Appendix F: Ecology F-3 Wetland Delineation Report



Wetland Delineation Report for the Tappan Zee Hudson River Crossing Project

June 2012

Enclosure 1: Wetland Delineation Report

Tappan Zee Hudson River Crossing Project Wetland Delineation Report Temporary Access Road Location, Westchester County, NY April 12, 2012

SUMMARY

Federally-regulated wetlands and waters have been identified and field delineated at the proposed location of the temporary construction access road in Westchester County. The boundaries of these regulated wetland areas have been surveyed by a licensed land surveyor.

INTRODUCTION

The Federal Highway Administration (FHWA), as the federal lead agency, and the New York State Department of Transportation (NYSDOT) and the New York State Thruway Authority (NYSTA), as joint lead agencies are proposing the Tappan Zee Hudson River Crossing Project, which would result in the construction of a new bridge crossing, consisting of two structures (Replacement Bridge), over the Hudson River between Rockland and Westchester Counties (proposed project). The project site is located on the Hudson River (River Mile [RM] 27) in the Village of Tarrytown, Westchester County, NY and the Village of South Nyack, Rockland County, NY. The project site can be identified on the United States Geological Survey (USGS) map (Nyack and White Plains Quadrants; 41 04'12.55''N, 73 54'27.47''W) (see Enclosure 2, Figure 1). The purpose of the proposed project is to maintain a vital link in the regional and national transportation network by providing an improved Hudson River crossing between Rockland and Westchester Counties. The proposed project would address the structural, operational, mobility, safety, and security limitations and deficiencies of the existing Tappan Zee Bridge.

A Joint Permit Application (JPA) was submitted to the United States Army Corps of Engineers (USACE), New York State Department of Environmental Conservation (NYSDEC), and New York State Office of General Services (NYSOGS) on March 26, 2012 for the proposed construction of waterfront bridge staging areas in Westchester and Rockland Counties and a temporary access road immediately south of the toll plaza in Westchester County (see Enclosure 2, Figure 2). The existing conditions with respect to wetlands as described in the March 2012 JPA were based on a preliminary wetland investigation that was performed prior to the growing season (March 6, 2012). On April 6, 2012, several of the project team members (i.e., FHWA, NYSDOT, NYSTA, and AKRF) met with the USACE onsite to discuss the wetlands present within the vicinity of the Westchester County. As described in the JPA (JPA Enclosure 3, page 10), in the vicinity of the proposed Westchester County temporary access road there is a small stream and wetland area located approximately 300 feet south of the existing bridge and toll plaza. During the April 6, 2012 site visit, the USACE indicated that the stream/wetland would fall under the jurisdiction of the USACE and requested a formal delineation in order to

initiate the review of the JPA. This report and attached datasheets serve as the formal delineation report and replace the existing conditions section (JPA Enclosure 3, Page 10) of the March 2012 JPA pertaining to the Westchester County stream and wetland area.

METHODOLOGY

Prior to field investigations, NYSDEC and National Wetlands Inventory (NWI) maps were reviewed to determine the presence or absence of state and federal wetlands in the proposed project area. No NYSDEC- or NWI-mapped wetlands occur in the project area (see Enclosure 2, Figure 3). On April 12, 2012, a team of two AKRF, Inc. field staff conducted a delineation of the stream and associated wetland following methods outlined in the United States Army Corps of Engineers (USACE) *Corps of Engineers Wetlands Delineation Manual* (1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2.0) (January 2012). Methodology pertaining to the three USACE wetland indicators (i.e., hydrology, soils, and hydrophytic vegetation) is described below.

HYDROLOGY AND SOILS

Hydrology was documented using site observations and an auger to determine soil saturation or a high water table. The soils of the site were documented with the use of an auger and a Munsell Soil Color Chart. Both hydrology and soils observations were made during a period of dry weather.

VEGETATION

Wetland

Due to the linear orientation of the riparian zone, the tree and vine strata were documented for two 20 by 35 foot (ft) (700 square [sq] ft) linear plots paralleling the stream. One 10 by 10 ft (100 square ft) shrub plot was established in each of the tree stratum plots and herbaceous vegetation was documented and averaged for three 3.28 ft by 3.28 ft (~9 sq ft) plots located within each of the tree stratum plots. Both the Dominance Test and Prevalence Index tests were used to calculate the indicators of hydrophytic vegetation.

Upland

For the upland plot, a 30-ft radius plot was established for the tree and vine strata. Within this plot, a 15-ft radius plot and a 5-ft radius plot were sampled for shrubs and herbs, respectively.

STREAM AND WETLAND BOUNDARY MAPPING

Both sides of the wetland and stream were flagged and surveyed by a NYSDOT licensed land survey team

EXISTING CONDITIONS

The federally-regulated area consists of an intermittent stream corridor and portions of its adjacent, vegetated floodplain. The stream and wetland area measure 0.2344 acres. The stream begins near the top of the slope at an approximately 2-ft diameter outfall located in an embankment (see Enclosure 3, photo 1). The stream flows through a disturbed successional forest (approximately 0.63 acres) dominated by Norway maple (*Acer platanoides*) with European black alder (*Alnus glutinosa*) and oak (*Quercus* sp.) at lower percentages in the

canopy. Multi-flora rose (*Rosa multiflora*), Japanese honeysuckle (*Lonicera japonica*), wineberry (*Rubus phoenicolasius*), and Japanese knotweed (*Polygonum cuspidatum*) form dense thickets along the stream banks and upland areas, particularly at the higher contour elevations. Large rocks, boulders, metal, asphalt, pipes, and slabs of concrete are present within the streambed at the higher elevations (see Enclosure 3, photo 2). Particularly along the southern edge of the site, the streambed is cut deeply into the hill with large sections of bank erosion. This steeply sloped portion of the stream, before it turns northwards, has no vegetation or soils and was flagged solely on the presence of flowing water and the eroded banks that approximate an "ordinary high water mark." Where the stream width was greater than 3+/- feet, both banks were flagged and surveyed in the field.

At the toe of the slope, the stream flows through a foundation structure and takes a sharp bend to the north. This region exhibits hydrophytic vegetation and hydric soils in and adjacent to the stream. The stream flows parallel to the Metro North Railroad (MNR) tracks and the toe of slope along a flat streambed (see Enclosure 3, photo 3) for approximately 250 feet until it turns directly west and flows under the MNR tracks to the Hudson River. The wetland associated with the stream at the toe of the slope as well as the conditions immediately upslope from the wetland are described below in the context of the three wetland parameters as defined by the USACE: hydrology, hydrophytic vegetation, and hydric soils.

