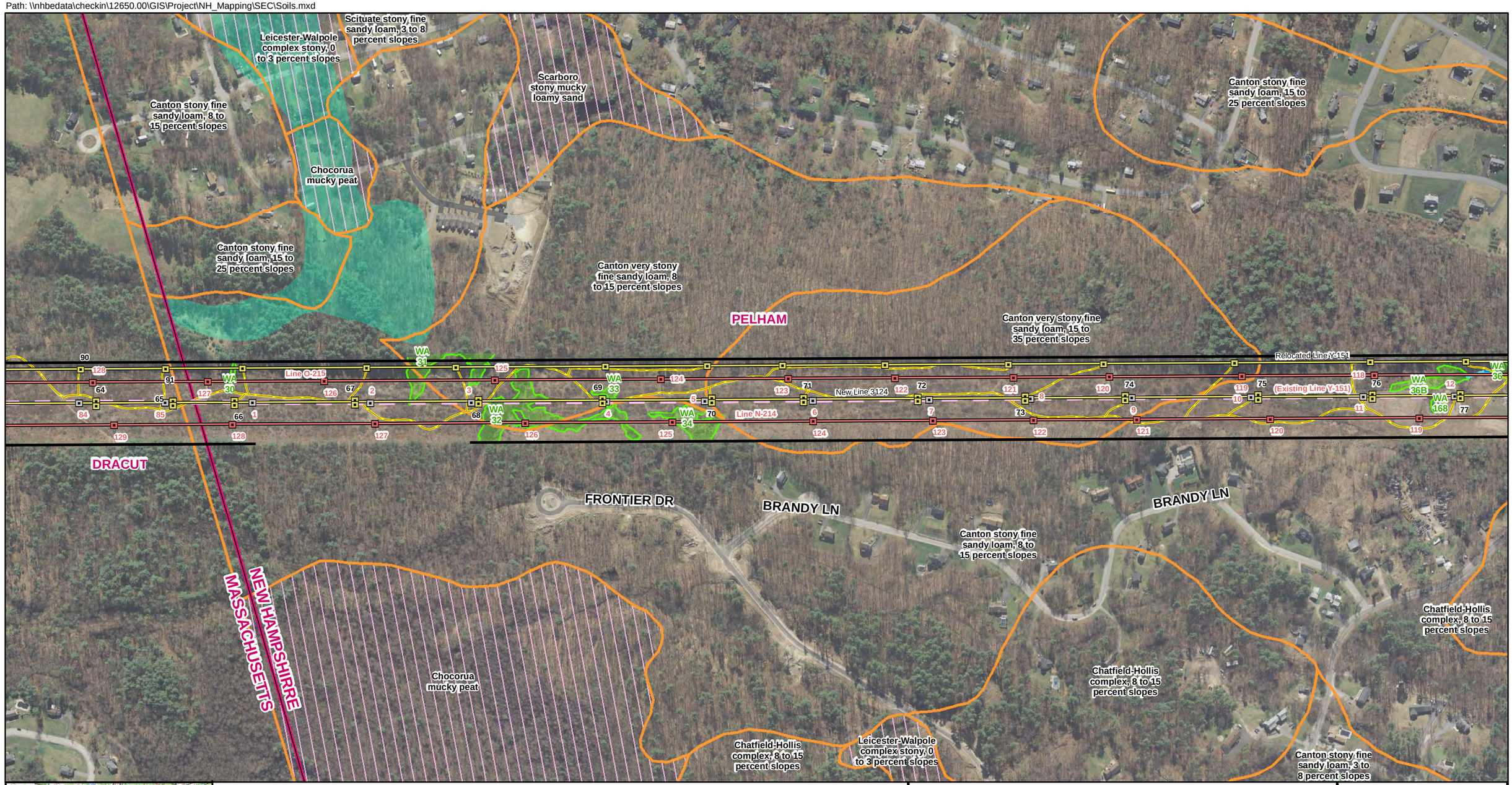

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- USGS Stream
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- Hydric Soil
- FEMA 100-yr Floodplain
- Town Boundaries

1 Inch = 400 Feet

0 200 400 800

Feet

Figure 2 - NRCS Soils
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to Scobie Pond 345 kV Substation NH

Source:
NGRID,Black & Veatch,VHB
Beals & Thomas,EVERSOURCE,Normandeau

Date: 5/29/2015

nationalgrid

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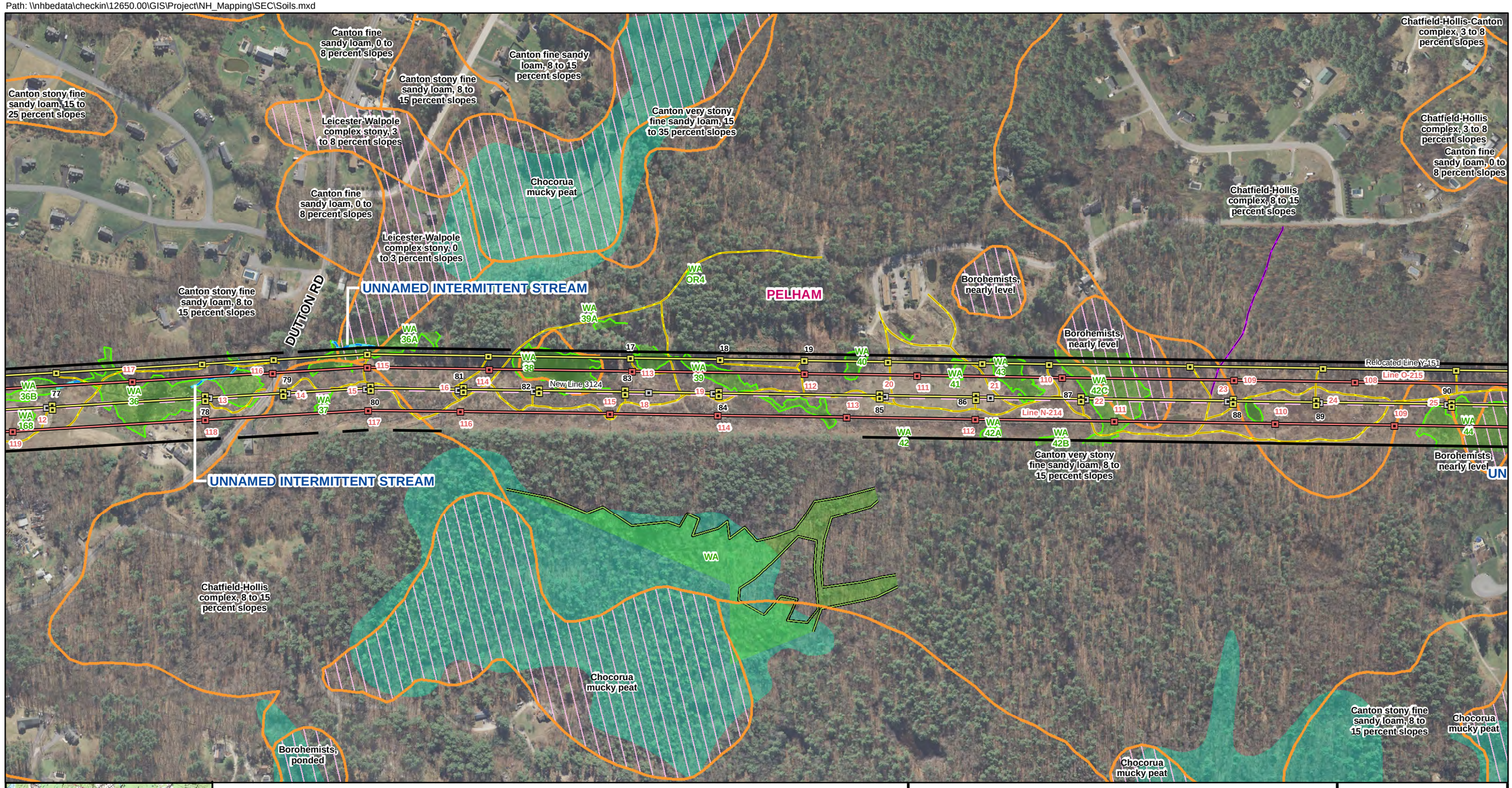

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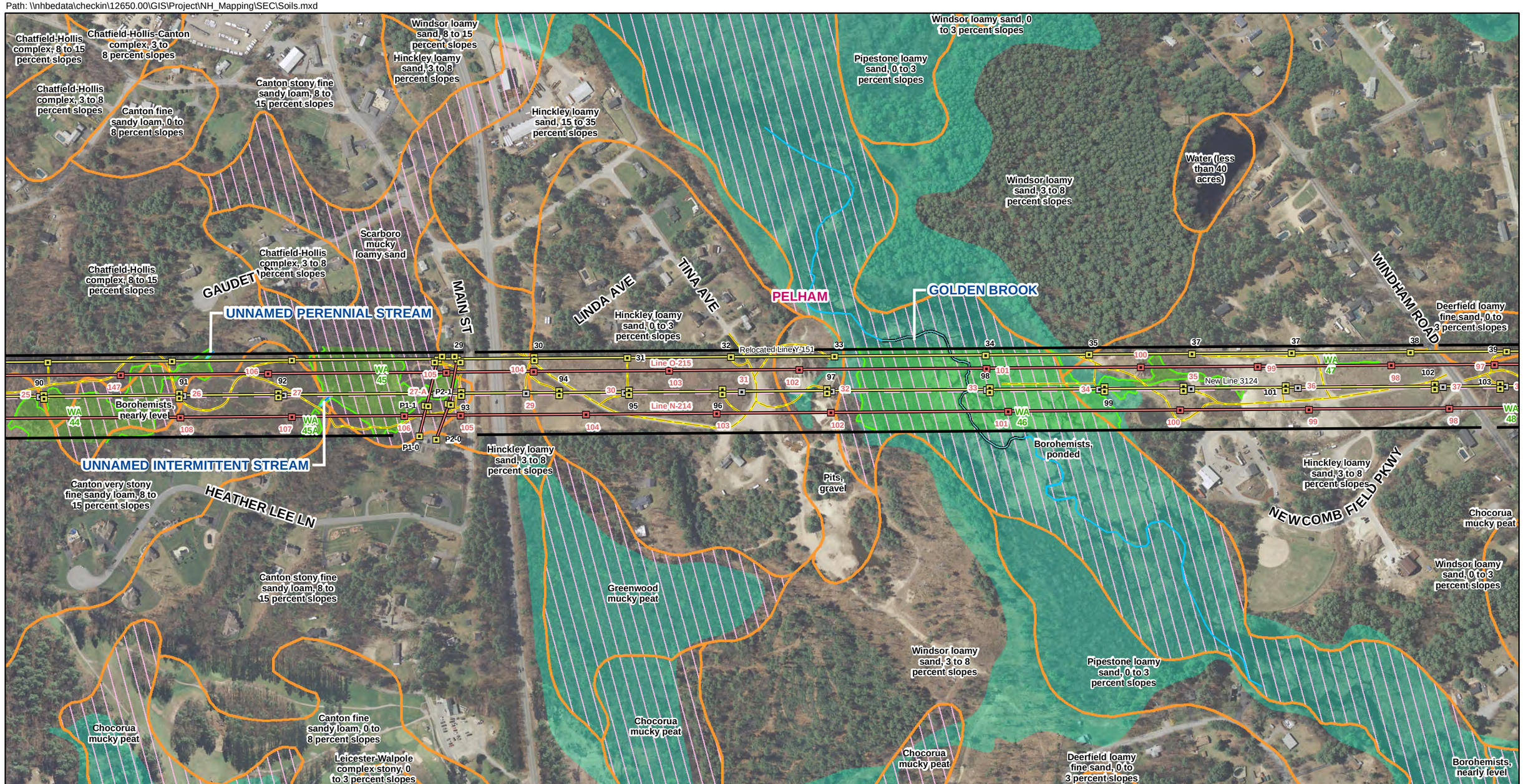

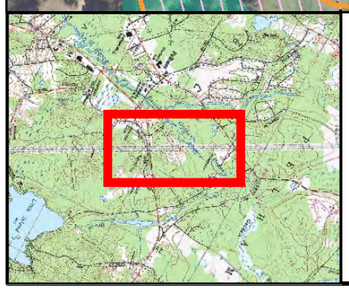

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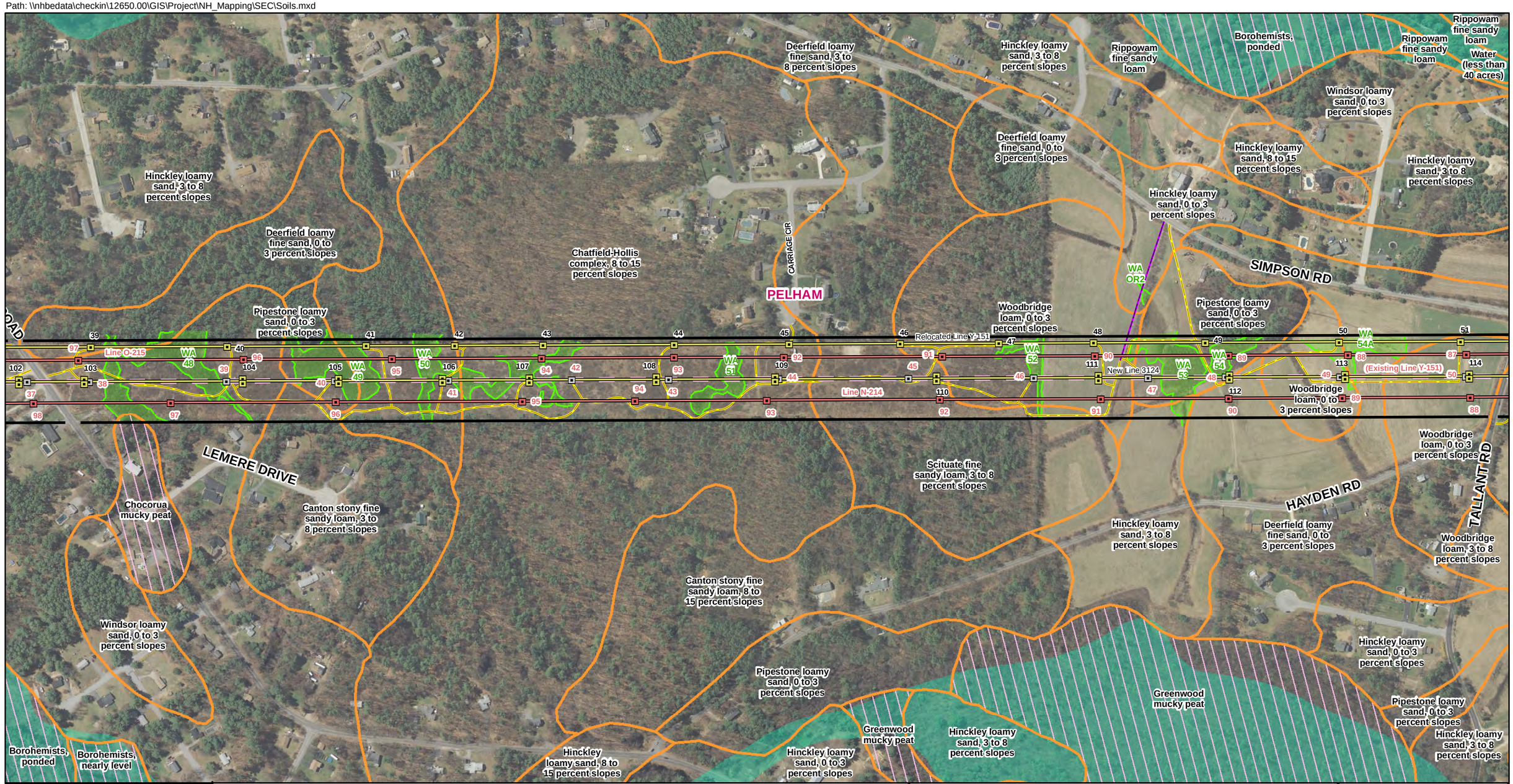

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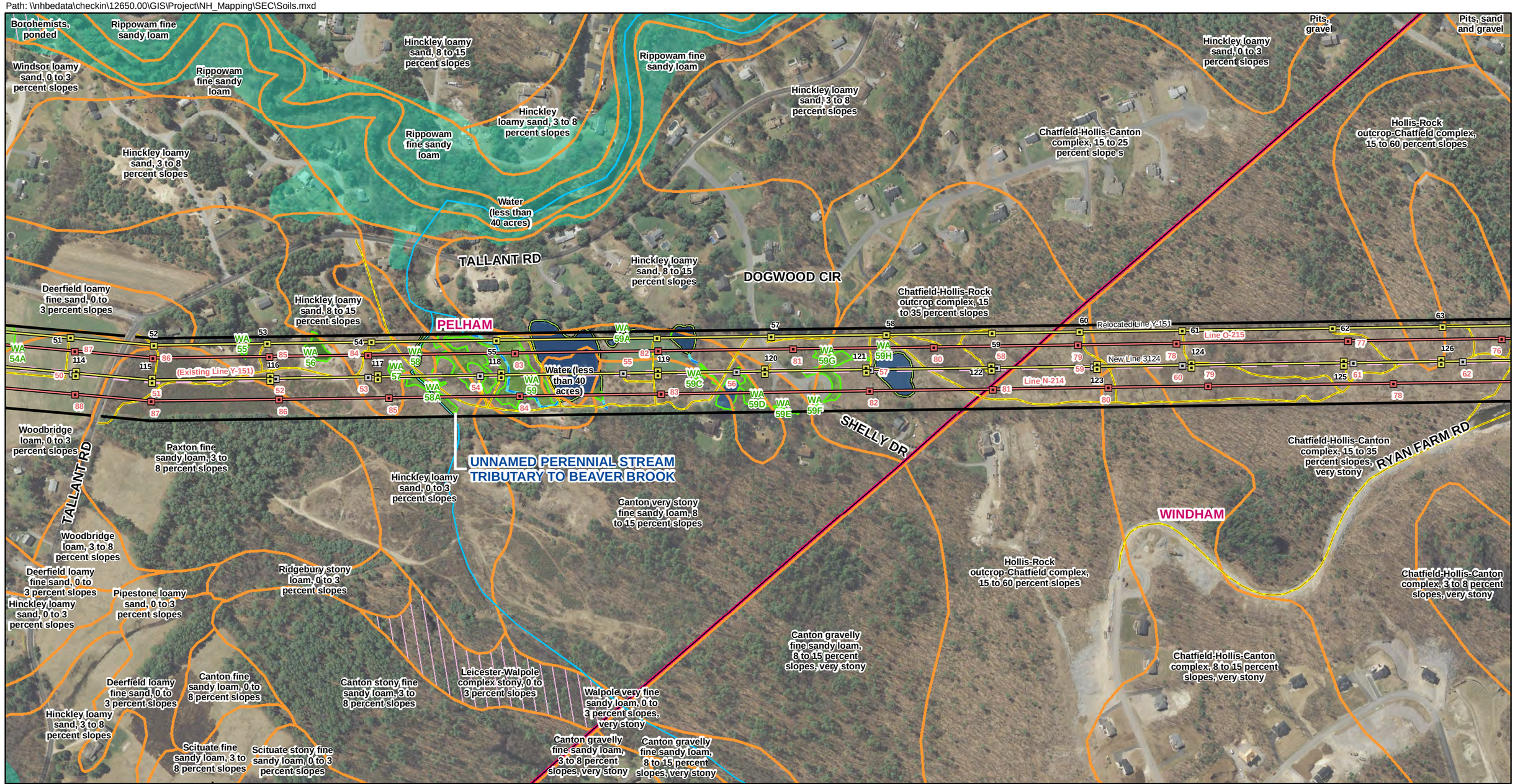

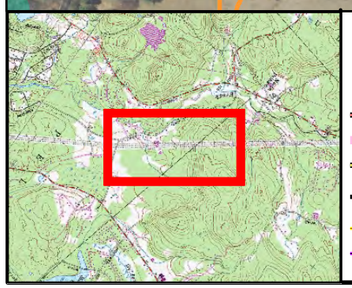

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PELHAM
Chatfield-Hollis-Canton complex, 15 to 35 percent slopes, very stony
Pits, sand and gravel
Walpole very fine sandy loam, 0 to 3 percent slopes, very stony
Hinckley loamy sand, 3 to 8 percent slopes
Rippowam fine sandy loam
Chocorua mucky peat
Pootatuck fine sandy loam
Scarboro muck
Hinckley loamy sand, 3 to 8 percent slopes
Windsor loamy sand, 8 to 15 percent slopes
Canton gravelly fine sandy loam, 3 to 8 percent slopes, very stony
Water (less than 40 acres)
PELHAM
Hollis-Rock outcrop-Chatfield complex, 15 to 60 percent slopes
Hollis-Rock outcrop-Chatfield complex, 15 to 60 percent slopes
Hinckley loamy sand, 0 to 3 percent slopes
Pipestone loamy sand, 0 to 3 percent slopes
VER BROOK
Pootatuck fine sandy loam
CASTLE HILL RD
Chatfield-Hollis-Canton complex, 3 to 8 percent slopes, very stony
UNNAMED PERENNIAL STREAM TRIBUTARY TO OOK
Hinckley fine sandy loam, 8 to 15 percent slopes
MAMMOTH RD
PLEASANT ST
Hinckley fine sandy loam, 3 to 8 percent slopes
Relocated Line Y-151
New Line 3124
Line O-215
(Existing Line Y-151)
Line N-214
WA 60
WA 61
WA 62
WA 63
WA 64
WA 65
WA 66
WA 67
WA 67A
WA 68
WA 68A
FARM RD
Chatfield-Hollis-Canton complex, 15 to 35 percent slopes, very stony
WINDHAM
UNNAMED PERENNIAL STREAM TRIBUTARY TO BEAVER BROOK
WINTER ST
AUTUMN ST
Pipestone sand, 0 to 5 percent slopes
GLANCE RD
Hinckley fine sandy loam, 8 to 15 percent slopes
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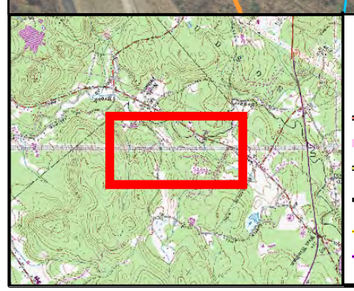

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NGRID,Black & Veatch,VHB
Beals & Thomas,EVERSOURCE,Normandeau

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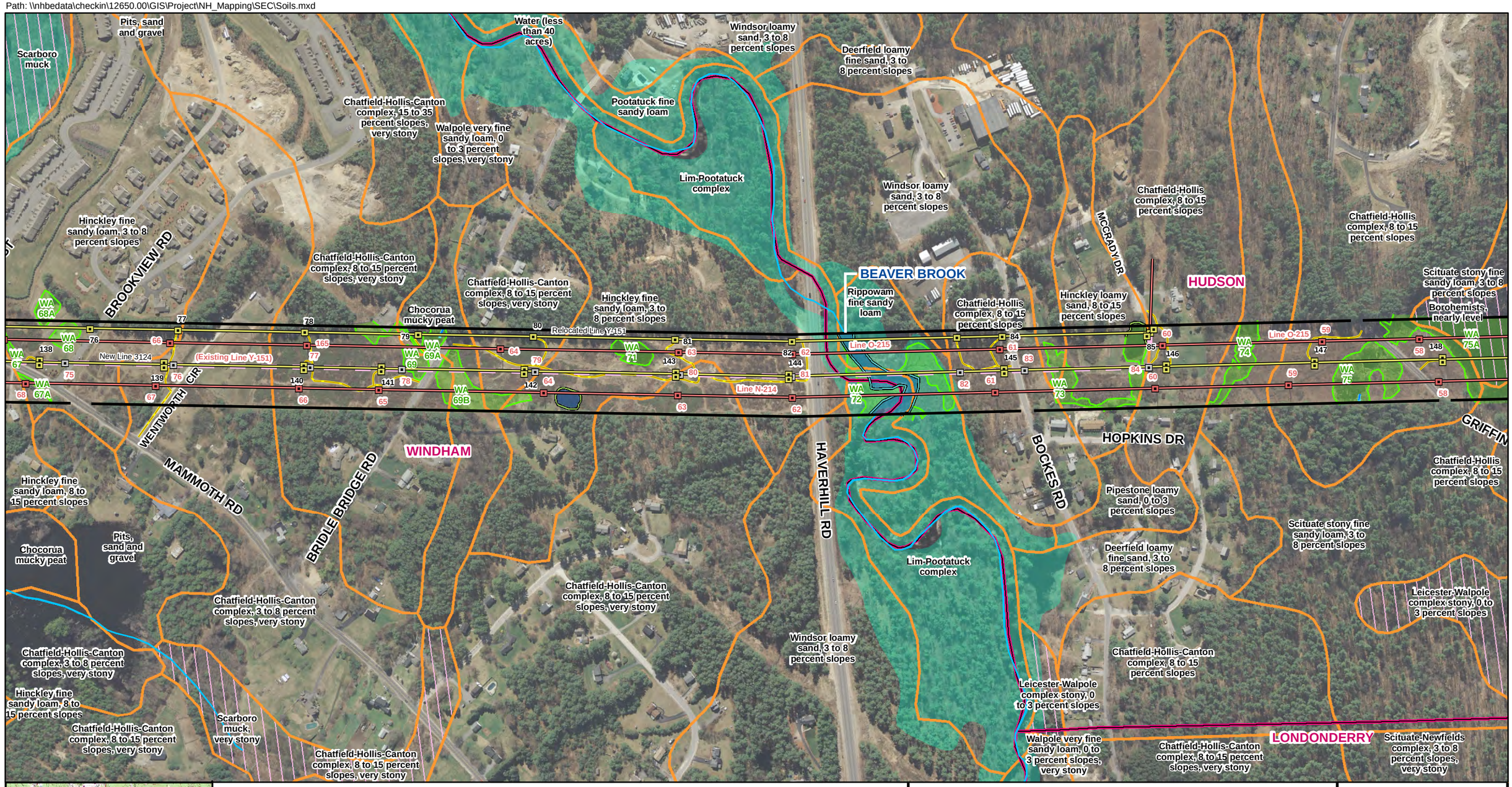

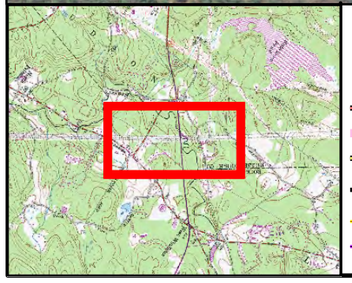

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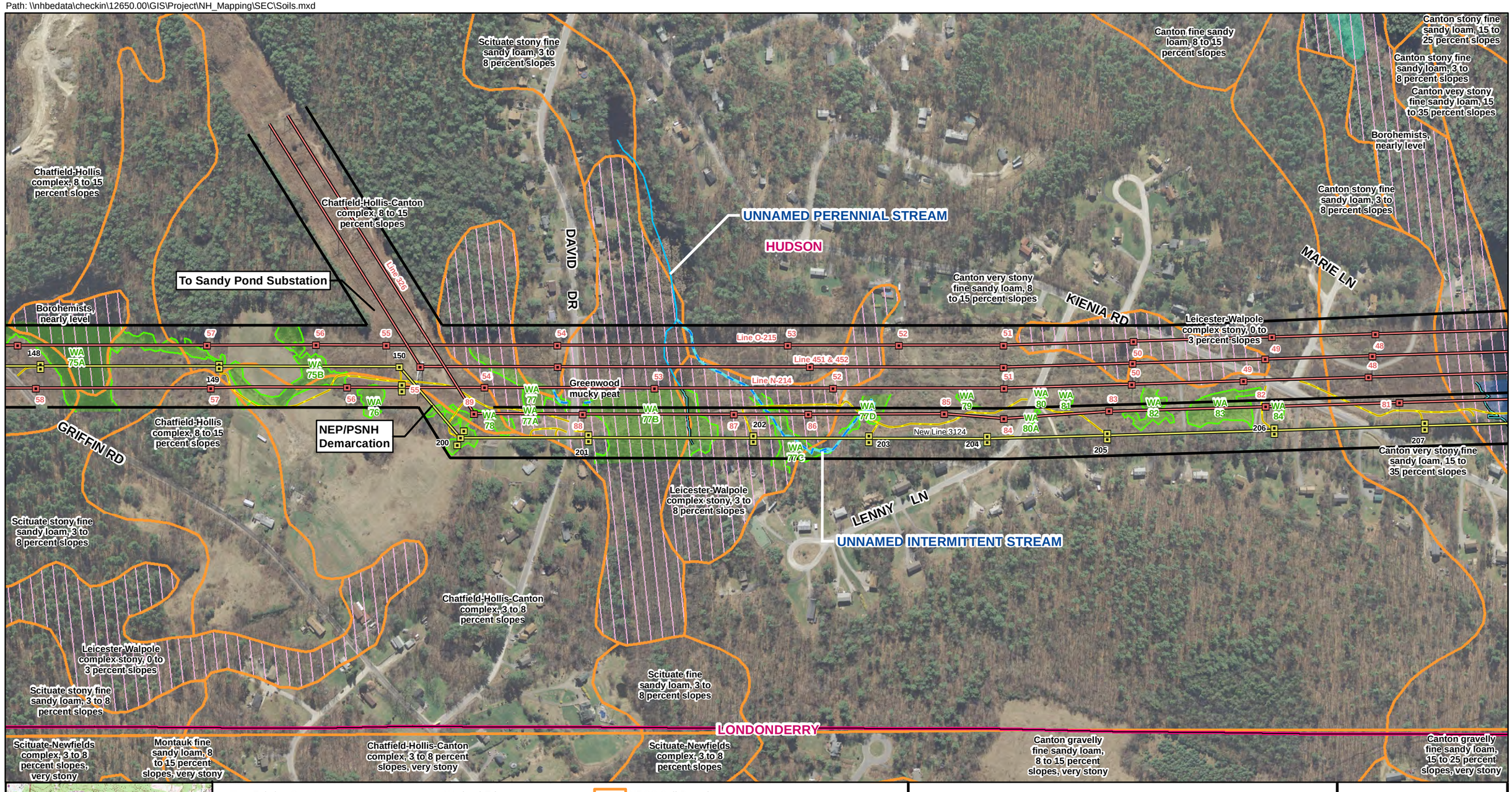

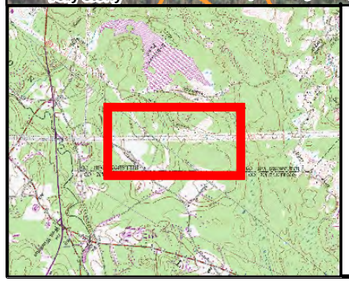

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Date: 7/6/2015

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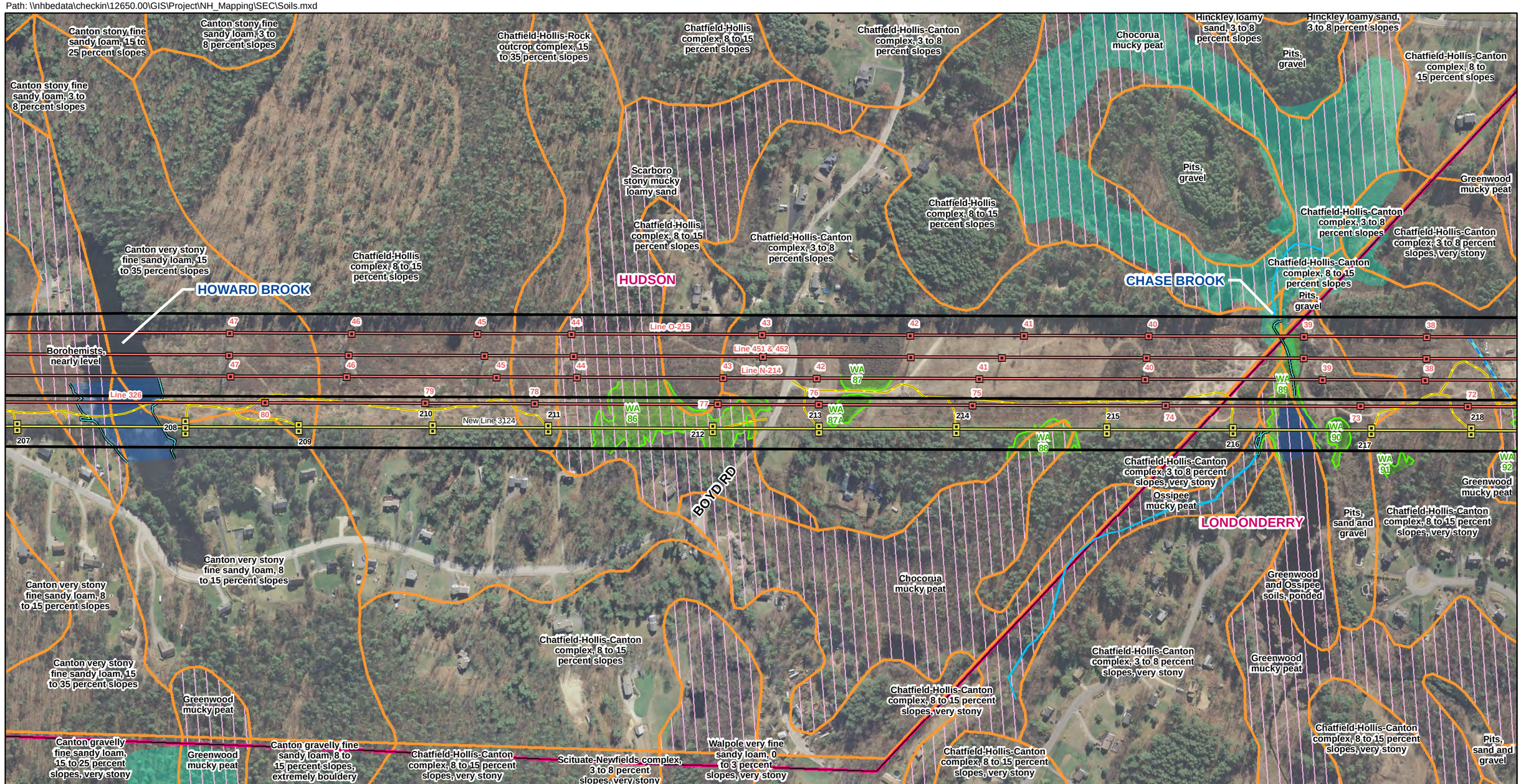

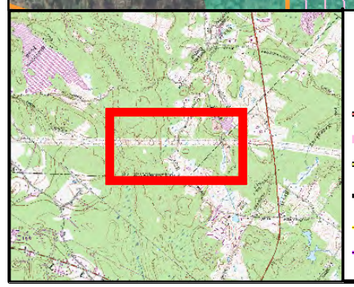

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Beals & Thomas,EVERSOURCE,Normandeau

Date: 5/29/2015

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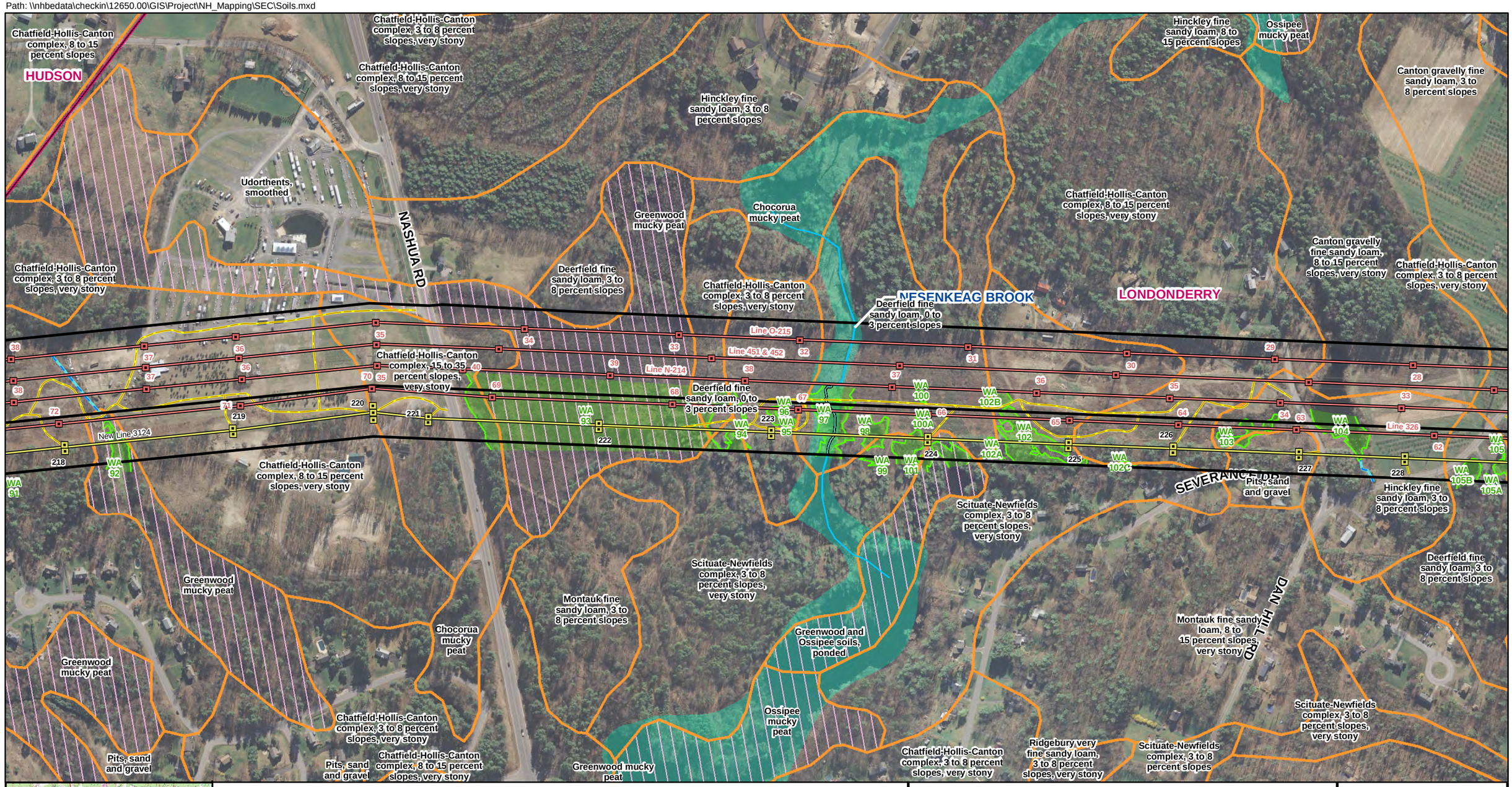

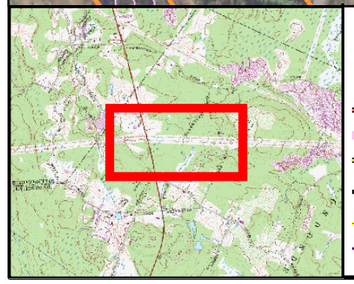

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Proposed Transmission Line
Surveyed ROW Boundary
Primary Access
Alternate Access

Wetland Edge
Estimated Wetland Edge
Wetland Resource Area
Open Water
Delineated Perennial Stream
Delineated Intermittent Stream
Delineated Ordinary High Water
USGS Stream

NRCS Soil Boundary
Hydric Soil
FEMA 100-yr Floodplain
Town Boundaries

1 Inch = 400 Feet
0 200 400 800
Feet

Figure 2 - NRCS Soils
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to Scobie Pond 345 kV Substation NH

Source:
NGRID,Black & Veatch,VHB
Beals & Thomas,EVERSOURCE,Normandeau

Date: 5/29/2015

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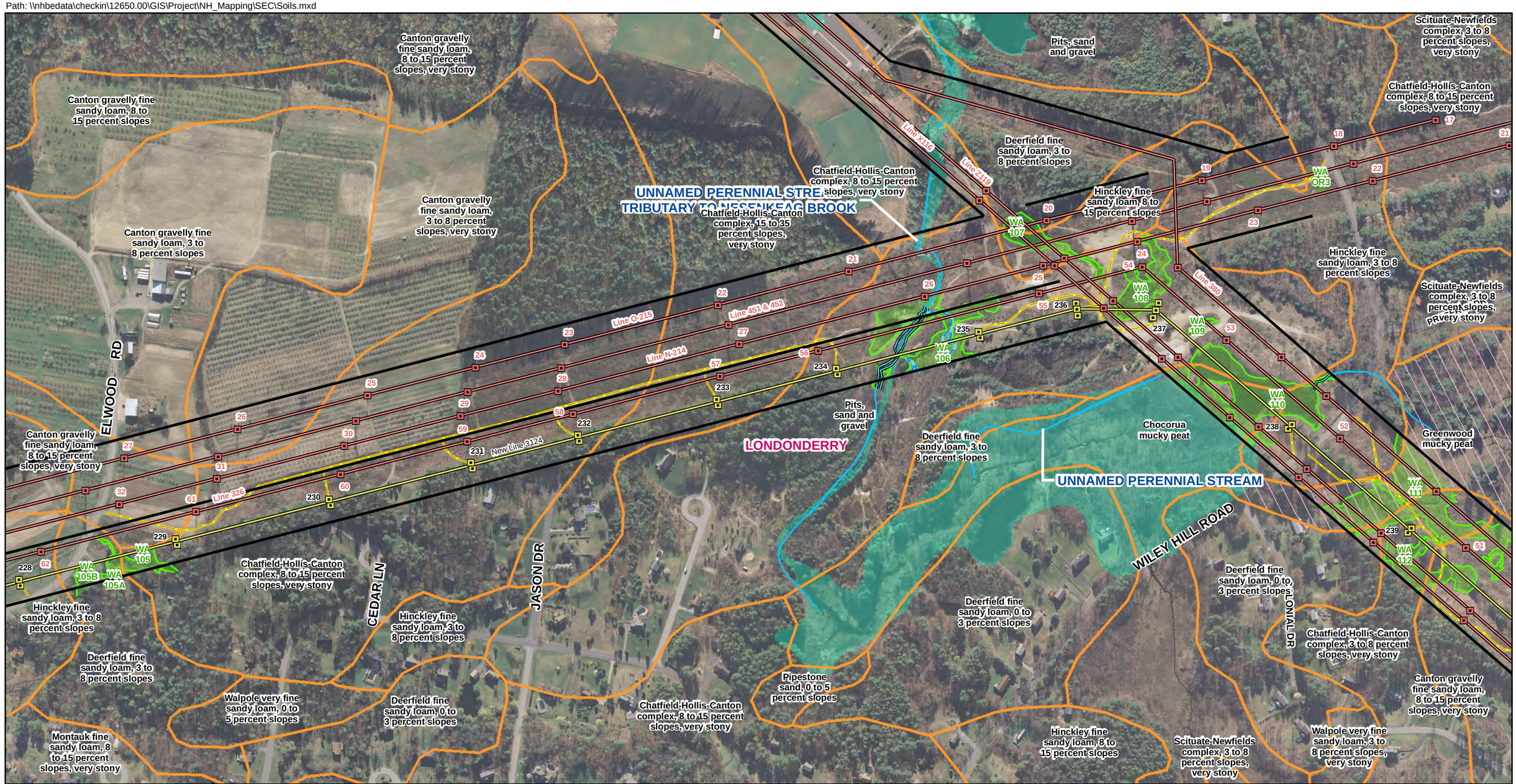

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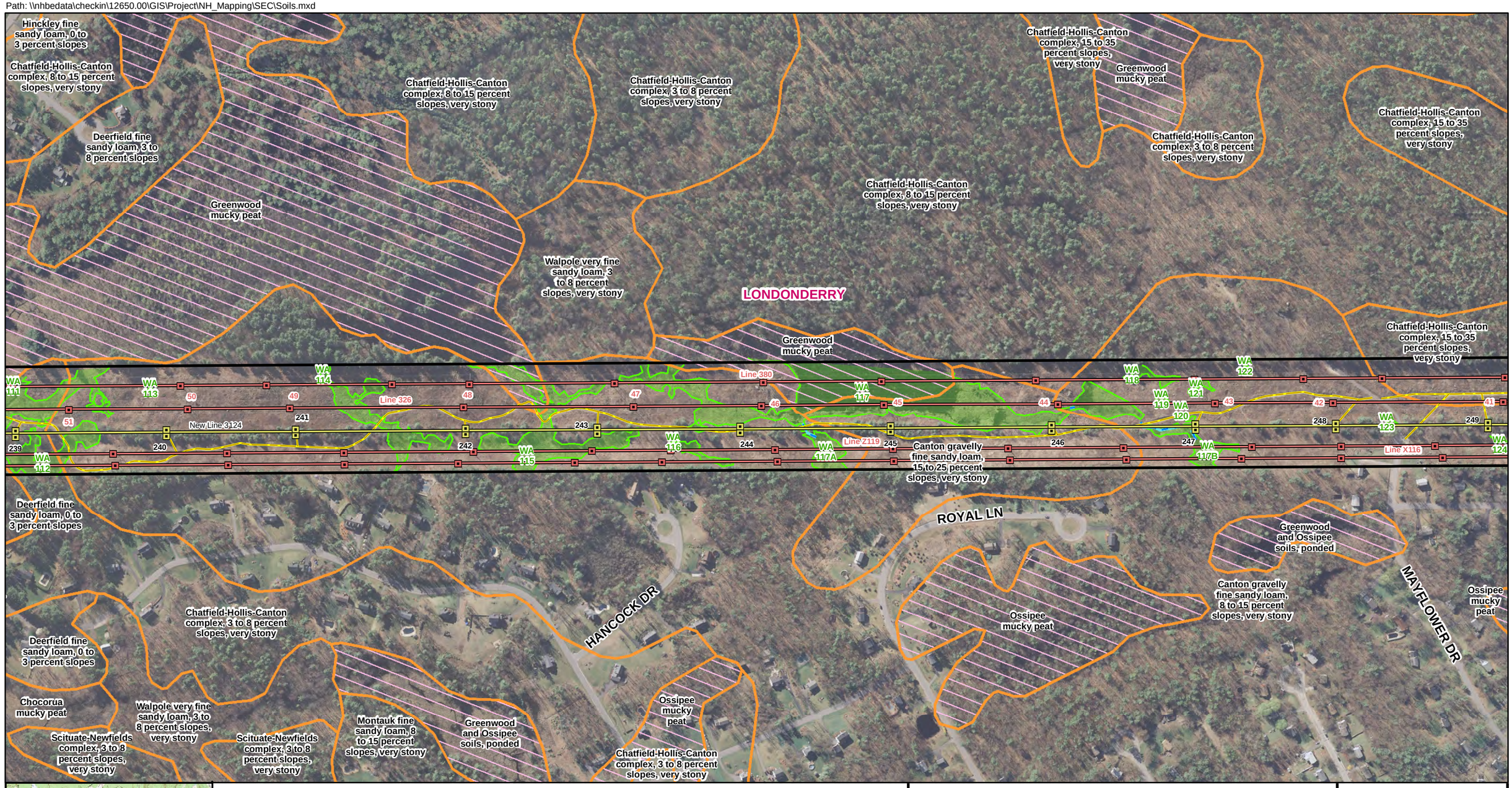

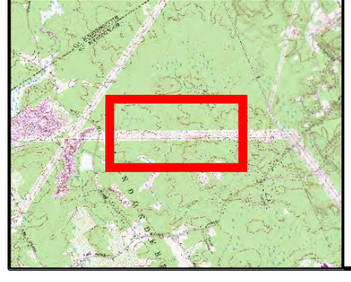

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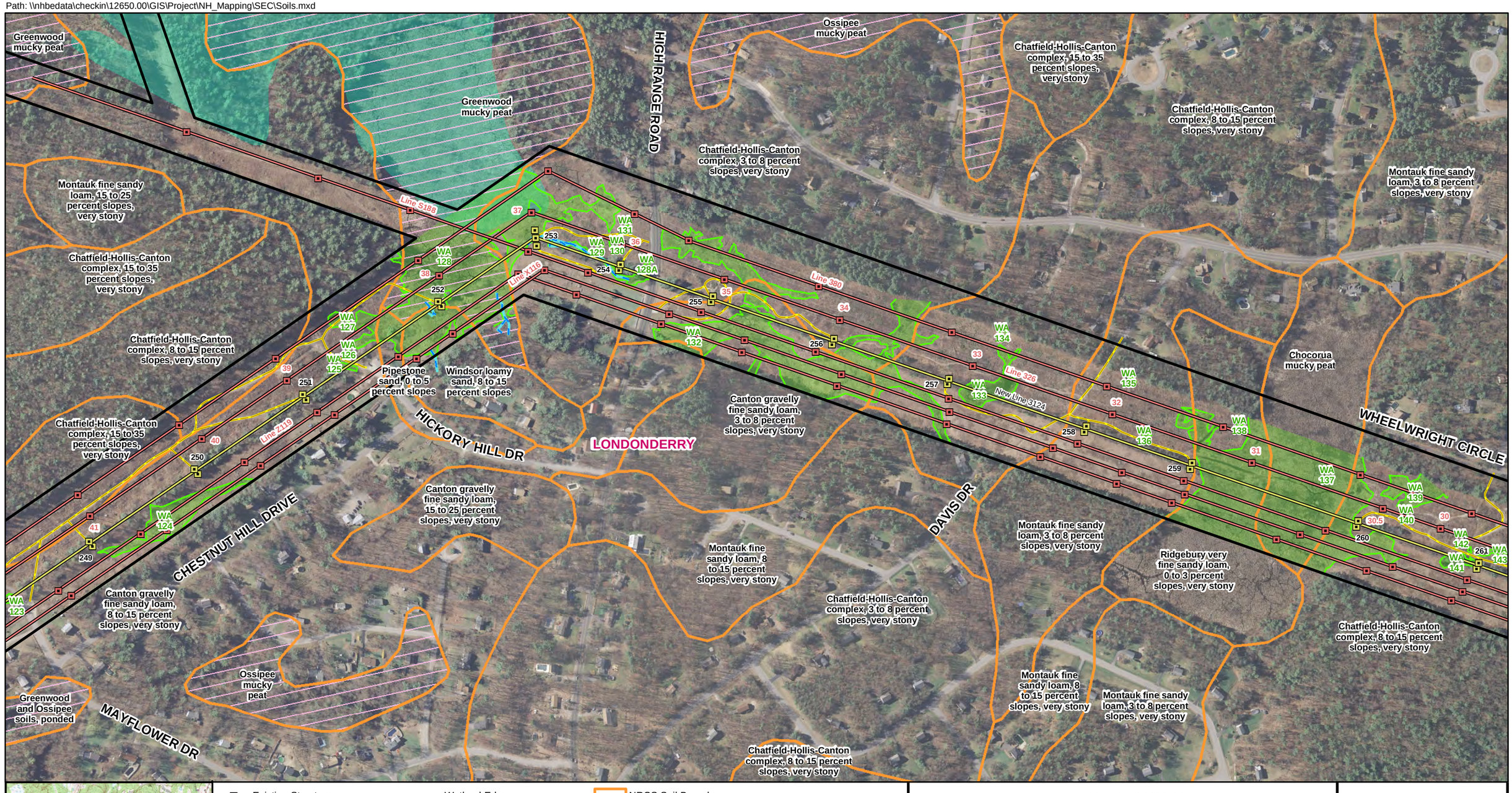

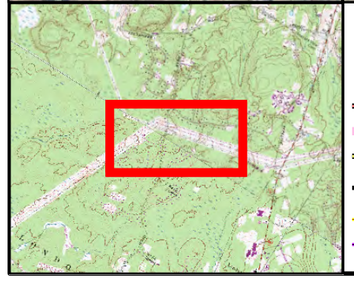

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Figure 2 - NRCS Soils
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to Scobie Pond 345 kV Substation NH

Source:
NGRID,Black & Veatch,VHB
Beals & Thomas,EVERSOURCE,Normandeau

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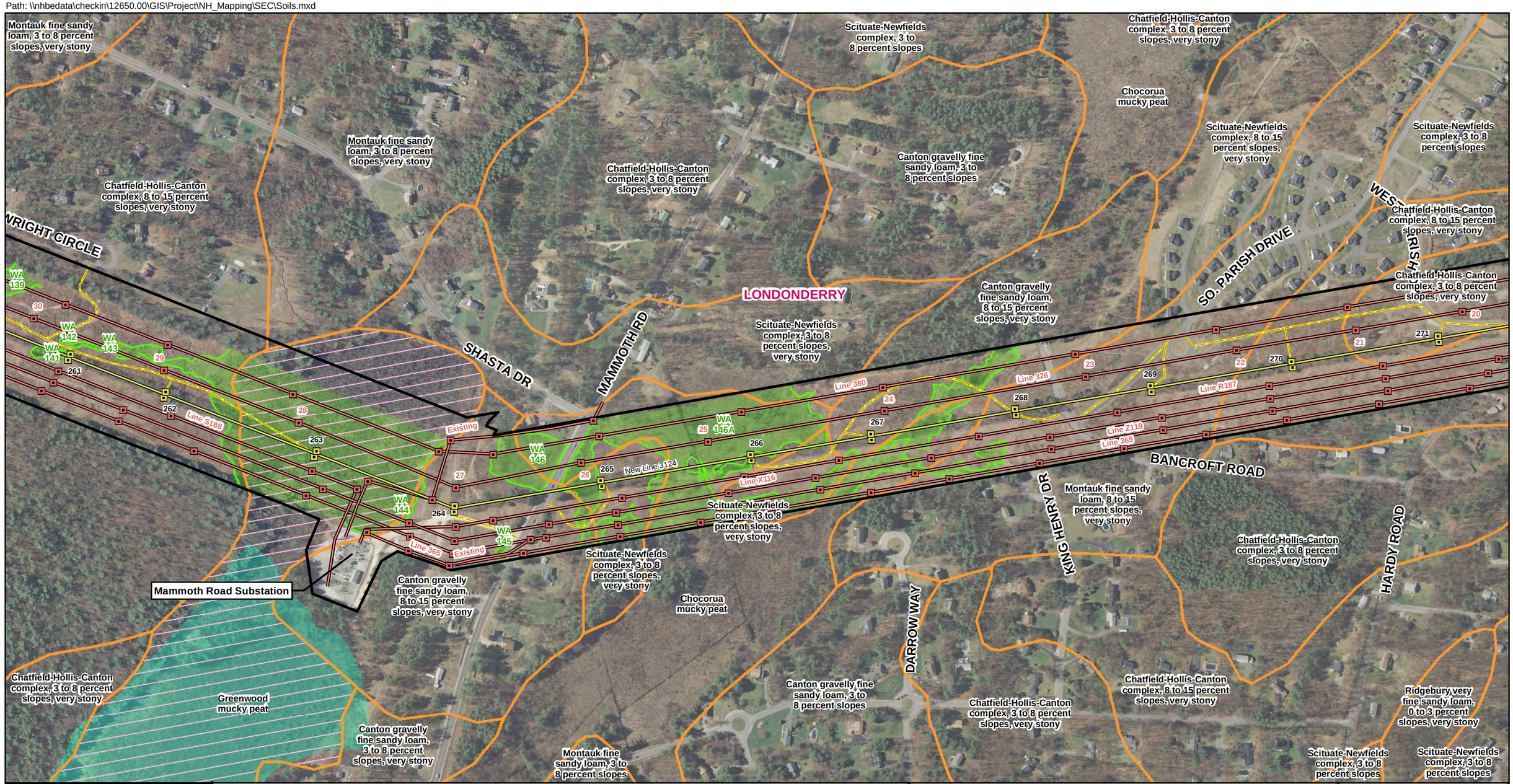

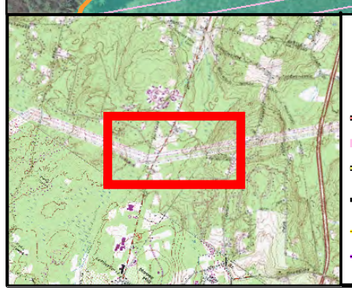

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Figure 2 - NRCS Soils
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to Scobie Pond 345 kV Substation NH

Source:
NGRID,Black & Veatch,VHB
Beals & Thomas,EVERSOURCE,Normandeau

Date: 5/29/2015

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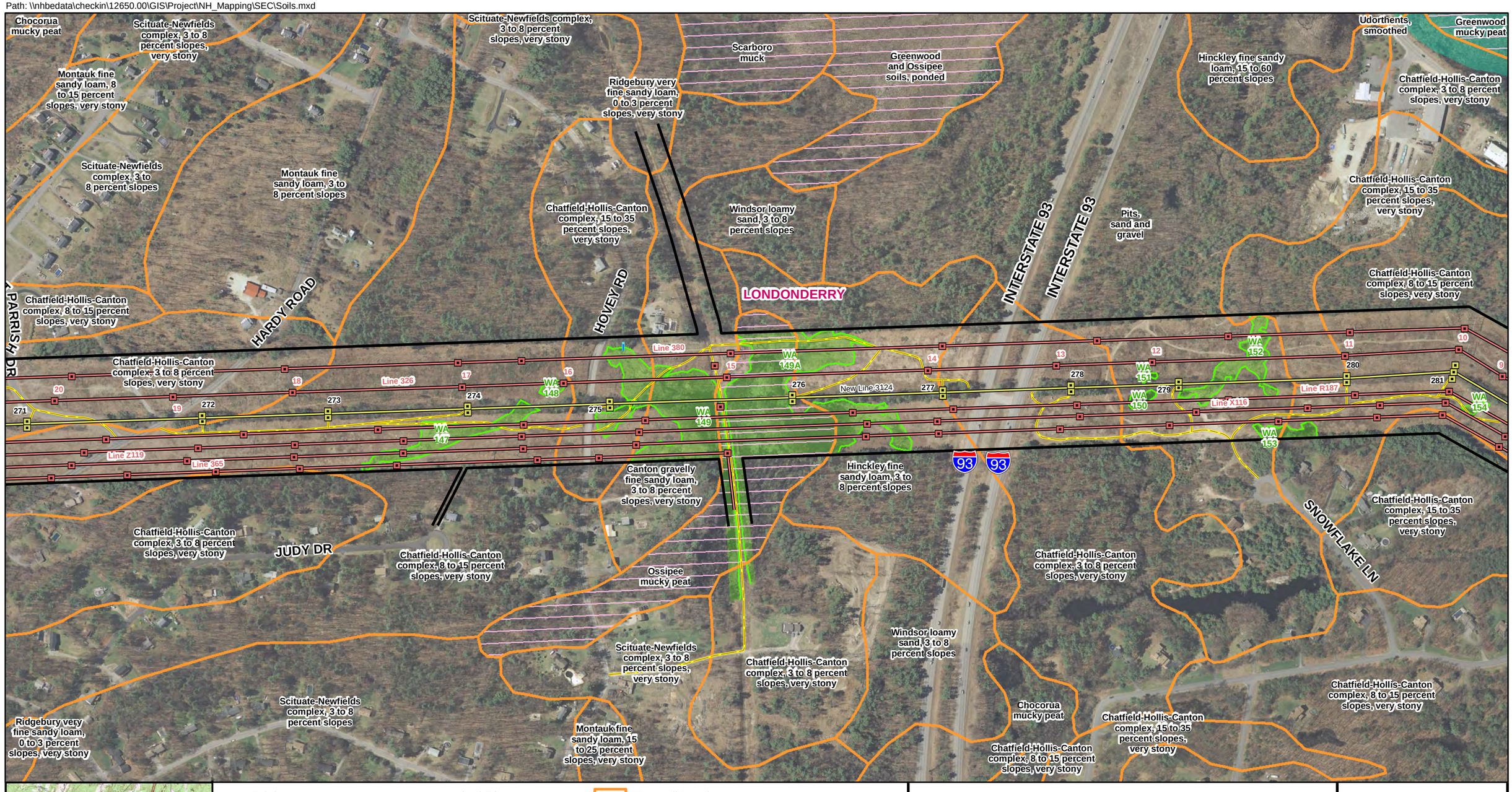

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Figure 2 - NRCS Soils
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Source:
NGRID,Black & Veatch,VHB
Beals & Thomas,EVERSOURCE,Normandeau

Date: 5/29/2015

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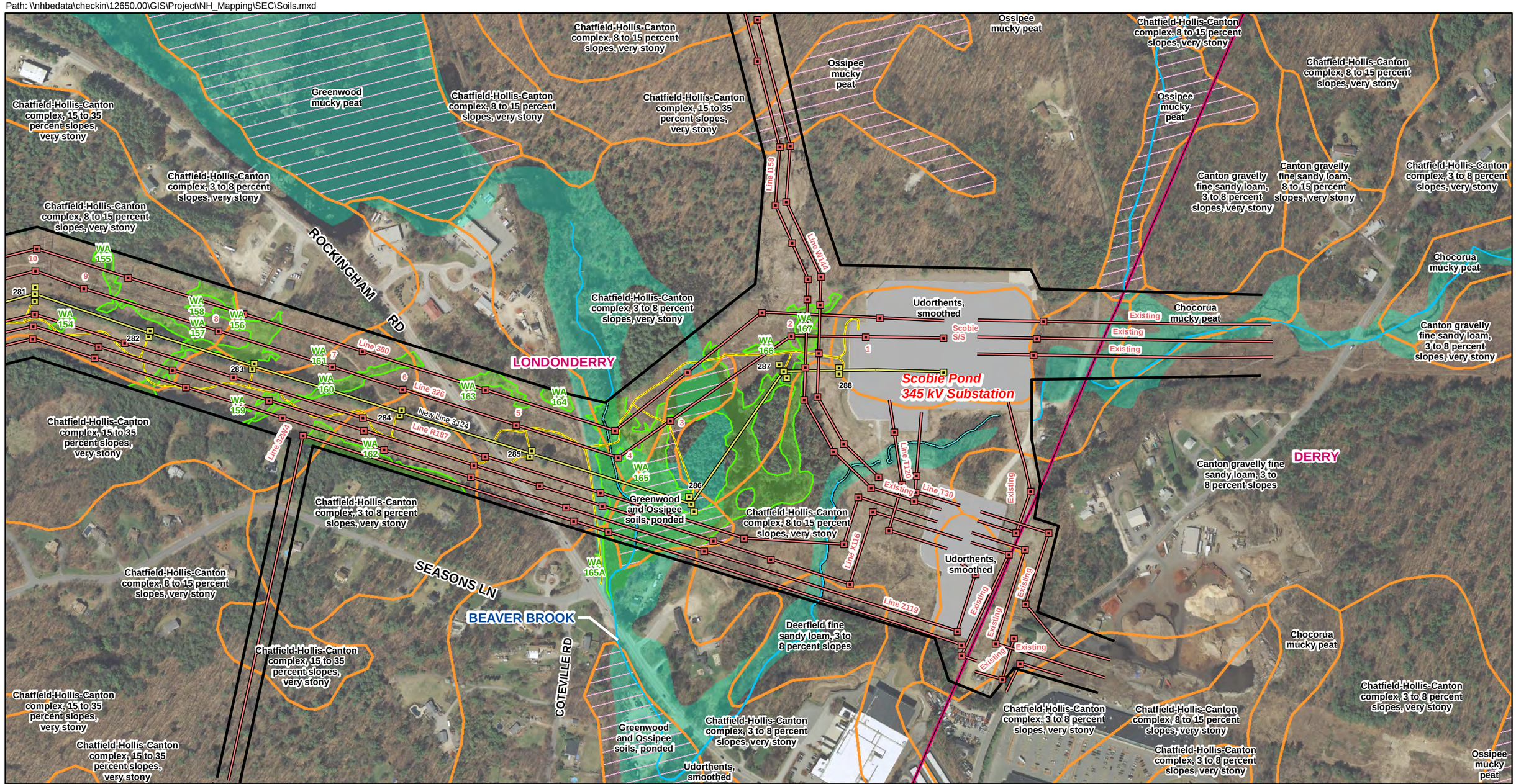

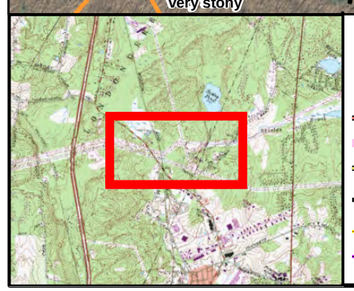

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Figure 2 - NRCS Soils
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to Scobie Pond 345 kV Substation NH

Source:
NGRID,Black & Veatch,VHB
Beals & Thomas,EVERSOURCE,Normandeau

Date: 6/17/2015

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Aerial Photograph of the Site

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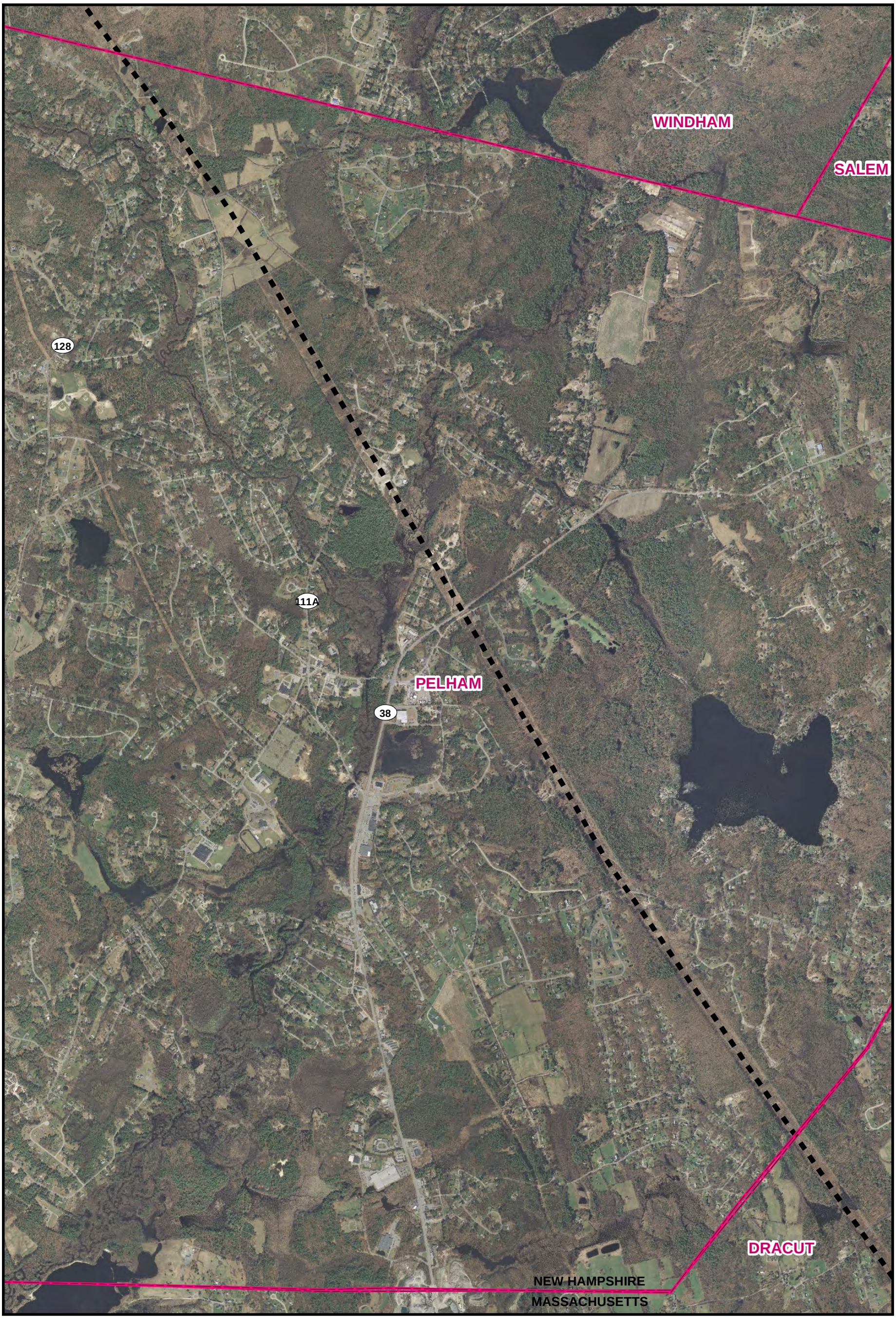
Last Updated Date & Revisions: VHB, 4/13/2015



1 inch = 2,000 feet

Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Aerial Project Overview Map

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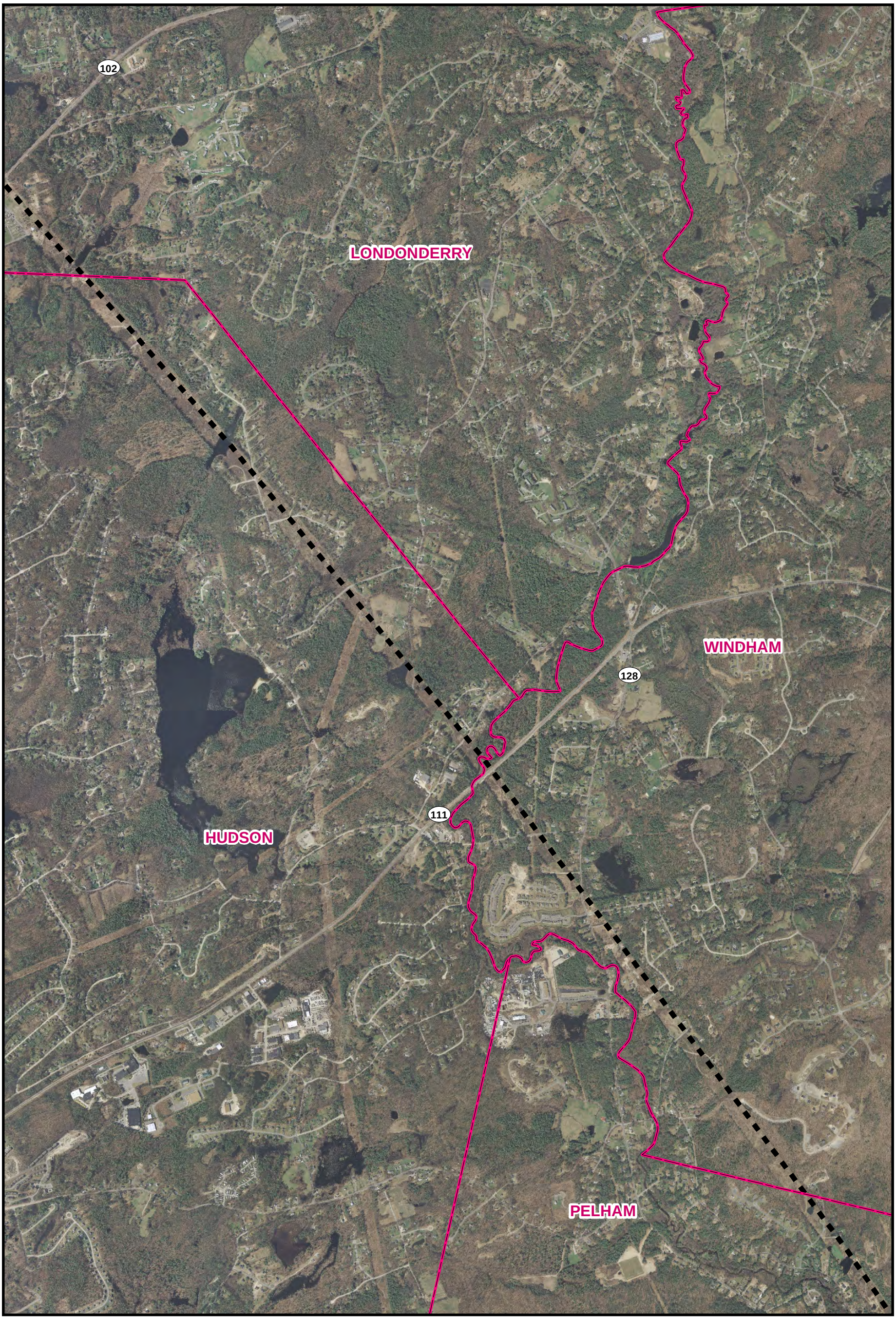

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Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
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Aerial Project Overview Map

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Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
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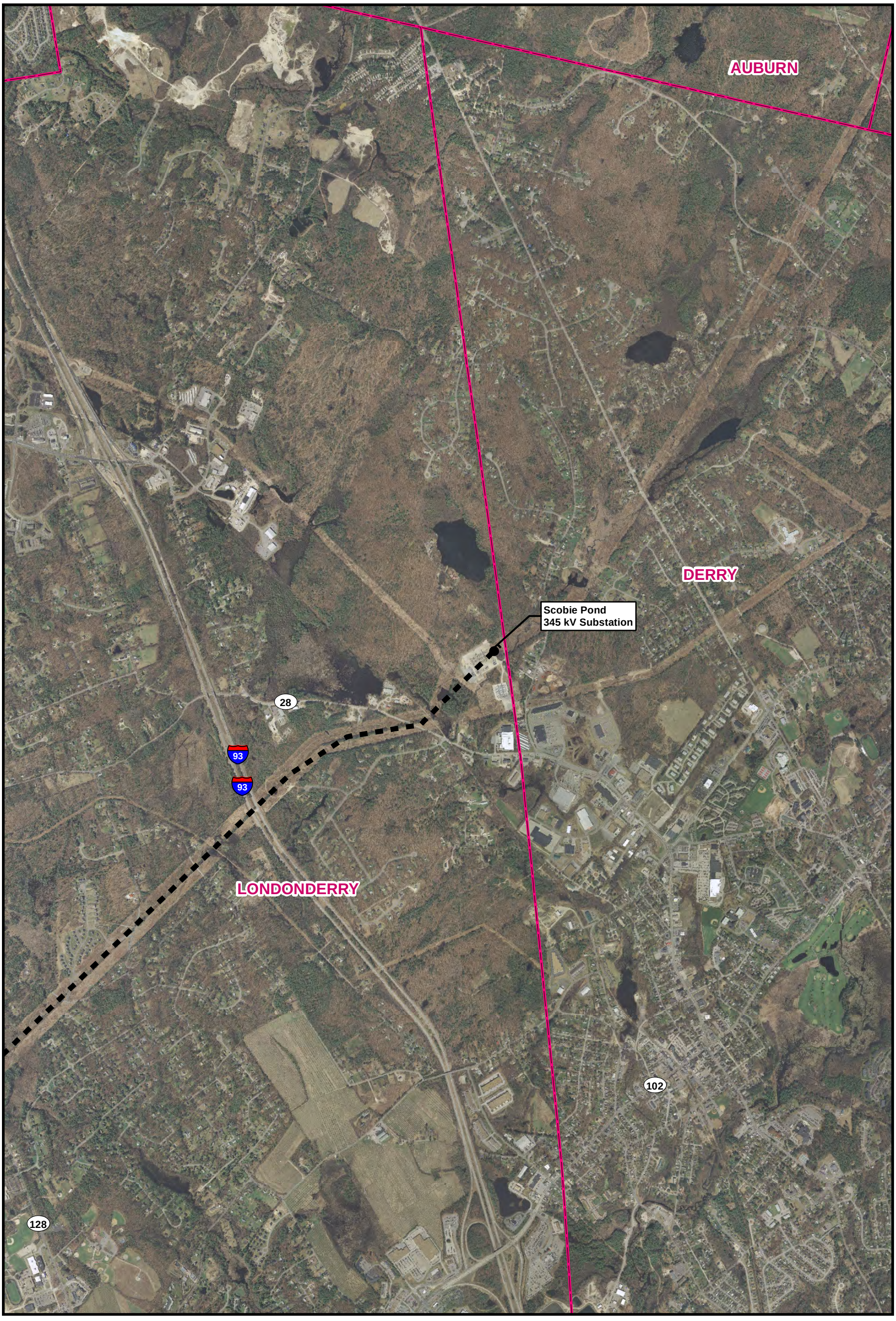

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Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Aerial Project Overview Map

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Site Photographs

Wetland Representative Site Photographs
Merrimack Valley Reliability Project
MA/NH State Line to Scobie Pond Substation, NH

Photo 1: View northwest toward WA 30. Construction work pad is planned in this area for pole installation outside of wetland. Limited tree clearing proposed along edge of ROW. 10/07/2014.

