



## Memorandum

To: Aileen Kenney

Date: October 26, 2017

Project #: 42256.00

From: Jeffrey Peterson CPSS  
Susan Moberg PWS

Re: Exhibit C  
Habitat Assessment and Forest Characterization  
Tobacco Valley Solar, Simsbury Connecticut

This memo presents the findings of field surveys conducted at the Tobacco Valley Solar Project Site regarding natural diversity database (NDDDB) listed species and available habitat, forest characteristics and evaluation of interconnections between the Project Site and nearby open space and conservation areas.

### Habitat Assessment

As reported during the October 10, 2017 hearing, NDDDB staff reported that they do not have records for any state or federal listed plant or animal species occurring on the property. NDDDB staff reported that the list was prepared based on records from habitats along the Farmington River, Simsbury Airport, and others in the general proximity to the project.

After completing field surveys in spring (May 11<sup>th</sup> and June 8<sup>th</sup>), summer (August 14<sup>th</sup> and September 1<sup>st</sup>), and fall (October 17<sup>th</sup> to 18<sup>th</sup>) of 2017, it is VHB's opinion that the Project Site does not provide suitable habitat for the following taxa included in the NDDDB correspondence (reference Petition Exhibit J):

- The active crop fields do not provide suitable breeding habitat for the five listed Grassland bird species<sup>1</sup>;
- Davis' sedge, known to occur on moist/mesic floodplain of the Farmington River;
- Starry campion, known to occur in the floodplain forest of the Farmington River; and
- Northern leopard frog known to occur in grassy floodplain levees and above backwaters of the Farmington River.

VHB's field efforts on September 1, 2017 resulted in the location of one station of Dillenius' tick-trefoil (*Desmoidium glabellum*), a State-listed plant species of special concern. VHB also located a cluster of host plants for the larva of scribbled sallow moth (*Sympistis perscripta*), a State-listed moth of special concern on June 8, 2017. The host plant is common and not protected, but the area where it is present will be protected to avoid potential effect on the moth.

Field work performed by VHB on October 17-18, 2017 was conducted to collect data to develop this response to the interrogatory. VHB biologists collected data on the floristic composition, structure, and dominance by species at 22 30-foot diameter vegetation plots in the Project Site. These data were used to correlate the plant associations observed at each plot with the ten unique Key Habitats as described in the 2015 Connecticut Statewide Wildlife Action Plan<sup>2</sup> (CT SWAP). The habitat requirements and preferences of each of the listed species which were documented in the Wildlife Memo (reference Petition Exhibit I) and the Species Conservation Plan (reference Petition Exhibit J). The

<sup>1</sup> Grasshopper sparrow, savannah sparrow, horned lark, eastern meadowlark, and vesper sparrow,

<sup>2</sup> State of Connecticut Department of Energy and Environmental Protection Bureau of Natural Resources, 2015. Connecticut Wildlife Action Plan.

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Key Habitat types and the listed species that may utilize such habitats are mapped in the figure provided as Exhibit A to the Petitioners Responses to CSC Interrogatories Set 3 and described below. The Forest Data Plot forms (attached) describes the flora assemblage present at each habitat assessment plot.

- Upland Forest (CT SWAP Key Habitat 1): The mixed evergreen-deciduous woodlands support some of the sub-habitat types described in the CT SWAP, including oak forest and mixed hardwood forest. Most of the forested areas occupy glacial outwash terraces, kames, or terrace escarpments. Some forest areas show little sign of human disturbance while other areas have been excavated or are crossed by cart-paths or ATV trails. Common species in the forest include red oak (*Quercus rubra*), eastern hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*), white oak (*Quercus alba*), white pine (*Pinus strobus*), and American beech (*Fagus grandifolia*). Black birch (*Betula lenta*) or white pine recruitment often fills gaps in the canopy created by tree throw.

The shrub and herbaceous strata in these closed crown forests are sparse and provide little diversity. A complete species list for the forested plot is provided in the attached Forest Data Plot forms. These forests may provide habitat suitable for eastern whip-poor-will (*Caprimulgus vociferous*), silver bat (*Lasionycteris noctivagans*), red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), and northern long-eared bat (*Myotis septentrionalis*).

- Upland Forest Edge: In some areas where the agricultural field abuts the forested area there is little to no transitional zone between the forest and the field. These areas are considered forested edge and may support eastern hognose snake (*Heterodon platirhinos*), eastern box turtle (*Terrapene carolina carolina*) and wood turtle (*Glyptemys insculpta*).
- Upland Woodland and Shrub (CT SWAP Key Habitat 2): Transitional zones located between the forest and the agricultural fields are classified as sub-habitat Reverting Field and Early Successional Habitat. Common species in this habitat include common blackberry (*Rubus allegheniensis*), blackcap raspberry (*R. occidentalis*), smooth sumac (*Rhus glabra*) several goldenrod species (*Solidago sp.*) and common ragweed (*Ambrosia artemisiifolia*). This type of vegetative community was also the most prone to hosting invasive species such as Asiatic bittersweet (*Celastrus orbiculatus*), Morrow's honeysuckle (*Lonicera morrowii*) and multiflora rose (*Rosa multiflora*). This cover type appears suitable for brown thrasher (*Toxostoma rufum*), eastern box turtle, and eastern hognose snake. This habitat type also occurs within the Eversource Public Utility Transmission Corridor described below.
- Upland Herbaceous (Key CT SWAP Key Habitat 3): There are pockets of sub-habitat Sparsely Vegetated Sand and Gravel along farm access roads in the northern most parcel. This loose, sandy substrate appears to be suitable to support big sand tiger beetle, however this species was not encountered in these areas. Relatively frequent travel during certain periods of agricultural operations may preclude occupation by this species.
- Forested Inland Wetland (CT SWAP Key Habitat 4): Approximately 34 acres of the Project Site consists of forested wetland. The sub-habitat that occurs within this key habitat type is Red Maple Swamps. Common species observed in this vegetative community includes red maple, white pine (*Pinus strobus*), winterberry (*Ilex verticillata*), sweet pepperbush (*Clethra alnifolia*) and sensitive fern (*Onoclea sensibilis*). Eastern box turtle and wood turtle may inhabit this type of vegetative community.

- Freshwater Aquatic (CT SWAP Key Habitat 8): The three perennial tributaries to the Farmington River that flow through the Project Area are classified as sub-habitat Cold Water Streams. There are also four farm ponds that may be considered within the sub-habitat Ponds and their Shorelines. Each of the farm ponds support fish populations and are currently used as an irrigation source for the agricultural fields. These different waterbodies may support the eastern pearlshell (*Margaritifera margaritifera*), eastern pondmussel (*Ligumia nasuta*), dwarf wedgemussel (*Alasmodonta heterodon*), and the streams may support rapids clubtail (*Gomphus quadricolor*).
- Manmade – Public Utility Transmission Corridors (CT SWAP Key Habitat 10): The electric utility right-of-way that is maintained by Eversource is considered a manmade habitat because vegetation maintenance schedules remove vegetation that could grow to a height that would interfere with the overhead powerlines. The sewer line easement which is subject to periodic traffic is also considered a public utility transmission corridor. The frequent disturbance in these manmade habitats has maintained Early Successional Shrubland (described above) and Shrub Swamp and Herbaceous Upland/Inland Wetland (described below).
  - Shrub Inland Wetland (CT SWAP Key Habitat 5): A section of the Public Utility Transmission Corridor managed by Eversource consists of sub-habitat Shrub Swamp in the Project Site north of Saxton Brook. This cover type may be utilized by eastern box turtle and it could be visited by wood turtle foraging along the proximate Saxton Brook. This wetland was investigated for tall swamp rosette-panic grass (*Dichanthelium scabriusculum*) but none was found.
  - Herbaceous Upland/Inland Wetland (CT SWAP Key Habitat 3/6): The sewer line easement that parallels Bissell Brook does not have an improved road surface and supports herbaceous plant associations. The line is maintained frequently enough to prevent the establishment of woody vegetation, however the ecotone to the bordering forests includes shrubs. Both upland and wetland cover types are present. The density and height of the vegetation is greater in areas of greater light penetration. Common species observed include spreading dogbane (*Apocynium androsaemifolium*), tall goldenrod (*Solidago altissima*), rough-stemmed goldenrod (*S. rugosa*), sensitive fern, deer tongue (*Dichanthelium clandestinum*), and swamp dewberry (*Rubus hispidus*). This cover type may be utilized by eastern box turtle and wood turtle. Eastern whip-poor-will may use the forest opening for foraging.
- Manmade – Agricultural Fields (CT SWAP Key Habitat 10): Actively farmed agricultural fields occupy approximately 131 acres of the Project Area. If the fields were fallow then they may be utilized by the five NDDB listed grassland species of eastern meadowlark (*Sturnella magna*), horned lark (*Eremophila alpestris*), Savannah sparrow (*Passerculus sandwichensis*), grasshopper sparrow (*Ammodramus savannarum*) or vesper sparrow (*Pooecetes gramineus*). However, the actively managed state of the agricultural fields does not provide suitable habitat to these species because of their specific habitat requirements and the frequent disturbance from agricultural management.

## Forest Characterization

VHB biologists collected data on the floristic composition, structure, and dominance by species at 22 30-foot diameter vegetation plots in the Project Site. The three forest areas to be cleared would be classified as Upland Forest, Oak Forests according to the 2015 Connecticut Wildlife Action Plan (CT SWAP; see Exhibit A to the Petitioners Responses to CSC Interrogatories Set 3 "Key Habitat Characterization & Assessment Plots"). These forests are typically mixed with coniferous species, eastern hemlock (*Tsuga canadensis*) and/or white pine (*Pinus strobus*). Habitat characterization plots were documented on October 17-18, 2017 and data from these plots, which includes species composition, diameter at breast height (DBH) measurements, percent dominance by basal area and percent cover by lower strata is provided in the attached Forest Data Plot forms. Additionally, VHB overlaid the location of the habitat plots on the oldest aerial imagery available (1934 from UCONN Map and Geographic Information Center) to understand the changes in landscape cover between 1934 and the present day (see attached Project Area Map 1934 Aerial Imagery).