HYDROLOGY

Wetland

The wetland is located between the east bank of the stream and the toe of the slope. It is fed, in part, by surface expressions (i.e., groundwater seeps) from the side of the slope (see Enclosure 3, photo 4). In some locations, these seeps produce surface water (A1) flow to the stream and in other locations, are limited to standing water (A1) with minimal flow. As documented for Sampling Plots W-1 and W-2 the water table was observed at 8 inches and 6 inches (A2), respectively. Water stained leaves (B9) were observed throughout the sampling plots, particularly where seeps are present. All of these hydrologic features are defined by USACE as "primary indicators" of hydrology.

In addition to the stream and associated seeps, a drainage channel or ditch (see Enclosure 3, photo 5) is located at the northern end of the stream where it is diverted to the Hudson River via a culvert that runs under the MNR tracks. This ditch conveys surface runoff along the eastern side of railroad tracks southwards, entering the stream channel where it is conveyed beneath the railroad tracks. Although hydrology was observed within this ditch, hydric soils and hydrophytic vegetation are not present. Ditches that drain only uplands and do not carry a relatively permanent flow of water are generally not jurisdictional under the Clean Water Act (CWA). Therefore, it is expected that the USACE would not take jurisdiction over this ditch. This ditch appears to be located on MNR property and in close proximity to moving trains. It was not flagged as part of the April 12, 2012 delineation.

Upland

Hydrology indicators were not observed upslope from the wetland area.

VEGETATION

Wetland

Enclosure 3, Photos 6 through 10, show the vegetation sampling areas. The tree canopy along the streambed and associated wetland area is dominated by European black alder (FACW-) with a small number of Norway maple (NI). The shrub layer contains pockets of common privet (*Ligustrum vulgare*) (FACU) (see data form for Sampling Plot W-3). Skunk cabbage (*Symplocarpus foetidus*) (OBL) (see data form for Sampling Plot W-1) is present in small pockets within the herbaceous layer with patches of garlic mustard (*Alliaria petiolata*) (FACU-), poison ivy (*Toxicodendron radicans*) (FAC), and Indian strawberry (*Duchesnea indica*) (FACU-) (see Enclosure 4, data form for Sampling Plot W-2). While there are non-wetland species present in the herbaceous layer, these are represented in low percentages and are not dominant. In general, the species composition/absolute percent cover in the understory is relatively scarce in comparison to the European black alder-dominated (~55 to 65 percent absolute cover) canopy.

Upland

Immediately upslope from the wetland area, the canopy is dominated by Norway maple, with a small percentage of European black alder. The understory is quite open and is lacking a shrub layer altogether. The herbaceous layer is also quite bare, with garlic mustard as the only herbaceous plant observed at about 7 percent absolute cover.

SOILS

Wetland

Soils within the three sampling locations meet one or more of the following hydric soil indicators: "Thick Dark Surface" (A12), "Loamy Mucky Mineral" (F1), "Loamy gleyed matrix" (F2), and "Depleted Matrix" (F3). Soil texture ranges from silty loam to sandy loam within the upper 16 inches of the solum. The O and A horizons were uniformly low value/low chroma and typically include 4 inches (+/-) of mucky mineral soil material. Within 10 inches, a depleted matrix is observed, mottling was shown, or the dark surface value/chroma continues to a depth of 10 inches or greater where gley soil colors are obtained without appreciable mottling.

Upland

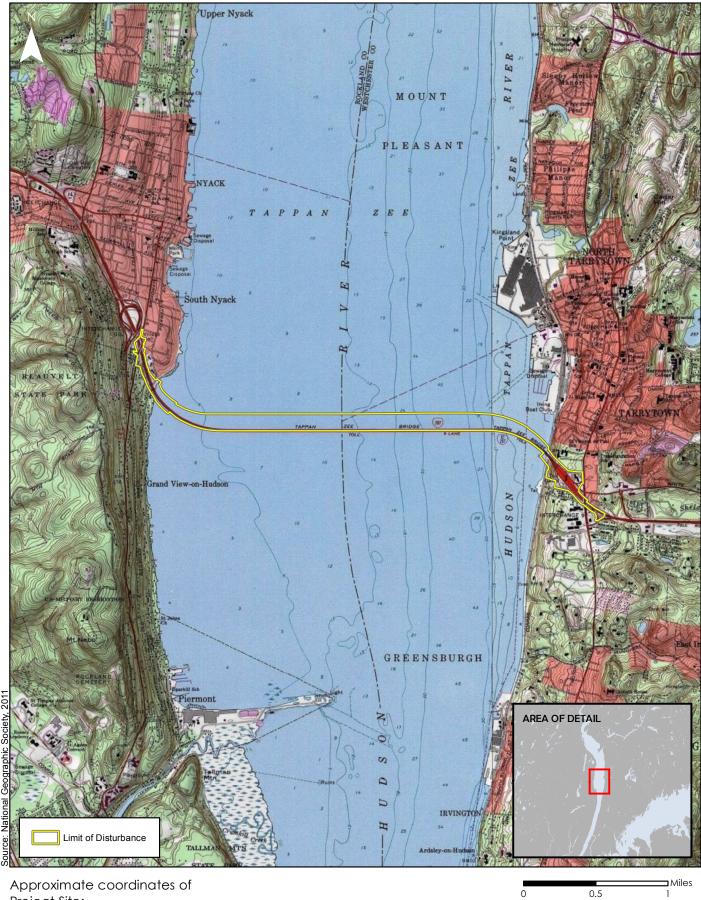
Hydric soils were not observed in the upland portions of the site. In some locations, it was difficult to sample soils due to rock, riprap, and other debris located near the surface of the soil. In locations where a sample was possible, the soils demonstrated a 10 YR 5/4 and 4/4 to 4/6 up to a 12 inch depth with no redox features.

CONCLUSIONS

Based on the data collected during the wetland delineation performed on April 12, 2012 and the site visit with USACE on April 6, 2012, the stream and associated wetland area would be expected to fall under the jurisdiction of the USACE. Enclosure 4 includes four data sheets documenting the wetland and upland hydrology, vegetation, and soils of the site. Three of the data forms (Sampling Plots W-1 to W-3) show wetland conditions as defined by USACE and the fourth (Sampling Plot W-4) demonstrates the non-wetland conditions immediately upslope from the wetland boundary. In addition, Drawing Sheet 10 of 16 in Enclosure 4 of the JPA, has been

updated to include the survey of the wetland boundary showing the flag numbers and is included (see Sheet 6 of 6) in Enclosure 2 of this report.

