

Appendix 14-H
Wetland Mitigation Plan

APPENDIX 14-H – WETLAND MITIGATION PLAN

Introduction

A wetland mitigation plan for the CPV Valley Project Energy Center Project has been developed to offset permanent wetland impacts that have been avoided and minimized to the greatest extent practicable. The wetland compensation area cover approximately 0.8 acres where wetland will be created to offset 0.266 acres of permanent (non-forested) wetland impacts associated with the placement of fill for the construction of the Energy Center and electric interconnect structures. The proposed wetland compensation has been designed in accordance with standards and specifications of the New York Army Corps of Engineers (ACOE) Compensatory Mitigation Plan Guidelines as required by the USACE's New York State Nationwide Permit – 39.

Compensatory Wetland Goals

Wetland impacts include approximately 0.266 acres (11,616 sq. ft.) of permanent fill for the construction of the Energy Center and electric interconnect structures. Temporary impacts will include approximately 2.16 acres (93,991 sq. ft.) and are limited to construction of the electric interconnect structures and laydown areas. These areas will be restored following construction completion. Consequently, these temporary impacts do not result in loss of wetland functions or values necessitating wetland compensation. Additionally, approximately 0.92 acres (40,075 sq. ft.) of palustrine forested (PFO1) wetland areas will be converted to palustrine scrub shrub (PSS1) wetlands as a result of the construction of the transmission line corridor area. Replication for the conversion areas is not being proposed, although the wetland replication area will be planted with tree species and will ultimately become forested swamp.

Of the 0.266 acres (11,616 sq. ft.) of permanent fill, a total of 0.246 acres (10,716 sq. ft.) of permanent wetland filling will occur within several linear Palustrine Emergent Wetland (PEM) wetland swales containing mostly herbaceous, wet meadow species located within and adjacent to the agricultural fields where the Energy Facility will located. These areas are federal-jurisdictional wetlands based on the Army Corps Wetland Jurisdictional Determination completed in 2008. The wetlands contain mostly herbaceous, disturbance tolerant vegetation, a shallow, perched groundwater table, and some were frequently tilled in the recent past as part of the crop field. Additionally, 0.02 acres (900 sq. ft.) of red maple-dominated Palustrine Forested Wetland (PFO) and PEM will be permanently impacted for installation of the electric interconnect structures (monopoles).

To assess the overall affects of the permanent fill of these wetlands, a wetland functional assessment was conducted for the site (Appendix 14-C). Where fill in wetlands could not be avoided, loss of certain wetland functions is anticipated. However, the functional assessment concludes that loss of function is primarily limited to Sediment/Toxicant/ Pathogen Retention and Nutrient Removal/Retention and Transformation within PEM wetlands generally dominated by common reed (*Phragmites australis*). The loss of wildlife habitat is primarily associated with the permanent impacts to PFO. Other functions and values attributed to other on-site wetlands were either found to be absent from the wetlands to be impacted or so small an impact that overall functional loss was very minimal. Therefore, the objectives of wetland compensation for

the CPV Valley Energy Center Project are to primarily offset the loss of Sediment/Toxicant/Pathogen Retention and Nutrient Removal/Retention and Transformation associated with the areas of filled PEM wetlands and the loss of wildlife habitat associated with PFO impacts. Additional benefits in terms of enhanced groundwater recharge, visual quality/aesthetics and flood storage will also be provided by the compensatory wetland area.

Permanent loss of PFO and PEM wetlands from the placement of fill will be compensated for at a replication to impact ratio of greater than >2:1 (Table H-1). The overall goal of the compensatory wetland area is to create a forested wetland environment that replaces and enhances the wetland functions lost.

Table H-1. Compensatory Wetland Area, CPV Valley Energy Center Project				
Compensatory Wetland Area	Wetland Type	Area (acres /square feet)		Watershed
		Impact	Compensation	
1	PFO1	0.02 acres / 900 sq. ft.	0.04 acres / 1,800 sq. ft.	Carpenter Creek/Monhegan Brook
	PEM2	0.246 acres / 10,716 sq. ft.	0.76 acres / 33,106 sq. ft.	Carpenter Creek/Monhegan Brook
Summary	PFO1/PEM2	Fill =0.266 acres / 11,616 sq. ft	0.80 acres / 34,906 sq. ft.	Carpenter Creek/Monhegan Brook

Wetland Mitigation Plan

Specifications and details of layout plans for the wetlands to be created (Sheets ES-9 and ES-10 of Site Plans) are discussed below and are integral to the success and sustainability of the compensatory mitigation. Construction requirements are depicted within the compensation notes on Sheet ES-10 and include the following elements: sub-grade and final grade specifications, topsoil thickness, surface drainage requirements and planting specifications depicting location, quantities, density and species necessary to establish the PFO wetland area. Typical cross-sections for the proposed compensatory wetland area are also depicted within each of the above-mentioned figures.