The 18.1 acres to be cleared in the northern parcel primarily occurs in two compartments, one north of the large cultivated field and one south of the field. The compartment north of the field is a mixed hardwood/coniferous forest that is uneven-aged. The median DBH from two sample plots is less than 12-inches with a few larger trees (e.g. 20-inch DBH) present within the stand. These largest trees may approach or exceed 100 years of age. Oaks are the dominant species and the coniferous component is provided by white pine and/or eastern hemlock. Several snags are present throughout the forest. Eastern hemlock is dominant at the bottom of the terrace escarpment along Munnisunk Brook. The shrub and herbaceous strata in this forest are sparse. Potentially suitable habitat for NDDB-listed species such as wood turtle is provided along Munnisunk Brook. Eastern whip-poor-will, red bat, hoary bat, silver bat, northern long-eared bat and eastern hognose snake may utilize the forest.

The clearing proposed south of the northern field area is also oak dominated with an eastern hemlock component. The median DBH is again less than 12 inches with significant recruitment of black birch and eastern hemlock filling voids in the canopy. Larger oaks and hickory ranging between 14 and 19 inches DBH are present.

The 7.2-acre Upland Forest to be cleared in the middle field area is uneven-aged and dominated by oaks which provide 55 to 67 percent of the basal area in the plots. Eastern hemlock and white pine are also present. Paper birch lend a northern forest component to this forest. Whip-poor-will, red bat, hoary bat, northern long-eared bat, and eastern hognose snake may utilize this forest.

The 4.7 acres of forest to be cleared in the south field area mostly consists of oak-dominant forest with the largest trees approaching a 20-inch DBH. The largest trees within the oak forest are probably in the 80 – 100-year age class as the compartment appears as a young forest/old field in the 1934 aerial photograph. The basal area of the oak-dominant forest is composed of approximately 70 percent red, black, white, and scarlet oak based on the two plots described in this area (see attached Forest Data Plot forms). American beech is present in one plot and black birch and red maple are smaller trees below the canopy. Due to the limited light penetrating the canopy and perhaps deer browse, the shrub and herbaceous strata are depauperate. Species listed by the NDDB that could potentially utilize this Upland Forest habitat include whip-poor-will, hoary bat, red bat, northern long-eared bat, eastern hognose snake and box turtle

Edge clearing is proposed adjacent to an older mixed hardwood stand in the southeast corner of the southern field. This rich slope forest is dominated by tulip tree and sugar maple. Here some trees exceed 36 inch DBH. Some of the trees in this stand are visible in the 1934 aerial and would exceed 100-years in age. In addition to the species listed for Upland Forest, wood turtle may also utilize habitat which is proximate to wetlands and Bissell Brook.

Table 4.3 in the CT SWAP provides a list of species of greatest conservation need (GCN) which may utilize Upland Forests. We observed the following GCN species in the Project Area during the course of field investigations: rose-breasted grosbeak, Baltimore oriole, veery, scarlet tanager, eastern wood-peewee, black and white warbler, worm-eating warbler, ovenbird, wood thrush, black-billed cuckoo, northern flicker, gray tree frog, wood frog, and sugar maple.

Based on 2006 Core Forest GIS coverage provided by CLEAR each of the three areas to be cleared consist of primarily of Edge Forest with Perforated Forest and Core Forest. The existing Core Forest areas in each of these three patches straddle the Project's property boundary. The CLEAR forest type-overlay is included in attached Core Forest figure with the proposed clearing limits.

The existing Core Forest Blocks in the north field area are 20.0 acres for the northern forest and 1.3 acres for the forest south of the agricultural field, 8.3 acres for the middle field area, and 10.7 acres for the south field area. After the clearing is complete, the Core Forest area remaining will be 16.3 acres for the northern forest in the north field area and the smaller southern block will be converted to edge forest, 4.6 acres for the middle field area, and 6.4 acres for the forest in the south field area.

UCONN CLEAR defines Core Forest blocks as small (<250 acres), medium (250 acres to 500 acres) and large (>500 acres). Each of the three existing Core Forest blocks would be classified as small. The principal citation used to support these classifications is an Environment Canada<sup>3</sup> report from 2004. This report was revised in 2013 and includes additional citations of studies that support the classification of a minimum 250-acre (100 ha) forest size for edge intolerant forest interior breeding birds and a study by Henderson et al. (2008)<sup>4</sup> of northern long-eared bat that showed the probability of a pair of bats utilizing a forest as increasing by 1.6 times for each additional 250 acre increase in forest block size. The three small Core Forest Blocks would support few interior breeding bird species according to Table 11 in the Environment Canada report. With the consideration of the proposed clearing, the forests will continue to provide wildlife habitat and wildlife corridors between habitat patches.

### **Project Vicinity Open Space and Habitat Corridors**

The Project Area and adjacent town-owned open space parcels are depicted on the attached figure "Open Space adjacent to Project Area". The parts of Project Area to be left in a natural state are cross-hatched in this figure. This figure shows that forest continuity to the town-owned open space will be maintained.

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<sup>3</sup> Environment Canada. 2013. How Much Habitat is Enough? Third Edition. Environment Canada, Toronto, Ontario.

<sup>4</sup> Henderson, L. E., L. J. Farrow, and H. G. Broders. 2008. "Intra-specific effects of forest loss on the distribution of the forest-dependent northern long-eared bat (*Myotis septentrionalis*).<sup>4</sup>" *Biological Conservation* 141(7): 1819-28.

The attached figures "Open Space and Inter-Conservation Area Connection" and "Project Area Position Relative to Farmington River Valley" overlay coverages from the Simsbury biodiversity map (Figure 14) from the Farmington Valley Biodiversity Project<sup>5</sup> (FVBP). These figures show that most of the Project Area is designated as "Inter-Conservation Area Connections." This designation is assigned to land that connects primary and secondary conservation areas across the larger regional landscape of the Farmington River Valley. Inter-conservation areas provide corridors that support long-term ecological functions (Gruner et al. 2006). There are no primary or secondary conservation areas located within or immediately adjacent to the Project Area. The 3,200-acre McLean Game Refuge, a nature preserve that straddles the Simsbury and Granby town line is an important primary conservation area. This nature preserve is located approximately 0.4 miles northwest of the Project Area and is separated by several housing subdivisions. According to the Figure 14 in the FVBP, the nature preserve is connected to the Project Area via the Inter-Conservation Area and a smaller portion of Secondary Conservation Area located on an agricultural parcel between Hoskins Road and County Road. The figure "Open Space adjacent to Project Area" also shows that wildlife passage corridors will be maintained between the natural areas within the Project Area, the open space parcels, and the inter-conservation areas that serve as habitat corridors.

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<sup>5</sup> Gruner, H. J., M. W. Klemens, and A. Persons. 2006. The Farmington Valley Biodiversity Project: A Model for Intermunicipal Biodiversity Planning in Connecticut. MCA Technical Paper No. 11, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	1
<b>Key Habitat Type:</b>	Upland Forest: Oak
<b>Date:</b>	10/17/17
<b>% Canopy Cover:</b>	90
<b>Soil Drainage Class:</b>	Somewhat excessively drained
<b>Landform:</b>	Outwash terrace

**Percent Cover within Forest Plot**

*30-foot radius for all strata*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent Dominance (basal area)</b>
American beech ( <i>Fagus grandifolia</i> )	8.6, 8.5, 5.5, 12, 4.5	18
red oak ( <i>Quercus rubra</i> )	24, 12.5, 11.5	44
white oak ( <i>Quercus alba</i> )	17.8	16
black oak ( <i>Quercus velutina</i> )	16.5	14
snag	10.5, 5.5	7

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
American beech ( <i>Fagus grandifolia</i> )	6

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
None	0

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
Beech drops ( <i>Epifagus virginiana</i> )	1
Indian pipe ( <i>Monotropa uniflora</i> )	1
American beech ( <i>Fagus grandifolia</i> )	5

**NDDB species that could potentially use this habitat:** eastern whip-poor-will, hoary bat, silver bat, red bat, northern long-eared bat

**Observations of invasive plants or pests:** No

**Snags or other suitable roosting tree present:** 4 snags

**Condition of plot point in 1934 aerial imagery:** Young forest

**General Notes:** This plot is located within a proposed clearing area

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	2
<b>Key Habitat Type:</b>	Upland Forest: Oak
<b>Date:</b>	10/17/17
<b>% Canopy Cover:</b>	70
<b>Soil Drainage Class:</b>	Somewhat excessively drained
<b>Landform:</b>	Toe of Slope

**Percent Cover within Forest Plot**

*30-foot radius plot sampled for all strata*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent Dominance (basal area)</b>
white pine ( <i>Pinus strobus</i> )	14.5, 6	11
white oak ( <i>Quercus alba</i> )	15	10
red oak ( <i>Quercus rubra</i> )	17, 12, 16.7,	33
black oak ( <i>Quercus velutina</i> )	13, 19	25
pignut hickory ( <i>Carya glabra</i> )	12	7
red maple ( <i>Acer rubrum</i> )	8.5	3
sugar maple ( <i>Acer saccharum</i> )	7	2
eastern hemlock ( <i>Tsuga canadensis</i> )	13	8

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
red maple	10
white pine	2

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
sugar maple	5
black birch ( <i>Betula lenta</i> )	2

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
wintergreen ( <i>Gaultheria procumbens</i> )	4
lowbush blueberry ( <i>Vaccinium angustifolium</i> )	trace
maple-leaf viburnum ( <i>Viburnum acerifolium</i> )	trace
American hazelnut ( <i>Corylus americana</i> )	trace
Pennsylvania sedge ( <i>Carex pensylvanica</i> )	3
white ash ( <i>Fraxinus americana</i> )	trace
white pine	trace

**NDDB species that could potentially use this habitat:** eastern whip-poor-will, hoary bat, silver bat, red bat, northern long-eared bat

**Observations of invasive plants or pests:** No

**Snags or other suitable roosting tree present?:** No

**Condition of plot in 1934 aerial imagery:** Young forest/Shrubland

**General Notes:** 15% slope southeast



**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	3
<b>Key Habitat Type:</b>	Forested Inland Wetland: Red Maple Swamp
<b>Date:</b>	10/17/17
<b>% Canopy Cover:</b>	85
<b>Soil Drainage Class:</b>	Moderately well-drained to poorly drained
<b>Landform:</b>	Outwash terrace

