

PSEG Early Site Permit Application Environmental Review Alternative Sites Audit Trip Report

April 17-19, 2012

1. Introduction

On May 25, 2010, PSEG Power, LLC and PSEG Nuclear, LLC (PSEG) submitted to the U.S. Nuclear Regulatory Commission (NRC) an application for an early site permit (ESP) at the PSEG ESP site (also referred to as “the proposed site” and “Site 7-4”). The PSEG ESP site is located north of and adjacent to PSEG’s existing Salem Generating Station (SGS) and Hope Creek Generating Station (HCGS) complex on the southern part of Artificial Island on the east bank of the Delaware River in Lower Alloways Creek Township, Salem County, New Jersey.

The PSEG ESP site comprises 819 acres, of which 734 acres is located within PSEG’s current property boundary. The remaining 85 acres is located within the U.S. Army Corps of Engineers’ (Corps) Artificial Island Confined Disposal Facility (CDF). PSEG has developed an agreement in principle with the Corps regarding the future acquisition of this 85-acre parcel through a land exchange, and has identified a potential land parcel for such an exchange (Site 15-G in Gloucester County, New Jersey).

The Corps (Philadelphia District) is a cooperating agency with the NRC in preparing the environmental impact statement (EIS) for PSEG’s ESP application. Therefore, ongoing engagement with the Corps is needed to understand the Corps’ acquisition and disposition process and to adequately address the action in the joint NRC-Corps EIS for the PSEG site.

In addition to the PSEG ESP site (Site 7-4), PSEG has identified four alternative sites:

- Site 4-1 (Hunterdon County, New Jersey)
- Site 7-1 (Salem County, New Jersey)
- Site 7-2 (Salem County, New Jersey)
- Site 7-3 (Cumberland County, New Jersey)

These alternative sites are shown in Figure 1 and described in detail in Section 4 below.

On April 17-19, 2012, staff from the NRC, the Corps, various Federal and State agencies, and three National Laboratories conducted an Alternative Sites Audit of the four alternative sites (see Appendix A for a complete list of participants). The Audit participants also toured the PSEG ESP site and the potential land exchange parcel (Site 15-G). The following sections discuss the scope and objectives of the Alternative Sites Audit, describe the Audit logistics and identify the participants, and provide a daily overview of the Audit.

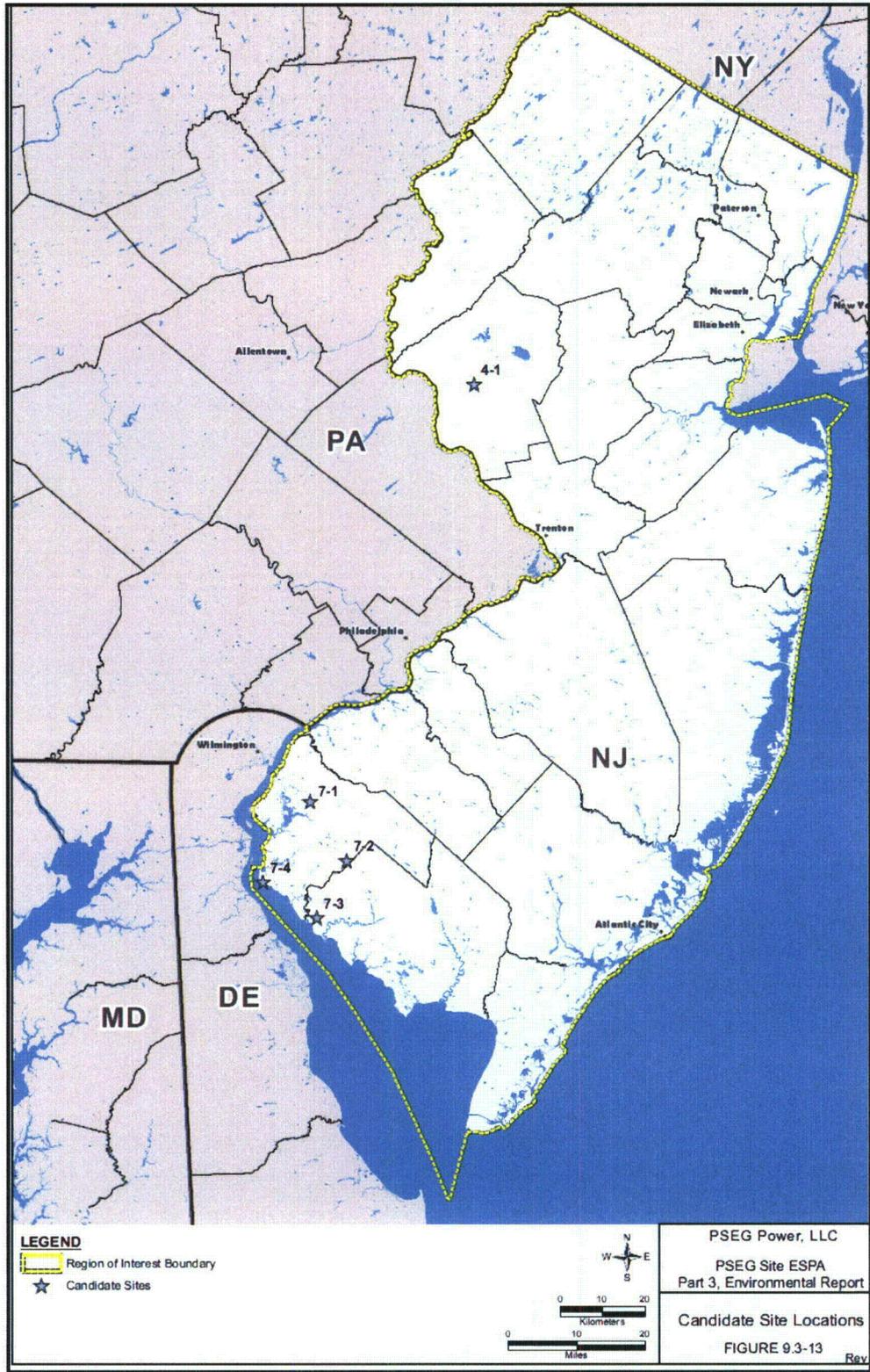


Figure 1. Map showing the PSEG ESP Site (Site 7-4) and Alternative Sites 4-1, 7-1, 7-2, and 7-3 (Source: PSEG 2010)

2. Alternative Sites Audit Scope and Objectives

The NRC staff and other participants conducted the Alternative Sites Audit to become more familiar with the alternative sites and to begin the process of evaluating them as alternatives to the PSEG ESP site. The scope and objectives of the Audit are to support a determination of whether: (1) PSEG has reasonably identified alternative sites, predicted the environmental impacts of construction and operation at these sites, and developed and used a logical, reproducible means of comparing sites that led to the selection of the proposed site; and (2) any alternative sites can be shown to be environmentally preferable, and if so, obviously superior to PSEG's proposed site.

