APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): June 19, 2020 - AJD Form # 2 for W/S-1, W/S-2, W/S-5 and P/PW-1.

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: NAE-2019-00514, North Stonington Solar Center, LLC c/o Adapture Renewables, Inc.

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: CT County/parish/borough: New London City: North Stonington
Center coordinates of site (lat/long in degree decimal format): Lat. 41.418730° **N**, Long. -71.836247° **W**.
Universal Transverse Mercator: 18
Name of nearest waterbody: Pawcatuck River
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Pawcatuck River
Name of watershed or Hydrologic Unit Code (HUC): 01090005 Pawcatuck-Wood, CT, RI
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☒ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: April 17, 2019, November 27, 2019 and December 17, 2019
☒ Field Determination. Date(s): April 18, 2019

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** *"navigable waters of the U.S."* within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. Waters of the U.S.

a. Indicate presence of waters of U.S. in review area (check all that apply): [1]

☒ TNWs, including territorial seas
☒ Wetlands adjacent to TNWs
☒ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
☐ Non-RPWs that flow directly or indirectly into TNWs
☒ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
☐ Impoundments of jurisdictional waters
☐ Isolated (interstate or intrastate) waters, including isolated wetlands

b. Identify (estimate) size of waters of the U.S. in the review area:

Non-wetland waters: 9061 linear feet: 2-70 width (ft) and/or acres.
Wetlands: 33.5 acres.

c. Limits (boundaries) of jurisdiction based on: **1987 Delineation Manual**

Elevation of established OHWM (if known):The Base Flood Elevation in the Pawcatuck River is identified as between 25-feet and 26.5 feet adjacent to the project site. Other boundaries have been established in accordance with OHWM without known elevation as the topography of the site is variable and wetlands have been documented in accordance with the federal wetland delineation manual and the north-central/north-east regional supplement.

2. Non-regulated waters/wetlands (check if applicable):[3]

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
Explain: .

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW

Identify TNW: **Pawcatuck River**.

Summarize rationale supporting determination: The Pawcatuck River is an (a)(2) water that serves as the interstate jurisdiction line between the states of Connecticut and Rhode Island. It is a perennial tributary with a watershed area of approximately 317 square miles, that at its lowermost extent, is tidal being subject to the ebb and flow of the tide. At the project site the river is "Navigable-in-Fact" purusant to 33 CFR Part 328.3(a)(1). Factors considered in making this determination included that there is a past, present, or potential presence of interstate foreign commerce, with or without reasonable improvements; the waterway is capable of being used for purposes of commerce, no matter what mode the commerce may be conducted; it is traversable even if it has "occasional natural obstructions or portages; it is capable of use as a highway of commerce and described as navigable-in-fact; and current use by boats demonstrates the availability of the stream for the simpler forms of commercial navigation (See discussion in Section IV.B. below (also MFR in file).

2. Wetland adjacent to TNW

Summarize rationale supporting conclusion that wetland is "adjacent": The wetland area for PW-1 totals approximately 10 acres. The resource area is configured adjacent to the Pawcatuck River as bordering and contiguous forested floodplain wetland (PFO1E) inundated by normal riveine flows from the Lower Perennial (R2UBH) river system . The wetlands physically abut and, in some cases, are contained within the bounds of the OHWM and thus meet the definition of adjacent pursuant to 33 CFR 328.3(c). These wetland features possess an unbroken surface connection to this WOUS. .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:

Watershed size: 25-58 **acres**
Drainage area: 25-58 **Pick List**
Average annual rainfall: 49 inches
Average annual snowfall: 30 inches

(ii) Physical Characteristics:

(a) Relationship with TNW:

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

☒ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **1 (or less)** river miles from TNW.
Project waters are **1 (or less)** river miles from RPW.
Project waters are **1 (or less)** aerial (straight) miles from TNW.
Project waters are **1 (or less)** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

Identify flow route to TNW[5]: S-1, S-2 and S-5 flow directly into the TNW (Pawcatuck River) within the bounds of the review area or just outside of the review area where they are situated between 600 and 900 feet upslope of the TNW. S-1 is impounded in its upper drainage area before being conveyed down to the utility ROW where it is passed through the access road via a culvert. From this point S-1 flows downslope approximately 400 feet to discharge into the TNW and its abutting wetland. S-2 follows a less confined route through multiple braided drainage features before it is impounded just upslope of the utility ROW/access road. Flow is passed through and over the "french mattress" road design before it is conveyeyed via confined channel approximately 600 feet to intersect with the TNW and its abutting riverine wetland area. S-5 follows a meandering route before being impounded at a mining berm and diverted around the former pit. After the diversion the tributary is passed via culvert under the former mining road and into a manmade conveyance constructed to replace the original channel and then another 600 feet before a confluance with the TNW.

.