Enclosure 2: Vicinity Map and Figures



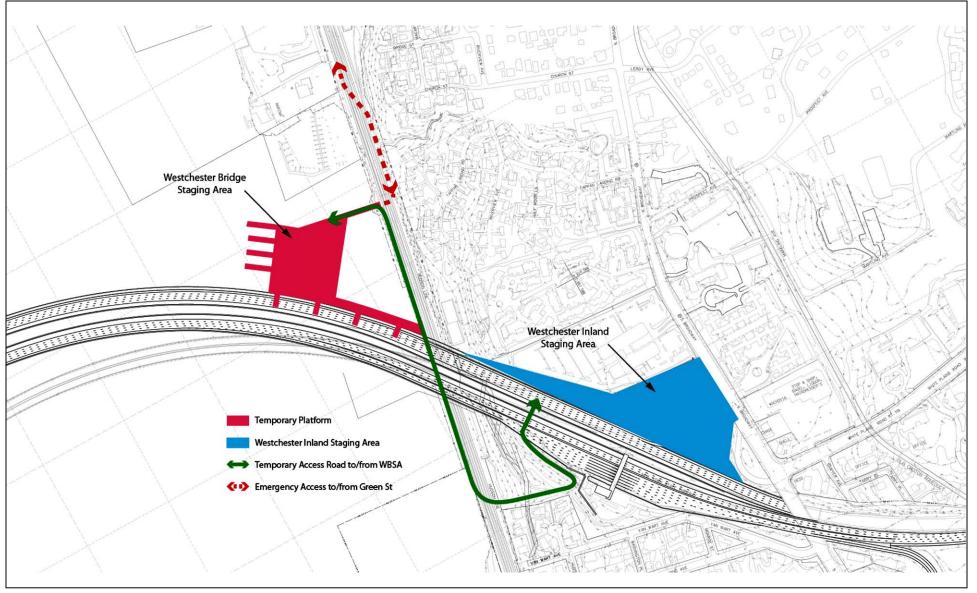
Approximate coordinates of Project Site: 41° 4' 15" N, 73° 53' 39" W

USGS 7.5 Minute Topographic Map - Nyack and White Plains Quads Figure 1

1

TAPPAN ZEE BRIDGE





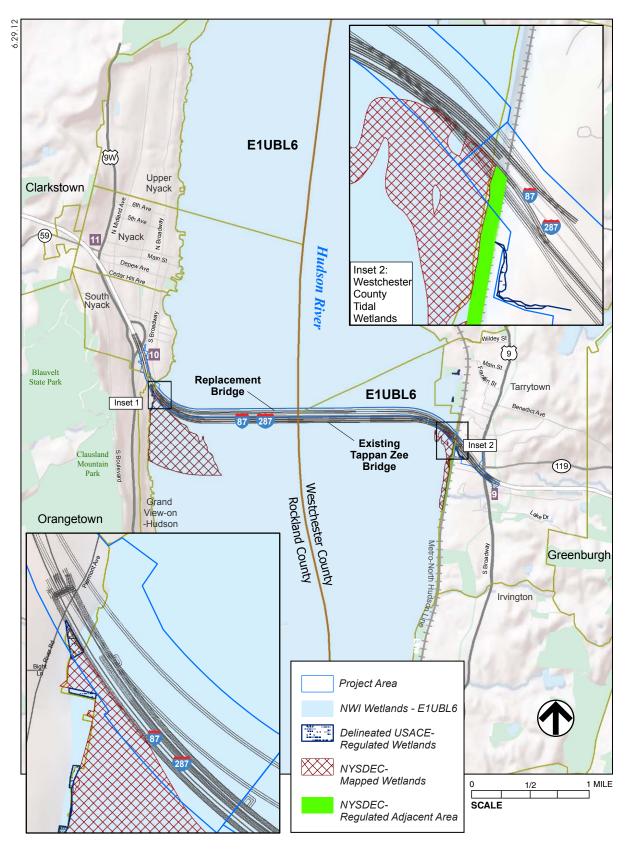
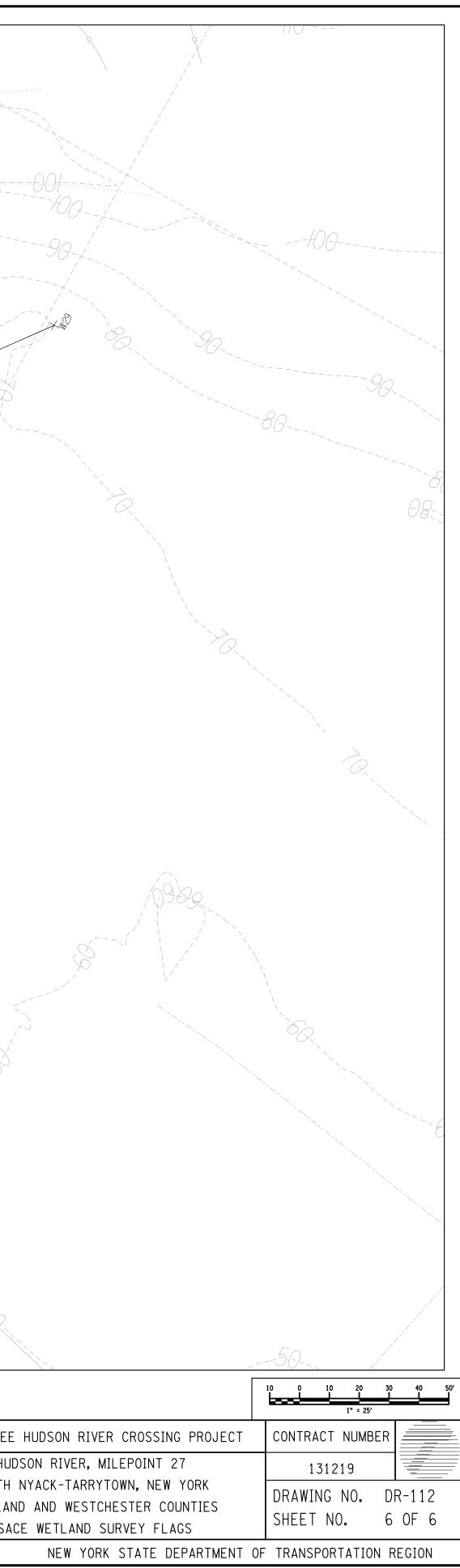


Figure 3 Freshwater and Tidal Wetlands

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		9090		
			909090 808080	9080
		7 (J 	797979	707070
			0G	
		A C SQ		
			30-	
	Margo L		20/10/10/10/10/10/10/10/10/10/10/10/10/10	
FLOOD				
EBB HUDSON RIVER				
NOTES: 1. FLAG W15 IS MISSING FROM THE SURVEY	AND MAY BE MISSING IN THE FIELD.			
2. FLAGS WITH (A) AND (B) FOLLOWING THE N FIELD. THE (A) AND (B) MODIFIERS WERE A SHOWN ON THE PHYSICAL FLAGS IN THE F	NUMBER DENOTE REPEATED NUMBERS IN THE ADDED TO THE SURVEY DRAWINGS AND ARE	NOT		
				TAPPAN 7FE
Arup USA, Inc. 155 Avenue of the Americas New York, NY 10013 Tel (212) 229 2669 Fax (212) 229 1056 www.arup.com	SIGNATURE	06-27-2012 DATE		TAPPAN ZEE HUI SOUTH ROCKLAN USA



Enclosure 3: Photographs

Enclosure 3

Wetland Delineation Report Photographs



Photo 1: View of the culvert where the stream surfaces above ground at the top of the slope.