Photo 2: View southwest toward WA 31. General location of planned tree clearing. Construction work pad planned just outside of wetland. 10/07/2014.

Photo 3: View south toward WA 32. Construction work pad is planned in this area for pole installation and removal outside of wetland. 10/07/2014.

Photo 4: View west toward WA 33. Construction work pad is planned in this area for pole installation and removal outside of wetland. 10/07/2014.

Photo 5: View west toward WA 34. Construction work pad is planned in this area for pole installation and removal outside of wetland. 10/07/2014.

Photo 6: View west of access road along edge of WA 36. 04/20/2015.

Photo 7: View northwest toward access road along the edge of WA 36. 04/20/2015.

Photo 8: View south of WA 36. Construction work pad planned to extend into wetland. 04/20/2015.

Photo 9: View northwest toward WA 36A. Construction work pad for pole installation in wetland to extend into this section of the wetland. Tree clearing proposed in wetland along ROW. 10/08/2014.

Photo 10: View southeast of access road through WA 37 where timber access matting is planned. Construction work pad for pole installation is planned just outside of wetland. 10/08/2014.

Photo 11: View west toward WA 39. Construction work pad is planned in this area for pole installation outside of wetland. 10/08/2014.

Photo 12: View east toward WA 39. Timber access matting is planned in this area. 10/08/2014.

Photo 13: View southeast toward WA 40. Limited tree clearing planned along edge of ROW. 10/08/2014.

Photo 14: View west toward WA 41. Limited tree clearing planned along edge of ROW. 10/08/2014.

Photo 15: View southwest toward WA 42C. Construction work pad planned to extend into this wetland for pole installation and removal outside of wetland. Timber access matting is planned along access road through eastern section of wetland. Limited tree clearing planned along edge of ROW. 10/07/2014.

Photo 16: View north toward WA 43 where limited tree clearing is planned. 10/07/2014.

Photo 17: View north toward WA 44. Construction work pad for pole installation in upland to extend into this section of the wetland. 10/08/2014.

Photo 18: View northeast toward WA 44. Construction work pad for pole installation in upland to extend into this section of the wetland. Timber access matting is planned along access road through eastern section of wetland. Tree clearing proposed in wetland along ROW. 10/08/2014.

Photo 19: View north toward WA 45. Timber access matting is planned in this area. 10/08/2014.

Photo 20: View south toward WA 45. Construction work pad for pole installation in upland to extend into this section of the wetland. Tree clearing proposed in wetland along ROW. 10/08/2014.

Photo 21: View south toward WA 46. Construction work pad for pole installation in upland to extend into this section of the wetland. Timber access matting is planned along access road through eastern section of wetland. Tree clearing proposed in wetland along ROW. 10/08/2014.

Photo 22: View east toward WA 46. Construction work pad for pole installation in upland to extend into this section of the wetland. 10/08/2014.

Photo 23: View north toward WA 46. Timber access matting is planned in this area. 10/08/2014.

Photo 24: View north of access road through WA 48 where timber access matting is planned. 10/09/2014.

Photo 25: View north of access road through WA 48 where timber access matting is planned. Construction work pad also planned in this general area for pole installation and removal outside of wetland. 10/09/2014.

Photo 26: View west toward WA 49. Construction work pad planned to extend into a section of this wetland for pole installation and removal outside of wetland. Limited tree clearing planned along edge of ROW. 10/09/2014.

Photo 27: View southeast toward WA 49 where a construction work pad is planned to extend into a section of the wetland for pole installation outside of wetland. 10/09/2014.

Photo 28: View north of NEP access road through toward WA 50 where timber access matting is planned. Tree clearing planned within wetland along edge of ROW. 10/09/2014.

Photo 29: View north of WA 50 where construction work pad is planned for pole installation and removal outside of wetland. General location of proposed permanent road crossing. 10/09/2014.

Photo 30: View northwest toward WA 50 where construction work pad is planned for pole installation outside of wetland. 10/09/2014.

Photo 31: View northwest toward WA 50 where construction work pad is planned to extend into a section of the wetland for pole installation outside of wetland. Tree clearing planned along edge of wetland. 10/09/2014.

Photo 32: View north toward WA 52. Construction work pad is planned in this area for pole installation outside of wetland. 10/09/2014.

Photo 33: View south toward WA 52 where timber access matting is planned to cross wetland. 10/09/2014.

Photo 34: View south toward WA 52. A construction work pad is planned to cross the wetland east of photo for pole removal just outside of wetland. Tree clearing proposed within wetland along edge of ROW. 10/09/2014.

Photo 35: View north toward WA 53. Timber access matting planned for access road through this wetland. Construction work pad for pole installation will extend into the wetland. 10/09/2014.

Photo 36: View south toward WA 54. A construction work pad for pole installation will extend into the wetland to the left of photo. Tree clearing proposed in wetland along edge of ROW. 10/09/2014.

Photo 37: View southeast toward WA 54A. Two construction work pads planned near this area, one for pole installation outside wetland and one to install Structure 51 within wetland. Timber access matting planned along NEP access road into wetland. 10/09/2014.

Photo 38: View west toward WA 59. Construction work pad for pole installation and removal outside of wetland planned in this area. 10/09/2014.

Photo 39: View east toward WA 59. Construction work pad for pole installation and removal outside of wetland planned in this section of the wetland. Timber access matting also planned along NEP access road along edge of wetland. 10/09/2014.

Photo 40: View west toward WA 59D. Construction work pad for pole installation planned in this section of the wetland. 10/09/2014.

Photo 41: View south toward WA 59G. Guard protection area proposed to extend into wetland in this area. 05/15/2015.

Photo 42: View southwest toward WA 60 and SA-18. Tree clearing planned along edge of ROW along the edge of wetland. 04/21/2015.

Photo 43: View north of WA 61. Tree clearing proposed along edge of ROW within this wetland. 04/21/2015.

Photo 44: View north of NEP access road through WA 62 where timber access matting and stone ford installation is planned. 10/09/2014.

Photo 45: View west of unnamed intermittent stream in WA 65. Tree clearing planned nearby. 10/09/2014.

Photo 46: View north toward WA 69. Construction work pad for pole installation outside of wetland to extend into this section of this wetland. Timber access matting planned along access road adjacent to WA 69A. 10/09/2014.

Photo 47: View west toward WA 69. Construction work pad for pole installation and removal outside of wetland and guard protection area. 10/09/2014.

Photo 48: View southwest toward WA 69A. Construction work pad for pole installation outside of wetland to extend into a section of this wetland. Timber access matting planned along access road adjacent to WA 69. 10/09/2014.

Photo 49: View southeast toward WA 72. Construction work pad for pole installation proposed northwest of photo. 10/08/2014.

Photo 50: View north toward WA 73. Construction work pad for pole installation outside of wetland to extend into this section of the wetland. Tree clearing proposed in wetland along ROW. 10/08/2014.

Photo 51: View south toward WA 75A. Construction work pad planned to extend into wetland for pole installation outside of wetland. 10/08/2014.

Photo 52: View north toward WA 75B. NEP access road where timber access matting is planned to right of photo. 10/08/2014.

Photo 53: View east toward second NEP access road through WA 75B where timber access matting is planned. 10/08/2014.

Photo 54: View north of WA 78. Tree clearing planned along visible tree-line. Construction work pad for pull pad site to extend into part of this wetland to right of photo. Timber access matting planned along access road through wetland. Guy anchor installation also proposed within this wetland. 10/08/2014.

Photo 55: View southeast of WA 77B. Tree clearing planned to the right of photo. 10/08/2014.

Photo 56: View west of Eversource access road through WA 77C where timber access matting is planned. Tree clearing planned within wetland along edge of ROW. 10/08/2014.

Photo 57: View north toward WA 77C. Tree clearing planned in this general area. 10/08/2014.

Photo 58: View south of Eversource access road through WA 77D where timber access matting is planned. 10/07/2014.

Photo 59: View south of WA 86 where tree clearing is planned. 10/06/2014.

Photo 60: View west of WA 86. Tree clearing planned to the west of photo. Construction work pad for installing Structure 212 within wetland to the left of photo. 10/06/2014.

Photo 61: View southeast of Eversource access road through WA 86 where timber access matting is planned. Proposed tree clearing to the left of photo. 10/06/2014.

Photo 62: View southeast of vernal pool within WA 88. Proposed tree clearing planned to the right of photo. 10/06/2014.

Photo 63: View southeast toward WA 89. Tree clearing proposed along the edges of this wetland. 10/06/2014.

Photo 64: View south toward vernal pool within WA 90. Limited tree clearing planned along the edges of the wetland within the general visible area. 10/06/2014.

Photo 65: View east of WA 91 where limited tree clearing is planned. 10/05/2014.

Photo 66: View southwest of WA 92. Proposed tree clearing planned northeast of photo. 10/05/2014.

Photo 67: View northeast of WA 93. Tree clearing proposed southwest of photo. 10/03/2014.

Photo 68: View east of WA 93. Timber access matting is planned along access road through the wetland (to left of photo). Further southeast of photo a construction work pad is planned to install Structure 222 within the wetland. Tree clearing planned to the left of photo. 10/03/2014.

Photo 69: View southeast toward WA 94. Tree clearing is planned along part of this wetland. 05/15/2015.

Photo 70: View east toward WA 95. Construction work pad for pole installation to extend into wetland area. Pole to be installed just outside of wetland. 10/03/2014.

Photo 71: View northwest along Eversource access road through WA 97 where timber access matting is planned. 10/03/2014.

Photo 72: View northeast toward WA 97 and Nesenkeag Brook. Limited tree clearing proposed along visible tree-line. 10/03/2014.

Photo 73: View west toward WA 98, tree clearing planned to right of photo. Vernal pool located in this wetland north of photo. 10/03/2014.

Photo 74: View east toward WA 99. Tree clearing is planned along the edge of this wetland. 05/15/2015.

Photo 75: View east toward WA 101 near the edge of proposed construction work pad area for nearby pole installation just outside of wetland. Tree clearing planned nearby. 10/03/2014.

Photo 76: View north toward WA 101. Tree clearing planned south of photo. 10/03/2014.

Photo 77: View west of the edge of WA 102A where tree clearing is planned. 10/03/2014.

Photo 78: View west toward vernal pool within WA 102. Tree clearing planned nearby. 10/03/2014.

Photo 79: View south of WA 102 near location of construction work pad for pole installation outside of wetland. Tree clearing planned nearby. 10/03/2014.

Photo 80: View northeast toward WA 102C. Proposed tree clearing is planned nearby. 10/03/2014.

Photo 81: View east toward intermittent stream in WA 104 where limited tree clearing is proposed. 10/03/2014.

Photo 82: View east of WA 105. Tree clearing planned to the west of photo. 10/02/2014.

Photo 83: View northeast toward WA 105A. Tree clearing planned within this wetland. 05/15/2015.

Photo 84: View east toward WA 105B where tree clearing is planned. 05/15/2015.

Photo 85: View east of unnamed perennial stream in WA 106 where limited tree clearing is planned. 10/02/2014.

Photo 86: View west toward WA 108. Construction work pad to extend into edge of wetland as part of a large pull pad site. Guy anchor installation also proposed within this wetland. 10/02/2014.

Photo 87: View east of WA 109 where construction work pad is planned along the edge of the wetland as part of a large pull pad site. 10/02/2014.

Photo 88: View northeast toward WA 110. Tree clearing planned in this area. 10/02/2014.

Photo 89: View south of the Eversource access road through first section of WA 111 where timber access matting is planned. Construction work pad site and proposed tree clearing left of photo. 10/02/2014.

Photo 90: View south of Eversource access road through second section of WA 111 where timber access matting is planned. Further south a construction work pad is planned for pole installation. 10/02/2014.

Photo 91: View south of WA 112. Further south is the Eversource access road where timber access matting is planned. Tree clearing planned nearby. Construction work pad for pole installation also planned nearby. 10/02/2014.

Photo 92: View south of Eversource access road through WA 114 where timber access matting is planned. Narrow strip of trees visible is proposed to be cleared. 10/01/2014.

Photo 93: View north, location of vernal pool within WA 114. Planned tree clearing nearby. 10/01/2014.

Photo 94: View south of Eversource access road through WA 115 where timber access matting is planned. 10/01/2014.

Photo 95: View northeast of WA 115. Tree clearing and construction work pad for pole installation planned to the left of photo. 10/01/2014.

Photo 96: View southwest of Eversource access road through WA 117 where timber access matting is planned. Northeast of photo is location for construction work pad and pole installation. Pad to extend into wetland, pole to be installed just outside of wetland. 10/01/2014.

Photo 97: View northeast toward WA 117A where tree clearing is planned. 05/15/2015.

Photo 98: View southwest toward WA 117. Northeast of photo is the location of proposed construction work pad for pole installation. Tree clearing is planned to the left of photo. 10/01/2014.

Photo 99: View northwest of WA 117B where an intermittent stream runs through the wetland. Location of construction work pad for pole installation to right of photo. Tree clearing also planned. 10/01/2014.

Photo 100: View east toward WA 120 where construction work pad is planned. 05/15/2015.

Photo 101: View south toward WA 123 where tree clearing is planned. 05/15/2015.

Photo 102: View south toward WA 124. Construction work pad proposed along the edge of this wetland. Tree clearing proposed within this wetland.

Photo 103: View west toward WA 125 where tree clearing is planned. 05/15/2015.

Photo 104: View north of Eversource access road through WA 127 where timber access matting is planned. 10/01/2014.

Photo 105: View east toward Eversource access road through WA 128 where timber access matting is planned. Construction work pad planned for area further east for pole installation in an upland area within wetland WA 128. Tree clearing is also planned for this area. 10/01/2014.

Photo 106: View west toward WA 128. Planned location of a large construction work pad area for pull pad and guard protection area. Structure 253 proposed to be installed just inside this wetland. Tree clearing proposed to right of photo. Guy anchor installation also proposed in this area. 09/30/2014.

Photo 107: View southeast toward WA 128A of area where clearing is planned. General location of construction work pad for pole installation just outside of wetland. 09/30/2014.

Photo 108: View east toward WA 132. Tree clearing is planned to right of photo. 09/30/2014.

Photo 109: View west along Eversource access road through WA 132 where timber access matting is planned. Tree clearing also planned within this wetland. 09/30/2014.

Photo 110: View east toward WA 133. Location of planned tree clearing. 09/30/2014.

Photo 111: View east toward WA 137. Tree clearing proposed within wetland along edge of ROW. 09/30/2014.

Photo 112: View west toward WA 137. To the west is the location of a construction work pad for pole installation just outside of wetland. 09/30/2014.

Photo 113: View east toward WA 141. Tree clearing is planned to the left of photo. A construction work pad for pole installation is to cross a corner of the wetland. 09/29/2014.

Photo 114: View northeast toward WA 143 where construction work pad is proposed to extend into wetland. 05/15/2015.

Photo 115: View east toward WA 144 along Eversource access road where timber access matting is planned. Clearing planned to right of photo. 09/30/2014.

Photo 116: View west of WA 144. Location of construction work pad to install Structure 263. Access road nearby. East of photo is location of proposed construction work pad for pull pad site. 09/29/2014.

Photo 117: View northeast toward WA 146A along Eversource access road where timber access matting is planned. 09/26/2014.

Photo 118: View north towards WA 146A. Near proposed structure where construction work pad is planned. Tree clearing planned to the left of photo. Access road just outside of wetland. 09/26/2014.

Photo 119: View west toward Eversource access road crossing WA 146A where timber access matting is planned. Tree clearing also planned within this wetland. 09/26/2014.

Photo 120: View west of WA 147 where tree clearing is planned. 09/26/2014.

Photo 121: View southeast of WA 147. Timber access matting planned where Eversource access road crosses wetland. 09/26/2014.

Photo 122: View northeast toward WA 149. Tree clearing is planned is to the right of the photo. Construction work pad planned on edge of wetland in general location of photo. 09/25/2014.

Photo 123: View west toward wetland WA 149 from access road between WA 149 and WA 149A. Tree clearing planned for strip of trees in the middle of ROW. 09/25/2014.

Photo 124: View northeast along Eversource access road toward WA 149A where timber access matting is planned. Construction work pad for pole installation and guard protection area proposed east of photo. Tree clearing also planned within this wetland. 09/25/2014.

Photo 125: View west of WA 152 toward the strip of trees proposed to be removed. Construction work pad and tree clearing planned within wetland. 09/25/2014.

Photo 126: View east toward WA 154 where access matting is planned. 05/15/2015.

Photo 127: View west toward southern end of WA 156 along access road. Location of timber mat access. Tree clearing planned to right of photo. 09/25/2014.

Photo 128: View east toward Eversource access road through WA 156 where timber access matting is planned. 09/25/2014.

Photo 129: View east toward southern end of WA 160 along access road. Access matting is planned to the east. Tree clearing planned to right of photo. To the north of photo is the proposed location for a construction work pad for pole installation. 09/25/2014.

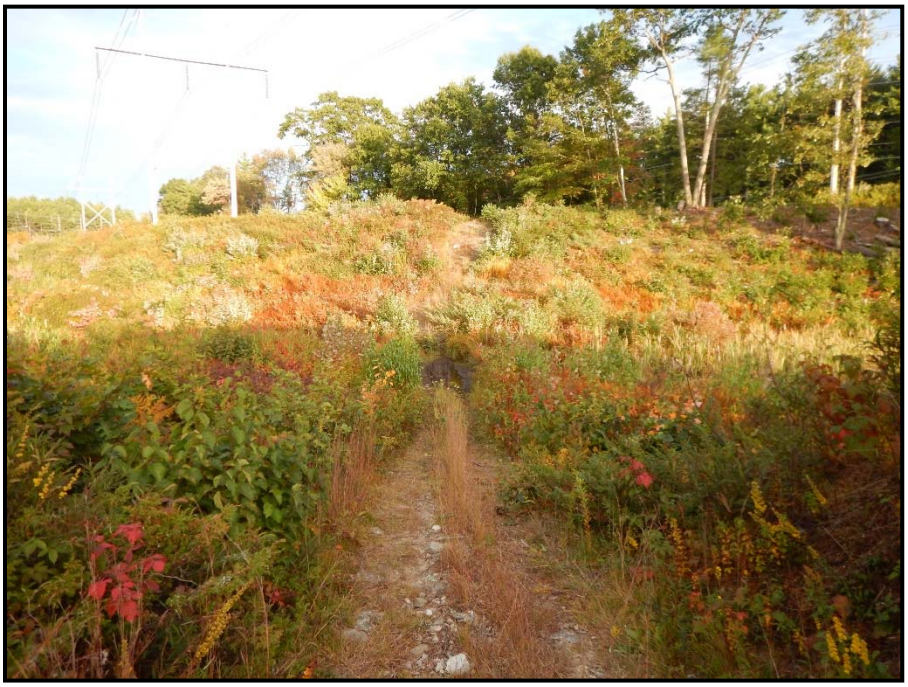

Photo 130: View east of Eversource access road through WA 160. Timber access matting proposed along access road through wetland. Tree clearing planned within wetland. 09/25/2014.

Photo 131: View south along Eversource access road through WA 165 where timber access matting is proposed. Clearing planned within wetland along ROW edges.09/25/2014.

Photo 132: View west of WA 165 in wooded area; general location of where a construction work pad is to be placed for pole installation and pull pad site. General location for guy anchor installation. 09/25/2014.

Photo 133: View southwest of Eversource access road next to WA 166. A construction work pad is to be placed over part of this wetland for a pull pad site. General location for guy wire installation. 09/24/2014.

Photo 134: View south toward WA 167 near the Scobie Pond Substation. A construction work pad is to be placed over part of this wetland for a pull pad site. 09/24/2014.

Photo 135: View northeast to OR2 at location of proposed permanent crossing. 04/21/2015.

Stream Representative Site Photographs
Merrimack Valley Reliability Project
MA/NH State Line to Scobie Pond Substation NH

Photo 1: View west of intermittent stream SA-11 to the south of Dutton Road. Limited tree clearing is proposed along western edge of the ROW in this location. 10/08/2014.

Photo 2: View east of intermittent stream SA-11 where limited tree clearing is planned along the western edge of the ROW to the north of Dutton Road within WA36A .04/21/2015.

Photo 3: View east of intermittent stream SA-12 where limited tree clearing is planned along the western edge of the ROW. 04/21/2015.

Photo 4: View of Golden Brook (SA-14), a perennial stream located within Lower Golden Brook Prime Wetland. Minimal tree clearing, as well as construction work pads are planned along the edge of the brook. Structure 34 and 98 are planned to be installed adjacent to (north of) the brook. 04/21/2015.

Photo 5: View northwest where timber mat access is planned along NEP access road across perennial stream SA-16. 10/09/2014.

Photo 6: View northeast of SA-16 where construction work pads are planned for pole installation and removal. 04/21/2015.

Photo 7: View west of perennial stream SA-18 where limited tree clearing is planned. 04/24/2015.

Photo 8: View southwest of intermittent stream SA-19 where limited tree clearing is planned. 04/21/2015.

Photo 9: View west of perennial stream SA-20. Limited tree clearing is planned along the western edge of the ROW adjacent to this channel. 10/09/2014.

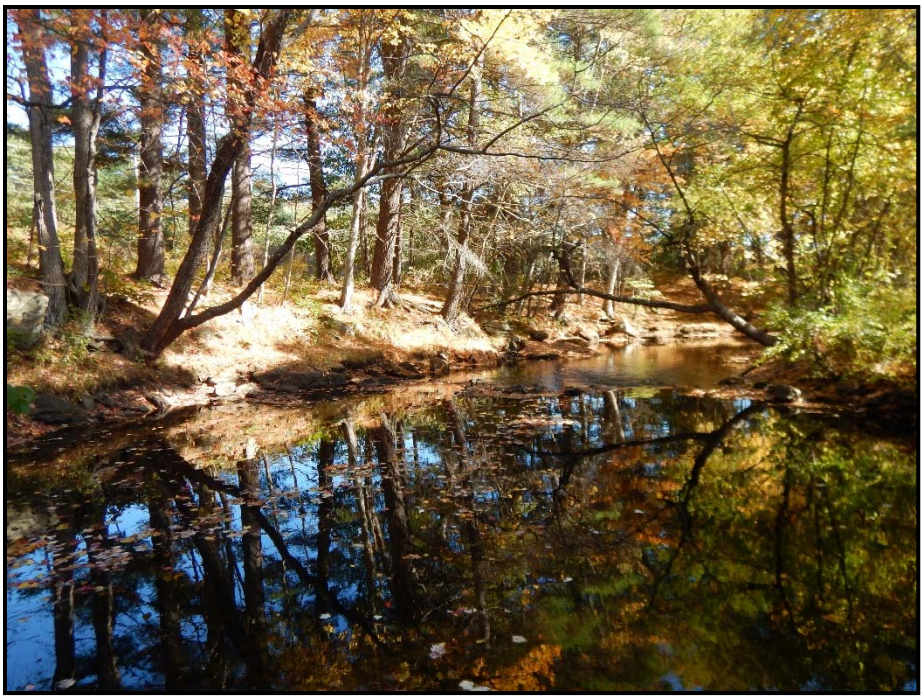

Photo 10: View of Beaver Brook (SA-21) looking east toward NEP ROW. Limited tree clearing is planned along the edge of the ROW. 10/09/2014.

Photo 11: View west of intermittent stream SA-22 towards proposed tree clearing along western edge of NEP ROW. 10/09/2014.

Photo 12: View of perennial stream SA-23 where limited tree clearing is planned. 04/21/2015.

Photo 13: View southeast of Beaver Brook (SA-24) to the north NH Route 111. Limited tree clearing is proposed adjacent to the brook along the western edge of the ROW. 10/08/2014.

Photo 14: View southeast to the start of perennial stream SA-27 where it flows west out of WA77B. Tree clearing is planned in this area. 10/08/2014.

Photo 15: View west of PSNH access road crossing intermittent stream SA-28 where timber access matting is planned. 10/08/2014.

Photo 16: View southeast of intermittent stream SA-28 where tree clearing is planned. 10/08/2014.

Photo 17: View southeast of SA-29 (Howard Brook) where timber access matting is planned. Additionally, limited tree clearing is proposed along the eastern edge of the ROW. 10/06/2014.

Photo 18: View northeast of Chase Brook (SA-30) where tree clearing is planned along the eastern edge of the ROW. 10/06/2014.

Photo 19: View southeast of access road where timber access matting is planned across Nesenkeag Brook (SA-32). Limited tree clearing is planned along the eastern edge of the ROW (photo left). 4/22/2015.

Photo 20: View south of SA-33 looking toward ROW where tree clearing is planned. 10/02/2014.

Photo 21: View east of perennial stream SA-34 along the eastern edge of the ROW where tree clearing is planned. 10/02/2014.

Photo 22: View northeast of intermittent stream SA-35along the eastern edge of the ROW where tree clearing is planned. 10/02/2014.

Photo 23: View south of ROW access road crossing intermittent stream SA-37 where timber access matting is planned. Tree clearing is also planned down the center of the ROW in this location. 10/01/2014.

Photo 24: View west of intermittent stream SA-38 where tree clearing is planned down the center of the ROW. 10/1/2014.

Photo 25: View south of ROW access road crossing intermittent stream SA-38 where timber access matting is planned. 04/22/2015.

Photo 26: View north of intermittent stream SA-39. Construction work pad for pole installation to extend across stream. Timber access matting planned where ROW access road crosses stream. 04/22/2015.

Photo 27: View west of intermittent stream SA-41 where construction work pad and tree clearing is planned. 04/21/2015.

Photo 28: View west of intermittent stream SA-41 where construction work pad is planned for pull pad site. Also location of planned tree clearing. South of photo is where Structure 253 is proposed to be installed adjacent to channel. 04/21/2015.

Photo 29: View east to proposed location of outlet of realigned western end of stream SA-41 within wetland WA 128. 04/21/2015.

Photo 30: View west of SA-149A which flows into wetland WA 149. 04/22/2015.

Photo 31: View northeast of ROW access road crossing perennial stream SA-43 where access matting is planned. 09/25/2014.

Photo 32: View northwest of SA-43. Access matting across stream planned nearby. Tree clearing also planned southern side ROW adjacent to this stream. 09/25/2014.

Attachment B:

Alteration of Terrain Permitting Plans

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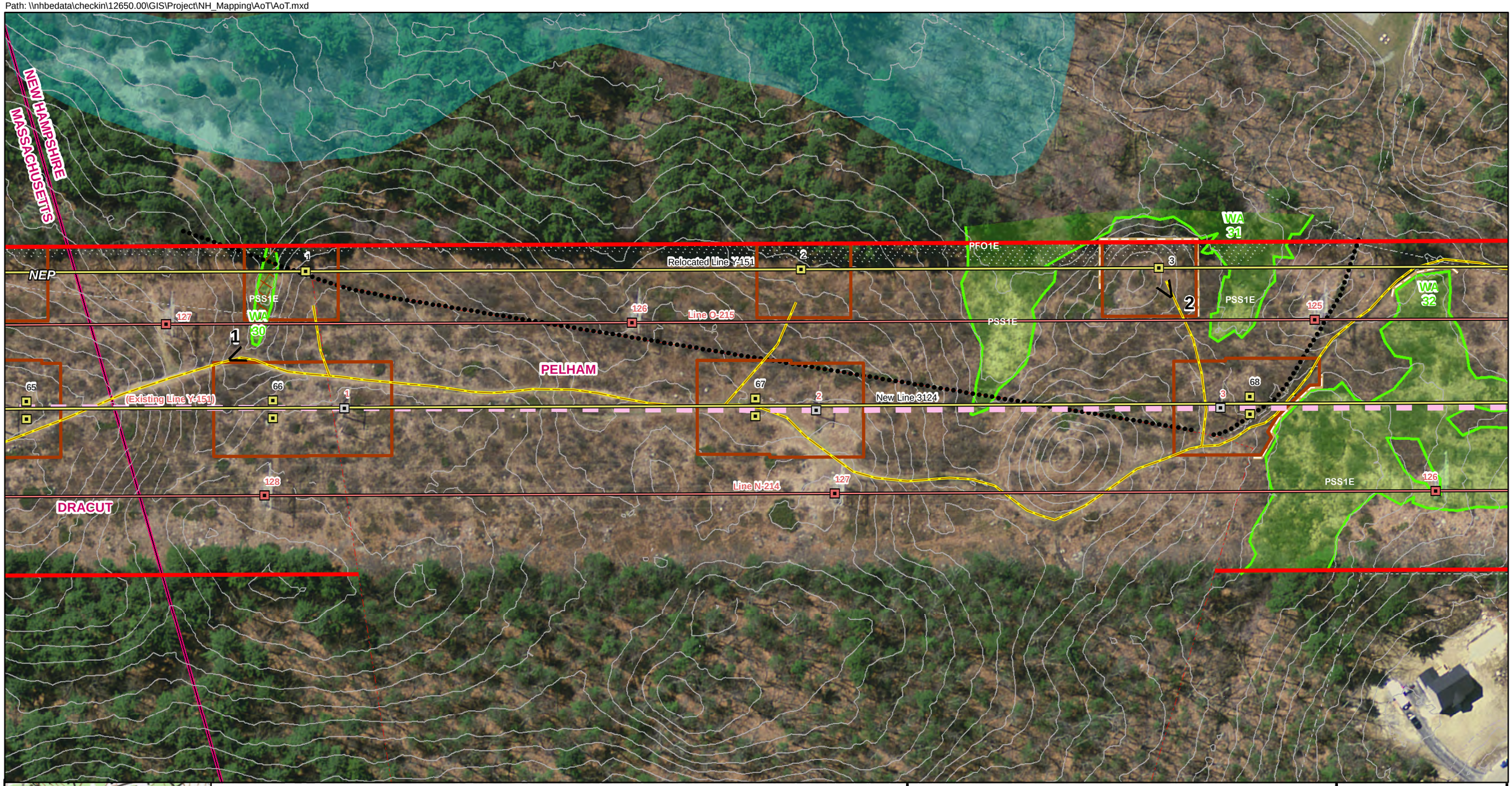

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Swamp Mat Access
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Laydown Area
Stone Apron
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Fence

Stone Wall
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Tree Clearing Area
Photo Location
Town Boundary

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0 50 100 200
Feet

Alteration of Terrain Permitting Plans
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Source:
NGRID,Black & Veatch,VHB,
Beals & Thomas,Eversource,Normandeau

Date: 6/30/2015

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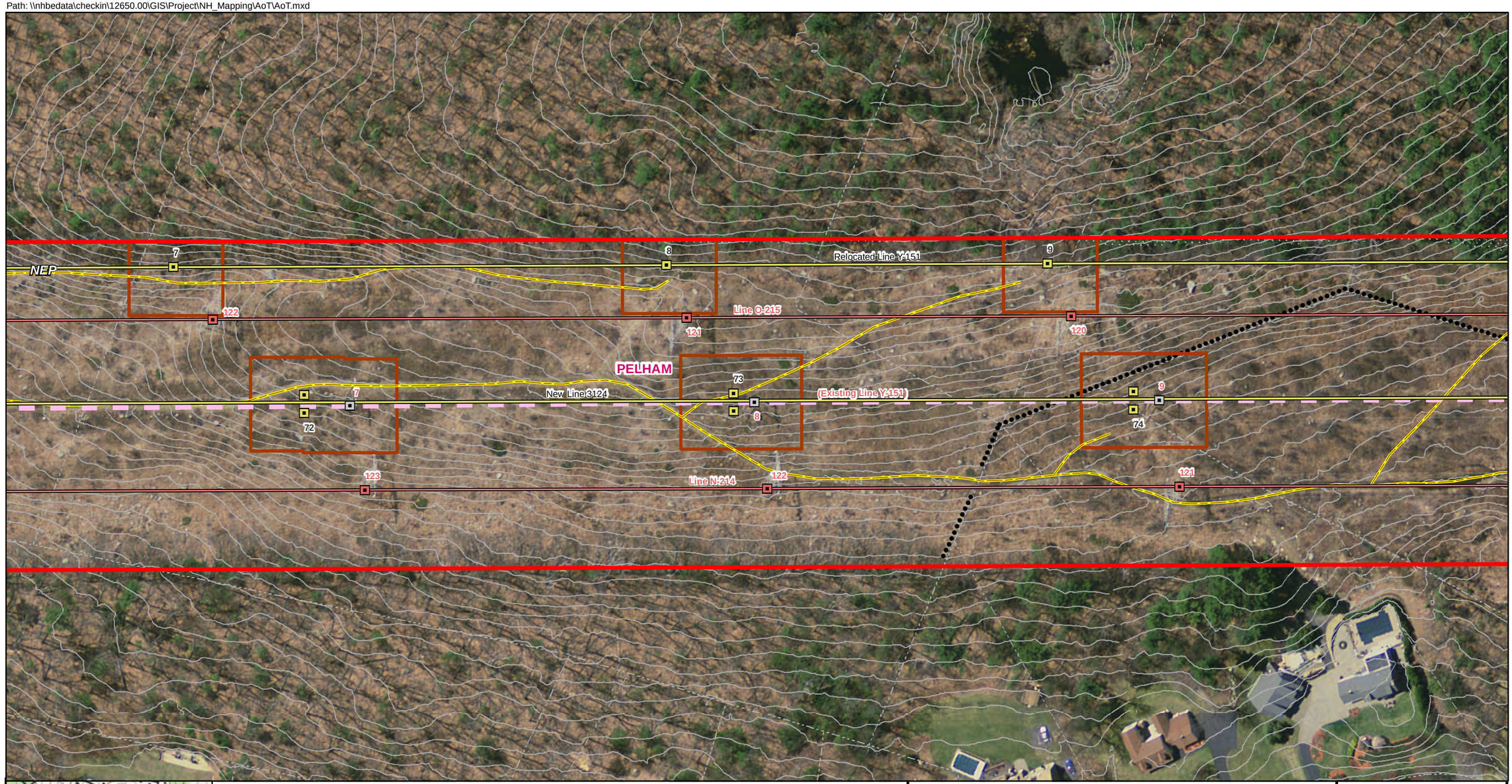

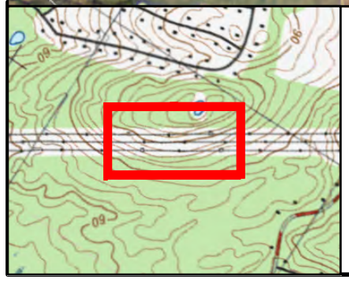

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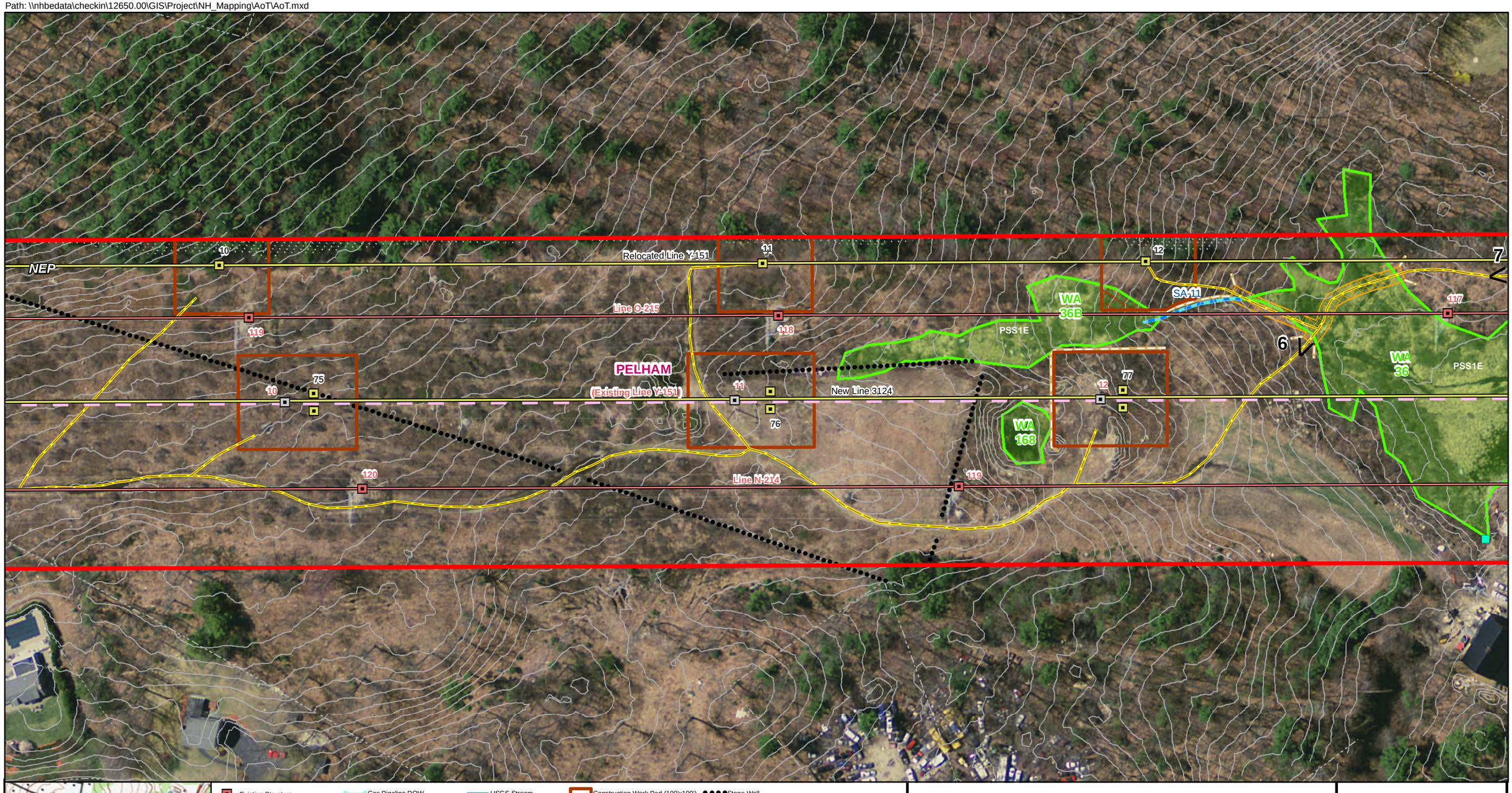

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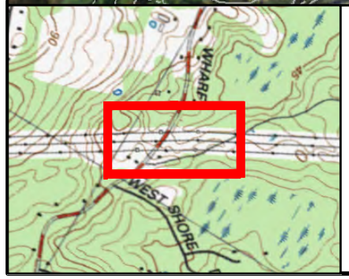

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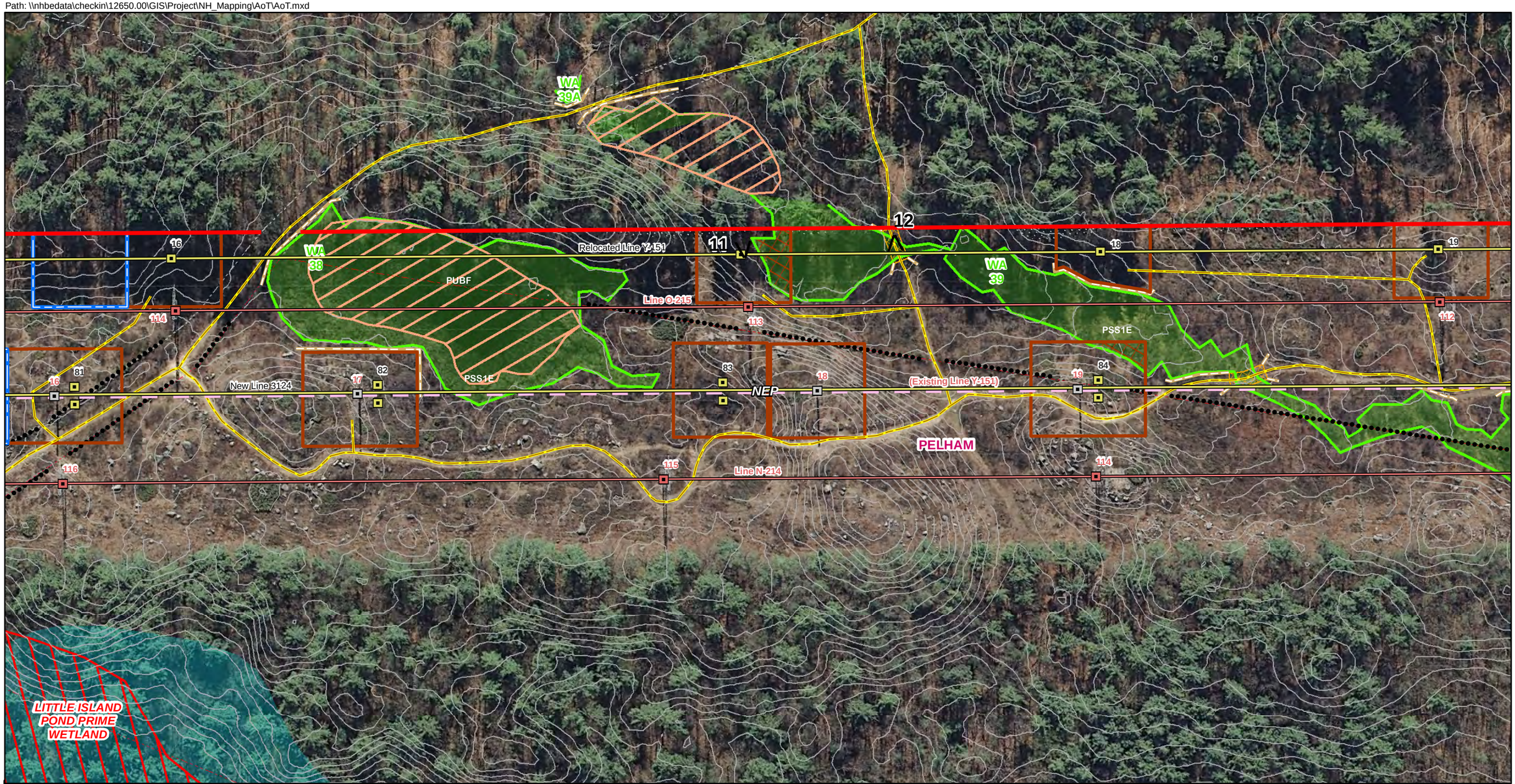

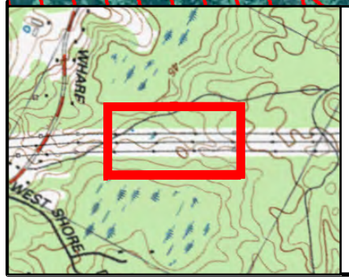

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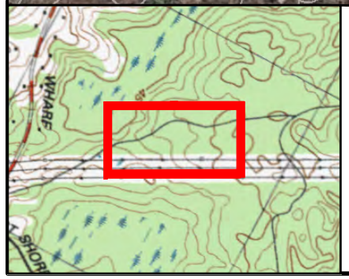

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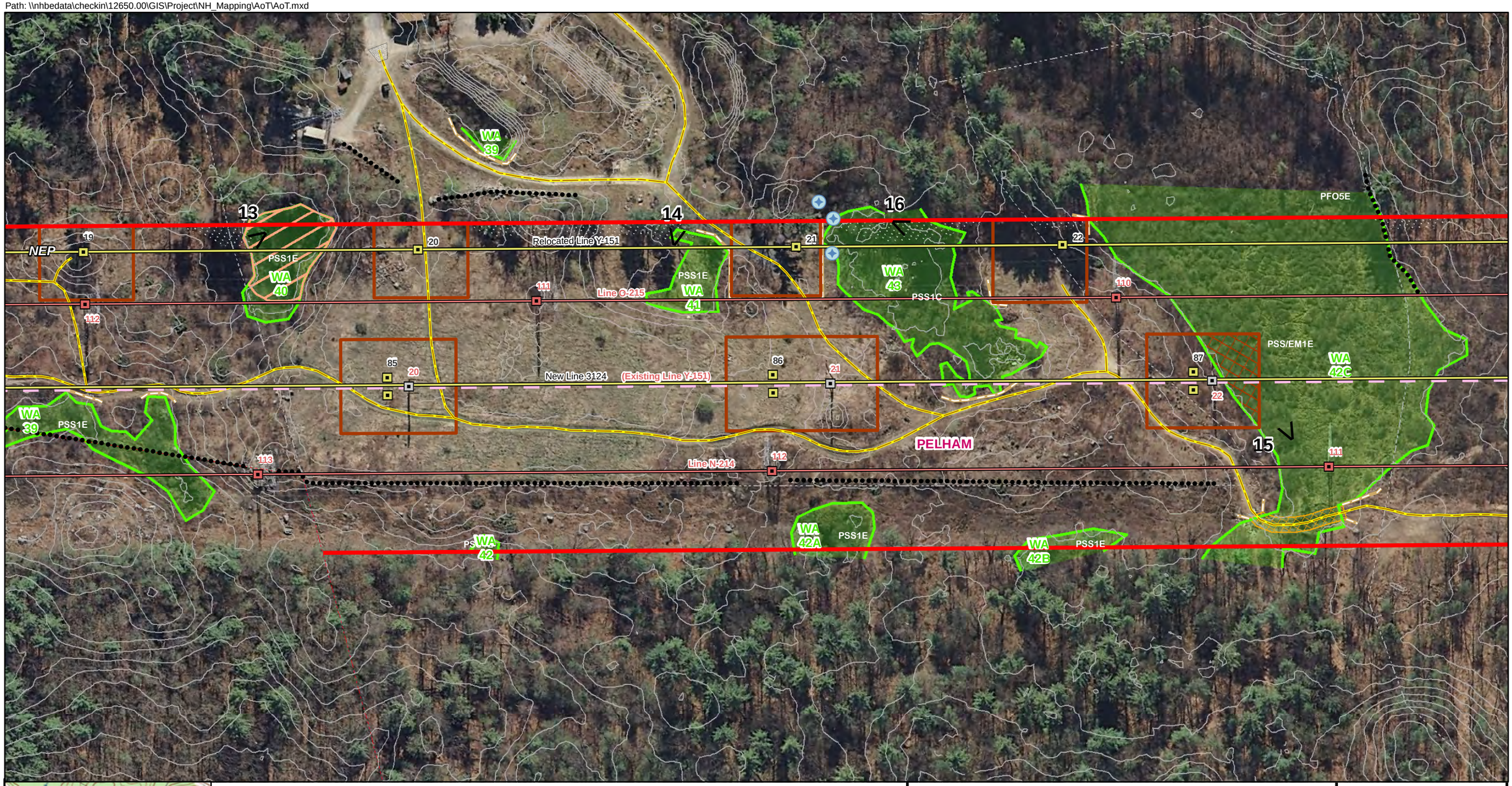

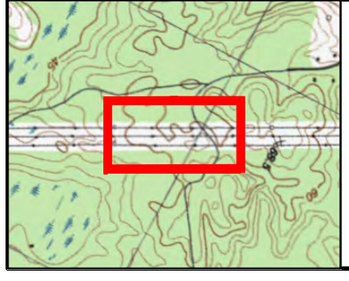

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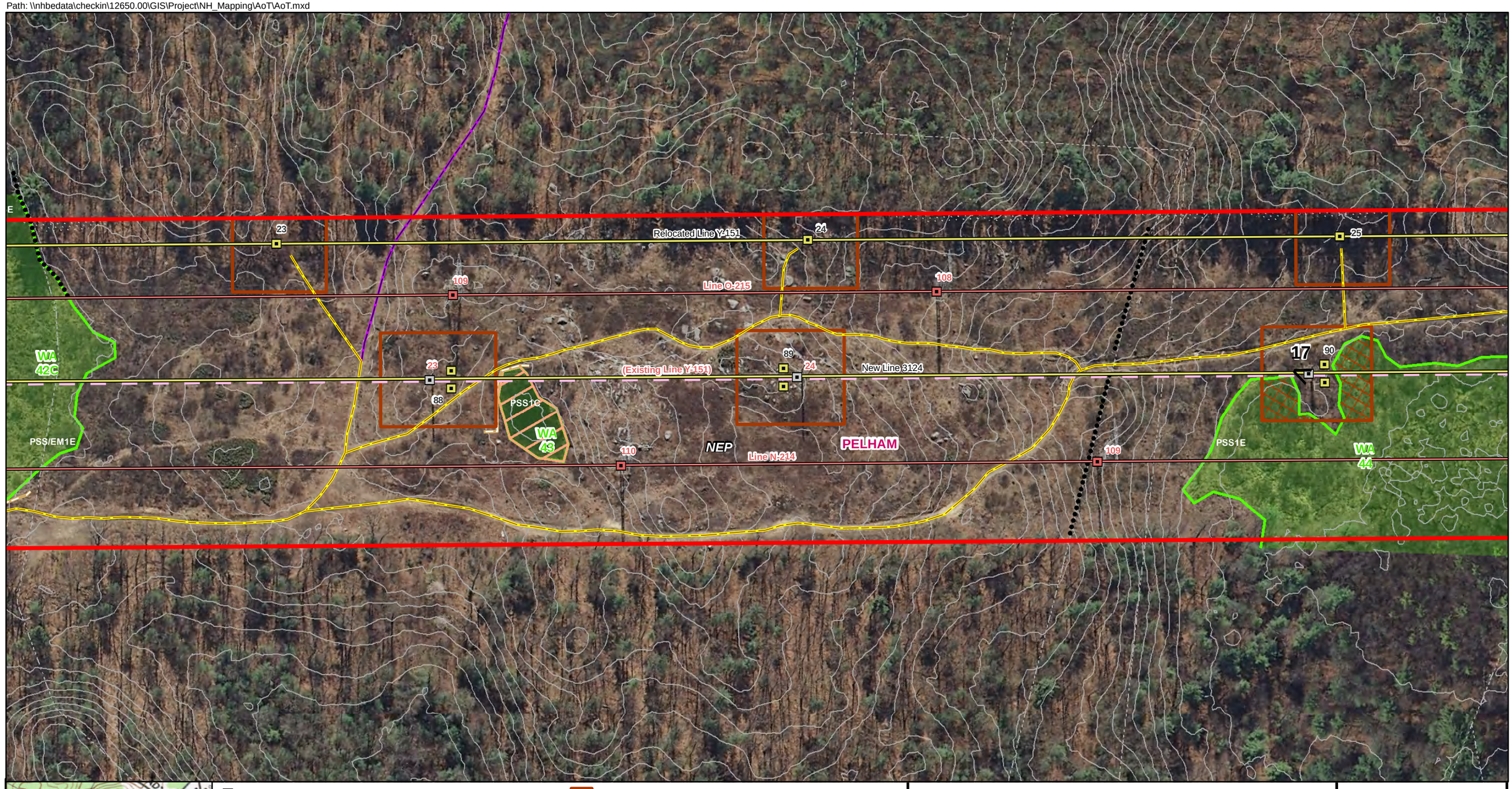

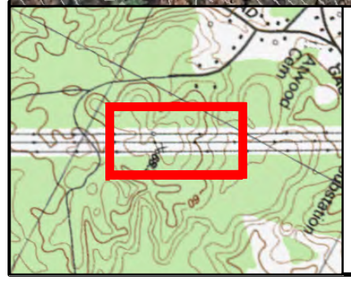

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Fence

Stone Wall
Erosion Control
Tree Clearing Area
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Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Source:
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Beals & Thomas,Eversource,Normandeau

Date: 6/30/2015

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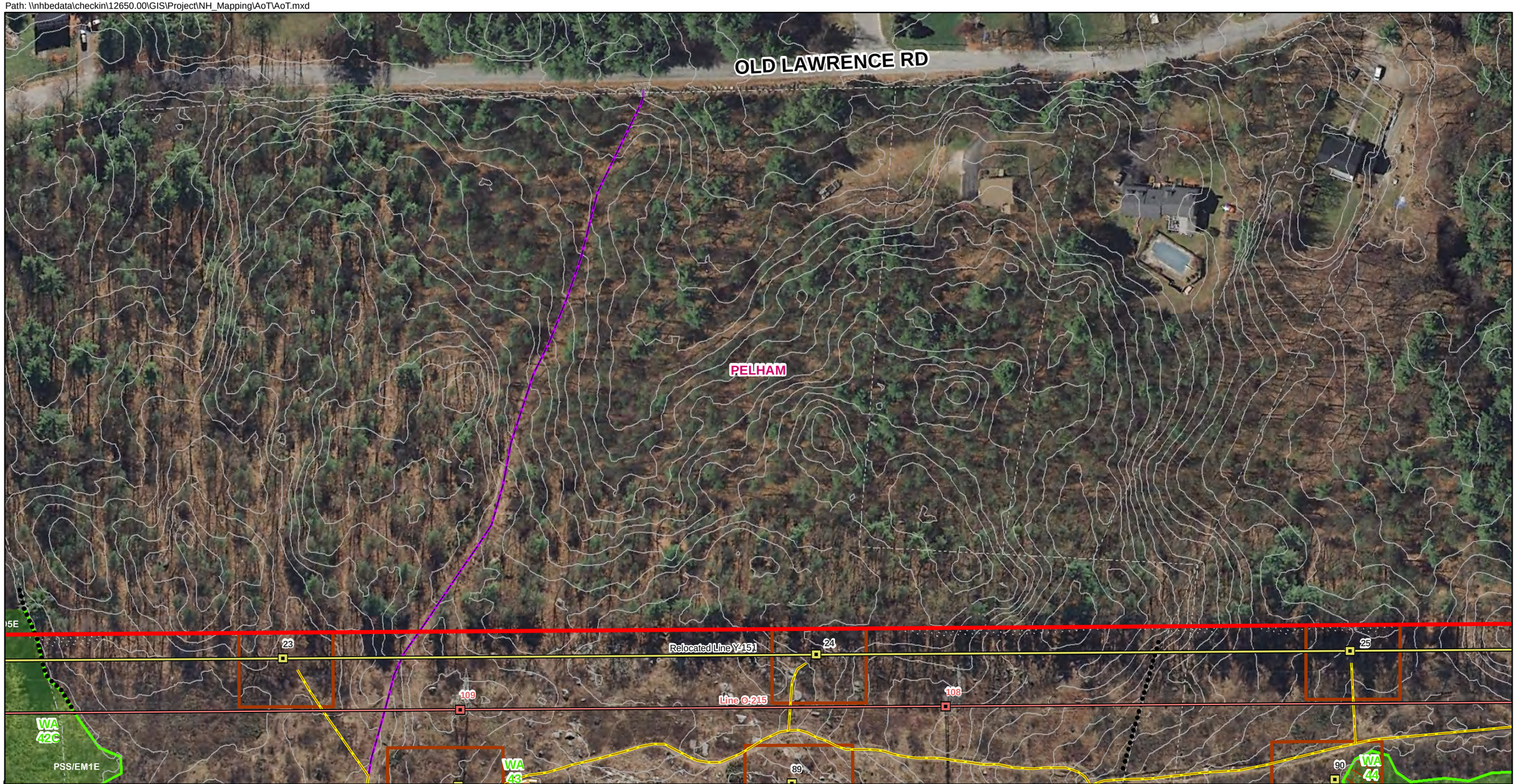

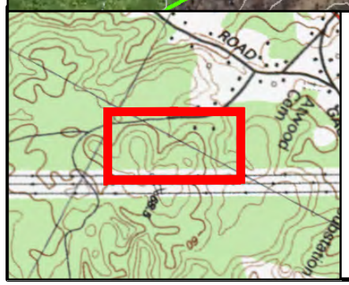

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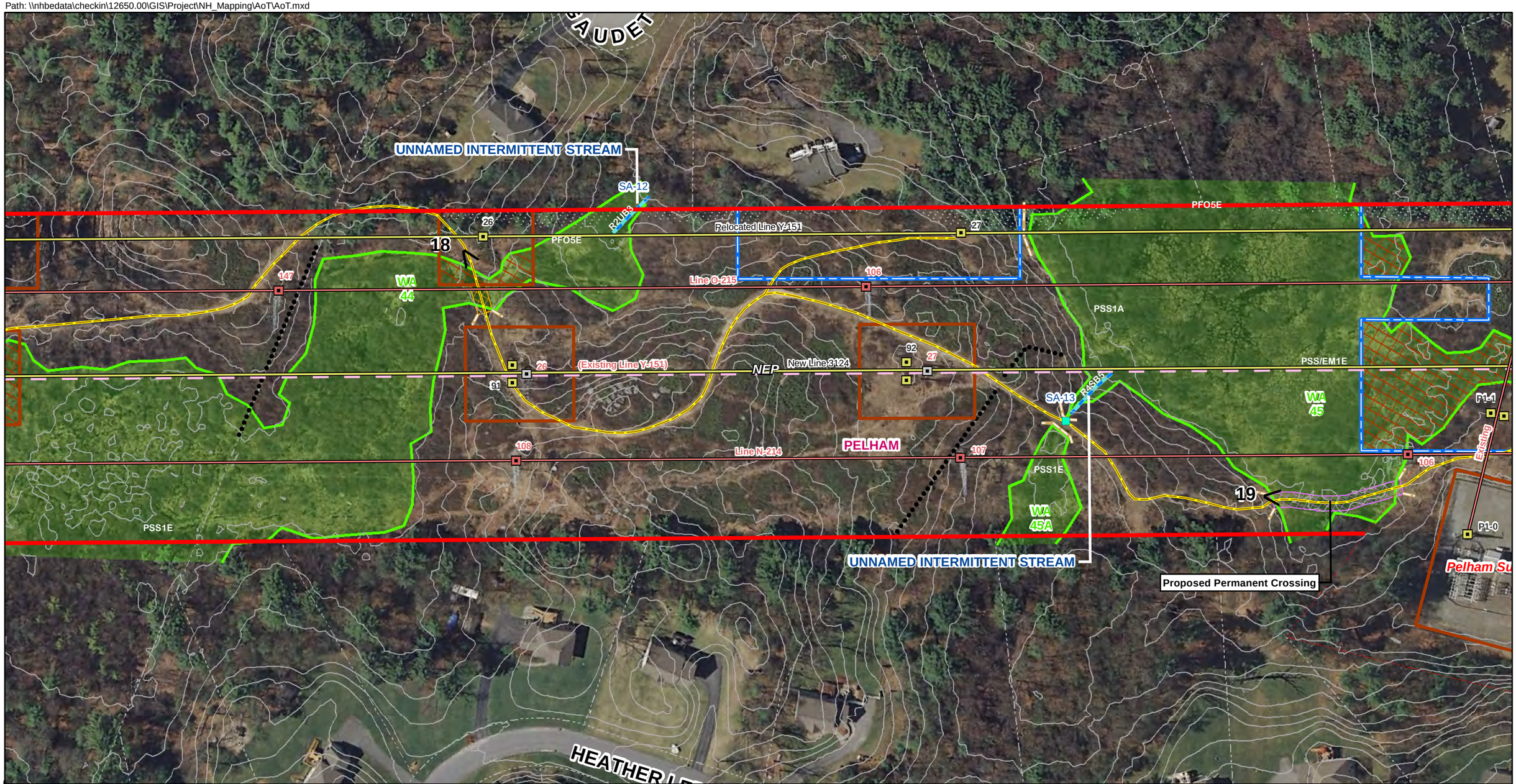

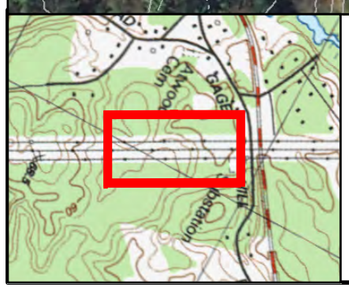

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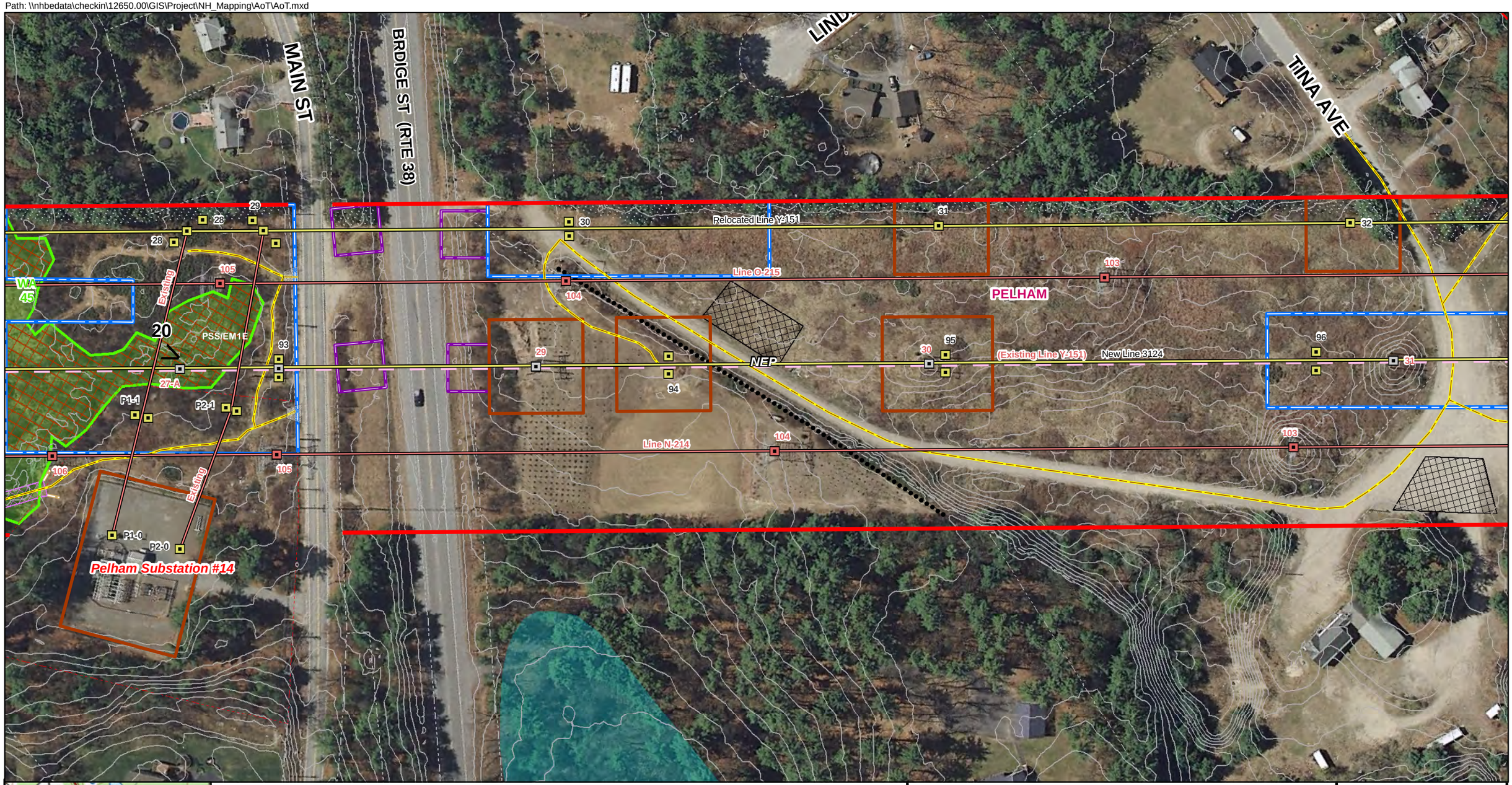

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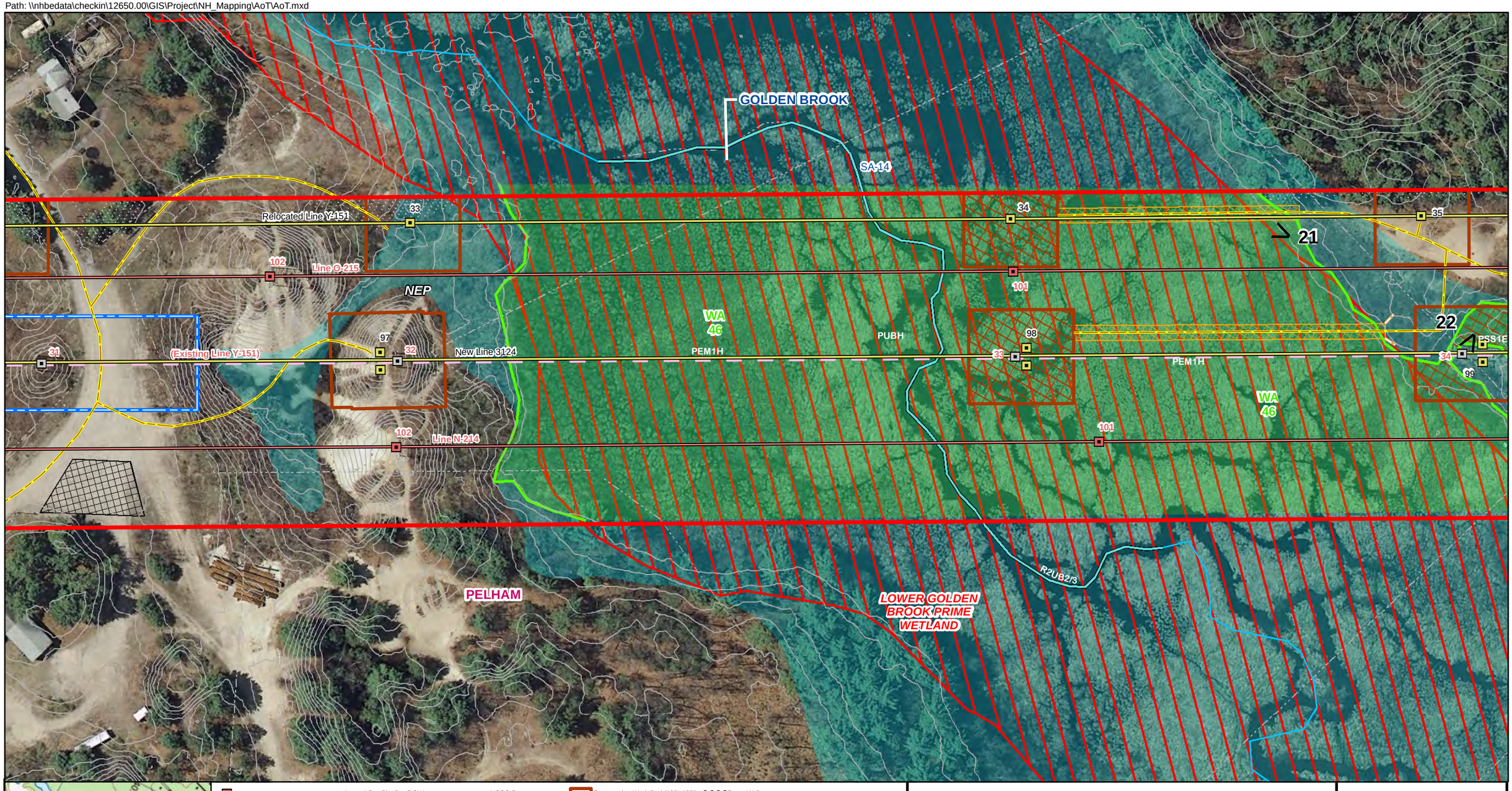

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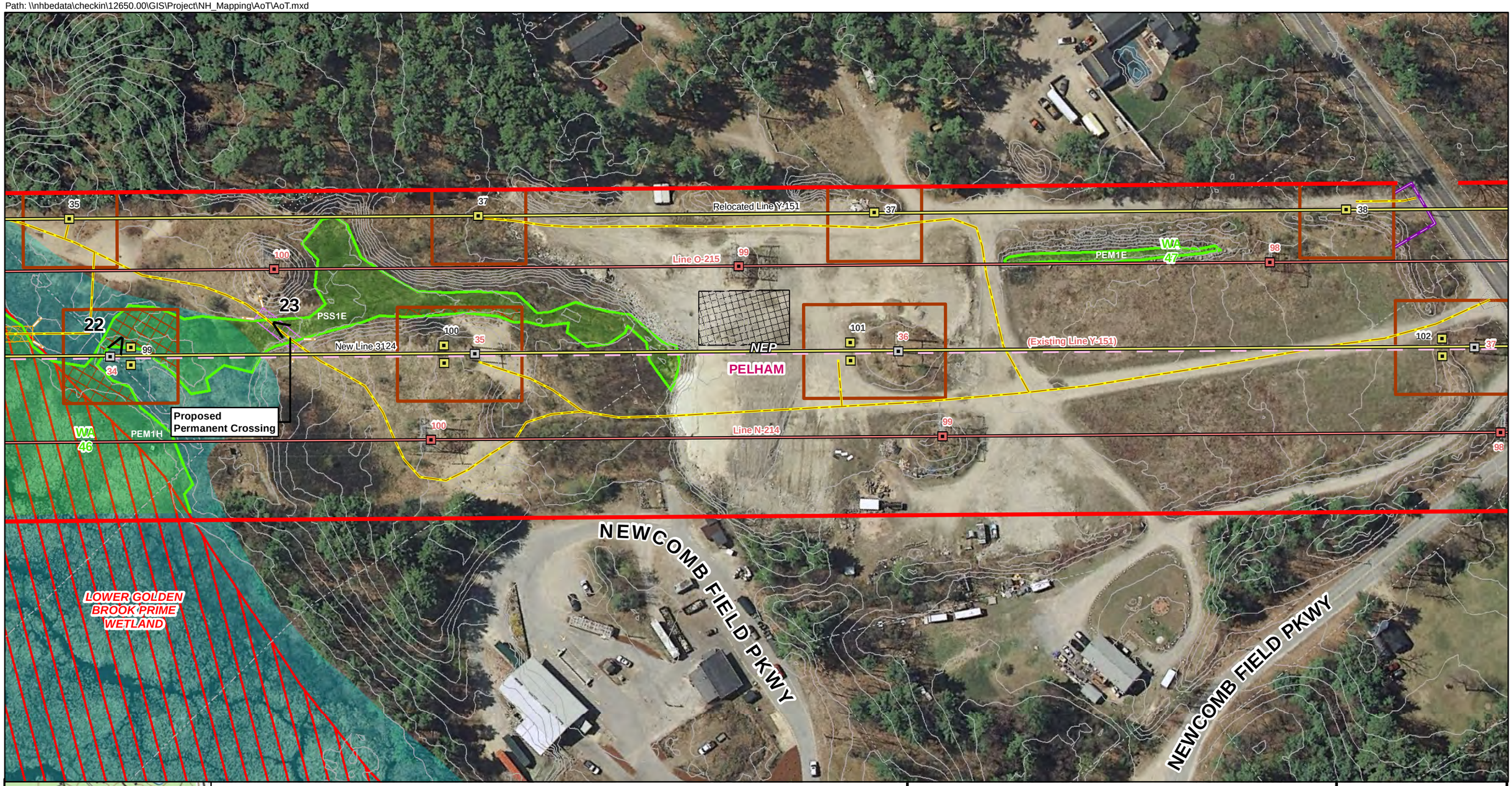