**Percent Cover within Forest Plot**

*Plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent Dominance (basal area)</b>
white pine ( <i>Pinus strobus</i> )	31	27
snag	12	4
eastern hemlock ( <i>Tsuga canadensis</i> )	14, 9.5, 9.5, 7.5, 10, 10.5	18
tulip tree ( <i>Liriodendron tulipifera</i> )	24	16
black birch ( <i>Betula lenta</i> )	13.5, 5, 10	8
yellow birch ( <i>Betula alleghaniensis</i> )	9.5, 20.5	14
red maple ( <i>Acer rubrum</i> )	16, 15	13

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
black birch ( <i>Betula lenta</i> )	10

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
American witch-hazel ( <i>Hamamelis virginiana</i> )	7
winterberry ( <i>Ilex verticillata</i> )	1
eastern hemlock ( <i>Tsuga canadensis</i> )	2
yellow birch ( <i>Betula alleghaniensis</i> )	1

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
spinulose woodfern ( <i>Dryopteris carthusiana</i> )	15
princess pine ( <i>Dendrolycopodium obscurum</i> )	4
partridgeberry ( <i>Mitchella repens</i> )	8
cinnamon fern ( <i>Osmundastrum cinnamomeum</i> )	trace
Pennsylvania sedge ( <i>Carex pensylvanica</i> )	3
white ash ( <i>Fraxinus americana</i> )	trace
white pine ( <i>Pinus strobus</i> )	trace

**NDDB species that could potentially use this habitat:** eastern whip-poor-will, hoary bat, silver bat, red bat, northern long-eared bat

**Observations of invasive plants or pests:** No

**Snags or other suitable roosting tree present:** No

**Condition of plot point in 1934 aerial imagery:** Young forest/shrubland

**General Notes:** This plot point straddles an upland inclusion within forested inland wetland

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	4
<b>Key Habitat Type:</b>	Upland Forest: Mixed Hardwood
<b>Date:</b>	10/17/17
<b>% Canopy Cover:</b>	80
<b>Soil Drainage Class:</b>	Moderately well-drained
<b>Landform:</b>	Upper side slope

**Percent Cover within Forest Plot**

*Plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent Dominance (basal area)</b>
tulip tree ( <i>Liriodendron tulipifera</i> )	39	43
sugar maple ( <i>Acer saccharum</i> )	5, 11, 32, 7.5, 5.5, 5.5	37
pignut hickory ( <i>Carya glabra</i> )	15	6
red maple ( <i>Acer rubrum</i> )	6	1
black oak ( <i>Quercus velutina</i> )	21	13

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
sugar maple ( <i>Acer saccharum</i> )	20

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
American beech ( <i>Fagus grandifolia</i> )	3
sugar maple ( <i>Acer saccharum</i> )	3

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
maple-leaf viburnum ( <i>Viburnum acerifolium</i> )	1
burning bush ( <i>Euonymus alatus</i> )	1

**NDDB species that could potentially use this habitat:** eastern whip-poor-will, hoary bat, silver bat, red bat, northern long-eared bat

**Observations of invasive plants or pests:** burning bush

**Snags or other suitable roosting tree present:** Yes, and some tree cavities  
Yes, and some cavities

**Condition of plot point in 1934 aerial imagery:** Forested with mature trees

**General Notes:** Rich seepage slope. This plot is in a mixed hardwood forest with many trees with DBH exceeding 24 inches. The area has been used as a BMX bicycle course with several jumps constructed from excavated earth.

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	5
<b>Key Habitat Type:</b>	Forested Inland Wetland: Red Maple Swamp
<b>Date:</b>	10/17/17
<b>% Canopy Cover:</b>	75
<b>Soil Drainage Class:</b>	Poorly drained
<b>Landform:</b>	Foot slope/wetland

**Percent Cover within Forest Plot**

*Plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent dominance (basal area)</b>
red maple ( <i>Acer rubrum</i> )	19.5, 6.5, 14, 16, 15.5, 8.5	79
white ash ( <i>Fraxinus americana</i> )	6, 14.5	16
American elm ( <i>Ulmus americana</i> )	8	4

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
tulip tree ( <i>Liriodendron tulipifera</i> )	8
red maple ( <i>Acer rubrum</i> )	2

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
multiflora rose ( <i>Rosa multiflora</i> )	7
northern spicebush ( <i>Lindera Benzoin</i> )	20
tulip tree ( <i>Liriodendron tulipifera</i> )	2
Japanese barberry ( <i>Berberis thunbergii</i> )	2
white ash ( <i>Fraxinus americana</i> )	2
oriental bittersweet ( <i>Celastrus orbiculatus</i> )	trace

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
drooping wood-reed grass ( <i>Cinna latifolia</i> )	5
sedge ( <i>Carex sp.</i> )	7
lady fern ( <i>Athyrium filix-femina</i> )	trace
spinulose wood fern ( <i>Dryopteris carthusiana</i> )	1
skunk cabbage ( <i>Symplocarpus foetidus</i> )	2
stinging nettle ( <i>Urtica dioica</i> )	trace
white snakeroot ( <i>Eupatorium rugosum</i> )	trace
common cinquefoil ( <i>Potentilla simplex</i> )	trace
royal fern ( <i>Osmunda regalis</i> )	1
sensitive fern ( <i>Onoclea sensibilis</i> )	5
New York fern ( <i>Thelypteris noveboracensis</i> )	1
poison ivy ( <i>Toxicodendron radicans</i> )	10
Japanese barberry ( <i>Berberis thunbergii</i> )	5
Christmas fern ( <i>Polystichum acrostichoides</i> )	trace
rough-stemmed Goldenrod ( <i>Solidago rugosa</i> )	trace
white avens ( <i>Geum canadense</i> )	1
long beechfern ( <i>Phegopteris connectilis</i> )	trace
clear weed ( <i>Pilea pumila</i> )	5
jewelweed ( <i>Impatiens capensis</i> )	trace
marsh blue violet ( <i>Viola cucullata</i> )	1
American marsh-pennywort ( <i>Hydrocotyle americana</i> )	trace
cinnamon fern ( <i>Osmundastrum cinnamomeum</i> )	1

**Forest Plot 5 cont.**

**NDDB species that could potentially use this habitat:** eastern box turtle, wood turtle, Whip-poor-will, red bat, silver bat, hoary bat, northern long-eared bat.

**Observations of invasive plants or pests:** Japanese barberry, oriental bittersweet, multiflora rose

**Snags or other suitable roosting tree present:** No

**Condition of plot point in 1934 aerial imagery:** Forested with several large tree visible

**General Notes:** Wetland dry at the time this description was completed

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	6
<b>Key Habitat Type:</b>	Upland Forest: Oak
<b>Date:</b>	10/17/17
<b>% Canopy Cover:</b>	70
<b>Soil Drainage Class:</b>	Somewhat excessively drained
<b>Landform:</b>	Outwash terrace

**Percent Cover within Forest Plot**

*Forest plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent dominance (basal area)</b>
red oak ( <i>Quercus rubra</i> )	11.5, 11.5, 17	32
black oak ( <i>Quercus velutina</i> )	19.5	22
red maple ( <i>Acer rubrum</i> )	5	1
white oak ( <i>Quercus alba</i> )	12, 14	19
scarlett oak ( <i>Quercus coccinea</i> )	14.5, 13.5	22
black birch ( <i>Betula lenta</i> )	8	4

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
black birch ( <i>Betula lenta</i> )	8
white pine ( <i>Pinus strobus</i> )	5

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
white pine ( <i>Pinus strobus</i> )	2
black birch ( <i>Betula lenta</i> )	3
American chestnut ( <i>Castanea dentata</i> )	1
red maple ( <i>Acer rubrum</i> )	3

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
white pine ( <i>Pinus strobus</i> )	trace
wintergreen ( <i>Gaultheria procumbens</i> )	4
hillside blueberry ( <i>Vaccinium pallidum</i> )	8
spotted wintergreen ( <i>Chimaphila maculata</i> )	trace
red maple ( <i>Acer rubrum</i> )	1
piresap ( <i>Hypopitys monotropa</i> )	1
shadbush ( <i>Amelanchier arborea</i> )	trace
Pennsylvania sedge ( <i>Carex pensylvanica</i> )	2
lowbush blueberry ( <i>Vaccinium angustifolium</i> )	1
white oak ( <i>Quercus alba</i> )	1

**NDDB species that could potentially use this habitat:** eastern whip-poor-will, hoary bat, silver bat, red bat, northern long-eared bat

**Observations of invasive plants or pests:** No

**Snags or other suitable roosting tree present:** No

**Condition of plot point in 1934 aerial imagery:** Young forest

**General Notes:** This plot is located within a proposed clearing area

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	7
<b>Key Forest Habitat:</b>	Upland Forest: Oak
<b>Date:</b>	10/17/17
<b>% Canopy Cover:</b>	90
<b>Soil Drainage Class:</b>	Well to somewhat excessively drained
<b>Landform:</b>	Outwash terrace

**Percent Cover within Forest Plot**

*Plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent dominance (basal area)</b>
red oak ( <i>Quercus rubra</i> )	18, 19.5, 25.5, 7.5, 6	48
red maple ( <i>Acer rubrum</i> )	11	5
eastern hemlock ( <i>Tsuga canadensis</i> )	10, 7, 5, 5, 10	14
paper birch ( <i>Betula papyrifera</i> )	10.5, 7.5, 9, 11	15
white oak ( <i>Quercus alba</i> )	9.5, 7	6
white pine ( <i>Pinus strobus</i> )	5.5	1
black oak ( <i>Quercus velutina</i> )	12.5, 11.5	12

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
eastern hemlock ( <i>Tsuga canadensis</i> )	20
red maple ( <i>Acer rubrum</i> )	10
white pine ( <i>Pinus strobus</i> )	15

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
white pine ( <i>Pinus strobus</i> )	3
sugar maple ( <i>Acer saccharum</i> )	3
eastern hemlock ( <i>Tsuga canadensis</i> )	4