Tributary stream order, if known: S-1 and S-2 are first order streams. S-5 is considered a second order stream as another seasonal RPW (S-6) converges with this feature before entering the TNW in floodplain wetlands below the utlity ROW/access road.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☒ Natural
☐ Artificial (man-made). Explain: .
☒ Manipulated (man-altered). Explain: Portions of the tributary remain natural in character and development with meandering trajectories and sediment sorting while other areas of the tributaries have been impounded and piped, most notably at the former mining road and current utility access road or otherwise diverted through manmade conduits.

Tributary properties with respect to top of bank (estimate):
Average width: 3 to 6 feet
Average depth: 1.5 to 5 feet
Average side slopes: **3:1 .**

Primary tributary substrate composition (check all that apply):

☒ Silts	☒ Sands	☐ Concrete
☒ Cobbles	☒ Gravel	☐ Muck
☐ Bedrock	☒ Vegetation. Type/% cover: 25% emergent at manmade impoundment and 35% forested/shrub upslope of access road impoundment.	
☐ Other. Explain: .		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: Where we observed them the tributaries in the upper reaches of the waterways are mostly stable and meander in a natural manner except where they have been modified by anthropogenic activity. Subrates are finer, consisting of well-sorted fine sand or braids between vegetation. As the topography steepens midway at S-1 and S-2 and approximately at two-thirds total length for S-5, the stream features become straighter and present with undercut banks and courser bed substrates. Immediately downstream of the utility access road the features are incised where flow volume has been concentrated. These areas exhibit 2 to 1 side slopes with undercutting.

.

Presence of run/riffle/pool complexes. Explain: In the upper portion of the tributary drainages small seasonal pools on steep gradient are created through debris dams and topographical differences within the forested portion of the tributaries before they converge into a confined feature at the base of slopes. .

Tributary geometry: **Relatively straight**
Tributary gradient (approximate average slope): 3-8 %

(c) Flow:

Tributary provides for: **Seasonal flow**
Estimate average number of flow events in review area/year: **2-5**

Describe flow regime: The flow characteristics for these streams can be attributed to geomorphic setting, climatic condition, seasonal water table and surficial sediment (parent) material. In New England the addition of persistent groundwater to normal seasonal precipitation results in continuous low-volume flow seasonally (usually December through May) in these tributaries. At the uppermost extent of these tributaries the continuity of flow may initially be fragmented before developing reliable indicators of flow further downstream. At their confluence with the TNW S-1, S-2 and S-5 are seasonal RPWs. The source of hydrology feeding the tributaries is a source of seasonally high groundwater, possibly supplemented by snow pack contributing to snow melt in very poorly

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

drained glacial till with moderate to steep slopes. Regionally these systems are inundated or saturated to the surface and flow freely from late-winter through early spring, usually commencing with the first thaw in February and continuing through full lead-out sometime around mid to late May.

Other information on duration and volume: USGS StreamStats seasonal flow statistics report based on similar watershed regression modeling indicates that flows are likely to be range from between 0.05 (22 gmp) to 0.1 cfs (45 gpm) during the late winter and early spring when groundwater intercepts the surface when flow equals or exceeds mean annual flow. It is these events that exceed mean but occur with some regularity that are expected to maintain channel geometry and contribute to the development of the OHWM. Snow melt and precipitation events are going to be additive to this figure.

Surface flow is: **Discrete and confined.** Characteristics: At the upper extent of these tributary features surface flow is discrete and can be found in multiple braided channels or a single active channel that allows flow to intercept adjacent low-lying areas with development of point bars in some locations. Where there is no modification, the streams display natural stability and very little erosion. As the topography of the site increases, especially below the utility access road, surface flow displays a more confined character with incised banks. The features at this location are very much influenced by landform (constricted by topography). In some locations the channel appears less resistant to seasonal fluctuations and is contributing sources of sediment downstream where normally rock/cobble bed would be the prevailing condition.

Subsurface flow: **No**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☒ Bed and banks
☒ OHWM[6] (check all indicators that apply):

☒ clear, natural line impressed on the bank	☒ the presence of litter and debris
☒ changes in the character of soil	☐ destruction of terrestrial vegetation
☐ shelving	☐ the presence of wrack line
☐ vegetation matted down, bent, or absent	☒ sediment sorting
☒ leaf litter disturbed or washed away	☒ scour
☒ sediment deposition	☒ multiple observed or predicted flow events
☒ water staining	☒ abrupt change in plant community
☐ other (list):	

☒ Discontinuous OHWM.[7] Explain:In multiple locations along the tributaries manmade modifications to the subject site have resulted in redirection, piping or modification of the pathway and periodicity of the streambed of S-1, S-2 and S-5. Most notably are the berms and drainage features erected for mining diversion of S-5, the utility corridor access road and associated piping and conveyance that bisects all three of the tributaries. At these locations the OHWM was briefly obscured by the manmade conveyance. A combination of on-site investigation and remote resources was used to verify that where the OHWM varied a reliable indicator could be found both upstream and downstream from the feature. Our analysis confirmed that the manmade changes to the site have not severed flow, but redirected it either through or around impediments. Once the impediment is cleared an OHWM was discernible and continous from that point onward to the next impediment or to confluence with the TNW.