Photo 2: View of boulders and debris lining the channel along the south side of the property.



Photo 3: View of the flat streambed before it discharges to the Hudson River.



Photo 4: View of surface water from hillside seep. (Note: This photo is located in the vicinity of Sampling Plot W-2.)

June 2012



Photo 5: View facing north of drainage ditch that is located parallel to MNR tracks.



Photo 6: View of skunk cabbage and garlic mustard in Sampling Plot W-1.



Photo 7: View facing south of Sampling Plot W-1.



Photo 8: View of general location of Sampling Plot W-2.



Photo 9: View of general location of Sampling Plot W-3 facing south.



Photo 10: View of general location of Sampling Plot W-3 facing north.

Enclosure 4: Data Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tappan Zee Bridge Hudson River Crossing Project	City/County: Tarrytown/Westo	chester County Sampling Date. April 12, 2012
Applicant/Owner: New York Thruway Authority		
lim Neeh and Aubrey McMahan AKDE Inc		
Investigator(s):Stream floodplain	Section, Township, Range:	
Landform (hillslope, terrace, etc.): <u>Stream floodplain</u>		
Slope (%): Lat:	Long:	Datum:
Slope (%): 0 Lat: Soil Map Unit Name: Charlton loam 25 to 35% slopes (ChE)		NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of ye		
Are Vegetation <u>No</u> , Soil <u>No</u> , or Hydrology <u>No</u> significantly	disturbed? Are "Normal (Circumstances" present? Yes X No
Are Vegetation <u>No</u> , Soil <u>No</u> , or Hydrology <u>No</u> naturally pr		
SUMMARY OF FINDINGS – Attach site map showing	sampling point location	ns, transects, important features, etc.
Hydrophytic Vegetation Present? Yes X No	Is the Sampled Area	
Hydrophytic Vegetation Present? Yes A No Hydric Soil Present? Yes X No	within a Wetland?	Yes X No
Wetland Hydrology Present? Yes X No		
Remarks: (Explain alternative procedures here or in a separate repo		Site ID: W
This wetland is adjacent to a stream at the toe of a steep slope. The	,	a been disturbed as large boulders, debris
drainage channels, and pipes are present throughout the site. Satura area. Seeps are present at the toe of the slope, and in most instance wetland along the stream is bare, the invasive European Black Elder	produce surface flow to the stre	eam. Although much of the understory of the
(Symplocarpus foetidus) (OBL), poison ivy (Toxicodendron radicans)		
(Alliaria petiolata) (FACU-) and privet (Ligustrum vulgare) (FACU). As		
riparian habitat. Therefore, the vegetation monitoring plot sizes were	nodified to accommodate the line	ear configuration of the wetland area.
HYDROLOGY		
Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		Surface Soil Cracks (B6)
Surface Water (A1) Water-Stained	_eaves (B9)	Drainage Patterns (B10)
X High Water Table (A2)	(B13)	Moss Trim Lines (B16)
Saturation (A3) Marl Deposits	315)	Dry-Season Water Table (C2)
Water Marks (B1) Hydrogen Sulf		Crayfish Burrows (C8)
	spheres on Living Roots (C3)	Saturation Visible on Aerial Imagery (C9)
Drift Deposits (B3) Presence of R		Stunted or Stressed Plants (D1)
		X Geomorphic Position (D2)
Iron Deposits (B5) Thin Muck Sur		Shallow Aquitard (D3)
Inundation Visible on Aerial Imagery (B7) Other (Explain	n Remarks)	Microtopographic Relief (D4)
Sparsely Vegetated Concave Surface (B8)		FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes No Depth (inches		
Water Table Present? Yes X No Depth (inches		Y.
Saturation Present? Yes No Depth (inches (includes capillary fringe)		ydrology Present? Yes X No
Describe Recorded Data (stream gauge, monitoring well, aerial phot	s, previous inspections), if available	able:
Remarks:		
Observations were made during a dry period.	The compline point is	in botwoon an intermittent
• • •		
stream (located in a floodplain of this stream)	inu a rocky/talus slop	
A high water table at an 8 inch depth was obs	•	

plot seeps (surface water [A1]) at the toe of the adjacent rocky/talus slope are present. In some instances, these seeps produce surface flow to the creek, while others demonstrate ponding at the soil surface.

VEGETATION – Use scientific names of plants.

2025 #	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 20x35 ft)		Species?		Number of Dominant Species
1. Alnus glutinosa	65	Y	FACW-	That Are OBL, FACW, or FAC: 2 (A)
2. Acer platanoides	5	Ν	NL	Total Number of Dominant
3				Species Across All Strata: <u>2</u> (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: 100 (A/B)
6				
				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
10 × 10 ft	70	= Total Cov	/er	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10 x 10 ft)				FACW species x 2 =
1. <u>N/A</u>				FAC species x 3 =
2				FACU species x 4 =
3				UPL species x 5 =
				Column Totals: (A) (B)
4 5				Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
				Rapid Test for Hydrophytic Vegetation
7	0			Dominance Test is >50%
2.29 x 2.29 ft plot ovo)	0	= Total Cov	/er	Prevalence Index is $\leq 3.0^1$
Herb Stratum (Plot size: 3.28 x 3.28 ft plot ave))				Morphological Adaptations ¹ (Provide supporting
1. Symplocarpus foetidus	25	Y	FAC	data in Remarks or on a separate sheet)
2. Alliaria petiolata	15	Ν	FACU-	Problematic Hydrophytic Vegetation ¹ (Explain)
3. Toxicodendrons radicans	5	Ν	FAC	
4				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				
7				Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8				
9				Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12.				Woody vines – All woody vines greater than 3.28 ft in
12.	45	= Total Cov		height.
20 x35 ft		- 101ai 001	/ei	
Woody Vine Stratum (Plot size: 20 x35 ft)				
1. <u>N/A</u>		<u> </u>		
2				
3				Hydrophytic
4				Vegetation
	0	= Total Cov	/or	Present? Yes X No
Remarks: (Include photo numbers here or on a separate s		- 10101 000		
		Deport	Dhoto	areasha 6 and 7 above Sompling Diat
Photos are included in the Wetland Del W-1.	Ineation	Гкероп		graphs o and / show Sampling Flot