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
maple leaf viburnum ( <i>Viburnum acerifolium</i> )	2
black cherry ( <i>Prunus serotina</i> )	trace
spotted wintergreen ( <i>Chimaphila maculata</i> )	trace

**NDDB species that could potentially use this habitat:** eastern whip-poor-will, hoary bat, silver bat, red bat, northern long-eared bat

**Observations of invasive plants or pests:** No

**Snags or other suitable roosting tree present:** Yes, 4-5 small to medium snags

**Condition of plot point in 1934 aerial imagery:** Forested

**General Notes:** Abundance of woody debris and snags present relative to other plots

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	8
<b>Key Habitat Type:</b>	Upland Forest: Oak
<b>Date:</b>	10/17/17
<b>% Canopy Cover:</b>	50
<b>Soil Drainage Class:</b>	Well-drained
<b>Landform:</b>	Toe of slope with northern aspect to slope

**Percent Cover within Forest Plot**

*Plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent Dominance (basal area)</b>
white pine ( <i>Pinus strobus</i> )	25.5, 20, 19	59
eastern hemlock ( <i>Tsuga canadensis</i> )	7.5, 11, 10, 11, 6, 6.5, 5.5, 9	26
American beech ( <i>Fagus grandifolia</i> )	5, 6.5	3
white oak ( <i>Quercus alba</i> )	11, 10	10
yellow birch ( <i>Betula alleghaniensis</i> )	8	3

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
American beech ( <i>Fagus grandifolia</i> )	10
eastern hemlock ( <i>Tsuga canadensis</i> )	12

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
American beech ( <i>Fagus grandifolia</i> )	8
Eastern hemlock ( <i>Tsuga canadensis</i> )	8

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
American beech ( <i>Fagus grandifolia</i> )	1
white pine ( <i>Pinus strobus</i> )	trace
red maple ( <i>Acer rubrum</i> )	trace
red oak ( <i>Quercus rubra</i> )	trace
white oak ( <i>Quercus alba</i> )	trace
black cherry ( <i>Prunus serotina</i> )	trace

**NDDB species that could potentially use this habitat:** eastern whip-poor-will, hoary bat, silver bat, red bat, northern long-eared bat

**Observations of invasive plants or pests:** No

**Snags or other suitable roosting tree present:** No

**Condition of plot point in 1934 aerial imagery:** Forested

**General Notes:** Moderate amounts of downed woody debris

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	9
<b>Key Habitat Type:</b>	Upland Forest: Oak
<b>Date:</b>	10/18/17
<b>% Canopy Cover:</b>	80
<b>Soil Drainage Class:</b>	Somewhat excessively drained
<b>Landform:</b>	Outwash terrace

**Percent Cover within Forest Plot**

*Plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent Dominance (basal area)</b>
eastern hemlock ( <i>Tsuga canadensis</i> )	10.5, 20.5, 12	30
white pine ( <i>Pinus strobus</i> )	17.5	14
American beech ( <i>Fagus grandifolia</i> )	5.5	1
red oak ( <i>Quercus rubra</i> )	17.5, 6, 8, 18	33
white oak ( <i>Quercus alba</i> )	6	2
black oak ( <i>Quercus velutina</i> )	13, 16.5	20

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
American beech ( <i>Fagus grandifolia</i> )	35%
eastern hemlock ( <i>Tsuga canadensis</i> )	8%

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
American beech ( <i>Fagus grandifolia</i> )	5%
black birch ( <i>Betula lenta</i> )	1%
American chestnut ( <i>Castanea dentata</i> )	1%
eastern hemlock ( <i>Tsuga canadensis</i> )	2%

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
wintergreen ( <i>Gaultheria procumbens</i> )	Trace

**NDDB species that could potentially use this habitat?:** eastern whip-poor-will, hoary bat, silver bat, red bat, northern long-eared bat

**Observations of invasive plants or pests:** No

**Snags or other suitable roosting tree present:** No

**Condition of plot point in 1934 aerial imagery:** Young forest

**General Notes:** This plot is located within a proposed clearing area and is approximately 200 feet south/southwest of a former gravel pit.



**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	10
<b>Key Habitat Type:</b>	Upland Forest: Oak/Forested Inland Wetland: Red Maple Swamp
<b>Date:</b>	10/18/17
<b>% Canopy Cover:</b>	80
<b>Soil Drainage Class:</b>	Moderately well drained to poorly drained
<b>Landform:</b>	Toe of slope

**Percent Cover within Forest Plot**

*Plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent Dominance (basal area)</b>
red maple ( <i>Acer rubrum</i> )	6, 17, 20	32
white ash ( <i>Fraxinus americana</i> )	11, 7.5	8
red oak ( <i>Quercus rubra</i> )	17.5, 30.5	53
black birch ( <i>Betula lenta</i> )	7	2%
basswood ( <i>Tilia Americana</i> )	11	5%

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
black cherry ( <i>Prunus serotina</i> )	3
American elm ( <i>Ulmus americana</i> )	2
white ash ( <i>Fraxinus americana</i> )	5
red maple ( <i>Acer rubrum</i> )	3
musclewood ( <i>Carpinus caroliniana</i> )	15
black birch ( <i>Betula lenta</i> )	20

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
White Pine ( <i>Pinus strobus</i> )	2
American Elm ( <i>Ulmus americana</i> )	5
American Hazelnut ( <i>Corylus americana</i> )	6
musclewood ( <i>Carpinus caroliniana</i> )	5

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
Christmas Fern ( <i>Polystichum acrostichoides</i> )	5
Lady Fern ( <i>Athyrium filix-femina</i> )	2
Red Oak ( <i>Quercus rubra</i> )	1
Maple-leaf Viburnum ( <i>Viburnum acerifolium</i> )	trace
Cinnamon Fern ( <i>Osmundastrum cinnamomeum</i> )	5
Eastern Bottlebrush Grass ( <i>Elymus hystrix</i> )	4
New York fern ( <i>Thelypteris noveboracensis</i> )	2
common woodland sedge ( <i>Carex blanda</i> )	Trace
pennsylvania Sedge ( <i>Carex pensylvanica</i> )	
Musclewood ( <i>Carpinus Caroliniana</i> )	Trace

**Forest Plot 10 cont.**

**NDDB species that could potentially use this habitat:** eastern whip-poor-will, hoary bat, silver bat, red bat, northern long-eared bat, wood turtle, box turtle

**Observations of invasive plants or pests:** No

**Snags or other suitable roosting tree present:** No, but cavities in large living trees present

**Condition of plot point in 1934 aerial imagery:** Young forest

**General Notes:** This forest plot is located approximately 50 feet west of Farm Pond 1 and straddles a wetland boundary.

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	11
<b>Key Habitat Type:</b>	Upland Forest: Oak
<b>Date:</b>	10/18/17
<b>% Canopy Cover:</b>	90
<b>Soil Drainage Class:</b>	Somewhat excessively drained
<b>Landform:</b>	Terrace escarpment

**Percent Cover within Forest Plot**

*Plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent Dominance (basal area)</b>
Black Cherry ( <i>Prunus serotina</i> )	5, 6.5	4
Black Birch ( <i>Betula lenta</i> )	5.5, 7.5, 6.5, 5.5	9
Hophornbeam ( <i>Ostrya virginiana</i> )	5.5	2
Eastern Hemlock ( <i>Tsuga canadensis</i> )	5, 11.5, 9, 9.5	18
Red Maple ( <i>Acer rubrum</i> )	15	12
Pignut hickory ( <i>Carya glabra</i> )	18	17
White Pine ( <i>Pinus strobus</i> )	27	39

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
Black Birch ( <i>Betula lenta</i> )	40
Hophornbeam ( <i>Ostrya virginiana</i> )	3
Eastern Hemlock ( <i>Tsuga canadensis</i> )	7

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
Black Birch ( <i>Betula lenta</i> )	1
Red Maple ( <i>Acer rubrum</i> )	3
Eastern Hemlock ( <i>Tsuga canadensis</i> )	15

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
Canada Mayflower ( <i>Maianthemum canadense</i> )	trace
Hay-Scented Fern ( <i>Dennstaedtia punctilobula</i> )	5
White Pine ( <i>Pinus strobus</i> )	trace
Spinulose Wood Fern ( <i>Dryopteris carthusiana</i> )	1
Maple-leaf Viburnum ( <i>Viburnum acerifolium</i> )	trace
Pennsylvania Sedge ( <i>Carex pensylvanica</i> )	trace
Princess Pine ( <i>Dendrolycopodium obscurum</i> )	trace
Red Maple ( <i>Acer rubrum</i> )	1
Sugar Maple ( <i>Acer saccharum</i> )	1
Red Oak ( <i>Quercus rubra</i> )	trace

**Forest Plot 11 cont.**

**NDDB species that could potentially use this habitat:** eastern whip-poor-will, hoary bat, silver bat, red bat, northern long-eared bat, wood turtle

**Observations of invasive plants or pests:** No

**Snags or other suitable roosting tree present:** No

**Condition of plot in 1934 aerial imagery:** Early successional growth within an apparent abandoned farm field.

**General Notes:** ATV trail next to plot

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	12
<b>Key Habitat Type:</b>	Upland Forest: Oak
<b>Date:</b>	10/18/17
<b>% Canopy Cover:</b>	85
<b>Soil Drainage Class:</b>	Somewhat excessively drained
<b>Landform:</b>	terrace

**Percent Cover within Forest Plot**

*Plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent dominance (basal area)</b>
White Pine ( <i>Pinus strobus</i> )	7.5, 13, 13, 6.5, 6.5	26
Red Oak ( <i>Quercus rubra</i> )	10, 6.5, 7, 12, 8.5, 6.5, 7.5, 16, 7, 9.5, 10, 6.5, 7.5, 12.5	71
Black Birch ( <i>Betula lenta</i> )	7	1
Black Oak ( <i>Quercus velutina</i> )	6.5	2

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
White Pine ( <i>Pinus strobus</i> )	3

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
Red Cedar ( <i>Juniperus virginiana</i> )	2
White Pine ( <i>Pinus strobus</i> )	25
Black Oak ( <i>Quercus velutina</i> )	4

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
White Pine ( <i>Pinus strobus</i> )	5
Red cedar ( <i>Juniperus virginiana</i> )	5
Black Cherry ( <i>Prunus serotina</i> )	trace
Spotted Wintergreen ( <i>Chimaphila maculata</i> )	trace
pignut hickory ( <i>Carya glabra</i> )	trace
Maple Leaf Viburnum ( <i>Viburnum acerifolium</i> )	trace

**NDDB species that could potentially use this habitat?** eastern whip-poor-will, hoary bat, silver bat, red bat, northern long-eared bat

**Observations of invasive plants or pests:** No

**Snags or other suitable roosting tree present:** Yes

**Condition of plot point in 1934 aerial imagery:** early successional growth within an apparent abandoned farm field in 1934.