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:	☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects	☐ survey to available datum;
☐ fine shell or debris deposits (foreshore)	☐ physical markings;
☐ physical markings/characteristics	☐ vegetation lines/changes in vegetation types.
☐ tidal gauges	
☐ other (list):	

(iii) Chemical Characteristics:

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Like most headwater streams in New England the chemical character is influenced by landscape and landform. The higher elevation portions of S-2 and S-5 with little slope change had a darker (slight brown) coloration consistent with the presence of large amounts of decomposing organic material. As flow increased with slope, stream color, especially in S-5 transitioned to transparent which is a reflection of cold water and high oxygenation. The chemical stream character of S-2 has been severely impacted by ongoing agricultural activity and possessed suspended sediment from exposed soils (cultivated areas). At lower elevations (below the utlity ROW) all three tributaries transitioned to a slightly orange/brown tint typical of New England streams where the natural mineral content has been variably exposed to an oxygentated environment.

Identify specific pollutants, if known: Because of the agricultural land use practices adjacent to or directly within S-1 and S-2 these features will possess components from organic (compost) and inorganic fertilizer and may contain pesticides/herbicides from decades of agricultural production. S-5 is less likely to possess such constituents as it is completely surrounded by mature woodland.

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

☒ Riparian corridor. Characteristics (type, average width): S-5 and S-2 possess riparian wetland corridor on one or both side of the tributary ranging from 50 feet to 300 feet wide. S-1 has a vary narrow riparian wetland corridor as it has been modified by agricultural landuse and habitat conversion. Where the wetlands are encroached upon by agricultural use and historic modification the vegetative community is dominated by disturbance-tolerant emergent vegetation, small shrubs and invasive vines. When the tributaries enter the older forested landscape the wetland areas take upon a more natural configuration and vertical vegetated community structure.

☐ Wetland fringe. Characteristics: .

☒ Habitat for:

☐ Federally Listed species. Explain findings: .

☐ Fish/spawn areas. Explain findings: .

☐ Other environmentally-sensitive species. Explain findings: .

☒ Aquatic/wildlife diversity. Explain findings: The tributaries are contigous with an interconnected network of upland forest and floodplain wetland contigous with the Pawcatuck River. Wetland dependent non-avian vertebrates such as mink, fisher, opossum, spotted turtle, box turtle, gray tree frog, little brown bat and spring peeper are common and are expected to use the habitat and contribute to the biological productivity of the river. All 3 of the tributaries' riparian areas possessed a diversity of vegetation, especially berry producing shrubs and tuber-producing herbs that would be used by wildlife that forage in wetlands. However, the quality of the aquatic habitat function varied between these features depending upon nearby uses. The upper portion of W-5, which is best described as a red maple swamp, had a higher level of aquatic function due to landscape setting and contiguous area of unfragmented forest. W-2 had the highest density of berry producing shrubs as it had a broader wetland boundary and more diffifuse flow throughout. The depth of the water within portions of these features as well as their character is sufficient to provide habitat for obligate macroinvertebrates (caddisfly larvae cases were observed in multiple reviewed tributary locations) and stream-oriented frogs such as leopard frog, fowlers toad and eastern newt.

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: 36 acres

Wetland type. Explain:The predominant wetland type associated with S-1, S-2 and S-5 are palustrine forested broad-leaved deciduous wetlands that are either temporarily flooded, seasonally flooded or seasonally saturated. W-1 does possess an emergent wetland that is associated with a broad hillside seep that has been converted to agriculture. There is also a small component of flooded emergent wetland within W-1 created by a manmade berm. Vegetation dominant here includes Juncus spp., Carex spp. Typha spp., Eutrochium spp. and Symplocarpus foetidus.

Wetland quality. Explain: Water quality in the upper undisturbed portions of these wetlands is good; relatively clear and cold. The disturbed wetland areas possess fair water quality and as they are impacted by agricultural activity and unconsolidated sediment discharge as runoff from unvegetated fields.

Project wetlands cross or serve as state boundaries. Explain: N/A.

(b) General Flow Relationship with Non-TNW:

Flow is: **Intermittent flow**. Explain: The wetlands are fed by seasonal (spring and winter) groundwater seeps at landform slope transitions and the majority of flow in the wetland and associated tribuaries is obtained via groundwater discharge during the late winter and early spring when the water table is at its highest and soils are completely saturated. The wetlands possess character and morphology attributed to very poorly drained soils which lead to variable flow dependent upon soil capacity. As the topography decreases flow volume increases due to multiple groundwater discharge locations throughout the wetland and associated stream reach and little opportunity for infiltration. Flow in and through these wetlands is not consistent along the entire length of the streams. Topography with depressions or manmade obstructions often result in ponding before volumetric capacity is reached by landscape configuration and flow. Consequently, some of the wetland areas will remain inundated or saturated year round (perennial) and may still contribute to flow during the dry season, while other locations that possess less poorly drained character/soils will dry out at the vegetation surface during the drier season.