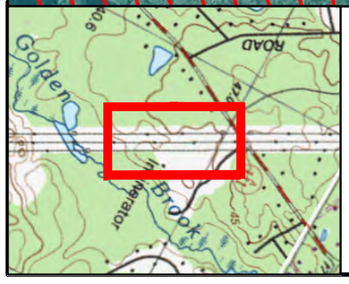

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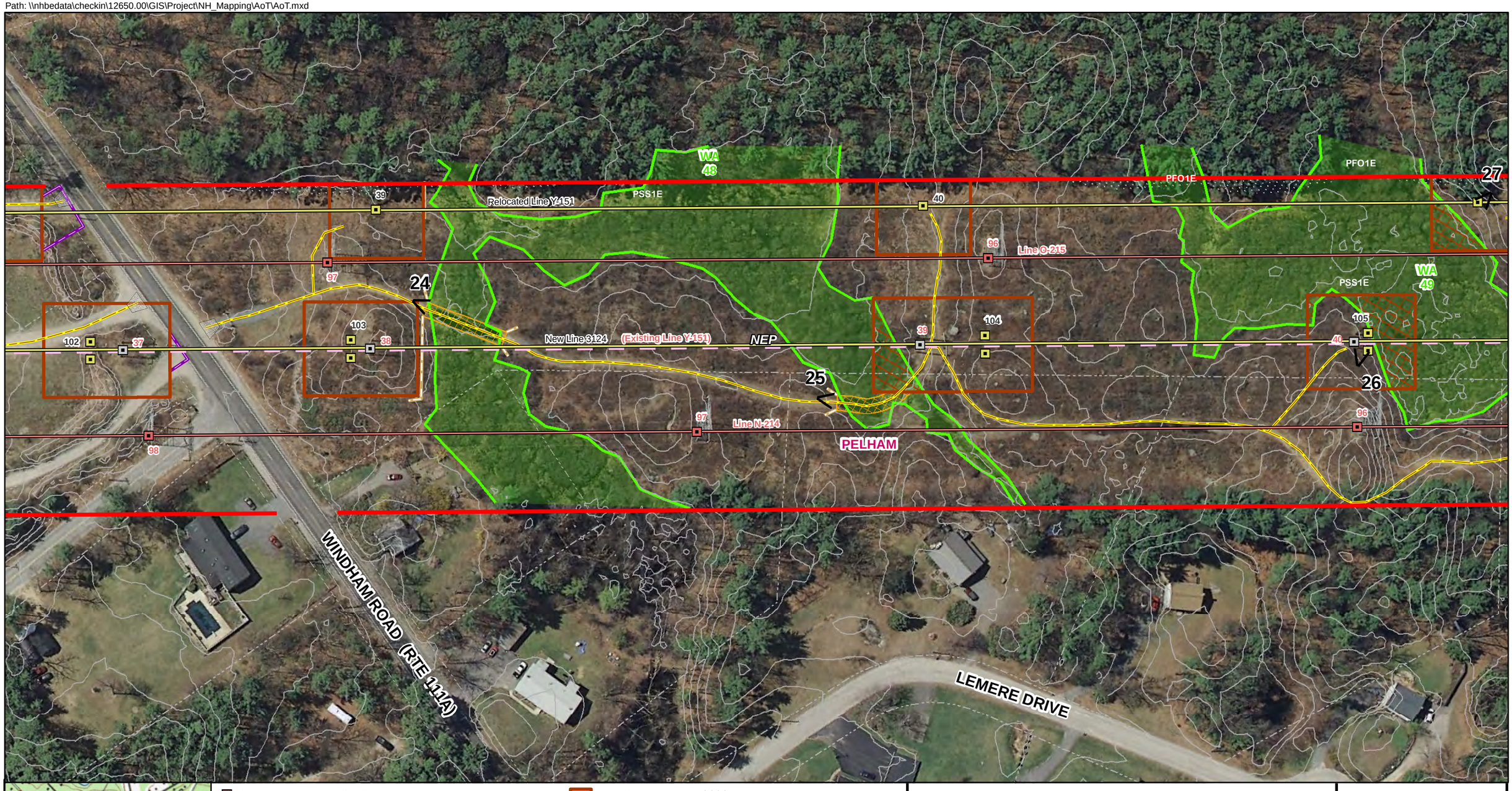

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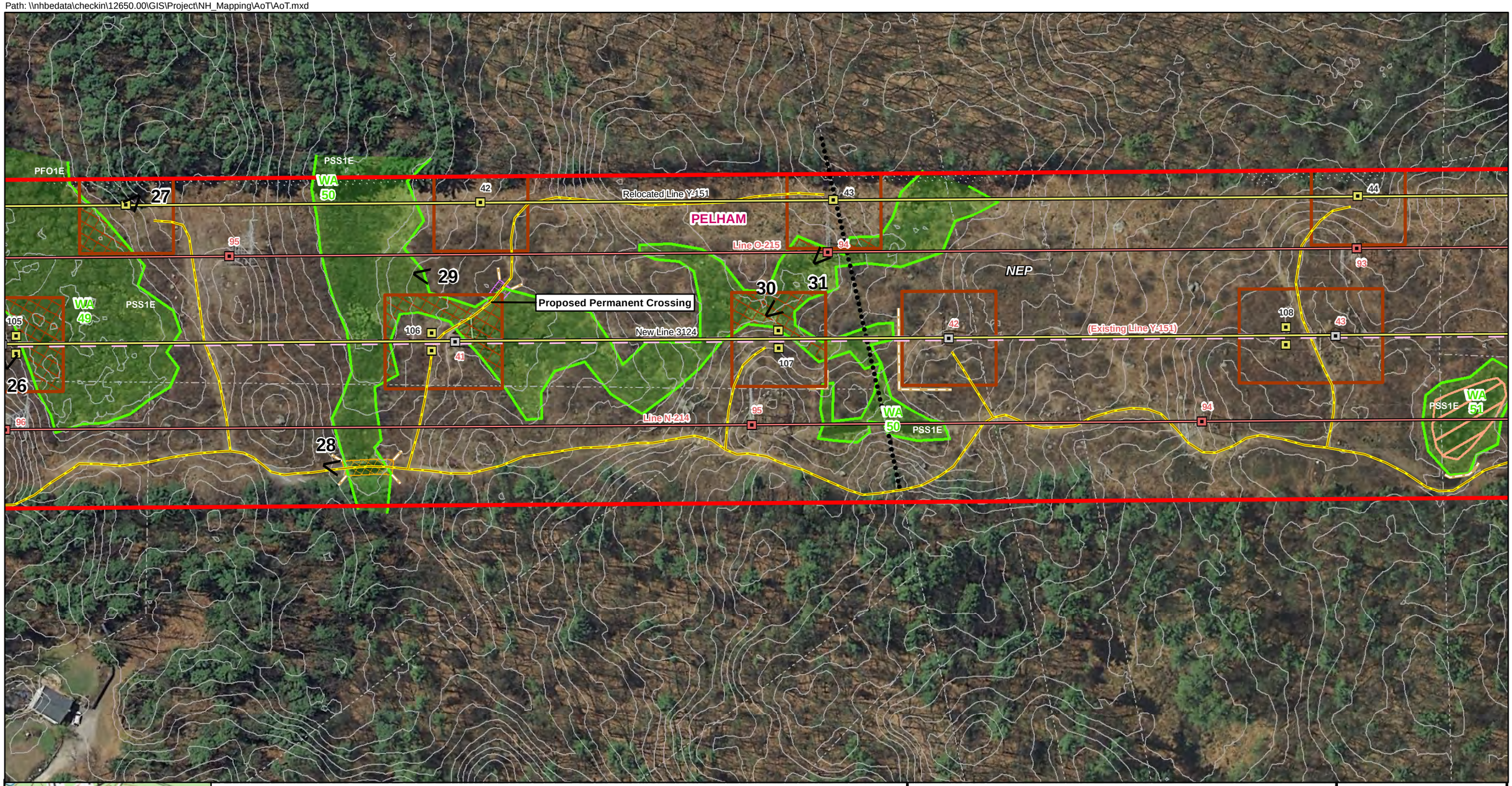

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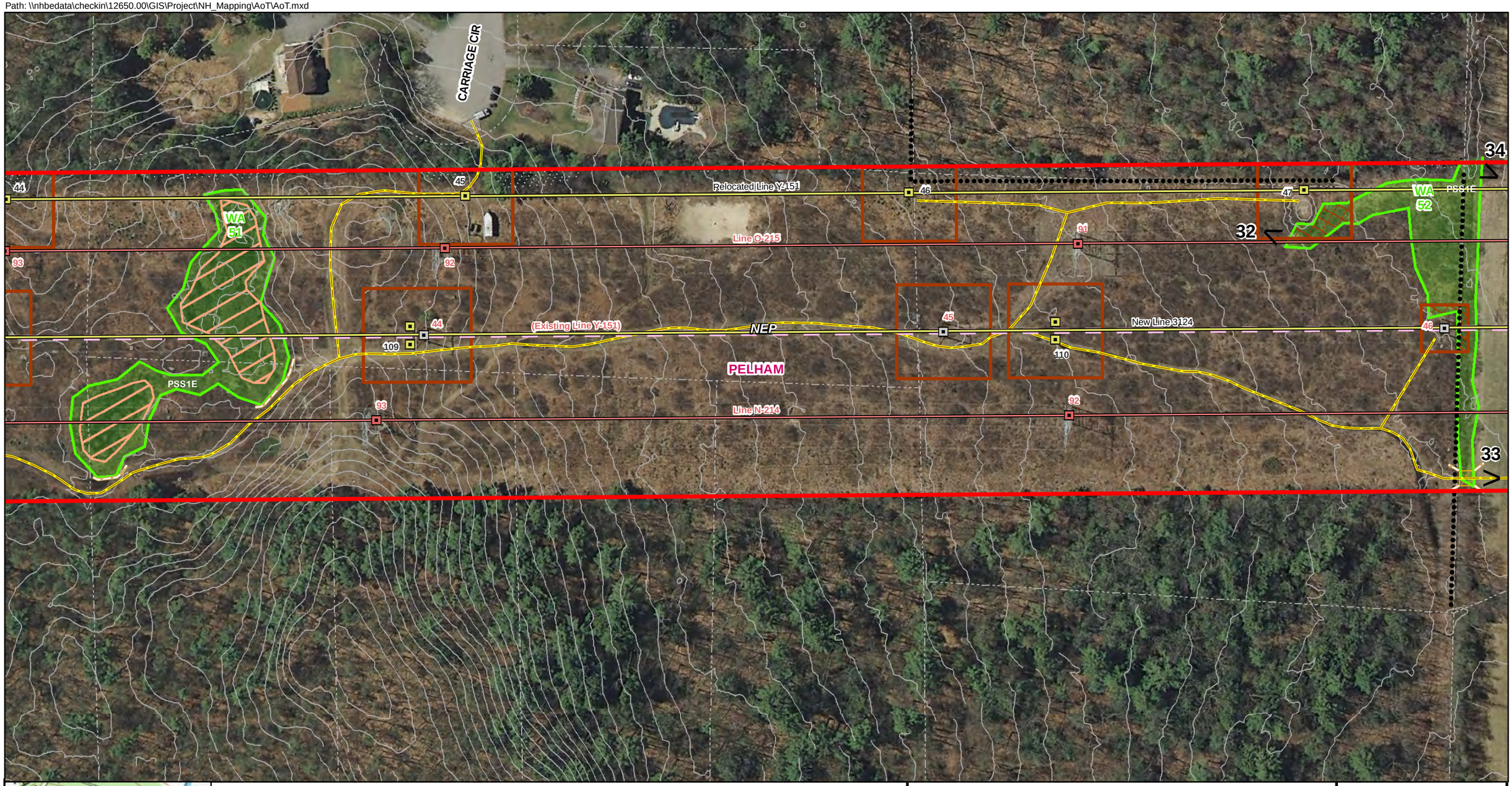

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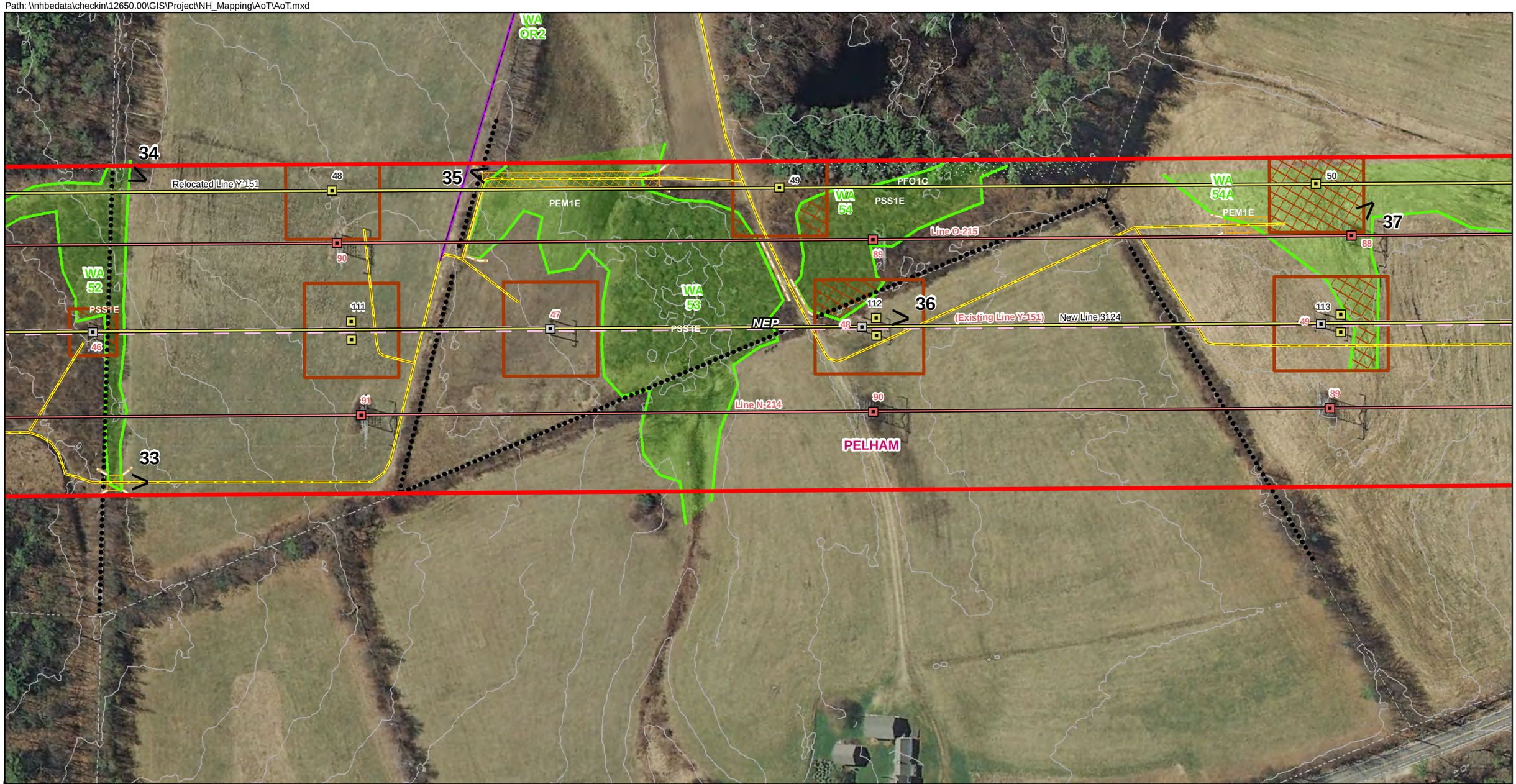

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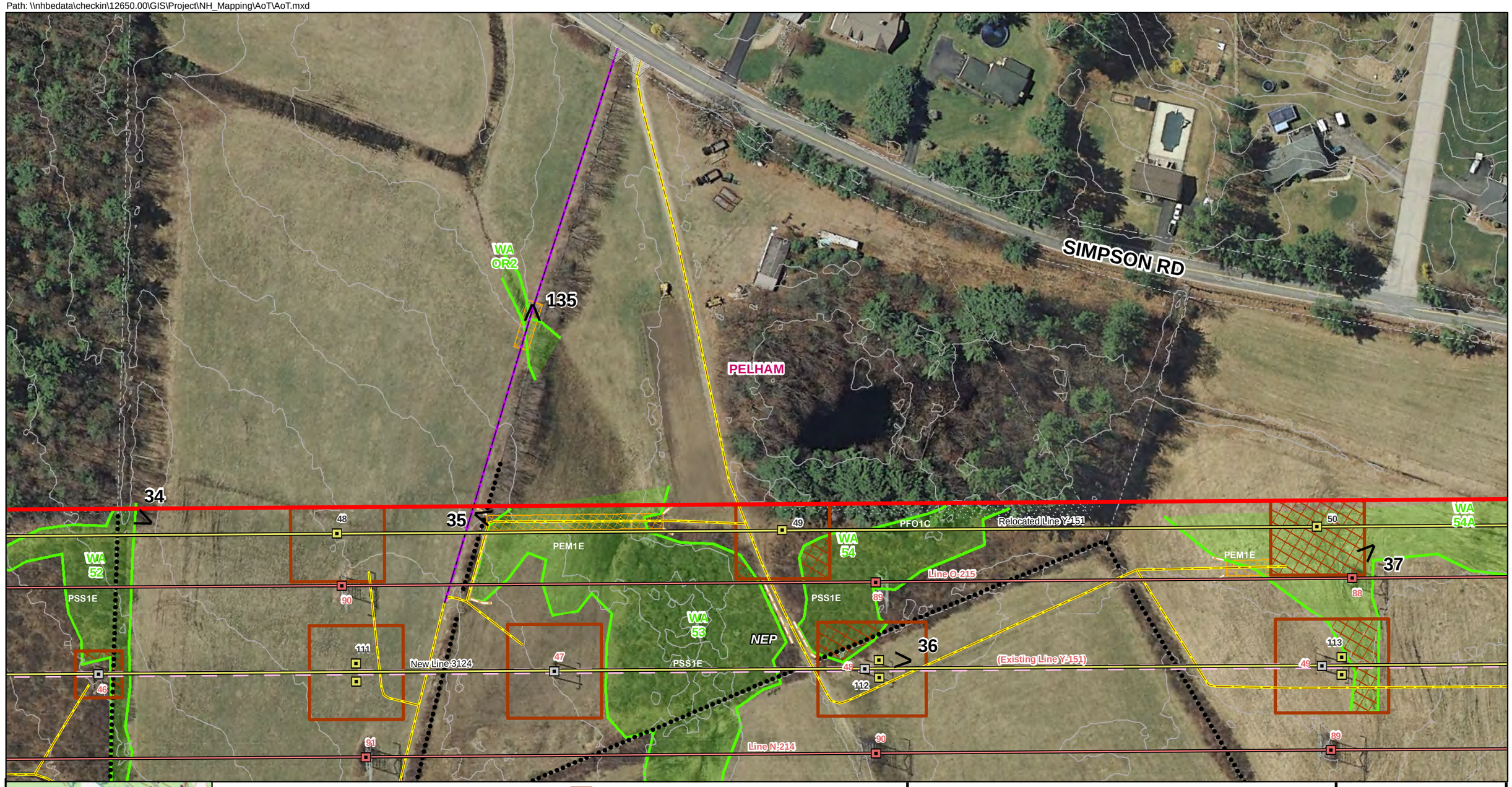

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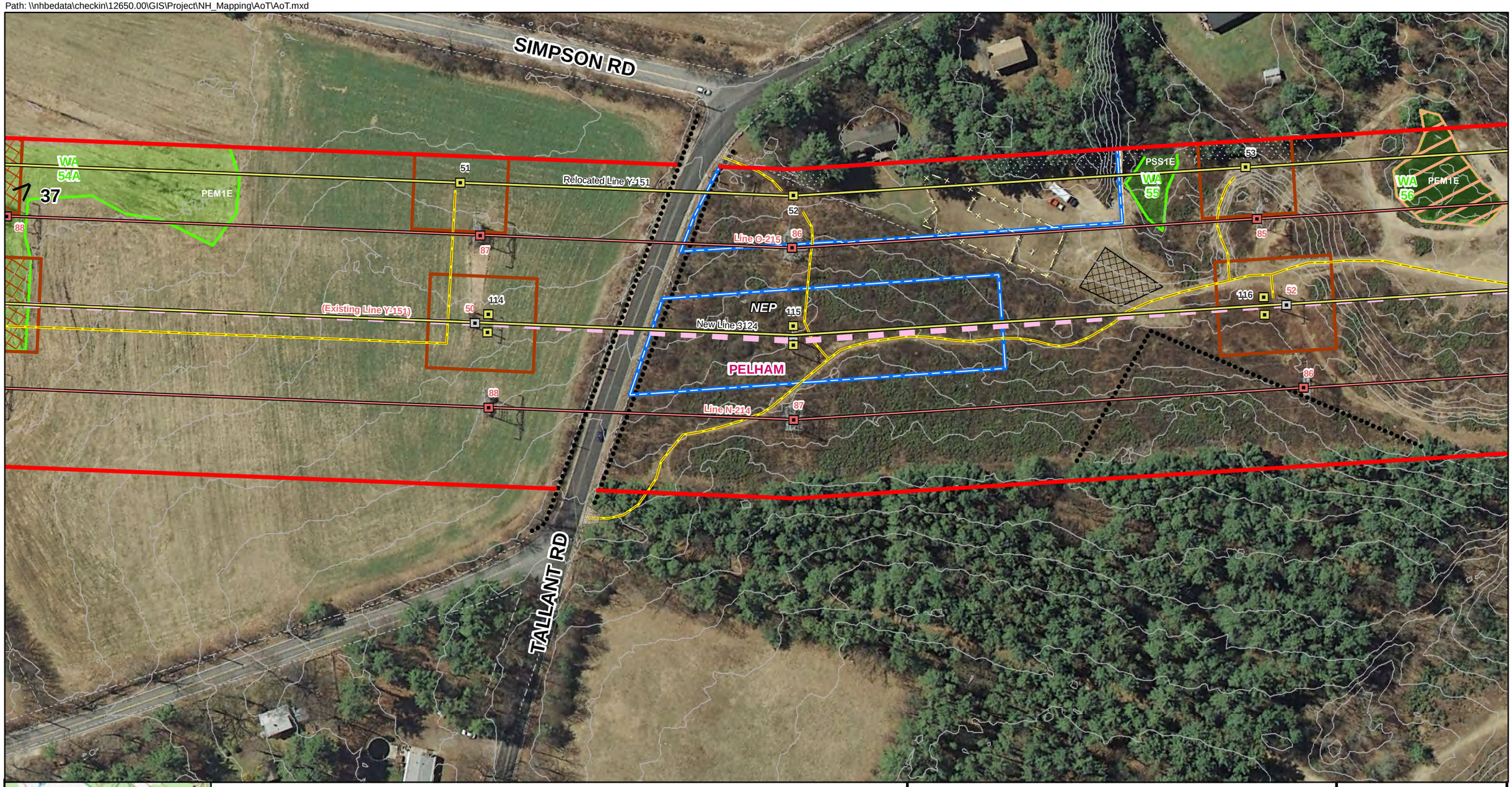

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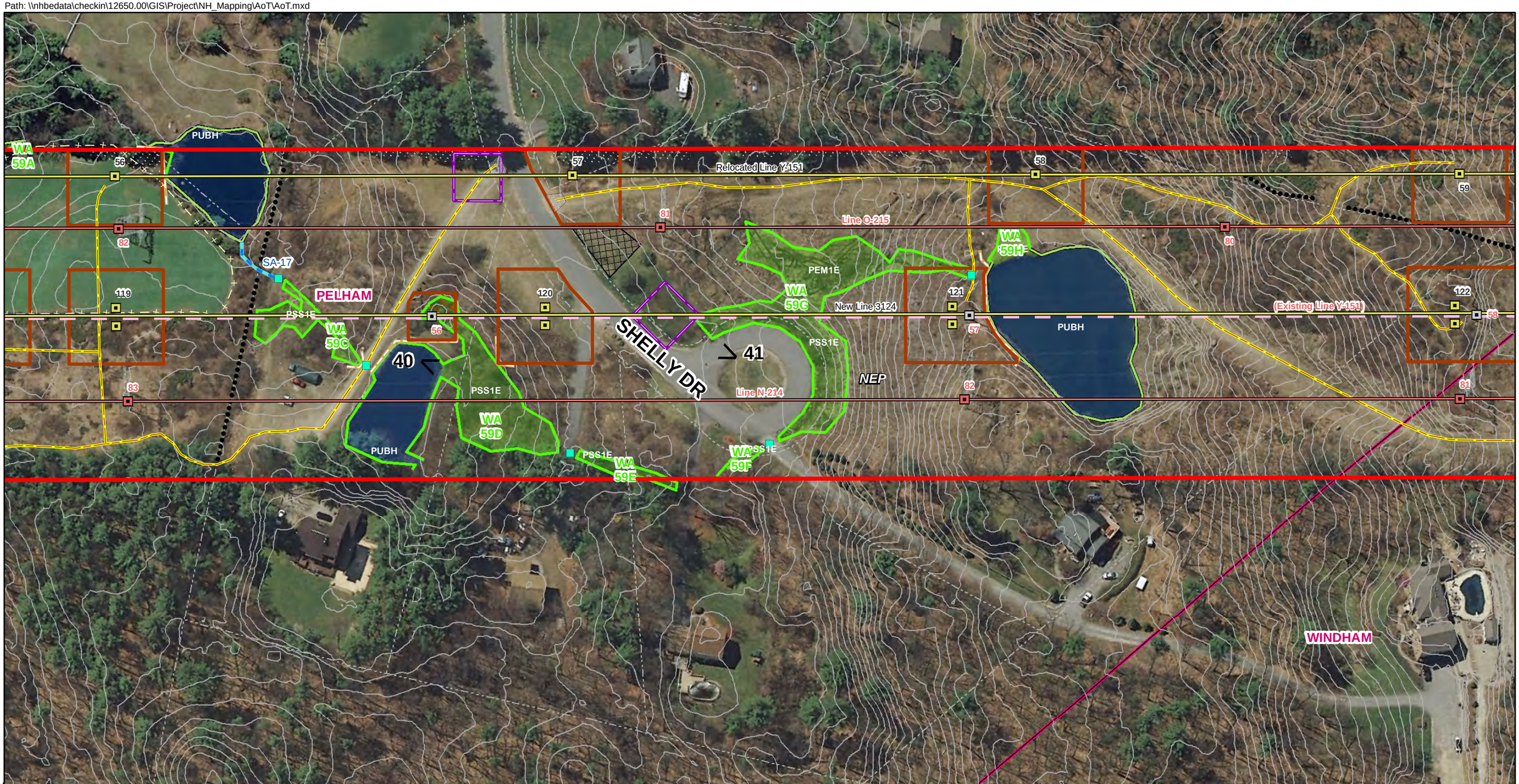

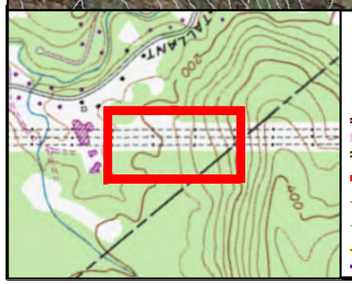

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Laydown Area
Stone Apron
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Fence

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Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to Scobie Pond 345 kV Substation NH

Source:
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Beals & Thomas,Eversource,Normandeau

Date: 6/30/2015

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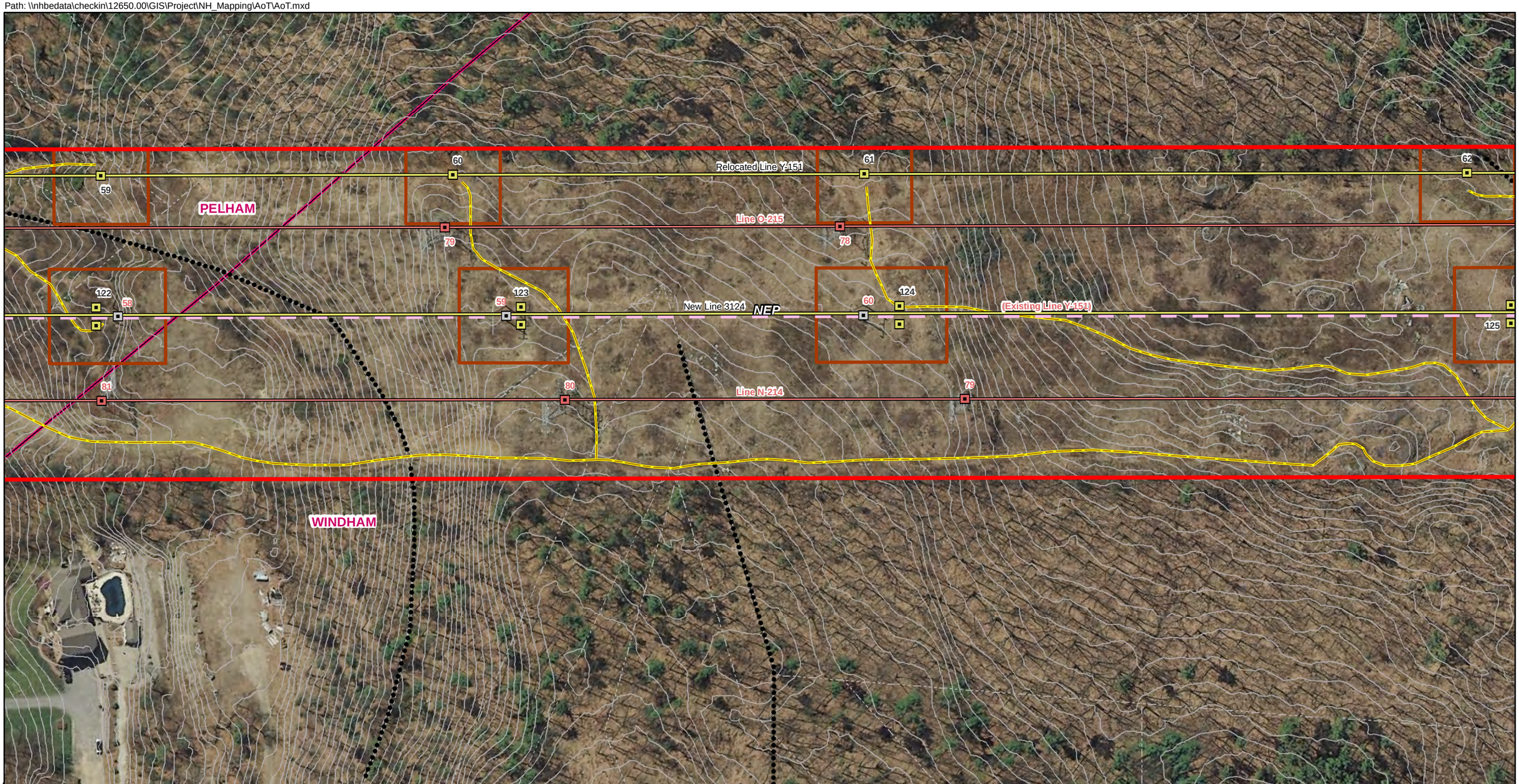

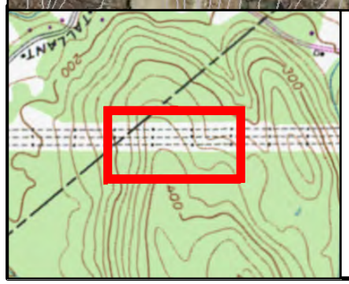

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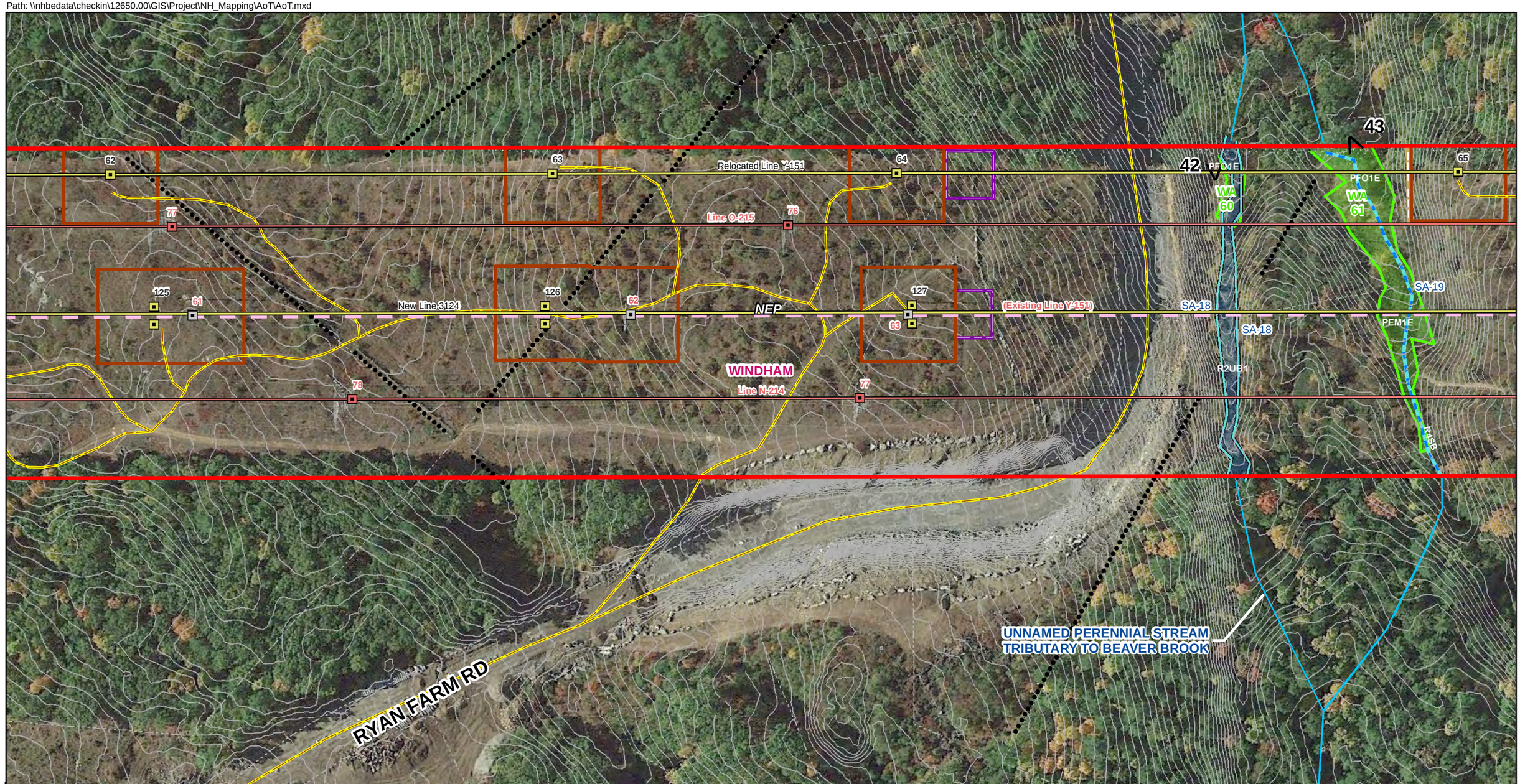

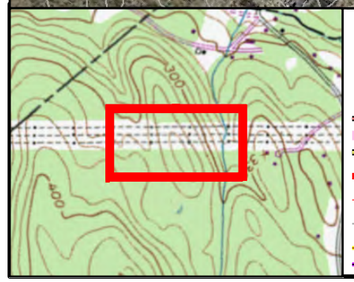

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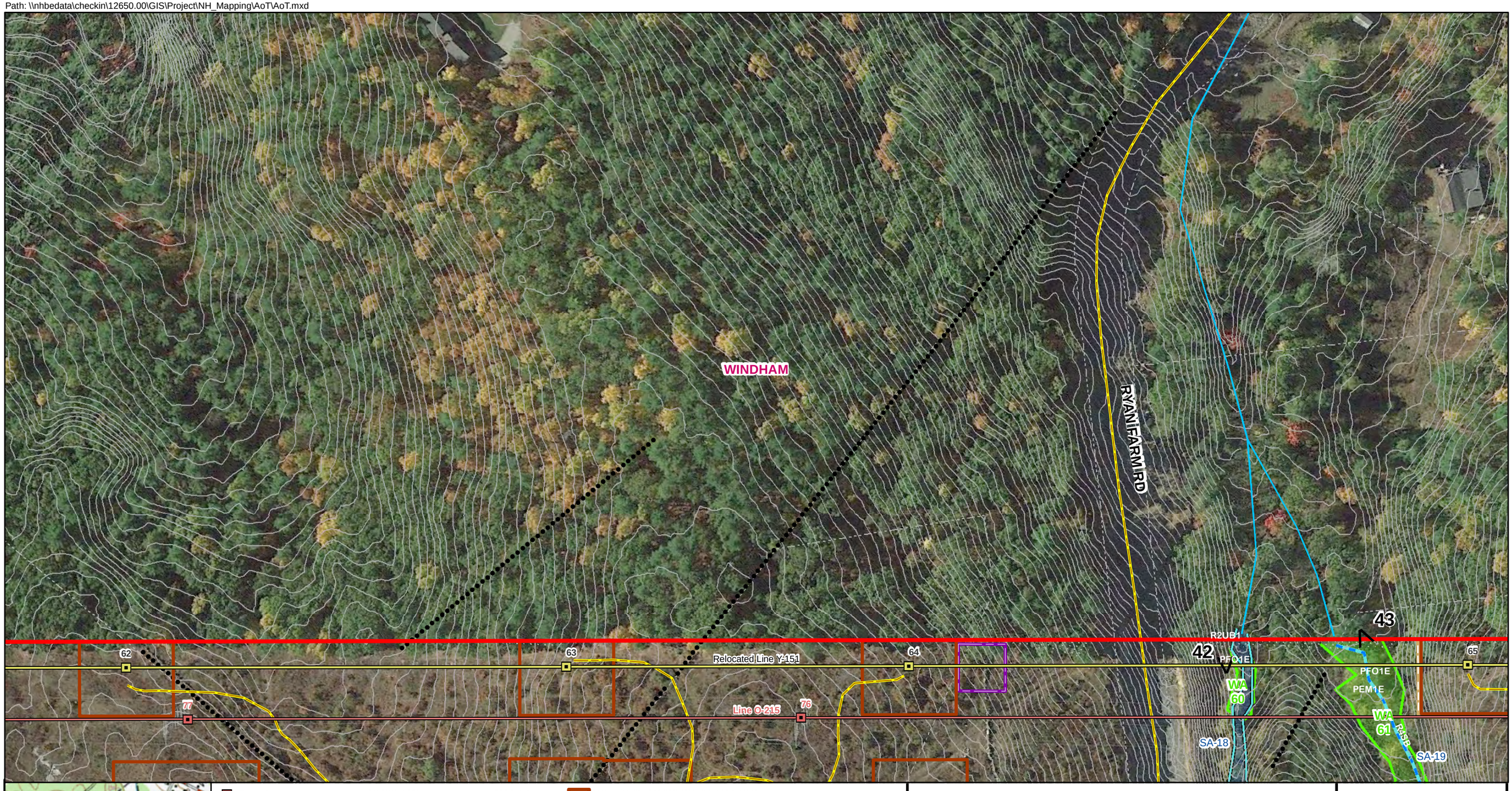

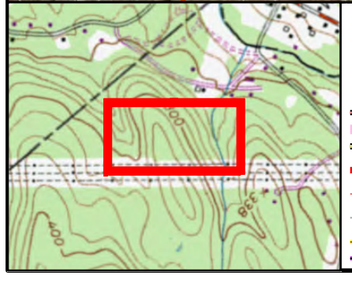

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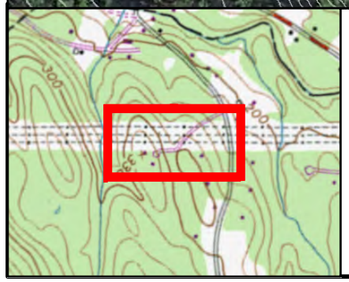

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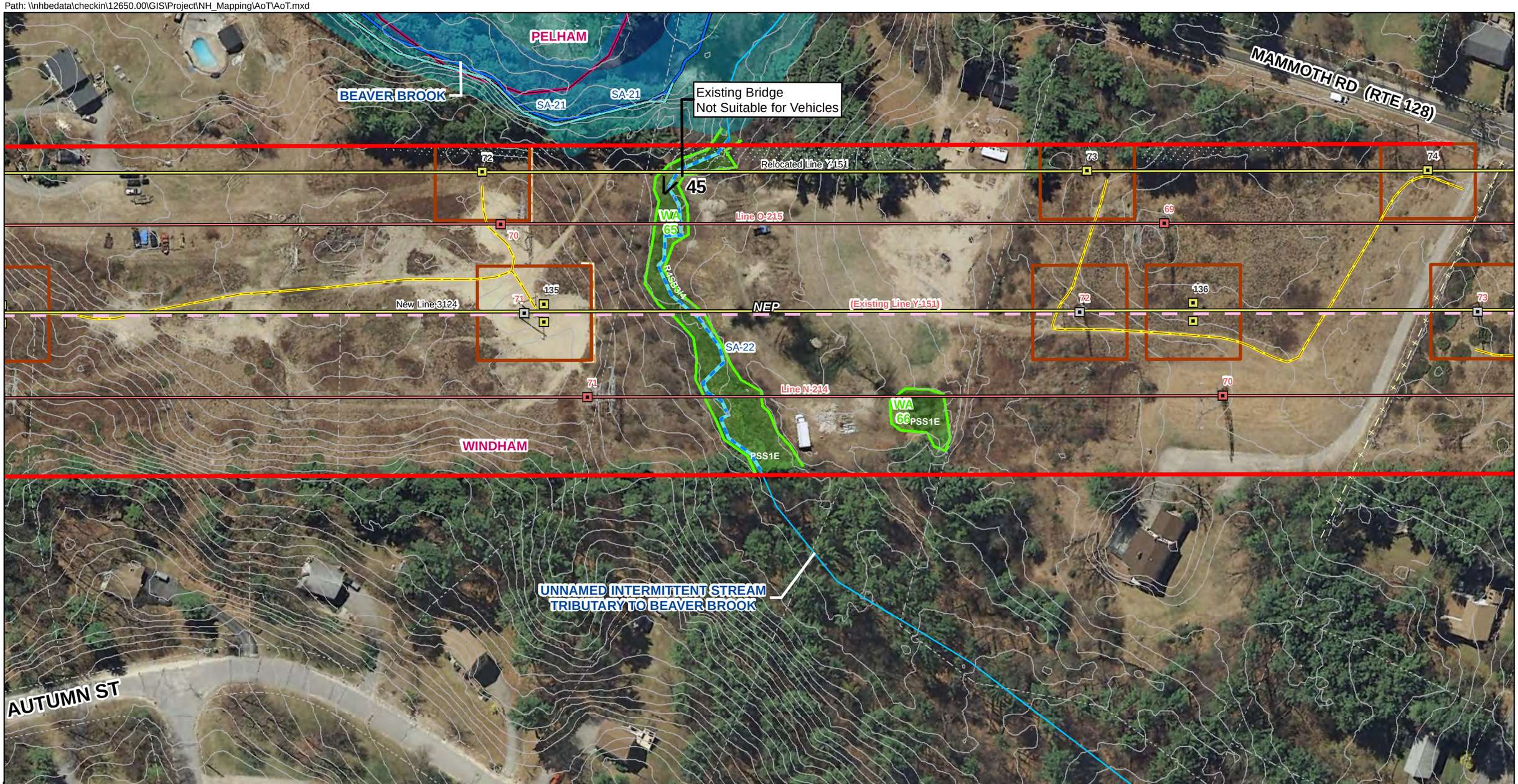

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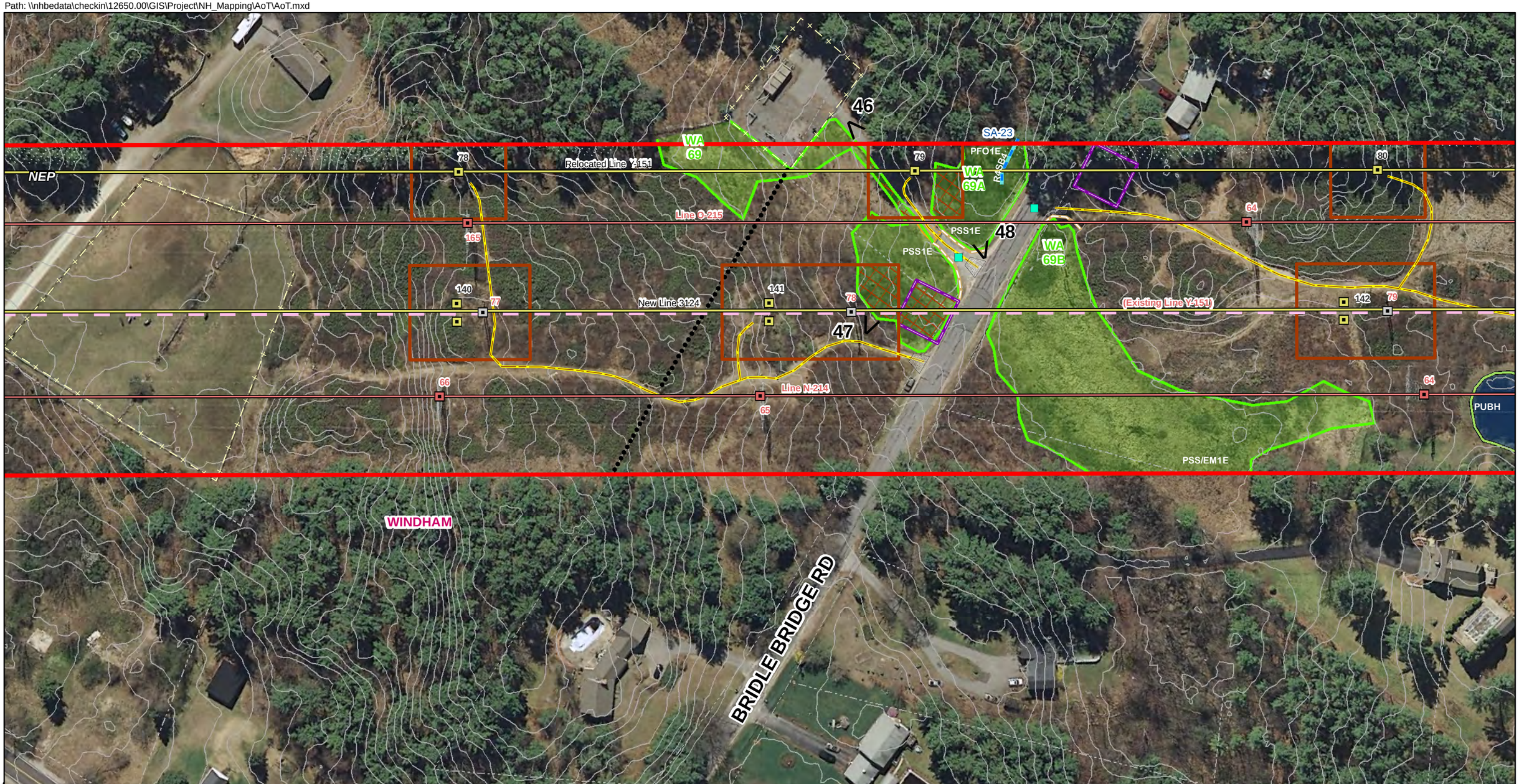

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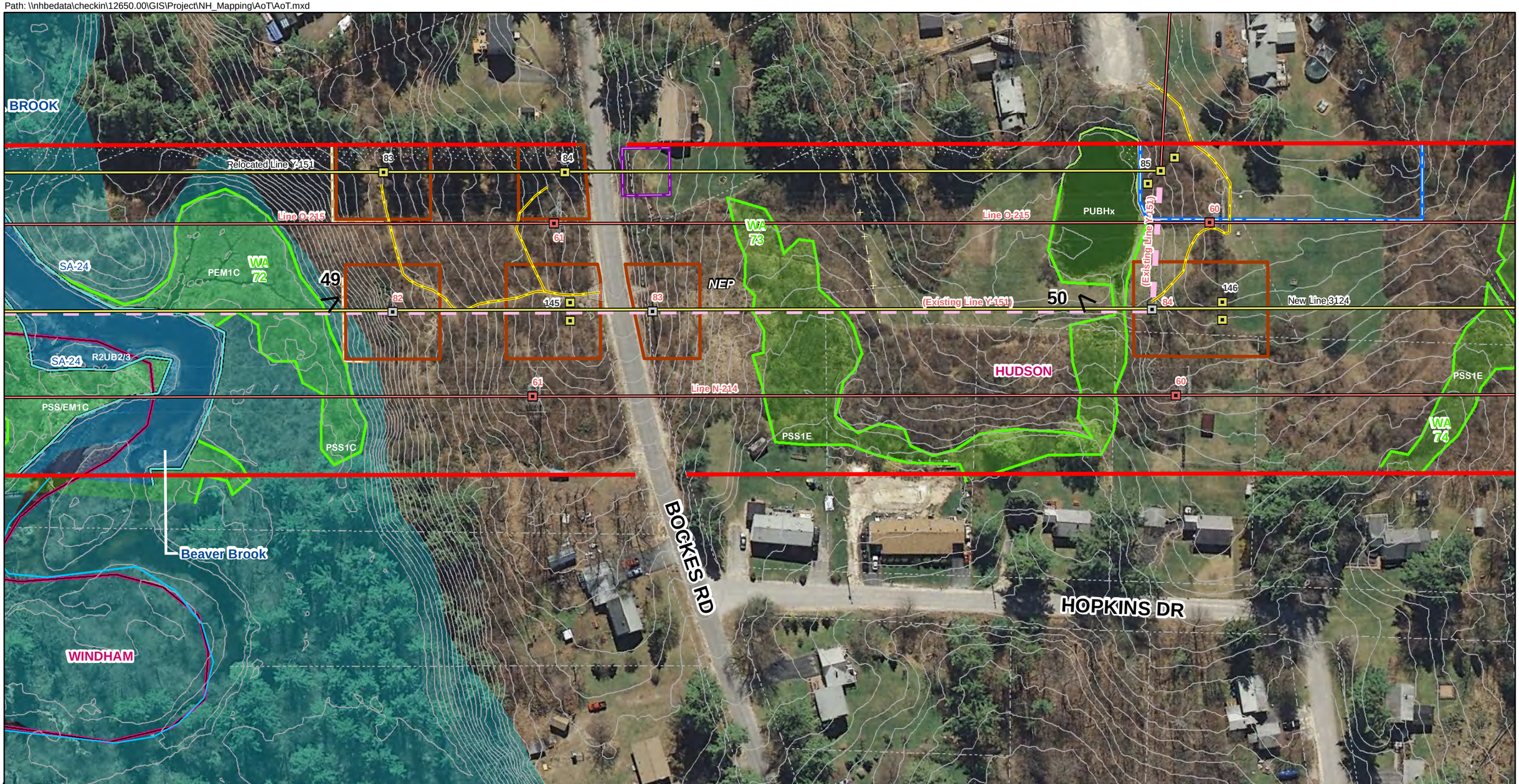

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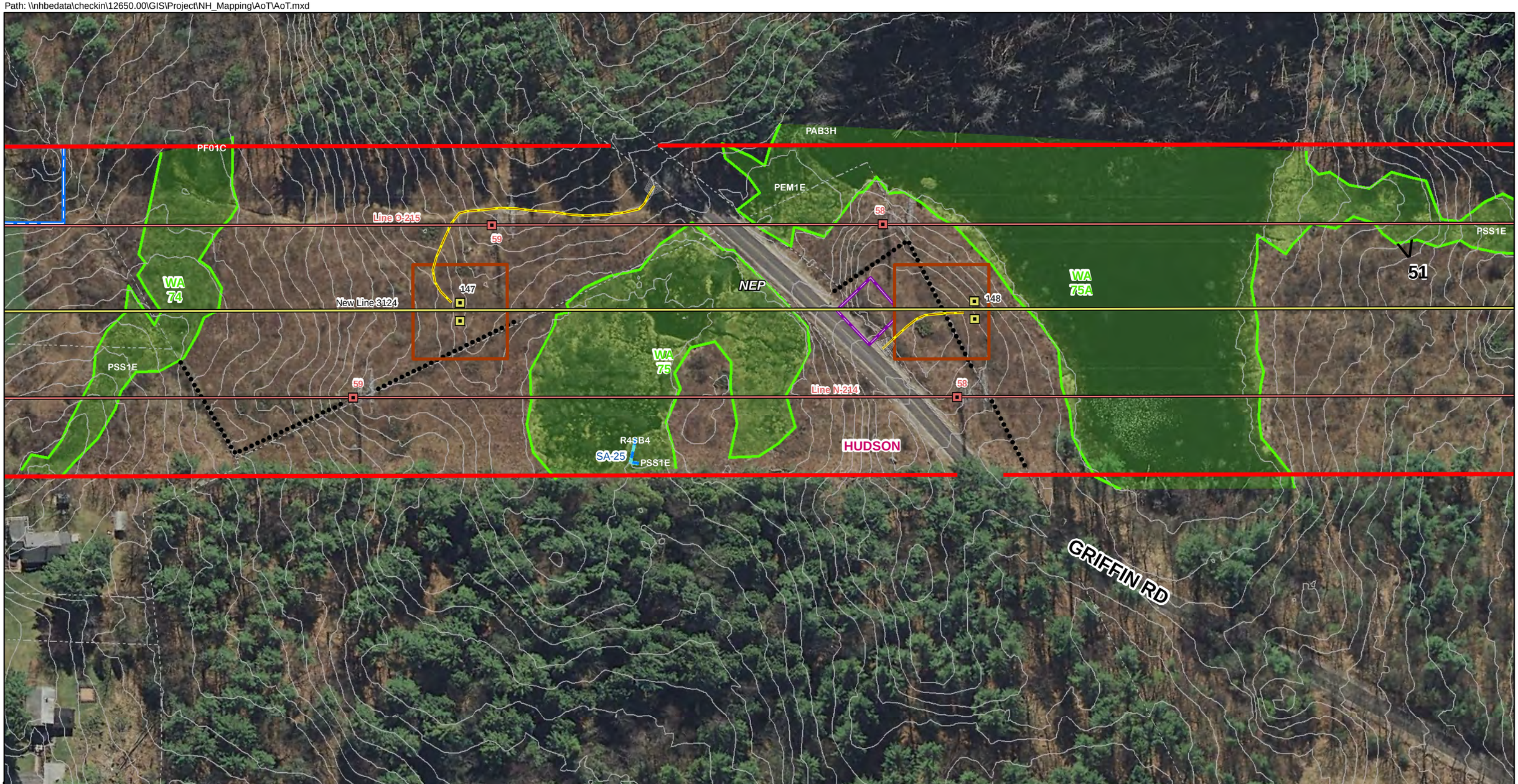

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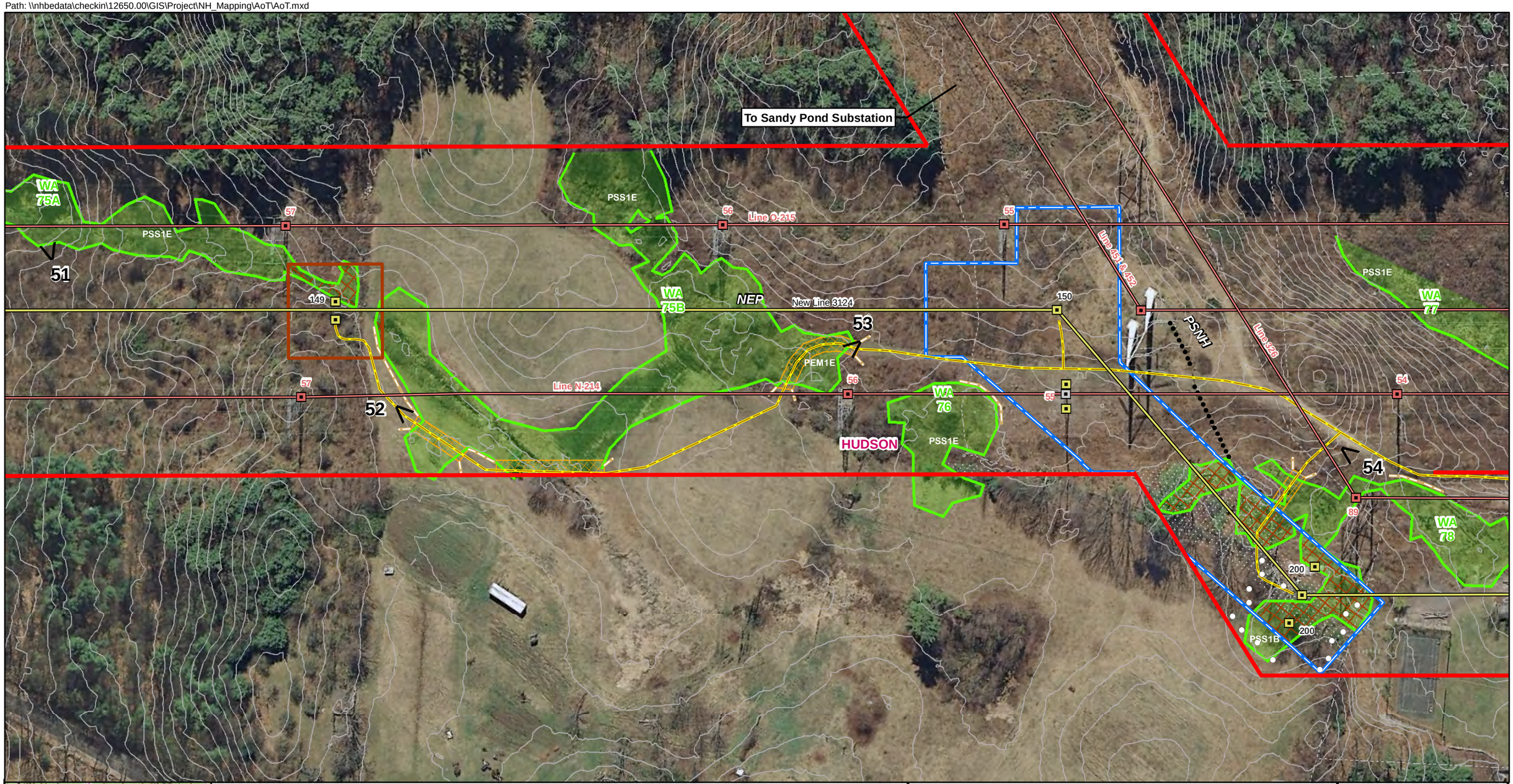

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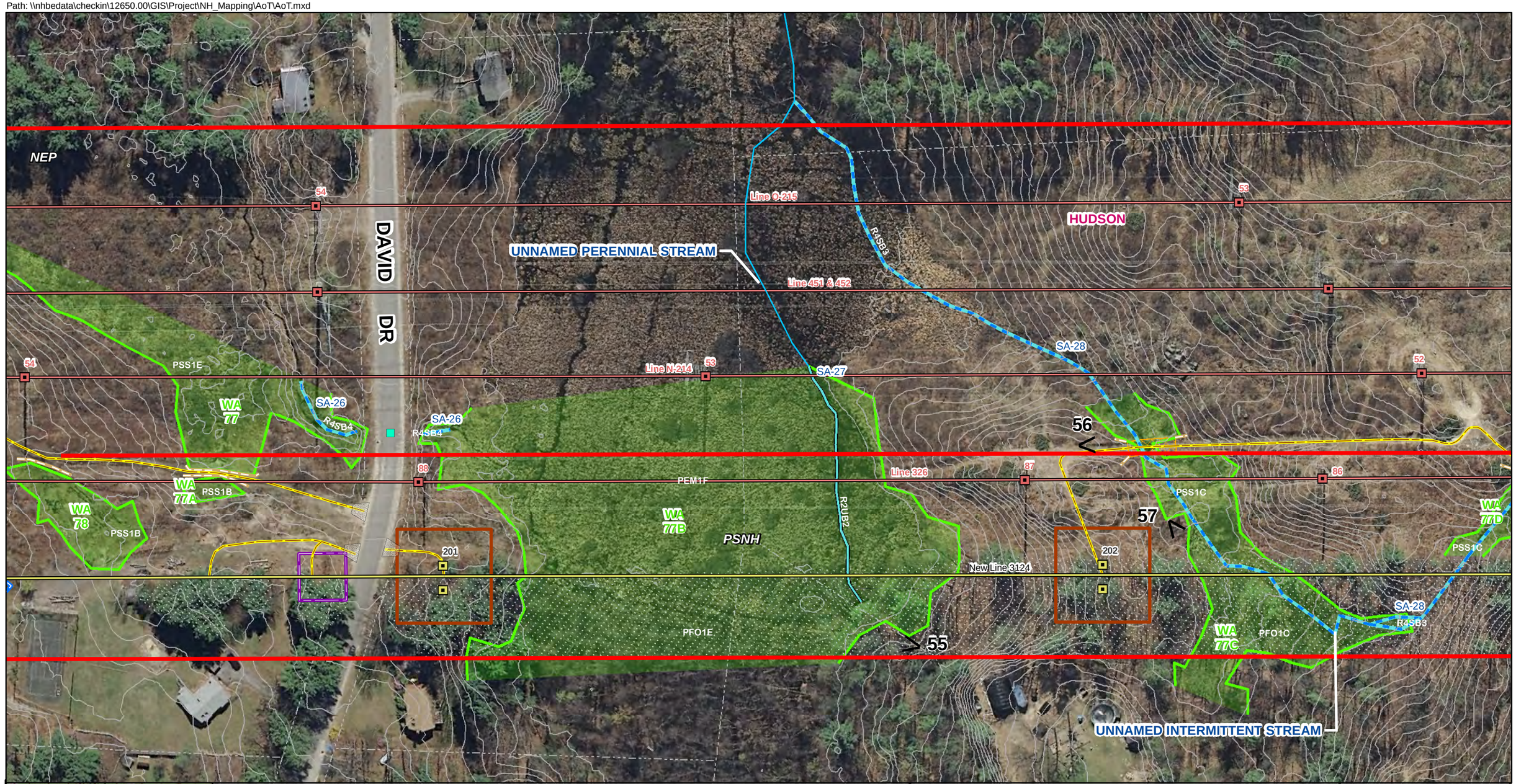

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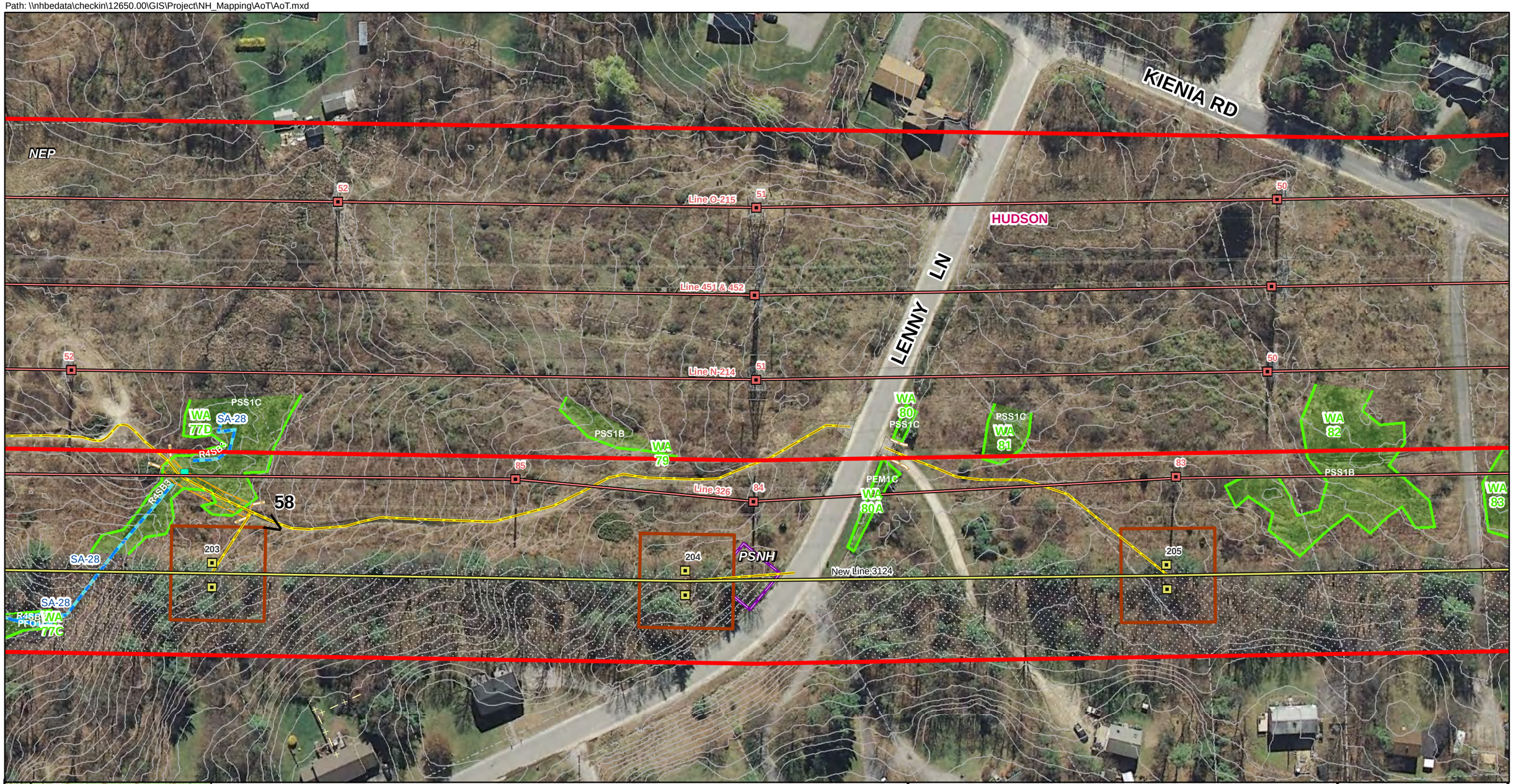

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Estimated Wetland Edge
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Vernal Pool
Delineated Perennial Stream
Delineated Intermittent Stream
Delineated Ordinary High Water

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Source:
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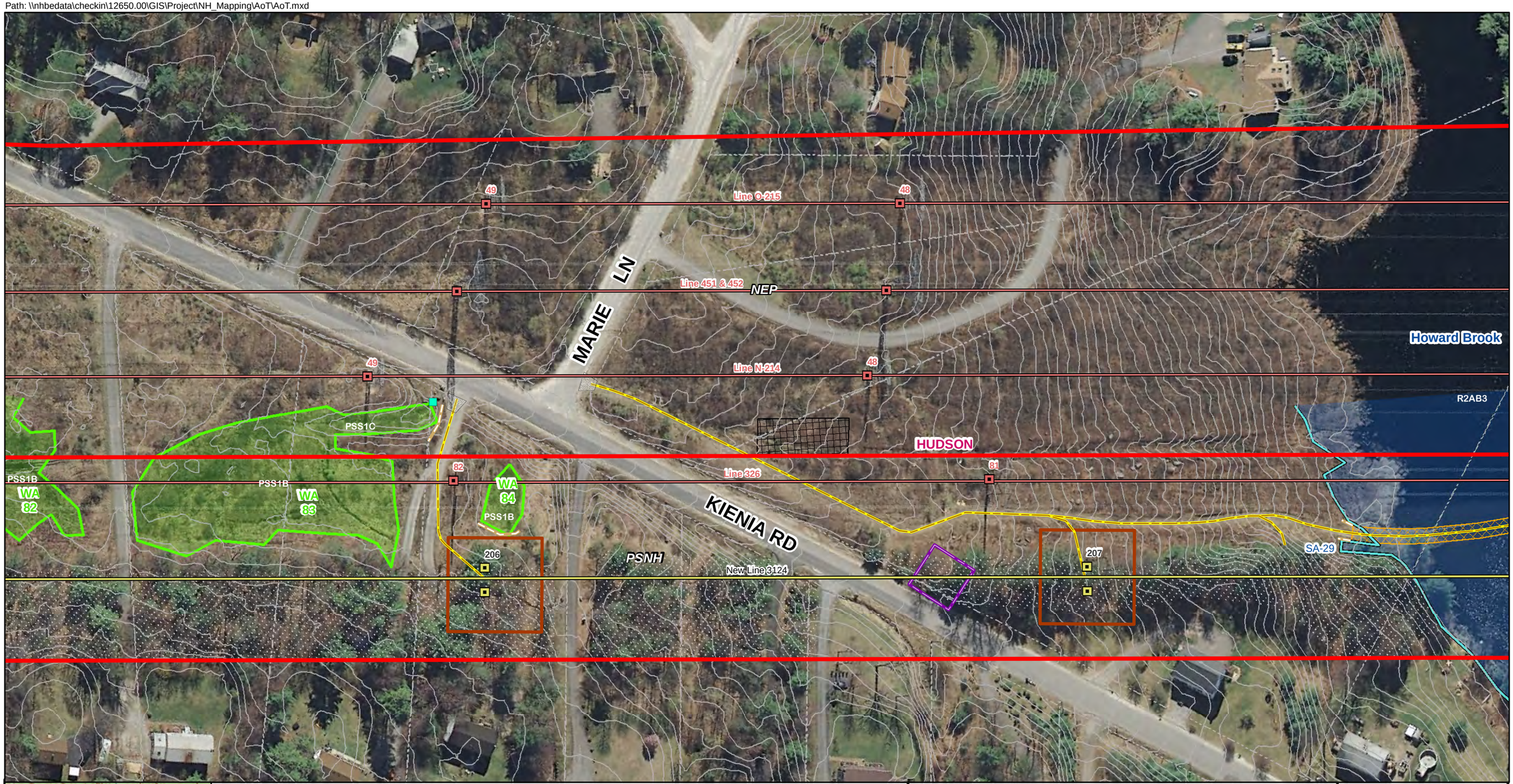