**General Notes:** The forest plot is located within a proposed clearing area

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	13
<b>Key Habitat Type:</b>	Upland Forest: Oak
<b>Date:</b>	10/18/17
<b>% Canopy Cover:</b>	70
<b>Soil Drainage Class:</b>	Somewhat excessively drained
<b>Landform:</b>	terrace

**Percent Cover within Forest Plot**

*Plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent Dominance (basal area)</b>
red maple ( <i>Acer rubrum</i> )	16, 6.5, 11.5	29
eastern hemlock ( <i>Tsuga canadensis</i> )	6, 6, 9.5	11
black birch ( <i>Betula lenta</i> )	6.5, 6, 5	7
white oak ( <i>Quercus alba</i> )	13, 16.5	29
Red Oak ( <i>Quercus rubra</i> )	19	24

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
Black Birch ( <i>Betula lenta</i> )	25
Eastern Hemlock ( <i>Tsuga canadensis</i> )	10

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
N/A	

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
Wintergreen ( <i>Gaultheria procumbens</i> )	1
Partridgeberry ( <i>Mitchella repens</i> )	1
Princess pine ( <i>Dendrolycopodium obscurum</i> )	5
Red Maple ( <i>Acer rubrum</i> )	1
White Oak ( <i>Quercus alba</i> )	1
Eastern hemlock ( <i>Tsuga canadensis</i> )	1
Pennsylvania Sedge ( <i>Carex pensylvanica</i> )	trace
Spotted wintergreen ( <i>Chimaphila maculata</i> )	trace
Pinesap ( <i>Monotropa hypopitys</i> )	trace

**NDDB species that could potentially use this habitat:** eastern whip-poor-will, hoary bat, silver bat, red bat, northern long-eared bat

**Observations of invasive plants or pests:** No

**Snags or other suitable roosting tree present:** No, but some snags are located just outside plot

**Condition of plot point in 1934 aerial imagery:** Early successional growth within recently abandoned field.

**General Notes:** This forest plot is located within a proposed clearing area and is adjacent to an ATV trail.

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	14
<b>Key Habitat Type:</b>	Upland Forest: Oak
<b>Date:</b>	10/18/17
<b>% Canopy Cover:</b>	70
<b>Soil Drainage Class:</b>	Somewhat excessively drained
<b>Landform:</b>	Outwash terrace

**Percent Cover within Forest Plot**

*Plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent Dominance (basal area)</b>
Black Birch ( <i>Betula lenta</i> )	5.5	2
White Oak ( <i>Quercus alba</i> )	16, 13, 17, 19, 16.5	68
Pignut hickory ( <i>Carya glabra</i> )	14.5	11
Eastern Hemlock ( <i>Tsuga canadensis</i> )	7.5, 8, 9.5	11
Red Maple ( <i>Acer rubrum</i> )	13	9

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
Black Birch ( <i>Betula lenta</i> )	25
Eastern Hemlock ( <i>Tsuga canadensis</i> )	5

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
Eastern Hemlock ( <i>Tsuga canadensis</i> )	25
Black Birch ( <i>Betula lenta</i> )	10

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
Eastern Hemlock ( <i>Tsuga canadensis</i> )	3
Wintergreen ( <i>Gaultheria procumbens</i> )	1
Spotted Wintergreen ( <i>Chimaphila maculata</i> )	trace
Pennsylvania Sedge ( <i>Carex pensylvanica</i> )	trace
White Pine ( <i>Pinus strobus</i> )	trace
Ground cedar ( <i>Diphasiastrum complanatum</i> )	3
American Beech ( <i>Fagus grandifolia</i> )	1
White Oak ( <i>Quercus alba</i> )	1
Red Maple ( <i>Acer rubrum</i> )	trace

**NDDB species that could potentially use this habitat:** eastern whip-poor-will, hoary bat, silver bat, red bat, northern long-eared bat

**Observations of invasive plants or pests:** No

**Snags or other suitable roosting tree present:** No

**Condition of plot point in 1934 aerial imagery:** Early successional growth within a recently abandoned field.

**General Notes:** Rotting hemlock boles on ground may have been caused by wooly adelgid.

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Forest Plot:</b>	15
<b>Key Habitat Type:</b>	Upland Forest: Oak
<b>Date:</b>	10/18/17
<b>% Canopy Cover:</b>	70
<b>Soil Drainage Class:</b>	Excessively drained
<b>Landform:</b>	Mid-slope down kame

**Percent Cover within Forest Plot**

*Plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Individual DBH (inches)</b>	<b>Percent Dominance (basal area)</b>
American Beech ( <i>Fagus grandifolia</i> )	5, 9, 11.5, 7	11
Eastern Hemlock ( <i>Tsuga canadensis</i> )	20	16
Red Maple ( <i>Acer rubrum</i> )	12, 16	16
White Oak ( <i>Quercus alba</i> )	19	14
Paper Birch ( <i>Betula papyrifera</i> )	16.5	11
White Pine ( <i>Pinus strobus</i> )	29	33

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
American Beech ( <i>Fagus grandifolia</i> )	30
Eastern Hemlock ( <i>Tsuga canadensis</i> )	5
Musclewood ( <i>Carpinus caroliniana</i> )	8

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
Eastern Hemlock ( <i>Tsuga canadensis</i> )	5
Black Birch ( <i>Betula lenta</i> )	10
American Birch ( <i>Betula nigra</i> )	10
White Pine ( <i>Pinus strobus</i> )	3

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
Spotted Wintergreen ( <i>Chimaphila maculata</i> )	trace
Hillside Blueberry ( <i>Vaccinium pallidum</i> )	trace
American Chestnut ( <i>Castanea dentata</i> )	trace

**NDDB species that could potentially use this habitat:** eastern whip-poor-will, hoary bat, silver bat, red bat, northern long-eared bat

**Observations of invasive plants or pests:** No

**Snags or other suitable roosting tree present:** Yes, paper birch and a few outside of plot.

**Condition of plot point in 1934 aerial imagery:** Young forest

**General Notes:** This plot adjacent to an abandoned cart path. Large white pines scattered across hillside forest.



**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Shrub Plot:</b>	1
<b>Key Habitat Type:</b>	Upland Woodland and Shrub: Early Successional
<b>Date:</b>	10/17/17
<b>% Canopy Cover:</b>	10%
<b>Soil Drainage Class:</b>	Excessively drained
<b>Landform:</b>	Terrace

Vegetation % Cover within Forest Plot

*Forest plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Percent Cover of Plot</b>
red maple ( <i>Acer rubrum</i> )	10

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
multiflora rose ( <i>Rosa multiflora</i> )	5
common elderberry ( <i>Sambucus nigra</i> )	5
blackcap raspberry ( <i>Rubus occidentalis</i> )	20
common blackberry ( <i>Rubus allegheniensis</i> )	20

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
smartweed ( <i>Polygonum sp.</i> )	25
stinging nettle ( <i>Urtica dioica</i> )	10
curly dock ( <i>Rumex crispus</i> )	2
blue verbena ( <i>Verbena hastata</i> )	5
hairy vetch ( <i>Vicia villosa</i> )	5
common milkweed ( <i>Asclepias syriaca</i> )	2
grass-leaved goldenrod ( <i>Euthamia graminifolia</i> )	7
lambquarters ( <i>Chenopodium album</i> )	3
rabbit's foot clover ( <i>Trifolium arvense</i> )	4

<b>Vines Stratum</b>	<b>Percent Cover of Plot</b>
oriental bittersweet ( <i>Celastrus orbiculatus</i> )	10
fox grape ( <i>Vitis labrusca</i> )	15

**NDDB species that could potentially use this habitat:** brown thrasher

**Observations of invasive plants or pests:** Yes, multiflora rose, oriental bittersweet

**Snags or other suitable roosting tree present:** No

**Condition of plot point in 1934 aerial imagery:** Managed agricultural field

**General Notes:** N/A

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Shrub Plot:</b>	2
<b>Key Habitat Type:</b>	Upland Woodland and Shrub: Early Successional
<b>Date:</b>	10/17/17
<b>% Canopy Cover:</b>	N/A
<b>Soil Drainage Class:</b>	Well to somewhat excessively drained
<b>Landform:</b>	Outwash terrace

**Percent Cover within Shrub Plot**

*Plot measures 30-foot radius from center point*

<b>Sapling Stratum</b>	<b>Percent Cover of Plot</b>
northern catalpa ( <i>Catalpa speciosa</i> )	1

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
Smooth Sumac ( <i>Rhus glabra</i> )	40
Black Cherry ( <i>Prunus serotina</i> )	15
Common Blackberry ( <i>Rubus allegheniensis</i> )	20
Black Raspberry ( <i>Rubus occidentalis</i> )	5
Northern catalpa ( <i>Catalpa speciosa</i> )	3
Rose multiflora ( <i>Rosa multiflora</i> )	15
Autumn olive ( <i>Elaeagnus umbellata</i> )	10

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
Grass-leaved Goldenrod ( <i>Solidago graminifolia</i> )	10
Yellow foxtail ( <i>Setaria glauca</i> )	2
Daisy Fleabane ( <i>Erigeron annuus</i> )	trace
Milkweed ( <i>Asclepias syriaca</i> )	trace
Heath Aster ( <i>Aster ericoides</i> )	2
Evening Primrose ( <i>Oenothera biennis</i> )	3
Rough Cinquefoil ( <i>Potentilla norvegica</i> )	2
Oriental Bittersweet ( <i>Celastrus orbiculatus</i> )	25
Northern Dewberry ( <i>Rubus flagellaris</i> )	5
Tall Goldenrod ( <i>Solidago altissima</i> )	5
Rabbits Foot Clover ( <i>Trifolium arvense</i> )	trace