For the EIS, the NRC staff and the Corps staff (the "Review Team") will evaluate numerous topics for each of the alternative sites, including land use, hydrology, water quality, water availability, terrestrial ecological resources, aquatic ecological resources, wetlands, wetland buffers, transmission corridors, socioeconomic/environmental justice issues, air quality, radiological and non-radiological health impacts, and cultural resources. The Review Team will evaluate these topics to determine whether additional information may be needed to complete its environmental review of the alternative sites.

3. Alternative Sites Audit Logistics

The Alternative Sites Audit was conducted from April 17-19, 2012. On April 17 and 18, the NRC staff and other participants met at the PSEG Energy and Environmental Resource Center in Salem, New Jersey, and traveled to the alternative sites. Section IV below describes these two Audit "travel days" in detail. The Audit was finalized on April 19 with a publicly-noticed exit briefing conducted at the PSEG Energy and Environmental Resource Center. Appendix A to this report lists the Audit participants.

4. Alternative Sites Audit Daily Details

4.1 Tuesday, April 17

4.1.1 PSEG's Alternative Sites Evaluation and Selection Process

On Tuesday, April 17, the Audit participants met at the PSEG Energy and Environmental Resource Center. The day began with PSEG contractor staff providing an overview of PSEG's alternative sites evaluation and selection process. No copies of the presentation were retained by the participants; however, the following narrative summarizes the presentation.

PSEG's site-selection process is described in several documents, only one of which had been provided to the NRC staff for review. These documents were all prepared by Sargent & Lundy, and they are:

- *Alternative Site Evaluation Study*, March 2010; ML1014600084 (S&L 2010)
- *Candidate Site Impact Quantification Report*, April 2010

- *Field Verification of Key Resources at PSEG Alternative Sites Report, April 2011*

The site selection process was based on the *EPRI Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application*, dated March 2002 (the Siting Guide). The process described in the Siting Guide was used as a general basis, and PSEG adapted this process based on its own specific business needs.

The general approach was to apply a multi-step, sequential process as follows:

- **Step 1: Identify a Region of Interest (ROI).** PSEG's parent company owns a subsidiary that engages in the transmission and distribution of natural gas and electricity in an area limited to the state of New Jersey. The state of New Jersey was therefore selected as the ROI.
- **Step 2: Identify Candidate Areas.** Digitized maps of the ROI were obtained and constructed to apply exclusionary criteria to eliminate areas considered to be unsuitable for the siting of a nuclear power plant. These criteria included factors (such as high population density) that might make the licensing, permitting, or development of a new nuclear power plant impractical. Seven candidate areas were identified in this step of the process.
- **Step 3: Identify Potential Sites.** Regions within each of the seven candidate areas were examined to identify locations for potential sites suitable for siting a new nuclear power plant. Preliminary footprint layouts were developed and overlaid on each potential site to confirm the adequacy of the available land. Other required conditions included site topography and proximity to water supply. In this step, at least one potential site was identified in each of the seven candidate areas for further evaluation in the next step.
- **Step 4: Identify Candidate Sites.** The primary criteria used for the selection of candidate sites included consideration as to whether the potential site had any significant environmental or other issues that would make them impractical or undesirable for licensing, permitting, or development with a new nuclear power plant. The following issues were considered: environmental acceptability, nuclear licensing, and engineering. The total number of significant issues was identified for each potential site, and the sites with the least number of such significant issues were retained as candidate sites. The following five sites were identified for further study in the next step:
 - Site 4-1 in Hunterdon County, New Jersey
 - Site 7-1 in Salem County, New Jersey
 - Site 7-2 in Salem County, New Jersey
 - Site 7-3 in Cumberland County, New Jersey
 - Site 7-4 in Salem County, New Jersey

- Step 5: Identify the Proposed Site. Each of the above five candidate sites was evaluated against more specific criteria from both technical and environmental perspectives. A numerical scoring system was used as the basis for comparing the candidate sites. Site 7-4 (i.e., the site north of and adjacent to the existing SGS/HCGS site) emerged as the proposed site. The other sites were identified as the alternative sites, in the following order according to their numerical scores (best to worst): Site 7-3, Site 7-2, Site 7-1, and Site 4-1.

According to Sargent & Lundy staff, in response to questions raised during the Audit presentation, the above process deviated from the EPRI guidelines in the following two ways: (1) no explicit public participation process was included in any of the steps and (2) no meteorological data were obtained for the sites in order to compute and compare χ/Q dispersion parameters.

As described previously, the above steps are documented in the *Alternate Site Evaluation Study* (S&L 2010) and in the *Candidate Site Impact Quantification Report* (April 2010). In early 2011, PSEG staff conducted additional field reconnaissance at each of the alternative sites. The findings are documented in the *Field Verification of Key Resources at PSEG Alternative Sites Report* (April 2011), and according to PSEG they confirm the preference for Site 7-4 to be the proposed site.