Surface flow is**: Discrete and confined**

Characteristics: In the upper extent of the wetland areas surface flow within the wetland is discrete or distinct from the densely vegetated areas. A change in topography further down in the wetland where the glacial outwash transitions to terrace results in discrete and confined flow and features exhibiting clear bed and banks.

Subsurface flow: **Unknown**. Explain findings: Due to areas of unconsolidated coarse sand at the site it is possible that there may be areas of subsurface flow that resurfaces into the tributary further downslope. These flows would continue to feed the wetland system but would not be evident without additional evaluation. Such additional investigation will not change the outcome of this evaluation and not deemed necessary.

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

☒ Directly abutting

☐ Not directly abutting

☐ Discrete wetland hydrologic connection. Explain: .

☐ Ecological connection. Explain: .

☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW
Project wetlands are **1 (or less)** river miles from TNW.
Project waters are **1 (or less)** aerial (straight) miles from TNW.
Flow is from: **Wetland to navigable waters.**
Estimate approximate location of wetland as within the **500-year or greater** floodplain.

(ii) Chemical Characteristics:
Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: The wetland systems associated with this AJD possess high organic content ranging in color from slightly brown to relatively clear. Where the wetland areas are surrounded by upland forest or dense vegetation water quality is clear even in the presence of high organic matter.
Identify specific pollutants, if known: Unconsolidated sediment from plowed farm fields is present in the upper wetland areas that abut agriculture use. Components of agricultural products including organic and inorganic fertilizers, pesticides and herbicides are expected to be present in the system due to the long agricultural history of this site.

(iii) Biological Characteristics. Wetland supports (check all that apply):
☒ Riparian buffer. Characteristics (type, average width):PFO or PSS of variable width from 100 to 600 feet wide.
☒ Vegetation type/percent cover. Explain: Upper wetland areas possess a mix of hydrophytic vegetation with a relatively robust herbaceous layer with greater than 90% cover. As topography changes the community is dominated more by dense shrub layer or trees. Cover is estimated at 60 to 75%.
☒ Habitat for:
☒ Federally Listed species. Explain findings:The more mature forested sections of W-2 and W-5 may possess suitable maternity or roost trees for the endangered northern long-eared bat. However, the site has not be surveyed so this statement is only supported by the fact that larger trees with loose exfoliating bark that equal or exceed 3 inches diameter breast height are present within the wetlands.
☐ Fish/spawn areas. Explain findings: .
☒ Other environmentally-sensitive species. Explain findings:A portion of W-5 is identified by the CT DEEP natural diversity database as designated habitat for the state-endangered spadefoot toad. This amphibian uses shallow emphemeral wetland pools to complete its reproductive life cycle.
☒ Aquatic/wildlife diversity. Explain findings:The wetlands are a component of a relatively undeveloped habitat corridor abutting a large riverine system that is federally recognized as a National Wild and Scenic River System and they possess a variety of berry-producing shrubs and mast-producing trees that will be used by wildlife. Portions of these wetlands possess suitable habitat characteristics for the eastern box turtle, the wood turtle and the spotted turtle as well as aquatic habitat for wetland-dependent frogs and salamanders.

3. Characteristics of all wetlands adjacent to the tributary (if any)
All wetland(s) being considered in the cumulative analysis: **3**
Approximately (36) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)
W-1 Yes	4.9	W-2 Yes	9.8
W-5 Yes	8.8		

Summarize overall biological, chemical and physical functions being performed: These three wetlands are being considered cumulatively together because they possess similar structural and ecological character and function in combination to contribute the following wetland functions that help maintain the chemical, physical and biological environment of the TNW (Pawcatuck River). The principal functions we document are groundwater discharge/recharge, sediment/toxicant retention, nutrient removal and wildlife habitat. The wetlands are fed by groundwater seeps and springs which provide a strong source of clear, cold groundwater water that contributes base flow to the Pawcatuck River to maintain water quality and fish habitat. Conversely, during the dry season sources of precipitation in absence of the water table will contribute infiltration to recharge the aquifer, though the rate is completely dependent on the porosity of the underlying substrate. Two of these wetlands (W-1 and W-2) are located downslope and/or immediately adjacent to active agricultural lands. They possess dense vegetation that slow water velocity and serve to filter and trap unconsolidated sediment, agricultural nutrients (especially phosphorus), and contaminants before they can be conveyed into the Pawcatuck River. As evidenced by sediment accumulated on the edge of the wetlands adjacent to the active agricultural areas, these wetlands are quite effective at trapping this material within the upper portion of the headwater system. This function is quite significant, physically discernible and more than speculative or insubstantial for the maintenance of chemical and physical characteristics of the river. Additionally, W-1, W-2 and W-5 prolong the retention of water in the presence of deep organic materials to sequester carbon, while the shallow flows within the tributaries faciliate denitrification, tranforming excess nutrients into vegetative matter and food sources for wildlife. The natural biological productivity of W-5 and W-2 contributes to the production of detritus and food sources that are exported in braided hydrologic connections to be disseminated as nitrate export or throughout trophic pathways. W-5 is a component of a much larger undisturbed wildlife corridor that facilates biological interaction between the stream, wetland dependent organisms and the Pawcatuck River.