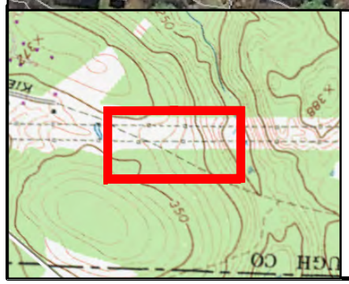

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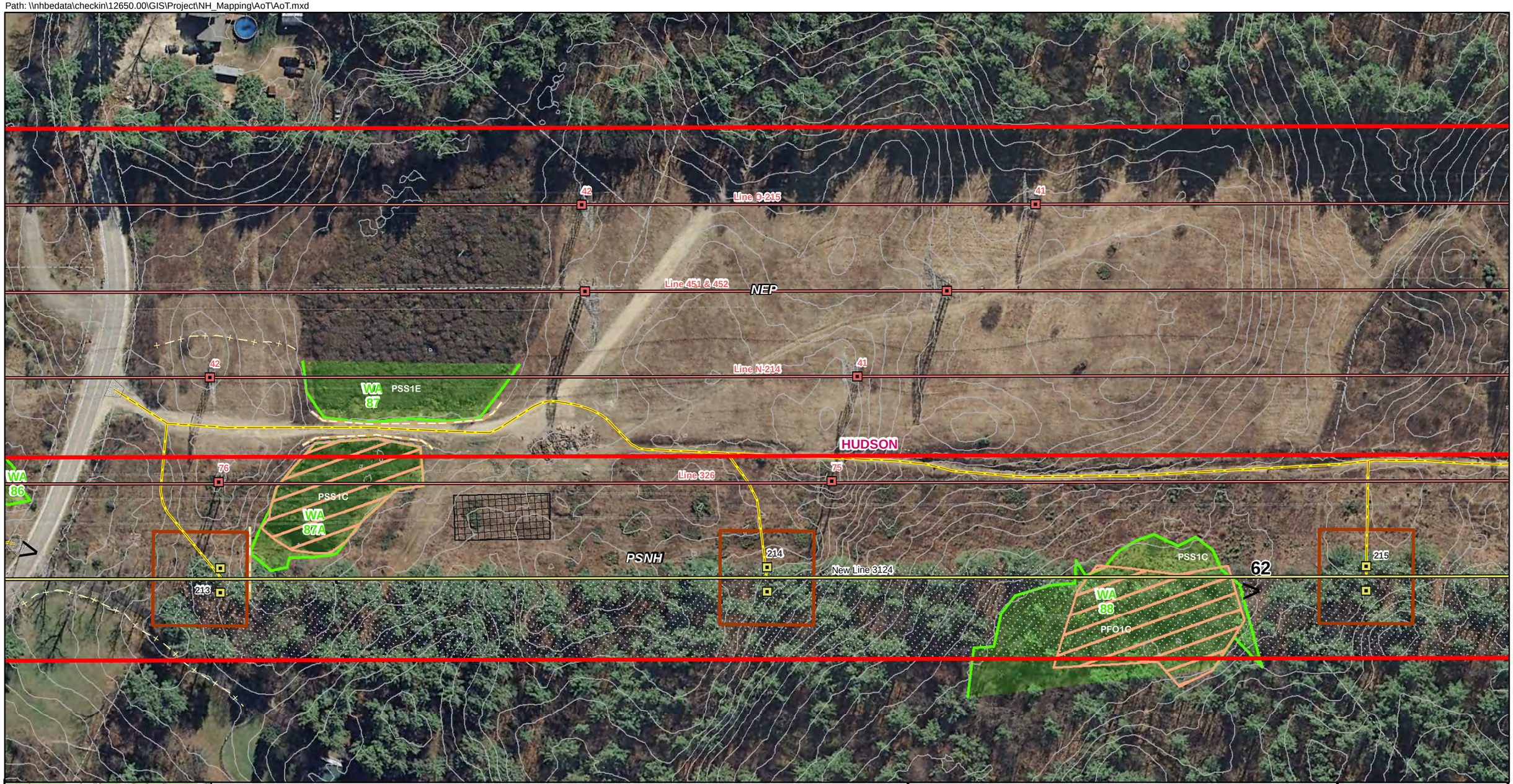

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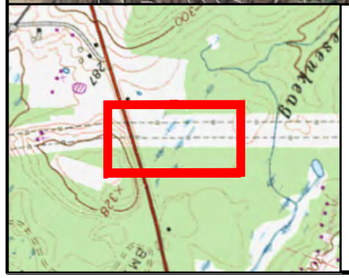

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NESENKEAG BROOK
NEP
32
31
Line O-215
LONDONDERRY
R2UB2
Line 451 & 452
38
37
36
Line N-214
WA 93
71
PEM/SS1F
WA 100
PSS1C
PEM1E
WA 102B
PEM1F
72
WA SS1C 96
67
66
65
Line 326
WA 95
WA 100A
WA 97
SA-32
PEM/SS1E
PEM1H
PSNH
New Line 3124
WA 98
224
223
225
WA 94
70
PSS1C
69
PFO1C
WA 102
PFO1C
WA 101
WA 102A
73
74
75
76
PAB3G
77
78
WA 99
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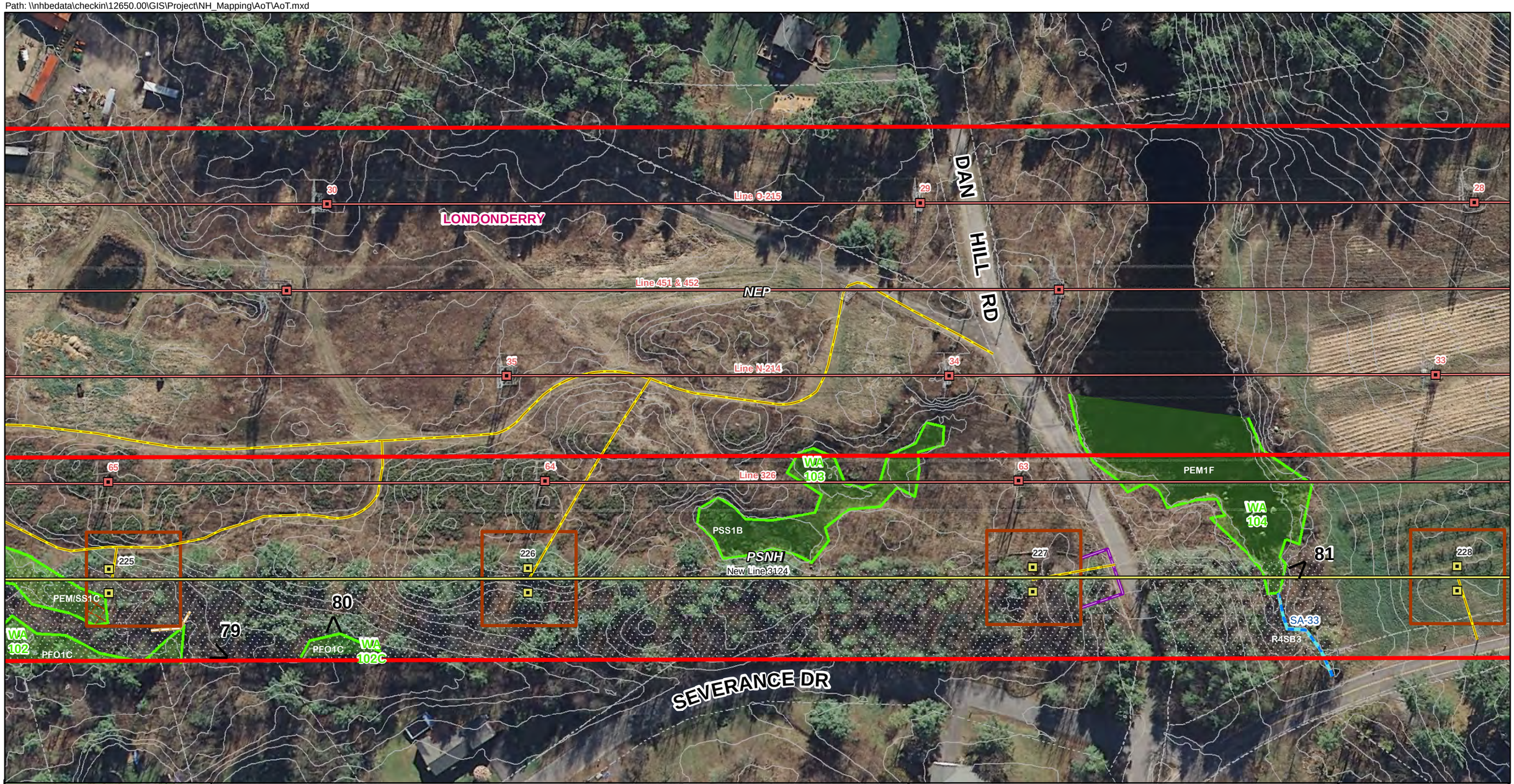

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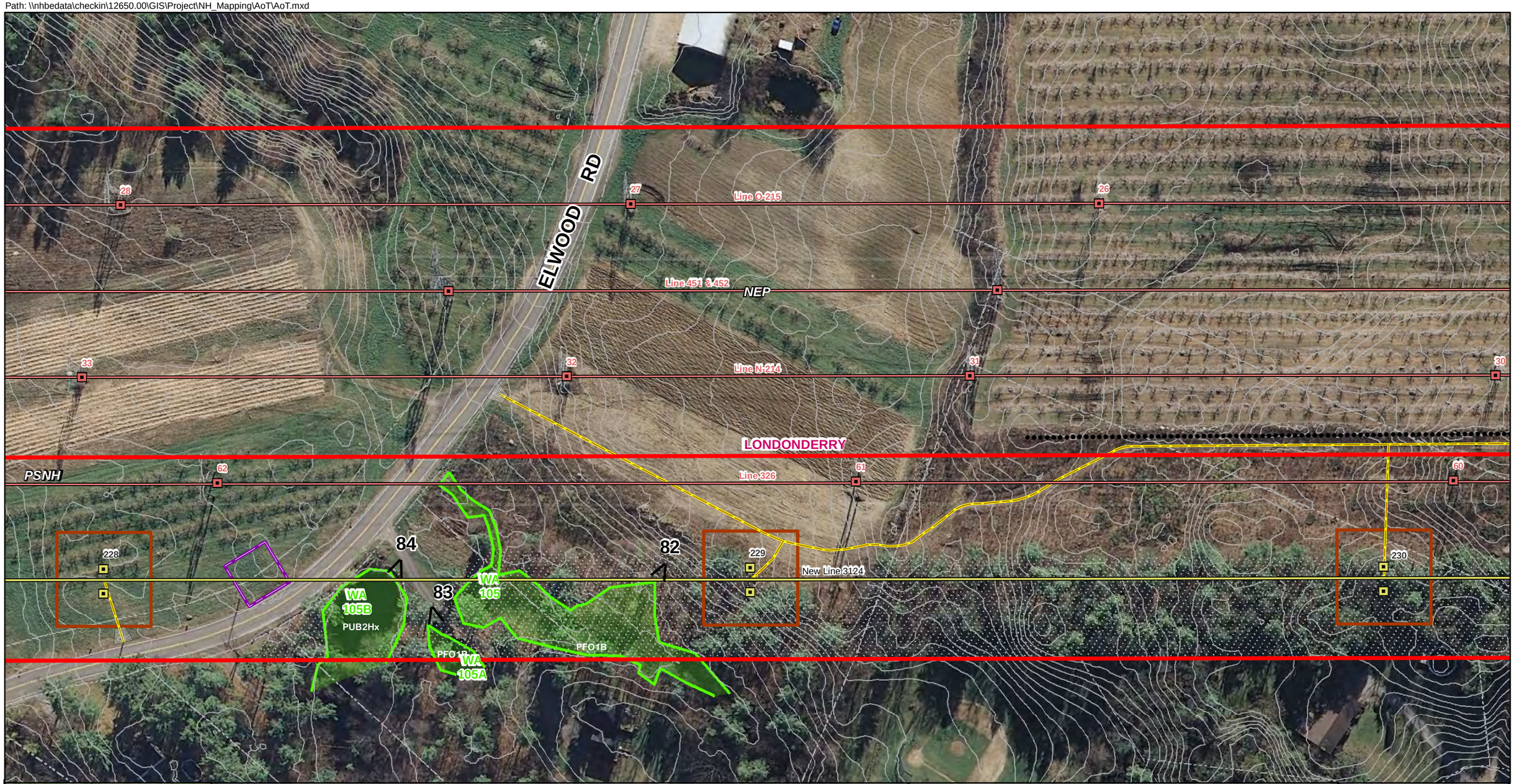

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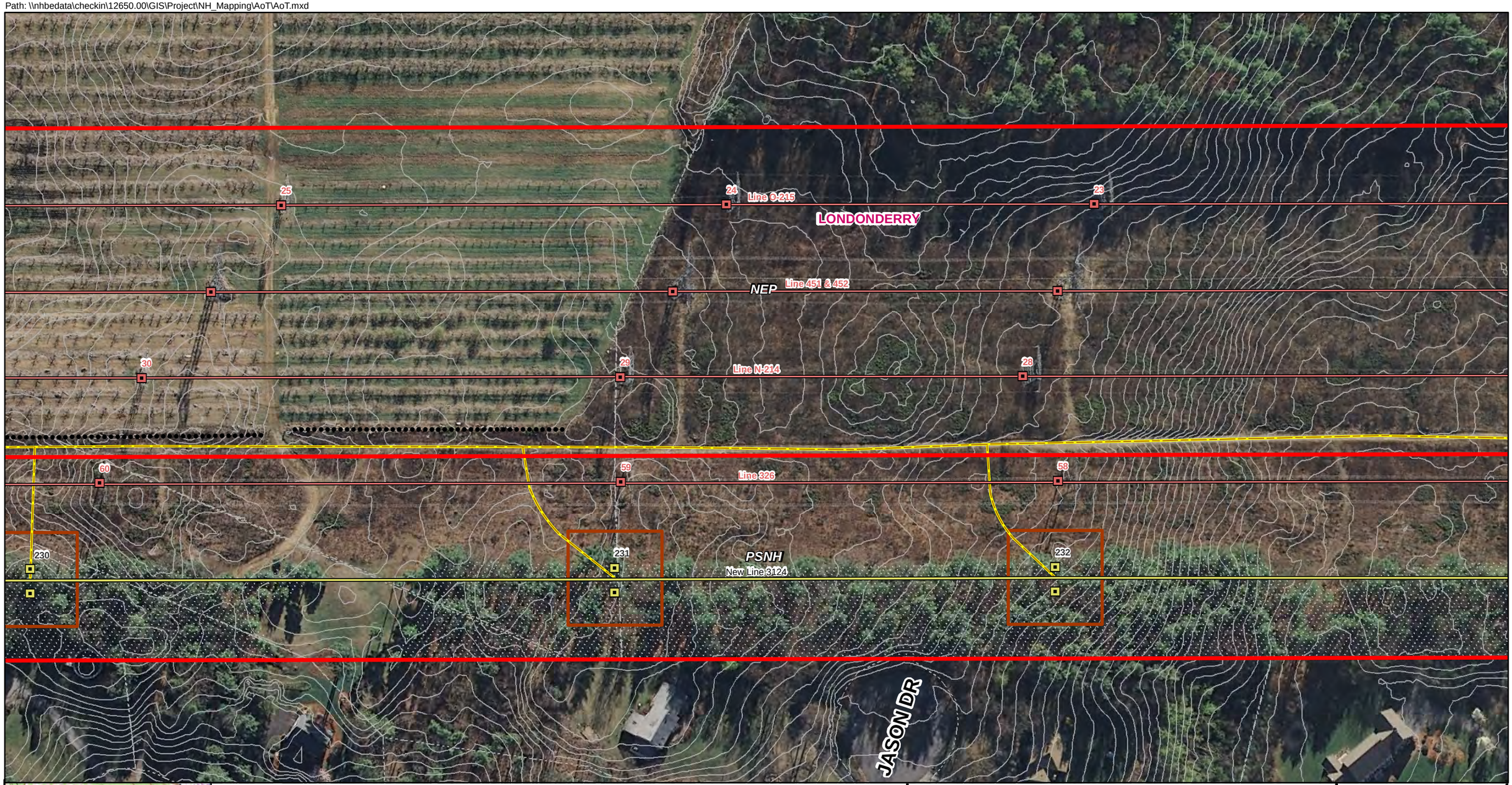

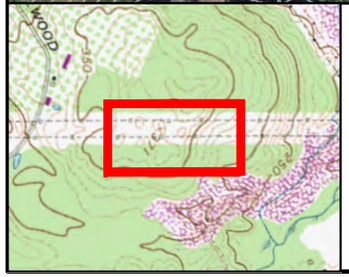

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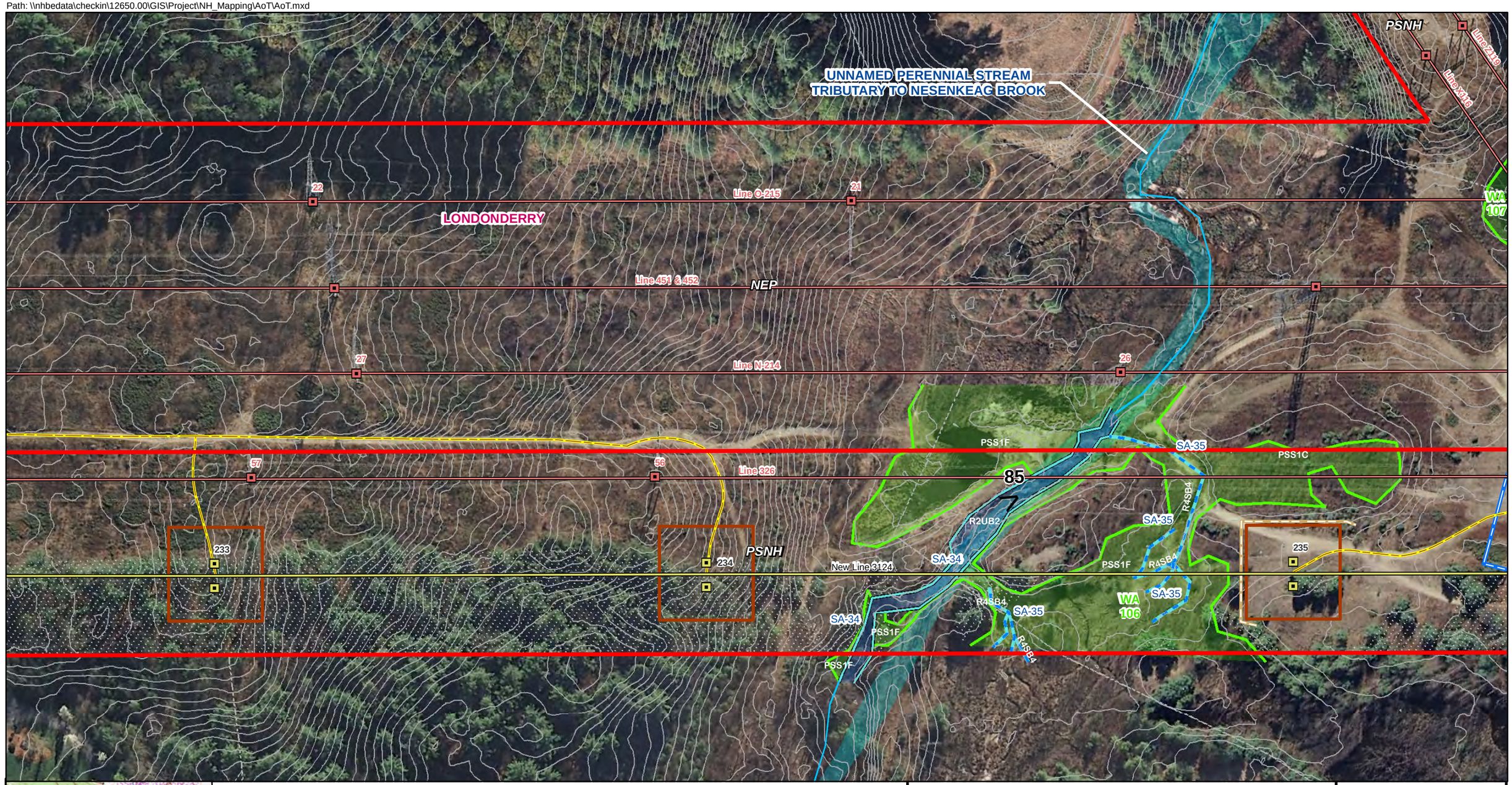

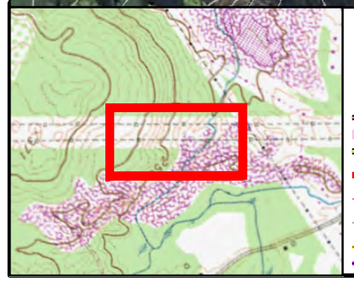

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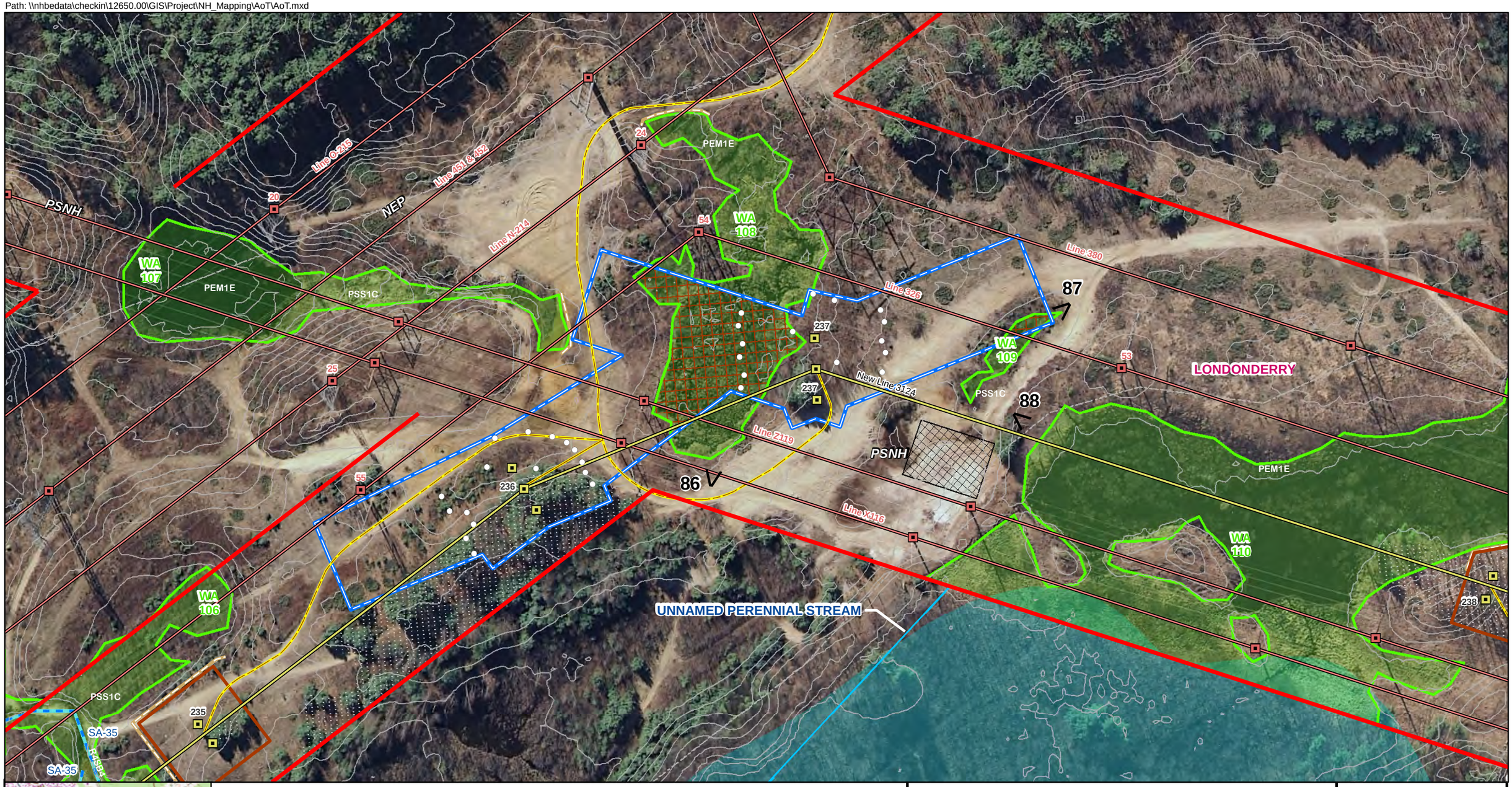

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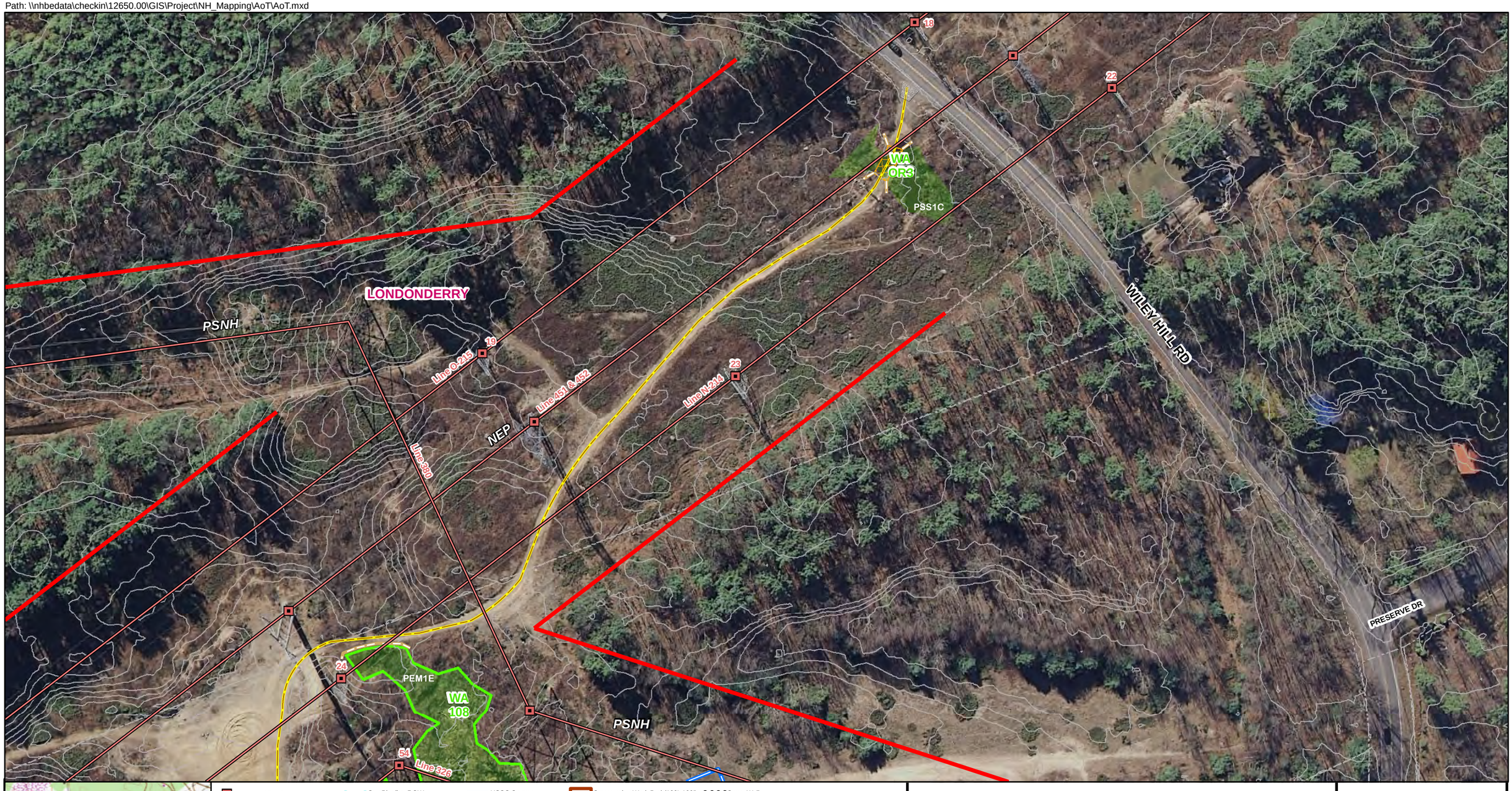

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- Laydown Area
- Stone Apron
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- Erosion Control
- Tree Clearing Area
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0 50 100 200

Feet

Alteration of Terrain Permitting Plans
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
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Source:
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Beals & Thomas,Eversource,Normandeau

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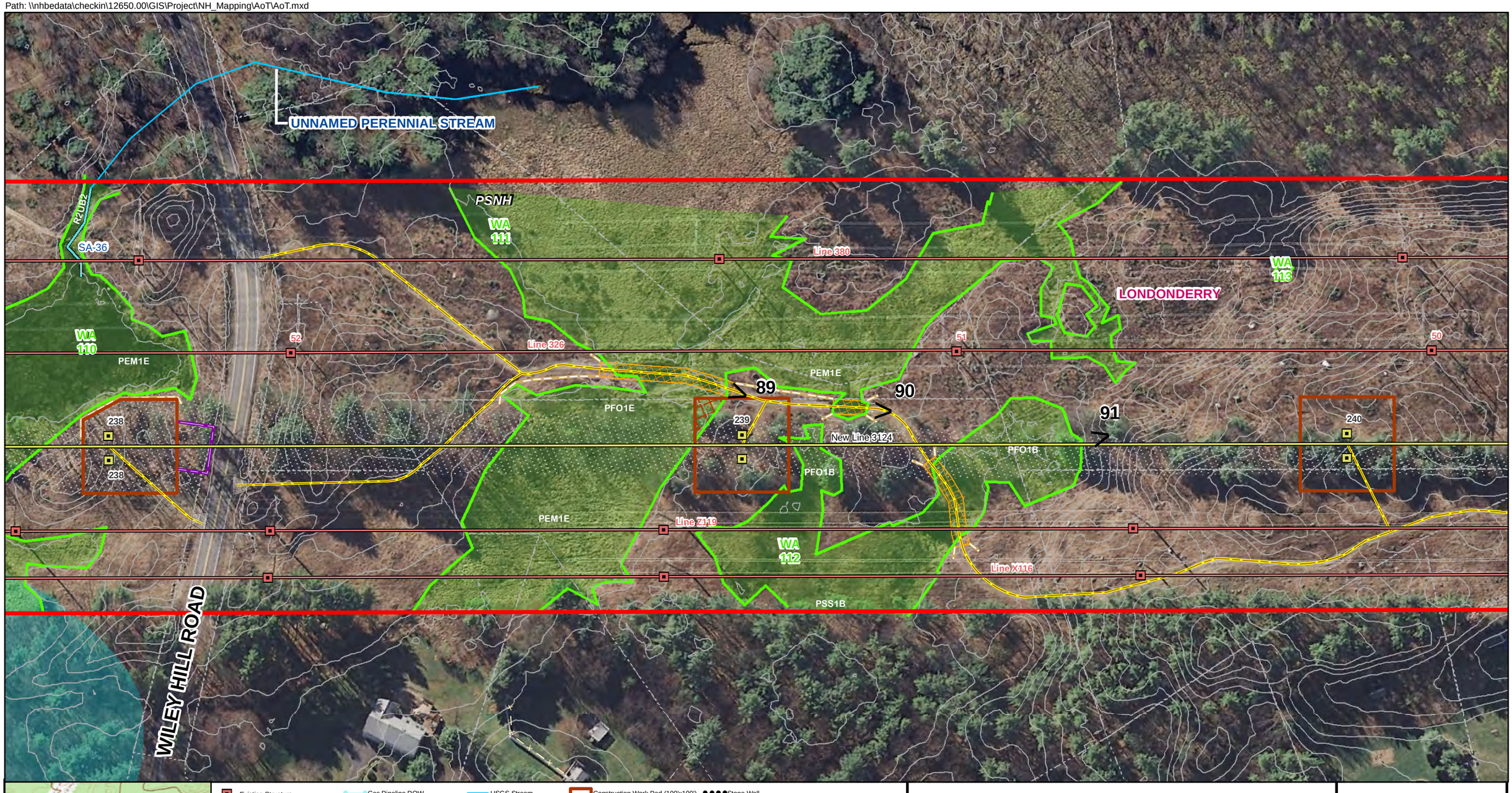

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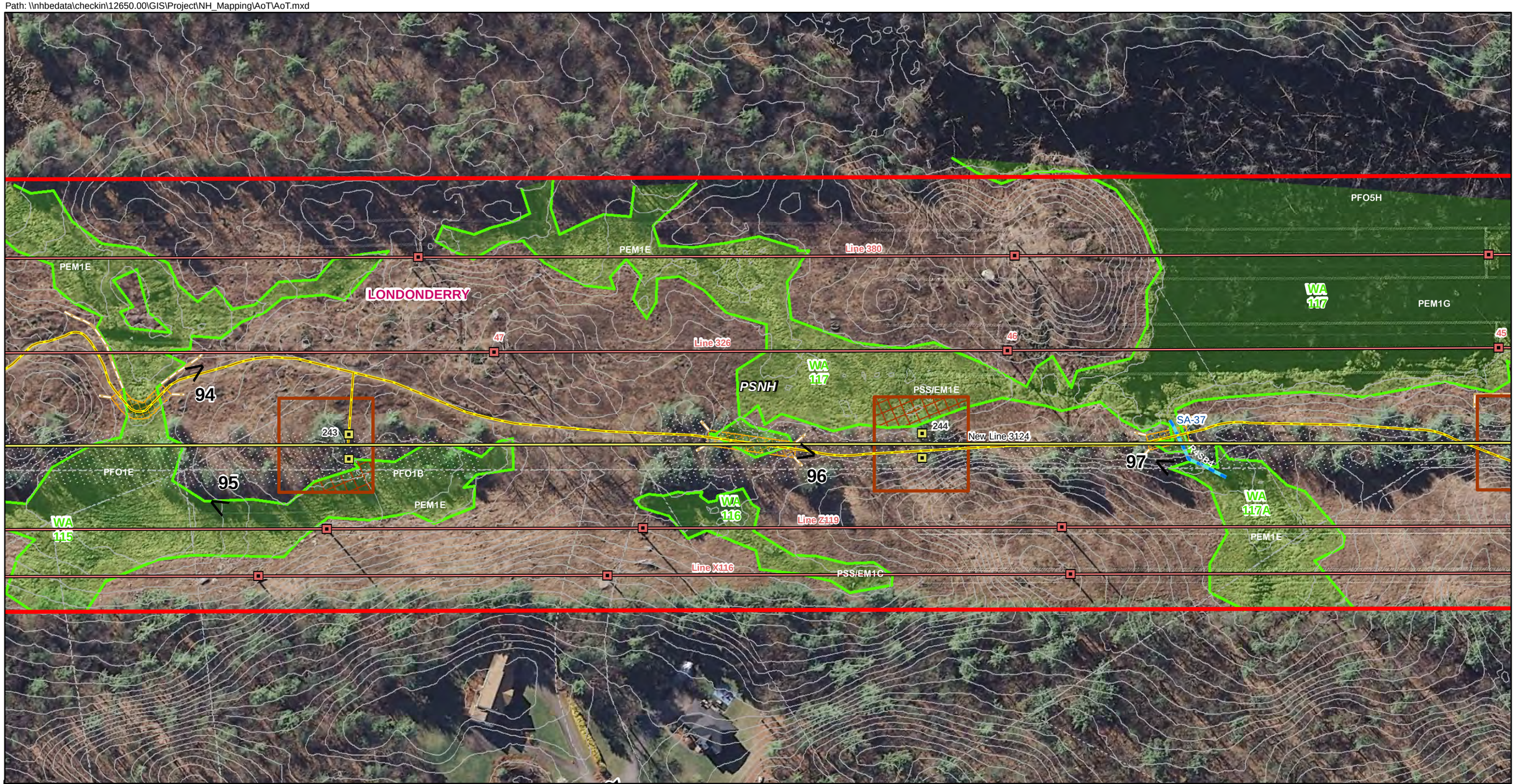

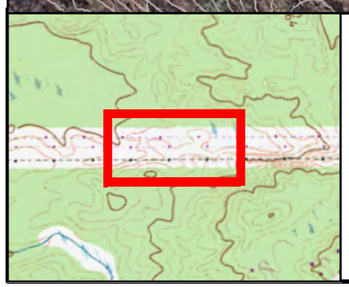

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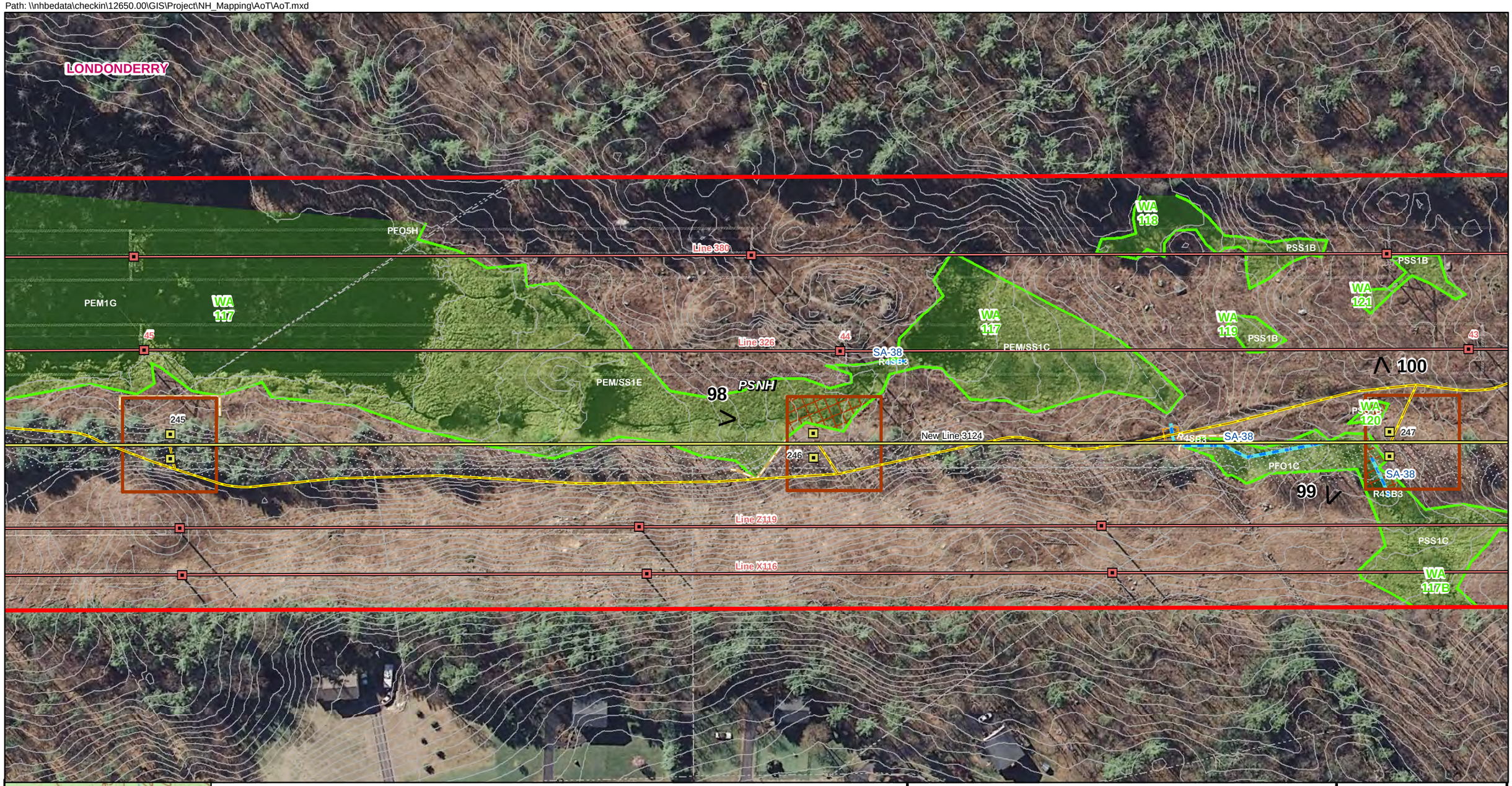

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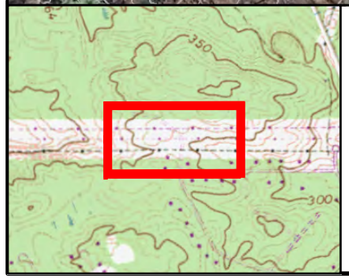

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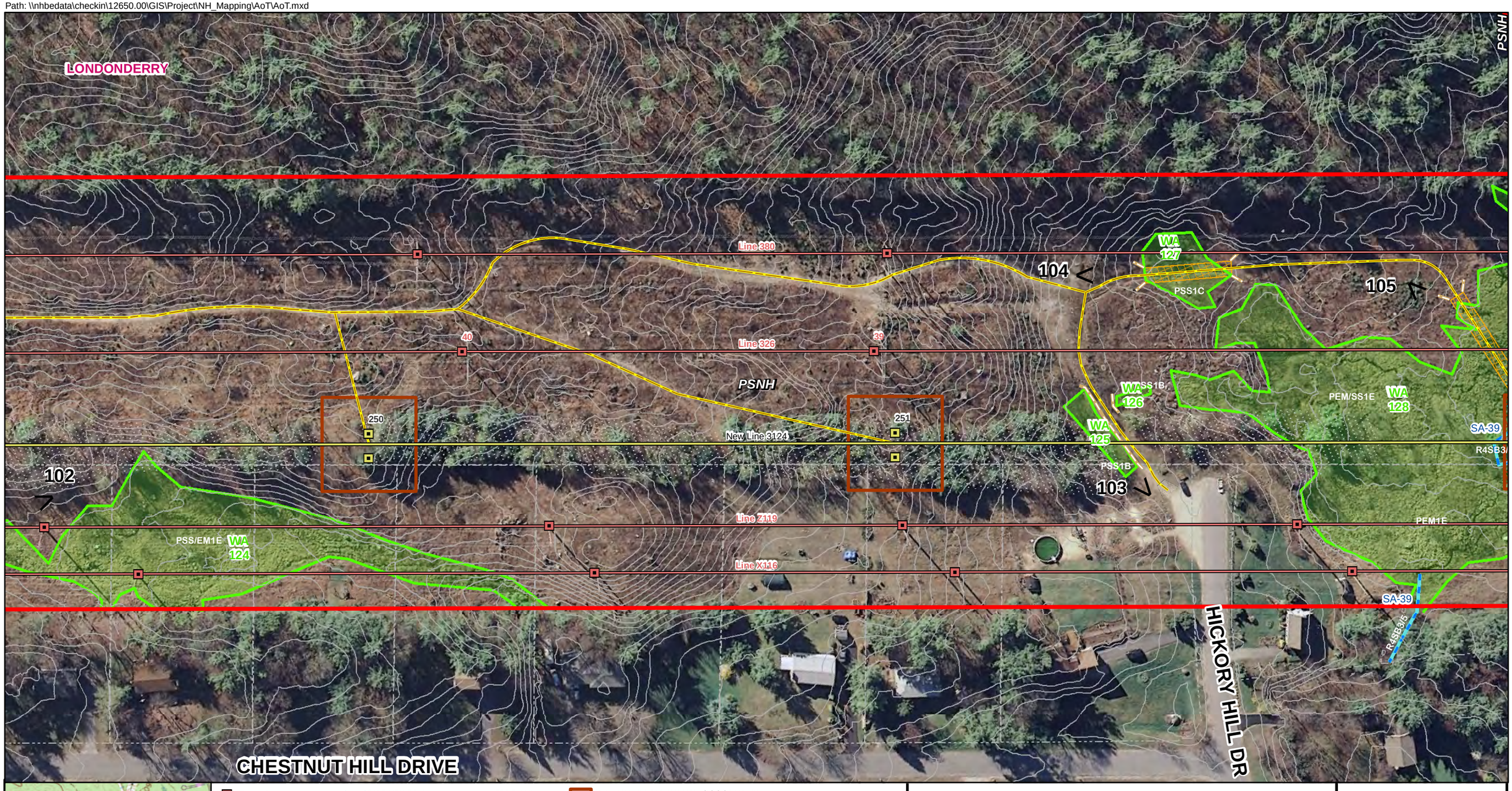

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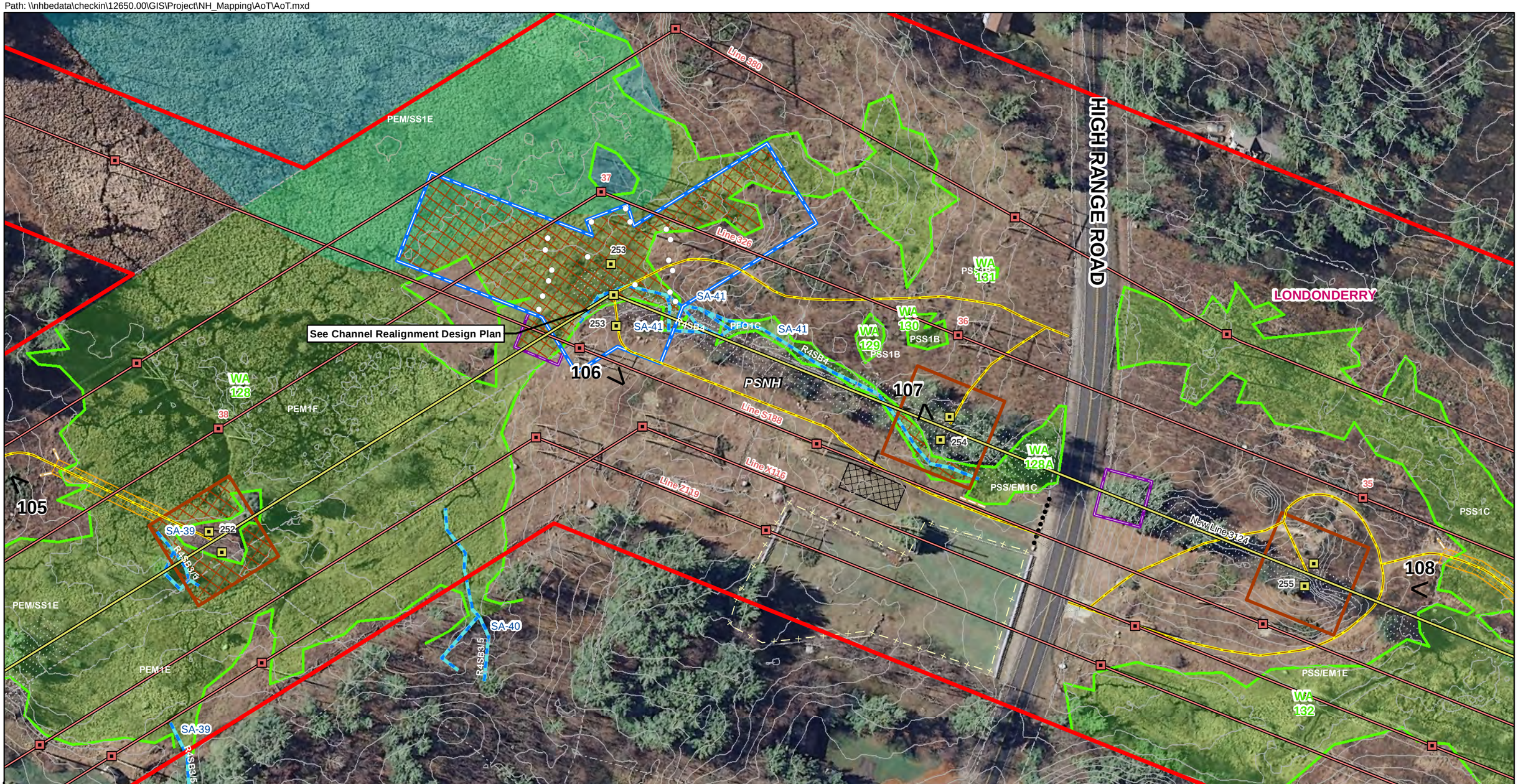

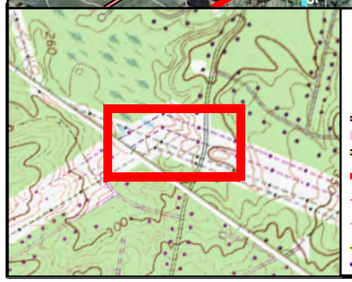

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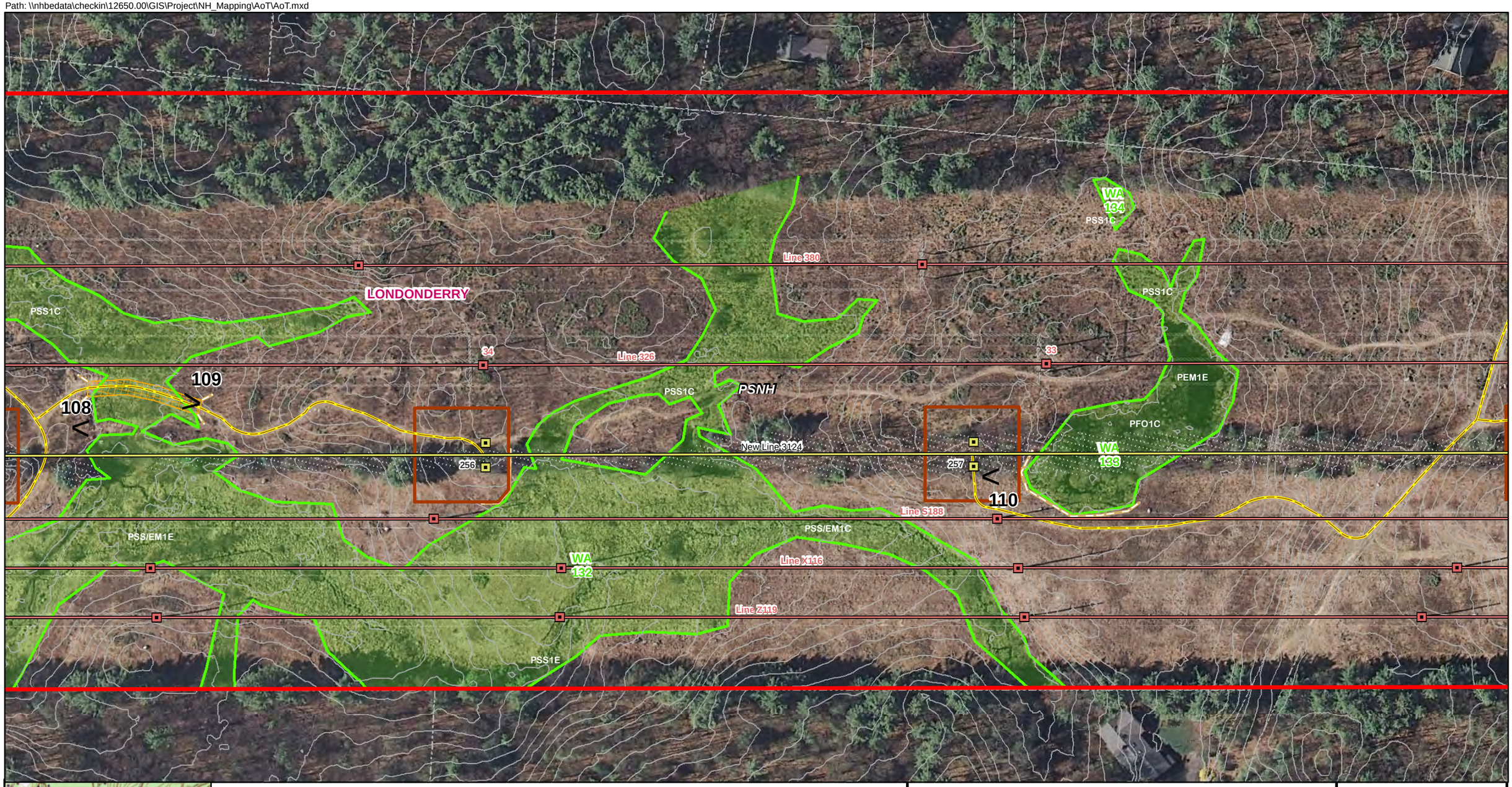

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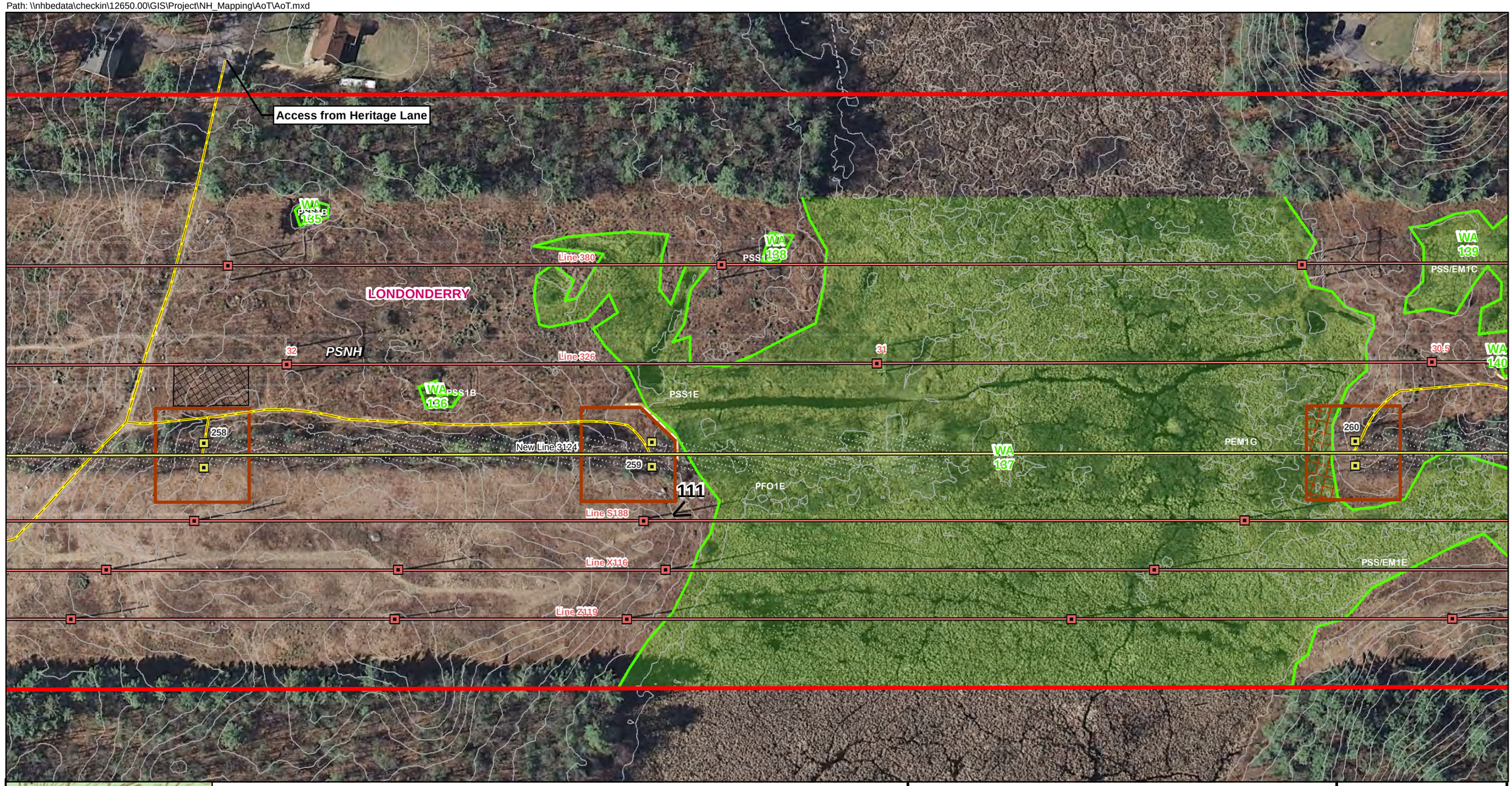

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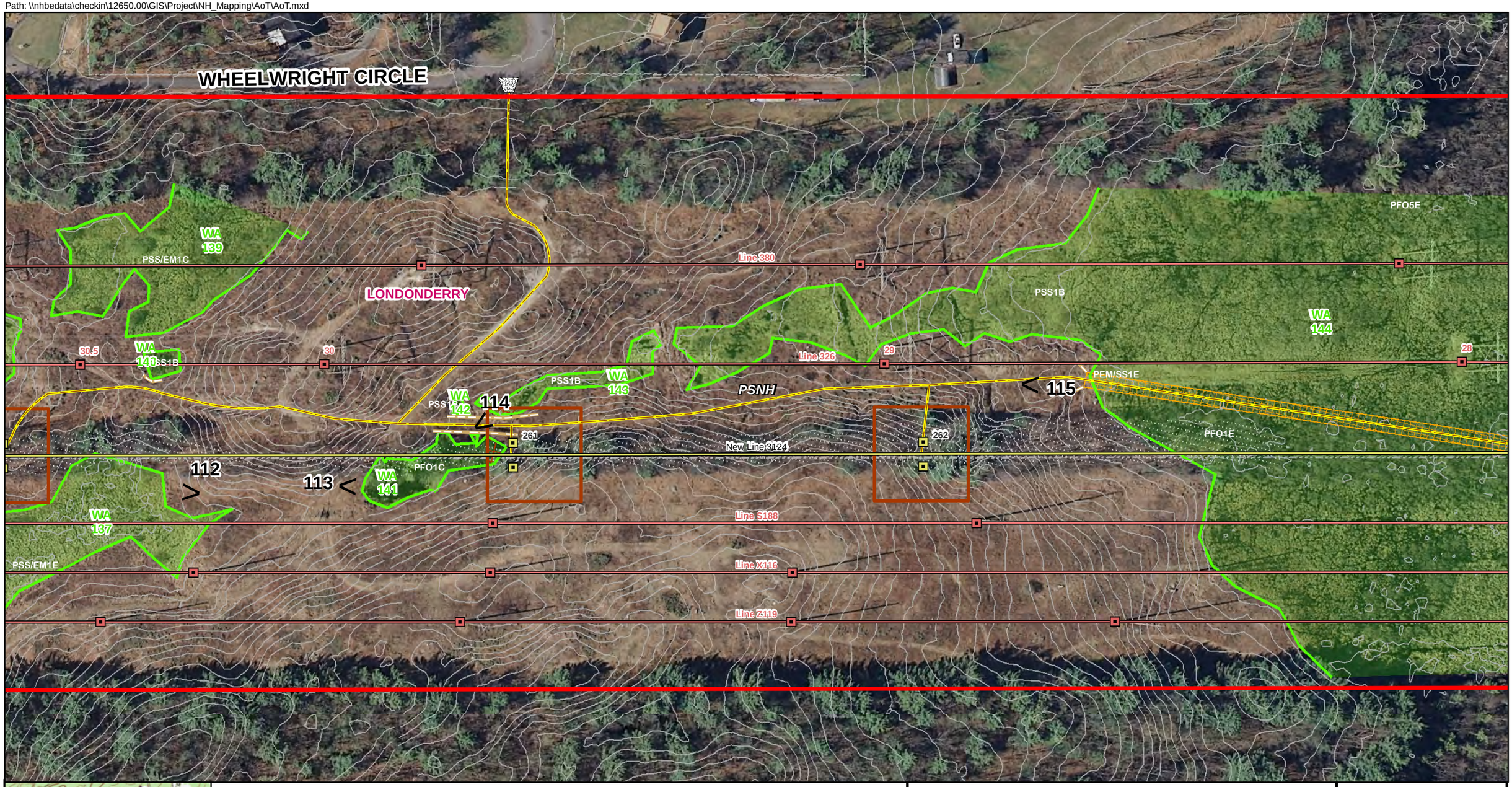

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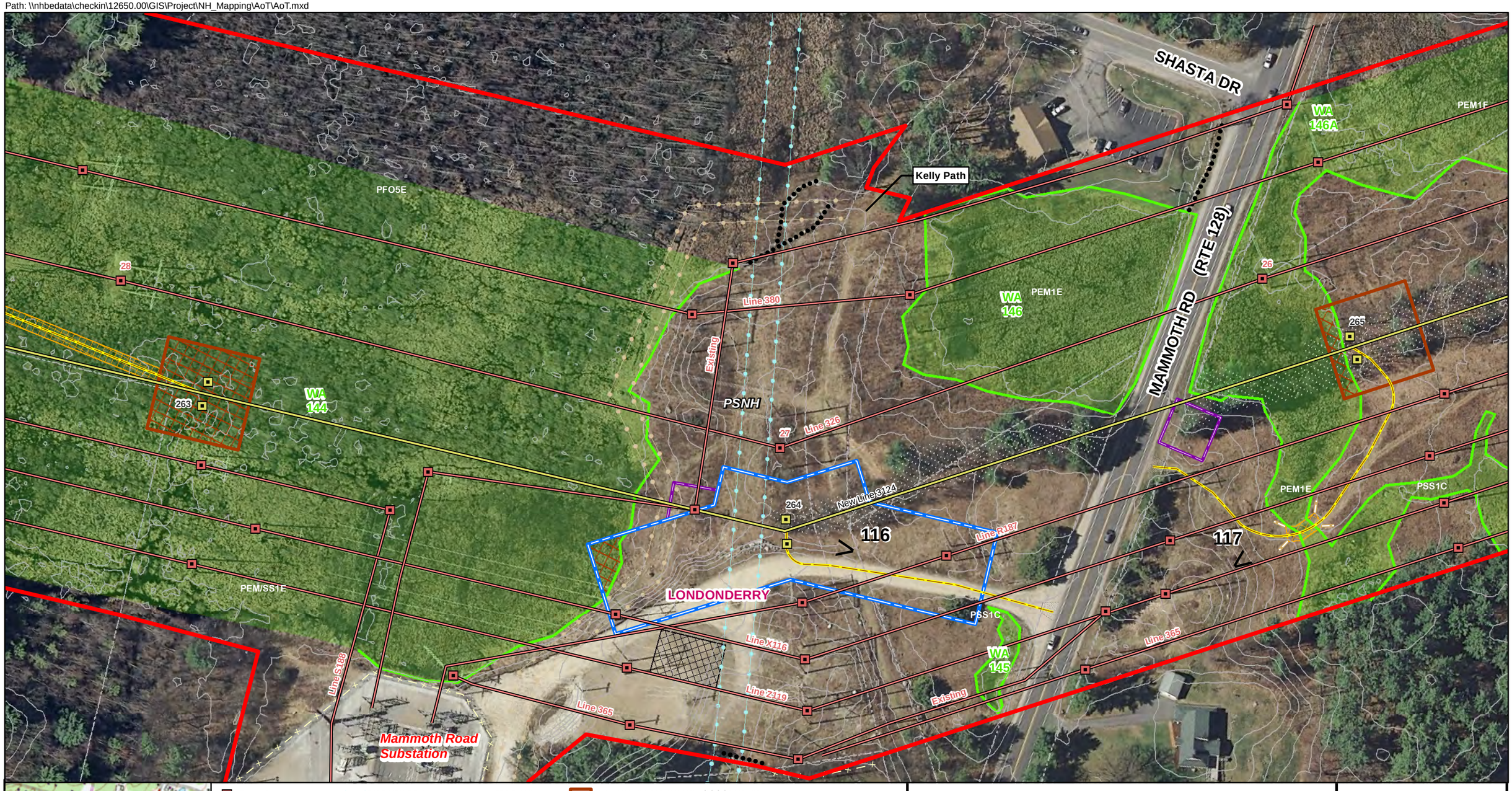

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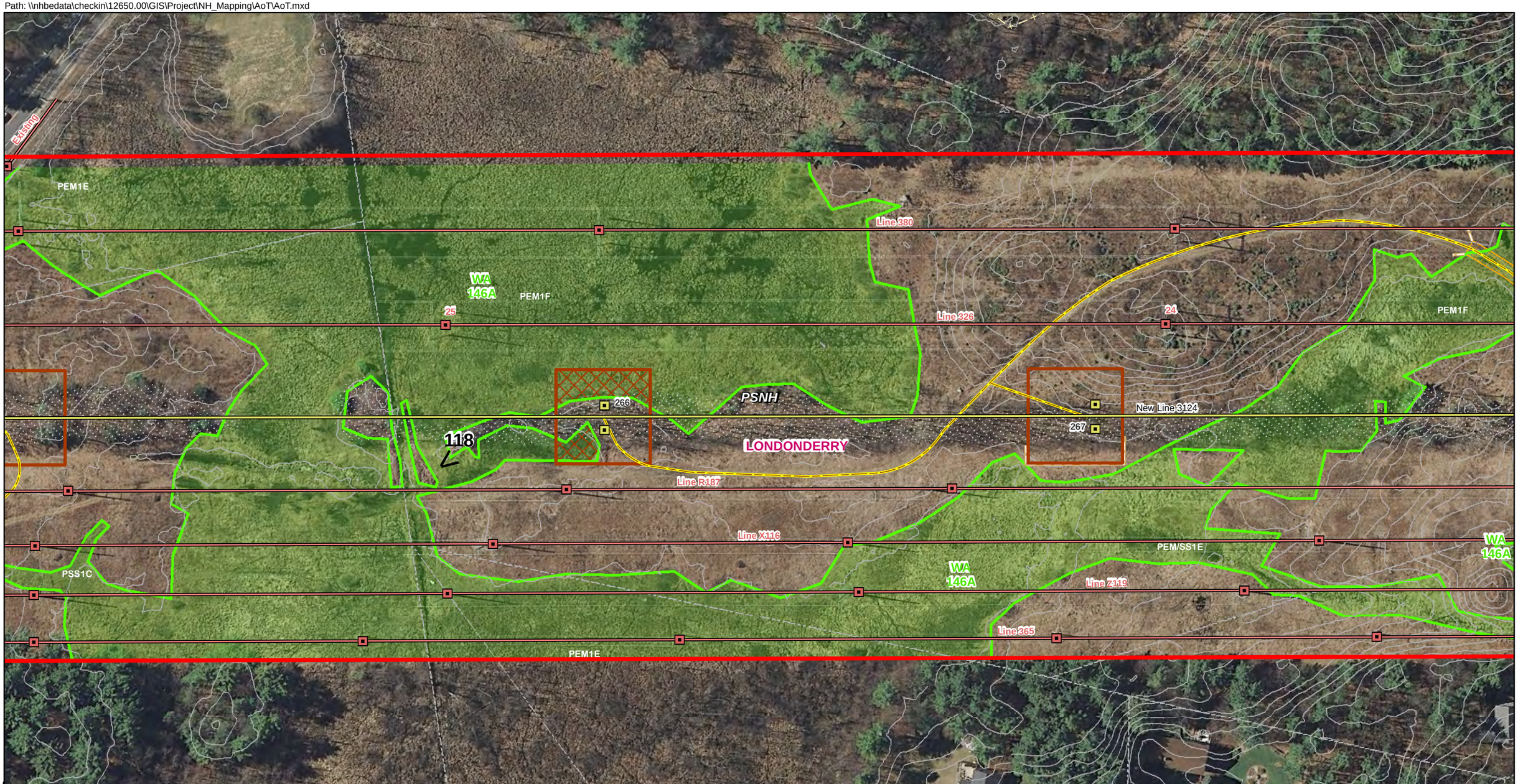

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PARISH DRIVE

SO.