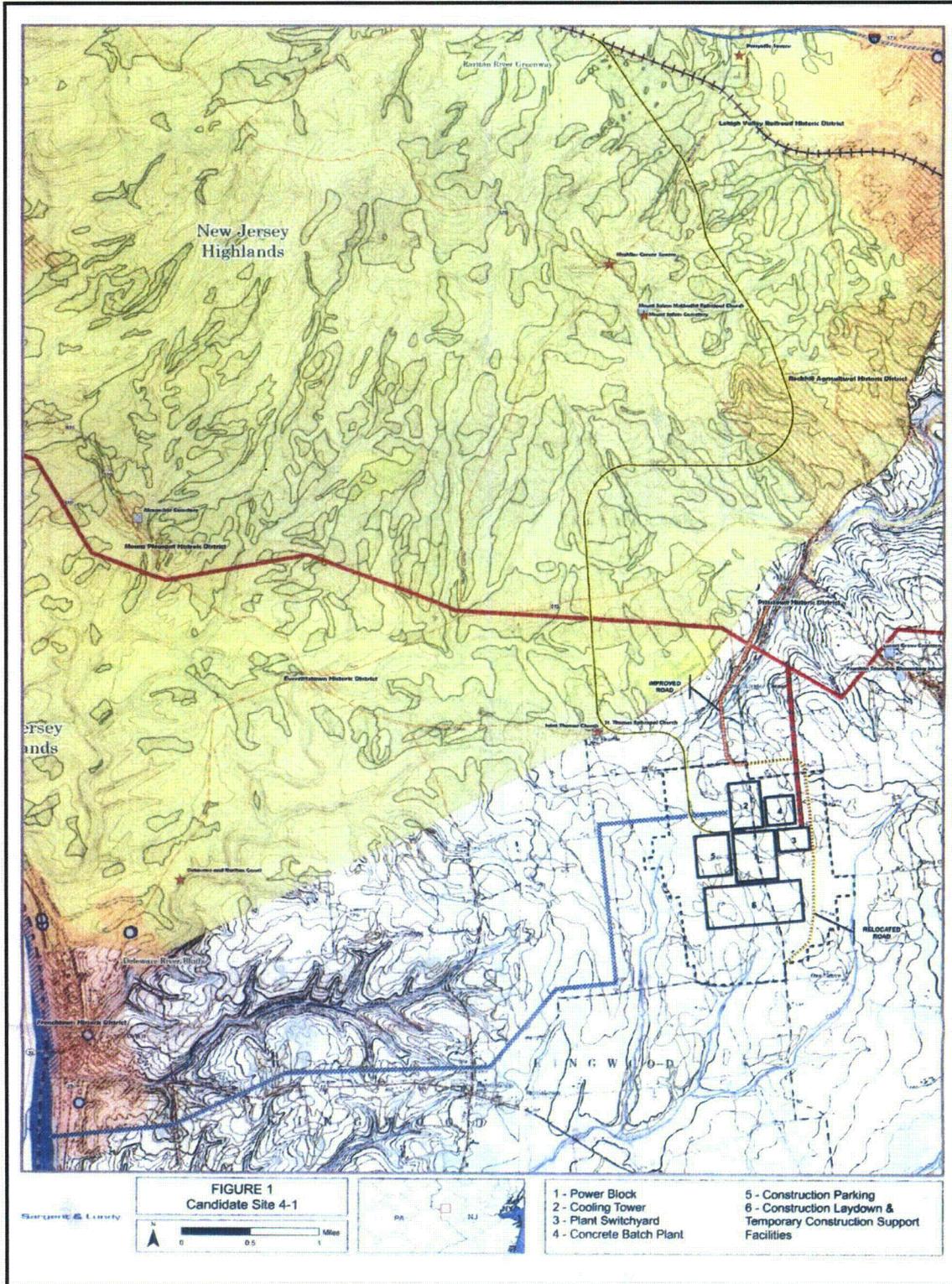
During the Audit, PSEG staff offered to place the *Candidate Site Impact Quantification Report* and the *Field Verification of Key Resources at PSEG Alternative Sites Report* in the e-Docs “Reading Room” for the PSEG ESP application. PSEG staff placed the two documents in the e-Docs Reading Room following the Audit.

4.1.2 Alternative Site 4-1

After the presentation on PSEG’s alternative sites evaluation and selection process, Audit participants traveled to Site 4-1 (Figure 2), a greenfield site in Hunterdon County, New Jersey. The site is located on relatively flat land approximately 5 miles (mi) east of the Delaware River, which would be the primary water source. Elevations across the site range from 540 to 640 feet (ft) above Mean Sea Level (msl). Based on conceptual site boundaries identified by considering site development requirements and existing property parcels, Site 4-1 has a total area of 1128 acres (ac).

Land Use

Existing land use at Site 4-1 is predominantly agricultural, with large areas planted in cultivated crops and some livestock. This area has some very high-quality farm land, and parts of the site are designated County Preserved Farms by the State of New Jersey. This “Preserved” designation would need to be addressed in developing a nuclear power plant on the site. There is also a Rutgers University Agricultural Extension Research Station on the northern boundary of the site. The Franklin Township Recycling Center is located northwest of and very close to the site.



**Figure 2. Map showing Alternative Site 4-1
(see map legend on Figure 3 of this report)
(Source: S&L 2010)**

Legend for Candidate Site Maps

Figure 6



Map Extent

LEGEND - USGS TOPOGRAPHIC BASE MAPS

Existing Site Features

- State Boundary
- County Boundary
- Limited Access Highway
- Highway
- Major Road
- Local Road
- Rail Lines
- Natural Gas Pipelines
- Oil Pipelines
- Transmission Lines < 500 kV
- Transmission Lines > = 500 kV
- Ⓜ Substations < 500 kV
- Ⓜ Substations > = 500 kV
- Ⓜ Public Institutions
- Ⓜ Public Drinking Water Intakes
- ★ Historical Sites
- ▨ Historic Districts
- ▨ Critical Environmental Sites
- ▨ Protected Groundwater Resources
- Airports
- 100-Year Flood Areas
- Parks and Preserves
- Wetlands
- Prime Farmland

Potential Site Features

- Site Boundary
- ▭ Plant Layout
- Transmission Line to Plant
- Rail Spur to Plant
- New or Improved Roadway for Plant Access
- Relocated Existing Road
- Makeup Water Pipeline

Sargent & Lundy

Figure 3. Map legend for Figures 2, 4, 5, and 6 in this report
(Source: S&L 2010)

There are numerous single-family houses located within the Site 4-1 boundaries (PSEG's ER says approximately 25), and most of these houses would have to be removed. There is also a county road that bisects the site, and it would be relocated to the east of the site.