Construction of the compensatory wetland area may commence as early as spring 2012, but will generally follow the overall site grading and a major portion of project construction due to its juxtaposition to the work area. Prior to commencement of work, a pre-construction meeting will be held to familiarize contractors with the design and permitting requirements for the compensatory wetland area. The meeting will be convened by a wetland scientist familiar with the requirements of the project plans and the conditions of the permits issued by the New York Department of Conservation (NYDEC) and ACOE. The project wetland scientist will be present onsite during construction to monitor the work and to ensure compliance with requirements of the compensatory wetland plans and permits.

Construction and planting of the compensatory wetland area is anticipated to take place over approximately a three month period. Initiation of construction of the compensatory wetland area will be dependent on the time of year, plant availability and other elements of the project

schedule. Successful indications of sustainable wetland conditions are anticipated to be evident at the compensatory wetland area within one-full growing season following completion of construction. Conditions at the compensatory wetland area will then be monitored annually for five successive years following construction.

The compensatory wetland area will be constructed within the same watershed as the wetland impact areas. Ground water levels, as well as adjacent natural grades control the depth of excavation and final topography in the compensatory wetland area and will be field adjusted as necessary by a wetland scientist during construction. The resultant proposed contours are to be excavated to provide grades conducive to establish a forested wetland community.

Hydrologic conditions similar to the existing wetlands occur in the adjacent areas where the compensatory wetland area will be created. Drainage class, shallow depth to water table and frequency of inundation have been recorded in the proposed compensatory wetland area by the Orange County Soil Survey (USDA, 2008) and are indicative of hydrologic conditions suitable for constructing the compensatory wetland area. Augmenting this groundwater source of wetland hydrology is surface runoff from the adjacent Energy Center sloping toward the compensatory wetland area location. Proposed grades throughout the created wetland will be designed to capture this surface drainage.

Prior to construction at the compensatory wetland area, erosion controls conforming to Best Management Practice (BMP) specifications such as staked hay bales and/or silt fence will be erected down-gradient of construction to protect areas that could be impacted during the course of project construction. Erosion control measures will be functionally maintained until adjacent slopes and bare soil areas have been stabilized with vegetation. It is anticipated that stability will be achieved by or before **November 1**. Once the adjacent slopes have been stabilized, erosion control measures will be removed and properly disposed of offsite. Any sediment collected by the erosion control measures will be stabilized, or removed and disposed of in a manner that prevents transport of the material into a waterway or wetland.

A tracked excavator will be used at the replacement wetlands to create irregular basins within the compensatory wetland. The basins will be constructed so that the centers of the basins are deeper than the surrounding perimeter. Where excavation is required, sub-grades will be excavated eight-to 12-inches below final grade to accept backfill with a corresponding thickness of wetland topsoil. This thickness of topsoil is representative of the corresponding "A" horizon within the impacted wetlands or in other undisturbed wetlands adjoining the replacement wetlands. Hydric or wetland soil stockpiled from the wetlands to be filled, or other sources, will be salvaged and spread over the surface of the replacement wetlands. Other potential sources of supplemental organic materials include composted leaf mulch from local municipalities. This topsoil shall also be free of invasive plant species, trash, or other non-native material. After application of the topsoil to sub-grades, the constructed wetland footprint will blend in with contours of adjacent undisturbed slopes.

Native species indigenous to New York are to be planted in the compensatory wetland area to replicate and re-establish a forested wetland community. In particular, native species tolerant of periodic inundation or saturated soils will be planted. Based on the proximity of existing

wetlands, it is reasonable to expect other “volunteer” species of woody and herbaceous vegetation to colonize the compensatory wetland area.

A commercially available seed mixture of acceptable native hydrophytes will be sown across bare soil in the compensatory wetland area to establish an understory of herbaceous wetland vegetation beneath the woody plantings. The seed mix will be formulated for wildlife and plant diversity which will enhance the natural wetland communities within the area. Typical application rates of such seed mixes are 15 pounds per acre (± 0.5 pounds per 1,000 square feet). This seed mixture will also be applied to the impacted wetlands associated with the temporary laydown areas and electrical interconnect structures.