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☒ TNWs: 5975 linear feet 90-150 width (ft), Or, acres.
   - ☒ Wetlands adjacent to TNWs: 10 acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☒ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: Assessment of multiple years of spring and winter aerial photographs document visible flow within a descrete and or confined feature during both winter and early spring indicating that these features possess flow consistently during this timeframe.

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   - ☒ Tributary waters: **3086** linear feet **2-6 feet** width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☒ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
     - ☒ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: During a site visit on April 18, 2019 staff observed the continous physical connectivity of these wetland areas to the tributaries. At least one side of the wetland abuts or is contiguous with its tributary.

   Provide acreage estimates for jurisdictional wetlands in the review area: **23.5** acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

[8]See Footnote # 3.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. Impoundments of jurisdictional waters.[9]

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.

- ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
- ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
- ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):

- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters: .
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
- ☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

- ☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:Figure 2 Existing Conditions Map dated June 2020.
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.

[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☒ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☒ U.S. Geological Survey Hydrologic Atlas: USGS The National Map accessed April 2019.
☒ USGS NHD data.
☒ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name:USGS NHD accessed November 2019.
☒ USDA Natural Resources Conservation Service Soil Survey. Citation:Web Soil Survey/SSURGO accessed April 2019.
☒ National wetlands inventory map(s). Cite name: NWI accessed via USFWS NWI Mapper accessed April 2019.
☒ State/Local wetland inventory map(s): Town of North Stonington accessed April 2019.
☒ FEMA/FIRM maps:09011c0412H 4/3/2020.
☒ 100-year Floodplain Elevation is: 25 to 26.5 feet (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):Various Sources in File Record.
or ☒ Other (Name & Date):Site visit on April 18, 2019; Provided by wetland scientist .
☐ Previous determination(s). File no. and date of response letter: .
☒ Applicable/supporting case law: See MFR in File.
☒ Applicable/supporting scientific literature: See MFR in File.
☒ Other information (please specify):USACE New England Wetland Functions & Values, A Descriptive Approach; USACE Jurisidictional Determination Guidebook (6/1/2007 version); U.S. EPA, Connectivity of Streams and Wetlands To Downstream Waters: A Review and Synthesis of the Scientific Evidence 2015 Final Report; USFWS Connecticut Wetlands: Characterization and Landscape-level Functional Assessment, March 2013; Freeman M.C., C.M. Pringle and C.R. Jackson, Hydrologic Connectivity and the Contribution of Stream Headwaters to Ecological Integrity at Regional Scales, JAWRA, Feb. 2007.

B. ADDITIONAL COMMENTS TO SUPPORT JD:

SECTION I.A - AJD Form #2 - Based upon physical character and hydrology aquatic features identified as S/W-1, S/W-2 and S/W-5 were consolidated for this analysis as we concluded that they were situated within similar landscape and topographical setting and possessed similar physical, chemical and biological characteristics that could be described cumulatively.

SECTION III.A.1 Justification for consideration of the Pawcatuck River as a Traditional Navigable Water (TNW) - Review of available documentation indicates that the Pawcatuck River, which separated the Rhode Island Colony from land that would become known as Connecticut, was the territory of the Pequot Indians until their defeat by colonists in 1639. After the defeat of the Pequot's the territory between the Thames River and the Pawcatuck River was opened up to the colonists. Thomas Stanton, one of the first settlers of Stonington acquiring over 20,000 acres, petitioned the General Court of Connecticut for approval, and in 1651 erected a trading post on the west bank of the Pawcatuck River, near a place known ever since as Pawcatuck Rock. Stanton regularly engaged in fur trading with the Indians on the Pawcatuck River. The site of the trading house was selected for access to a natural deep-water channel and steep slopes such that canoes and sailing vessels could easily pull up and unload their furs in exchange for beads, metal tools, nails, cloth etc. The trading post was the first known commercial enterprise in Stonington, CT. Review of multiples sources in RI and CT, demonstrates that the Pawcatuck River is the primary drainage for the 194,000 acre Pawcatuck River Watershed. The River's upper section is non-tidal but "navigable-in-fact" for approximately 35 miles from Shannock Falls (approximately 41.4475 degrees north and -71.6366 degrees east) to the head of tide at Westerly, RI. The tidal reach of the river empties into the ocean at Little Narragansett Bay. Waterborn recreation outdoor pages indicate that the waterway is used as the current site of the U.S. Canoe Association's RI Flatwater Championships and several commercial canoe and kayak rental facilities exist along the waterway, as well as fishing access areas and recreational ramp facilities. The entire waterway is regularly traversed by canoe in association with scientific educational classes from the University of Rhode Island's W. Alton Jones Campus. Finally, in addition to the lower portion of the Pawcatuck River being subject to the ebb and flow of the tide the feature serves as the interstate political jurisdictional boundary between the states of Connecticut and Rhode Island. In summary our review revealed that both historic and current records indicate that the waterway has been used in the past for the purpose of interstate commerce, it is currently capable of use as a highway for interstate commerce, and the majority of the waterway is navigable by craft historically used in simpler forms of interstate commerce.