Hydrology

Construction impacts to groundwater flow at Site 4-1 could result in existing stream volume being reduced due to temporary groundwater drawdown from dewatering activities.

During plant operations, groundwater would be used for potable needs and fire suppression (210 gpm average and 953 gpm maximum). Based on information in the ER and general knowledge of the water bearing properties of the geologic units at Site 4-1, there should not be any difficulty in satisfying the requirements. The number and depth of wells would depend on the specific yield of the fractured rock (shale, sandstone, and some conglomerate) bedrock encountered. Well depths in these aquifers typically range from 30 to 1500 ft, with groundwater yields of up to 1500 gpm.

Ecology (Terrestrial and Aquatic)

The overall character of the area around Site 4-1 is scenic and rural, with a mixture of woodlots, hedgerows, mowed fields and agriculture. Roadsides are bordered by a single row of old-growth trees in many areas. One large white oak with sufficient exfoliating bark to contain potential bat roosting habitat was noted. Some large maples and other old-growth trees were also noted bordering roads.

PSEG used reconnaissance-level data for evaluation and did not conduct any detailed field studies on Site 4-1. PSEG obtained information on protected and rare species that may occur in the vicinity of the site from the New Jersey Department of Environmental Protection (NJDEP). According to this information, 13 wildlife species and one plant species have been recorded within approximately 1 mi of the site. However, this list will require an update and re-evaluation to account for recent (February 2012) changes made to New Jersey's threatened, endangered and special concern lists. The degree to which any listed species might be utilizing Site 4-1 would require detailed field surveys.

Some areas around the proposed plant site at Site 4-1 were dominated by low grasses (turf grasses prevalent). Red-winged blackbirds were noted in these areas, and turkey vultures were noted flying over the area. There are some small woodlots bordering these grassy areas, mainly consisting of mixed hardwoods. Narrow wooded shelterbelts were also noted between the agricultural fields. Wildlife characteristic of open country, small woodlots and edge habitat would be expected to frequent this area. The section of the transmission line corridor viewed in the area contained mainly mowed turf grasses.

We did not visit the potential locations of the Site 4-1 cooling water intake and discharge structures on the Delaware River. We visited a general area along the river that included a

narrow border of large maples along the river (park-like setting). Canada geese, red-winged blackbirds and song sparrows were noted in this area.

Based on reconnaissance-level information (PSEG's ER and topographic maps), there are small freshwater streams on Site 4-1. The streams were not visited during the tour, but PSEG's information indicates that associated aquatic resources do not have exceptional or high ecological value. PSEG's online searches did not indicate the presence of any rare, protected, threatened or endangered aquatic species on Site 4-1.

4.1.3 Potential Land Exchange Parcel (Site 15-G)

After visiting Site 4-1, Audit participants traveled to Site 15-G, the parcel that PSEG could acquire and give to the Corps in exchange for the 85-acre parcel PSEG proposes to acquire from the Corps at the Artificial Island CDF. Site 15-G is located in Gloucester County, New Jersey, about 30 miles upriver from the PSEG ESP site.

Land Use

The Corps developed Site 15-G as a CDF in the 1950s, but ceased disposal operations and sold the site to another entity in the 1970s. Currently, Site 15-G is not being used.

During the Audit, it was stated that Site 15-G totals 425 acres, but includes two separate parcels: a 373-acre "primary" parcel and a 52-acre "smaller" parcel. PSEG and Corps staff noted that the actual acreage of the land exchange has not been determined, and that the final exchange would be based on dredge material disposal capacity rather than acreage. So, in the final exchange, the Artificial Island CDF parcel could be larger or smaller than 85 acres, and the Site 15-G parcel could be larger or smaller than 425 acres. PSEG staff stated that the ESP application ER would be revised to reflect the final acreage of the land exchange.

Corps staff noted that Site 15-G is not currently zoned for land uses that would allow a CDF, and that this zoning issue would need to be addressed with Gloucester County and the affected townships.

Hydrology

If Site 15-G is re-developed as a CDF, the additional soil height would change the groundwater flow pattern and, if enough height is attained, eventually create a mound of radial groundwater flow. At this time it is not known if existing streams or wells are located close enough to the site to be affected by potential future activities.

Ecology (Terrestrial and Aquatic)

PSEG staff noted that there is elevated arsenic in the soils at the primary, 373-acre portion of Site 15-G, and elevated levels of metals in the groundwater (higher levels of arsenic is characteristic of dredge spoils along the Delaware River). The smaller, 52-acre

portion of Site 15-G, which is located south of Railroad Avenue, is currently a forested wetland and would not be used as part of the CDF.

Much of the primary portion of Site 15-G is low, grassy habitat, sparsely vegetated in some areas. There is a berm along the main road. Shrubby areas exist on two borders. Although habitat may appear marginal on the site, there is the potential for certain grassland species to frequent the site.

PSEG staff noted that they had done a threatened and endangered species evaluation for Site 15-G.

Based on reconnaissance-level information (online topographic maps), a moderate-sized freshwater stream drains the south, east, and north sides of Site 15-G. The stream, which drains to the Delaware River about 1 mile east of Site 15-G, was not visited during the tour.