Dead or dying coarse woody debris obtained from logs, limbs and stumps of non-invasive species will be distributed throughout the constructed wetlands. The woody debris is intended to provide structural and temporal diversity and cover, nest sites, and perches for wildlife. Woody debris will be sited to represent dispersed configurations typically observed in wetlands including fallen logs, snags, overturned stumps depicting wind-throw and other fallen canopy.

Compensatory Wetland Site

Sites selected for evaluation as compensatory wetland areas with basic requirements for success were assessed. In accordance with ACOE mitigation guidance, these sites were chosen based the following selection criteria:

- locate in the same sub-watershed as the filled wetlands with similar hydrogeomorphic, ecological landscape features, and functions and values ;
- locate with natural and adequate variable hydrological sources/conditions (including locating sites near existing wetlands or on “marginal” wetland/upland areas that do not meet all three wetland criteria, or where sites were previously wetlands;
- locate where soils and heterogeneous topographic gradients are available and will require minimal construction grading to achieve appropriate planting elevation, depth, soil type and seasonal timing; and
- consider the opportunities and constraints concerning equipment access for construction and maintenance, and agreeable landowners, subsurface conditions, and groundwater quantity and quality.

One compensatory wetland area will be created as compensation for impacts summarized in Table H-1. As with the impact areas, the replication site is located within Orange County and within the same watershed and property as the wetland impact areas. As a result, based on this location, the compensatory wetland area will continue to provide the same, if not more diverse functional benefits similar to those wetlands impacted by the project. Due to the position in the landscape and the generally flat nature surrounding the compensatory wetland area, “hydrologic energy” or flow velocities of contributing surface drainage are relatively low. Consequently, threat of erosion during or subsequent to establishment of vegetative cover in the compensatory wetland area is also relatively low. The replication site is summarized below and is shown on the Compensatory Wetland Area Plans (Sheets ES-9 and ES-10 of Site Plans).

The compensatory wetland area is located in the Carpenter Creek watershed and provides 0.8 acres (34,848 sq. ft.) of compensation for PEM and PFO wetland impacts. The compensatory wetland area is located to the east of the proposed Energy Facility and will connect to and expand the existing red maple swamp to the east. The area includes an existing wetland (agricultural) swale that will be incorporated into the mitigation area. Soils within the existing wetlands and compensatory wetland area consist of Madalin silt loam which is located in the eastern portion of the Project Site. This soil series consists of deep, poorly drained and very poorly drained, nearly level soils (USDA, 2008). Tree species to be planted include red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*) and yellow birch (*Betula alleghaniensis*). Shrub species such as highbush blueberry (*Vaccinium corymbosum*), winterberry (*Ilex verticillata*) and red osier dogwood (*Cornus stolonifera*) will be planted in clusters of three shrubs throughout the compensatory wetland area for a more natural habitat. Table H-2 below identifies the species and number or seed density to be planted as well as functional attributes of each species. A wetland seed mix (Northeast Wetland Hummock Mix from Southern Tier Consulting, Inc.) consisting of herbaceous species will be sown throughout the compensatory wetland area to establish a wetland community that compensates for impacts to the PEM wetlands.

Plant Species	Number of Specimens	Functional Attributes¹
Trees		
Red maple (<i>Acer rubrum</i>)	70	Food sources for mammals and birds; nesting sites
Green ash (<i>Fraxinus pennsylvanica</i>)	70	Food source for mammals and birds; cover and nesting sites for birds
Yellow birch (<i>Betula alleghaniensis</i>)	71	Food source for birds; nesting site for red-shouldered hawks
Shrubs		
Highbush blueberry (<i>Vaccinium corymbosum</i>)	201	Food source for song and game birds and various mammals
Winterberry (<i>Ilex verticillata</i>)	201	Food source for birds in fall and winter months; cover and nesting sites
Red osier dogwood (<i>Cornus stolonifera</i>)	201	Food source for birds in late summer and early fall; cover and nesting sites
Herbaceous		
Green bulrush (<i>Scirpus atrovirens</i>)	3.25 lbs/acre	Food source for water fowl and small mammals
Soft rush (<i>Juncus effusus</i>)	3.25 lbs/acre.	Cover for water birds
Fox sedge (<i>Carex vulpinoidea</i>)	3.25 lbs/acre.	Food source for birds; cover sites
Rice cut grass (<i>Leersia oryzoides</i>)	3.25 lbs/acre.	Food source for birds
Bearded sedge (<i>Carex comosa</i>)	3.25 lbs/acre	Food source for birds; cover sites
Fringed sedge (<i>Carex crinita</i>)	3.25 lbs/acre	Food source for birds; cover sites
Lurid sedge (<i>Carex lurida</i>)	3.25 lbs/acre	Food source for birds; cover sites
Hop sedge (<i>Carex lupulina</i>)	3.25 lbs/acre	Food source for birds; cover sites
¹ Martin, A.C. et al 1951. <i>American Wildlife & Plants, A Guide to Wildlife Food Habits</i> . Dover Publications Inc. New York, NY. 500pp.		