**NDDB species that could potentially use this habitat:** brown thrasher

**Observations of invasive plants or pests:** multiflora rose, autumn olive, rough cinquefoil, oriental bittersweet, yellow foxtail

**Snags or other suitable roosting tree present:** No

**Condition of plot point in 1934 aerial imagery:** Managed agricultural field

**General Notes:** N/A

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Shrub Plot:</b>	3
<b>Key Habitat Type:</b>	Upland Woodland and Shrub: Early Successional
<b>Date:</b>	10/17/17
<b>% Canopy Cover:</b>	N/A
<b>Soil Drainage Class:</b>	Well to somewhat excessively drained
<b>Landform:</b>	Outwash terrace

**Percent Cover within Shrub Plot**

*Plot measures 30-foot radius from center point*

<b>Tree Stratum</b>	<b>Percent Cover of Plot</b>
Red Maple ( <i>Acer rubrum</i> )	10
Red Oak ( <i>Quercus rubra</i> )	10
<b>Sapling Stratum</b>	
Butternut ( <i>Juglans cinerea</i> )	15
<b>Shrub Stratum</b>	
Black Cherry ( <i>Prunus serotina</i> )	10
Common Blackberry ( <i>Rubus allegheniensis</i> )	20
Pokeweed ( <i>Phytolacca americana</i> )	20
<b>Herb Stratum</b>	
Common milkweed ( <i>Asclepias syriaca</i> )	1
yellow foxtail ( <i>Setaria glauca</i> )	10
Blue verbena ( <i>Verbena hastata</i> )	2
Rough-stemmed goldenrod ( <i>Solidago rugosa</i> )	trace
climbing false buckwheat ( <i>Polygonum scandens</i> )	2
<b>Vine Stratum</b>	
oriental bittersweet ( <i>Celastrus orbiculatus</i> )	5
fox grape ( <i>Vitis labrusca</i> )	5

**NDDB species that could potentially use this habitat:** brown thrasher

**Observations of invasive plants or pests:** Oriental bittersweet, yellow foxtail, climbing false buckwheat

**Snags or other suitable roosting tree present:** No

**Condition of plot point in 1934 aerial imagery:** Forested

**General Notes:** Saxton Brook is located within the narrow, forested area between the scrub-shrub edge and the Saxton Brook Drive subdivision.

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Shrub Plot:</b>	4
<b>Key Habitat Type:</b>	Manmade: Public Utility Transmission Corridor, sub-habitat: Shrub Swamp
<b>Date:</b>	10/18/17
<b>% Canopy Cover:</b>	N/A
<b>Soil Drainage Class:</b>	Moderately well to very poorly drained
<b>Landform:</b>	Wetland/valley

**Percent Cover within Shrub Plot**

*Plot measures 30-foot radius from center point*

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
gray alder ( <i>Alnus incana</i> )	3%
American Hazelnut ( <i>Corylus americana</i> )	2%
Willow ( <i>Salix cf. eriocephala</i> )	5%
Silky Dogwood ( <i>Cornus amomum</i> )	20%
Morrow's Honeysuckle ( <i>Lonicera morrowii</i> )	5%
Dewberry ( <i>Rubus ideas</i> )	2%
Multiflora Rose ( <i>Rosa multiflora</i> )	5%
Swamp Rose ( <i>Rosa palustris</i> )	3%
arrowwood ( <i>Viburnum dentatum</i> )	5%
Poison Sumac ( <i>Toxicodendron vernix</i> )	Trace

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
Canada goldenrod ( <i>Solidago canadensis</i> )	4%
Grass-leaved goldenrod ( <i>Euthamia graminifolia</i> )	4%
Lady Fern ( <i>Athyrium filix-femina</i> )	3%
Sensitive Fern ( <i>Onoclea sensibilis</i> )	20%
Purpleleaf Willow-Herb ( <i>Epilobium coloratum</i> )	3%
Devil's Darning Needles ( <i>Clematis virginiana</i> )	5%
Jewelweed ( <i>Impatiens capensis</i> )	2%
Beggar-Tick ( <i>Bidens frondosa</i> )	4%
Purplestem Aster ( <i>Aster puniceus</i> )	trace
Nut Sedge ( <i>Cyperus sp.</i> )	2%
Marsh Fern ( <i>Thelypteris palustris</i> )	2%
Large-leaved Avens ( <i>Geum macrophyllum</i> )	1%
Marsh St. John's-wort ( <i>Triadenum sp.</i> )	trace
Wool Grass ( <i>Scirpus cyperinus</i> )	5%
rosette grass ( <i>Dichanthelium sp.</i> )	2%

<b>Vine Stratum</b>	<b>% Cover</b>
Virginia Creeper ( <i>Parthenocissus quinquefolia</i> )	10%
Fox Grape ( <i>Vitis labrusca</i> )	3%

**Shrub Plot 4 cont.**

**NDDB species that could potentially use this habitat:** eastern whip-poor-will, brown thrasher, box turtle, wood turtle

**Observations of invasive plants or pests:** multiflora rose

**Snags or other suitable roosting tree present:** no

**Condition of plot point in 1934 aerial imagery:** Forested

**General Notes:** This plot was recorded in the Eversource ROW

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Shrub Plot:</b>	5
<b>Key Habitat Type:</b>	Upland Woodland and Shrub: Early Successional
<b>Date:</b>	10/18/17
<b>% Canopy Cover:</b>	N/A
<b>Soil Drainage Class:</b>	Excessively drained
<b>Landform:</b>	Terrace

**Percent Cover within Shrub Plot**

*Plot measures 30-foot radius from center point*

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
Morrow's honeysuckle ( <i>Lonicera morrowii</i> )	10
multiflora rose ( <i>Rosa multiflora</i> )	10

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
common ragweed ( <i>Ambrosia artemisiifolia</i> )	30
common mullein ( <i>Verbascum thapsus</i> )	2
horseweed ( <i>Conyza canadensis</i> )	5
rough cinquefoil ( <i>Potentilla norvegica</i> )	2
Devil's Darning Needles ( <i>Clematis virginiana</i> .)	25
wild carrot ( <i>Daucus carota</i> )	1
mugwort ( <i>Artemisia vulgaris</i> )	15
swamp dewberry ( <i>Rubus hispidus</i> )	12
Common dewberry ( <i>Rubus flagellaris</i> )	8

<b>Vines Stratum</b>	<b>Percent Cover of Plot</b>
oriental bittersweet ( <i>Celastrus orbiculatus</i> )	15

**NDDB species that could potentially use this habitat:** brown thrasher

**Observations of invasive plants or pests:** multiflora rose, oriental bittersweet, rough cinquefoil, mugwort, Morrow's honeysuckle

**Snags or other suitable roosting tree present:** No

**Condition of plot point in 1934 aerial imagery:** open

**General Notes:** Thicket at edge of agricultural field

**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Shrub Plot:</b>	6
<b>Key Habitat Type:</b>	Manmade: Public Utility Transmission Corridor, sub-habitat: Early Successional (upland)
<b>Date:</b>	10/18/17
<b>% Canopy Cover:</b>	N/A
<b>Soil Drainage Class:</b>	Excessively drained
<b>Landform:</b>	Kame

Percent Cover within Shrub Plot

*Plot measures 30-foot radius from center point*

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
white pine ( <i>Pinus strobus</i> )	10
Morrow's honeysuckle ( <i>Lonicera morrowii</i> )	6
Red raspberry ( <i>Rubus idaeus</i> )	15
common blackberry ( <i>Rubus allegheniensis</i> )	20
Arrowwood ( <i>Viburnum dentatum</i> )	3
white oak ( <i>Quercus alba</i> )	1
red oak ( <i>Quercus rubra</i> )	1
American hazelnut ( <i>Corylus americana</i> )	2
glossy buckthorn ( <i>Frangula alnus</i> )	

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
rough-stemmed goldenrod ( <i>Solidago rugosa</i> )	15
deer tongue ( <i>Dichanthelium clandestinum</i> )	10
common dewberry ( <i>Rubus flagellaris</i> )	5
haircap moss ( <i>Polytrichum sp.</i> )	3
grass-leaved goldenrod ( <i>Euthamia graminifolia</i> )	12
early goldenrod ( <i>Solidago juncea</i> )	6
hay-scented fern ( <i>Dennstaedtia punctilobula</i> )	7
yellow wild indigo ( <i>Baptisia tinctoria</i> )	2
trembling aspen ( <i>Populus tremuloides</i> )	12
meadow sweet ( <i>Spiraea alba</i> )	4
steepleshbush ( <i>Spiraea tomentosa</i> )	5
whorled loosestrife ( <i>Lysimachia quadrifolia</i> )	1
Blunt-lobed grapefern ( <i>Botrychium oneidense</i> )	Trace
smooth sumac ( <i>Rhus glabra</i> )	6
bracken fern ( <i>Pteridium aquilinum</i> )	3
little bluestem ( <i>Schizachryium scoparium</i> )	4
annual ragweed ( <i>Ambrosia artemisiifolia</i> )	7
wild strawberry ( <i>Frageria virginiana</i> )	Trace
white heath aster ( <i>Symphyotrichum ericoides</i> )	2

**Shrub Plot 6 cont.**

**NDDB species that could potentially use this habitat:** brown thrasher, scribble sallow moth, eastern hognose snake, Dillenius' tick-trefoil, eastern box turtle, eastern whip poor will

**Observations of invasive plants or pests:** multiflora rose and oriental bittersweet

**Snags or other suitable roosting tree present:** No

**Condition of plot point in 1934 aerial imagery:** Young forest

**General Notes:** This plot point was recorded within the Eversource ROW subject to vegetation management.



**Key Habitat Assessment Data Plots**  
**Tobacco Valley Solar Project**

**October 26, 2017**

<b>Herbaceous Plot:</b>	1
<b>Key Habitat Type:</b>	Herbaceous Upland/Inland Wetland
<b>Date:</b>	10/17/17
<b>% Canopy Cover:</b>	N/A
<b>Soil Drainage Class:</b>	Moderately well-drained with poorly drained ruts
<b>Landform:</b>	toe of slope, altered