4.1.4 Alternative Site 7-1

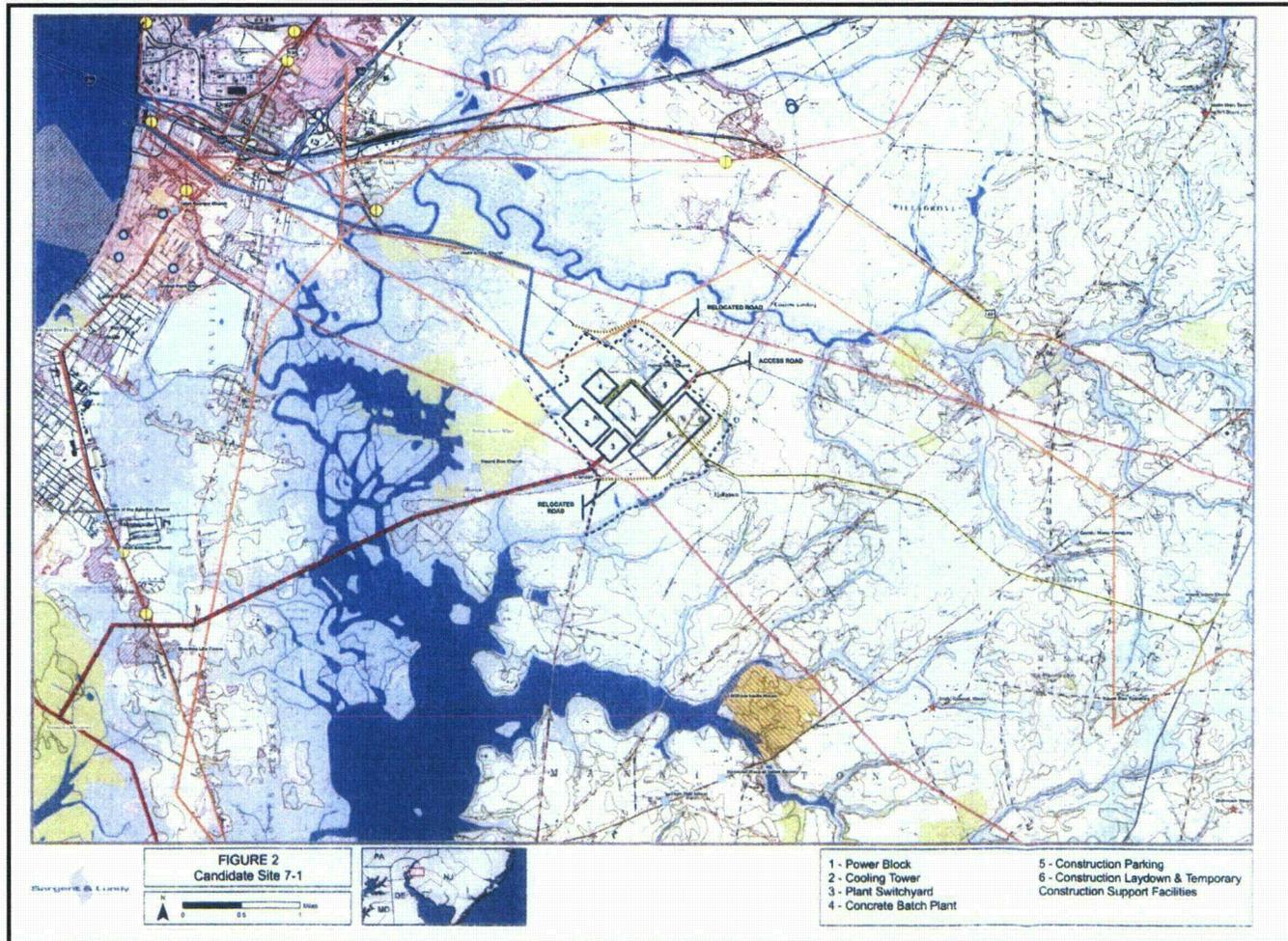
After visiting Site 15-G, Audit participants traveled to Site 7-1 (Figure 4). Site 7-1 is a greenfield site in Salem County, New Jersey. The site is located on flat land 5 mi east of the Delaware River, which would be the primary water source. Elevations across the site range from 15 to 35 ft msl. Based on conceptual site boundaries identified by considering site development requirements and existing property parcels, the site has a total area of 987 ac.

Land Use

Existing land use at Site 7-1 is predominantly agricultural, with large fields planted in cultivated crops. Soils classified as prime farmland or Farmland of Statewide Importance occur across much of the site.

There are numerous single-family houses located within the Site 7-1 boundaries (PSEG's ER says approximately 17), and most of these houses would have to be removed. There is also an active church and a cemetery (with gravestones dating to at least the early 19th Century) within the Site 7-1 boundaries. PSEG staff stated that the church and cemetery would not be directly affected by power plant development at Site 7-1, and that access to the church and cemetery could be maintained during project construction. However, PSEG staff stated that emergency planning might limit access to the church and cemetery during project operation.

Maps made available to the Audit participants during the visit to Site 7-1 indicated that the footprint layout of the plant was different than what was provided in the March 2010 *Alternate Site Evaluation Study* (S&L 2010). At that point, the participants were made



**Figure 4. Map showing Alternative Site 7-1
(see map legend on Figure 3 of this report)
(Source: S&L 2010)**

aware of revised and updated maps and layouts that are available in the April 2010 *Candidate Site Impact Quantification Report*. Because no detailed maps of the alternative sites are contained in the ER, a copy of the Quantification Report was requested for review and inspection in the electronic reading room.

Hydrology

Construction impacts to groundwater flow at Site 7-1 could result in existing stream volume and neighboring well yields being reduced due to temporary groundwater drawdown from dewatering activities.

During plant operations, groundwater would be used for potable needs and fire suppression (210 gpm average and 953 gpm maximum). Based on information in the ER and general knowledge of the water bearing properties of the geologic units at Site 7-1, there should not be any difficulty in satisfying the requirements. The number and depth of wells will depend on the specific yield of the coastal plain geologic zones encountered.

Ecology (Terrestrial and Aquatic)

Site 7-1 is mainly agricultural with scattered woodlots, hedgerows, and shrubby areas. PSEG used reconnaissance-level data for evaluation and did not conduct any detailed field studies on the site. PSEG obtained information on protected and rare species that may occur in the vicinity of the site from NJDEP. According to that information, nine wildlife species and one plant species have been recorded within approximately 1 mile of Site 7-1. However, this list will require an update and a re-evaluation to account for recent (February 2012) changes made to New Jersey threatened, endangered and special concern lists. The degree to which any listed species might be utilizing Site 7-1 would require detailed field surveys.

Birds noted in the area included Carolina wren, brown-headed cowbird, northern cardinal and mourning dove. Wildlife characteristic of open country, small woodlots and edge habitat would be expected to frequent this area.

Based on reconnaissance-level information (information in PSEG's ER and topographic maps), small freshwater streams are found on Site 7-1. The streams were not visited during the tour, but PSEG's information indicated that associated aquatic resources do not have exceptional or high ecological value. PSEG's online searches did not indicate the presence of any rare, protected, threatened or endangered aquatic species on Site 7-1.