Line 380

WA 146A

PEM1F

LONDONDERRY

23

Line 326

22

119

268

269

270

PSNH

New Line 3124

Line R187

Line X116

PEM/SS1E

Line Z119

Line 365

BANCROFT ROAD

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0 50 100 200
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Alteration of Terrain Permitting Plans
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Source:
NGRID,Black & Veatch,VHB,
Beals & Thomas,Eversource,Normandeau

Date: 6/30/2015

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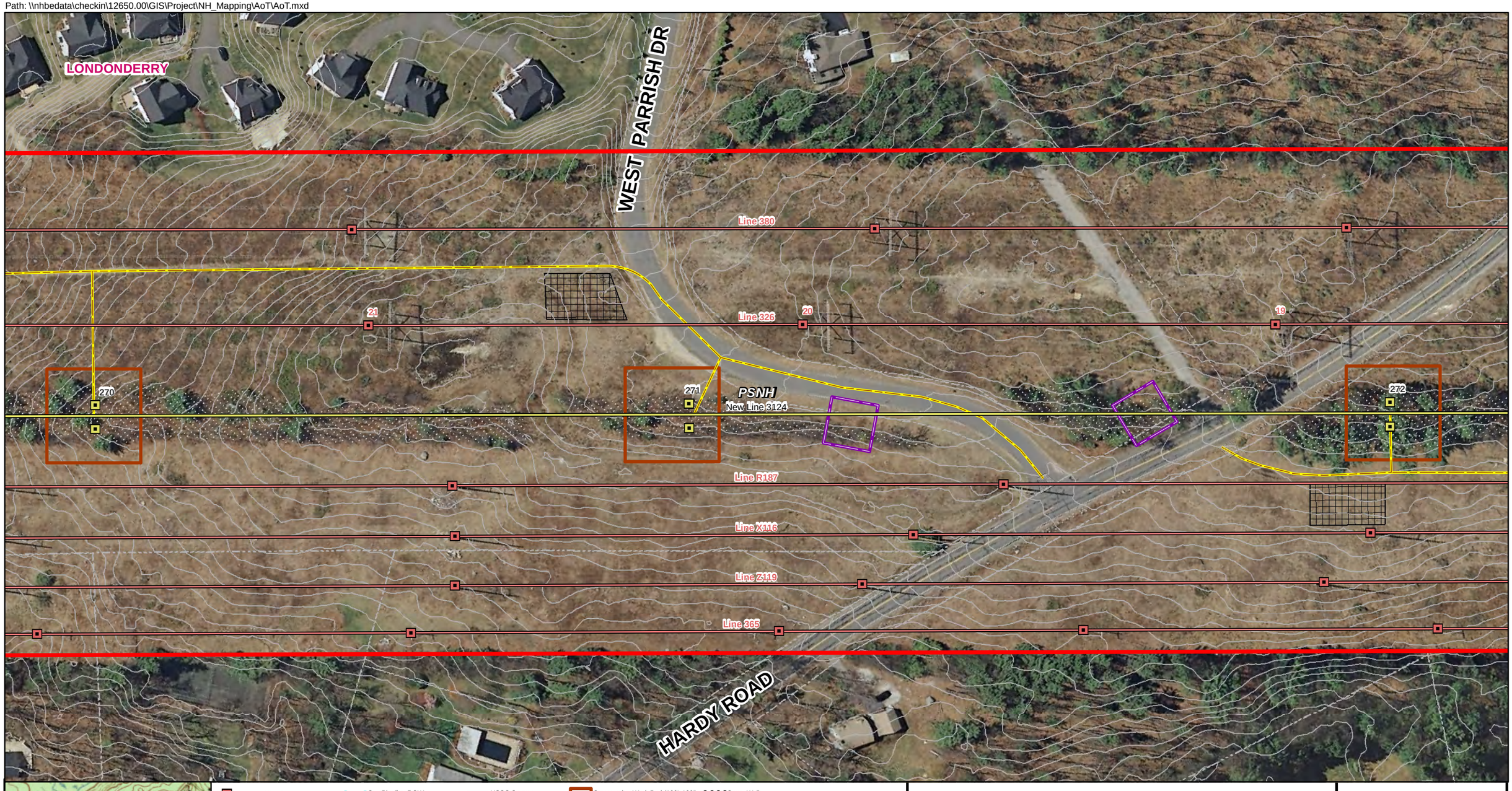

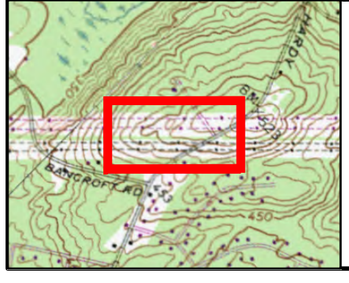

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NEP Property
Parcel Boundary
Primary Access
Alternate Access

Gas Pipeline ROW
Sewer Line ROW
Delineated Wetland Edge
Estimated Wetland Edge
Wetland Resource Area
Open Water
Vernal Pool
Delineated Perennial Stream
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Existing Culvert
Fence

Stone Wall
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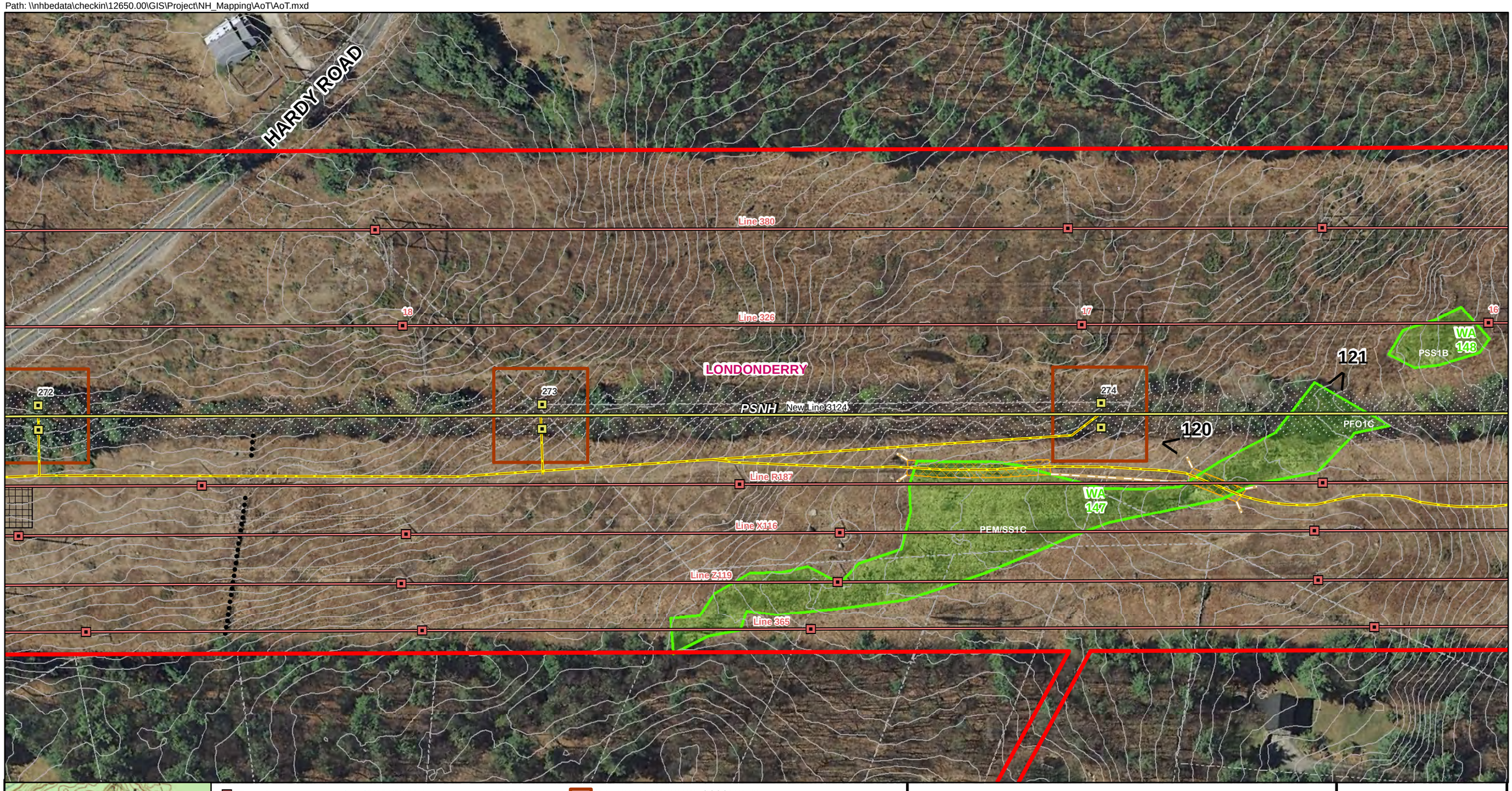

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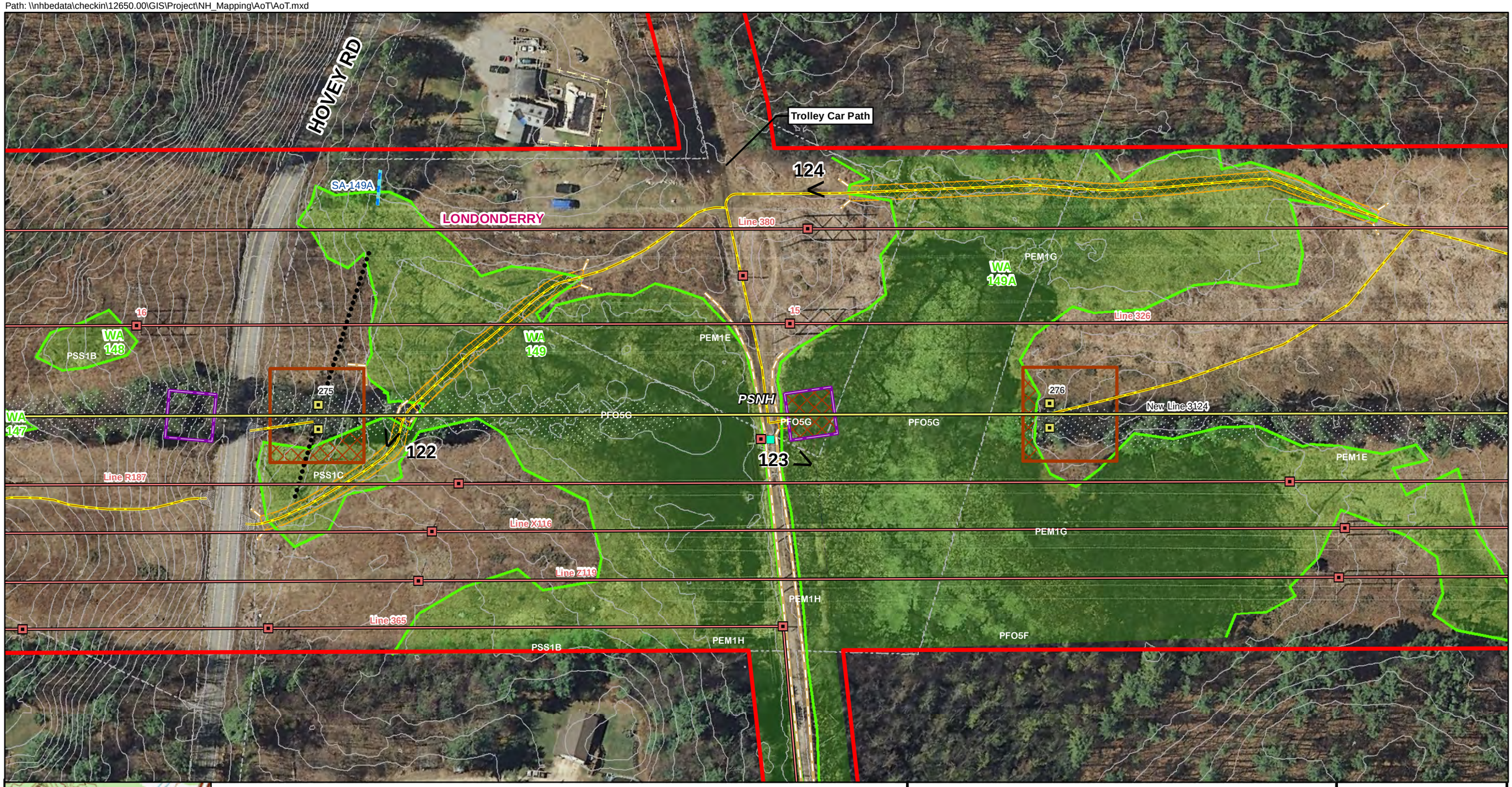

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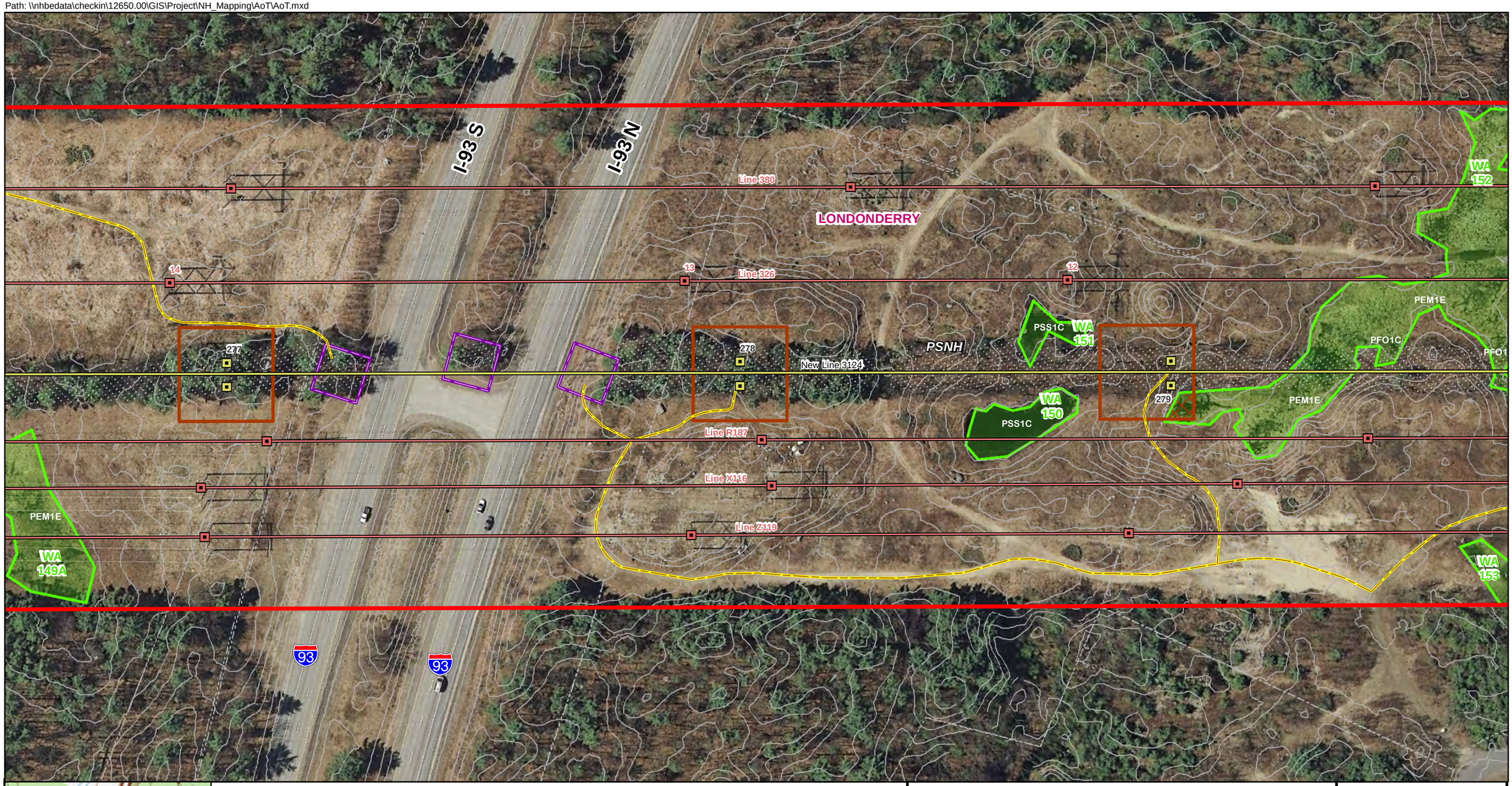

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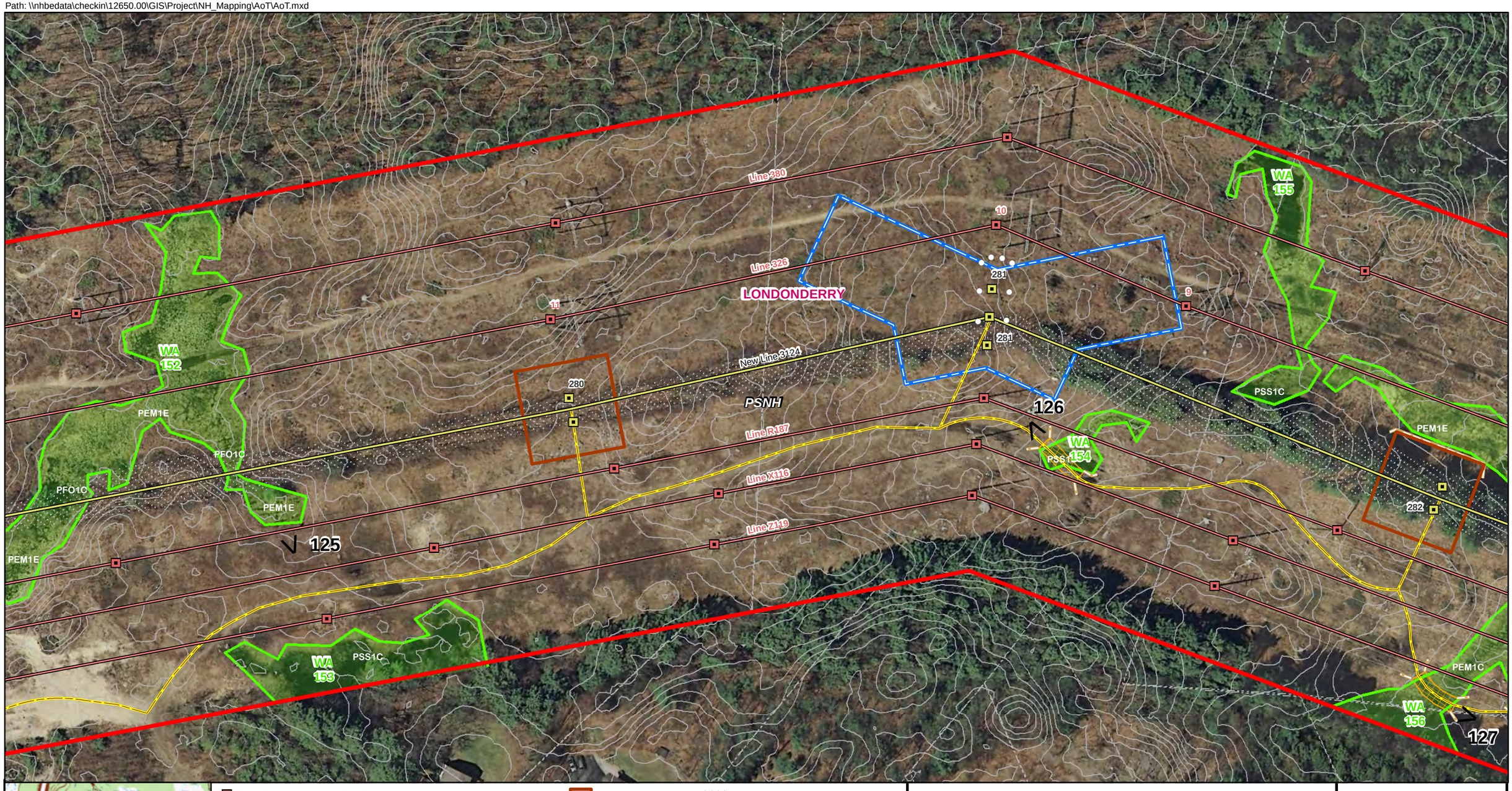

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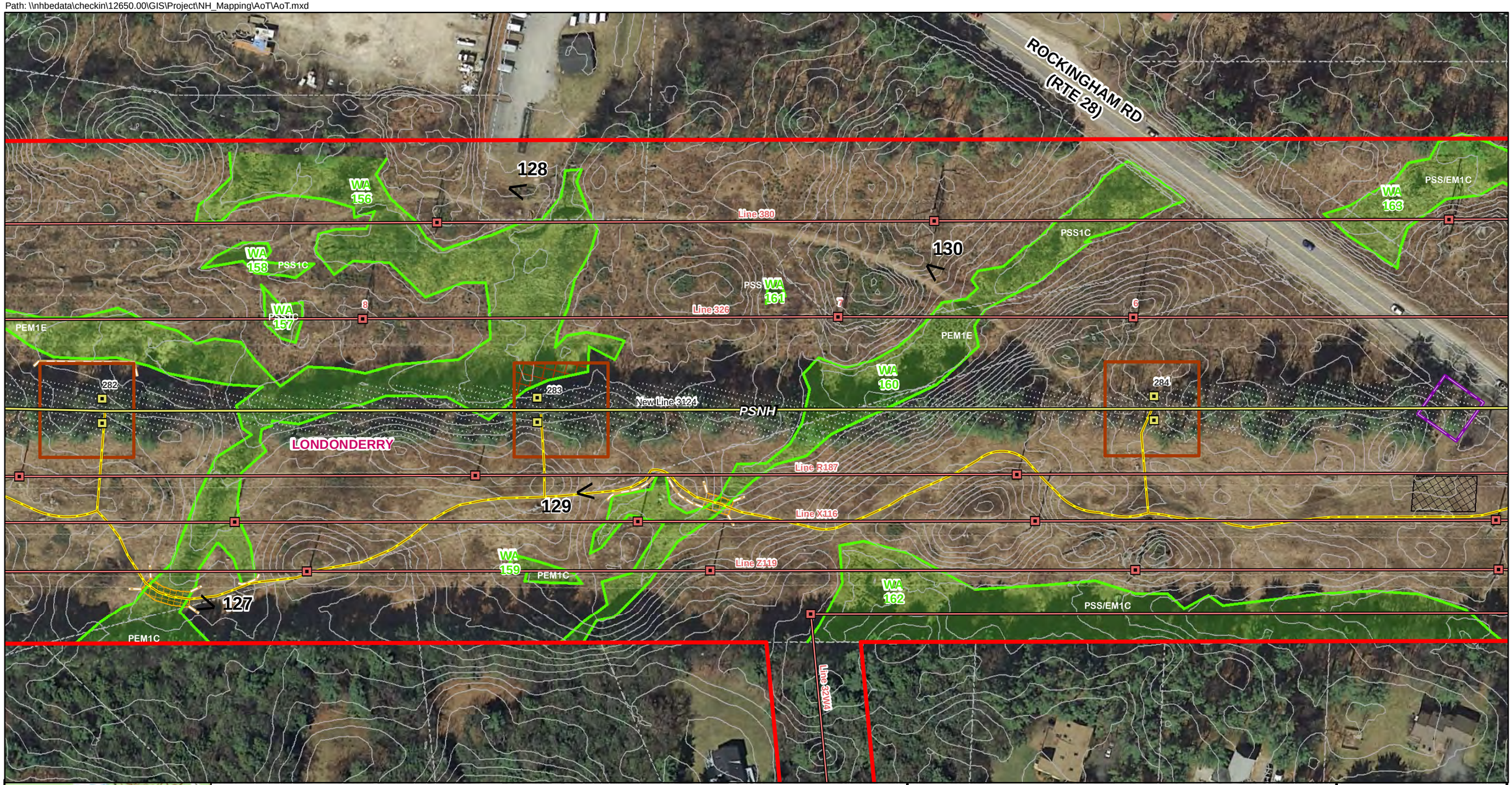

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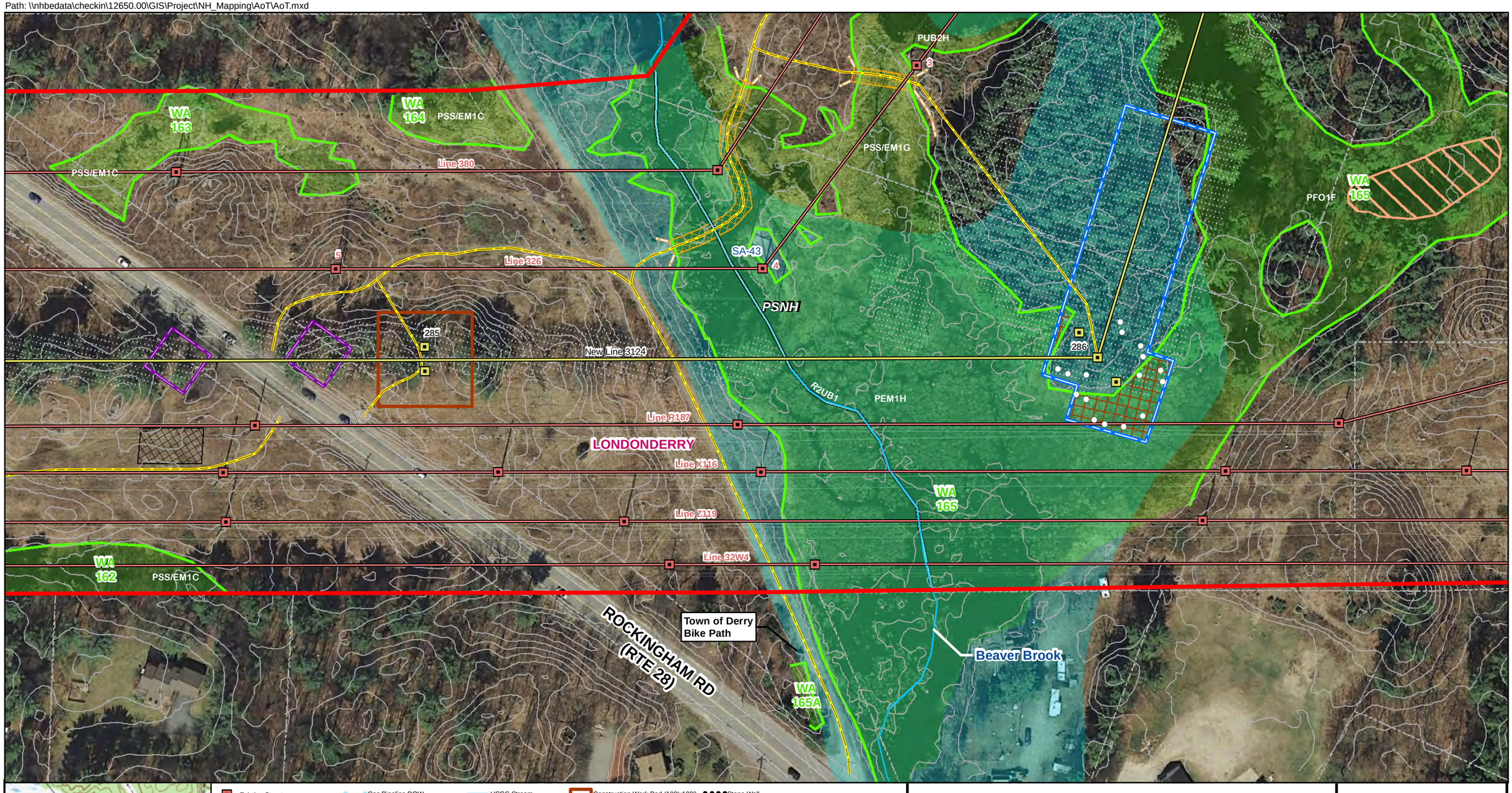

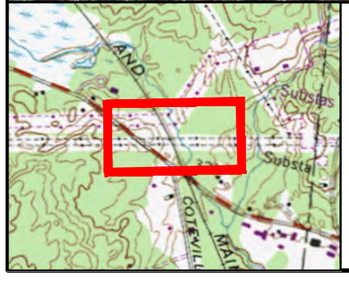

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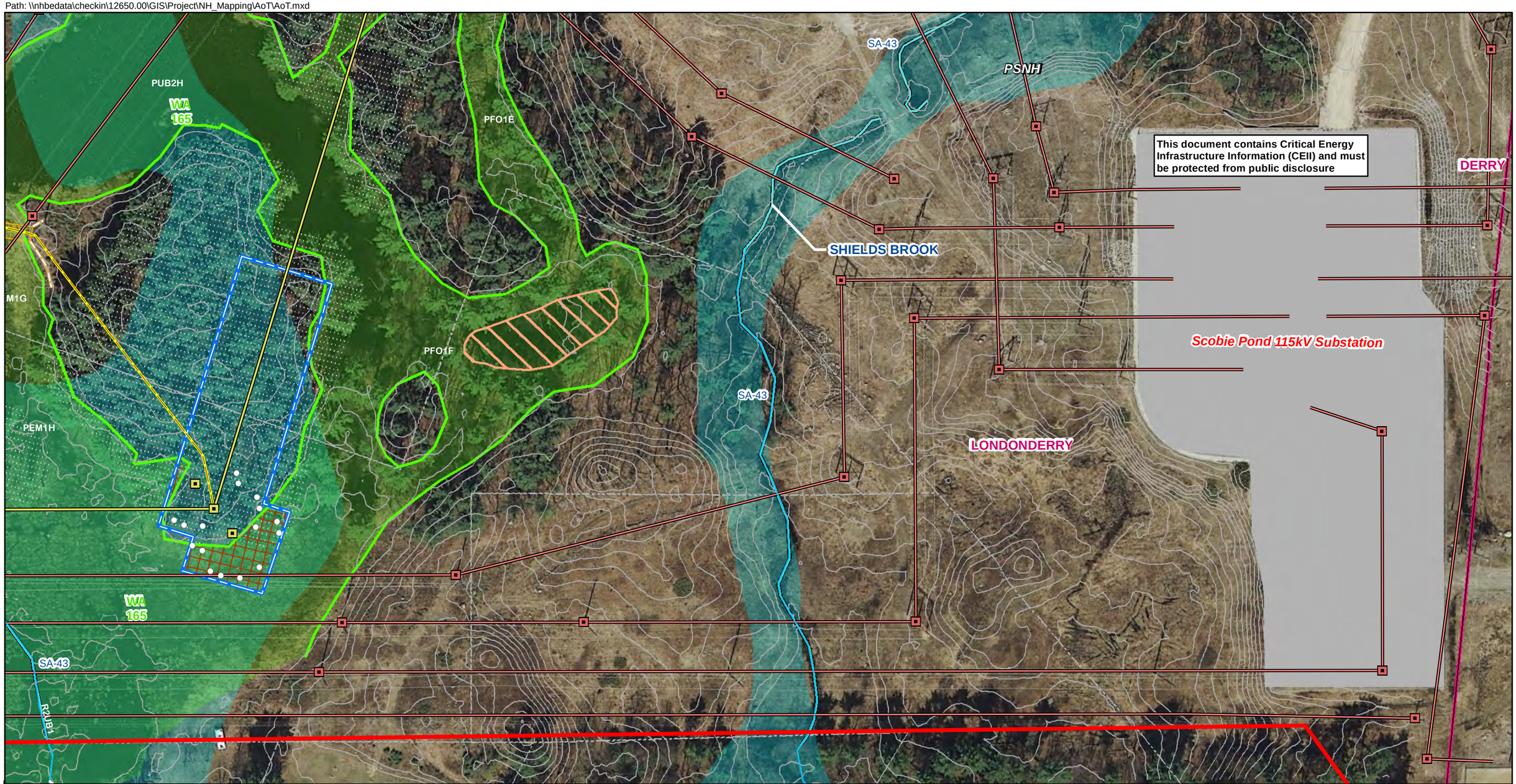

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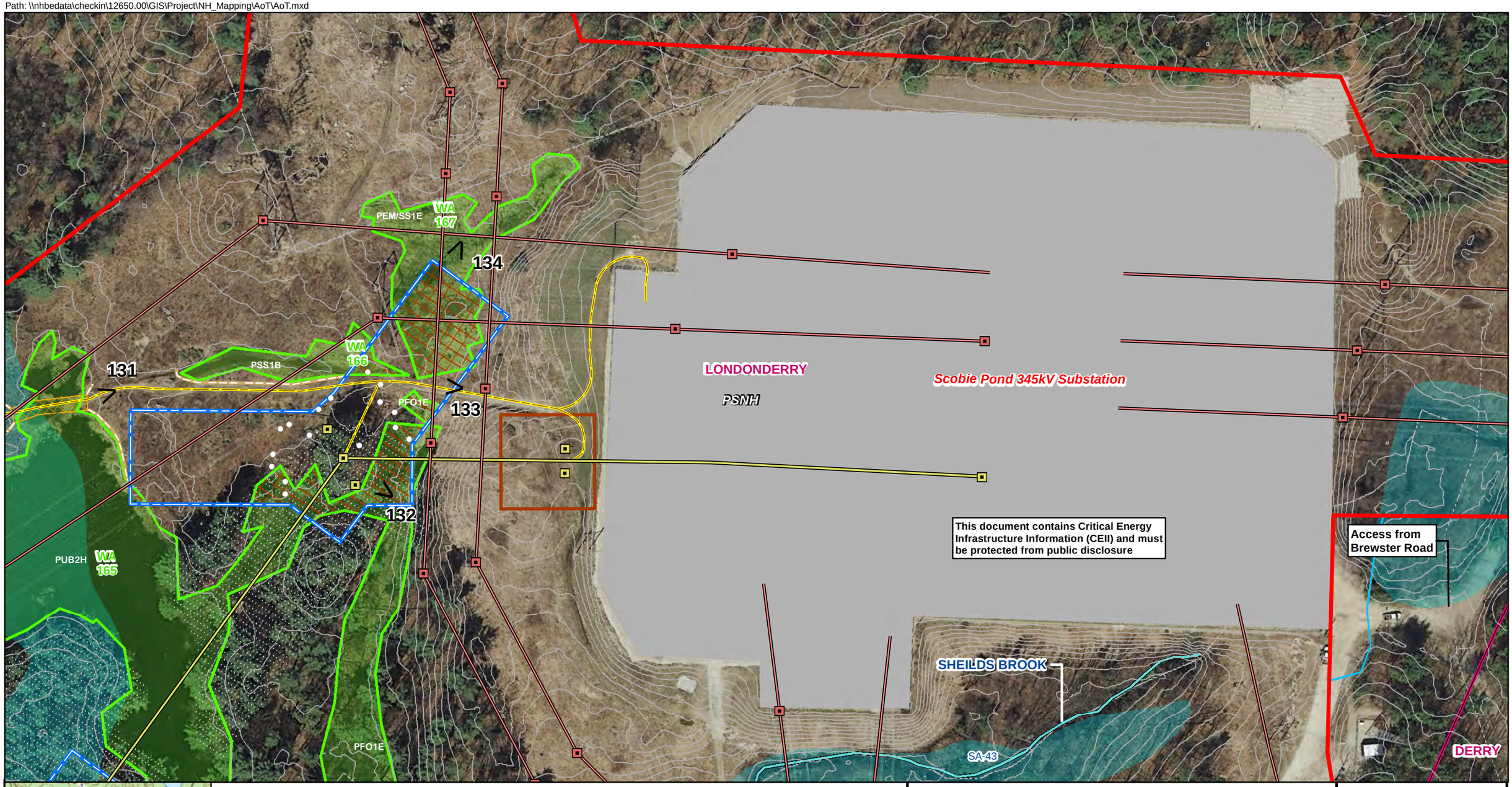

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EXISTING CONDITIONS INFORMATION:

TOPOGRAPHY

- ELEVATION DATA WAS OBTAINED USING LiDAR. ELEVATIONS ARE BASED ON NAVD 88.

WAIVERS

- WAIVER REQUEST FROM ENV-WQ 1509.04 FOR STORMWATER DRAINAGE REPORT, DRAINAGE AREA PLANS, HYDROLOGIC SOIL GROUP PLANS

STATE PERMITS

- NHDES WETLANDS PERMIT [PENDING]
- NHDES SHORELAND PERMIT [PENDING]
- NHDES WATER QUALITY CERRTIFICATION [PENDING]
- NHDOT PERMITS [PENDING]
- NH PUBLIC UTILITIES COMMISSION LICENSE [PENDING]

DOCUMENT USE

- THESE PLANS AND CORRESPONDING ARE INSTRUMENTS OF PROFESSIONAL SERVICE, AND SHALL NOT BE USED, IN WHOLE OR IN PART, FOR ANY PURPOSE OTHER THAN FOR WHICH IT WAS CREATED WITHOUT THE EXPRESSED, WRITTEN CONSENT OF VHB. ANY UNAUTHORIZED USE, REUSE, MODIFICATION OR ALTERATION, INCLUDING AUTOMATED CONVERSION OF THIS DOCUMENT SHALL BE AT THE USER'S SOLE RISK WITHOUT LIABILITY OR LEGAL EXPOSURE TO VHB.

WETLAND DELINEATION

- WETLANDS IN LONDONDERRY WERE DELINEATED IN THE FALL OF 2012 BY NORMANDEAU ASSOCIATES IN SUPPORT OF A PREVIOUS PSNH PROJECT. DURING SEPTEMBER AND OCTOBER 2014, AND APRIL 2015, VHB WETLANDS SCIENTISTS REVIEWED AND CONFIRMED PREVIOUSLY DELINEATED WETLAND AREAS AND EXTENDED BOUNDARIES AS NEEDED TO INCLUDE THE ENTIRE PROJECT AREA. VHB ALSO DELINEATED A NUMBER OF WETLANDS, NOT PREVIOUSLY DELINEATED BY NORMANDEAU, THAT WERE OUTSIDE THE STUDY AREA FOR THE PREVIOUS PSNH PROJECT. WETLANDS WERE DELINEATED USING ALPHA-NUMERICALLY CODED PINK FLAGGING TAPE.
- WETLAND DELINEATION WAS PERFORMED TO THE STANDARDS IN THE *CORPS OF ENGINEERS WETLAND DELINEATION MANUAL AND THE REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, VERSION 2.0* (JANUARY 2012).

CONSTRUCTION SEQUENCE:

1. SURVEY AND STAKE LIMITS OF CLEARING AND GRUBBING.
2. INSTALL SILT FENCING, HAY BALES, CONSTRUCTION EXITS, ETC. PRIOR TO START OF CONSTRUCTION, TO BE MAINTAINED UNTIL COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER.
3. THE ENVIRONMENTAL CONTROLS SHOWN ON THESE PLANS MAY NEED TO BE SUPPLEMENTED DUE TO SEASON OF WORK, WORK METHODS PROPOSED, AND ADDITIONAL REQUIREMENTS OF OUTSTANDING PERMITS. REFER TO BMP MANUALS AND ADDITIONAL GUIDANCE DOCUMENTS, AS NEEDED.
4. ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY HALF-INCH OF RAINFALL. REPAIR, CLEAN, AND REPLACE ANY SEDIMENT CONTROLS DAMAGED DURING AND/OR AFTER RAINFALL EVENTS.
5. PERFORM REQUIRED GRADING AND INSTALL BMPS TO CONTROL STORMWATER AS MAY BE REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSURING THAT THE PRELIMINARY GRADING ALLOWS SURFACE WATER RUN-OFF FROM UNSTABILIZED AREAS TO FLOW TOWARDS STABILIZED AREAS.
6. PERFORM CONSTRUCTION (I.E. UTILITY STRUCTURE INSTALLATION).
7. LOAM, SEED, AND MULCH DISTURBED AREAS, AS NECESSARY.
8. REMOVE TEMPORARY EROSION CONTROL MEASURES, SILT FENCE, ETC. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER.

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Source:
National Grid, Eversource

nationalgrid

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EROSION CONTROL

1. PRIOR TO STARTING ANY OTHER WORK ON THE SITE, THE CONTRACTOR SHALL NOTIFY APPROPRIATE AGENCIES AND SHALL INSTALL EROSION CONTROL MEASURES AS SHOWN ON THE PLANS AND AS IDENTIFIED IN FEDERAL, STATE, AND LOCAL APPROVAL DOCUMENTS PERTAINING TO THIS PROJECT.
2. EROSION AND SEDIMENTATION CONTROLS SHALL BE APPROPRIATE TO THE SIZE AND NATURE OF THE PROJECT AND TO THE PHYSICAL CHARACTERISTICS OF THE SITE, INCLUDING SLOPE, SOIL TYPE, VEGETATIVE COVER, AND PROXIMITY TO WETLANDS OR SURFACE WATERS.
3. THE TYPE AND INSTALLATION METHOD OF EROSION AND SEDIMENT CONTROLS SHALL BE IN ACCORDANCE WITH NATIONAL GRID'S ENVIRONMENTAL GUIDANCE DOCUMENT ("EG-303NE") OR THE BMP MANUAL FOR *UTILITY MAINTENANCE IN AND ADJACENT TO WETLANDS AND WATERBODIES IN NEW HAMPSHIRE* ("BMP MANUAL") (NHDRED, 2010).
4. CONTRACTOR SHALL INSPECT AND MAINTAIN EROSION CONTROL MEASURES, AND REMOVE SEDIMENT THEREFROM ON A WEEKLY BASIS AND WITHIN TWELVE HOURS AFTER EACH STORM EVENT (0.5" OF RAINFALL OR GREATER) AND DISPOSE OF SEDIMENTS IN AN UPLAND AREA SUCH THAT THEY DO NOT ENCUMBER OTHER PROTECTED AREAS.
5. CONTRACTOR SHALL BE FULLY RESPONSIBLE TO CONTROL CONSTRUCTION SUCH THAT SEDIMENTATION SHALL NOT AFFECT REGULATORY PROTECTED AREAS, WHETHER SUCH SEDIMENTATION IS CAUSED BY WATER, WIND, OR DIRECT DEPOSIT.
6. CONTRACTOR SHALL PERFORM CONSTRUCTION SEQUENCING SUCH THAT EARTH MATERIALS ARE EXPOSED FOR A MINIMUM AMOUNT OF TIME BEFORE THEY ARE COVERED, SEEDED, OR OTHERWISE STABILIZED TO PREVENT EROSION.
7. AT NO TIME SHALL THE TOTAL UNSTABILIZED DISTURBED AREA ON-SITE BE GREATER THAN (5) FIVE ACRES.
8. AREAS REMAINING UNSTABILIZED FOR A PERIOD OF MORE THAN 30 DAYS SHALL BE TEMPORARILY SEEDED AND MULCHED. HAY MULCH SHALL BE APPLIED AT A MINIMUM RATE OF 1-1/2 TONS/ACRE.
9. PERMANENT SEEDING SHALL OCCUR BETWEEN APRIL 1 AND JUNE 1, AND/OR BETWEEN AUGUST 15 AND OCTOBER 15. ALL SEEDING FROM SEPTEMBER 15 SHALL BE HAY MULCHED.
10. DUST SHALL BE CONTROLLED THROUGH THE USE OF WATER.
11. THE SELECTED CONTRACTOR IS RESPONSIBLE FOR STREET SWEEPING, AS REQUIRED, AT POINTS OF INGRESS/EGRESS FROM PUBLIC AND PRIVATE ROADWAYS IN ACCORDANCE WITH THE NPDES CONSTRUCTION GENERAL PERMIT.
12. SOILS TO BE STOCKPILED FOR A PERIOD OF MORE THAN 30 DAYS SHALL BE TEMPORARILY SEEDED AND MULCHED. CONTRACTOR SHALL INSTALL SILT FENCING ALONG DOWNHILL SIDE OF STOCKPILES.
13. SWAMP MATTING SHOWN ON THE PLANS REPRESENTS THE SQUARE FOOTAGE AND ALIGNMENT OF MATTING WHICH IS REQUIRED AND HAS BEEN APPROVED BY THE REGULATORS. ADDITIONAL LAYERS OF MATS MAY BE REQUIRED AT CERTAIN LOCATIONS. ANY INCREASE IN THE NUMBER, CHANGE IN ALIGNMENT, OR DECISION NOT TO USE SWAMP MATS MUST BE APPROVED BY AN AUTHORIZED REPRESENTATIVE OF THE PERMITTEE(S) AND , AS APPROPRIATE, REGULATORS.
14. SPAN STREAMS OR DRAINAGE SWALES WITH TEMPORARY BRIDGE OR SWAMP MATS THAT ARE FREE OF SOIL AND DEBRIS. PROTECT ALL EXISTING CULVERTS ENCOUNTERED ALONG ACCESS ROADS WITHIN THE ROW.
15. CONTRACTOR SHALL PROVIDE NECESSARY EROSION CONTROL MEASURES TO INSURE THAT SURFACE WATER RUN-OFF FROM UNSTABILIZED AREAS DOES NOT CARRY SILT, SEDIMENT, AND OTHER DEBRIS OUTSIDE OF THE LIMITS OF WORK.
16. IF DEWATERING IS REQUIRED, DEWATERING BASINS SHALL BE PLACED IN UPLANDS AREAS AND DISCHARGE WATER INTO UPLAND AREAS.
17. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
    a. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
    b. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
    c. A MINIMUM OF 3-IN OF NON-EROSIVE MATERIAL, SUCH AS STONE OR RIPRAP, HAS BEEN INSTALLED;
    d. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
18. ANY PERMANENT CUT AND FILL SLOPES SHALL BE LOAMED AND SEEDED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.

Alteration of Terrain Permitting Plans
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Source:
National Grid, Eversource

nationalgrid

EVERSOURCE ENERGY

EROSION CONTROL (Continued)

1. ALL PERMANENT AND TEMPORARY SEEDING SHALL BE AS FOLLOWS (UNLESS OTHERWISE NOTED):

PERMANENT SEEDING	PROPORTION	GERMINATION MINIMUM	PURITY MINIMUM
LAWNS:			
CREEPING RED FESCUE	50%	85%	95%
KENTUCKY BLUEGRASS	40%	85%	90%
MANHATTAN PERENNIAL RYE	10%	90%	95%

TEMPORARY SEEDING*	% WEIGHT	GERMINATION MINIMUM
WINTER RYE	80% MIN.	85%
RED FESCUE (CREEPING)	4% MIN.	80%
PERENNIAL RYE GRASS	3% MIN.	90%
RED CLOVER	3% MIN.	90%
OTHER CROP GRASS	0.5% MAX.	
NOXIOUS WEED SEED	0.5% MAX.	
INERT MATTER	1.0% MAX.	

*TEMPORARY SEED FOR LAWNS SHALL ONLY BE PLANTED WHEN PERMANENT GRASSES CANNOT BE PLANTED DUE TO THE GROWING SEASON.

2. HE NO-MOW PLANTING MIX" SHALL BE THE "NEW ENGLAND CONSERVATION WILDLIFE MIX' AS MANUFACTURED BY NEW ENGLAND WETLAND PLANTS, INC.
3. EROSION CONTROL BLANKETS SHALL BE INSTALLED ON ALL SLOPES THAT ARE STEEPER THAN 3-FT HORIZONTAL AND 1-FT VERTICAL (3:1). EROSION CONTROL BLANKETS SHALL BE NORTH AMERICAN GREEN SC150BN, OR APPROVED EQUAL.
4. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER, CONTRACTOR SHALL REMOVE AND DISPOSE OF EROSION CONTROL MEASURES.

CONSTRUCTION

1. THE CONTRACTOR SHALL NOT CONSIDER THESE PLANS COMPLETE UNLESS ACCOMPANIED BY THE ENGINEERING DOCUMENTS PREPARED FOR NATIONALGRID AND EVERSOURCE ENERGY.
2. THE PROJECT IS TO BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.

WINTER CONSTRUCTION NOTES:

1. ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED. STABILIZATION METHODS SHALL INCLUDE SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS.
2. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE TEMPORARILY STABILIZED WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.
3. AFTER NOVEMBER 15TH, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL (NHDOT 304.3).

Alteration of Terrain Permitting Plans
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Source:
National Grid, Eversource

nationalgrid

EVERSOURCE ENERGY

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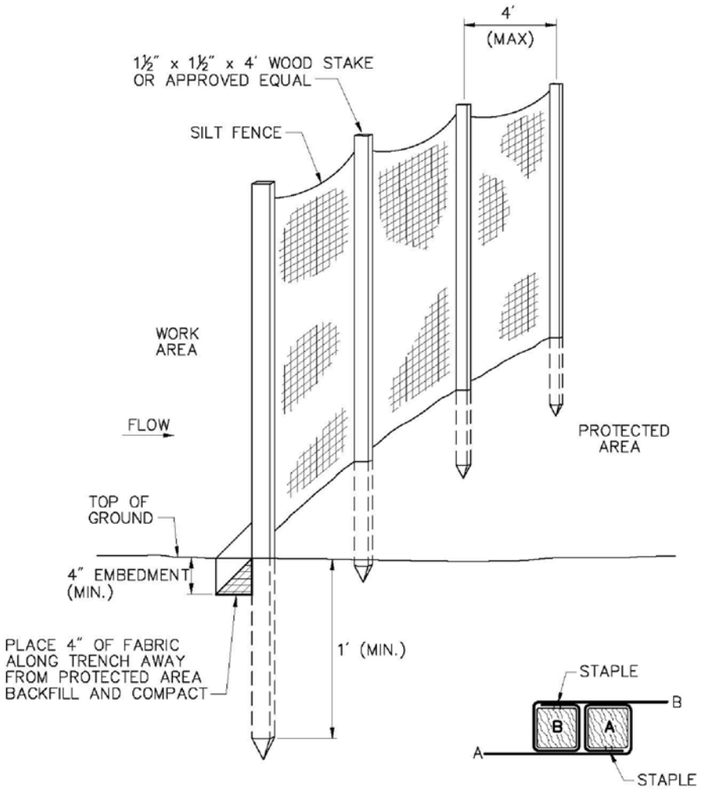
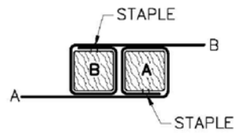


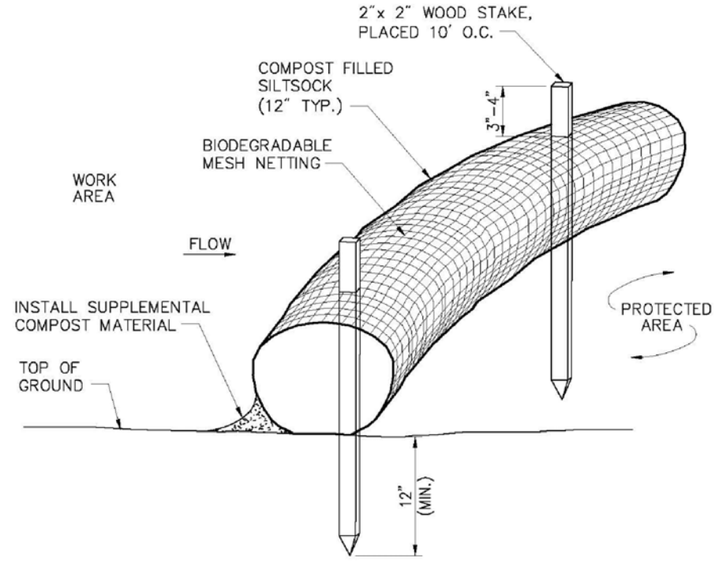


Wood Stake Joint Detail

Silt Fence Barrier

6/08

N.T.S. Source: VHB REV LD_650



Notes:

1. SILTSOCK SHALL BE FILTREXX SILTSOXX, OR APPROVED EQUAL.
2. SILTSOCKS SHALL OVERLAP A MINIMUM OF 12 INCHES.
3. SILTSOCK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS, AND REPAIR OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED.
4. COMPOST MATERIAL SHALL BE DISPERSED ON SITE, AS DETERMINED BY THE ENGINEER.
5. IF NON BIODEGRADABLE NETTING IS USED THE NETTING SHALL BE COLLECTED AND DISPOSED OF OFFSITE.

Siltsock - Erosion Control Barrier

8/12

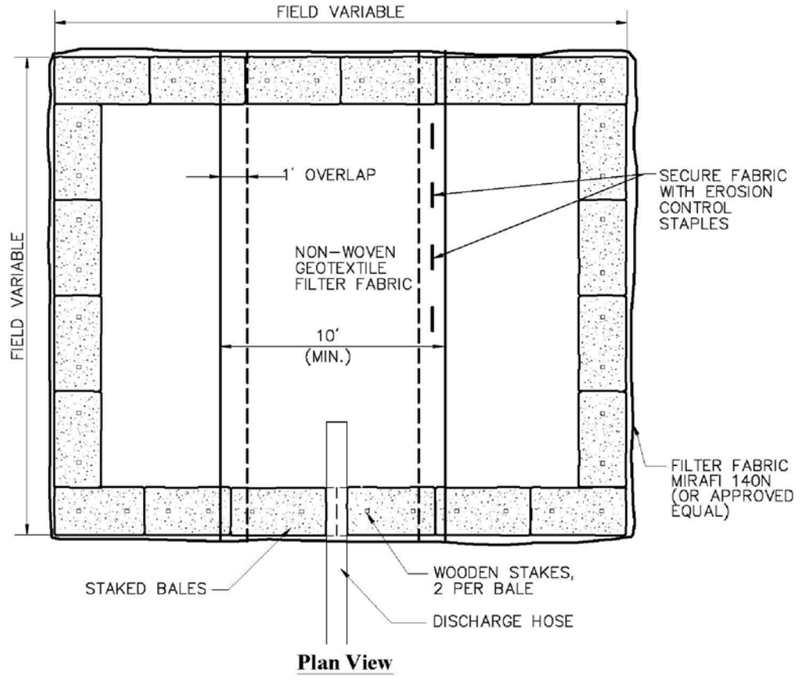
N.T.S. Source: VHB LD_658

Alteration of Terrain Permitting Plans
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

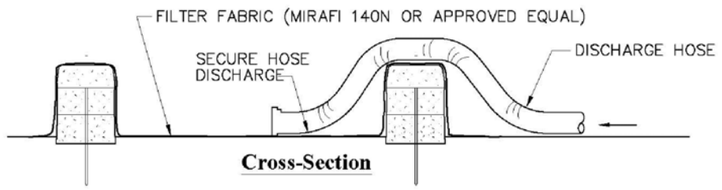
Source:
National Grid

nationalgrid

EVERSOURCE ENERGY



Plan View



Cross-Section

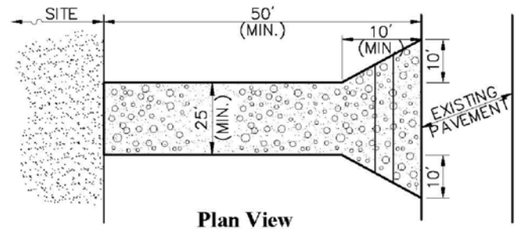
Notes:

1. NUMBER OF BALES MAY VARY DEPENDING ON SITE CONDITIONS.
2. THE BASIN TO BE SIZED TO PREVENT DISCHARGE WATER FROM OVERTOPPING BASIN.

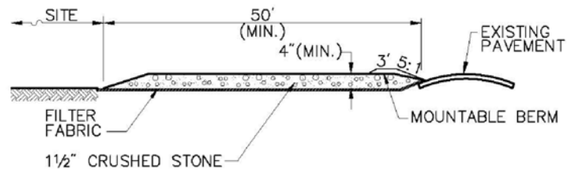
Dewatering Straw Bale Basin

2/11

N.T.S. Source: VHB REV LD_690



Plan View



Cross-section

Notes:

1. ENTRANCE WIDTH SHALL BE A TWENTY-FIVE (25) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
2. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY. BERM SHALL BE PERMITTED. PERIODIC INSPECTION AND MAINTENANCE SHALL BE PROVIDED AS NEEDED.
3. STABILIZED CONSTRUCTION EXIT SHALL BE REMOVED PRIOR TO FINAL FINISH MATERIALS BEING INSTALLED.

Stabilized Construction Exit

6/08

N.T.S. Source: VHB REV LD_682

Alteration of Terrain Permitting Plans
Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
Scobie Pond 345 kV Substation NH

Source:
National Grid

nationalgrid

EVERSOURCE ENERGY

Attachment C:
National Grid Guidance Document
(EG-303NE)

SCOPE: This specification provides Environmental Procedures and Best Management Practices (BMPs) for work on electric and natural gas transmission and distribution rights-of-way (ROWs), fee-owned and easement, cross-country, and public/private roadways, as well as substations, company facilities and on customer-owned projects, and other facilities in New England.

Note that project-specific permits may have other BMPs/constraints that differ from this Environmental Guidance (EG). The projects shall be be constructed in accordance with the project-specific permits and this specification. For maintenance work in New Hampshire, there is a state specific BMP manual which supersedes EG-303NE, where applicable[1]. For work in Vermont, there is a state specific BMP manual which may supersede EG-303NE, where applicable[2]. The Massachusetts Runoff, Erosion & Sedimentation Control Field Guide published by the Massachusetts Association of Conservation Commissions (MACC) is incorporated herein as a reference. The MACC Guide is intended as a supplement to EG-303NE and shall be superseded by EG-303NE in the case of an inconsistency or conflict.

PURPOSE: The purpose of this specification is to provide National Grid personnel, consultants and contractors with BMPs to support work that is protective of the environment and that complies with all applicable environmental laws, regulations and company policies and procedures. Environmental policies require the Company to avoid, minimize and mitigate negative impacts to the environment.

POLICY: These BMPs are to be effectively and consistently followed by all personnel accessing Company facilities, ROWs, and customer projects for inspection, maintenance and construction work purposes.

If there are any questions on this guidance, contact the local or project National Grid Environmental Scientist.

These BMPs do not apply to Company employees and contractors performing routine vegetation management activities that are not part of a construction or maintenance project. Employees and contractors maintaining vegetation on Company ROWs and substations shall follow the National Grid Right-of-Way Vegetation Management Plan; Right-of-Way Vegetation Management Specification; Substation, Switch Yard, and Pole Yard Vegetation Management Specification; and Right-of-Way Vegetation Mowing Specification. For more information regarding routine vegetation management, please contact a National Grid Forester.

[1] The "Best Management Practices Manual For Utility Maintenance In And Adjacent To Wetlands and Waterbodies in New Hampshire"

[2] Vermont DEC, 2006. The Vermont Standards and Specifications for Erosion Prevention and Sediment Control.

APPLICABLE REGULATIONS: Refer to Applicable Regulations in state-specific EG-301 documents.

CONTACTS: If there are any questions on this guidance, contact the National Grid Environmental Scientist.

1.0 Definitions

Refer to **Glossary in Appendix 1** and **Acronyms in Appendix 2.**

2.0 Project Planning

Prior to the start of any project (proposed new facilities or maintenance of existing facilities), the Project Engineer or other project planner shall determine whether any environmental permits or approvals are required, per the state-specific EG-301 environmental checklists. Any questions regarding which activities may be conducted in regulated areas or within environmentally sensitive areas shall be referred to the National Grid Environmental Scientist or Project Environmental Consultant

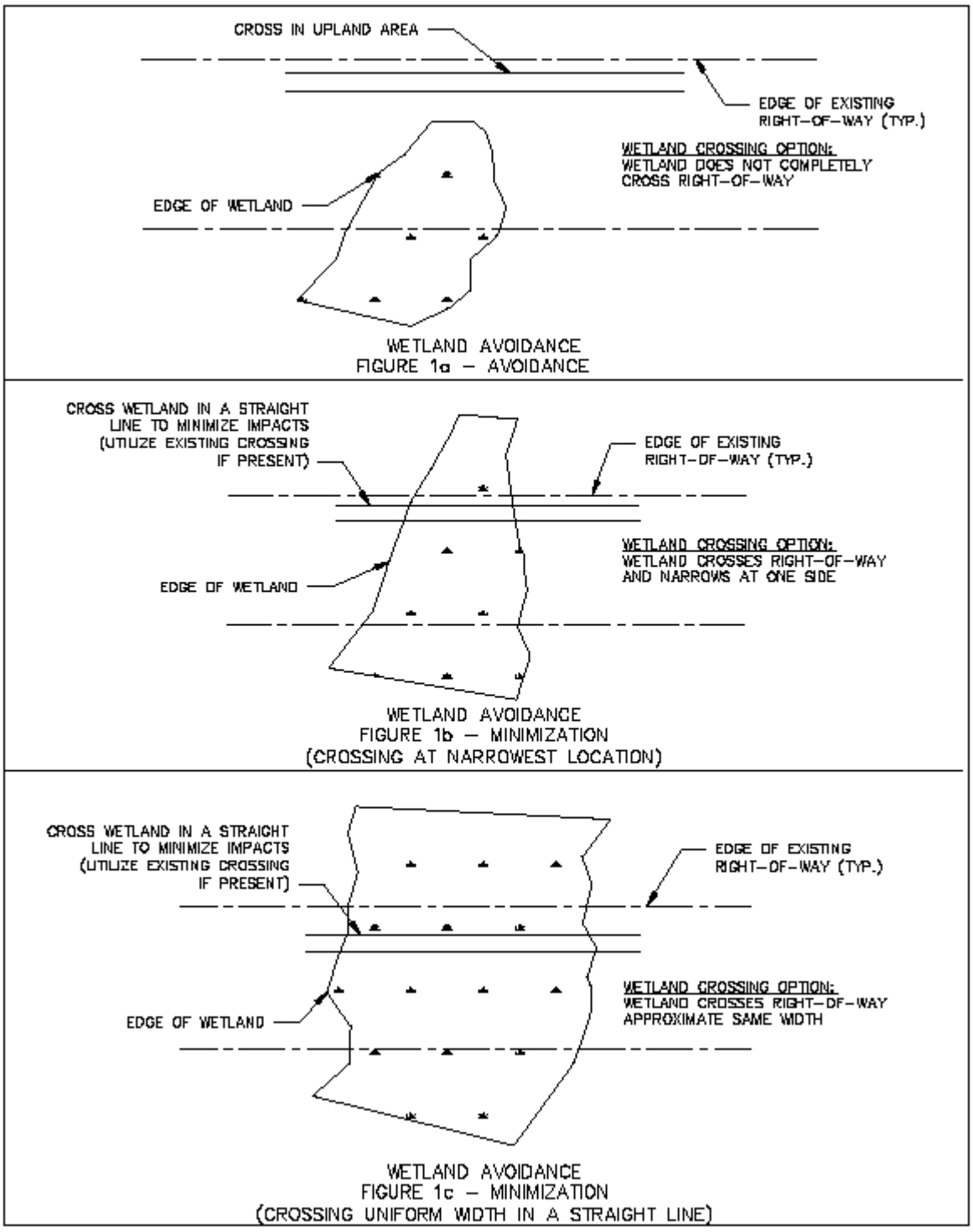
All new construction and maintenance projects shall follow clear and enforceable environmental performance standards, which is the purpose for which these BMPs have been compiled.

2.1 Avoidance and Minimization

Measures shall always be taken to avoid impacts to wetlands, waterways, rare species habitats, known below and above ground historical/archeological resources and other environmentally sensitive areas. If avoidance is not possible, then measures shall be taken to minimize the extent of impacts. Alternate access routes or staging areas shall always be considered. Below is a list of methods that shall be considered where impacts are unavoidable:

- Use existing ROW access where available. Keep to approved routes and roads without deviating from them or making them wider.
- Off-ROW access shall never be assumed and shall be coordinated through National Grid Real Estate before being implemented.
- Where no existing ROW access is present, avoid wetlands and if a wetland crossing is necessary, cross wetlands at the most narrow point possible or at the location of a previously used crossing (if evident). Figure 1 below illustrates this minimization technique.
- Avoid and minimize stream crossings;
- Minimize the width of typical access roads through wetlands to a maximum width of 16 feet;

- Conduct work manually (without using motorized equipment) in wetlands, wherever possible;
- Use swamp, timber, or similar mats in wetlands to minimize soil disturbance and rutting when crossing or working within wetlands. When not using mats for access, standard vehicles shall not be allowed to drive across wetlands without the prior approval of the National Grid Environmental Scientist. Use of a low ground pressure (LGP) vehicle may be a feasible alternative to mats provided that such LGP vehicle use has been reviewed and approved by the National Grid Environmental Scientist. See Section 8.5.
- Coordinate the timing of work to cause the least impacts during the regulatory low-flow period under normal conditions, when water/ground is frozen, after the spring songbird nesting season, and, outside of the anticipated amphibian migration window (mid-February to mid-June). The United States Army Corps of Engineers (USACE) defines the low-flow period as July 1 through August 30 in MA, July 1 through October 1 in RI, July 1 through October 1 in NH, and July 1 through October 1 in VT.
- Seek alternative routes or work methods to minimize impact.


CROSS IN UPLAND AREA
EDGE OF EXISTING RIGHT-OF-WAY (TYP.)
WETLAND CROSSING OPTION:
WETLAND DOES NOT COMPLETELY CROSS RIGHT-OF-WAY
EDGE OF WETLAND
WETLAND AVOIDANCE
FIGURE 1a – AVOIDANCE
CROSS WETLAND IN A STRAIGHT LINE TO MINIMIZE IMPACTS (UTILIZE EXISTING CROSSING IF PRESENT)
EDGE OF EXISTING RIGHT-OF-WAY (TYP.)
WETLAND CROSSING OPTION:
WETLAND CROSSES RIGHT-OF-WAY AND NARROWS AT ONE SIDE
EDGE OF WETLAND
WETLAND AVOIDANCE
FIGURE 1b – MINIMIZATION
(CROSSING AT NARROWEST LOCATION)
CROSS WETLAND IN A STRAIGHT LINE TO MINIMIZE IMPACTS (UTILIZE EXISTING CROSSING IF PRESENT)
EDGE OF EXISTING RIGHT-OF-WAY (TYP.)
WETLAND CROSSING OPTION:
WETLAND CROSSES RIGHT-OF-WAY APPROXIMATE SAME WIDTH
EDGE OF WETLAND
WETLAND AVOIDANCE
FIGURE 1c – MINIMIZATION
(CROSSING UNIFORM WIDTH IN A STRAIGHT LINE)

2.2 Historically Significant Areas

Areas that have been identified as historically and/or culturally significant shall be avoided in accordance with site-specific avoidance plans, as applicable. Refer to the project-specific Environmental Field Issue (EFI) for any applicable avoidance plans or consult with the National Grid Environmental Scientist. Demarcation of these areas to be avoided shall use staked orange snow fencing or an equivalent physical barrier (not just ribbon flagging) and signage. Refer to Section 16.0 for signage guidance.

2.3 Rare Species Habitat

Work within areas that have been identified as mapped rare species habitat shall follow site-specific requirements, as applicable. In Massachusetts, maintenance activities within mapped habitat (known as Priority Habitat of Rare Species) shall follow the BMPs outlined in the Natural Heritage Endangered Species Program (NHESP)-approved National Grid Operation and Maintenance Plan. Work in mapped rare species habitat may require, at a minimum, turtle training for crews and sweeps of work areas for turtles, botanist identification of rare plant locations and avoidance of these locations, and protection of vernal pools, all prior to the start of work. Demarcation of these areas to be avoided (e.g., rare plant populations, overwintering turtles, nests) shall use staked orange snow fencing or an equivalent physical barrier (not just ribbon flagging) and signage. Refer to Section 16.0 for signage guidance.

Other requirements may apply in NH, VT and RI. Refer to the project-specific EFI for any applicable measures or consult with the National Grid Environmental Scientist.

2.4 Meetings

Pre-permitting meetings shall take place early in the project development process to determine what permits are triggered by the proposed work and the timeline required for permitting. During these meetings, the team shall develop access plans and BMPs to be used during construction of the project.

Field / Constructability review meetings shall take place on-site to evaluate construction site access and job site set-up, to ensure that the project can proceed as permitted. It is at this point in time where work areas, pulling locations, laydown areas, parking areas, and equipment storage areas are evaluated and located. Off-ROW areas under consideration should be included in this discussion.

Prior to submitting permit plans to regulatory authorities, the construction group (contractor or National Grid) shall review the plans for final sign off.

Pre-construction meetings are typically held prior to the commencement of all work to appoint responsible parties, discuss timing of work, and further consider options to avoid and/or minimize impacts to sensitive areas. These meetings can occur on- or off-site and shall include all the willing and available stakeholders (i.e., utility employees, contractors, consultants, inspectors, and/or monitors, and regulatory personnel). Training of crews and supervisors of the EFI, Stormwater Pollution Prevention Plan (SWPPP), rare species, and other permit requirements shall be conducted at a pre-construction meeting.

Pre-job briefings shall be conducted daily or otherwise routinely scheduled meetings shall be conducted on-site with the work crew throughout the duration of the work. These meetings are a way of keeping everyone up to date, confirming there is consensus on work methods and responsibilities, and ensuring that tasks are being fulfilled with as little impact to the environment as possible.

The Project Environmental Scientist/Monitor and Construction Project Manager shall communicate regularly (e.g. weekly or bi-weekly meetings or phone conversations) to discuss the work completed since last communication (i.e. work locations, wetland impacts, equipment used, and unexpected delays or work conditions). These meetings or calls shall include the expected schedule of construction for the upcoming week, the long term construction plans, and planned methods for working near/in wetlands. Both the Project Environmental Scientist/Monitor and Construction Project Manager shall work together so the Project complies with all environmental permits and regulations. When changes to the Project scope or agreed work plan are proposed they shall be done so with the final approval of the National Grid Environmental Scientist.

2.5 Communication of Project Specific Environmental Requirements

Project specific requirements shall be communicated to the project manager/construction manager/engineering group using the following guidelines:

Environmental Field Issue – The EFI will be a full document consisting of narrative, project permits, access and matting plans. A table summarizing pertinent (but not all) permit conditions and the responsible party for those conditions shall be included in the EFI. Copies of all permits should be included as attachments. This will be prepared for most projects with multiple permits or large, complex projects (siting board, Section 404, 401 WQC, SWPPP). There should be EFI training at the pre-construction meeting. Appendix 3 is a sample EFI template

Simplified Environmental Field Issue – the simplified EFI is a memorandum containing project permit(s), access and matting plans and a table summarizing relevant permit conditions and responsible party for those conditions. Copies of all permits should be included as attachments. This will be prepared for most projects with 2 or more permits (Order of Conditions, S404 Cat 1). Appendix 4 is a sample simplified EFI template.

E-mail delivery of Permit and any Sediment/Erosion control or BMP plan – For those projects with only one permit (eg., MA Order of Conditions, RI DEM permit, RI CRMC permit, NH Utility Notification) or projects with a sediment & erosion control plan (local town requirement or for exempt maintenance work), a copy of the permit and any applicable plan will be emailed to the PM (and the project team where deemed necessary) to be incorporated into the Construction Field Issue.

STORMS work management system input – for STORMS work, no EFI is prepared unless multiple permits are required for the project (see guidance above). If only a MA Order of Conditions, MA Determination of Applicability, RI DEM permit, RI CRMC permit, RI SESC Approval, or NH Utility Notification is required, then the permit is attached in Documents tab and conditions noted in Remarks/comments section. Appendix 5 contains standard STORMS boilerplate language.

2.6 Timing of Work

Regulatory authorities may place seasonal or time-of-year restrictions on project construction elements. These time-of-year restrictions may be state or permit-specific, and shall be adhered to.

Work during frozen conditions. Activities conducted once wetland areas are frozen sufficient to minimize rutting and other impacts to the surrounding environment may be authorized by the National Grid Environmental Scientist. Work during this time also generally reduces disturbance of aquatic and terrestrial wildlife movement by avoiding sensitive breeding and nesting seasons. When not using mats for access, vehicles shall not be allowed to drive across wetlands without the prior approval of the National Grid Environmental Scientist.

Work during the regulatory low-flow period. Conducting work during the low-flow period can reduce impacts to surface water and generally avoids spawning and breeding seasons of aquatic organisms. If the water is above normal seasonal levels, adjustments to work activities and methods are required.

2.7 Alternate Access

2.7.1 Manual Access

In some cases such as for smaller projects, work areas can be accessed manually. This includes access on foot through upland and shallow wetland areas, access by boat through open water or ponded areas, and climbing of structures where possible. Smaller projects, such as repair of individual structures, or parts of structures, that do not categorically require the use of heavy machinery, shall be accessed manually to the greatest extent practicable.

2.7.2 Use of Overhead/Aerial Access

Using helicopters can be expensive and is not always feasible, but it may be appropriate in some situations in order to get workers and equipment to a site that otherwise may be very difficult to access. The use of overhead and/or aerial equipment may be beneficial for work in areas where larger water bodies, deep crevices, or mountainous areas hinder ground access. The landing area for helicopters shall be reviewed for environmentally sensitive resources. Use of helicopters requires Project Manager and Senior Management approval.

3.0 Inspection, Monitoring and Maintenance

All construction practices and controls shall be inspected on a regular basis and in accordance with all applicable permits and local, state, and federal regulations to avoid and correct ANY damage to sensitive areas.

The construction crews shall be responsible for completing daily inspections, and IMMEDIATELY bring any **damage or observed erosion, or failed erosion controls** to the attention of the Person-In-Charge and the National Grid Environmental Scientist. Where applicable and/or as directed by environmental permits issued for the project, the Project Environmental Consultant shall conduct weekly (at a minimum) inspections of the project work areas and shall document their inspection using the Stormwater, Wetlands & Priority Habitat Environmental Compliance Site Inspection / Monitoring Report form found in Appendix 6 and issue the report within 24 hours. The Person-in-Charge shall work with the National Grid Environmental Scientist and the Project Environmental Consultant to determine when and how the repairs shall be made.

Project-specific Action Logs and Long-Term Restoration Logs are prepared as needed by the National Grid Environmental Scientist or the Project Environmental Consultant to track issues and/or repairs and assign responsible parties.

4.0 Best Management Practices

The BMP sections presented in this EG address access, construction, snow and ice management, structures in wetlands, access road maintenance and repair, clean-up and restoration standards, ROW gates, field refueling and maintenance operations, management of spills/releases, and a summary of key construction BMPs.

Note that BMPs shown on any permit drawings for a specific project may need to be revised and or supplemented during the execution of a project based on unforeseen or unexpected factors such as extreme weather or unknown subsurface conditions. It is the responsibility of the Contractor to work with the National Grid Environmental Scientist and/or the Project

Environmental Consultant to identify necessary changes and to ensure that construction-related impacts to wetlands, waterbodies and other environmentally sensitive areas are avoided.

Any deviation from the approved Best Management Practices shown in the EFI and/or SWPPP plans shall be communicated immediately to the National Grid Environmental Scientist as it may require additional permitting or could result in a permit violation.

4.1 Sedimentation and Erosion Controls

Appropriate sedimentation and erosion control devices shall be installed at work sites, in accordance with permit conditions and/or regulatory approvals, and as needed to prevent adverse impacts to water resources and adjacent properties.

The overall purpose of such controls is to prevent and control the movement of disturbed soil and sediment from work sites to adjacent, undisturbed areas, and particularly to water resources, public roads and adjacent properties. All proprietary controls shall be installed per manufacturer's recommendations and specifications.

Appropriate sedimentation and erosion control devices include but are not limited to: silt fencing, straw bales, wood chip bags, straw wattles, compost socks, erosion control blankets, mulch, slope interruption practices, flocculent powder/blocks and storm drain/catch basin inlet protection. Such controls shall be installed between the work area and environmentally sensitive areas such as wetlands, streams, drainage courses, roads and adjacent property when work activities shall disturb soils and result in a potential for causing sedimentation and erosion.

Staked straw bales often serve as the demarcation of the limits of work and/or sensitive areas to be avoided. Work shall never be conducted outside the limit of erosion controls without prior approval from the National Grid Environmental Scientist.

Project plans depict proposed erosion controls, however field conditions may warrant additional practices be implemented (e.g., wet conditions, frozen conditions, poorly drained soils, steep slopes, materials used for work pads, transition areas to swamp mats, number of trips across work areas, etc.).

Any deviation from the approved erosion controls shown in the EFI and/or SWPPP plans needs to be communicated immediately to the National Grid Environmental Scientist as it may require additional permitting or result in a permit violation.

Appendix 7 provides typical sketches of common sedimentation and erosion controls. If a SWPPP is required for the project, maintenance and inspection of erosion controls shall follow the SWPPP requirements. Sedimentation and erosion controls shall be properly maintained and

inspected on a periodic basis, until work sites are properly stabilized and restored. Inspections shall be documented using the Inspection Form "Storm Water, Wetlands & Priority Habitat Environmental Compliance Site Inspection/Monitoring Report" (**Appendix 6**).

The sequence and timing of the installation of sedimentation and erosion control measures is critical to their success. Sedimentation and erosion controls shall be installed prior to commencing construction activities that may result in any soil disturbance or cause otherwise polluted site runoff. Inspection of these devices may be required by the National Grid Environmental Scientist or by regulators prior to the start of work. The installation of water bars and other erosion control measures shall be installed shortly thereafter.

4.2 Concrete Wash Outs

Concrete wash outs shall be used for management of concrete waste. Concrete and concrete washout water shall not be deposited or discharged directly on the ground, in wetlands or waterbodies, or in catch basins or other drainage structures. Where possible, concrete washouts shall be located away from wetlands or other sensitive areas. Consult the National Grid Environmental Scientist on proposed concrete wash out locations prior to their use. Following the completion of concrete pouring operations, the wash outs shall be disposed of off-site with other construction debris. Refer to BMPs in Appendix 7.

4.3 Construction Activities in Standing Water

The use of silt curtains or turbidity barriers may be required when working in or adjacent to standing water such as ponds, reservoirs, low flowing rivers/streams, or coastal areas. Silt curtains and turbidity barriers prevent sediment from migrating beyond the immediate work area into the resource areas.

Coffer dams constructed using sheet piling or large sandbags (Trade names such as "the Big Bag" or "DamItDams") may be used to temporarily isolate and contain a work area in standing water.

When working in standing water, an oil absorbent boom, in addition to a silt curtain or other temporary barrier, shall be placed around the work area for spill prevention.

Work in drinking water reservoirs or other waters may require extensive regulatory agency review, even for maintenance work, which could result in additional time required for permitting, review and material procurement prior to the start of work.

4.4 Dewatering

Where excavations require the need for dewatering of groundwater or accumulated stormwater, the water shall be treated before discharge. Appropriate controls include dewatering basins,

flocculent blocks, filter bags, filter socks, or weir tanks. Schematics of these BMPs are included as in Appendix 7. Water trucks or fractionation tanks may be utilized if watertight containers are desired for controlled on-site discharge or for off-site discharge into an approved dewatering area when site restrictions make it difficult to utilize other dewatering methods on-site. Dewatering discharge water shall never be directed into wetlands, streams/rivers, other sensitive resource areas, catch basins, other stormwater devices, or substation Trenwa trenches. Dewatering flow shall be controlled so that it does not cause scouring or erosion through the use of a dewatering basin, filter sock, or equivalent. If it is determined that the chosen controls are not appropriately filtering the fine sediment from the dewatering pumpate then the National Grid Environmental Scientist shall be notified immediately and the controls shall be revised or supplemented.

When establishing a dewatering basin, consideration should be given to the anticipated volume of water and rate of pumping in determining the size of the dewatering basin. Dewatering basins shall be constructed on level ground. Once pumping commences, the basin shall be monitored frequently to assure that the rate of water delivery to the structure is low enough to prevent water from flowing, unfiltered, over the top of the basin walls. The basin shall be monitored throughout the dewatering process because the rate of filtration shall decrease as sediment clogs the filter fabric. If the basin is not appropriately filtering the fine sediment from the dewatering pumpate then the basin may need to be supplemented with a flocculent block. Field conditions shall dictate how often the basin should be inspected.