SECTION III.B.1.ii.(c). Discontinuous OHWM - Because there was some indication that OHWM discontinuities for some of the tributaries, including S-5, occurred outside of the area of evaluation (review area), we relied on the data submitted by the consultant and remote sources including aerial photography and lidar land surface elevation imaging to document indicators of flow both upstream and downstream of visible breaks. Remote resources indicate that S-5 and its pathway has been significantly altered by previous sand mining. However, remote documentation clearly depicts physical surface water connectivity to the Pawcatuck River.

SECTION III.B.1 and 2 - There is a reasonable amount of scientific documentation that has successfully addressed the role of headwater streams to the maintenance of downstream water quality and their ecological and biological linkage to large riverine systems (References below and in supporting file documentation). For example, the use of a mass-balance model indicates that first-order headwaters such as W-1, W-2 and W-5, on a cumulative scale, contribute approximately 70 percent of the mean annual water volume and 65 percent of the mean annual nitrogen flux in second-order streams, and therefore these tributaries appreciably influence downstream water quality and quantity and function to regulate the supply and transport of nitrogen which is needed for healthy downstream aquatic ecosystems (Richard B Alexander*). These first and second order headwater tributaries modify the nitrogen and other organic material instream to facilitate transformation and removal of the nutrients (Takashi, Bruce J Peterson, Brian J. Roberts*). Research has also revealed that the rate of nitrogen uptake and removal declines in a downstream direction with an increase in stream size, and therefore headwater tributaries such as

those above are very important to the chemical quality of water which is ultimately transformed by physical stream size into a TNW (Brian J. Roberts).

Removal of S-1, S-2 and S-5 and their abutting wetlands either individually, or of similarly situated waters or wetlands on a cumulative scale, will result in a change in the periodicity of retention and a reduction in the gradual release of flows after storms. These conditions will reduce the time allotted for processing of nitrogen in low order streams and increase the distance that untransformed nutrients can travel in the Pawcatuck River, especially as these headwater streams are the major source of water volume within the entire system. This in tum will result in a higher input of nutrient loading than what can be processed by the TNW, especially if available nitrogen is already high from suburban development and agricultural uses and will ultimately lead to a greater frequency and magnitude of events in which water quality standards cannot be met either within the TNW (Pawcatuck River) or Little Narragansett.

In addition to the water quality function discussed above, most of the wetlands associated with the relevant reach of the project site demonstrates a moderate level of sediment and toxicant retention. A reasonable amount of ponding or retention is seasonally available within the subject wetlands, which can be evidenced by the extent of soil washout from the farm field and the permanence of water stains within the seasonally inundated wetland areas. Multiple braided flow channels and recurring debris dams along many sections of the S-1, S-2 and S-5 stream channels exhibit how these streams are contributing to an increase in water residence time, otherwise known as transient storage, which in turn is facilitating opportunity for infiltration to feed the aquifer and resulting in the deposition and retention of suspended solids including fine organic particulate materials and chemical constituents adsorbed to them. By retarding the flows which travel down the steep terrain, these streams and their abutting wetlands are cumulatively metering the conditions that otherwise have the potential to contribute to local flooding, but more importantly serves to moderate adverse water quality events (hypoxia and nuisance algae) downstream.