The potential locations of the cooling water intake and discharge structures on the Delaware River (stated to be near Katie's Creek Meadow) were not visited.

4.2 Wednesday, April 18

4.2.1 Alternative Site 7-2

On Wednesday, April 18, the Audit participants met at the PSEG Energy and Environmental Resource Center and then traveled to Site 7-2 (Figure 5), a greenfield site in Salem County, New Jersey. The site is located on flat land 12 mi east of the Delaware River, which would be the primary water source. Elevations across the site range from 120 to 140 ft above msl. Based on conceptual site boundaries identified by considering site development requirements and existing property parcels, the site has a total area of 996 ac.

Land Use

Existing land use at Site 7-2 is predominantly agricultural, with large fields planted in cultivated crops. Soils classified as prime farmland or Farmland of Statewide Importance occur across much of the site.

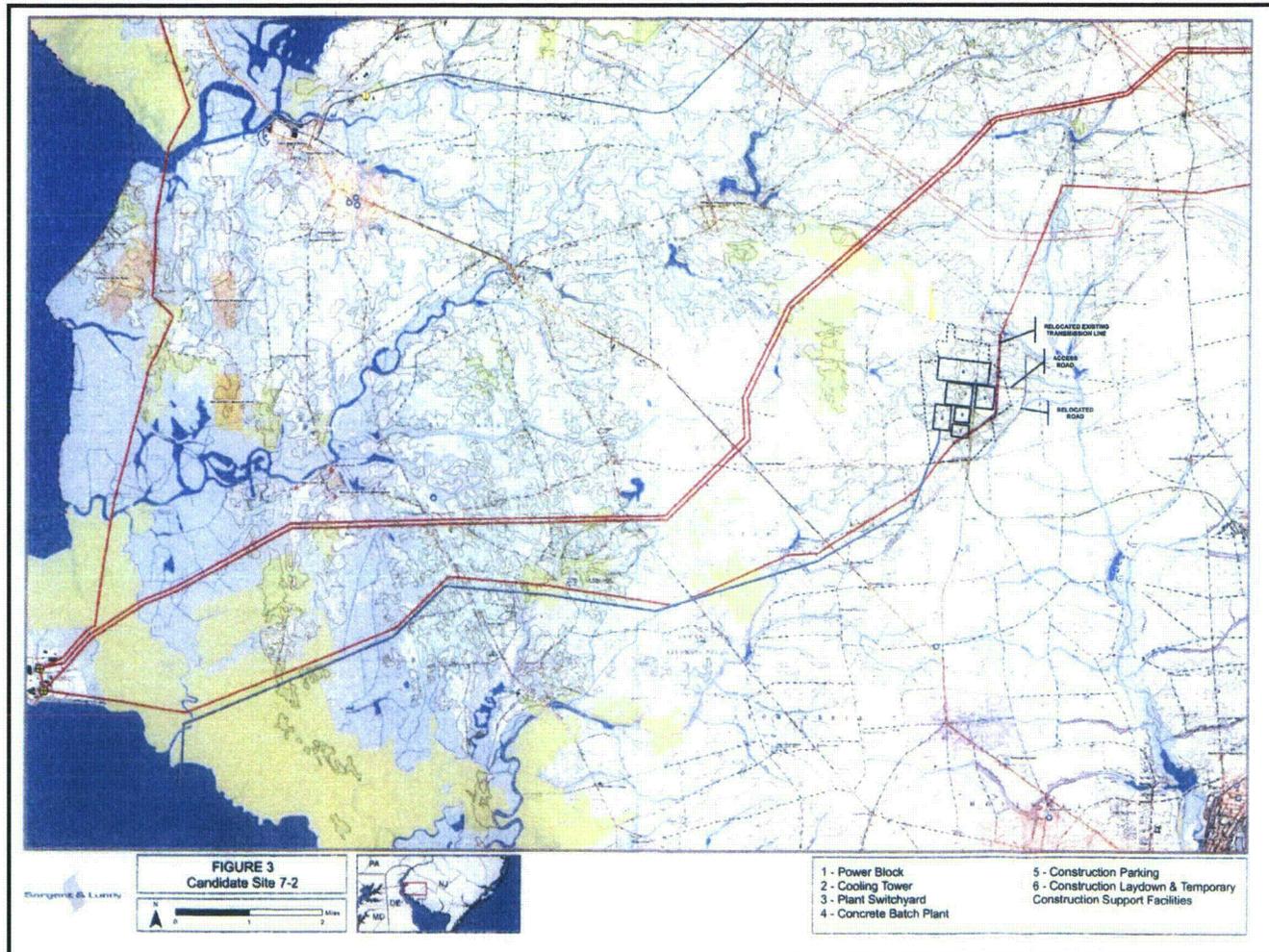
There are numerous single-family houses located within the Site 7-1 boundaries (PSEG's ER says approximately 46), and most of these houses would have to be removed. The conceptual reactor location at Site 7-2 is at the site of an existing farm silo.

The borrow site for the fill materials used during HCGS construction is located to the east of Site 7-2 (near the intersection of County Hwy. 733 and Swing West Road).

Hydrology

Construction impacts to groundwater flow at Site 7-2 could result in existing stream volume and neighboring well yields being reduced due to temporary groundwater drawdown from dewatering activities. Construction impacts to groundwater flow could also result in saltwater intrusion into aquifers due to temporary groundwater drawdown from dewatering activities.

During plant operations, groundwater would be used for potable needs and fire suppression (210 gpm average and 953 gpm maximum). Based on information in the ER and general knowledge of the water bearing properties of the geologic units at Site 7-2, there should not be any difficulty in satisfying the requirements. The number and depth of wells will depend on the specific yield of the coastal plain geologic zones encountered.



**Figure 5. Map showing Alternative Site 7-2
 (see map legend on Figure 3 of this report)
 (Source: S&L 2010)**

Ecology (Terrestrial and Aquatic)

There are scattered woodlots at Site 7-2. Agricultural fields include winter wheat and tilled soil. The area also contains mixed woodlots and shrubby areas, with some turf grass fields and nurseries.