Distance to sensitive areas, direction of flow (toward or away from protected, or sensitive areas, such as wetlands, ponds, or streams), amount of vegetative ground cover between the basin and nearby sensitive areas, ground conditions (ledge, frozen, etc.), volume of water being pumped, and pump-rate, are some of the factors to be considered when determining an inspection frequency. Clogged filter fabric shall be replaced and accumulated sediment shall be removed as necessary from the basins to maintain efficacy.

Unattended dewatering shall never be allowed. If 24-hour dewatering is required for on-site construction activities, a designated attendee shall be trained by the National Grid Environmental Scientist.

Basins shall be cleaned and removed as soon as dewatering is complete. Sediment removed from the dewatering basin shall be allowed to dry before being disposed of by evenly spreading it over unvegetated upland areas where erosion is not a concern if clean or removing it from the site for proper disposal. Off-site trucking of wet soils is prohibited. The sediment disposal area shall be approved by the National Grid Environmental Scientist or the Project Environmental Consultant prior to use. Stabilization measures shall also need to implemented and approved by the National Grid Environmental Scientist or the Project Environmental Consultant. Soils/sediments shall be dewatered or mixed with dry material such that they are appropriate for off-site transport.

Any new dewatering location (not previously reviewed and approved by the National Grid Environmental Scientist during project planning or permitting) shall be reviewed and the discharge location approved by the National Grid Environmental Scientist before use.

Complex projects that require large scale dewatering shall require individual review by the National Grid Environmental Scientist and may trigger additional permitting.

Dewatering in areas of known chemical contamination may require a separate NPDES permit, or other approval, and treatment or containment system. Consult with the National Grid Environmental Scientist.

4.5 Check Dams

Check dams are a porous physical barrier installed perpendicular to concentrated storm water flow. They are used to reduce erosion in a swale by reducing runoff energy (velocity), while filtering storm water, thereby aiding in the removal of suspended solids.

Check dams should only be used in small drainage swales that shall not be overtopped by flow once the dams are constructed. These dams should not be placed in streams. Check dams are typically installed in ROWs or on other construction sites prior to the start of soil disturbing work. Per the Rhode Island Soil Erosion and Sediment Control Handbook, no formal design is required for a check dam if the contributing drainage area is 2 acres or less and its intended use is shorter than 6 months; however, the following criteria should be adhered to when specifying check dams.

- The drainage area of the ditch or swale being protected should not exceed 10 acres.
- The maximum height of the check dam should be 2 feet.
- The center of the check dam must be at least 6 inches lower than the outer edges.
- The maximum spacing between the dams should be such that the toe at the upstream dam is at the same elevation as the top of the downstream dam.

Per the NHDES stormwater manual, the use of check dams should be limited to swales with longitudinal slopes that range between 2 to 5 percent that convey drainage from an area less than 1 acre. Existing conditions that exceed these limitations should be assessed in the field and discussed with the National Grid Environmental Scientist to determine the viability of this BMP for the specific application. Check dams are often comprised of stone, straw bales, sand bags, or compost/silt socks. Use of check dams should be coordinated with the National Grid Environmental Scientist to ensure that the material selection, spacing and construction method are appropriate for the site. Check dams composed of biodegradable materials (e.g. straw bales

or wattles, wood chip bags) may require periodic replacement for continued proper functioning[3]. Refer to BMPs in Appendix 7.

4.6 Water Bars

Water bars should be used on sloping ROWs to divert storm water runoff from unstabilized or active access roads when needed to prevent erosion. Surface disturbance and tire compaction promote gully formation by increasing the concentration and velocity of runoff. Water bars are constructed by forming a ridge or ridge and channel diagonally across the sloping ROW. Each outlet should be stable. The height and side slopes of the ridge and channel are designed to divert water and to allow vehicles to cross. When siting water bars, consideration shall be given to the sensitivity of the area receiving the diverted runoff. For example, runoff should not be directed into a wetland, waterbody, other environmentally sensitive areas, or to private property or public roadways. Refer to BMPs in Appendix 7.

4.7 Retaining Walls

In some situations, retaining walls comprised of concrete blocks, gabions, boulders or other comparable materials may be required to stabilize the shoulder of existing access roads and/or supplement required erosion controls. Installation of such measures shall not be allowed as a maintenance activity. Should these controls be considered for a project, it shall be reviewed by the National Grid Environmental Scientist, as design and additional permitting may be required.

4.8 Slope Stabilization

Temporary slope stabilization practices help to keep exposed, erodible soils stabilized while vegetation is becoming established. Acceptable temporary slope stabilization practices may include the use of erosion control blankets, or hydraulic erosion control. Erosion control blankets, often comprised of natural fibers (e.g., jute, straw, coconut, or other degradable materials) are a useful slope stabilization, erosion control and vegetation establishment practice for ditches or steep slopes. Blankets are typically installed after final grading and seeding for temporary or permanent seeding applications. Hydraulic erosion control practices, including Bonded Fiber Matrix or hydroseed with a soil stabilizer (e.g., tackifier and/or mulch) may be an acceptable or desirable alternative form of temporary slope stabilization. For all practices, manufacturer's specifications should be followed for installation depending on slope and other field conditions. Consult the National Grid Environmental Scientist prior to selecting and installing any slope stabilization practices. Refer to BMPs in Appendix 7.

[3] Grass growth on a biodegradable type check dam is evidence that the material is decomposing. While this doesn't mean it is no longer functioning, it means it may be in a weakened condition and could potentially fail under high flow velocity. It is acceptable for grass to be growing on a stone check dam.

4.9 Maintenance of Sedimentation and Erosion Controls

Sedimentation and erosion controls shall be maintained in good operational condition during the course of the work. This includes , but is not limited to, replacing straw bales that are no longer in good condition, re-staking straw bales, replacing or re-staking silt fence, and removing accumulated sediment. Remove sediment before it has accumulated to one half the height of any exposed silt fence fabric, straw bales, other filter berm, check dams or water bars. Accumulated sediment shall be removed from sedimentation basins to maintain their efficacy. Manage the removed sediment by evenly spreading it over unvegetated upland areas where erosion is not a concern, by stockpiling and stabilizing, or by disposing of off-site. Stabilization measures shall also need to be implemented and approved by the National Grid Environmental Scientist or the Project Environmental Consultant. Where a SWPPP has been prepared for a specific site, the guidelines documented therein shall govern the management of sediment.

5.0 Right-of-Way (ROW) Access

Whenever possible, access shall be gained along existing access routes or roads within the ROW. However, in some cases there is no existing access. In many cases, temporary access can be utilized. The following practices provide general guidance on accessing a ROW. Check with a National Grid Environmental Scientist to determine if any environmental permitting is required before utilizing a temporary access.

National Grid operates substations and has cross-country ROW with overhead electric power lines in four New England States. MA, NH and RI also have transmission and distribution natural gas pipelines. Access is needed to substations, ROWs, and customer property, for inspection, maintenance and construction activities. Many projects are located in or near environmentally sensitive areas, such as rivers/streams, wetlands, floodplains, or rare species habitat, etc., which are protected from activities that may disturb these resources.

Note that the building of new roads or enlargement of existing roads is **prohibited** unless this activity is allowed by a project-specific permit, and the new roads appear on the Site Plans that were authorized in the regulatory approvals.

5.1 Off-ROW Access

Off-ROW access shall be evaluated for wetlands, rare species, cultural resources and other potential sensitive receptors, as applicable. National Grid Real Estate and Stakeholder Relations shall also be contacted as soon as possible once off-ROW access is determined to be needed.

5.2 Stabilized Construction Entrance/Exit for Access to ROWs from Public or Private Roads

A suitable (minimum 15-foot wide by 50-foot long) construction entrance/exit shall be installed at the intersection of the ROW access road/route with public/private paved roads, or other such locations where equipment could track mud or soil onto paved roads. The construction entrance/exit shall be comprised of clean stone installed over a geotextile fabric. Refer to BMPs in Appendix 7.

Construction entrance areas shall be monitored and maintained to ensure that stone or other material is not deposited onto the roadway, causing a safety concern. Where track-out of sediment has occurred onto a roadway, it shall be swept off the road by the end of that same work day.

If a construction entrance/exit is clogged with sediment and no longer functions, the sediment and stone may require removal and replacement with additional clean stone (clean stone refreshment) to ensure this tracking pad is performing its intended function adequately. Heavier traffic use may require this clean stone refreshment multiple times throughout a project. Reinforcement of these stabilized construction entrance/exits with asphalt binder or asphalt millings is not likely to be considered "maintenance" and may trigger additional permitting requirements[4]. In some cases, heavily used construction entrances/exits may benefit from the installation of a 5-15 foot strip of asphalt binder or asphalt millings closest to the paved roadway to capture any stone that is tracked from the stone apron. Such cases shall be evaluated on an individual basis with the National Grid Environmental Scientist.

Once work is complete, the crushed stone and geotextile fabric shall either be removed or retained, depending upon future maintenance-related access needs and/or project-specific approvals. If removed, the area shall be graded, seeded (if adequate root and seed stock are absent) and mulched. Proper approvals for leaving access roads in place shall be obtained; contact the National Grid Environmental Scientist and Property Legal.

5.3 Maintenance of Existing Access Roads

In many cases, the existing access road may need to be maintained to allow passage of the heavy equipment required for scheduled maintenance work. Access roads cannot deviate from the approved and permitted access plans. Maintenance of these roads may include adding clean gravel or clean crushed stone to fill depressions and eroded areas. This activity shall be conducted only within the width of the existing access road footprint and does not include widening existing access roads

If gravel begins to migrate onto the existing vegetated road shoulder, this gravel shall be removed during the project and/or after the completion of use of the road to ensure the road fill is not spreading into adjacent resource areas, or resulting in the road becoming much wider than its pre-existing or permitted condition. In some areas of mapped rare species habitat or

[4] Depending on the road, use of an asphalt binder or asphalt millings as a construction entrance/exit may trigger state or local permit requirements.

other sensitive areas where project-specific permit conditions require the prevention of the migration of sediments into adjacent resources, an engineered stabilization system (e.g., GeoWeb or similar) may be suitable to prevent sedimentation while allowing for unrestricted wildlife migration.

Major reconstruction projects may require multiple permits. In all cases, the fill to be used for existing access roads shall be clean and free of construction debris, trash or woody debris. Use of processed gravel may be approved by the Person-In-Charge or the National Grid Environmental Scientist, on a case-by-case basis. If clean stone is used then addition of more erosion controls may not be necessary.

5.4 Maintenance of Existing Access Routes (Cross Country Routes)

Ruts and depressions along existing access routes and within the existing ROW may only be leveled and graded. Addition of fill or stone may require permitting as well as additional erosion controls, and needs to be approved by the National Grid Environmental Scientist

5.5 Maintenance of Existing Culverts

Damaged culverts may not be repaired or replaced without consulting with the National Grid Environmental Scientist to determine if a permit is required. For functioning culverts, care shall be taken to protect adjacent wetlands and watercourses by installing appropriate sedimentation and erosion controls around the downstream end of the culvert. Culverts shall be repaired/replaced in kind and shall not be changed in size unless approval has been obtained from the National Grid Environmental Scientist. In-kind replacement is replacement using the same material, functional inverts, diameter and length as the existing culvert. Changes to any of these characteristics shall require permitting. Installation of any **new** culvert is not allowed without obtaining all necessary permits first. Refer to BMPs in Appendix 7.

If, at the time of anticipated replacement, there is heavy flow through the culvert, the Person-In-Charge shall consult with the National Grid Environmental Scientist, to verify whether the culvert shall be replaced at that time. Water may need to be temporarily diverted during culvert repair/replacement. There typically are seasonal restrictions limiting both the replacement of existing culverts as well as installation of new culverts to the low-flow period. The low-flow period can vary from state to state. If any unexpected conditions are encountered during culvert replacement, the National Grid Environmental Scientist shall be contacted immediately prior to the work being completed for additional consultation.

5.6 Temporary Construction Access over Drainage Ditch or Swale

In some situations, construction access from paved roads onto ROWs may require the crossing of drainage ditches or swales along the road shoulder. In these situations, the installation of swamp mats, mat bridges or temporary culverts may facilitate construction access over the

ditches or swales. These culverts shall be temporary only, sized for peak flow, and shall be removed after construction is complete. Consult with the National Grid Environmental Scientist prior to installation. In addition, if access over existing culverts may require extending the culvert, consult with the National Grid Environmental Scientist. Refer to BMPs in Appendix 7.

5.7 Construction Material along ROW

After preparing a site by clearing and/or installing any necessary erosion and sediment controls and prior to the start of construction, material such as poles, cross-arms, cable, insulators, stone and other engineered backfill materials may be placed along the ROW, as part of the project. The stockpiling of stone and other unconsolidated material on swamp mats shall be avoided, if determined necessary due to access and workpad constraints, the material must be placed on a geotextile fabric and be properly contained with a sedimentation barrier such as straw wattle. No construction material shall be placed in wetlands or other sensitive resource areas unless authorized by the National Grid Environmental Scientist or Project Environmental Consultant

6.0 Winter Conditions

6.1 Snow Management

DO NOT stockpile or dispose of snow in any water body, including wetlands, rivers/streams, the ocean, reservoirs, ponds, or stormwater catch basins. A buffer of at least 25 feet shall be maintained between any snow disposal area and any the high water mark of any surface water. A silt fence or equivalent barrier shall be securely placed between the snow storage area and the high water mark of rivers, streams, ponds, or the ocean. In addition to water quality impacts and flooding, snow disposed in surface water can cause navigational hazards when it freezes into ice blocks. Some state and local authorities have specific snow management requirements. Consult with the National Grid Environmental Scientist on specific restrictions.

DO NOT deposit snow within a wellhead protection area (e.g., a Zone II), in a high or medium-yield aquifer, or within 200 feet of a private well, where road salt may contaminate water supplies**. Consult with the National Grid Environmental Scientist to determine if a proposed disposal area is located within one of these sensitive areas.**

Avoid disposing of snow on top of storm drain catch basins or in storm water drainage swales or ditches. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water and could also result in fines or a violation being assessed against National Grid.

All debris in a snow storage area shall be cleared from the site and properly disposed of no later than May 15 of each year.

Care shall be taken not to plow road materials away when removing snow.

6.2 De-Icing

Where allowed, calcium chloride is preferred as a de-icing agent when applied according to manufacturer's guidelines in upland areas. Sand shall be used on swamp mats through wetland areas.

Consult with the National Grid Environmental Scientist on de-icing agents when working in a facility or substation close to resource areas. Many municipalities have specific requirements for de-icing agents allowed within 100 feet of wetland resources and other sensitive areas.

6.3 Snow and Ice Management on Swamp Mats

Proper snow removal on swamp mats shall avoid the formation of ice. To avoid the formation of ice, snow shall be removed from swamp mats before applying sand. Prior to their removal from wetlands, sand shall be collected from the swamp mats and disposed of in an upland area. A round street sweeping brush mounted on the front of a truck may be an effective way to remove snow from swamp mats. Propane heaters may also be suitable solutions for snow removal and/or de-icing of swamp mats.

Once swamp mats are removed, wetlands shall be inspected for build up of sand that may have fallen through swamp mats. Care shall be taken to inspect wetland crossings as each mat is removed to ensure sand is properly removed and disposed of off-site.

7.0 Swamp Mats

The use of swamp mats allows for heavy equipment access within wetland areas. The use of swamp mats minimizes the need to remove vegetation beneath the access way and helps to reduce the degree of soil disturbance and rutting in soft wetland soils. Swamp mats most often used by National Grid are wooden timbers bolted together typically into 4-ft by 16-ft sections, wooden lattice mats, or composite mats. In some cases, swamp mats or other mats are used for staging or access in upland areas based on site conditions (e.g., agricultural field access). Refer to BMPs in Appendix 7.

Typically swamp mats may be installed on top of the existing vegetation, however in some instances cutting large woody vegetation may be required. Check with National Grid Environmental Scientist prior to cutting or clearing vegetation for swamp mat placement.

Follow the approved plans in the EFI for swamp mat installation and do not deviate from the plans. **Any deviation from the approved plans needs to be communicated immediately to the National Grid Environmental Scientist as it may require additional permitting, require stopping the project or result in a permit violation or revocation.**

Close coordination with the mowing contractor shall be required to ensure that access plans are followed, and swamp mats are utilized when necessary. Sometimes mowing contractors may

have to work off the leading edge of a swamp mat to mow in order to lay the next swamp mat and continue further into the wetland. Under no circumstances shall trees or shrubs be allowed to be pulled out of the wetland by the root ball. The root ball of trees and shrubs shall remain intact. Chipping debris and excessive amounts of slash shall not be placed in wetlands or other resource areas. In some instances, it may be beneficial to pile a reasonable amount of slash within a nearby upland area to create habitat for wildlife. This activity shall be approved by the National Grid Environmental Scientist

7.1 Stream Crossings and Stream Bank Stabilization

Stream crossings shall be bridged with swamp mats or other temporary minimally-intrusive measures unless fording is acceptable for the site and is authorized by the National Grid Environmental Scientist. Care shall be taken when installing a swamp mat bridge to insure that the stream bed and banks are not damaged during installation and removal and that stream flow is not unduly restricted. An environmental permit may be required to cross or disturb protected waters, depending upon state-specific regulatory requirements. Refer to BMPs in Appendix 7. Immediately following swamp mat removal, all stream banks shall be stabilized and restored to prevent sedimentation and erosion.

7.2 Cleaning of Swamp Mats

Mats shall be certified clean by the vendor prior to installation. The vendor shall use the certification form provided as Appendix 8 to document compliance. Clean is defined as being free of plant matter (stems, flowers, roots, etc), soil, or other deleterious materials prior to being brought to the project site. Any equipment or timber mats that have been placed or used within areas containing invasive species within the project site shall be cleaned of plant matter (stems, flowers, roots, etc), soil, or other deleterious materials at the site of the invasive species prior to being moved to other areas on the project site to prevent the spread of invasive species from one area to another[5]. **Mats shall be cleaned prior to being removed at the completion of the project: exceptions to this requirement may be made on a case-by-case basis.** Consult with the National Grid Environmental Scientist prior to discharging or disposing of any waste water or waste material from the cleaning of swamp mats.

7.3 Stone Removal for Swamp Mat Placement

For situations where the matting contractor determines that stones or boulders must be removed or relocated within wetland areas in order to install safe and level structure work pads or access roads the boulders shall be moved in a manner which does not result in significant soil disturbance (i.e., pushing with a bull dozer is not allowed). The boulders shall not be placed on any existing vegetated areas within wetlands or within vernal pools. When numerous boulders shall be removed from a wetland area, they shall be deposited in an upland area outside of the

[5] On ROW projects where multiple wetlands may be dominated by the same invasive species, cleaning may not be required for movement along the ROW. Check with the National Grid Environmental scientist for guidance.

flagged wetland limits, outside of any cultural resource areas and outside of any RTE species populations. Any boulders that shall be placed within buffers (In MA, the 100-foot buffer zone, and in RI, the 50-foot Perimeter Wetland, 100-foot or 200-foot Riverbank Wetlands) shall be placed to avoid causing soil disturbance and they shall be within an approved limit of work. When there is a significant number of boulders that shall be removed, the National Grid Environmental Scientist shall be consulted for guidance.

7.4 Transition onto Mats

Erosion controls and stone or wood chip ramps shall be installed to promote a smooth transition to and minimize sediment tracking onto swamp mats. Geotextile may be added beneath stone or wood chip transitions to facilitate removal, as necessitated by site or permit conditions. Refer to BMPs in Appendix 7.

7.5 Corduroy Roads

Corduroy roads are a wetland crossing method where logs are cut from the immediate area and used as a road bed to prevent rutting from equipment crossing. This technique is designed to be used in areas of wetland crossings where there is no defined channel or stream flow and should never be used in streams. Corduroy logs shall be placed in the narrowest area practicable for crossing with the logs placed perpendicular to the direction of travel across wet area. The use of corduroy logs shall only be in emergencies when approved by the National Grid Environmental Scientist or when they have been specifically permitted as part of a project. Refer to BMPs in Appendix 7.

7.6 Swamp Mat Removal

Once swamp mats are removed, wetlands shall be inspected for build up of sand or other materials that may have fallen through swamp mats. Care shall be taken to inspect wetland crossings as each mat is removed to ensure any materials are properly removed and disposed of off-site.

7.7 Bridging over other utility facilities

In ROWs where other utility facilities (including but not limited to gas, oil, fiber optic, electric, water, and sewer) are co-located within the transmission ROW, bridging may be required to cross those facilities. The project team shall coordinate with the respective utility company prior to determining if bridging or permanent crossings are required.

8.0 LGP Equipment Use

Only when approved by the National Grid Environmental Scientist on a case-by-case basis shall equipment with LGP of **less than 3 psi when loaded** be allowed to access through wetlands. The National Grid Environmental Scientist's approval of the use of LGP equipment through wetlands depends on several criteria including:

- Time of year. LGP equipment use may be allowed if weather and field conditions at the time of construction are suitable to eliminate/minimize the concern of rutting or other impacts. Frozen, frozen snow pack, low flow, or drought conditions are typically acceptable conditions. Spring and fall construction, due to the typical higher precipitation, are not suitable times of year for LGP equipment use.
- Number of trips. Multiple trips through a wetland have shown to increase the potential for damage and require matting. LGP equipment use shall likely only be approved if trips are limited to one trip in and one trip out.
- Type of wetland system. Some wetlands have harder soils/substrate, and may be passable without causing significant damage. Some of the wetlands along National Grid ROWs have existing hard bottom roads that have been vegetated over time and may be traversed with LGP equipment without swamp mats.
- Emergencies. LGP equipment use may be allowed during emergency or storm conditions for outage restoration.
- State-specific USACE General Permit Performance Standards. The standard is for no impact to the wetland, which may be obtained by using LGP equipment (<3 psi **when loaded**). "*Where construction requires heavy equipment operation in wetlands, the equipment shall either have low ground pressure (<3 psi), or shall not be located directly on wetland soils and vegetation; it shall be placed on swamp mats that are adequate to support the equipment in such a way as to minimize disturbance of wetland soil and vegetation.*"
- Local bylaws. Municipal wetland bylaws, where applicable, shall be reviewed for prohibitive conditions or applicable performance standards.

LGP equipment approval is required **at the time of construction for each wetland crossing** and shall be dependent upon the above conditions. In addition, LGP equipment use and approval shall be assessed by the National Grid Environmental Scientist during construction on a continuing basis; LGP equipment use shall cease immediately if field conditions are found to be unsuitable. ***Please note that if LGP vehicles are used, and wetlands damage occurs, the use of the LGP equipment shall be suspended.***

9.0 Soil Disturbing Activities

9.1 Dust Control

Water or application of calcium chloride or other National Grid approved equivalent in accordance with the manufacturer's guidelines may be used for dust control along ROWs in

upland areas. During application of water for dust control, care shall be taken to ensure that water does not create run-off or erosion issues. Refer to BMPs in Appendix 7.

9.2 Clearing

Clearing is not allowed without specific permission as it constitutes soil disturbance under several regulatory programs and may trigger permitting by increasing the project's footprint of disturbance. If clearing is required for a project, the limit of clearing shall be established with flagging or construction fencing and/or erosion controls. Clearing shall be done in accordance with project specific permits. Following the completion of clearing, the limits of work shall be re-established. Refer to BMPs in Appendix 7.

9.3 Grubbing

Grubbing is not allowed without specific permission as it constitutes soil disturbance under several regulatory programs and likely triggers permitting by increasing the project's footprint of disturbance. If grubbing is required for a project, the limit of grubbing shall be re-established after clearing has been completed. The area of grubbing shall be identified with flagging or construction fencing and/or erosion controls. Grubbing shall be conducted in accordance with project-specific permits.

9.4 Blasting

If blasting is anticipated, the project team, including the National Grid Environmental Scientist, shall be consulted.

9.5 Site Grading

The work site shall not be graded other than in accordance with project permits. Any proposed grading shall be reviewed by the National Grid Environmental Scientist for wetlands, rare species habitat, areas of cultural and historical significance, and other environmentally sensitive areas prior to start of work. In some cases, additional testing for cultural or historical resources may be triggered by proposed grading; alternatives to grading may be sought due to protracted time frame of obtaining the permit associated with testing and performing the testing. Grading outside of a regulated area shall be kept to the minimum extent necessary for safe and efficient operations and shall comply with the project permit plans.

Grading shall be performed in a manner which does not increase the erosion potential at the Site (e.g., terraces or slope interruptions shall be utilized). Graded sites shall be promptly stabilized by applying a National Grid approved seed mix (if adequate root and seed stock are absent), and mulching with hay, straw or cellulose (use straw or cellulose hydromulch where the potential introduction of invasive plant species is of concern) to reduce erosion and visual impact, as soon as possible following completion of work at the site. Grading within a

regulated area shall be subject to the review and approval of the National Grid Environmental Scientist.

In some municipalities, site grading activities require the prior approval of the Town Engineer, Building and Zoning Official, or Public Works Director. Local ordinances or bylaws should be reviewed for applicable restrictions and permitting thresholds

9.6 Site Staging and Parking

During the project planning and permitting process, locations shall be identified for designated crew parking areas, material storage, and staging areas. Where possible, these areas should be located outside of buffer zones, watershed protection areas, and other environmentally sensitive areas. Any proposed locations shall be evaluated for all sensitive receptors and for new projects requiring permitting, shall be incorporated onto permitting and access plans.

9.7 Soil Stockpiling

Soil stockpiles shall be located in upland areas and if in close proximity to wetlands and wetland buffers, shall be enclosed by staked straw bales or another erosion control barrier. Additional controls, such as watertight mud boxes and geotextile/filter fabric over or between swamp mats shall be considered for saturated stockpile management in work areas in wetlands (i.e., swamp mat platforms) where sediment-laden runoff would pose a threat to the surrounding wetland. Saturated soils shall be allowed to dewater prior to off-site transport for sufficient time to ensure that water/sediment is not deposited onto swamp mats or public roads during transport.

9.8 Top Soil/High Organic Content Soil

When the work site requires excavation and grading, the top soil shall be stockpiled separately from the material excavated. This top soil shall be spread as a top dressing over the disturbed area during restoration of the site.

In some instances where work is occurring within wetlands, high organic content soil may be displaced. Such high organic content soil shall be segregated from other excavated materials and stockpiled for use in wetland restoration areas. Care shall be taken to minimize the handling of high organic content soil. Preferably, the soil shall be stockpiled in one location until it is moved to the restoration area.

10.0 Stone Wall Dismantling and Re-building

Removal or alteration of stonewalls shall be avoided, whenever possible. As appropriate, some stonewalls removed or breached by construction activities shall be repaired or rebuilt. Rebuilt stone walls shall be placed on the same alignment that existed prior to temporary removal, to

the extent that it shall not interfere with operations. The removal and rebuilding of stone walls requires approval from the National Grid Environmental Scientist and Property Legal, and may require several weeks lead time for coordination. Note that not all states allow this technique. Dismantling may not be allowed at all due to quality or significance of the wall. Once a stone wall has been identified as requiring dismantling, the following procedures shall be followed:

- Identify stone wall that is required to be temporarily dismantled and notify project team that a site visit is warranted to review the stone wall.
- The National Grid Environmental Scientist, with support from Property Legal and/or cultural/historical consultant, shall determine if permitting or additional permissions are required prior to dismantling stone wall.
- Once permit or permissions have been received, full documentation of wall dimensions (measurements and photographs) shall be submitted to the National Grid Environmental Scientist. Documentation of the wall dimensions shall be marked onto a copy of the applicable EFI access plan (or equivalent plan) with a useful reference for future locating such as GPS coordinates and/or measurement from a permanent reference point (closest structure location or closest cross street, etc.). The wall shall be photographed from all sides with a written description of the photograph (i.e. southern side of wall looking north). In addition, documentation of the length of wall to be dismantled shall be recorded. Take special care to note if granite property bounds (or other marker) are located within the wall so additional survey can be accomplished prior to dismantling in cases where the stone wall represents a property boundary. Site visits by project team (which shall include the National Grid Environmental Scientist) are a mandatory requirement prior to dismantling.
- No dismantling shall take place until documentation has been submitted to the National Grid Environmental Scientist and approved as sufficient documentation.
- Stones from the wall shall be removed from the work area and temporarily stored in nearby location, away from wetlands; buffer zones; rare species habitat and other historical/archeological concerns.
- Avoid dismantling via the “bulldozer” method when possible as this method makes it nearly impossible to rebuild the wall in the same alignment due to its uncontrolled nature. Dismantling shall be conducted either by hand, with stones stacked as they are removed, or on less “sensitive” walls to use an excavator with a thumb to grab each stone and build a stockpile. Significant ground disturbance below the wall shall be avoided.

Once construction and access in the area has been completed, the wall shall be rebuilt to pre-dismantled conditions or better. If rebuilding a stone walls can not be placed on the same alignment that existed prior to temporary removal, approval from the National Grid Environmental Scientist and Property Legal is required. **Note that if the wall represents a legal property boundary or is historically or culturally significant (or was previously determined to be in a very high quality condition), a professional stone masonry company may be required to document wall alignment, and conduct the dismantling and rebuilding**

11.0 Avian Nest Removal

Avian nest removal shall be done in accordance with EG-304. Consult the National Grid Environmental Scientist prior to removing any nests. There are seasonal restrictions of the removal of avian nests and federal or state permits may be necessary prior to removal

12.0 Drilling Fluids and Additives

Notify the National Grid Environmental Scientist if drilling fluids/additives are proposed to be used on a project. Use and disposal of spent drilling fluids/slurries shall be approved by the National Grid Environmental Scientist, as regulatory approvals and drinking water wells may be of concern. Deactivation and sampling may be required prior to disposal.

13.0 Grounding Wells

The installation of grounding wells shall require erosion controls and proper soil management. Due to the typical depth required for grounding wells (typically 50 to 200 feet or more), erosion controls shall be installed around the proposed well location when working in buffer zone, in proximity to sensitive resources or near slopes. Also, dewatering basins may be required for the proper management of groundwater. The National Grid Environmental Scientist shall be consulted for the disposal of any excess soil.

14.0 Counterpoise and Cathodic Protection

The installation of counterpoise or cathodic protection shall require erosion controls and proper soil management. The National Grid Environmental Scientist shall be consulted for the disposal of any excess soil.

15.0 Gates

When not in use, gates shall be locked with a company-approved lock or double locked with the property owner's lock. New gates may be installed during a project, however, installation of a gate requires permission from the property owner, and may require environmental permitting. Consult with National Grid Real Estate and the National Grid Environmental Scientist prior to installing a new gate, as well as with the appropriate engineering department for the current company gate specifications. Refer to BMPs in Appendix 7. Installation of ROW access restrictions (e.g., stone, bollards, other) at road crossings also require consultation with the National Grid Environmental Scientist and Property Legal.

16.0 Signage

Specific signage may be required by permits or be specified in the EFI to limit access in certain sensitive areas. Signs shall be used to clarify allowed access and sensitive areas, such as:

- "No snow stockpiling beyond this point,"
- "Approved access (to structures A-F)";
- "Do not cross this area until swamp mats are in place";
- "No vehicle crossing";
- "Areas to avoid"; and
- "Environmentally Sensitive Area – Keep Out."

Signs shall be used in conjunction with snow fencing or other physical barriers as demarcation for sensitive areas (e.g., rare species areas, sensitive archeological locations, etc.) that need to be protected and avoided by construction activities. In addition, permit signs required by the regulatory agencies shall be present (i.e. MADEP, RIDEM, EPA (SWPPP), ACOE, etc) at construction sites and/or ROW access points. Construction signage shall be installed and maintained by the contractor performing the work during the project. Absence of signage does not eliminate the need to comply with access plans, permit conditions, and other regulatory requirements. Refer to BMPs in Appendix 7.

17.0 Refueling and Maintenance Operations

17.1 Spill Prevention and Response Plan

Spill controls shall be provided on every field vehicle. Bulk storage of fuels (55 gallons or greater) shall be approved by the National Grid Environmental Scientist prior to being brought on site. The need for a field spill plan shall be evaluated specific to the project for regulatory requirements under SPCC regulations or local ordinances. A field spill plan would include information on fuels and oils being used, approximate amounts in each container or type of equipment, location, fueling location, secondary containment, response and notification procedures, including contact phone numbers, etc. All personnel shall be briefed on spill prevention and response prior to the commencement of construction. The state-specific EG-501 and EG-502 shall be followed in the event of a spill.

Typical construction activities do not require the use or storage of large quantities of oil or hazardous materials (i.e., greater than 55 gallons). However, oil and/or hazardous materials (OHM) may be required in limited quantities to support construction or vehicle operations. Best practices shall be followed in the use and storage of OHM which include but are not limited to: storage and refueling greater than 100 feet from resource areas; maintenance of spill response equipment at work locations sufficient to handle incidental releases from operating equipment; general training for on-site personnel for spill clean up response for incidental releases of OHM; and contracting with an on-call spill response contractor that is capable of managing incidental and significant releases of OHM. There may situations that additional precautions shall be required for the storage or use of OHM (i.e., within wellhead protection areas, GA/GAA areas,

Zone IIs). Storage of OHM shall be done in accordance with any applicable regulatory requirements.

17.2 Field Refueling

When refueling vehicles, Company personnel or contractors at field locations shall bring vehicles or equipment (except for fixed equipment such as drill rigs) to an access area outside of environmentally sensitive areas (such as waterways, wetlands, buffer zones or drinking water sources), or as specified in permit conditions and the EFI. A paved area such as a parking lot or roadway is preferred, to minimize the possibility of spill or release to the environment. The driver shall take all usual and reasonable environmental and safety precautions during refueling, such as connecting a safety grounding strap between the fuel tank and vehicle or equipment being refueled. The driver shall frequently check for fuel spills, drips, or seeps during the refueling operation.

Small equipment such as pumps and generators shall be placed in small swimming pools or on absorbent blankets/pads, to contain any accidental fuel spills. Small swimming pools with absorbent blankets/pads, and/or other secondary containment, shall be used for refueling of fixed equipment in wetlands and should be maintained to prevent accumulation of precipitation.

17.3 Grease, Oil, and Filter Changes

Routine vehicle maintenance shall not be conducted on project sites.

17.4 Other Field Maintenance Operations

When other vehicle or equipment maintenance operations (such as emergency repairs) occur, company personnel or contractors at field locations shall bring vehicles or equipment to an access location a minimum of 100 feet away from environmentally sensitive areas (e.g., wetlands or drinking water sources). A paved area, such as a parking lot or roadway, is a preferred field maintenance location to minimize the possibility of spills or releases to the environment.

Crews shall take all usual and reasonable environmental precautions during repair or maintenance operations. Occasionally, it is infeasible to move the affected vehicle or equipment from an environmentally sensitive area to a suitable access area. When this situation occurs, precautions shall be taken to prevent oil or hazardous material release to the environment. These precautions include (but are not limited to) deployment of portable basins or similar secondary containment devices, use of ground covers, such as plastic tarpaulins, and precautionary placement of floating booms on nearby surface water bodies.

17.5 Tools and Equipment

Cleaning of tools and equipment shall be conducted away from environmentally sensitive areas (such as wetlands, buffer zones or drinking water sources) to the maximum extent possible. A paved area such as a parking lot or roadway is preferred, to minimize the possibility of spill or release to the environment. Crews shall wipe up all minor drips or spills of grease and oil at field locations.

18.0 Clean-up and Restoration Standards

The following steps shall be taken once construction has been completed at each location along the ROW or within the project site. Refer to the EFI for applicable permit requirements, to determine if the site shall be reviewed by the permitting authorities prior to removal of erosion controls.

18.1 Sedimentation and Erosion Controls

After all work has been satisfactorily completed and vegetation has been re-established to a minimum of 75% cover, and upon approval by the National Grid Environmental Scientist, all non-biodegradable materials (e.g., siltation fencing, straw bale strings, stakes, straw wattle mesh casing, etc.) shall be disposed of properly off-site.

Dependent on permit requirements, sedimentation and erosion controls may not be allowed to be removed until after inspection and approval by one or more permitting authority. In most cases, removed straw bales may be used to mulch disturbed areas. Remaining straw bales that do not block the flow of water may be left in place unless they are required to be removed pursuant to permit conditions. Straw bales that block the flow of water shall be removed.

Prior to project construction being completed, the project team will develop post-construction inspection intervals to ensure timely removal of temporary BMPs. BMPs will be removed when the area is stabilized, which typically occurs when the area has either naturally stabilized (75 % cover), or seed and mulch that was installed has achieved 75% cover.

18.2 Disturbed Areas

Unless otherwise specified in permits or prescribed by the National Grid Environmental Scientist or the Project Environmental Consultant, all disturbed areas, including stream banks, wetlands and access routes, shall be restored following the completion of work. When the work is completed, the disturbed vegetation and soil shall be restored and stabilized[6] by:

- Regrading the area to pre-existing conditions, if needed;
- Seeding (if adequate root and seed stock are absent) and mulching the exposed soil;
- Removing strings and stakes from straw bales and using broken up straw bales for the mulch; and,

[6] For projects subject to the 2012 CGP, stabilization is required within 14 days, or within 7 days for sensitive areas.

- Removing siltation fencing, strings and stakes for disposal as ordinary waste.

For some wetland areas, natural re-vegetation may be more appropriate than seeding disturbed sites. Refer to BMPs in Appendix 7 for seed mix tables and mulch ratio tables

18.3 Invasive Species

All equipment shall be certified clean[7] utilizing the attached form (Appendix 8) or equivalent as approved by by the vendor prior to mobilization to the work site. The vendor shall use the certification from provided as Appendix 8 to document compliance with invasive species management BMPs, Clean is defined as being free of plant matter (stems, flowers, roots, etc), soil, or other deleterious materials prior to being brought to the project site. Any equipment that has been placed or used within areas containing invasive species within the project site shall be cleaned of plant matter (stems, flowers, roots, etc), soil, or other deleterious materials at the site of the invasive species prior to being moved to other areas on the project site to prevent the spread of invasive species from one area to another[8]. **Equipment shall be cleaned prior to being removed at the completion of the project: exceptions to this requirement shall be determined on a case-by-case basis.** Consult with the National Grid Environmental Scientist prior to discharging or disposing of any waste water or waste material from the cleaning of equipment.

18.4 Cleaning of Equipment

At the completion of the project, Equipment shall be cleaned prior to being de-mobilized to prevent tracking of material onto roads and causing safety issues. Consult with the National Grid Environmental Scientist prior to discharging or disposing of any waste water or waste material from the cleaning of equipment

18.5 Access Routes (Cross Country Routes)

Cross country access routes shall be returned to pre-construction grade (if needed), seeded (if adequate root and seed stock are absent) and mulched. Pre-existing sandy soils within mapped rare turtle habitat shall not be seeded unless directed by the National Grid Environmental Scientist so as to not alter nesting habitat.

18.6 Access Roads

Constructed gravel roads shall be left in place following project completion unless permit conditions require their removal. Refer to the specific permit conditions for these provisions. If the road is to be removed, the crushed stone and geotextile fabric shall be removed from the work

[7] The Appendix 8 certification form (or equivalent as approved by National Grid Environmental scientist) shall be used to document the clean certification

[8] On ROW projects where multiple wetlands may be dominated by the same invasive species, cleaning may not be required for movement along the ROW. Check with the National Grid Environmental scientist for guidance.

site. This excess material can be retained off-site for future maintenance-related access needs. Seeding and/or mulching of gravel roads is generally not required, unless necessary to prevent erosion.

18.7 Stone Work Pads

Unless permit conditions or property owner's require the removal of constructed stone work pads following project completion, constructed work pads shall be left in place. Refer to the specific permit conditions for these provisions.

18.8 Construction Materials on ROWs

As soon as the structure work has been completed, all used parts and trash are to be picked up and removed from the project site. Retired poles shall be removed in accordance with National Grid Engineering Standard SP,06.01.301. In some cases, the used material from structure work may be temporarily stored at the work area by placing it out of the wetlands or other sensitive resource area until work in the adjacent areas has been completed. However, treated wood poles shall never be stored in standing water or in wetlands. If the project is cancelled, all material shall be removed from the project site. Excess material brought to the project site shall be removed upon project completion. Consult with the National Grid Environmental Scientist on whether the work site shall be restored in addition to the measures outlined in 8.14.1 to 8.14.5 above

18.9 Improved Areas

Yards, lawns, agricultural areas, and other improved areas shall be returned to a condition at least equal to that which existed at the start of the project. Alternately, if requested, the property owner may be reimbursed to perform their own restoration, after the site has been left in an environmentally sound manner. If this option is requested, it shall be documented in a written release signed by the property owner. Consult with National Grid Real Estate and/or Stakeholder Relations for the details on existing agreements. Off-ROW access shall never be assumed and shall be coordinated through Real Estate before being implemented. Depending on the access point, swamp matting, composite matting or other BMPs may be required to prevent ruts, lawn damage, or other property damage. Restoration following the completion of work and any use of improved areas shall be conducted in accordance with 8.14.2 above

18.10 Property Damage

All damage to property occurring as a result of a project shall be immediately repaired or replaced. In some locations, it may be desirable to document pre-existing damage prior to work commencing in that area in order to demonstrate afterwards that the damage did not result from the project. Work crews, the Project Environmental Consultant or the National Grid Environmental Scientist shall document repairs that were performed in response to damage from unauthorized vehicle use.

18.11 Overall Work Site

Upon satisfactory completion of work, the construction personnel shall remove all work-related trailers, buildings, rubbish, waste soil, temporary structures, and unused materials belonging to them or used under their direction during construction, or waste materials from previous construction and maintenance operations. All areas shall be left clean, without any litter or equipment (wire, pole butts, anchors, insulators, cross-arms, cardboard, coffee cups, water bottles, etc.) and restored to a stable condition and as near as possible to its original condition, where feasible. Debris and spent equipment shall be returned to the operating facility or contractor staging area for disposal or recycling (cardboard) as appropriate in accordance with EG-111.

18.12 Material Storage/Staging and Parking Areas

Upon completion of all work, all material storage yards, staging areas, and parking areas shall be completely cleared of all waste and debris. Unless otherwise directed or unless other arrangements have been made with an off ROW or off-property owner, material storage yards and staging areas shall be returned to the condition that existed prior to the installation of the material storage yard or staging area. Regardless of arrangements made with a landowner, all areas shall be restored to their pre-construction condition or better. Also any temporary structures erected by the construction personnel, including fences, shall be removed by the construction personnel and the area restored as near as possible to its original condition, including seeding and mulching as needed.

19.0 Notification of Emergency Work

Because it is sometimes difficult to identify wetlands and other sensitive environmental areas, the National Grid Environmental Scientist shall be notified within 24 hours or by the next working day whenever emergency off-road repair work takes place. Although the routine maintenance and emergency repair work is generally allowed, due to site conditions or the scope of the project, notification to the regulating agencies may be required

20.0 Appendices

APPENDIX 1: Glossary
APPENDIX 2: Acronyms
APPENDIX 3: EFI Template
APPENDIX 4: Simplified EFI Template
APPENDIX 5: Standard STORMS boilerplate language
APPENDIX 6: Storm Water, Wetlands & Priority Habitat Environmental Compliance Site Inspection / Monitoring Report Form
APPENDIX 7: BMP Drawings and Guidelines

APPENDIX 8: Certification Sheet for Invasive Species Control

Appendix 1 – Glossary

Access Road – An existing, periodically maintained road often consisting of gravel and/or exposed soils or vegetated with grasses but devoid of woody vegetation, that is visible on aerial photography and shown on ROW T-sheets. May include newly permitted permanent roads (i.e., roads to be constructed in accordance with a project-specific permit).

Access Route - A pathway previously used or proposed to be used by crews for access along the ROW. Routes may be shown on ROW T-sheets or previous project access plans but are not improved as maintained gravel/exposed soil roads. Access routes may be mown and can consist of trails utilized by recreational vehicles.

Action Logs – Project-specific log used to document action items required for permit compliance. The log identifies timeframes for completion and responsible parties. The log is typically updated by the Project Environmental Consultant or the National Grid Environment Scientist and circulated to the project team on a weekly, or more frequent, basis.

Bank – The transitional slope immediately adjacent to the edge of a surface water body, the upper limit of which is usually defined by a break in slope, or, for a wetland, where a line delineated in accordance with applicable state and federal regulations that indicates a change from wetland to upland.

BMP – Best Management Practice. Individual engineered constructions or operating procedures intended to minimize and mitigate soil disturbance, erosion, sedimentation, turbid discharges, and/or impacts to sensitive receptors.

Clean - free of plant matter (stems, flowers, roots, etc), soil, or other deleterious materials prior to being brought to the project site.

Clean Gravel – Gravel is a type of coarse-grained soil that consists of small stones and other mineral particles. Clean Gravel shall meet the requirements in accordance with National Grid Standard Construction Specification for Electric Stations (Engineering Standard SP.08.00.001) Clean Gravel will not have fine materials that could lead to a turbid discharge.

Clean Stone (Crushed Stone) – Clean Stone (Crushed Stone) shall meet the requirements in accordance with National Grid Standard Construction Specification for Electric Stations (Engineering Standard SP.08.00.001). Clean Stone will not have fine materials that could lead to a turbid discharge.

Clearing – The cutting of trees and large bushes by hand and/or mechanical means.

Compost Socks – Tubular devices comprised of non-degradable, photodegradable, or biodegradable mesh tubing containing organic compost matrix. Compost socks are effective for intercepting site runoff, trapping sediment, and treating for soluble pollutants by filtering stormwater runoff. .

Compost socks are a useful sedimentation control device along construction site perimeters, as check dams in drainage channels, as a slope interruption practice on long and/or steep slopes, and around drain or street curb inlets.

Corduroy Road – Corduroy roads are cut trees and/or saplings with the crowns and branches removed, and the trunks lined up next to one another.

Dewatering Basin – An established containment area for saturated materials and pumped discharges. This measure is used for the purpose of de-watering soils prior to transport off site or for use in another location on site, and for allowing suspended sediment to settle out of pumped discharges.

Detention/Retention Basin – A detention/retention basin is designed for the purpose of detaining or retaining water. A dewatering basin is a form of detention basin

Dewatering – Use of a system of pumps, pipes and temporary holding dams to drain or divert waterways or wetlands, or lower the groundwater table before and during excavation activities.

Drainage Ditch or Swale – a clearly noticeable channel that is typically dry, except after precipitation events. Intermittent and perennial streams and rivers are not included in this definition.

Dredge – To dig, excavate, or otherwise disturb the contour or integrity of sediments in the bank or bed of a wetland, a surface water body, or other area within the regulating bodies' jurisdiction.

Dredge Spoils – Material removed as the result of dredging.

Embankment – A protective bank constructed of mounded earth or fill materials located between a roadway (or rail bed) and a seasonal stream or other wetland.

Environmental Field Issue – Document that contains copies of all project-specific environmental permits and summarizes all environmental permit conditions. The EFI is prepared by the Project Environmental Consultant or the National Grid Environment Scientist and copies are provided to the Project Manager, Construction Supervisor(s), and other team members as appropriate.

Environmental Monitoring Records – Examples of checklists and/or monitoring reports suggested for use by the Company Environmental Engineer to document conformance of the project with this Environmental Guidance and or project specific permit/license conditions.

Environmental Scientist – Formerly Environmental Engineer. The National Grid Environmental Department representative for the project or the territory where the work is located. For a map of Environmental Department staff territories, refer to the Environmental page of the National Grid infonet.

Environmentally Sensitive Areas – Examples of environmentally sensitive areas that may be found on National Grid properties are rivers, streams, ponds, lakes, wetlands, bogs, swamps, salt marshes, rare species habitat, wellhead protection areas, cultural sites, parks, preserves, schools and as otherwise defined by Federal, State or local regulations. Refer to EG-301.

Erosion Controls – The utilization of methods to prevent soil detachment and minimize displacement or washing down slopes by rainfall or run-off. Common practices include, but are not limited to:

(a) Temporary and Permanent Seeding

(b) Mulching, Soil Binders, Tackifiers

(c) Erosion Control Blankets

(d) Hydraulic Erosion Control

Excavate/Excavation – To dig, remove, or form a cavity or a hole in an area within the department's jurisdiction.

Fill (n.) – Any rock, soil, gravel, sand or other such material that has been deposited or caused to be deposited by human activity.

Fill (v.) – To place or deposit materials in or on a wetland, surface water body, bank or otherwise in or on an area within the jurisdiction of the department.

Flats – Relatively level landforms composed of unconsolidated mineral and organic sediments usually mud or sand, that are alternately flooded and exposed by the tides and that usually are continuous with the shore.

Frozen condition – Field conditions when the upper portion of the ground surface freezes or when areas of standing water freeze solid such that vehicle passage over these areas is supported without any resulting soil disturbance. The frozen conditions must have been affected by severe cold (maximum daily temperatures less than 32 degrees F) for a continuous 2-week period.

GAA – Rhode Island groundwater classification, groundwater resources that are know or presumed to be suitable for drinking water use without treatment and are located in one of the three areas described below.

a) The state's major stratified drift aquifers that are capable of serving as a significant source for a public water supply ("groundwater reservoirs") and the critical portion of their recharge area as delineated by DEM;

b) The wellhead protection area for each public water system community water supply well. Community watrer supply wells are those that serve resident populations and have at least 15 service connections or serve at least 25 individuals, e. g. municipal wells and wells serving nursing homes, condominiums, mobile home parks, etc.; and

c) Groundwater dependent areas that are physically isolated from reasonable alternative water supplies and where existing groundwater warrants the highest level of protection. At present only Block Island has been designated as meeting this criterion..

GA – Rhode Island groundwater classification, groundwater resources that are know or presumed to be suitable for drinking water use without treatment. However, groundwater classified by GA does not fall within any of the three priority areas described under the GAA classification.

Grade/Grading – The movement of soil and fill material to change the elevation of the land. The term refers to the combined actions of excavating and filling to change elevation or shape.

Grubbing – the removal of stumps/roots by mechanical means during site preparation activities.

In-kind replacement - replacement using the same material, functional inverts, diameter and length as the existing item. In-kind replacement includes the substitution of a structure with a similar structure in approximately the same location as is practicable, and is approximately the same in design. The design may be altered to meet applicable utility standards, and may include alternate materials designed to prolong the life of that service.

Intermittent Stream – A stream that flows for sufficient time to develop and maintain a defined channel, but which might not flow during dry portions of the year.

In the Dry – Work done either during periods of low water or behind temporary diversions, such as Earth Dike / Drainage Swale and Lined Ditches designed and installed in accordance with best management practices.

Limit of Work/Disturbance – The approved project limits within regulated areas. All project related activities in regulated areas must be conducted within the approved limit of work/disturbance. The limit of work/disturbance shall be depicted on the approved permit site plans and in the EFI plans. Where it is warranted National Grid may require that these limits be identified in the field by flagging, construction fencing, and/or perimeter erosion controls.

Long-Term Restoration Logs - Project-specific log used to document restoration required following the completion of construction or as areas of the project have been completed (i.e., segments of ROW for a multi-mile project). The log is typically updated by the Project Environmental Consultant or the National Grid Environment Scientist Environment Scientist and circulated to the project team on a weekly basis.

Low Flow Conditions – Low water flow that generally occurs during the summer, as a result of decreased precipitation and the removal of water by increased evaporation and evapotranspiration by vegetation. Work done under low-flow conditions minimizes the potential for environmental damage. The USACE defines the calendar dates for low flow conditions in its New England state-specific Programmatic General Permits.

Low Ground Pressure – equipment that meets the regulatory requirement of < 3 Pounds per Square Inch (PSI) ground pressure when loaded. Use of LGP equipment ***requires approval*** from the National Grid Environmental Scientist.

Marsh – A wetland:

a) That is distinguished by the absence of trees and shrubs;

b) Dominated by soft-stemmed herbaceous plants such as grasses, reeds, and sedges; and

c) Where the water table is at or above the surface throughout the year, but can fluctuate seasonally.

Methods – Are the construction practices and procedures that take place through choosing the proper equipment, trucks and labor to execute the earth moving activities based on the existing conditions and implementing creative and sensitive scheduling for the daily activities.

NHESP - Natural Heritage Endangered Species Program; a department within the Massachusetts Division of Fisheries and Wildlife that is responsible for protecting the 176 species of vertebrate and invertebrate animals and 259 species of native plants that are officially listed as Endangered, Threatened or of Special Concern in Massachusetts.

Perennial – A stream that contains water at all times except during extreme drought.

Person-in-Charge – A National Grid Project Engineer, Manager, Supervisor, Field Construction Coordinator or equivalent Contractor personnel assigned to oversee and coordinate work activities.

Processed Gravel – Processed Gravel shall meet the requirements in accordance with National Grid Standard Construction Specification for Electric Stations (Engineering Standard SP.08.00.001) Processed Gravel will not have fine materials that could lead to a turbid discharge. Gravel consisting of inert material that is hard, durable stone and is free from loam and clay, surface coatings and deleterious materials.

Regulating Body – Federal, State, or local authority that has jurisdiction over resource areas that may be impacted by company operations

Regulated Wetland Area – Those areas that are subject to federal, state or local wetland regulation, including certain buffer or adjacent areas.

Repair – The restoring of an existing legal structure by partial replacement of work, or broken, or unsound parts (Env-Wt 101.73).

Replacement – The substitution of a new structure for an existing legal structure with no change in size, dimensions, location, configuration, construction, or which conforms in all material aspects to the original structure

Right-of-Way – A corridor of land where National Grid has legal rights (either fee ownership, lease or easement) to construct, operate, and maintain an electric power line and/or natural gas pipeline and may include work on customer owned properties.

River – A watercourse that is larger than a perennial stream and flows all year long.

Routine Utility Rights-of-Way Maintenance Activity – Includes but is not limited to vegetation management and repair or replacement of existing utility structures.

Sedimentation Controls – Silt fences, straw bales, compost socks/berms and other barrier devices strategically placed to intercept and treat sediment-laden site runoff.

Siltation Curtain – An impervious barrier erected to prevent silt and sand and/or fines from being washed into a wetland, surface water body or other area of concern.

Surface Water Body or Surface Waters – Those portions of waters which have standing or flowing water at or on the surface of the ground.

Spill Prevention, Control and Countermeasure Plans – Required for site operations that involve the storage of 1,320 gallons or greater of fuel and oils, both in storage containers and stored in equipment. Response actions to spills and releases are specified in these plans.

Swamp Mats – Components of a temporary wood, plastic or other suitable material used as a BMP to cross sensitive areas or provide a stable working surface.

Stormwater Pollution Prevention Plan – A site-specific, written document that, among other things: (1) identifies potential sources of stormwater pollution at a construction site; (2) describes stormwater control measures to reduce or eliminate pollutants in stormwater discharge from a construction site; and (3) identifies procedures the operator will implement to comply with the terms and conditions of EPA NPDES Construction General Permit (CGP). SWPPPs must be prepared, maintained on-site, and amended as necessary in order to obtain NPDES permit coverage for specific construction site stormwater discharges under the EPA NPDES CGP.

Tidal Wetlands – A wetland whose vegetation, hydrology or soils are influenced by periodic inundation or tidal waters.

Topsoil – The uppermost part of the soil, ordinarily moved in tillage, or its equivalent in uncultivated soils and ranging in depth from 2 to 10 inches.

Turbidity – The condition in which solid particles suspended in water make the water cloudy or even opaque in extreme cases.

United States Geological Survey topographic map – A map that uses contour lines to represent the three-dimensional features of a landscape on a two-dimensional surface. These maps use a line and symbol representation of natural and artificially created features in an area.

Wetland – An area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation (more than 50 percent) typically adapted for life in saturated soil conditions (hydric soils). Wetlands include but are not limited to swamps, marshes, bogs, and similar areas.

Work Site – An area where work is performed.

Worker – Company employee, contractor, consultant working on site.

Zone II - Massachusetts - That area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at safe yield, with no recharge from precipitation). It is bounded by the groundwater divides which result from pumping the well and by the contact of the aquifer with less permeable materials such as till or bedrock. In some cases, streams or lakes may act as recharge boundaries. In all cases, Zone IIs shall extend up gradient to its point of intersection with prevailing hydrogeologic boundaries (a groundwater flow divide, a contact with till or bedrock , or a recharge boundary).

Appendix 2 – Acronyms

ASTM	American Society for Testing and Materials
BMP	Best Management Practices
EFI	Environmental Field Issue
EG	Environmental Guidance
EPA	Environmental Protection Agency
GA/GAA	Rhode Island Groundwater Classifications – see glossary
LGP	Low Ground Pressure
MA	Massachusetts
MA DEP	Massachusetts Department of Environmental Protection
MassDOT	Massachusetts Department of Transportation
NE	New England
NH	New Hampshire
NH DES	New Hampshire Department of Environmental Services
NHESP	Natural Heritage Endangered Species Program
NPDES	National Pollutant Discharge Elimination System
OHM	Oil and/or Hazardous Materials
PSI	Pounds per square inch
RI	Rhode Island
RI DEM	Rhode Island Department of Environmental Management
RI CRMC	Rhode Island Coastal Resources Management Council
RI SESC	Rhode Island soil erosion and sediment control
ROW	Right-of-Way
RTE	Rare, Threatened or Endangered
SPCC	Spill Prevention, Control and Countermeasure
SWPPP	Storm Water Pollution Prevention Plan
TOY	Time-of-Year
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
VT	Vermont
VT DEC	Vermont Department of Environmental Conservation

Zone II Massachusetts Groundwater Protection district – see glossary

Appendix 3 – EFI template

See EG303NE_Form1 for the EFI template

Appendix 4 – Simplified EFI template

See EG303NE_Form2 for the Simplified EFI template

Appendix 5 – Standard STORMS boilerplate language

See EG303NE_Form3 for examples of standard STORMS boilerplate language

Appendix 6

National Grid
Storm Water, Wetlands & Priority Habitat Environmental Compliance
Site Inspection / Monitoring Report

Project Name: Date:

City / Town: Time:

WO/WR #

Distribution Alliance Contractor Project? No Yes Identify Contractor

Current Weather Conditions:

Precipitation Since Last Inspection (Date, Est. Duration and Est. Amount from Each Storm):

Activities/Structures/Locations Inspected:

Identify Locations/Activities/Structures Within Designated Priority Habitat (Identify Rare Species Observations, if any) and Mitigation/Restoration Measures Implemented:

Any Significant Discharges of Sediment to Water Bodies or Wetlands? (If "yes," state locations):

Page 2

Compliance with SWPPP Storm Water Controls, O&M Plan, Order of Conditions or Other Applicable Environmental Requirements? (Explain if "no" for any feature inspected):

Additional BMPs or Other Corrective Action Needed and, if so, Where?

Page 3

Compliance with Previous Observations?

Are Spill Control Supplies Available? ☐ Yes ☐ No

Are Oil and/or Hazardous Materials Stored On-Site? ☐ Yes ☐ No

If So, Are They Properly Labeled and Managed? ☐ Yes ☐ No

Are Wastes Stored On-Site? ☐ Yes ☐ No *If So, Are They Properly Managed?* ☐ Yes ☐ No

Miscellaneous (e.g., dumping?):

Comments:

Name: Title/ Company:

Reference: EG-303NE

Appendix 7 – BMPs

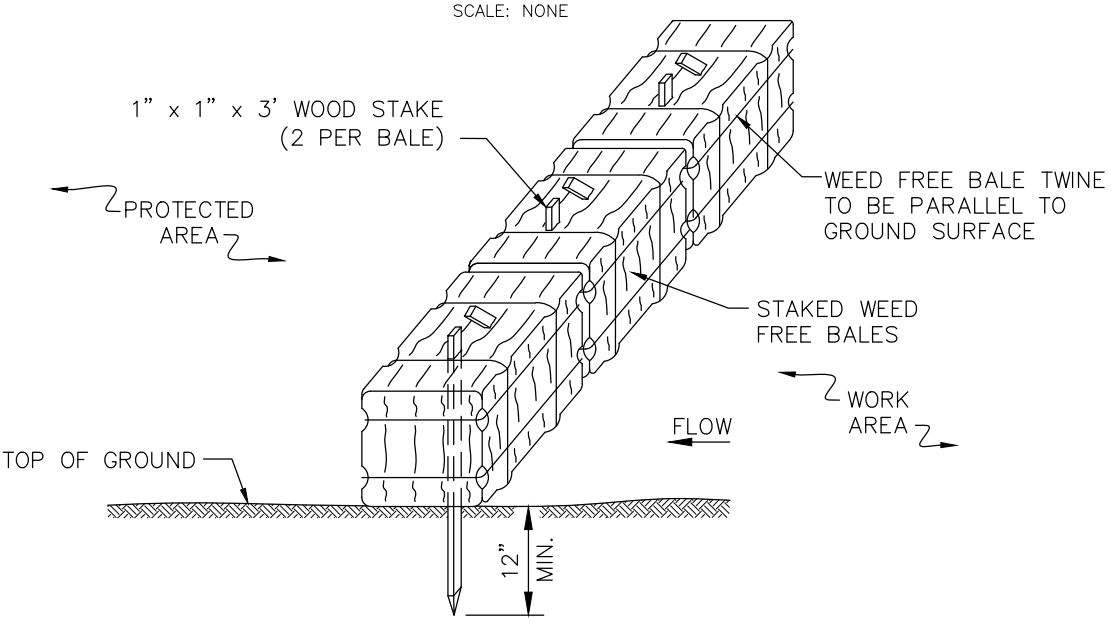
See EG303NE_Form4 for a list of BMPS

See EG303NE_Form5 for BMP details

	BMP #	Measure
Sediment & Erosion Controls	1	Weed free bale barrier
	2	Sediment control fence
	3	Silt fence / weed free barrier
	4	Silt Soxx
	5	Straw Wattle
	6	Erosion Control Blanket - Ditch
	7	Erosion Control Blanket - Slope
	8	Hydroseeding with Tackifier (slope stabilization)
	9	Mulch materials, rates and uses (from NY)
	10	Seeding options - Northern New England
	11	Seeding options - Southern New England
Crossing Measures	12	Prefabricated mats
	13	Mat bridge
	14	Swamp mat layout (with transition)
	15	Swamp mat layout (with transition and BMPs)
	16	Swamp mat - Air Bridge
	17	Corduroy road
	18	Temporary construction entrance / exit
	19	Temporary construction culvert
	20	Access way stabilization
	21	Construction signage
Advanced Applications	22	Reinforced silt fence
	23	Sediment filter
	24	Stone check dams
	25	Straw / haybale check dam
	26	Waterbar
	27	Sandbag check dam
	28	Earth dike
	29	Drainage swale and lined ditch
	30	Sedimentation basin
	31	Dewatering basin - Small scale
	32	Dewatering basin - Large scale
	33	Dirtbag
	34	Concrete waste sump
	35	Outpak concrete washout
	36	Barrier fence (construction fence)
	37	ROW gates / fences
	38	Bollard
	39	Dust control
	40	Catch Basin Inlet Protection
	41	Turbidity curtain
	42	Silt Sack

BMP DETAIL

SCALE: NONE



NOTES:

1. THE GROUND SHALL BE PREPARED TO PROVIDE COMPLETE CONTACT WITH THE BALES.

BMP PICTURE

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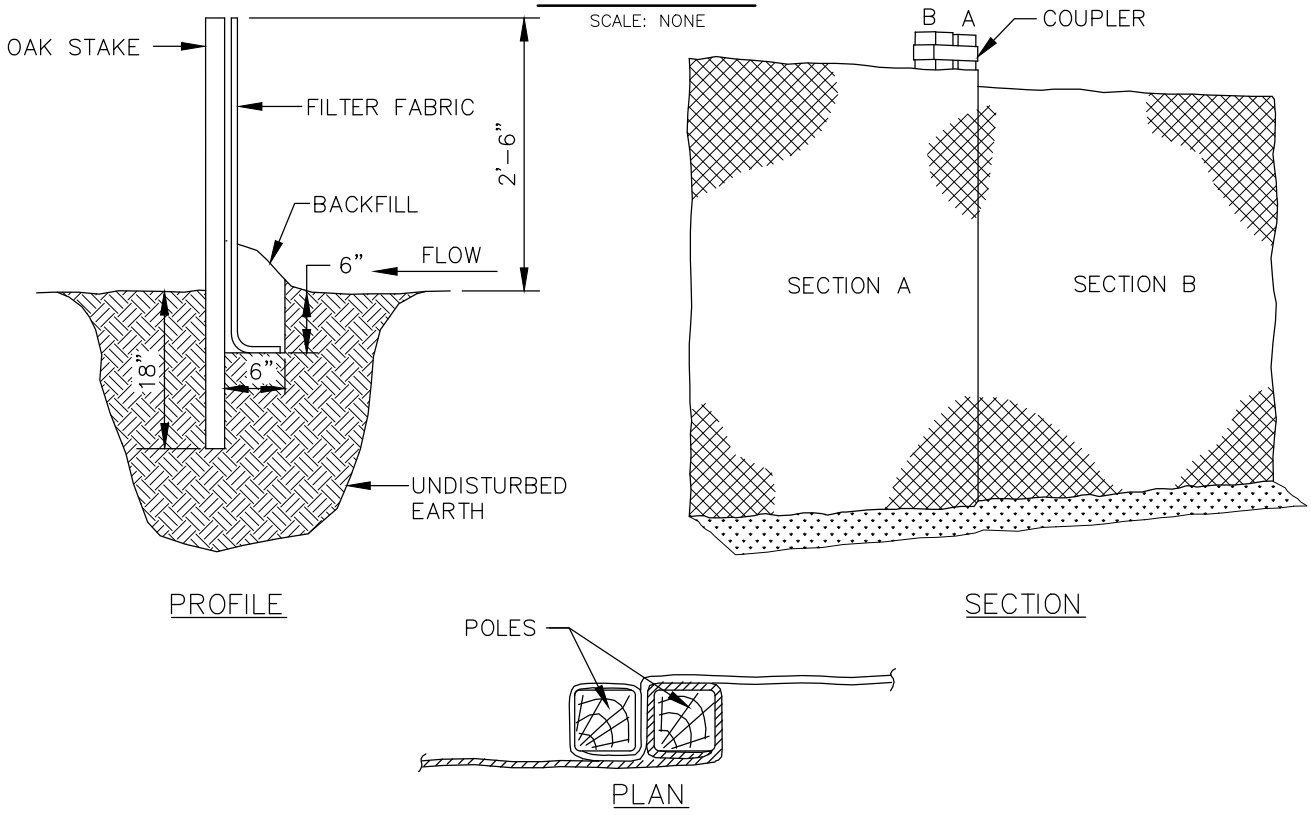
BMP # 1
WEED FREE BALE BARRIER

File: BALE_BARRIER.DWG

BMP DETAIL

SCALE: NONE



PROFILE

SECTION

PLAN

BMP PICTURE

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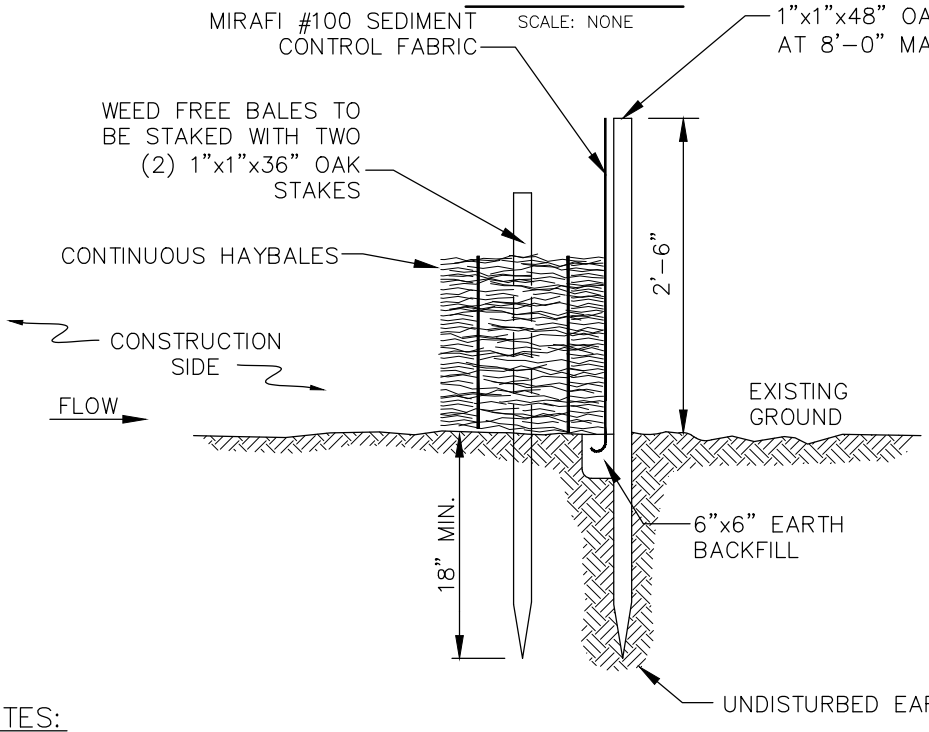
BMP # 2
SEDIMENT CONTROL FENCE

File: Sediment_Fence.dwg

BMP DETAIL



NOTES:

1. BALES SHALL BE PLACED IN A ROW WITH THE ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. BALES SHALL BE SECURELY ANCHORED IN PLACE BY TWO (2) 1"X1"X36" OAK STAKES DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
3. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
4. BALES SHALL BE REMOVED AND REPLACED WHEN THEY BECOME FILLED WITH SEDIMENT AND BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
5. BALES SHALL BE REMOVED WHEN THE EMBANKMENTS STABILIZE.
6. BALES TO BE TWINE BOUND.

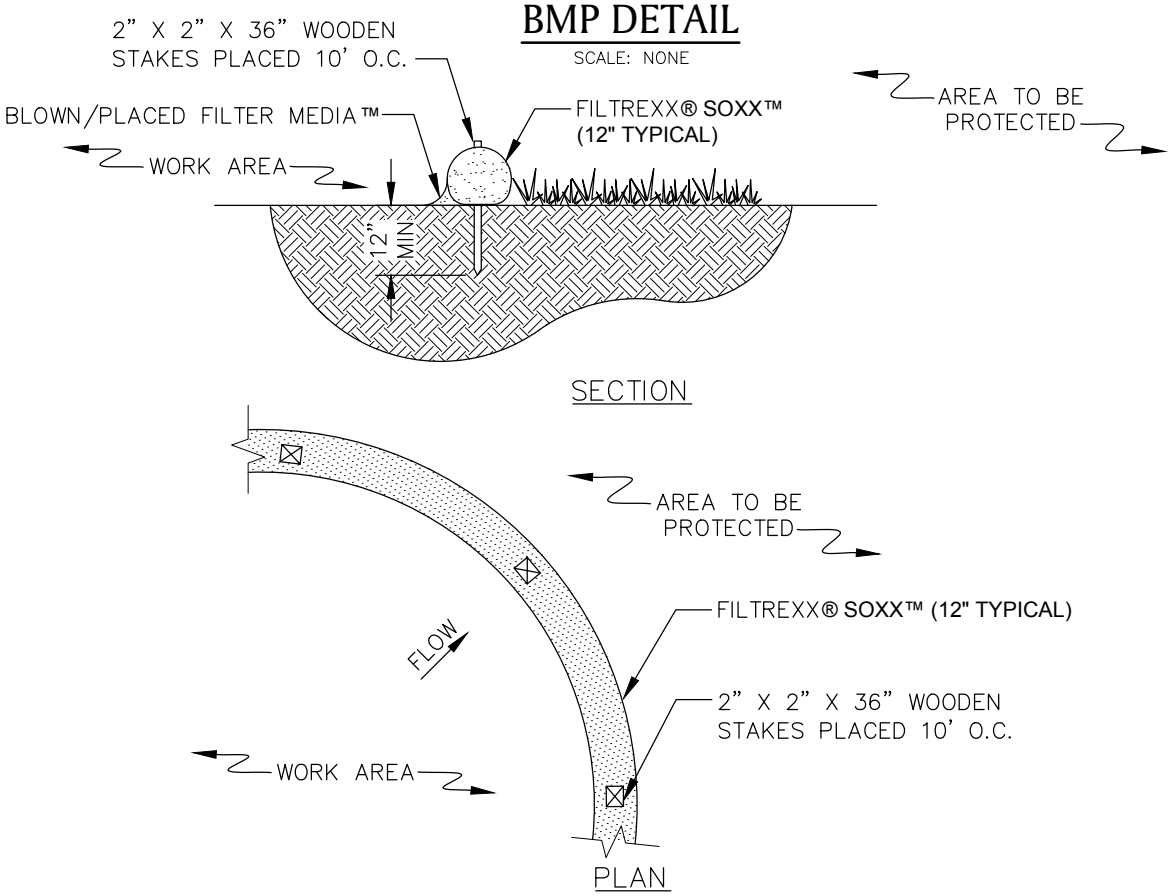
BMP PICTURE

BMP # 3
SILT FENCE /
WEED FREE BARRIER

File: Silt_Fence_&_Barrier.dwg

BMP DETAIL

SCALE: NONE



NOTES

1. PRODUCT TO BE FILTREXX® SILT SOXX™ OR APPROVED EQUAL BY NATIONAL GRID ENVIRONMENTAL SCIENTIST.
2. ALL MATERIAL TO MEET FILTREXX® SPECIFICATIONS.
3. FILTER MEDIA™ FILL TO MEET APPLICATION REQUIREMENTS.
4. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY NATIONAL GRID ENVIRONMENTAL SCIENTIST.