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth	Matrix			<u>x Feature</u>	s 1	- 2	- (
<u>(inches)</u> 0-6	Color (moist) 10 YR 2/1; 3/1; 4/1	<u>%</u> 30/30/40	Color (moist)	%	Type ¹	Loc ²	Texture Loam	Remarks mucky mineral soil material
6-12	10 YR 2/1; 3/1	50/50		·			Loam	
11-17+	5/10GY	100		·			Sandy loam	
¹ Type: C=C Hydric Soil Histosol Histoc E Black Hi Hydroge Stratifiee Depletee ✓ Thick Da Sandy M Sandy C Sandy F Stripped	oncentration, D=Depl Indicators:		=Reduced Matrix, CS Polyvalue Belov MLRA 149B) Thin Dark Surfa ✓ Loamy Mucky M ✓ Loamy Gleyed I Depleted Matrix Redox Dark Sur Depleted Dark Sur Redox Depress B)	v Surface ce (S9) (I /lineral (F ² Matrix (F2 (F3) fface (F6) Surface (F	(S8) (LRF _RR R, MI 1) (LRR K 2)	R R, LRA 149B	rains. ² Loc Indicators 2 cm N Coast) 5 cm N Dark S Polyva Thin D Iron-M Piedm Mesic Red P Very S	cation: PL=Pore Lining, M=Matrix. of or Problematic Hydric Soils ³ : Muck (A10) (LRR K, L, MLRA 149B) Prairie Redox (A16) (LRR K, L, R) Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L) alue Below Surface (S8) (LRR K, L) Dark Surface (S9) (LRR K, L) sourface (S9) (LRR K, L) shallow Surface (TF12) (MLRA 149B) Spallow Dark Surface (TF12) (Explain in Remarks)
		ion and w	etland hydrology mus	t be prese	ent, unless	s disturbed	l or problematio	С.
	Layer (if observed):							
Type: Depth (in	ches).						Hydric Soil	Present? Yes X No
Remarks:	<u> </u>							

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tappan Zee Bridge Hudson River Crossing Project City/Coun	tv: Tarrytown/Westchester County Sampling Date: April 12, 2012
Applicant/Owner: New York Thruway Authority	State: <u>NY</u> Sampling Point: <u>W-2</u>
Investigator(s): Jim Nash and Aubrey McMahon, AKRF, Inc. Section, 7	Township Range:
	_ Local relief (concave, convex, none):
Slope (%): 0 Lat: Long:	
Are climatic / hydrologic conditions on the site typical for this time of year? Yes	
Are Vegetation <u>No</u> , Soil <u>No</u> , or Hydrology <u>No</u> significantly disturbed	? Are "Normal Circumstances" present? Yes X No
Are Vegetation <u>No</u> , Soil <u>No</u> , or Hydrology <u>No</u> naturally problematic?	(If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing sampli	ng point locations, transects, important features, etc.
Hydric Soil Present? Yes X No with	the Sampled Area thin a Wetland? Yes X No /es, optional Wetland Site ID:
Remarks: (Explain alternative procedures here or in a separate report.)	
See remarks in the data form for Sampling Point W-1	
	Cocordor, Indicators (minimum of two required)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
	9) Surface Soil Cracks (B6) Drainage Patterns (B10)
\underline{X} High Water Table (A2) \underline{X} Aquatic Fauna (B13)	Moss Trim Lines (B16)
Saturation (A3) Marl Deposits (B15)	Dry-Season Water Table (C2)
Water Marks (B1) Hydrogen Sulfide Odor (C	
Sediment Deposits (B2) Oxidized Rhizospheres o	n Living Roots (C3) Saturation Visible on Aerial Imagery (C9)
Drift Deposits (B3) Presence of Reduced Iron	
Algal Mat or Crust (B4) Recent Iron Reduction in	
Iron Deposits (B5) Thin Muck Surface (C7)	Shallow Aquitard (D3)
Inundation Visible on Aerial Imagery (B7) Other (Explain in Remark	
Sparsely Vegetated Concave Surface (B8)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes No Depth (inches): Water Table Present? Yes X No Depth (inches): <u>6 inches</u>	
Saturation Present? Yes No Depth (inches):	N N
(includes capillary fringe)	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previou	is inspections), if available:
Remarks:	
Observations were made during a dry period. The sal stream (located in a floodplain of this stream) and a re	ocky/talus slope.
A high water table at a 6 inch depth was observed with	

plot seeps (surface water [A1]) at the toe of the adjacent rocky/talus slope are present. In some instances, these seeps produce surface flow to the creek, while others demonstrate ponding at the soil surface.

VEGETATION – Use scientific names of plants.

20 x 25 #	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 20 x 35 ft)	<u>% Cover</u>	Species?	Status	Number of Dominant Species
1. Alnus glutinosa	65	Y	FACW-	That Are OBL, FACW, or FAC: (A)
2. Acer platandoides	5	N	NL	Total Number of Dominant
3				Species Across All Strata: (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: (A/B)
6				
				Prevalence Index worksheet:
7	70	Table		Total % Cover of: Multiply by:
10 × 10 ft	10	= Total Cov	ver	OBL species $0 x = 0$
Sapling/Shrub Stratum (Plot size: 10 x 10 ft)	10	V	FACU	FACW species 65 x 2 = 130FAC species1x 3 = 3
1. Ligustrum vulgare	10	Y	FACU	FAC species1 $x 3 = \frac{3}{2}$ FACU species22 $x 4 = \frac{88}{2}$
2				
3				UPL species 0 x 5 = 0 Column Totals: 87 (A) 221 (B)
4				
5				Prevalence Index = $B/A = 2.5$
6				Hydrophytic Vegetation Indicators:
				Rapid Test for Hydrophytic Vegetation
7	10			Dominance Test is >50%
	10	= Total Cov	ver	Prevalence Index is $\leq 3.0^1$
Herb Stratum (Plot size:)	_			Morphological Adaptations ¹ (Provide supporting
1. Duchesnea indica	7	Y	FACU-	data in Remarks or on a separate sheet)
2. Alliaria petiolata	4	Y	FACU-	Problematic Hydrophytic Vegetation ¹ (Explain)
3. Toxicodendron radicans	1	Ν	FAC	1
4				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5				
				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9		<u> </u>		and greater than 3.28 ft (1 m) tall.
10			. <u></u>	Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in
	12	= Total Cov	ver	height.
Woody Vine Stratum (Plot size: 20 x 35 ft)				
1 N/A				
2				
3				Hydrophytic Vegetation
4				Present? Yes X No
		= Total Cov	ver	
Remarks: (Include photo numbers here or on a separate s	sheet.)			

The sampling plot contains bare areas lacking vegetation. The Duchesnea indica forms one \sim 4 x \sim 4 ft patch within the entire wetland area. Alliaria petiolata and Toxicodendron radicans are sparsely scattered throughout the plots. Alnus glutinosa (FACW-) is dominant in the canopy.