Wetland Monitoring

Monitoring of the compensatory wetland area will begin once the area has been constructed and will continue for five full growing seasons after completion of construction. Monitoring will occur twice a year during the growing season for the first three years and once a year during the growing season for the remaining two years. Monitoring will be conducted by a wetland scientist familiar with the design of the compensatory wetland area and the associated permitting requirements. Monitoring reports will be submitted to the NYDEC and ACOE within a month of observations. Below is a schedule and discussion of the observations to be made during the monitoring along with topics that are to be addressed in the annual monitoring reports.

Monitoring will take place at several key times throughout construction and the remainder of the first growing season. The time and purpose of these site visits are listed below and are based on construction commencing during the spring 2012:

<i>Prior to excavation</i>	confirm proper layout of the compensatory wetland area, document nearby or in-place occurrence of invasive or problematic species that may require future control or management;
<i>Prior to completion of grading</i>	verify hydrology, sub-grades and final grades have been achieved;
<i>Onset of planting</i>	verify adherence to planting specifications and identify planting locations;
<i>Completion of planting</i>	verify planting placement, evaluate need for irrigation, identify corrective measures;
<i>Weekly after planting</i>	evaluate need for irrigation and implement as necessary;
<i>Early October</i>	inspect success of plantings, implement necessary corrective measures before month end (end of growing season) photograph site from designated monitoring stations, and evaluate achievement of mitigation goals.

In the subsequent three years, monitoring will be conducted as scheduled below for the related purposes:

<i>Midway during growing season</i>	evaluate planting success and need for irrigation, inventory occurrence of invasive species, implement remedial measures ranging from physical removal to application of herbicides as appropriate for invasive species; and
<i>Early September</i>	inspect success of plantings, implement necessary corrective measures before month end (end of growing

season), photograph site from designated monitoring stations, and evaluate achievement of compensatory mitigation goals.

During the last two years of monitoring, observations documentation will be made only during the month of August.

Permanent monitoring stations will be established in the compensatory wetland area from which photographs will be taken annually to track development of wetland conditions. Data will also be collected at the monitoring station in late July or early August during the middle of the growing season. Vegetative data to be collected from nested quadrats containing respective strata at these stations will include species composition, percent dominance, and percent survival of planted species. Soils observations will consist of describing soil profiles at each monitoring station. Hydrologic data will be obtained from test pits excavated to evaluate soil profile development. The above data will be evaluated in accordance with methods presented in the 1987 *Corps of Engineers Wetland Delineation Manual* to determine whether conditions occur that meet criteria representative of a PFO wetland community. Conditions throughout the compensatory wetland area such as vegetative cover, occurrence and extent of invasive species, evidence of disturbance, slope stability, and use by wildlife (e.g. tracks, scat, browsing, or nests) will also be recorded during the mid-growing season monitoring.

Conditions observed at the monitoring stations and throughout the compensation area will be summarized in the monitoring report along with any necessary recommendations for remedial measures such as replacing dead vegetation, re-grading to achieve appropriate hydrology, controlling invasive species, and stabilizing un-vegetated or eroding soil. Data collected during monitoring site visits will be summarized in the report. By the end of the second growing season, the monitoring reports will also address the status of the following success standards:

- 1) 100 percent vegetative coverage;
- 2) More than 85 percent of the compensatory wetland area shall contain a minimum of six planted species or non-exotic volunteer species that are well represented in the compensation area;
- 3) Stable slopes/soils within and adjacent to the compensatory wetland area; and
- 4) Control of non-native invasive species (e.g. common reed, Russian and autumn olives, buckthorn and/or multiflora rose) within the compensatory wetland area.

The monitoring reports will contain:

- Plans showing the location of stations used to monitor species planted in the compensatory wetland area;
- Assessment of planted species survival and sustainability;
- Species list inventory of dominant (> 5 percent cover) volunteer species;

- Assessment of wetland functions being provided by the compensatory wetland area;
- Representative photographs of the created wetlands from monitoring stations; and
- Recommended remedial measures needed to correct problems or deficiencies.

REFERENCES

U.S. Department of Agriculture (USDA). 2008. Web Soil Survey, Orange County New York, (Online) <http://websoilsurvey.nrcs.usda.gov/app/>. Accessed October 20, 2008.