Percent Cover within Herbaceous Plot

*Plot measures 30-foot radius from center point*

<b>Shrub Stratum</b>	<b>Percent Cover of Plot</b>
Multiflora rose ( <i>Rosa multiflora</i> )	20

<b>Herb Stratum</b>	<b>Percent Cover of Plot</b>
spreading dogbane ( <i>Apocynum androsaemifolium</i> )	25
sensitive fern ( <i>Onoclea sensibilis</i> )	20
deer tongue ( <i>Dichanthelium clandestinum</i> )	10
common cinquefoil ( <i>Potentilla simplex</i> )	1
Canada goldenrod ( <i>Solidago canadensis</i> )	5
New York fern ( <i>Thelypteris noveboracensis</i> )	4
rough-stemmed goldenrod ( <i>Solidago rugosa</i> )	5
calico aster ( <i>Symphyotrichum lateriflorum</i> )	2
fowl mannagrass ( <i>Glyceria striata</i> )	5
swamp dewberry ( <i>Rubus hispidus</i> )	12
soft rush ( <i>Juncus effusus</i> )	5
green bulrush ( <i>Scirpus atrovirens</i> )	1
purpleleaf willow herb ( <i>Epilobium coloratum</i> )	3
golden groundsel ( <i>Packera aurea</i> )	10
lady fern ( <i>Athyrium filix-femina</i> )	2
Christmas fern ( <i>Polystichum arostichoides</i> )	trace
Grass ( <i>Poaceae sp.</i> )	15
broadleaf plantain ( <i>Plantago major</i> )	1
white avens ( <i>Geum canadense</i> )	trace

<b>Vines Stratum</b>	<b>Percent Cover of Plot</b>
oriental bittersweet ( <i>Celastrus orbiculatus</i> )	15

**Herbaceous Plot 1 cont.**

**NDDB species that could potentially use this habitat:** eastern whip-poor-will, eastern box turtle, wood turtle (short distance to Bissell Brook)

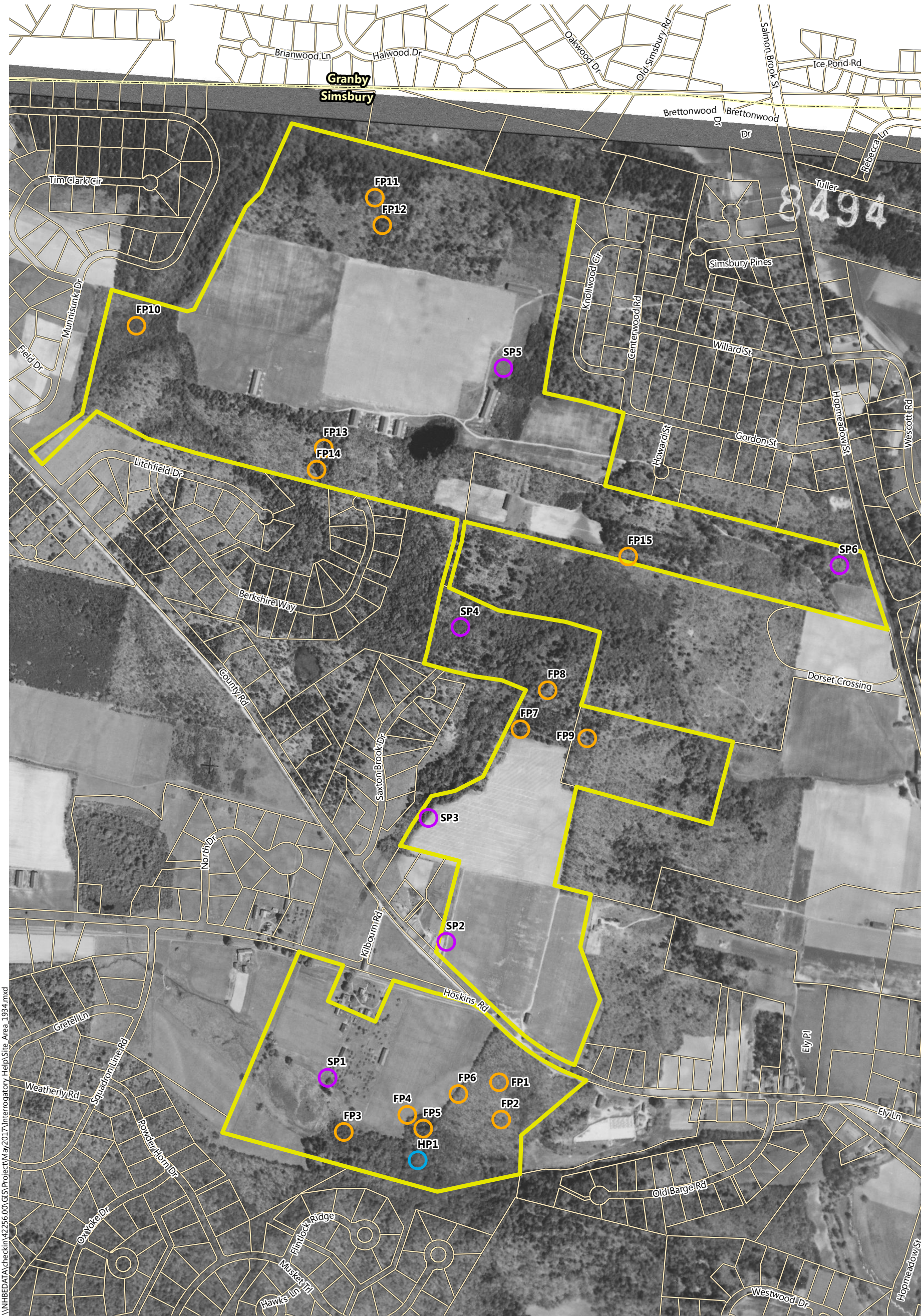
**Observations of invasive plants or pests:** multiflora rose and oriental bittersweet

**Snags or other suitable roosting tree present:** No

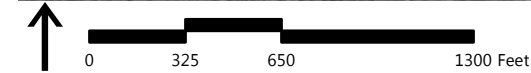
**Condition of plot point in 1934 aerial imagery:** Forested

**General Notes:** This plot was recorded along the sewer line right-of-way












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Tobacco Valley Solar

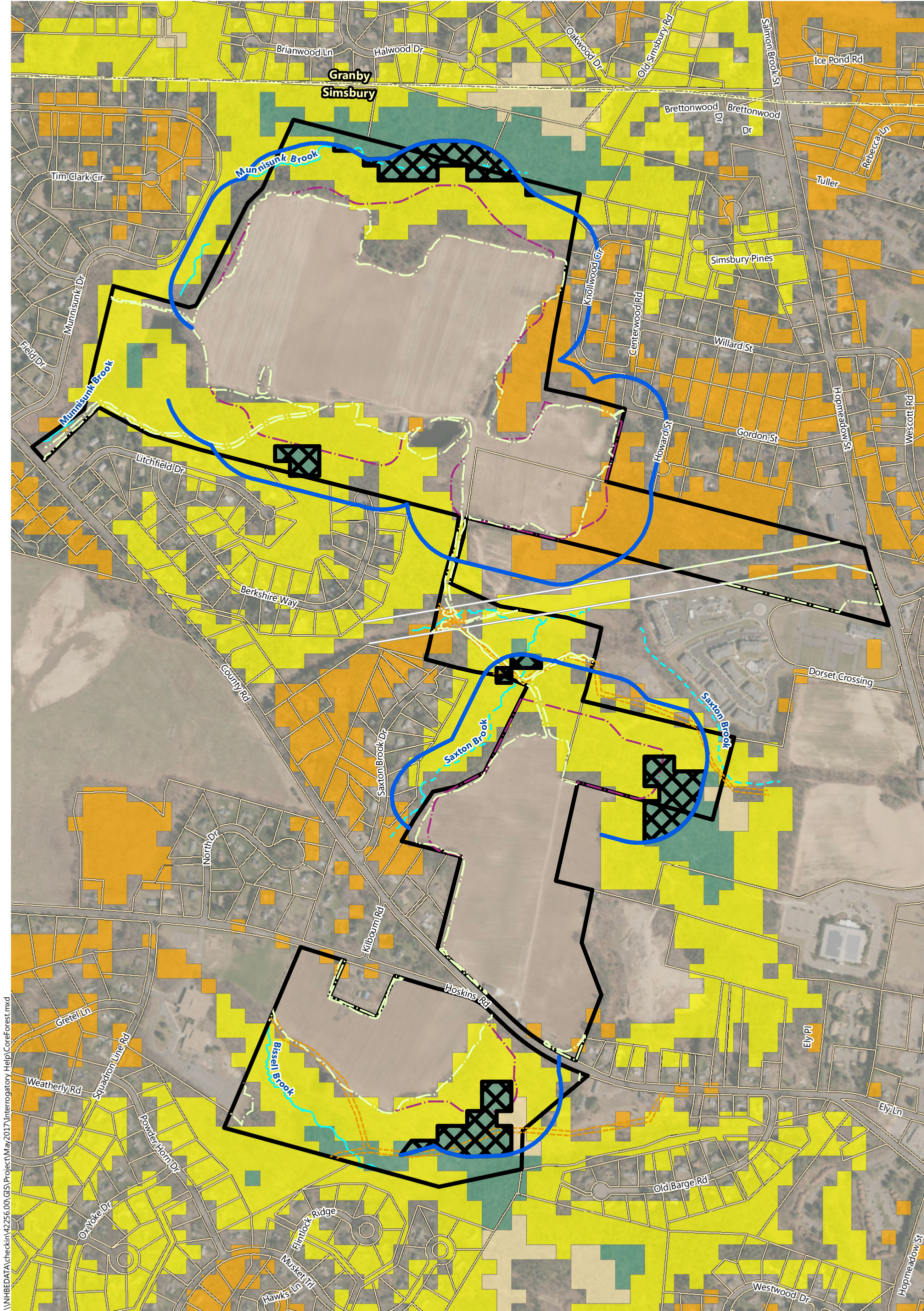
Simsbury, Connecticut

-  Property Boundary
-  Adjacent Parcels
-  Town Boundary
-  Forest Plot
-  Shrub Plot
-  Herbaceous Plot
-  Assessment Plot