Photographs are included in the Wetland Delineation Report. Photograph 8 shows Sampling Plot W-2.

Profile Desc	cription: (Describe	to the de	pth needed to docum	nent the i	ndicator	or confirm	the absence	of indicators.)
Depth	Matrix	0/		<u>k Features</u>		12	T	Durada
<u>(inches)</u> 0-6	<u>Color (moist)</u> 10 YR 2/1	<u>%</u> 100	Color (moist)	%	Type ¹	Loc ²	Texture Sandy Loam	Remarks
6-12	10 YR 4/2	70	10 YR 4/6, 3/6, 5/2&5/8	10.10.10			Sandy Loam	mottles
								motilos
Hydric Soil Histosol Histic Eț Black Hi Hydroge Stratified Depleted ✓ Thick Da Sandy M Sandy G Sandy R Stripped	Indicators:	e (A11)	I=Reduced Matrix, CS Polyvalue Below MLRA 149B) Thin Dark Surfa Loamy Mucky M Loamy Gleyed M ✓ Depleted Matrix Redox Dark Sur Depleted Dark Sur Redox Depressi B)	v Surface ce (S9) (L lineral (F1 Matrix (F2 (F3) face (F6) Surface (F	(S8) (LRF .RR R, MI)) (LRR K)	R R, LRA 1498	Indicators 2 cm M Coast 5 cm M Dark S Polyva Thin D Iron-M Piedm Mesic Red P Very S	cation: PL=Pore Lining, M=Matrix. 5 for Problematic Hydric Soils ³ : Muck (A10) (LRR K, L, MLRA 149B) Prairie Redox (A16) (LRR K, L, R) Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L) alue Below Surface (S8) (LRR K, L) Dark Surface (S9) (LRR K, L) Ianganese Masses (F12) (LRR K, L, R) Spodic (TA6) (MLRA 144A, 145, 149B) 'arent Material (TF2) Shallow Dark Surface (TF12) (Explain in Remarks)
	f hydrophytic vegeta L ayer (if observed) :		etland hydrology mus	t be prese	ent, unless	s disturbed	or problemation	С.
Type: N//								
	ches):						Hydric Soil	Present? Yes X No
Remarks:	cnes):							

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tappan Zee Bridge Hudson River Crossing Project City/County:	Tarrytown/Westchester County Sempling Date: April 12, 2012
Investigator(s): Jim Nash and Aubrey McMahon, AKRF, Inc. Section, Tow	
Landform (hillslope, terrace, etc.): Hill slope/	ocal relief (concave, convex, none):
Slope (%): 0 Lat: Long:	Datum:
Soil Map Unit Name: Charlton Ioam 25 to 35% slopes (ChE)	NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X	No (If no explain in Remarks)
Are Vegetation <u>No</u> , Soil <u>No</u> , or Hydrology <u>No</u> significantly disturbed?	
Are vegetation, Soil, or Hydrology significantly distribut? Are Vegetation, Soil _No, or Hydrology _No naturally problematic?	
SUMMARY OF FINDINGS – Attach site map showing sampling	
	Sampled Area a Wetland? Yes X No
Wetland Hydrology Present? Yes X No If yes, Remarks: (Explain alternative procedures here or in a separate report.)	optional Wetland Site ID:
See remarks section in data form for Sampling Point W-	-1.
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	Surface Soil Cracks (B6)
Surface Water (A1) X Water-Stained Leaves (B9)	<u>X</u> Drainage Patterns (B10)
Outrace Water (A1) Water Outrace (B3) High Water Table (A2) Aquatic Fauna (B13)	Moss Trim Lines (B16)
X Saturation (A3)	Dry-Season Water Table (C2)
Water Marks (B1) Hydrogen Sulfide Odor (C1)	Crayfish Burrows (C8)
Sediment Deposits (B2) Oxidized Rhizospheres on Li	
Drift Deposits (B3) Presence of Reduced Iron (C	
Algal Mat or Crust (B4) Recent Iron Reduction in Till	
Iron Deposits (B5) Thin Muck Surface (C7)	Shallow Aquitard (D3)
Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks)	Microtopographic Relief (D4)
Sparsely Vegetated Concave Surface (B8)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes X No Depth (inches): ~ < 1 inch	
Water Table Present? Yes X No Depth (inches):	
Saturation Present? Yes X No Depth (inches): surface	Wetland Hydrology Present? Yes X No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous ir	anastiona) if available:
Describe Recorded Data (stream gauge, monitoring well, aenai photos, previous in	spections), il available.
Remarks:	
Observations were made during a dry period. The same	oling point is in between an intermittent
stream (located in a floodplain of this stream) and a roc	
	ky/talus slope.
Within the compling plot coope (ourface water [Ad]) at the	a too of the adjacent real/ultelue class are
Within the sampling plot seeps (surface water [A1]) at the	
present. In some instances, these seeps produce surface	ce now to the creek, while others
demonstrate ponding at the soil surface.	

VEGETATION – Use scientific names of plants.