BMP PICTURE

* PICTURE AND DETAIL PROVIDED BY FILTREXX LAND IMPROVEMENT SYSTEMS

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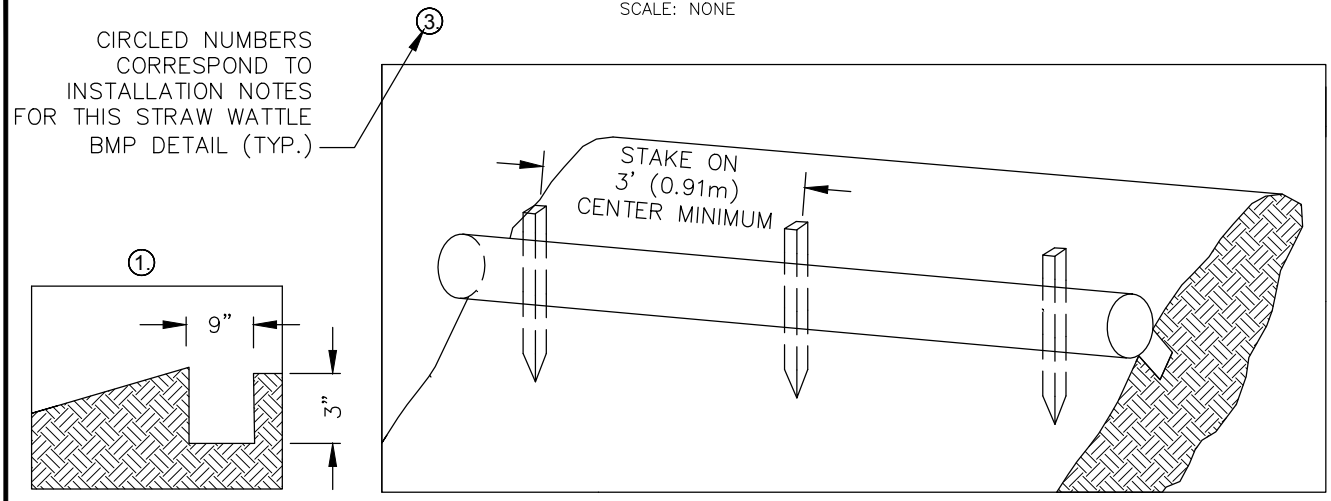
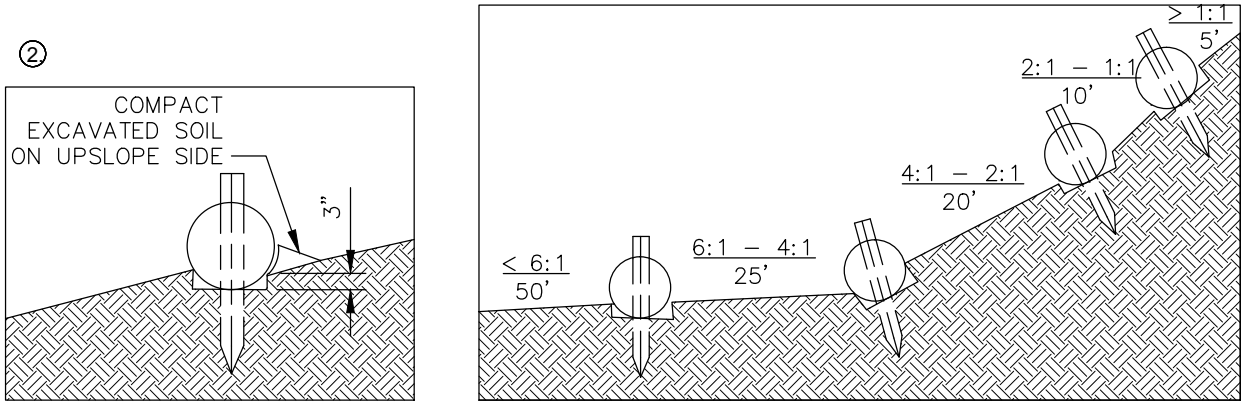
BMP # 4
SILT SOXX *

File: SiltSOXX.dwg

BMP DETAIL

SCALE: NONE





TYPICAL WATTLE SPACING DETAIL

NOTES:

1. PRODUCT TO BE TENSAR NORTH AMERICAN GREEN STRAW WATTLE OR APPROVED EQUAL BY NATIONAL GRID ENVIRONMENTAL SCIENTIST.
2. TYPICAL WATTLE SPACING BASED ON SLOPE GRADIENT. COORDINATE SPACING AND LOCATION WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST.

INSTALLATION NOTES:

1. BEGIN AT THE LOCATION WHERE THE WATTLE IS TO BE INSTALLED BY EXCAVATING A 2–3" DEEP X 9" WIDE TRENCH ALONG THE CONTOUR OF THE SLOPE. EXCAVATED SOIL SHOULD BE PLACED UPSLOPE FROM THE ANCHOR TRENCH.
2. PLACE THE WATTLE IN THE TRENCH SO THAT IT CONTOURS TO THE SOIL SURFACE. COMPACT SOIL FROM THE EXCAVATED TRENCH AGAINST THE WATTLE ON THE UPHILL SIDE. ADJACENT WATTLES SHOULD TIGHTLY ABUT.
3. SECURE THE WATTLE WITH 18–24" STAKES EVERY 3–4' AND WITH A STAKE ON EACH END. STAKES SHOULD BE DRIVEN THROUGH THE MIDDLE OF THE WATTLE LEAVING AT LEAST 2–3" OF STAKE EXTENDING ABOVE THE WATTLE. STAKES SHOULD BE DRIVEN PERPENDICULAR TO THE SLOPE FACE.

BMP PICTURE

* DETAIL AND PICTURE PROVIDED BY TENSAR NORTH AMERICAN GREEN

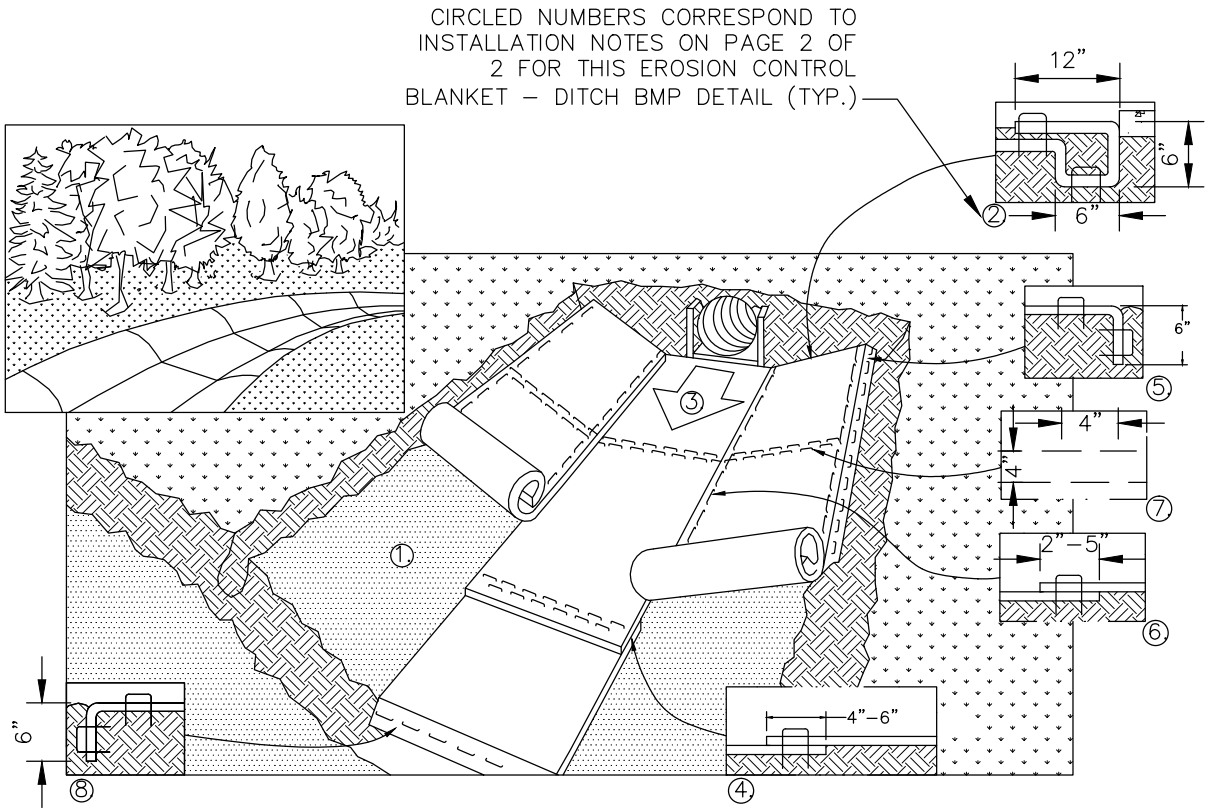
APPROVED BY: VICE PRESIDENT, ENVIRONMENTAL SERVICES

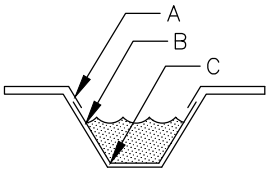
BMP # 5
STRAW WATTLE * (2 OF 2)

File: Straw_Wattle.dwg

BMP DETAIL

SCALE: NONE





CRITICAL POINTS
A. OVERLAPS AND SEAMS
B. PROJECTED WATER LINE
C. CHANNEL BOTTOM/SIDE SLOPE VERTICES

NOTES:

1. PRODUCT TO BE NORTH AMERICAN GREEN EROSION CONTROL BLANKET OR APPROVED EQUAL BY NATIONAL GRID ENVIRONMENTAL SCIENTIST.
2. HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE.
3. IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY ANCHOR THE ROLLED EROSION CONTROL PRODUCTS (RECP's).

BMP DETAIL

INSTALLATION NOTES:

1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE RECP's IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30 CM) OF RECP's EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMAPCT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) ACROSS THE WIDTH OF THE RECP's.
3. ROLL CENTER RECP's IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. ™ WHEN USING THE DOT SYSTEM , STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. PLACE CONSECUTIVE RECP's END OVER END (SHINGLE STYLE) WITH A 4" – 6" (10 CM –15 CM) OVERLAP. USE A DOUBLE ROW OF STAPLES STAGGERED 4" (10 CM) APART AND 4" (10 CM) ON CENTER TO SECURE RECP's.
5. FULL LENGTH EDGE OF RECP's AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
6. ADJACENT RECP's MUST BE OVERLAPPED APPROXIMATELY 2" – 5" (5 CM –12.5 CM) (DEPENDING ON RECP's TYPE) AND STAPLED.
7. IN HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FOOT (9 M – 12 M) INTERVALS. USE A DOUBLE ROW OF STAPLES STAGGERED 4" (10 CM) APART AND 4" (10 CM) ON CENTER OVER ENTIRE WIDTH OF THE CHANNEL.
8. THE TERMINAL END OF THE RECP's MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.

BMP PICTURE

* PICTURE AND DETAIL PROVIDED BY TENSAR NORTH AMERICAN GREEN

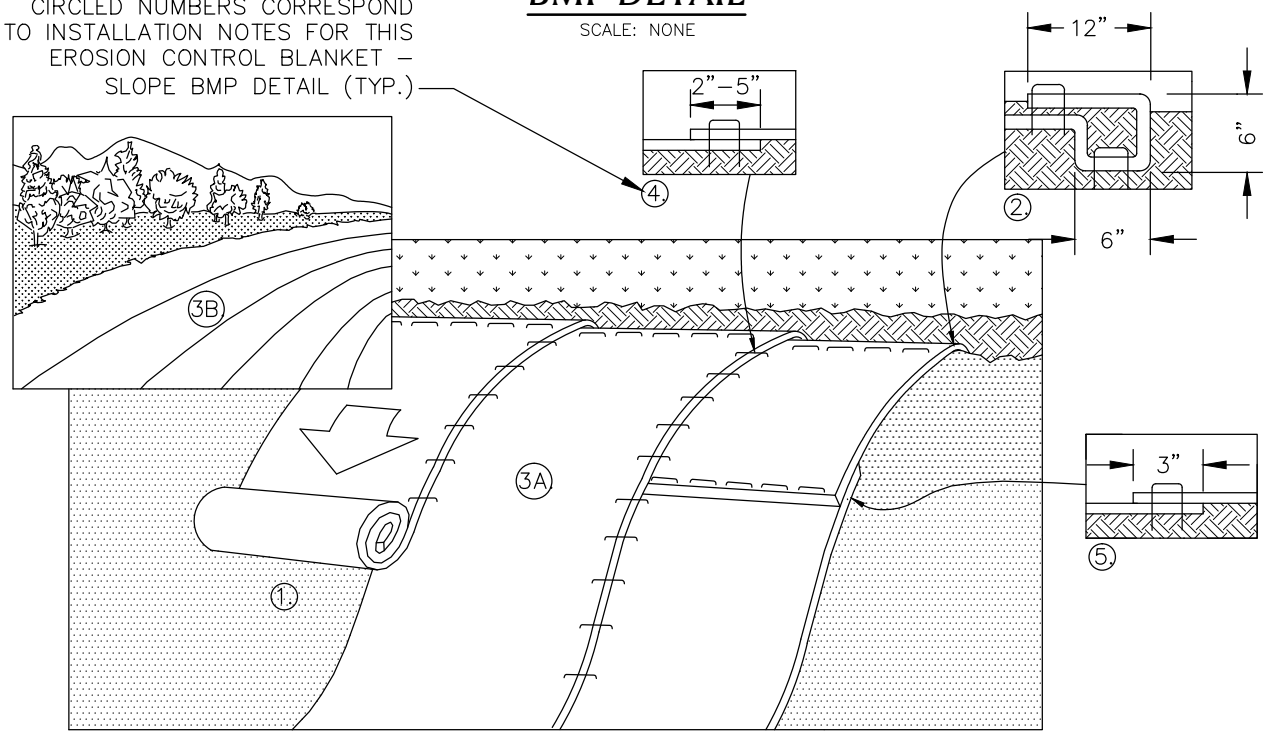
APPROVED BY: VICE PRESIDENT, ENVIRONMENTAL SERVICES

BMP # 6
EROSION CONTROL BLANKET - DITCH * (2 OF 2)

File: Erosion_Blanket_Ditch.dwg

BMP DETAIL

SCALE: NONE



NOTES:

1. PRODUCT TO BE NORTH AMERICAN GREEN EROSION CONTROL BLANKET OR APPROVED EQUAL BY NATIONAL GRID ENVIRONMENTAL SCIENTIST.
2. IN LOOSE SOIL CONDITIONS, THE USE OF STAPLES OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE RECP's.

INSTALLATION NOTES:

1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL–O–SEED DO NOT SEED PREPARED AREA. CELL–O–SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP's IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30 CM) OF RECP's EXTENDED BEYOND THE UP–SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE RECP's.
3. ROLL THE RECP's (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES ™ IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM , STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATELY 2" – 5" (5 CM – 12.5 CM) OVERLAP DEPENDING ON RECP's TYPE.
5. CONSECUTIVE RECP's SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE RECP's WIDTH.

* PICTURE AND DETAIL PROVIDED BY TENSAR NORTH AMERICAN GREEN

APPROVED BY: VICE PRESIDENT, ENVIRONMENTAL SERVICES

BMP # 7
EROSION CONTROL BLANKET - SLOPE * (1 OF 2)

File: Erosion_Blanket_Slope.dwg

BMP PICTURE

* PICTURE AND DETAIL PROVIDED BY TENSAR NORTH AMERICAN GREEN

APPROVED BY: VICE PRESIDENT, ENVIRONMENTAL SERVICES

BMP # 7
EROSION CONTROL BLANKET - SLOPE * (2 OF 2)

File: Erosion_Blanket_Slope.dwg

BMP PICTURE

NOTES:

1. COORDINATE MIXTURE TYPE AND APPLICATION AREAS WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST PRIOR TO CONSTRUCTION.
2. A MINIMUM OF 1500 LBS. PER ACRE OF A PAPER/CORN FIBER OR EQUIVALENT WITH NATURAL TACKIFIERS WILL BE USED ON SLOPES LESS THAN 3:1.
3. A BFM (BONDED FIBER MATRIX) WILL BE USED ON SLOPES GREATER THAN 2:1.
4. A FGM (FLEXIBLE GROWTH MATRIX) OR ESM (EXTREME SLOPE MATRIX) WILL BE USED ON SLOPES GREATER THAN 1:1.
5. REFER TO BMP #10 FOR SEED MIXTURE OPTIONS.

* PICTURE PROVIDED BY TENSAR NORTH AMERICAN GREEN
* TACKIFIER INFORMATION PROVIDED BY FILTREXX LAND IMPROVEMENT SYSTEMS AND TENSAR NORTH AMERICAN GREEN

BMP # 8
HYDROSEEDING WITH TACKIFIER
(SLOPE STABILIZATION) *

File: Hydroseeding.dwg

BMP

Definition

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface.

Purpose

The primary purpose is to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch is also used alone for temporary stabilization in non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/ acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.

NOTE:

1. PICTURE DEPICTS STRAW MULCH APPLICATION (FROM MULCH SPREADER) ON STEEP SLOPE WITH AN IMPROVED DRAINAGE SWALE.
2. COORDINATE MULCH MATERIALS AND RATES WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST.

* BMP INFORMATION FROM "NEW YORK STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL (AUGUST, 2005)." INFORMATION OBTAINED VIA WEBSITE: http://www.dec.ny.gov/chemical/29066.html

BMP # 9
MULCH MATERIALS, RATES AND USES (FROM NY) *

UPLAND ROW RESTORATION MIX – GENERAL

Species Composition Options:

- Andropogon gerardii; Niagra Big Bluestem
- Schizachyrium scoparium; Little Bluestem
- Elymus Canadensis; Canada Wild Rye
- Elymus virginicus; Virginia Wildrye
- Lolium multiflorum; Annual Ryegrass
- Sorghastrum nutans; Indiangrass
- Chamaecrista fasciculate; Partridge Pea
- Desmodium canadense; Showy Tick Trefoil
- Helioposis helianthoides; Ox–Eye Sunflower
- Panicum virgatum; Switchgrass
- Rudbeckia hirta; Black Eyed Susan
- Poa palustris; Fowl Bluegrass
- Agrostis perennans; Upland Bentgrass
- Agrostis alba; Redtop
- Festuca rubra; Red Fescue
- Lotus corniculatus; Birds–Foot Trefoil
- Chrysanthemum leucanthem; Ox–Eye Daisy
- Aster novae–angliae; New England Aster

Example Seed Mixes:

1. Native Upland wildlife forage and Cover Meadow Mix – Ernst Conservation Seeds (ERNMX–123)
2. Eastern Ecotype Native Grass Mix– Ernst Conservation Seeds (ERNMX–177)
3. New England Native Warm Season Grass Mix – New England Wetland Plants, Inc.
4. New England Logging Road Mix – New England Wetland Plants, Inc.
5. Northeast Upland Wildflower/Restoration Erosion Mix – Southern Tier Consulting (STCMX–2)

UPLAND ROW RESTORATION MIX – DRY/ROCKY SITES

Species Composition Options:

- Festuca rubra; Red Fescue
- Schizachyrium scoparium; Little Bluestem
- Elymus Canadensis; Canada Wild Rye
- Bouteloua gracillis; Blue Grama
- Lolium multiflorum; Annual Ryegrass
- Lolium perenne; Perennial Ryegrass
- Agrostics scabra; Rough Bentgrass
- Agrostis perennans; Upland Bentgrass
- Sorghastrum nutans; Indiangrass

Example Seed Mixes:

1. New England Erosion Control/ Restoration Mix for Dry Sites – New England Wetland Plants, Inc.
2. Ernst Conservation Seeds and similar companies can create a custom seed mix matching the composition above (with site specific additions if necessary).

WETLAND ROW RESTORATION MIX

Species Composition Options:

- Agrostis stolonifera; Creeping Bentgrass
- Poa trivialis; Rough Bluegrass
- Alopecurus arundinaceus; Creeping Meadow Foxtail
- Lolium multiflorum; Annual Ryegrass
- Festuca rubra; Creeping Red Fescue
- Elymus virginicus; Virginia Wildrye
- Schizachyrium scoparium; Little Bluestem
- Andropogon gerardii; Niagra Big Bluestem
- Carex vulpinoidea; Fox sedge
- Panicum virgatum; Switchgrass
- Agrostis scabra; Rough Bentgrass
- Aster novae–angliae; New England Aster
- Eupatorium perfoliatum; Boneset
- Euthamia graminifolia; Grass Leaved Goldenrod
- Scirpus atrovirens; Green Bulrush
- Verbene hastate; Blue Vervain
- Juncus effusus; Soft Rush
- Scirpus cyperinus; Wool Grass
- Panicum clandestinum; Deertongue

Example Seed Mixes

1. New England Erosion Control/Restoration Mix for Detention Basins and Moist Sites – New England Wetland Plants, Inc.
2. Northeast Wetland Grass Seed Mix – Southern Tier Consulting (STCMX–7)
3. Ernst Conservation Seeds and similar companies can create a custom seed mix matching the composition above (with site specific additions if necessary).

GERNERAL NOTES:

1. Seed mixes described herein are intended to cover a variety of typical new england landscapes. However, site specific seed mixes will need to be evaluated in coastal or mountainous regions.
2. Seed mixes described herein are intended for general ROW restoration. Site specific wetland seed mixes may be required by local, state and/or federal regulators for certain impacts to wetlands.
3. All seed mixes are to be approved by National Grid Environmental Scientist prior to construction and must conform with all project permits.
4. Seedbed preparation and maintenance as well as temporary erosion and sediment controls are crucial to the establishment of newly seeded areas. Coordinate with National Grid Environmental Scientist on seed bed preparation and maintenance as well as temporary erosion and sediment controls prior to construction.

BMP PICTURE

SCALE: NONE

NOTES:

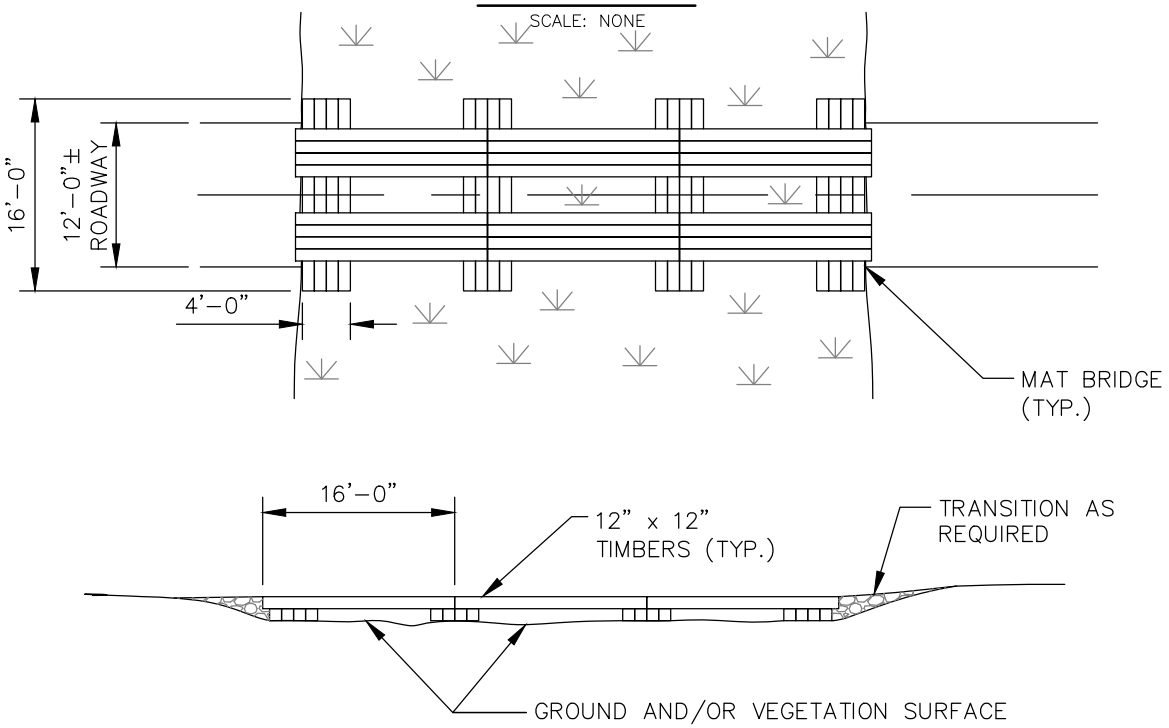
1. PRODUCT TO BE ALTURNAMATS' PREFABRICATED MATS OR APPROVED EQUAL BY NATIONAL GRID ENVIRONMENTAL SCIENTIST.
2. PRODUCT AVAILABLE IN 4X8' UNITS.
3. IF MATS ARE INSTALLED IN A WETLAND AREA, INSTALL EROSION CONTROLS TO CONTAIN MATERIAL UTILIZED IN THE MAT TRANSITIONS.

* PICTURE PROVIDED BY ALTURNAMATS

BMP # 12
PREFABRICATED MATS *

File: Prefab_Mats.dwg

BMP DETAIL



NOTES:

1. IF MATS ARE INSTALLED IN A WETLAND AREA, INSTALL EROSION CONTROLS TO CONTAIN MATERIAL UTILIZED IN THE MAT TRANSITIONS.

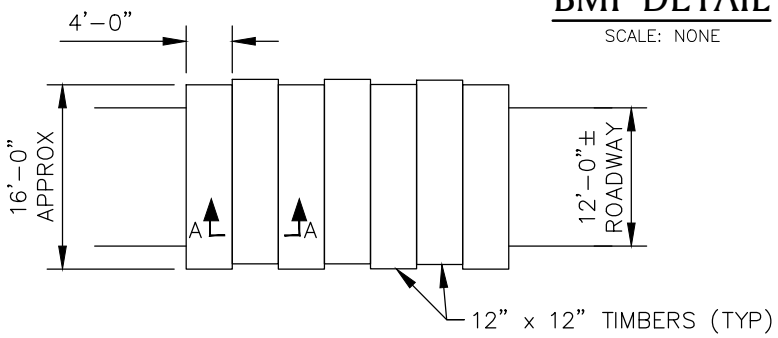
BMP PICTURE

BMP # 13
MAT BRIDGE

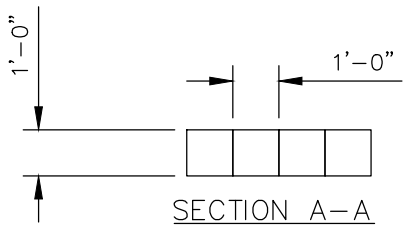
File: Mat_Bridge.dwg

BMP DETAIL

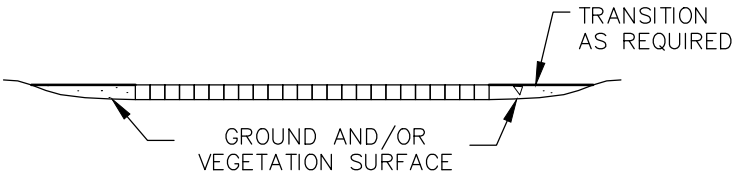
SCALE: NONE



TYPICAL PLAN VIEW



SECTION A–A
TYPICAL MAT SECTION
BOLTED TOGETHER



TYPICAL SECTION VIEW

NOTES:

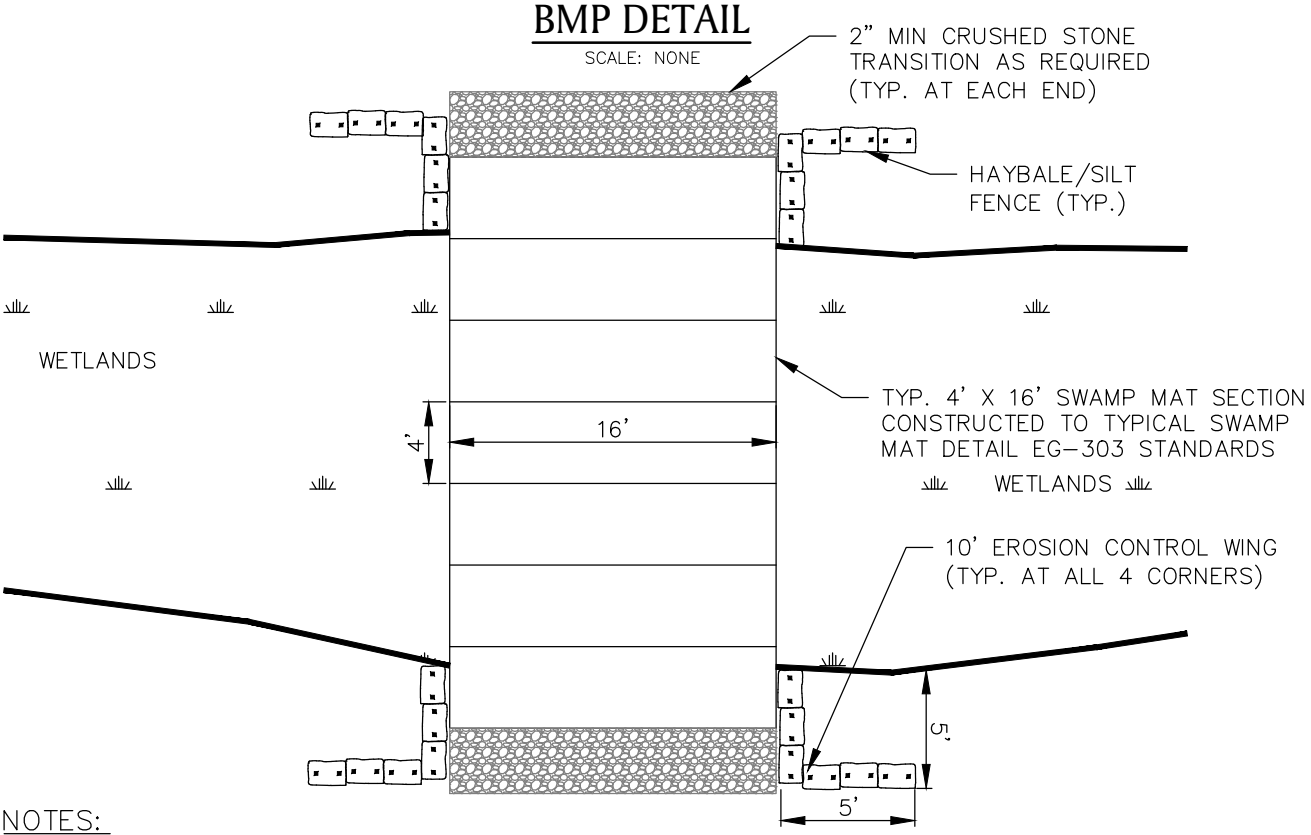
1. TO BE INSTALLED IF NECESSARY TO PREVENT RUTTING, TO ACCESS STRUCTURES.
2. THIS DETAIL SHOWS TYPICAL DIMENSIONS. SOME CONTRACTOR'S SWAMP MATS ARE DIMENSIONALLY DIFFERENT FROM WHAT IS SHOWN HERE.
3. DEPENDENT ON SITE CONDITIONS, MULTIPLE LAYERS OF SWAMP MATS MAY BE INSTALLED.

BMP PICTURE

BMP # 14
SWAMP MAT LAYOUT (WITH TRANSITION)

BMP DETAIL

SCALE: NONE



NOTES:

1. ADD FILTER FABRIC AS NEEDED UNDER STONE TRANSITION RAMPS.
2. ALL MEASUREMENTS AND LOCATIONS ARE APPROXIMATE.

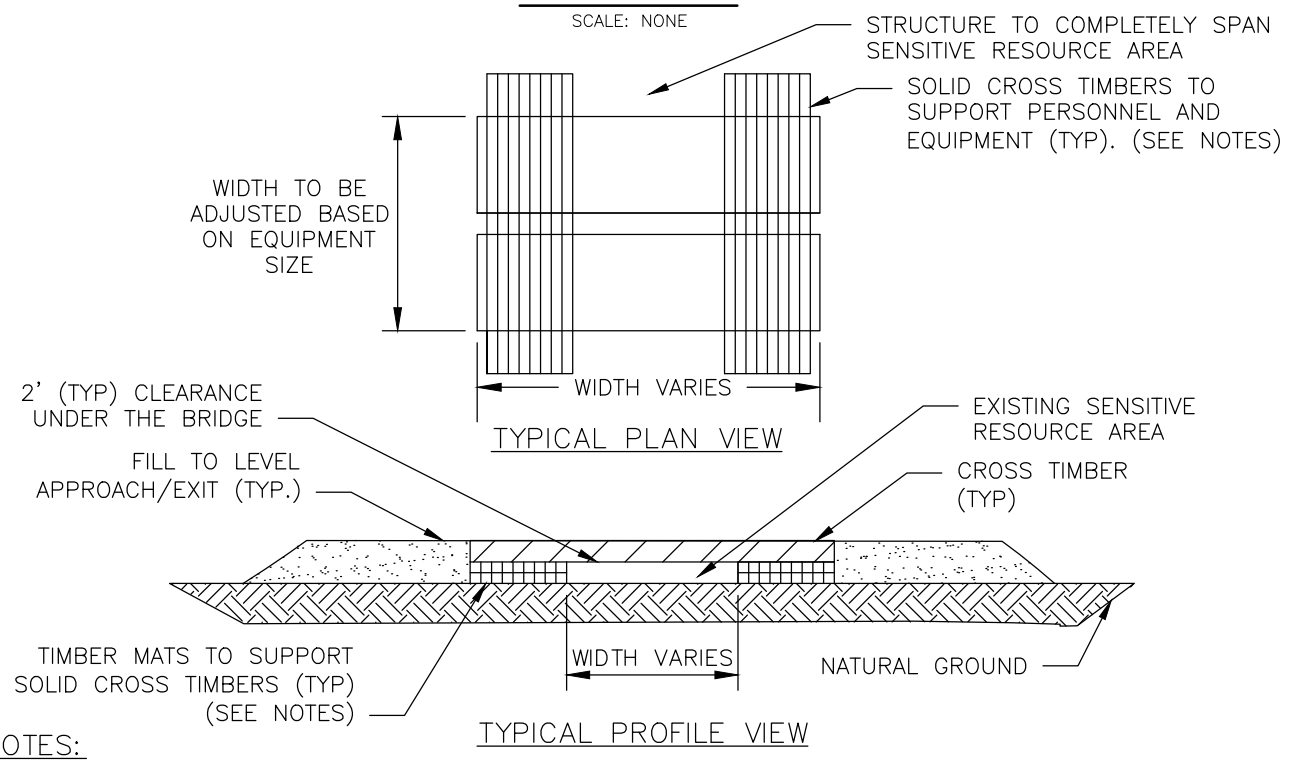
BMP PICTURE

BMP # 15
SWAMP MAT LAYOUT
(WITH TRANSITION AND BMPs)

File: Swamp_Mat_Transition and BMPs.dwg

BMP DETAIL

SCALE: NONE



NOTES:

1. THE DETAIL SHOWN IS CONCEPTUAL. TIMBER MATS AND CROSS TIMBERS SHALL BE SIZED AND SELECTED BASED ON SPAN WIDTH, CROSSING EQUIPMENT AND FIELD CONDITIONS.
2. THE NUMBER OF TIMBER MATS MAY VARY DEPENDING ON THE CLEARANCE HEIGHT.
3. EQUIPMENT AND PERSONNEL LOAD SHALL BE DISTRIBUTED ON ALL TIMBERS.
4. EACH EQUIPMENT OPERATOR AND USER OF THE FIELD BRIDGE SHALL BE FAMILIAR WITH THE DESIGN AND THE MAXIMUM EQUIPMENT AND PERSONNEL LOADS.
5. THIS DETAIL MAY NOT BE APPLICABLE IN ALL FIELD CONDITIONS.
6. INSTALL EROSION CONTROLS ADJACENT TO THE CULVERT ENDS TO PROTECT THE WATERWAY FROM ROADWAY DEBRIS.

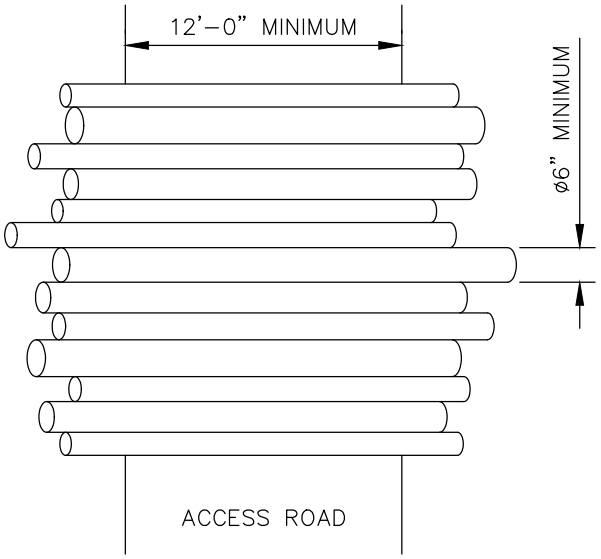
BMP PICTURE

BMP # 16
SWAMP MAT - AIR BRIDGE

File: Swamp_Mat_AIR BRIDGE.dwg

BMP DETAIL

SCALE: NONE

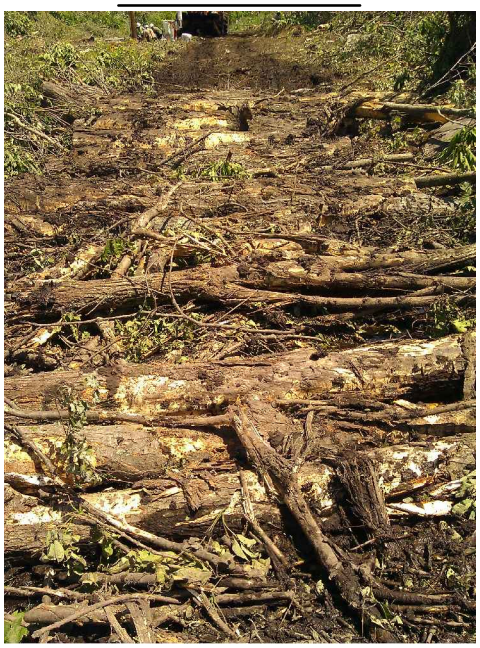


RANDOM LENGTH AND DIAMETER LOGS PLACED ACROSS AN ACCESS ROAD

NOTE:

1. A SIMILAR BRUSH MAT INSTALLATION CONSISTING OF SMALLER DIAMETER STEMS AND LOGS CAN BE USED.
2. CORDUROY ROADS SHALL ONLY BE USED IN EMERGENCIES OR AFTER APPROVAL FROM THE PROJECT ENVIRONMENTAL CONSULTANT OR NATIONAL GRID ENVIRONMENTAL SCIENTIST.

BMP PICTURE

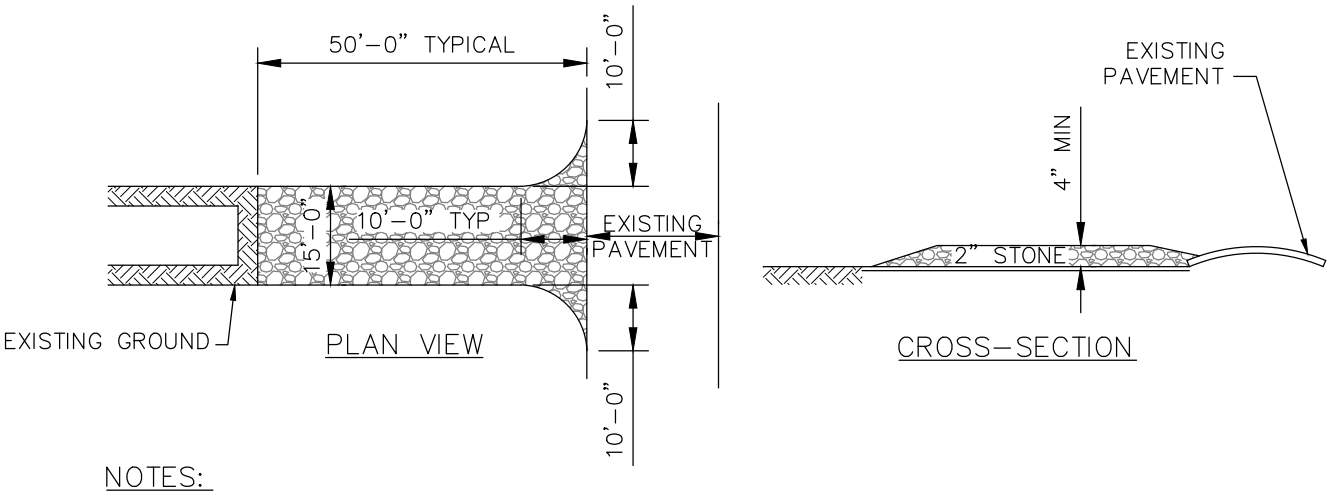


BMP # 17
CORDUROY ROAD

File: Corduroy_Road.dwg

BMP DETAIL

SCALE: NONE



NOTES:

1. STONE SIZE – USE 2" STONE (MINIMUM) TO 6" STONE (MAXIMUM)
2. LENGTH – GREATER THAN OR EQUAL TO 50 FEET
3. THICKNESS – 4"
4. WIDTH – FIFTEEN (15) FOOT TYP., BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM SHALL BE PERMITTED.
6. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
7. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED.
8. DEPENDING UPON SITE CONDITIONS, THIS ENTRANCE MAY OR MAY NOT BE PERMANENT.

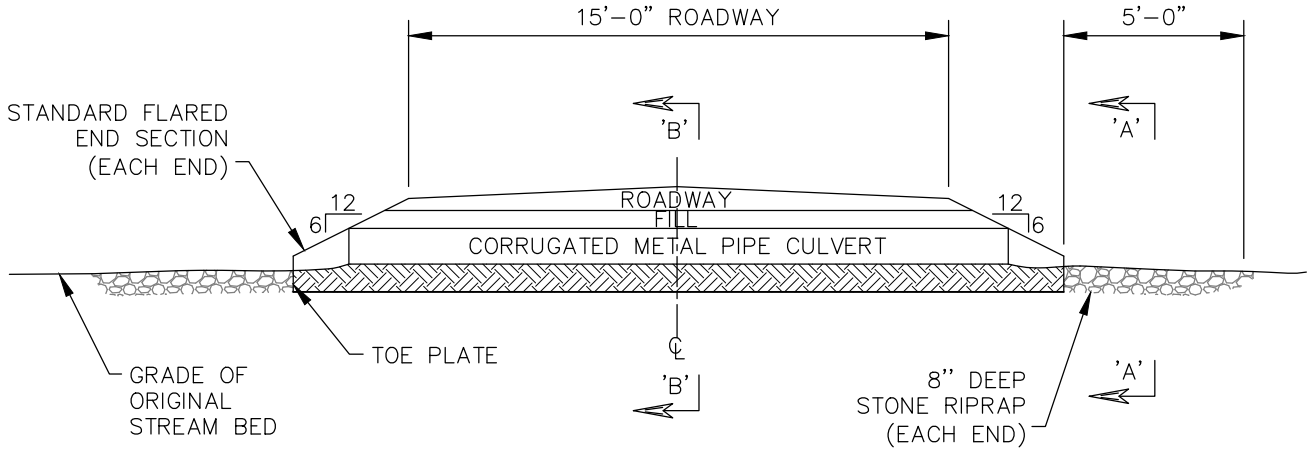
BMP PICTURE

BMP # 18
TEMPORARY CONSTRUCTION ENTRANCE/ EXIT

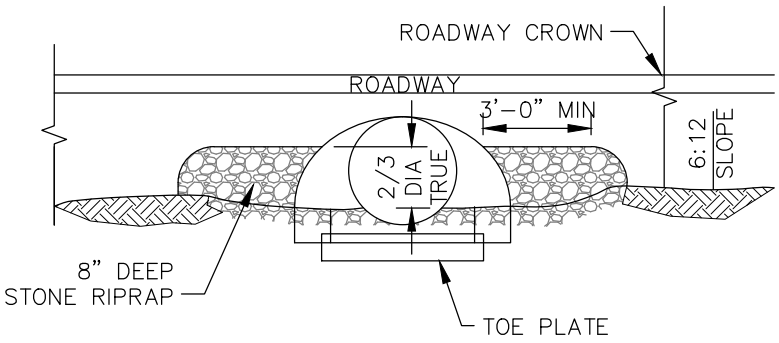
File: Temp_Construction_Ent.dwg

BMP DETAIL

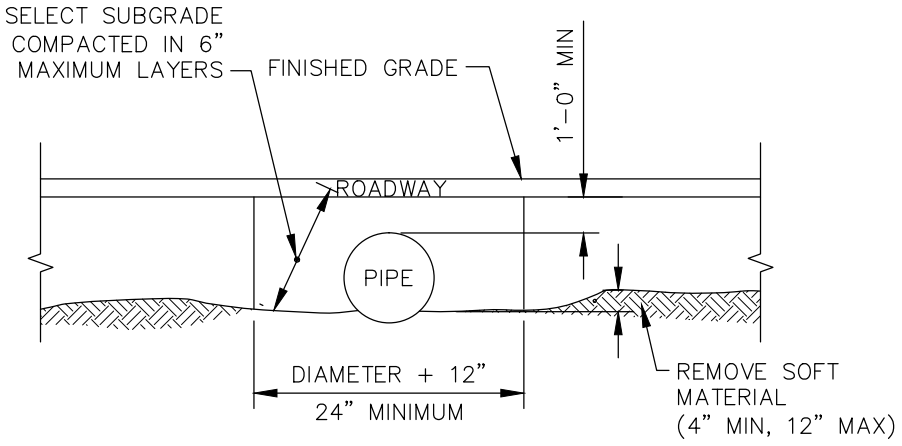
SCALE: NONE



CROSS SECTION



SECTION 'A–A'
(SAME BOTH ENDS)



SECTION 'B–B'

BMP # 19
TEMPORARY CONSTRUCTION CULVERT (1 OF 2)

BMP DETAIL

SCALE: NONE

NOTES:

1. CULVERT DESIGN AND LAYOUT SHALL BE COORDINATED WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST (NGES).
2. CROWN ROADWAY 1/2 INCH PER FOOT.
3. LAY THE CULVERT STRAIGHT AND AS NEARLY AS POSSIBLE ALONG THE EXISTING STREAM BED AND WITH THE INVERTS AT OR SLIGHTLY BELOW BED ELEVATION.
4. CORRUGATED METAL PIPE IS TO BE GALVANIZED STEEL, OR ALUMINIZED STEEL (TYPE 2), WITH BOLTED CONNECTORS.
5. DIAMETERS SHALL BE AS PER THE PROJECT DRAWINGS AND THE SPECIFICATION. THE PIPE GAGE SHALL BE AS FOLLOWS:

DIAMETER (INCHES)	GAGE
12" – 15"	.004"
18" – 24"	.079"
30" – 36"	.109"

6. INSTALLATION OF CULVERTS LARGER THAN 36 INCH DIAMETER SHALL REQUIRE SPECIAL ENGINEERING DESIGN.
7. SELECT SUBGRADE SHALL BE A GRANULAR MATERIAL AS DESCRIBED IN NYSDOT SPECIFICATION ITEM 203–2.02C, OR AS APPROVED BY A NGES.
8. STONE RIPRAP SHALL BE AS DESCRIBED IN NYSDOT SPECIFICATION ITEM 203–2.02D, WITH 8 INCH MAXIMUM SIZE, OR AS APPROVED BY A NGES. EXCEPT WHERE PROTECTED BY STONE, ALL EMBANKMENT SLOPES ARE TO BE STABILIZED, MULCHED AND SEEDED AS PER PROJECT SPECIFICATIONS.
9. OUTLET SHOULD BE CONFIGURED NOT TO CREATE HYDRAULIC JUMP OR PLUNGE POOL.
10. INSTALL EROSION CONTROLS ADJACENT TO THE CULVERT ENDS TO PROTECT THE WATERWAY FROM ROADWAY DEBRIS.

BMP PICTURE

BMP # 19
TEMPORARY CONSTRUCTION CULVERT (2 OF 2)

File: Temp_Constr_Culvert.dwg

BMP PICTURE

NOTE:

1. PICTURE SHOWS VIEW OF ACCESS WAY STABILIZATION ADJACENT TO A WETLAND.
2. COORDINATE STABILIZATION DESIGN AND PRODUCT WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST.

BMP # 20
ACCESS WAY STABILIZATION

File: Access_Stabilization.dwg

BMP PICTURE


NO ACCESS – WETLAND/STREAM CROSSING MATS REQUIRED

NO ACCESS – A.) PROJECT LIMITS E.G. ROW LIMITS
B.) HISTORICAL/CULTURAL
C.) ENVIRONMENTALLY SENSITIVE E.G. THREATENED & ENDANGERED
D.) OTHER

APPROVED ACCESS

BMP DETAIL

SCALE: NONE

WIRE BACKED SILT FENCE

MUTUAL INDUSTRIES WIRE BACKED SILT FENCE
PART # 1776-14-24
36" X 100'
36" MISF 1776 FABRIC
24" 14GA WIRE MESH
OPENING OF MESH 2" X 4"
FABRIC HOG RINGED EVERY 12"-18" ALONG THE TOP OF THE FENCE

ROLL WEIGHT 40 LBS

32 ROLLS PER PALLET

NOTES:

1. PRODUCT TO BE MUTUAL INDUSTRIES' WIRE BACKED SILT FENCE OR APPROVED EQUAL BY NATIONAL ENVIRONMENTAL SCIENTIST.
2. COORDINATE INSTALLATION METHOD AND LOCATION WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST.

* PICTURE AND DETAIL PROVIDED BY MUTUAL INDUSTRIES
APPROVED BY: VICE PRESIDENT, ENVIRONMENTAL SERVICES
PRINTED COPIES ARE NOT DOCUMENT CONTROLLED. FOR LATEST AUTHORIZED VERSION PLEASE REFER TO THE NATIONAL GRID ENVIRONMENTAL INFONET SITE.

BMP # 22
REINFORCED SILT FENCE *

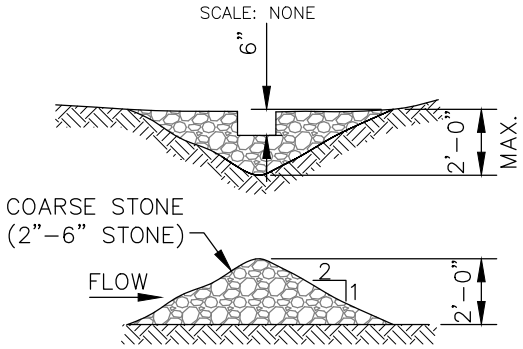
File: Reinforced_Silt_Fence.dwg

BMP PICTURE

NOTE:

1. PICTURE SHOWS SEDIMENT FILTER WITHIN A WETLAND.

BMP DETAIL



STONE CHECK DAM

NOTES:

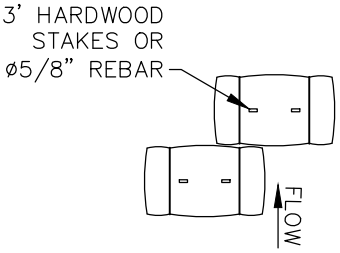
1. USE CHECK DAMS TO SLOW WATER FLOWS AND AS SMALL SEDIMENT TRAPS IN DITCHES ALONG ACCESS ROADS.
2. CLEAN SEDIMENT AND REPLACE DAMS AS NECESSARY.
3. THE CENTER OF THE CHECK DAM MUST BE AT LEAST 6" LOWER THAN THE OUTER EDGES.
4. COORDINATE SPACING WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST.
5. MAX. SPACING: TOE OF THE UPSTREAM DAM IS SAME ELEVATION AS TOP OF DOWNSTREAM DAM.
6. STONE SHALL BE FREE OF FINE PARTICLES TO PREVENT TURBID DISCHARGES.

BMP PICTURE

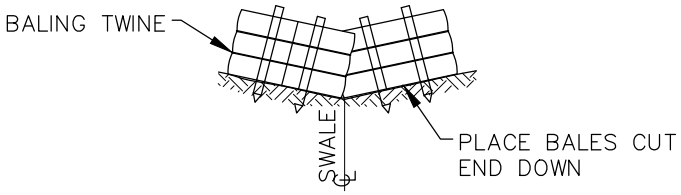
NOTE: A SMALLER STONE SIZE IS SHOWN IN THIS PICTURE.

BMP DETAIL

SCALE: NONE



PLAN VIEW



SECTION VIEW

NOTES:

1. USE CHECK DAMS TO SLOW WATER FLOWS AND AS SMALL SEDIMENT TRAPS IN DITCHES ALONG ACCESS ROADS.
2. CLEAN SEDIMENT AND REPLACE DAMS AS NECESSARY.
3. COORDINATE SPACING WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST.

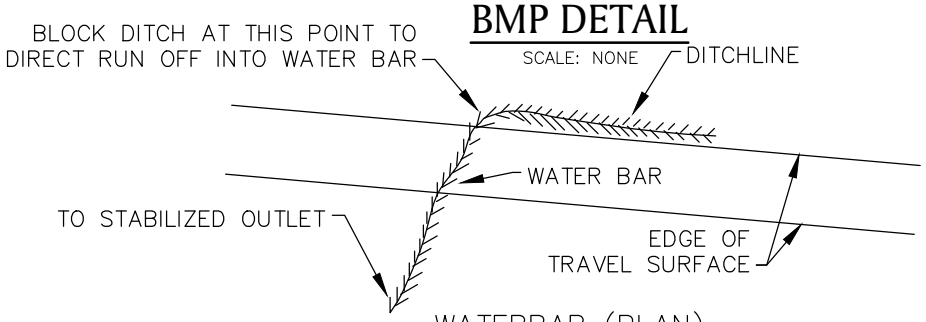
BMP PICTURE

BMP # 25
STRAW / HAYBALE CHECK DAM

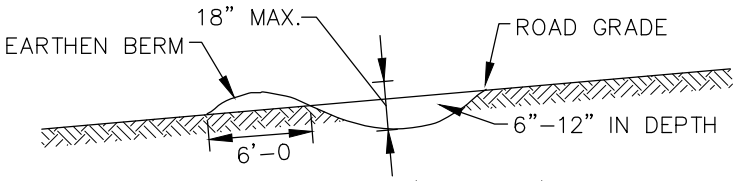
File: Straw_Check_Dam.dwg

BMP DETAIL

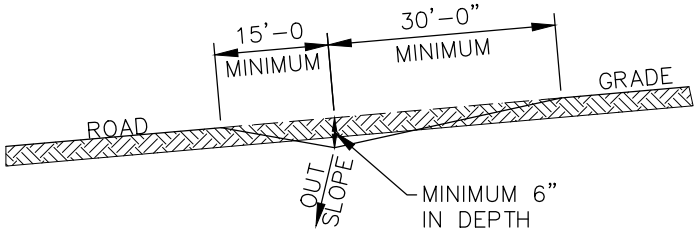
SCALE: NONE



WATERBAR (PLAN)



WATERBAR (SECTION)



DISCHARGE (SECTION)

NOTE:

1. LINE WITH 2"–6" STONE UNDERLAIN BY GEOTEXTILE FILTER FABRIC, KEYED INTO ROAD SURFACE AT LEAST 10 FEET EACH SIDE OF WATERBAR.
2. COORDINATE SPACING WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST.

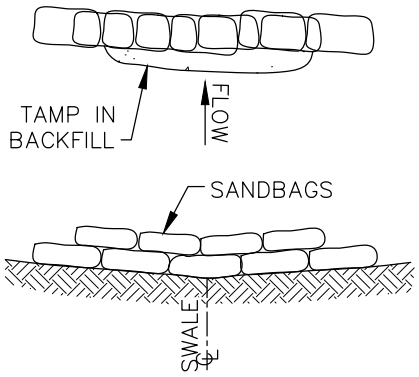
BMP PICTURE

BMP # 26
WATERBAR

File: Waterbar.dwg

BMP DETAIL

SCALE: NONE



SANDBAG
CHECK DAM

NOTES:

1. USE CHECK DAMS TO SLOW WATER FLOWS AND AS SMALL SEDIMENT TRAPS IN DITCHES ALONG ACCESS ROADS.
2. CLEAN SEDIMENT AND REPLACE DAMS AS NECESSARY.
3. COORDINATE SPACING WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST.

BMP PICTURE

NOTE:

1. PICTURE DOES NOT DEPICT "TAMP IN BACKFILL"

BMP # 27
SANDBAG CHECK DAM

File: Sand_Bag_Check.dwg

BMP PICTURE

NOTE:

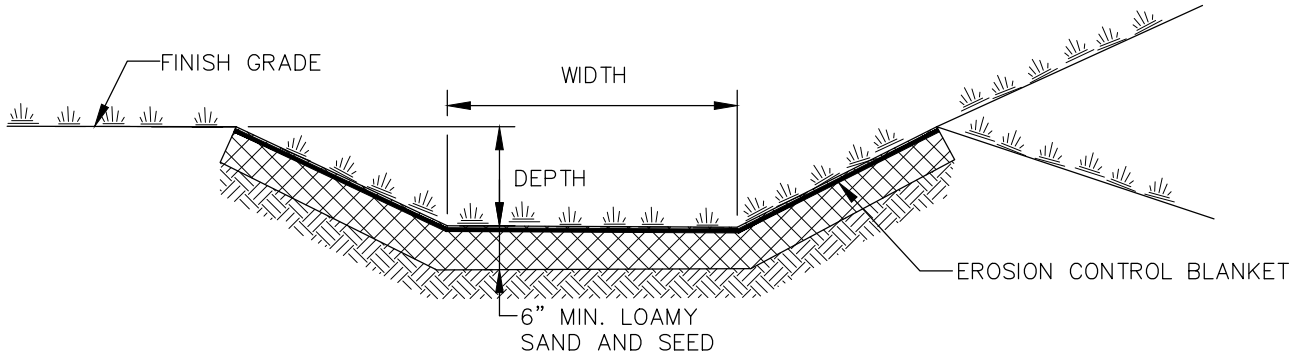
1. EXACT SIZE, LOCATION AND DESIGN IS DEPENDANT ON SITE CONDITIONS, AND LOCAL AND STATE REGULATIONS. COORDINATE THIS BMP WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST PRIOR TO CONSTRUCTION.

BMP # 28
EARTH DIKE

File: Earth_Dike.dwg

BMP DETAIL

SCALE: NONE



NOTES:

1. WIDTH AND DEPTH OF SWALE, AND EROSION CONTROL BLANKET TYPE TO BE COORDINATED WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST.
2. REFER TO BMP # 10 FOR SEED MIXTURE OPTIONS.

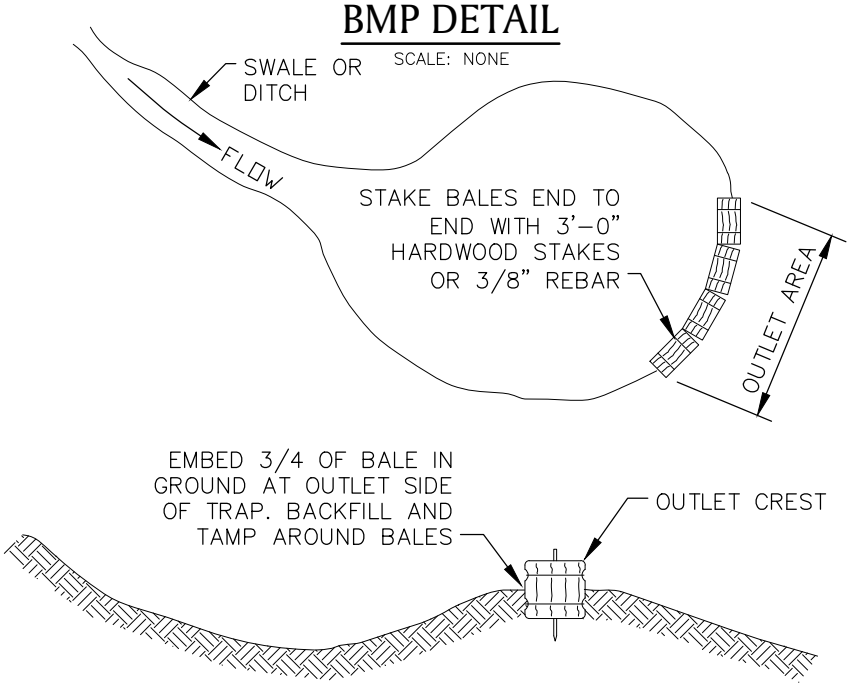
BMP PICTURE

BMP # 29
DRAINAGE SWALE AND
LINED DITCH

File: Lined_Drainage_Swale.dwg

BMP DETAIL

SCALE: NONE



TYPICAL PROFILE

NOTES

1. SIZE, SHAPE AND PROFILE OF SEDIMENT WILL VARY ACCORDING TO ANTICIPATED FLOW VOLUME AND SURROUNDING TERRAIN AND SHALL BE COORDIANTED WITH THE NATIONAL GRID ENVIRONMENTAL SCIENTIST.
2. THE BASIN SHALL BE CUT BELOW THE GROUNDLINE. FILL SHALL NOT BE USED TO HOLD WATER UNLESS ROLLED AND COMPACTED.
3. OUTLET AREA IS TO REMAIN FREE OF EXCAVATION SPOILS.
4. OUTLET CREST ELEVATION SHALL BE LOWER THAN INLET ELEVATION AND AT LEAST 1'–0" BELOW THE TOP OF THE BASIN.ARMOUR SLOPES >8% IN OUTLET AREA WITH STONE OF APPROPRIATE SIZE TO PREVENT SCOUR.
5. ARMOUR SLOPES >8% IN OUTLET AREA WITH STONE OF APPROPRIATE SIZE TO PREVENT SCOUR.

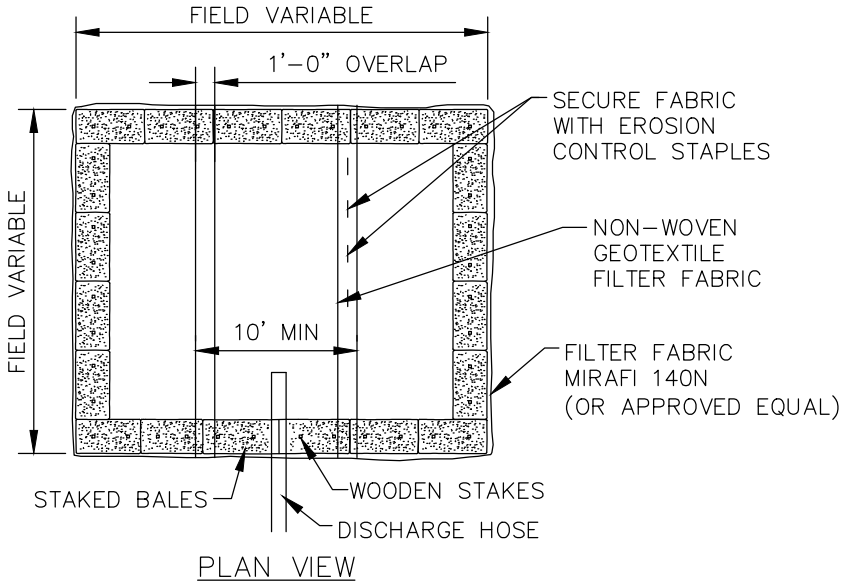
BMP PICTURE

BMP # 30
SEDIMENTATION BASIN

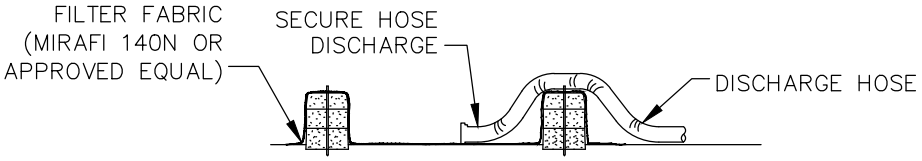
File: Sedimentation_Basin.dwg

BMP DETAIL

SCALE: NONE



PLAN VIEW



CROSS–SECTION

NOTES:

1. NUMBER OF BALES MAY VARY DEPENDING ON SITE CONDITIONS,
2. THE BASIN TO BE SIZED TO PREVENT DISCHARGE WATER FROM OVERTOPPING BASIN.
3. KEEP AS FAR FROM WETLANDS AS PRACTICAL.
4. CLEAN AND REMOVE AS SOON AS DEWATERING IS COMPLETE.

BMP PICTURE

BMP # 31
DEWATERING BASIN (SMALL SCALE)

File: Dewat_Bas_Small.dwg

BMP PICTURE

NOTE:

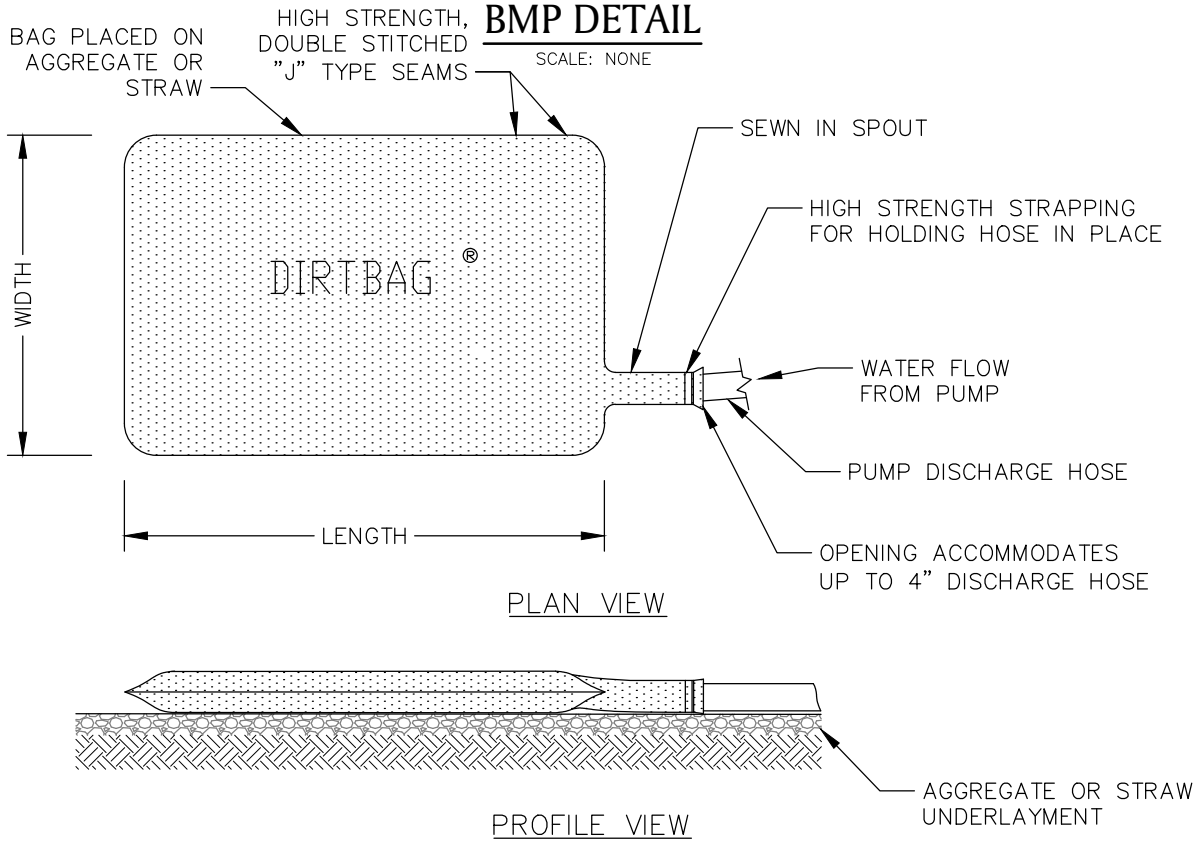
1. EXACT SIZE, LOCATION AND DESIGN IS DEPENDANT ON SITE CONDITIONS, AND LOCAL AND STATE REGULATIONS. COORDINATE THIS BMP WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST PRIOR TO CONSTRUCTION.

BMP # 32
DEWATERING BASIN -
LARGE SCALE

File: Dewat_Bas_Large.dwg

BMP DETAIL

SCALE: NONE



BMP PICTURE

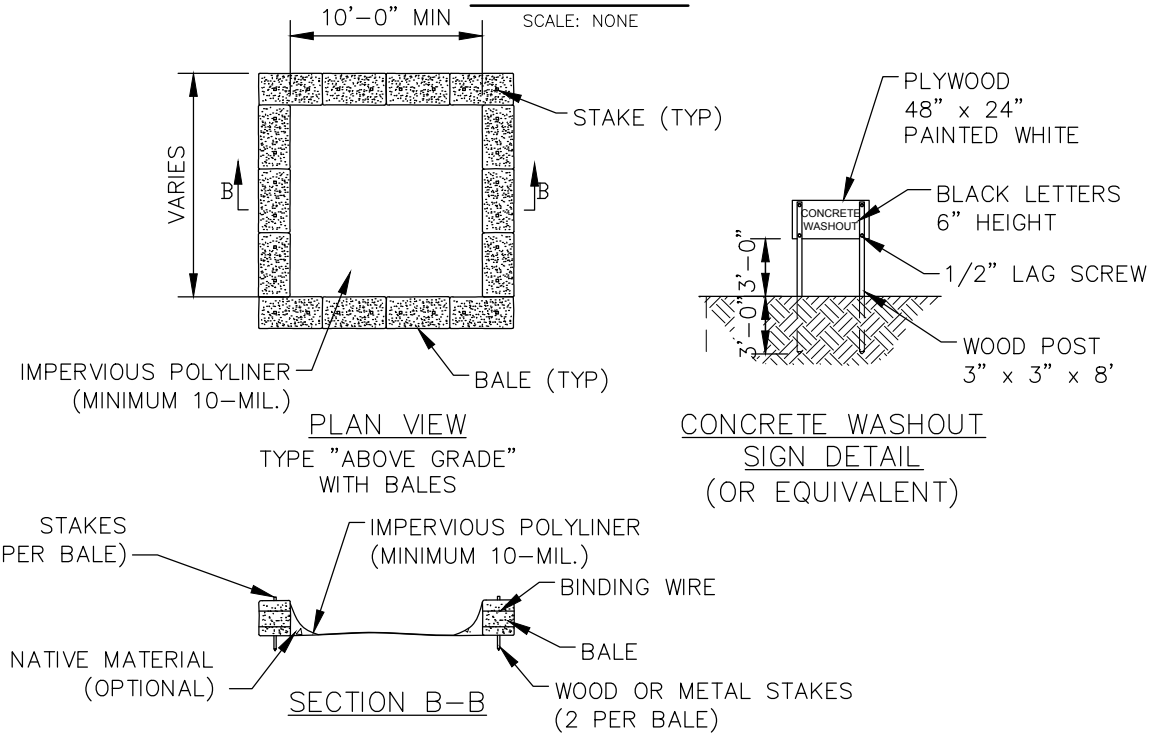
* PICTURE AND DETAIL PROVIDED BY ACF ENVIRONMENTAL

APPROVED BY: VICE PRESIDENT, ENVIRONMENTAL SERVICES

BMP # 33
DIRTBAG *

File: Dirtbag.dwg

BMP DETAIL



NOTES:

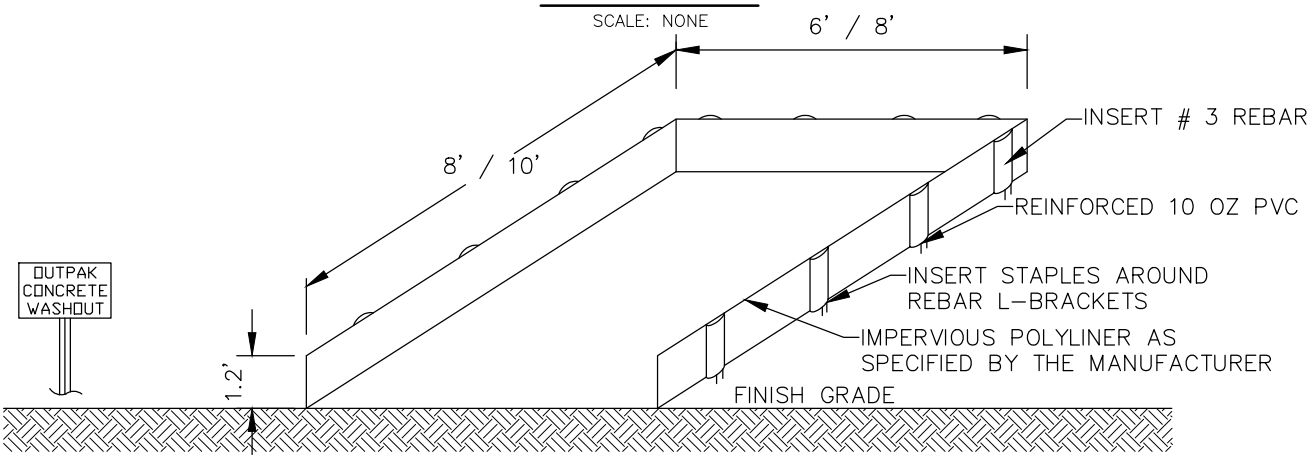
1. NUMBER OF BALES MAY VARY DEPENDING ON SITE CONDITIONS. COORDINATE SIZE AND LOCATION OF CONCRETE WASTE SUMP WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST.
2. KEEP AS FAR FROM DRAINAGE CHANNELS AND WETLAND AREAS AS PRACTICAL.
3. SUMPS TO BE CLEANED AND WASTE CONCRETE REMOVED AND PROPERLY DISPOSED OF UPON COMPLETION OF WORK.
4. SEE ADDITIONAL NOTES ON BMP #35.