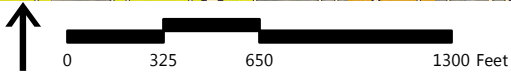
**Project Area Map**  
**1934 Aerial Imagery**

Source: VHB, MAGIC CTGIS, ESRI






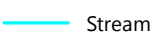









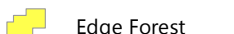



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**Tobacco Valley Solar**

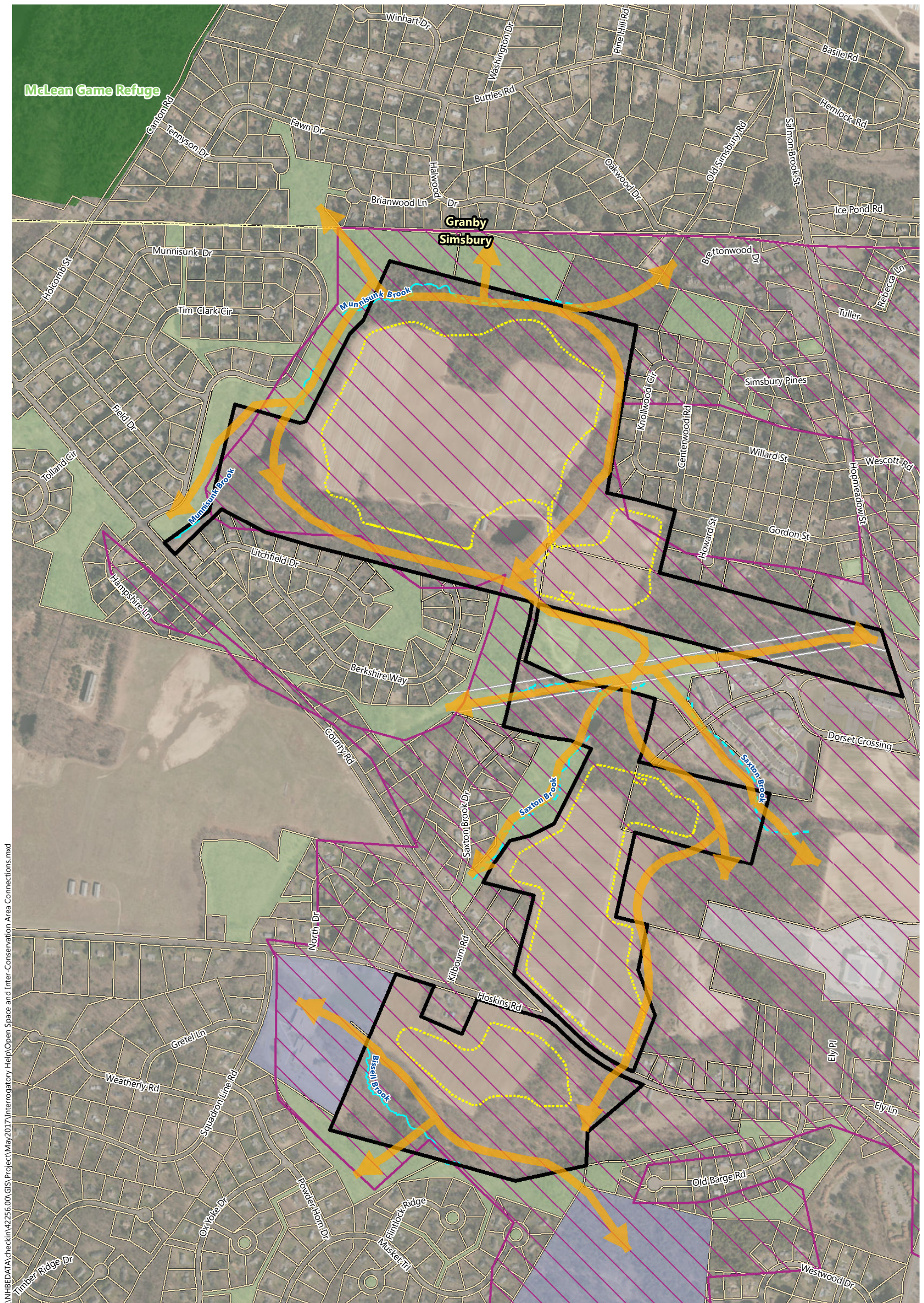
**Simsbury, Connecticut**

**Core Forest**

- |   |                         |   |                    |  |                                      |   |                   |
|---|-------------------------|---|--------------------|--|--------------------------------------|---|-------------------|
|  | Property Boundary       |  | Stream             |  | Sewer Easement                       |  | Core Forest Area  |
|  | Adjacent Parcels        |  | Approximate Stream |  | Existing Treeline                    |  | Patch Forest      |
|  | Town Boundary           |  | Proposed Treeline  |  | Impact to Core Forest                |  | Edge Forest       |
|  | Existing Eversource ROW |   |                    |  | 300-ft Buffer from Proposed Treeline |  | Perforated Forest |

Source: VHB, CTDEEP, ESRI, UCONN  
Center for Land Use Education and  
Research (2006)





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## Tobacco Valley Solar

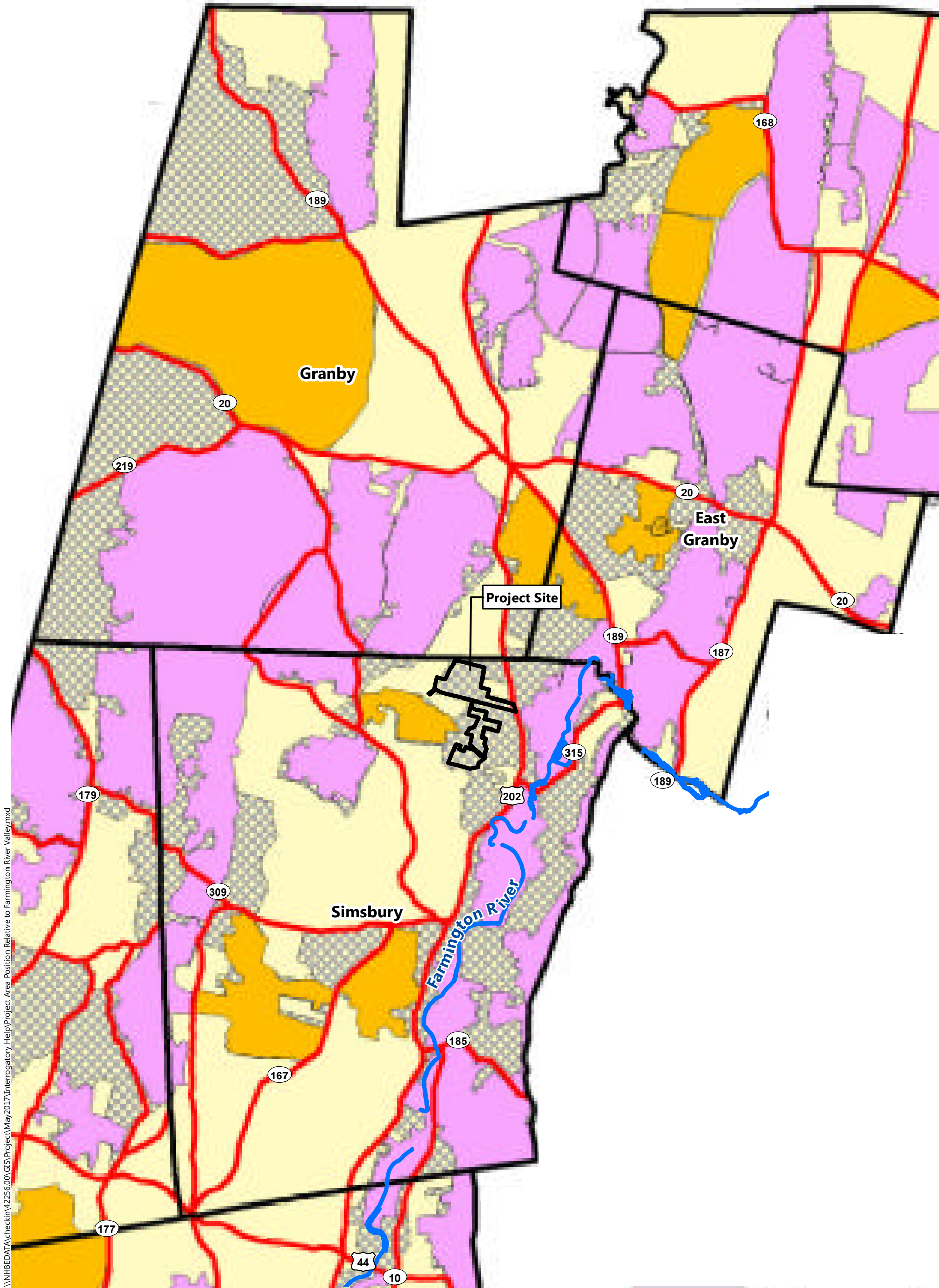
Simsbury, Connecticut

## Open Space and Inter-Conservation Area Connections

Source: VHB, CTDEEP, ESRI, NRCS  
Town of Simsbury, Connecticut Graphic &  
Property Information Application, Farmington  
Valley Biodiversity Project (2006)

NOTE: Fence line will be raised six inches above grade










0 3250 6500 13000 Feet

Tobacco Valley Solar

Simsbury, Connecticut

-  Property Boundary
-  Primary Conservation Areas
-  Secondary Conservation Areas
-  Inter-Conservation Area Connections
-  Freeway or Other Major Road

NOTE: Fence line will be raised six inches above grade

**Project Area Position Relative to Farmington River Valley**

Source: VHB, CTDEEP, ESRI, NRCS  
Town of Simsbury, Connecticut Graphic & Property Information Application, Farmington Valley Biodiversity Project 2006