1. Alnus glutinosa 55 Y FACW- Number of Dominant Species 3 (A) 2. Acer platandoides 5 N NL Total Number of Dominant 2 (B) 3. 4	Tree Stratum (Plot size: 20 x 35 ft)	Absolute	Dominant		Dominance Test worksheet:
2 Acer platandoides 5 N NL That Wold, PROM, or PR					
2	•	5	N	NL	That Are OBL, FACW, or FAC: (A)
4.	<u> </u>				Total Number of Dominant
5. That Are OBL, FACW, or FAC: 67 (AB) 6. Image: Segment Stratum 80 = Total (Cover Multiply by: 7. 80 = Total (Cover Multiply by: Multiply by: 9. 9. Total (S. cover of, Multiply by: Multiply by: 9. 9. FACU FACU FACU species x 4 =					
6.					
7. 60 = Total Cover Multiply by: Sapling/Shub Stratum (Plot size: 10 x 10 ft)) 0 = Total Cover X 1 =					
60 = Total Cover Sabing/Shub Stratum (Plot size: 10 x 10 ft) 1. Ligustrum vulgare 30 Y FACU 2					Prevalence Index worksheet:
Sabing/Shrub Stratum (Plot size: 10 x 10 ft)	7	60			
1. Ligustrum vulgare 30 Y FAC species x 3 =	10 - 10 #	00	= Total Cov	/er	
Provide support of the set of the			V	FAOL	
2	1. Ligustrum vulgare	30	Y	FACU	
3.	2				
4.	3				
5. Prevalence Index = B/A =	4				
6					Prevalence Index = B/A =
7. 30 = Total Cover Rapid Test for Hydrophytic Vegetation Herb Stratum (Plot size: 328 ± 3.28 ± (3 plot awe)) 1. Toxicodendron radicans 20 Y FAC 2. Ligustrum vulgare 5 N FACU Prevalence Index is s3.01 Provide supporting data in Remarks or on a separate sheet) 3. Alliaria petiolata 5 N FACU Problematic Hydrophytic Vegetation 1 (Explain) 1. folgonum cuspidatum 5 N FACU Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. 5.	6	<u> </u>			Hydrophytic Vegetation Indicators:
30 = Total Cover Herb Stratum (Plot size: 328 x 3.28 ft (3 plot ave)) 20 Y FAC 1. Toxicodendron radicans 20 Y FAC 2. Ligustrum vulgare 5 N FACU 3. Alliaria petiolata 5 N FACU 4. Polygonum cuspidatum 5 N FACU 5					Rapid Test for Hydrophytic Vegetation
Herb Stratum (Plot size: 1.428.3.2.8 ft a pot ave)) 1. Toxicodendron radicans 20 Y FAC 2. Ligustrum vulgare 5 N FACU 3. Alliaria petiolata 5 N FACU 4. Polygonum cuspidatum 5 N FACU 5. N FACU 6.		20	= Total Cov	/er	
1. Toxicodendron radicans 20 Y FAC Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet) 2. Ligustrum vulgare 5 N FACU Problematic Hydrophytic Vegetation' (Explain) 3. Alliaria petiolata 5 N FACU Problematic Hydrophytic Vegetation' (Explain) 4. Polygonum cuspidatum 5 N FACU Problematic Hydrophytic Vegetation' (Explain) 5. N FACU N FACU Problematic Hydrophytic Vegetation' (Explain) 6. N FACU N FACU Problematic. Definitions of Vegetation Strata: 7.	Herb Stratum (Plot size: ^{3.28 x 3.28 ft (3 plot ave)})				
2. Ligustrum vulgare 5 N FACU Problematic Hydrophytic Vegetation ¹ (Explain) 3. Alliaria petiolata 5 N FACU Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. 5. 5 N FACU Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. 6. 7 6 7 6 7 9. 9 9 9 9 10. 10. 10. 10. 10. 10. 11. 12. 35 = Total Cover 4. Woody Vine Stratum (Plot size: 20 × 35 ft) 1 11. 135 = Total Cover Hydrophytic Vegetation Present? No		20	Y	FAC	
3. Alliaria petiolata 5 N FACU- 4. Polygonum cuspidatum 5 N FACU- 5. N FACU- Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. 6.		5	N	FACU	
4. Polygonum cuspidatum 5 N FACU Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. 5.		5	N	FACU-	
6.		5	Ν	FACU	
7.					Definitions of Vegetation Strata:
8.					
9.					at breast height (DBH), regardless of height.
10.					
11.					
35 = Total Cover Woody Vine Stratum (Plot size: 20 X 35 ft) 1. N/A 2.	11				of size, and woody plants less than 3.28 ft tall.
35 = Total Cover Woody Vine Stratum (Plot size: 20 X 35 ft) 1. N/A 2.	12				, ,
1. N/A 2		35	= Total Cov	/er	neignt.
1. N/A 2	Woody Vine Stratum (Plot size: 20 X 35 ft)	_			
3.	, Ν/Δ				
3.					
4.					Hydrophytic
0 = Total Cover Remarks: (Include photo numbers here or on a separate sheet.) Photographs are included with the Wetland Delineation Report. Photographs 9 and 10 show					Vegetation
Remarks: (Include photo numbers here or on a separate sheet.) Photographs are included with the Wetland Delineation Report. Photographs 9 and 10 show				/er	Present? Yes <u>^</u> No
Photographs are included with the Wetland Delineation Report. Photographs 9 and 10 show	Remarks: (Include photo numbers here or on a separate		10101001		1
		,	lineation	Renor	t Photographs 9 and 10 show
			aliUl	rivehol	1. 1 Hotographs 2 and 10 Show

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth (inchoo)	Matrix	0/		x Features	5	Loc ²	Texture
<u>(inches)</u> 0-6	Color (moist) 10 YR 3/1 & 2/1	<u>%</u> 50/50	Color (moist)	%	Type ¹	LOC	<u>Texture</u> <u>Remarks</u> Silt Loam mucky mineral soil material
6-10	10 YR 4/1	100					Sandy Loam
10-15	10 YR 5/1	100					Silt Loam
16+	Gley 1 5/10 GY	100					Silt Loam
¹ Type: C=C Hydric Soil Histosol Histic E Black Hi Hydroge Stratifier Depleter ✓ Thick Da Sandy N	oncentration, D=Depl Indicators: (A1) bipedon (A2) istic (A3) en Sulfide (A4) d Layers (A5) d Below Dark Surface ark Surface (A12) Mucky Mineral (S1)		 Polyvalue Belov MLRA 149B) Thin Dark Surfa Loamy Mucky M Loamy Gleyed I Depleted Matrix Redox Dark Sur Depleted Dark Sur 	v Surface ce (S9) (L lineral (F1 Matrix (F2 (F3) face (F6) Surface (F	(S8) (LRF RR R, MI) (LRR K	R,	rains. ² Location: PL=Pore Lining, M=Matrix. Indicators for Problematic Hydric Soils ³ : 2 cm Muck (A10) (LRR K, L, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Dark Surface (S7) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L) Thin Dark Surface (S9) (LRR K, L) Iron-Manganese Masses (F12) (LRR K, L, R) Piedmont Floodplain Soils (F19) (MLRA 149B)
Sandy F	Gleyed Matrix (S4) Redox (S5) I Matrix (S6) rface (S7) (LRR R, N	ILRA 149B	Redox Depress				Mesic Spodic (TA6) (MLRA 144A, 145, 149B) Red Parent Material (TF2) Very Shallow Dark Surface (TF12) Other (Explain in Remarks)
	f hydrophytic vegetat			t ha nrasa	nt unloca	disturbed	
	Layer (if observed):		land flydrology ffids	t be prese	in, uness	uistuibeu	
Туре:							
	ches):						Hydric Soil Present? Yes X No
Remarks:							