PSEG used reconnaissance-level data for evaluation and did not conduct any detailed field studies on Site 7-2. PSEG obtained information on protected and rare species that may occur in the vicinity of the site from NJDEP. According to that information, eight wildlife species and two plant species have been recorded within approximately 1 mile of the site. However, this list will require an update and a re-evaluation to account for recent (February 2012) changes made to New Jersey threatened, endangered and special concern lists. The degree to which any listed species might be utilizing Site 7-2 would require detailed field surveys.

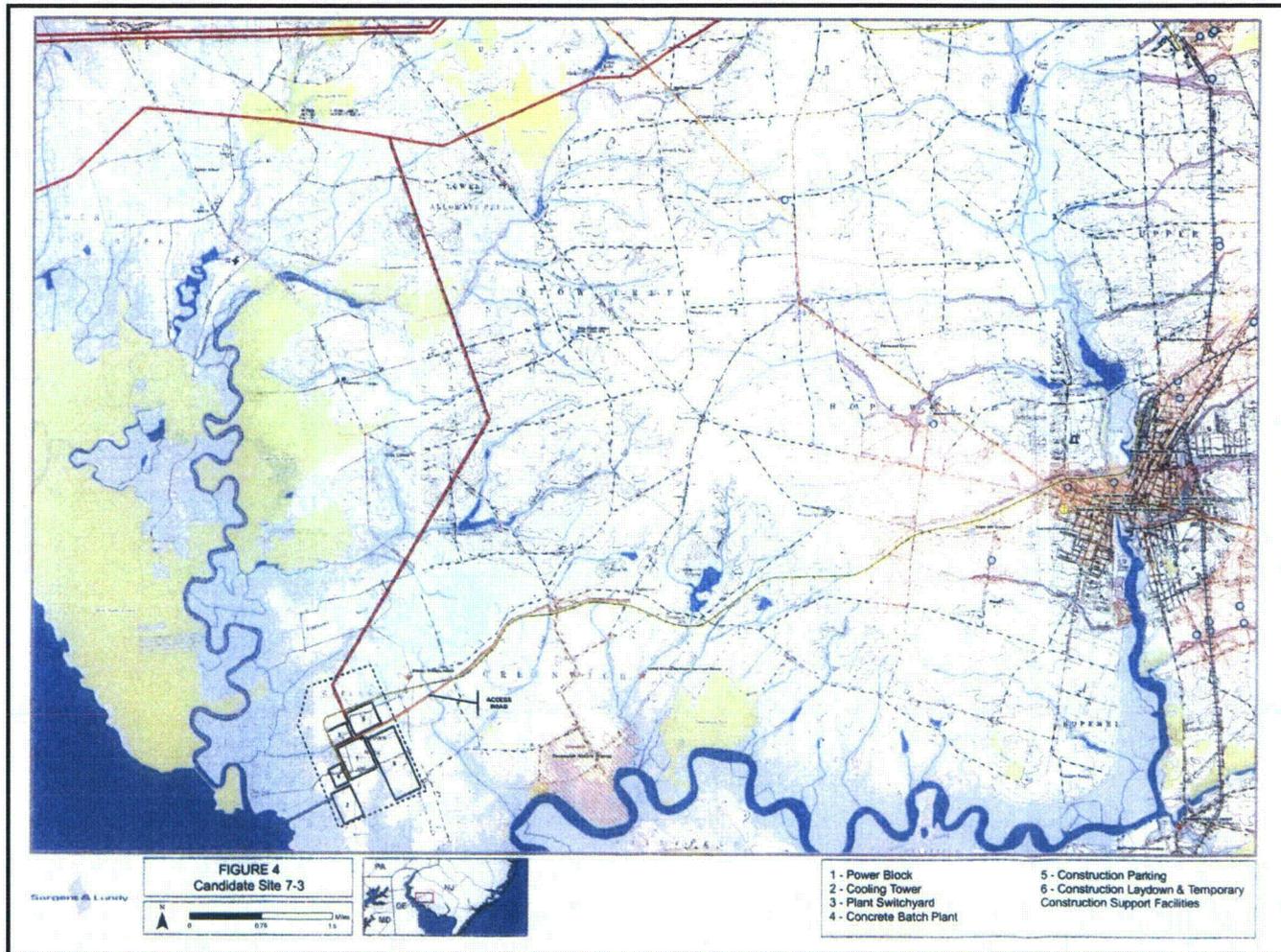
Wildlife characteristic of open country, small woodlots and edge habitat would be expected to frequent the area around Site 7-2. Red-winged blackbirds were noted in the area. Some white oaks were noted along Thomas Road that could provide potential bat roosting habitat. There was one area noted in the site vicinity with well-spaced pine trees, and low, sparse understory that could provide potential habitat for red-headed woodpeckers.

Based on reconnaissance-level information (information in PSEG's ER and topographic maps), small freshwater streams are found on Site 7-2. The streams were not visited during the tour, but PSEG's information indicated that associated aquatic resources do not have exceptional or high ecological value. PSEG's online searches did not indicate the presence of any rare, protected, threatened or endangered aquatic species on Site 7-2.

The potential locations of the cooling water intake and discharge structures on the Delaware River were not visited. Compared to the PSEG ESP site, PSEG staff suggested that more dredging would be needed in the Delaware River for the barge channel and barge turn-around area.

4.2.2 Alternative Site 7-3

After visiting Site 7-2, Audit participants traveled to Site 7-3 (Figure 6), a greenfield site in Cumberland County, New Jersey. The site is located on flat land less than 1 mi east of the Delaware River, which would be the primary water source. Elevations across the site range from 0 to 20 ft above msl. Based on conceptual site boundaries identified by considering site development requirements and existing property parcels, the site has a total area of 886 ac.



**Figure 5. Map showing Alternative Site 7-3
 (see map legend on Figure 3 of this report)
 (Source: S&L 2010)**

Land Use

Site 7-3 is the only potential ESP site (of the proposed and alternative sites) that PSEG owns. PSEG purchased the 4,500-acre site in the 1970s with plans to develop a nuclear power plant, but never developed the site.

Existing land use at Site 7-3 is predominantly agricultural, with large fields planted in cultivated crops. Soils classified as prime farmland occur across much of the site. PSEG leases the farmland in Site 7-3 to private individuals. There are several single-family houses located within the Site 7-3 boundaries (PSEG's ER says approximately nine), and most of these houses would have to be removed.