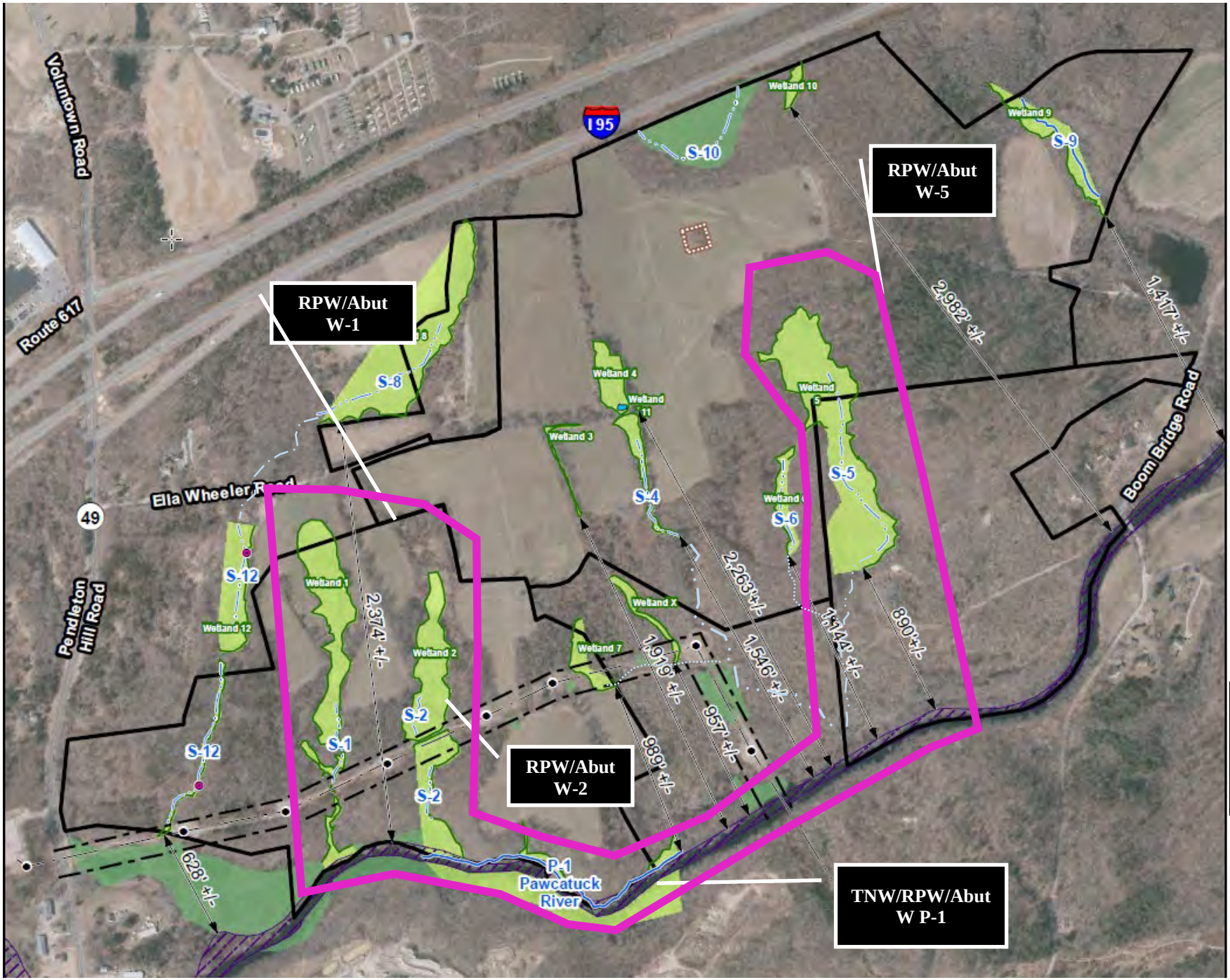
Our review revealed that the adjacent wetland areas associated with the subject tributaries possess the requisite materials to provide a source of biomass to the base of the Pawcatuck River detrital food chain. The configuration of these waterways on the landscape indicate that the flow with sufficient force to carry and ultimately export this biomass from the wetlands to the TNW. Consequently, there is a significant, demonstrable hydrologic-contributing ecologic nexus between the on-site waters, their adjacent wetlands and the Pawcatuck River (TNW).

*Richard B. Alexander et. al., The Role of Headwater Streams in Downstream Water Quality, Vol. 43, No. 1, Journal of the American Water Resources Association, February 2007
*Takashi Gomi et. al., Understanding Processes and Downstream Linkages of Headwater Systems, Bioscience Vol.52 No. 10, October 2002
*Bruce J. Peterson et. al., Control of Nitrogen Export from Watersheds by Headwater Streams, Science Vol 292, April 6, 2001.71
*Brian J Roberts et al, Effects of Upland Disturbance and Instream Restoration on Hydrodynamics and Ammonium Uptake in Headwater Streams, J. N. Am. Benthological Society, Vol 26 No. 1, 2007.

SECTION IV.A. Delineation datasheets provided by applicant - Our assessment of the field documentation identified several inconsistencies or errors in the application of federal delineation methodology. The most significant were multiple (at least four) attempts to use routine hydric soil indicators for disturbed or anthropogenically-modified sites (power-line right-of-way and farm fields). Realistically, these sites should have been evaluated using Chapter 5 of the 2012 Regional Supplement for Difficult Wetland Situations and Part IV Section F (Atypical Situations) of the 1987 Corps of Engineers Wetlands Delineation Manual. In these instances, the soil profiles did not meet a hydric indicator although the sites possessed suitable hydrology and/or hydric vegetation. This is not unusual, which is why such special procedures for disturbed areas exist. In at least two instances, secondary hydrology indicators were present but not documented, as the sample sites met the indicator for a dry season water table with ground water within 24-inches of the soil surface. We also found minor errors in the calculation of dominance test for documentation of hydrophytic vegetation as well as soils mischaracterized as “histosol” which was inconsistent with the recorded soil textures. Although present, these items did not result in an erroneous conclusion that would change the outcome of the delineation. In general, the data forms, when combined with our April 18, 2019 field verification of the features at the site, are enough to allow completion of this AJD. As such the dataforms provided by the applicant have been supplemented by best professional judgement and first-hand observation to complete this AJD.