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tappan Zee Bridge Hudson River Crossing P	roject _{Citv/County:} Tarry	town/Westchester County	Sampling Date: April 12, 2012	
Project/Site: Tappan Zee Bridge Hudson River Crossing P Applicant/Owner: New York Thruway Authority		State: NY	Sampling Point: W-4	
Investigator(s): Jim Nash and Aubrey McMahon, AKRF,	Inc. Section Township	Range	• • • • • • • • • • • • • • • • •	
Landform (hillslope, terrace, etc.): <u>Slope</u>			none	
Slope (%): <u>35</u> Soil Map Unit Name: <u>Charlton loam 25 to 35% slopes (Cl</u>	Long hE)		Δatum:	
Are climatic / hydrologic conditions on the site typical for this tir Are Vegetation <u>No</u> , Soil <u>No</u> , or Hydrology <u>No</u> sign Are Vegetation <u>No</u> , Soil <u>No</u> , or Hydrology <u>No</u> natu	ificantly disturbed?		resent? Yes X No	
SUMMARY OF FINDINGS – Attach site map sh				
-				
Hydrophytic Vegetation Present? Yes No Hydric Soil Present? Yes No Wetland Hydrology Present? Yes No Remarks: (Explain alternative procedures here or in a separation)	K within a weight of the second se	bled Area atland? Yes hal Wetland Site ID:		
This Sampling Point is located on a slope in data forms for Sampling Points W-1 thr wetland definition with respect to hydrolog	ough W-3. The Sa	impling Point does r	not meet the USACE	
HYDROLOGY				
Wetland Hydrology Indicators:		Secondary Indica	tors (minimum of two required)	
Primary Indicators (minimum of one is required; check all that	t apply)	Surface Soil		
	Stained Leaves (B9)	Drainage Pat		
	: Fauna (B13)	Moss Trim Li		
	eposits (B15)		Water Table (C2)	
	en Sulfide Odor (C1)	Crayfish Burr		
	ed Rhizospheres on Living F			
	ce of Reduced Iron (C4)		ressed Plants (D1)	
	Iron Reduction in Tilled So			
	uck Surface (C7)	Shallow Aqui		
	Explain in Remarks)		phic Relief (D4)	
Sparsely Vegetated Concave Surface (B8)	. ,	FAC-Neutral		
Field Observations:				
Surface Water Present? Yes No X Depth	(inches):			
Water Table Present? Yes No X Depth	(inches):			
Saturation Present? Yes <u>No X</u> Depth (includes capillary fringe)	(inches):	Wetland Hydrology Presen	t? Yes <u>No X</u>	
Describe Recorded Data (stream gauge, monitoring well, aer	ial photos, previous inspect	ions), if available:		
Remarks:				
Nonano.				

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-ft radius	Absolute	Dominant		Dominance Test worksheet:		
Acer platandoides	<u>% Cover</u> 70	<u>Species?</u> Y	NL	Number of Dominant Species That Are OBL EACW or EAC: 0 (A)		
2. Alnus glutinosa	10	-	FACW-	That Are OBL, FACW, or FAC: 0 (A)		
				Total Number of Dominant		
3				Species Across All Strata: <u>2</u> (B)		
4				Percent of Dominant Species That Are ORL EACIW or EAC: 0 (A/R)		
5				That Are OBL, FACW, or FAC: 0 (A/B)		
6				Prevalence Index worksheet:		
7				Total % Cover of: Multiply by:		
	80	= Total Cover		OBL species x 1 =		
Sapling/Shrub Stratum (Plot size: 15-ft radius)				FACW species x 2 =		
1				FAC species x 3 =		
2				FACU species x 4 =		
				UPL species x 5 =		
3				Column Totals: (A) (B)		
4				Prevalence Index = B/A =		
5			<u> </u>			
6				Hydrophytic Vegetation Indicators:		
7				Rapid Test for Hydrophytic Vegetation		
	N/A	= Total Cov	/er	Dominance Test is >50%		
Herb Stratum (Plot size:				Prevalence Index is $\leq 3.0^1$		
1. Alliaria petiolata	7	Υ	FACU-	Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)		
2				Problematic Hydrophytic Vegetation ¹ (Explain)		
3				¹ Indicators of hydric soil and wetland hydrology must		
4				be present, unless disturbed or problematic.		
5				Definitions of Vegetation Strata:		
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter		
7				at breast height (DBH), regardless of height.		
8				Sapling/shrub – Woody plants less than 3 in. DBH		
9				and greater than 3.28 ft (1 m) tall.		
10				Herb – All herbaceous (non-woody) plants, regardless		
11				of size, and woody plants less than 3.28 ft tall.		
12.				Woody vines – All woody vines greater than 3.28 ft in		
	7	= Total Cov	/er	height.		
Woody Vine Stratum (Plot size: 30-ft radius)		- 10121 005				
1. N/A						
2						
3				Hydrophytic Vegetation		
4			. <u> </u>	Vegetation Present? Yes <u>No X</u>		
	0	= Total Cov	/er			
Remarks: (Include photo numbers here or on a separate	sheet.)					

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)										
Depth	Matrix			x Features	1 . 2					
(inches)	Color (moist)	%	Color (moist)	<u>%</u> T	ype ¹ Loc ²		Remarks			
0-8	10 YR 5/4 & 4/4			·		Silty Loam				
8-12	10 YR 5/4 and 4/6	90/10				Silty Loam				
				·						
				· <u> </u>						
				·						
				·						
				·						
				·						
				· ·						
·				·						
¹ Type: C=Co	oncentration, D=Depl	etion RM=		=Covered or	Coated Sand	Grains ² I o	ocation: PL=Pore Lining, M=Matrix.			
Hydric Soil I					ooulou ounu		s for Problematic Hydric Soils ³ :			
Histosol	(A1)		Polyvalue Below	v Surface (S8	3) (LRR R,	🗌 2 cm	Muck (A10) (LRR K, L, MLRA 149B)			
Histic Ep	pipedon (A2)		MLRA 149B)				t Prairie Redox (A16) (LRR K, L, R)			
Black His	. ,		Thin Dark Surfa	. , .			Mucky Peat or Peat (S3) (LRR K, L, R)			
	n Sulfide (A4)		Loamy Mucky M		_RR K, L)		Surface (S7) (LRR K, L)			
	l Layers (A5) l Below Dark Surface	ο (Δ11)	Loamy Gleyed I Depleted Matrix				ralue Below Surface (S8) (LRR K, L) Dark Surface (S9) (LRR K, L)			
	ark Surface (A12)	= (ATT)	Redox Dark Su	. ,			Manganese Masses (F12) (LRR K, L, R)			
	lucky Mineral (S1)		Depleted Dark S	. ,			nont Floodplain Soils (F19) (MLRA 149B)			
Sandy G	leyed Matrix (S4)		Redox Depress	ions (F8)		Mesio	c Spodic (TA6) (MLRA 144A, 145, 149B)			
	edox (S5)						Parent Material (TF2)			
	Matrix (S6)						Shallow Dark Surface (TF12)			
	face (S7) (LRR R, N	ILRA 1496	3)				r (Explain in Remarks)			
³ Indicators of	hydrophytic vegetat	ion and we	tland hvdrology mus	t be present.	unless disturb	ed or problemat	ic.			
	ayer (if observed):		,							
Туре:										
Depth (inc	ches):					Hydric So	il Present? Yes <u>No X</u>			
Remarks:										
Remarks.										