BMP PICTURE

BMP # 34
CONCRETE WASTE SUMP

File: Conc_Waste_Sump.dwg

BMP DETAIL



CROSS SECTION

NOTES:

1. PRODUCT TO BE OUTPAK PVC CONCRETE WASHOUT OR APPROVED EQUAL BY NATIONAL GRID ENVIRONMENTAL SCIENTIST.
2. THE CONCRETE WASHOUT AREA SHALL BE INSTALLED PRIOR TO ANY CONCRETE PLACEMENT.
3. SIGNS SHALL BE PLACED AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CONCRETE WASHOUT.
4. THE CONCRETE WASHOUT AREA WILL BE REPLACED AS NECESSARY TO MAINTAIN CAPACITY FOR WASTE CONCRETE AND OTHER LIQUID WASTE.
5. WASHOUT RESIDUE SHALL BE REMOVED FROM THE SITE AND DISPENSED OF AT AN APPROVED WASTE SITE.
6. DO NOT MIX EXCESS AMOUNTS OF FRESH CONCRETE OR CEMENT ON-SITE.
7. DO NOT WASH OUT CONCRETE TRUCKS INTO STORM DRAINS, OPEN DITCHES, STREETS, OR STREAMS.
8. AVOID DUMPING EXCESS CONCRETE IN NON-DESIGNATED DUMPING AREAS.
9. LOCATE WASHOUT AREA AT LEAST 50' FROM STORM DRAIN, OPEN DITCHES, OR WATERBODIES. COORDINATE LOCATION WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST.
10. WASH OUT WASTES INTO THE OUTPAK WASHOUT WHERE THE CONCRETE CAN SET, BE BROKEN UP, AND THEN DISPOSED OF PROPERLY.
11. A SECURE, NON-COLLAPSING, NON-WATER COLLECTING COVER MUST BE PLACED OVER CONCRETE WASHOUT PRIOR TO PREDICTED WET WEATHER TO PREVENT ACCUMULATION AND OVERFLOW OF PRECIPITATION.

BMP PICTURE

* PICTURE AND DETAIL PROVIDED BY OUTPAK WASHOUT

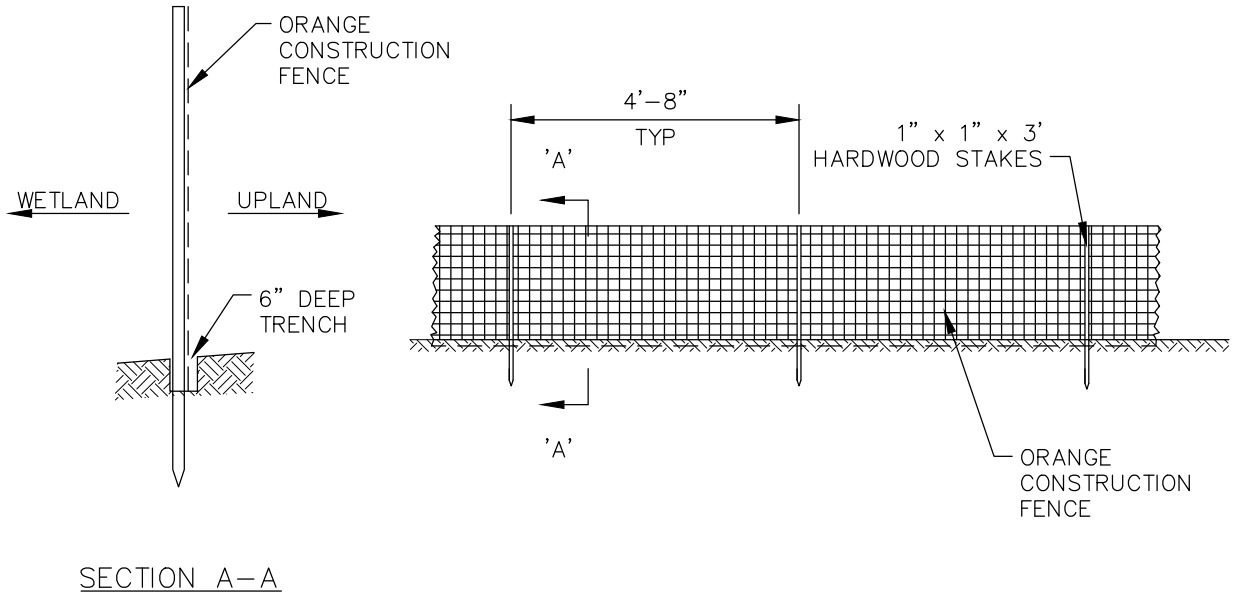
APPROVED BY: VICE PRESIDENT, ENVIRONMENTAL SERVICES

BMP # 35
OUTPAK CONCRETE WASHOUT *

File: Outpak_Washout.dwg

BMP DETAIL

SCALE: NONE



SECTION A-A

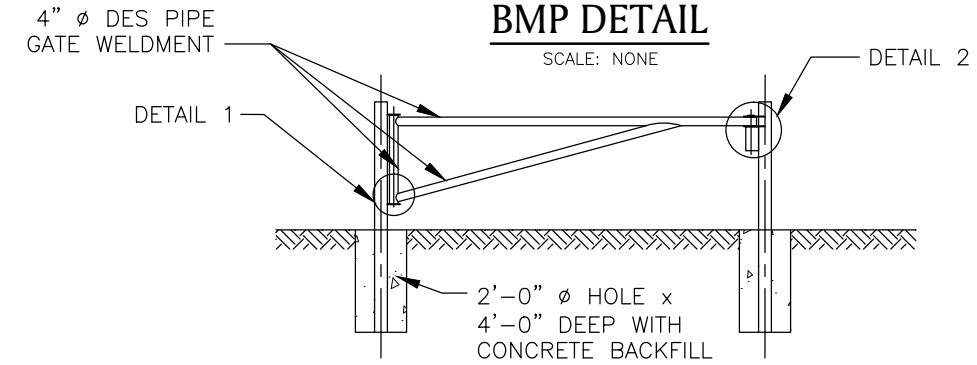
BMP PICTURE

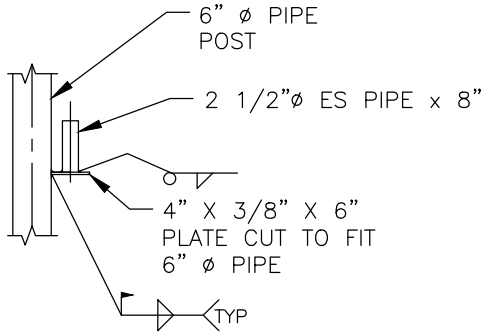
BMP # 36
BARRIER FENCE
(CONSTRUCTION FENCE)

File: Barrier_Fence.dwg

BMP DETAIL

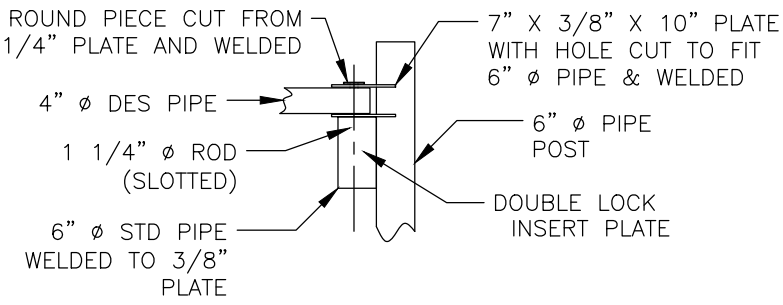
SCALE: NONE





DETAIL 1

SIMILAR DETAIL AT TOP



DETAIL 2

NOTES:

1. ALL GATE STEEL PIPES SHALL BE IN ACCORDANCE WITH ASTM A-501, PLATES SHALL BE ASTM A-36.
2. ALL STEEL PIPES SHALL BE PRIMED WITH ZINC-CHROMATE PRIMER AND FINISHED WITH AN APPROVED OSHA "SAFETY YELLOW" TOP COAT COMPATIBLE WITH THE PRIMER AND FOR EXTERIOR EXPOSURE.
3. REFLECTORS SHALL BE SPACED AT 3 FEET ALONG THE LENGTH OF THE CROSSBAR AND BRACE
4. BACKFILL AT POSTS TO BE COMPACTED.

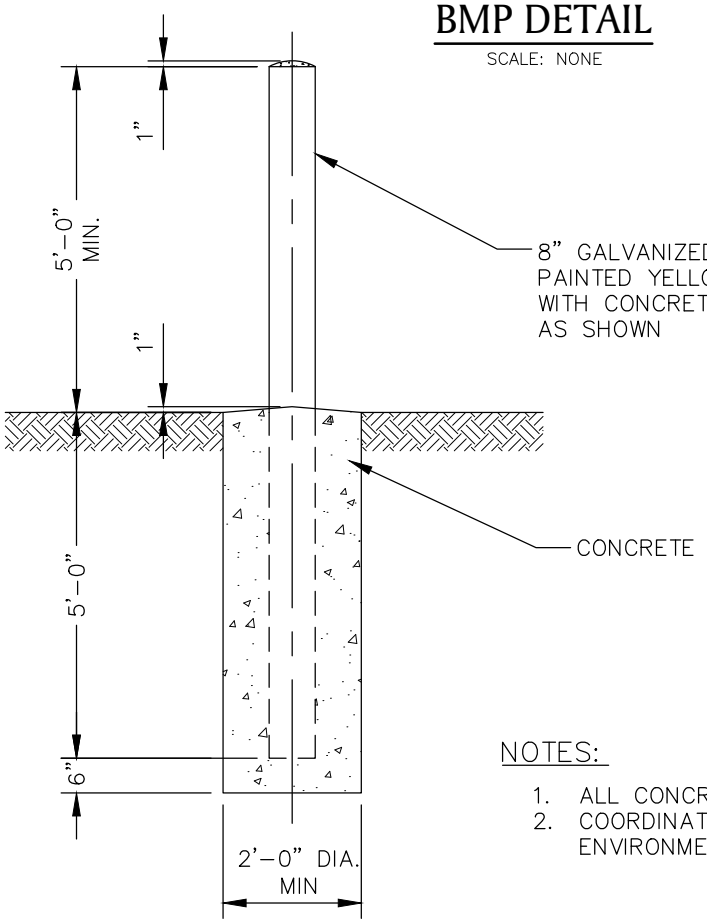
BMP PICTURE

BMP # 37
ROW GATE / FENCE

File: ROW_Gates.dwg

BMP DETAIL

SCALE: NONE



NOTES:

1. ALL CONCRETE TO BE 2500 P.S.I. MINIMUM.
2. COORDINATE LOCATIONS WITH NATIONAL GRID ENVIRONMENTAL SCIENTIST.

BMP PICTURE

BMP

Definition

The control of dust resulting from land-disturbing activities.

Purpose

To prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety problems.

Conditions Where Practice Applies

On construction roads, access points, and other disturbed areas subject to surface dust movement and dust blowing where off-site damage may occur if dust is not controlled.

Design Criteria

Construction operations should be scheduled to minimize the amount of area disturbed at one time. Buffer areas of vegetation should be left where practical. Temporary or permanent stabilization measures shall be installed. No specific design criteria is given; see construction specifications below for common methods of dust control.

Water quality must be considered when materials are selected for dust control. Where there is a potential for the material to wash off to a stream, ingredient information must be provided to the local permitting authority.

Construction Specifications

A. Non-driving Areas – These areas use products and materials applied or placed on soil surfaces to prevent airborne migration of soil particles.

Vegetative Cover – For disturbed areas not subject to traffic, vegetation provides the most practical method of dust control (see Section 3).

Mulch (including gravel mulch) – Mulch offers a fast effective means of controlling dust. This can also include rolled erosion control blankets.

Spray adhesives – These are products generally composed of polymers in a liquid or solid form that are mixed with water to form an emulsion that is sprayed on the soil surface with typical hydroseeding equipment. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations for the specific soils on the site. In no case should the application of these adhesives be made on wet soils or if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators and others working with the material.

B. Driving Areas – These areas utilize water, polymer emulsions, and barriers to prevent dust movement from the traffic surface into the air.

Sprinkling – The site may be sprayed with water until the surface is wet. This is especially effective on haul roads and access routes.

Polymer Additives – These polymers are mixed with water and applied to the driving surface by a water truck with a gravity feed drip bar, spray bar or automated distributor truck. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations. Incorporation of the emulsion into the soil will be done to the appropriate depth based on expected traffic. Compaction after incorporation will be by vibratory roller to a minimum of 95%. The prepared surface shall be moist and no application of the polymer will be made if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators working with the material.

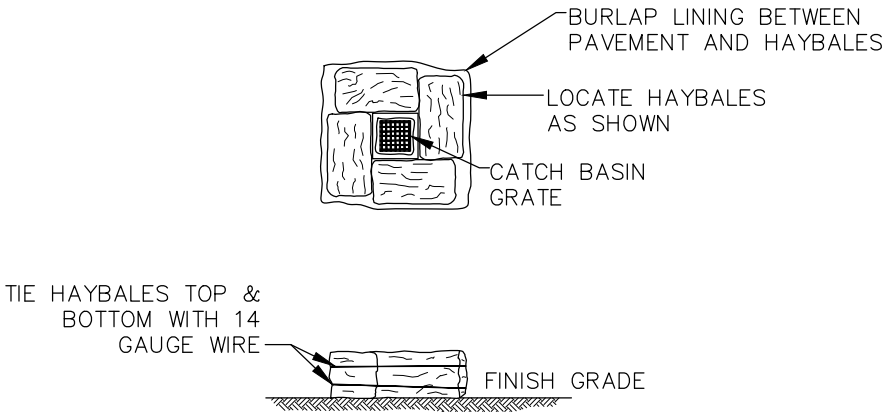
Barriers – Woven geotextiles can be placed on the driving surface to effectively reduce dust throw and particle migration on haul roads. Stone can also be used for construction roads for effective dust control.

Windbreak – A silt fence or similar barrier can control air currents at intervals equal to ten times the barrier height. Preserve existing wind barrier vegetation as much as practical.

* BMP INFORMATION FROM "NEW YORK STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL (AUGUST, 2005)." INFORMATION OBTAINED VIA WEBSITE: http://www.dec.ny.gov/chemical/29066.html

BMP DETAIL

SCALE: NONE



NOTES:

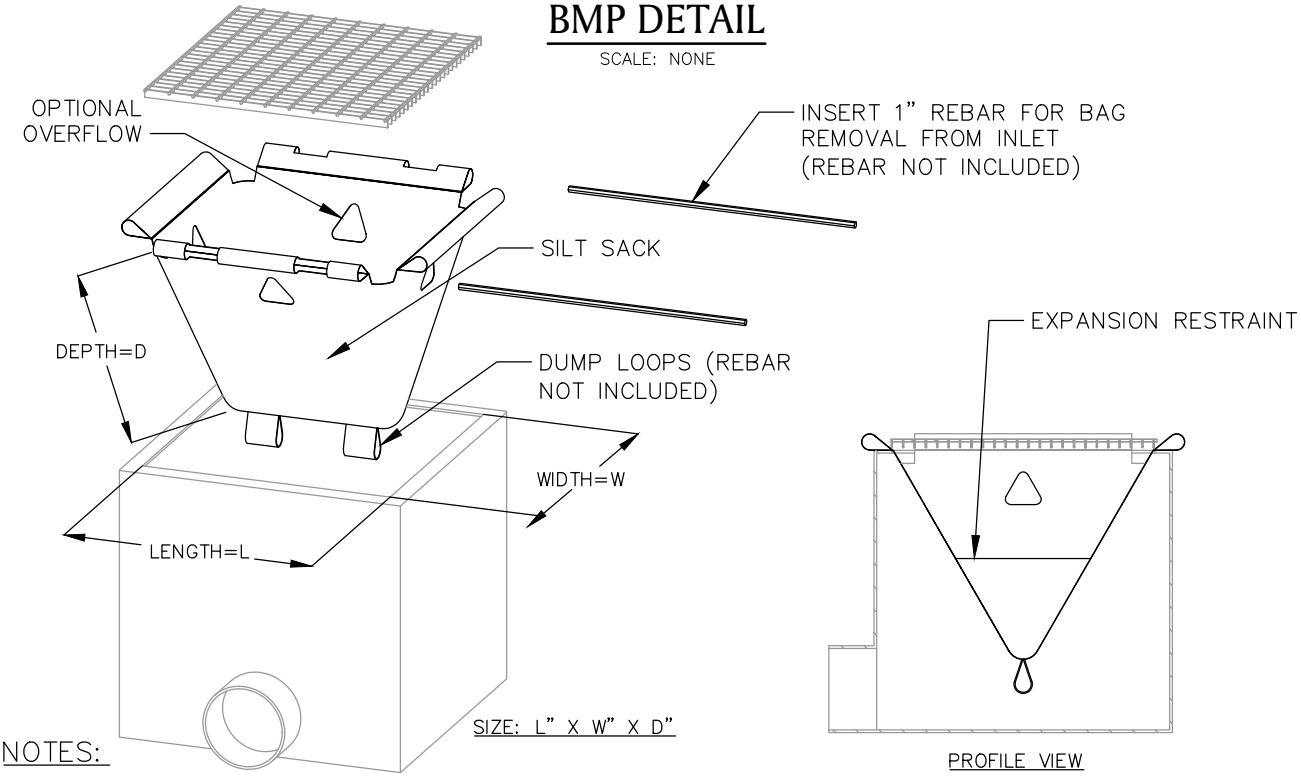
1. SURROUND STREET DRAINAGE STRUCTURE INLET WITH HAY BALES PRIOR TO CONSTRUCTION AND MAINTAIN UNTIL CONSTRUCTION IS COMPLETED. ACCUMULATED SEDIMENTS SHALL BE REMOVED.
2. HAYBALES PLACED ON PAVEMENT SHALL HAVE BURLAP PLACED BETWEEN PAVEMENT AND HAYBALE

BMP PICTURE

BMP # 40
CATCH BASIN INLET PROTECTION

BMP DETAIL

SCALE: NONE



NOTES:

1. PRODUCT TO BE SILT SACK OR APPROVED EQUAL BY NATIONAL GRID ENVIRONMENTAL SCIENTIST.
2. THE USE OF A SILT SACK OPTIONAL OVERFLOW AND OVERALL DIMENSIONS ARE TO BE COORDINATED WITH A NATIONAL GRID ENVIRONMENTAL SCIENTIST.

BMP PICTURE

* DETAIL PROVIDED BY ACF ENVIRONMENTAL

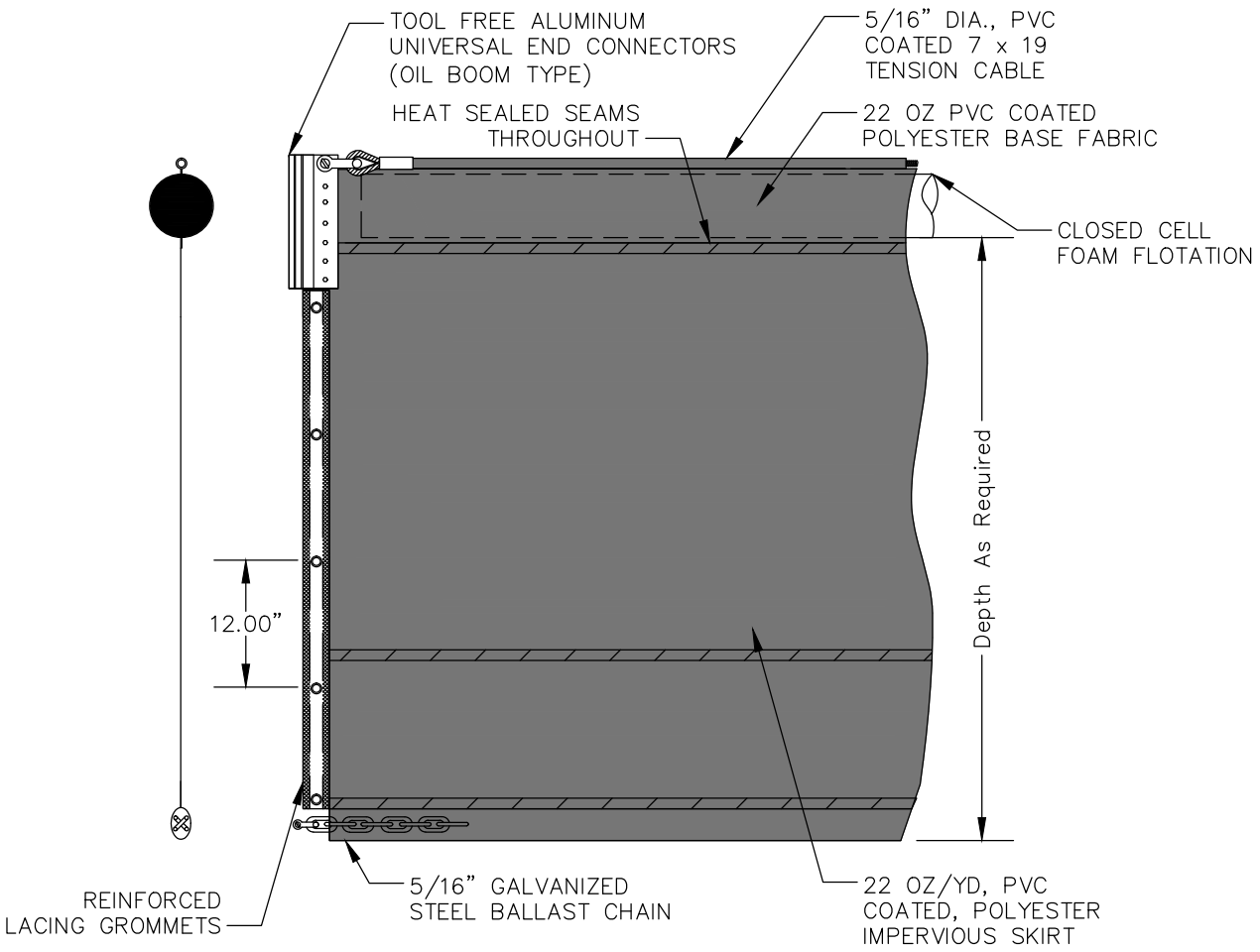
APPROVED BY: VICE PRESIDENT, ENVIRONMENTAL SERVICES

BMP # 41
SILT SACK *

File: SILT SACK.dwg

BMP DETAIL

SCALE: NONE



BMP PICTURE

* DETAIL PROVIDED BY BROCKTON EQUIPMENT / SPILLDAM INC.
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BMP # 42
TURBIDITY CURTAIN *

File: Turbidity_Curtain.dwg

APPENDIX 8
CERTIFICATION FORM FOR INVASIVE SPECIES CONTROL

Certain permit conditions, therefore a Condition of Contracts for the Prime Contractor, any Subcontractors, and any equipment or mat vendors for ***National Grid Projects*** shall be required to Certify their equipment[9] {each piece of equipment used on site} as 'clean'[10].

_____ (*name of firm*) hereby Certifies that

_____ (*make, model, and/or type*)

_____ (*equipment ID tag or #)* meets the following

1. before entry on to the job site, has been sufficiently cleaned to remove all accumulated mud, debris, plant fragments, and detritus that could harbor seeds, roots, or plant fragments of so-called invasive plant species; and

2. that the above piece of equipment has neither been off-loaded nor operated in the interval between cleaning and delivery to the jobsite.

3. that equipment deployed in areas of invasive species (as identified in project plans) shall be cleaned prior to redeployment

_____ (*signed*) _____ (*dated*)

_____ (*printed name*) _____ (*title*)

_____ (*Firm*)

The signed original of this form {one for each piece of equipment (or lot[11] of mats)} is to be given to the NG Field Construction Coordinator assigned to the project.

[9] Equipment may include, but is not limited to bulldozers, excavators, backhoes, bucket trucks (tracked or wheeled), pulling equipment, concrete trucks, compressors, drilling equipment, and mats (composite, wood, or other materials).

[10] With regard to invasive species, the definition of clean means free of accumulated mud, debris, plant fragments, and detritus that could harbor seeds, roots, or plant fragments of so-called invasive plant species.

[11] Lot of mats is the number of mats that may be transported by one forwarder/truck at a time.

Record of Change		
Date of Review/Revision:		
Revision	**Date**	**Description**
0	1/23/12	Issued New England Specific EG-303 NE
1	04/22/13	Stone wall dismantling edits.
2	1/23/14	added bmp # 39, edited text on p40 to reference form1 and form2
3	08/29/14	Added section on communication of project specific environmental requirements (2.5), added appendices for EFI, simplified EFI, and STORMS boilerplate language. Added language concerning removal of BMPs (18.1). Minor edits to BMP details, and renumbered appendices. Added swamp mat transition, mat air bridge and silt sack BMP details.
4	2/5/15	Adding additional language about signage and demarcation of rare species populations and historic resources.

Attachment D:
Construction Access Plan

Construction Access Plan

Merrimack Valley Reliability Project

PREPARED FOR

Eversource and National Grid

PREPARED BY

2 Bedford Farms Drive
Suite 200
Bedford, New Hampshire
603.391.3900

May 8, 2015

Introduction

VHB has prepared the following report to summarize the results of preliminary analysis of potential water quality impacts related to the construction of the Proposed Transmission Line related to the Merrimack Valley Reliablity Project. This analysis focuses on the portions of the project within the State of New Hampshire, for both the National Grid transmission lines, through Pelham, Windham, and Hudson, as well at the Eversource transmission line, through Hudson and Londonderry. A key plan has been attached for reference.

Methodology

For the purposes of this analysis, VHB prepared a set of plans that consists of data compiled from multiple sources to show the location of the proposed and existing transmission lines, including primary access and construction work pads, in relation to water resource areas including wetlands and streams. In addition, existing contour information was included in the plan to develop a general understanding of the existing drainage patterns and access road slopes. Below is a list of sources utilized for the analysis.

- **NHGRANIT:** Imagery, contours, town boundaries, USGS Streams, USGS topo
- **National Grid:** ROW Boundary, NEP property boundaries
- **Eversource:** ROW Boundary
- **Black & Veatch:** Transmission Lines, Structure Locations, Guy Locations
- **Beals & Thomas:** Transmission Lines, Structure Locations, Guy Locations
- **Normandeau:** Wetlands, Vernal Pools
- **VHB:** Field ID'd Vernal Pool, Work pads, pull sites, guard protection areas, stone aprons, delineated streams and wetlands, access, culverts

Once the base plan was developed, VHB analyzed the full length of the project to determine areas of potential water quality concern due to the proximity of proposed work to water resource areas. These designated areas may require additional erosion control measures in addition to implementation of the standard BMP's referenced in "Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire". Based on the preliminary analysis, it appears the most common concern is in areas where either a long straight section of road, or an excessively steep section of road, or both, leads directly to a water resource area. The concern is related to the velocities and erosion associated with the slopes. These areas have identified on the attached key plan and described in additional detail below.

Assumptions

For the purposes of this evaluation, VHB has assumed the following general roadway design parameters are to be utilized for the improvements to the existing access road.

- Proposed roadway profiles to match existing grades to the maximum extent possible.
- Gravel will be utilized in areas of unsuitable materials as determined in field.
- Cut/fill side slopes will be graded at 2:1 to minimize disturbance. Slopes to be stabilized with erosion control blankets during construction.
- Roadside ditches will not be constructed, as the intent of the design will be to sheet flow across the roadway to maintain existing drainage patterns and minimize impacts due to concentrated flow.
- Temporary wetland impacts to utilize mats.
- Permanent access road wetland impacts to use permeable roadway methods, such as stone fords.

BMPs

The entirety of the project shall adhere to the standard BMP's referenced in "Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire". The following is a list of available BMPs that can be used in conjunction with the access roads (BMP #'s correspond to details located in Appendix A of the manual):

- Stabilization (BMP #9)
- Silt Fence and other Perimeter Controls (BMPs #1, 2, and 3)
- Surface Water Diversions (BMPs #12 and 13)
- Temporary Crossings of Wetlands
    - Corduroy (BMP #7)
    - Mats (BMP #6)
    - Other Methods (BMP #8)
- Appropriate Mulching Materials (BMP #5)

- Seed – Temporary and Permanent (BMP #4)

  For the areas identified below, VHB recommends additional measures be taken including the following:

- Water bars be installed along roadway grades with slopes of 10% or greater.
- Level spreaders be installed at water bars to disperse the flow away from the roadway.
- In areas where roadside ditches are required, stone check dams should be incorporated to reduce velocity.

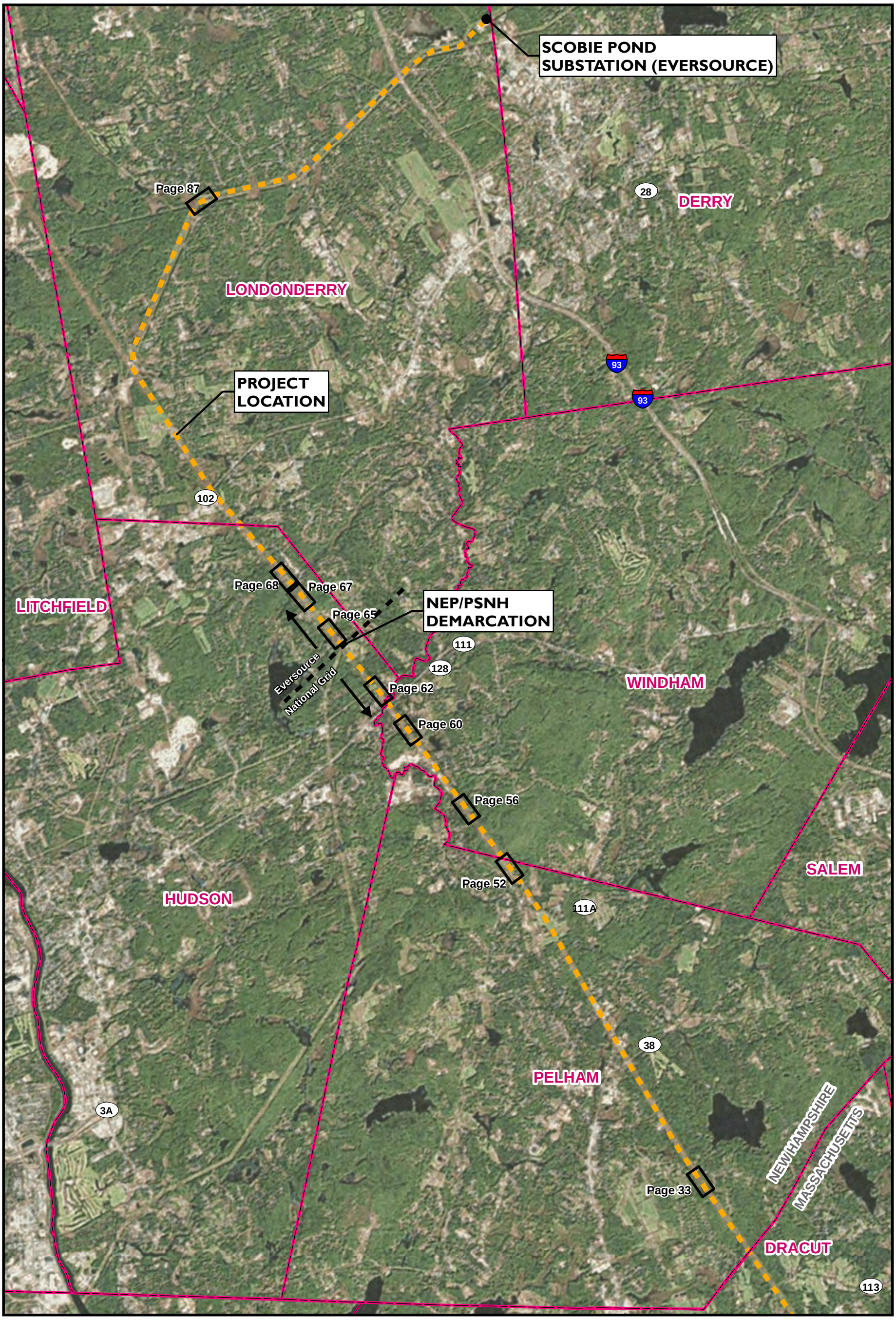
Areas of Supplemental BMPs

As described above, a number of areas were identified as locations that may require additional water quality measures. The individual sheets have been attached for reference.

- **Proposed Structure 77 (National Grid - Page 33)** – The access road north of Structure 77 has an approximately 19% slope grading towards Wetland WA 36.
- **Proposed Structure 121 (National Grid- Page 52)** – The access road north of Structure 121 has an approximately 13% slope grading towards the existing pond adjacent to Wetland WA 59H.
- **Proposed Structure 66 (National Grid – Page 56)** - The construction work pad for Structure 66 of the Relocated Line Y-151 is located on a steep slope of approximately 16% grading towards Wetland WA 61.
- **Proposed Structure (National Grid – Page 56)** – The access road in this area has an approximate 19% slope grading towards the permanent wetland crossing (stone ford) at Wetland WA 62.
- **Existing Structure 78 (National Grid – Page 60)** – The construction work pad overlaps Wetland WA 69. In addition the access road has an approximate 13% slope grading towards Wetland WA 69.
- **Existing Structure 82 (National Grid – Page 62)** – There is an excessive slope south of Structure 82 adjacent to Wetland WA 72. The access road from Bockes Road to the structure has an approximate 14% slope approaching the construction work pad.
- **Proposed Structure 202 (Eversource – Page 65)** – The access road heading south towards Structure 202 has an approximate 14% slope grading towards the unnamed intermittent street and WA 77C.

- **Proposed Structure 207 (Eversource – Page 67)** – The access road heading north from Structure 207 has an excessive slope grading towards Howards Brook (WA 85).
- **Proposed Structure 208 (Eversource – Page 68)** – The access road heading south from Structure 208 has an excessive slope grading towards Howards Brook (WA 85).
- **Proposed Structure 253 (Eversource – Page 87)** – The access road heading west towards Structure 253 from High Range Road has an excessive slope grading towards Wetland WA 128.

Figures



1 inch = 5,500 feet

Merrimack Valley Reliability Project
Tewksbury Substation MA to
Scobie Pond Substation NH

Construction Access Plans

nationalgrid

EVERSOURCE ENERGY

THIS DOCUMENT IS INTENDED FOR GENERAL PLANNING & INFORMATION PURPOSES ONLY. ALL MEASUREMENTS & LOCATIONS ARE APPROXIMATE

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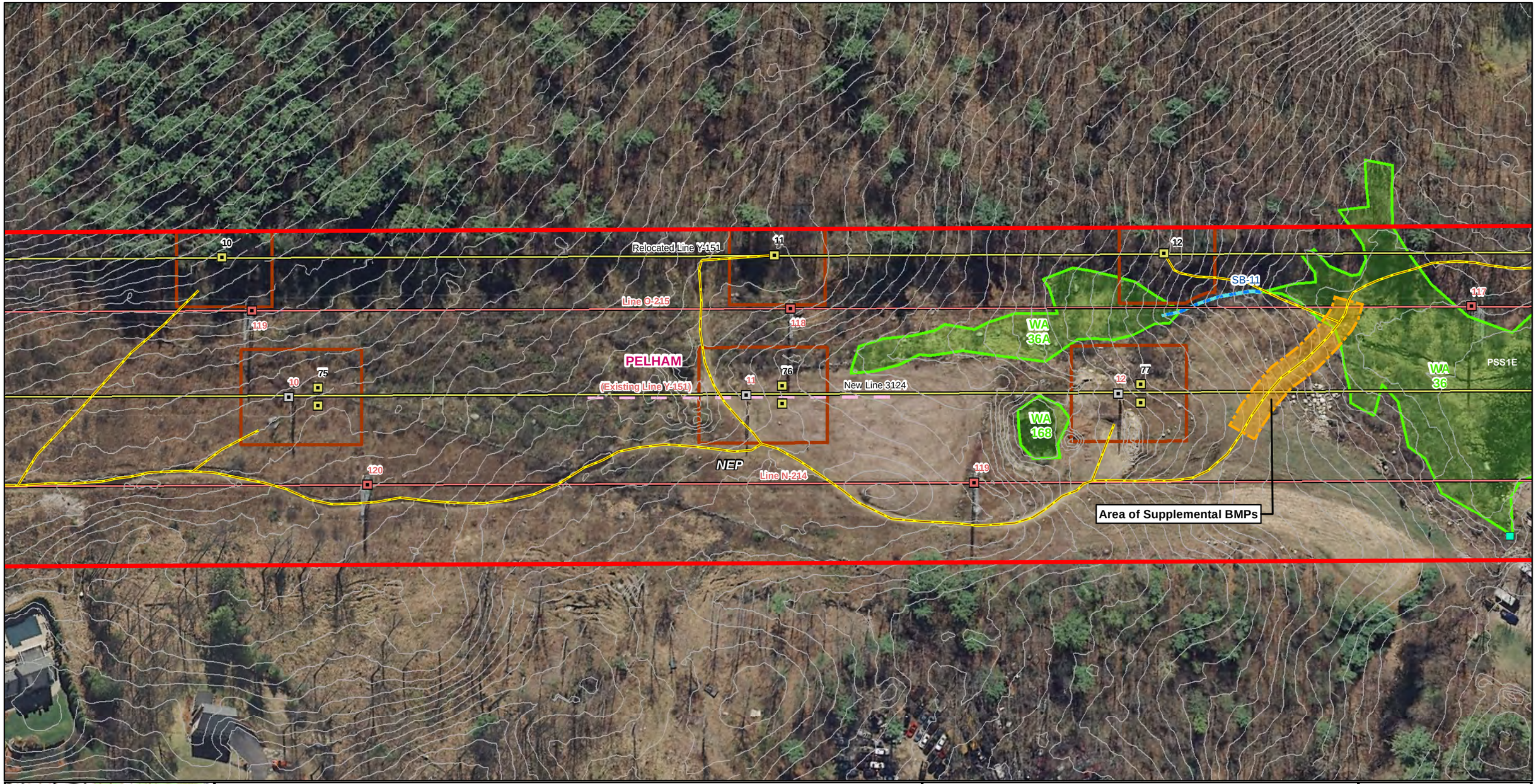

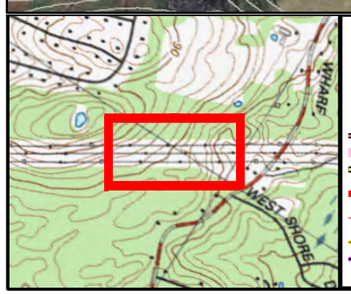

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0 50 100 200

Feet

Merrimack Valley Reliability Project

Tewksbury Substation MA to
Scobie Pond Substation NH

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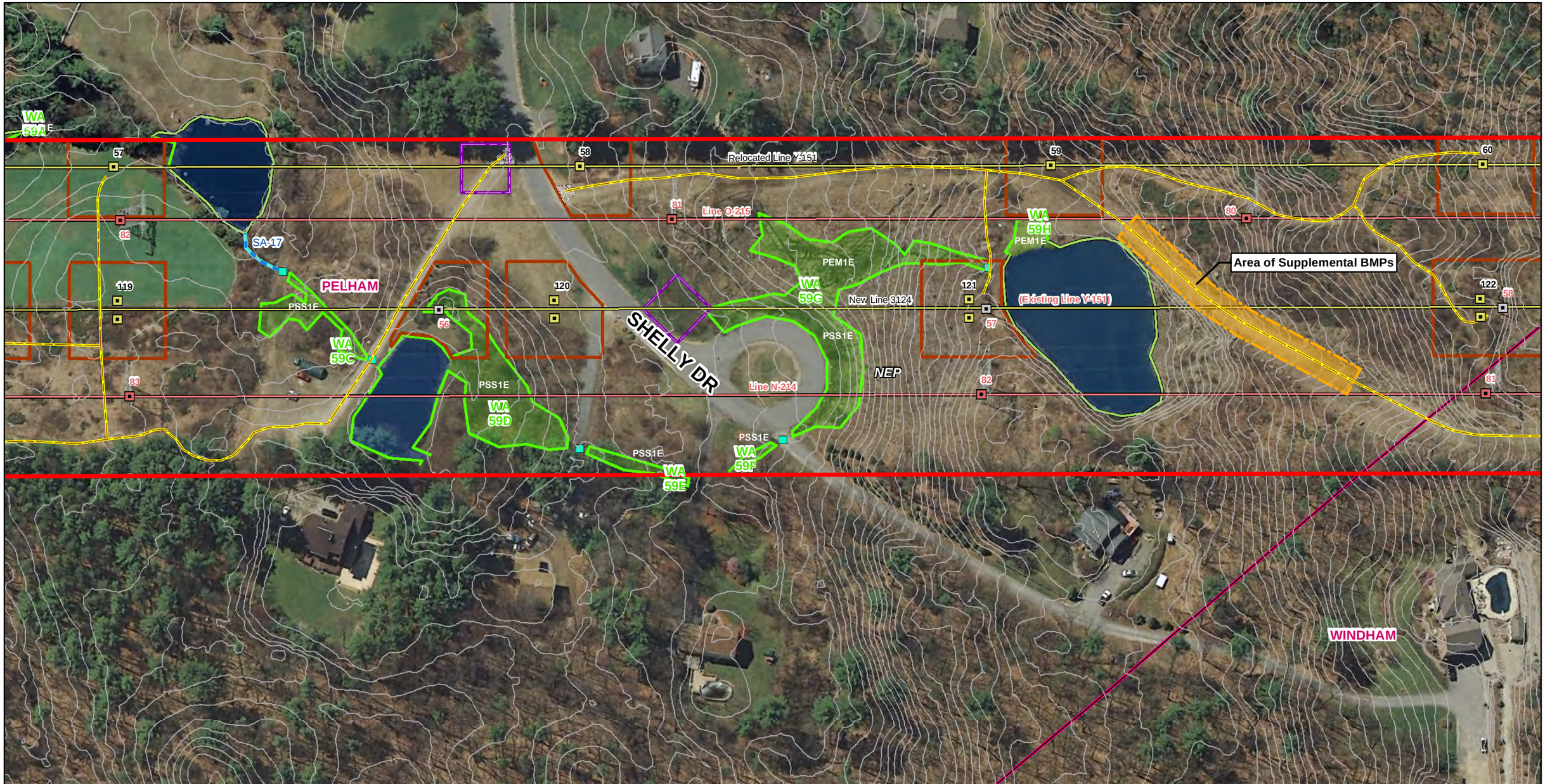

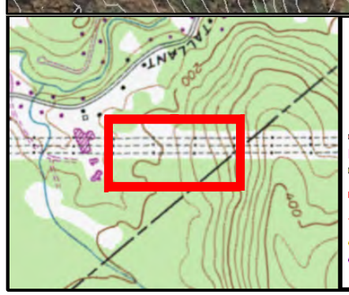

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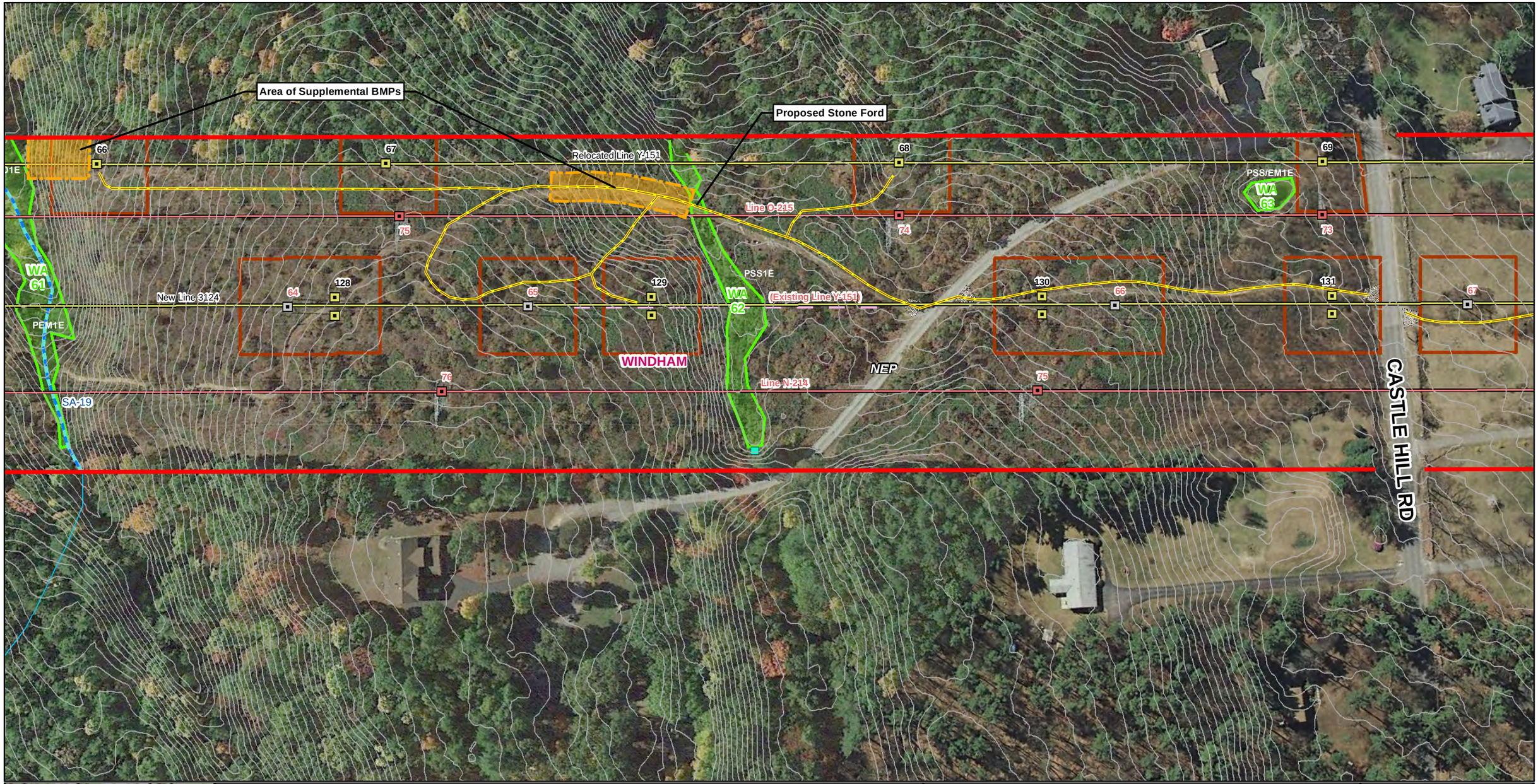

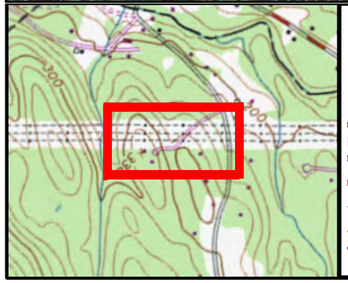

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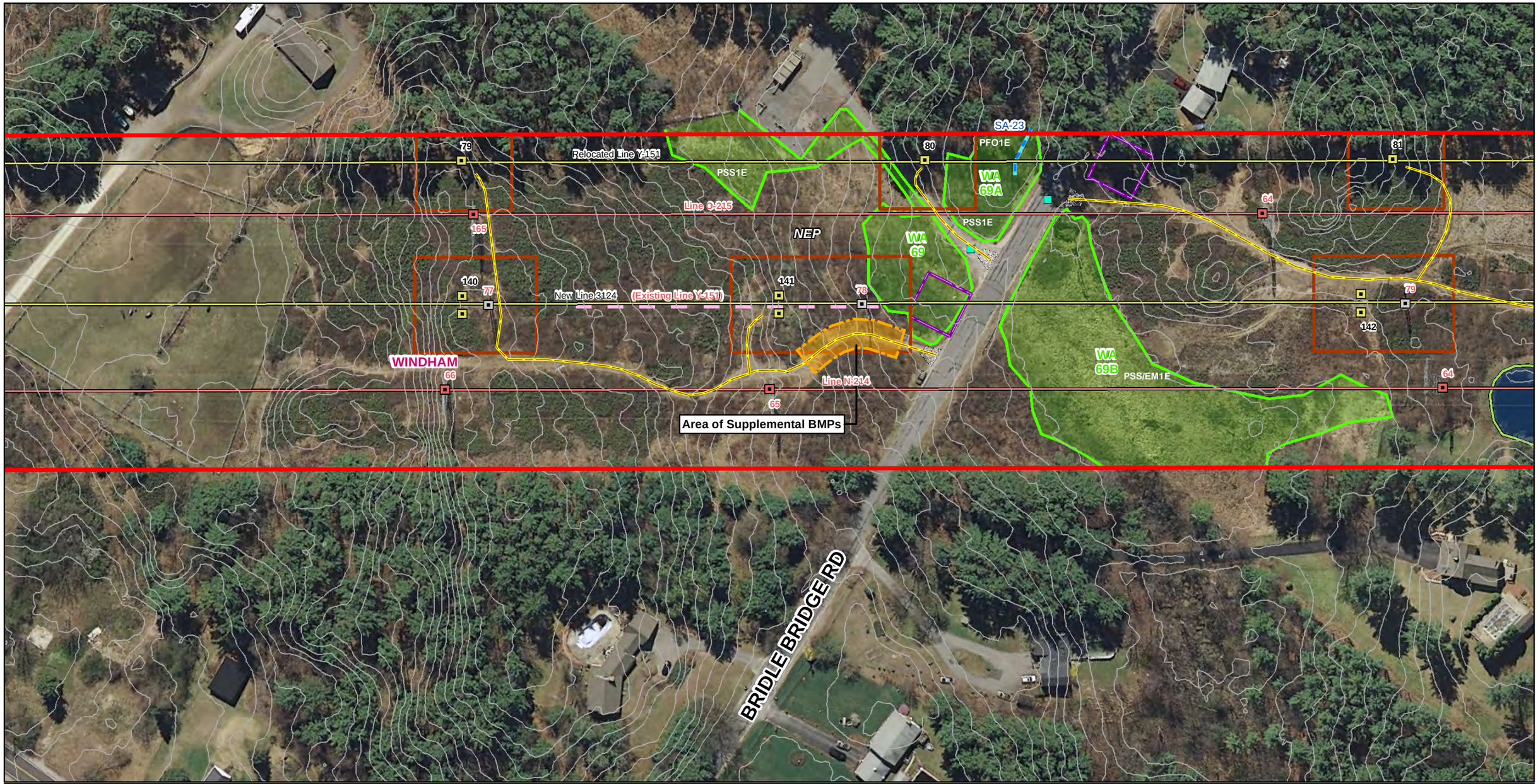

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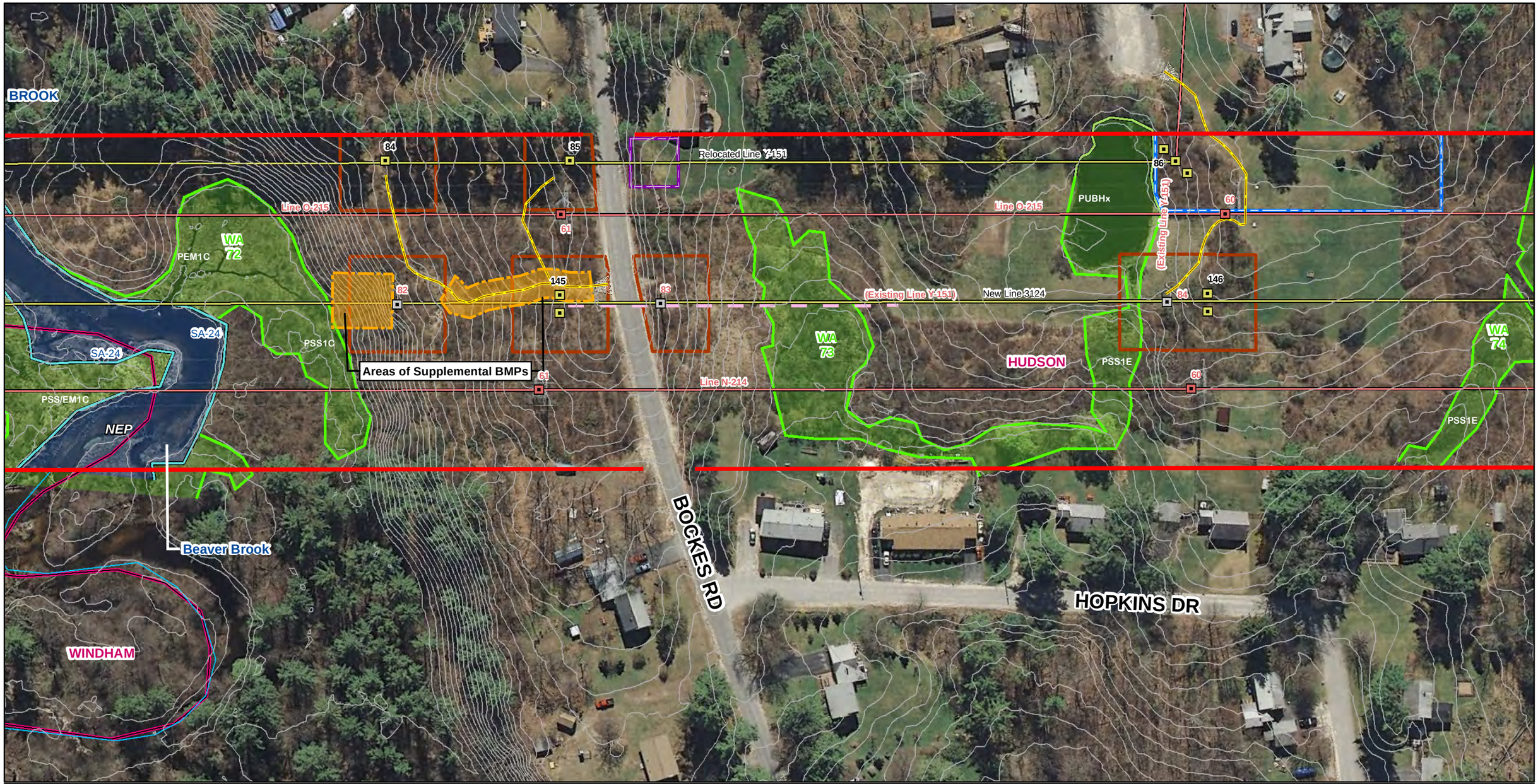

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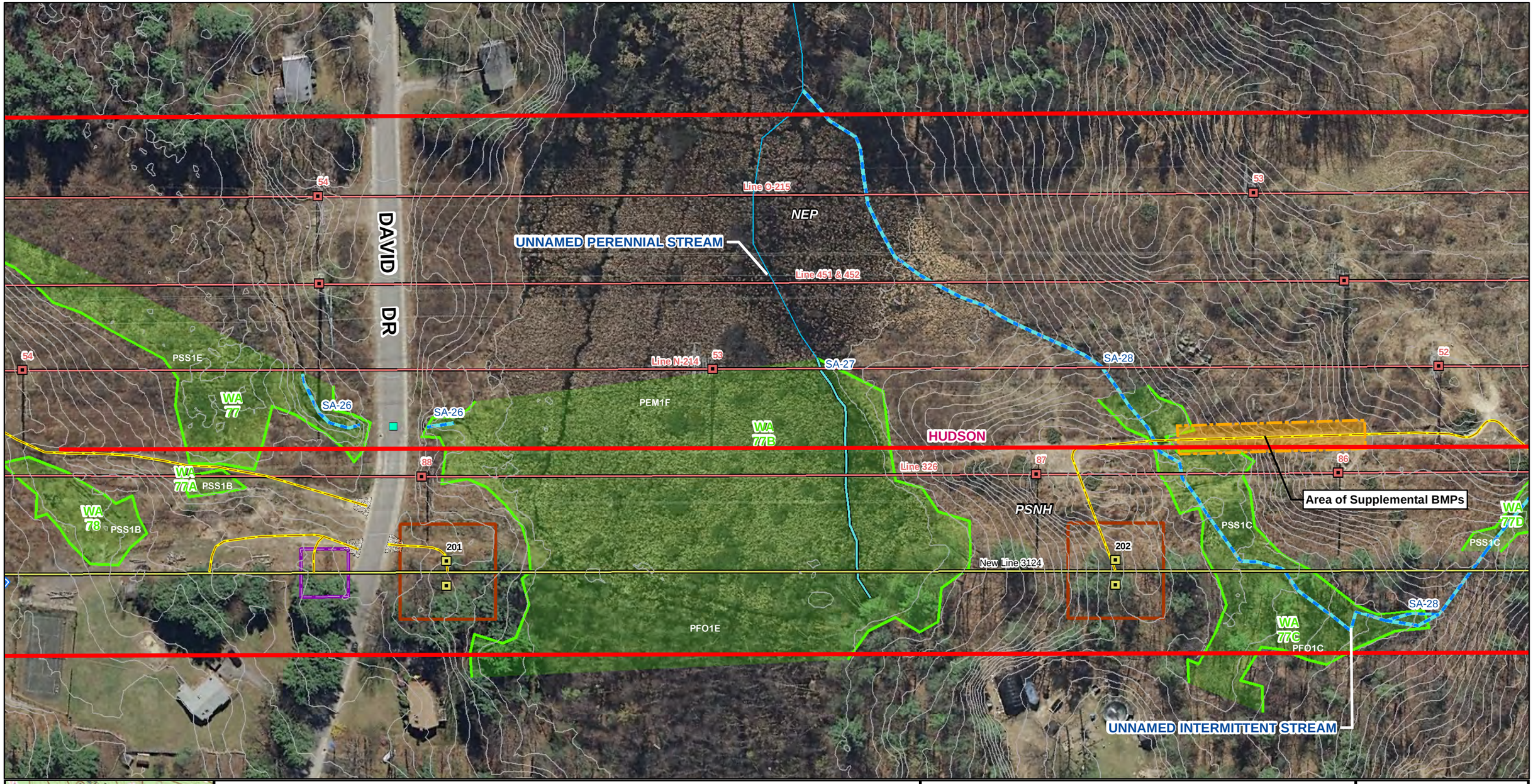

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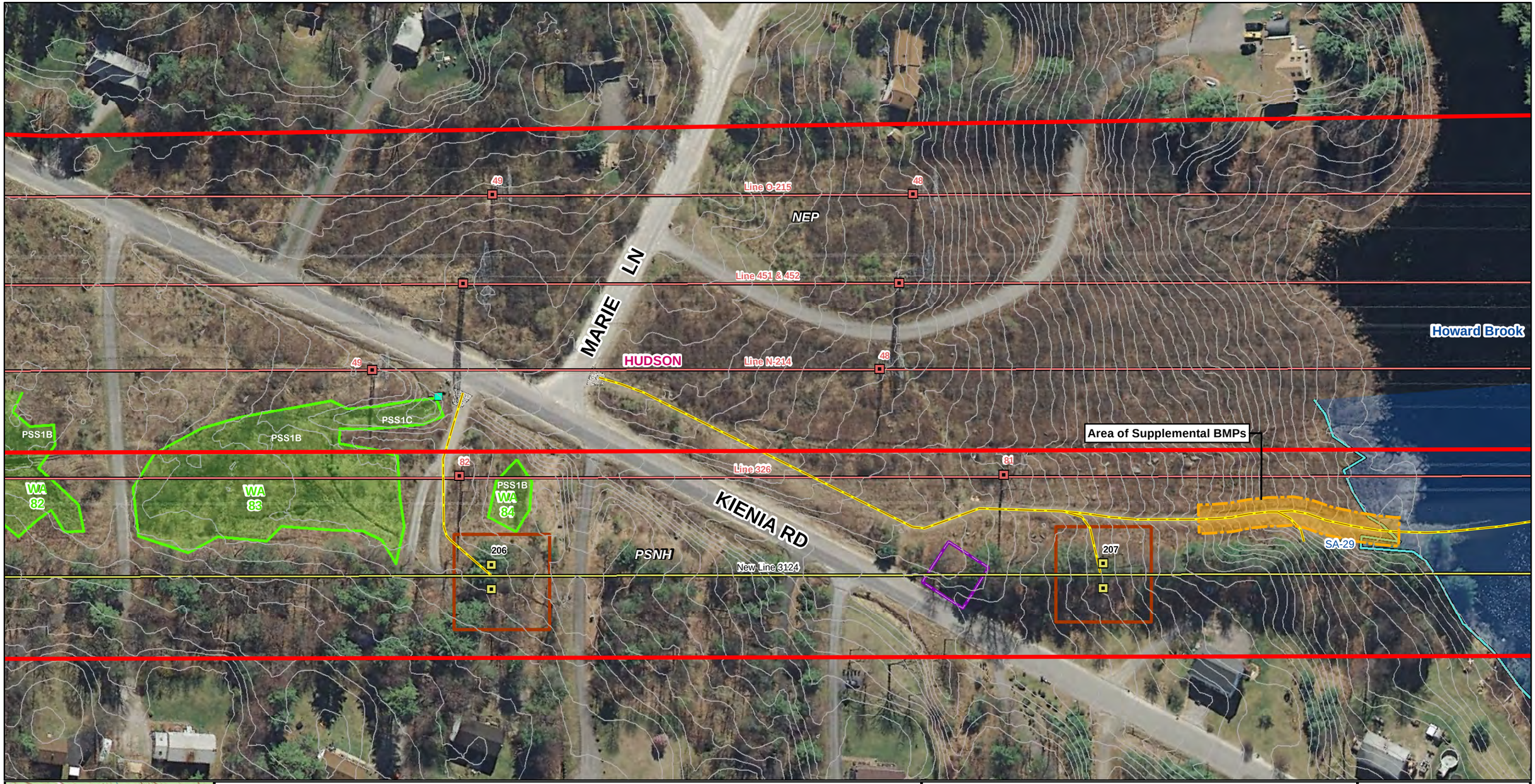

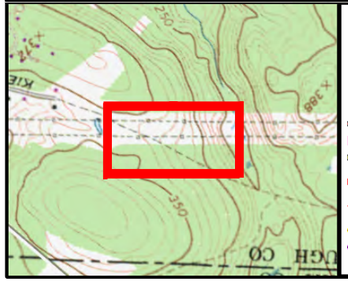

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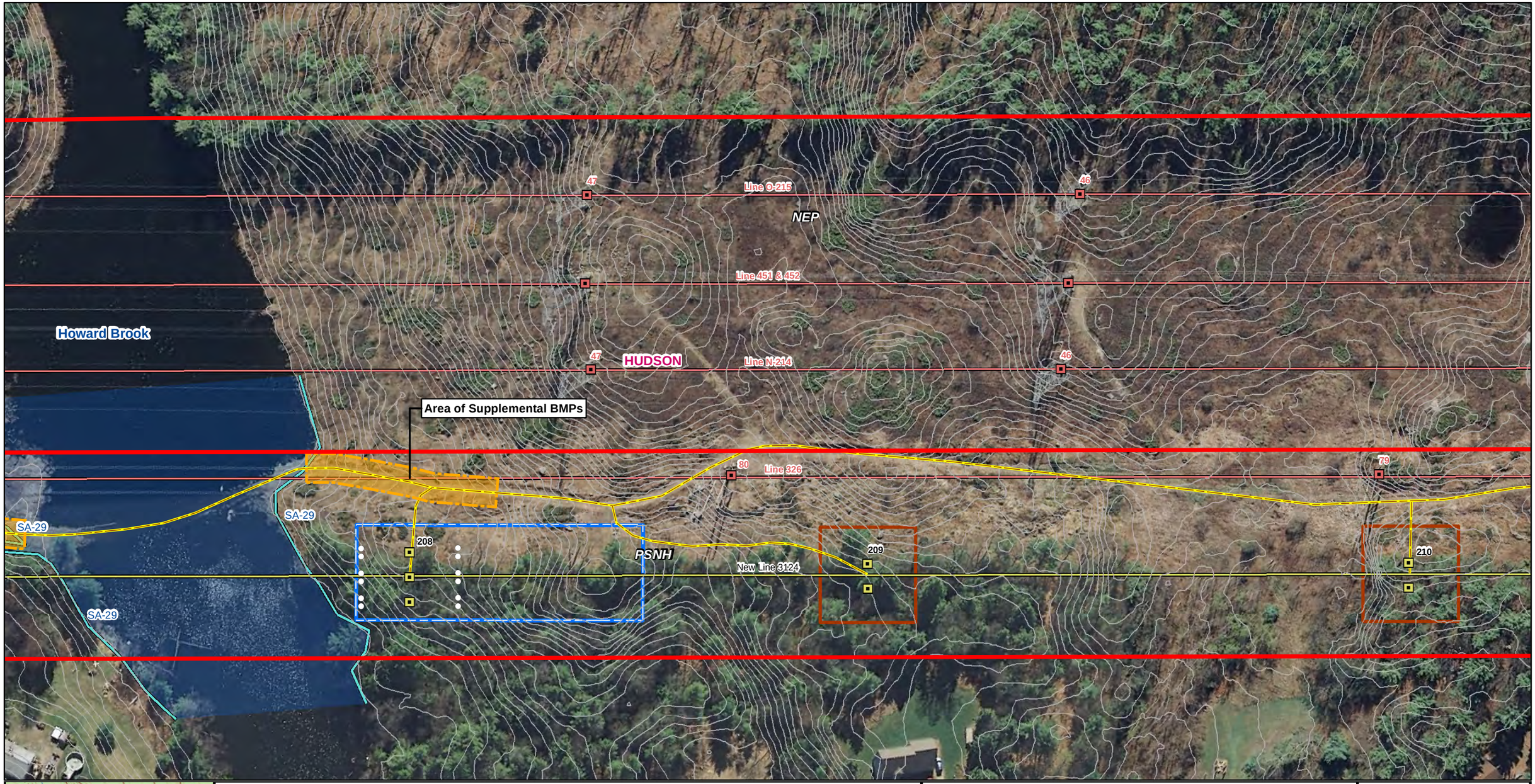

Existing Structure
Existing Structure to be Removed
Proposed Structure
Proposed Guy Anchor Locations
Existing Transmission Line
Existing Line to be Removed
Proposed Transmission Line
Surveyed ROW Boundary
NEP Property
Primary Access
Alternate Access

Delineated Wetland Edge
Estimated Wetland Edge
Wetland Resource Area
Open Water
Vernal Pool
Delineated Perennial Stream
Delineated Intermittent Stream
Delineated Ordinary High Water
USGS Stream
2-ft Elevation Contours
Field Identified Potential Vernal Pool

Construction Work Pad (100'x100')
Pull Pad Site (100'x300')
Guard Protection Area (50'x50')
Stone Apron
Existing Culvert
(needs field review)
Area of Supplemental BMPs
Town Boundary

1 Inch = 100 Feet
0 50 100 200
Feet

Merrimack Valley Reliability Project
Tewksbury Substation MA to
Scobie Pond Substation NH

PRELIMINARY PROGRESS PRINT

PRELIMINARY PROGRESS PRINT

Source:
NGRID,Black & Veatch,VHB,
Beals & Thomas,EVERSOURCE,Normandeau

Date: 5/7/2015

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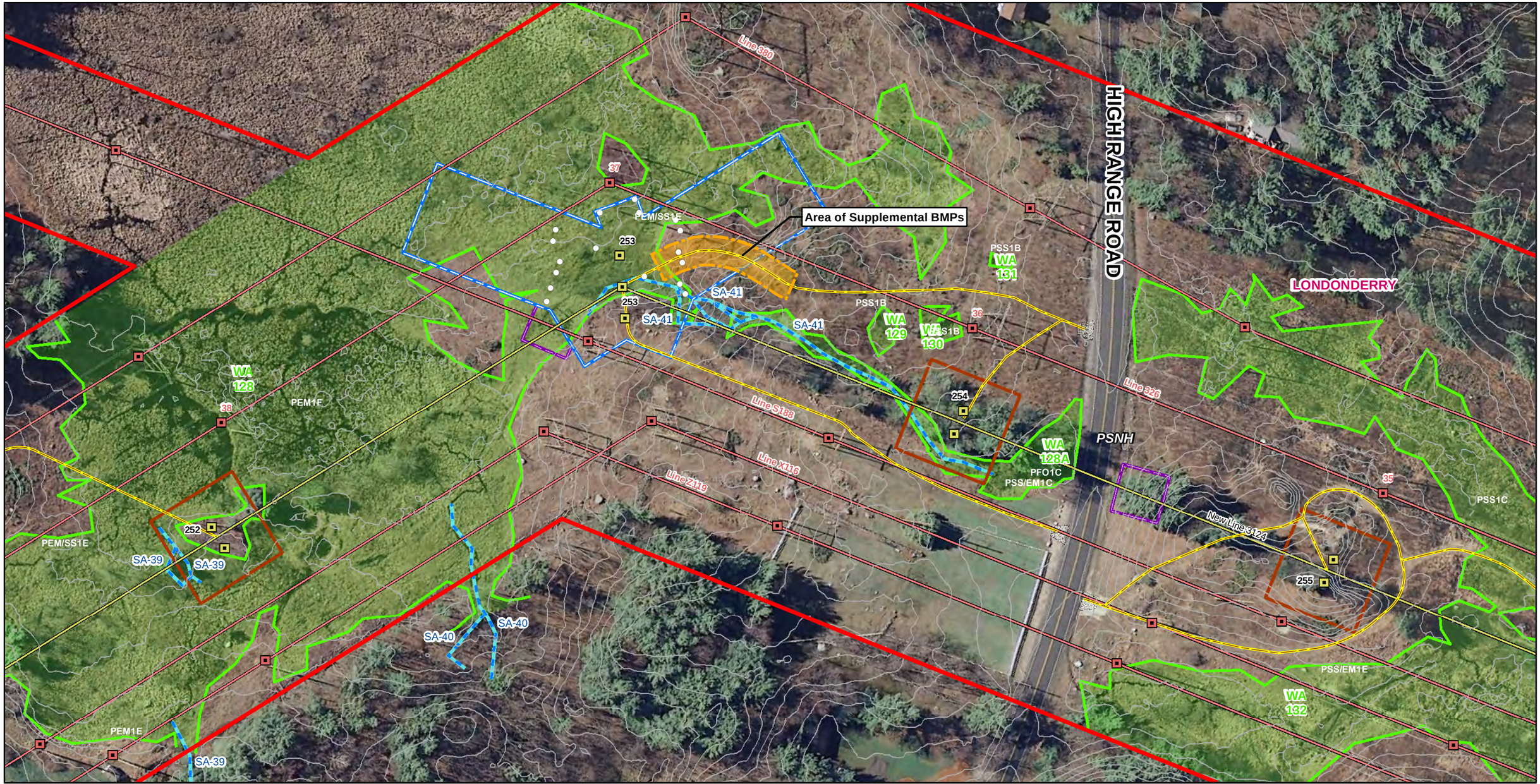

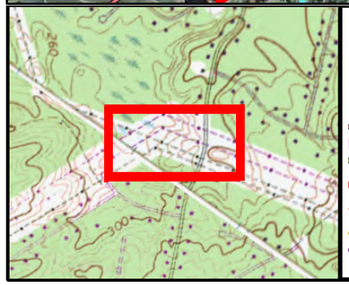

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