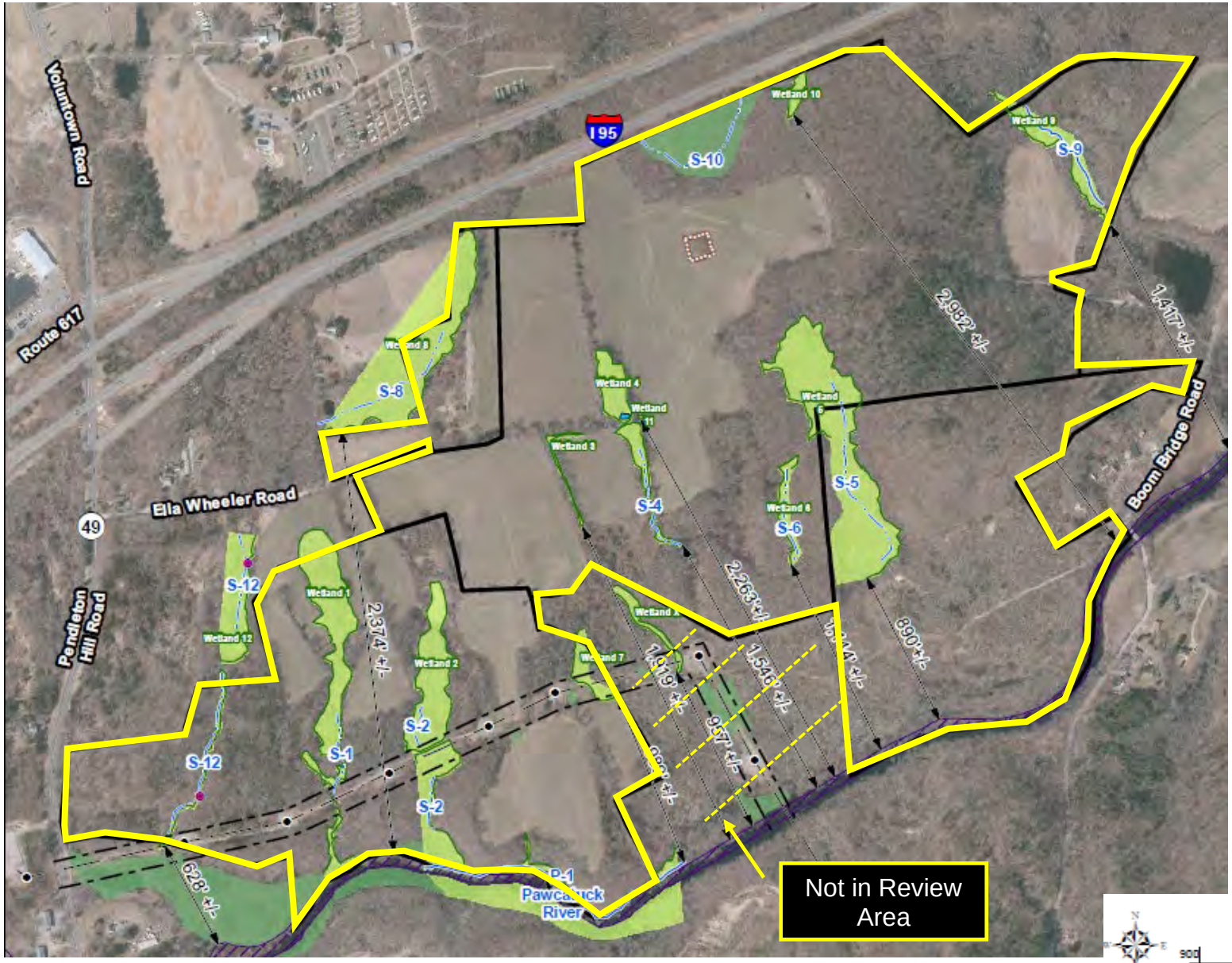
NORTH STONINGTON SOLAR CENTER NAE-2019-00514
Key to Jurisdictional Determinations Completed

AJD 2



Source: All-Points Technology Corp.
Created by: Cori M. Rose, USACE

NAE-2019-00514 APPROVED JURISDICTION REVIEW AREA



Source:
All-Points Technology
Existing Conditions Map

Created by: Cori M. Rose, USACE

Date: June 8, 2020

Legend

- Site
- Transmission Line
- Aproximate Transmission Right-of-Way
- Transmission Tower
- Culvert
- Perennial Watercourse Bank
- Intermittent Watercourse
- Delineated Wetland Boundary
- Delineated Wetland Area
- Approximate Wetland Area
- Vernal Pool
- Cemetery

Map Notes:
Base Map Source: CTECO 2019 Aerial Photograph
Map Scale: 1 inch = 900 feet
Map Date: June 2020

900 450 0 900 Feet