PSEG filed with the State of New Jersey a Deed of Conservation Restriction on portions of Site 7-3. This Deed restricts development of the affected portions of the site, and would have to be removed by the State and mitigated by PSEG before site development could occur.

After visiting Site 7-3, the Audit participants traveled to the location of the proposed barge and unloading facility that would be constructed for Site 7-3. PSEG staff presented maps from the Quantification Report (April 2010) showing the orientation and details for the barge facility. The proposed water intake for Site 7-3 was stated to be located at Caviar Point on the Delaware River.

Hydrology

Construction impacts to groundwater flow at Site 7-3 could result in saltwater intrusion into aquifers due to temporary groundwater drawdown from dewatering activities.

During plant operations, groundwater would be used for potable needs and fire suppression (210 gpm average and 953 gpm maximum). Based on the information in PSEG's ER and general knowledge of the water bearing properties of the geologic units at Site 7-3, there should not be any difficulty in satisfying the requirements. The number and depth of wells will depend on the specific yield of the coastal plain geologic zones encountered.

Ecology (Terrestrial and Aquatic)

Although Site 7-3 has an agricultural character, it has less area in active agriculture and larger areas of quality wildlife habitat. This includes areas of low-growing bunch grasses. The area contains good quality hedgerows with taller trees and low shrubs, creating good quality soft edges. These well-developed edges increase habitat structure, with the capability of supporting more diverse wildlife populations.

PSEG used reconnaissance-level data for evaluation and did not conduct any detailed field studies on Site 7-3. PSEG obtained information on protected and rare species that may occur in the vicinity of the site from NJDEP. According to that information, 13

wildlife species have been recorded within approximately 1 mile of the site. However, this list will require an update and a re-evaluation to account for recent (February 2012) changes made to New Jersey threatened, endangered and special concern lists. The degree to which any listed species might be utilizing Site 7-3 would require detailed field surveys.

Birds recorded at Site 7-3 included field sparrow, common yellowthroat, American crow, common grackle, brown thrasher, red-bellied woodpecker, bald eagle (flyover) and double-crested cormorant (flyover). New Jersey lists the brown thrasher as a species of “special concern” (breeding population). Areas on this site include good potential habitat for grassland bird species.

Many of the fields on Site 7-3 are managed for wildlife habitat in warm and cool season grasses. The property includes a conservation easement to the State of New Jersey and the U. S. Fish and Wildlife Service. There is an extensive program of buffers for farmland at this site. The area is also open for public hunting.

The site for the proposed water pipeline terminus at the Delaware River includes some coastal marsh where there has been some *Phragmites* control and restoration to *Spartina* marsh. Bird species noted in this area included northern harrier, bald eagle, double-crested cormorant, great egret, black duck and red-winged blackbird. There were two adult and two juvenile bald eagles noted on the marsh to the south of this location. The bald eagle is listed in New Jersey as endangered (breeding population) and as threatened (non-breeding population). The northern harrier is listed by New Jersey as endangered (breeding population) and special concern (non-breeding population).

Based on reconnaissance-level information (information in PSEG’s ER and topographic maps), small freshwater streams are found on Site 7-3. The streams were not visited during the tour, but PSEG’s information indicated that associated aquatic resources do not have exceptional or high ecological value. PSEG’s reconnaissance information indicates that endangered shortnose sturgeon may occur in the nearby Delaware River, but there are no other known rare, protected, threatened or endangered aquatic species on Site 7-3.

4.2.3 Proposed Causeway Corridor—Money Island Road

After visiting Site 7-3 and the location of the proposed barge and unloading facility for Site 7-3, Audit participants traveled to the proposed causeway corridor along Money Island Road. PSEG proposes to construct the causeway to prevent excess traffic through the town of Salem and on the existing SGS/HCGS access road during PSEG ESP site construction and operation.

The proposed causeway corridor parallels an existing transmission line from the SGS/HCGS site through wetlands that have been partially restored as part of PSEG’s Estuary Enhancement Program. The site is in the vicinity of the Alloways Creek

protection area where PSEG has done *Spartina* marsh restoration. PSEG generally works toward getting down to less than 4 percent *Phragmites* coverage.

PSEG staff discussed the possibility of restoring a large tract of wetland (800 – 1,000 ac) in the area of Mason's Point from its current state to *Spartina* marsh as mitigation for developing wetlands along the causeway corridor and at the PSEG ESP site. The potential mitigation tract contains mudflats and *Phragmites*. The area had been diked, but the dike has been breached and is causing local flooding issues. The area contains a 1722 farmhouse that is in danger of flooding.

Osprey nests are present about halfway up the transmission line towers that parallel the proposed causeway corridor. Birds recorded at the causeway location included osprey, red-winged blackbird, common yellowthroat, song sparrow, great egret, Carolina wren, barn swallow, double-crested cormorant, turkey vulture and black duck. Fiddler crab burrows were also noted at this location. The osprey is listed as threatened (breeding population) in New Jersey.

4.2.4 PSEG ESP Site (Site 7-4)

After visiting the proposed causeway corridor along Money Island Road, Audit participants traveled to the PSEG ESP site (Site 7-4) (Figure 7). The PSEG ESP site is located north of and adjacent to PSEG's existing SGS/HCGS complex on the southern part of Artificial Island on the east bank of the Delaware River in Lower Alloways Creek Township, Salem County, New Jersey.

Audit participants viewed the PSEG ESP site from the HCGS firing range tower, visited the existing HCGS barge slip on the Delaware River, and toured the section of the Artificial Island CDF that PSEG proposes to acquire from the Corps through a land exchange.

Land Use

The PSEG ESP site, which is part of the Corps' active Artificial Island CDF, consists of *Phragmites* dominated wetlands. The northern portion of the Artificial Island CDF (i.e., the area north of the parcel that PSEG proposes to acquire) would still be used by the Corps as a dredge material disposal site if PSEG developed a nuclear plant on the PSEG ESP site.

Hydrology

Construction impacts to groundwater flow at the PSEG ESP site could result in saltwater intrusion into aquifers due to temporary groundwater drawdown from dewatering activities.

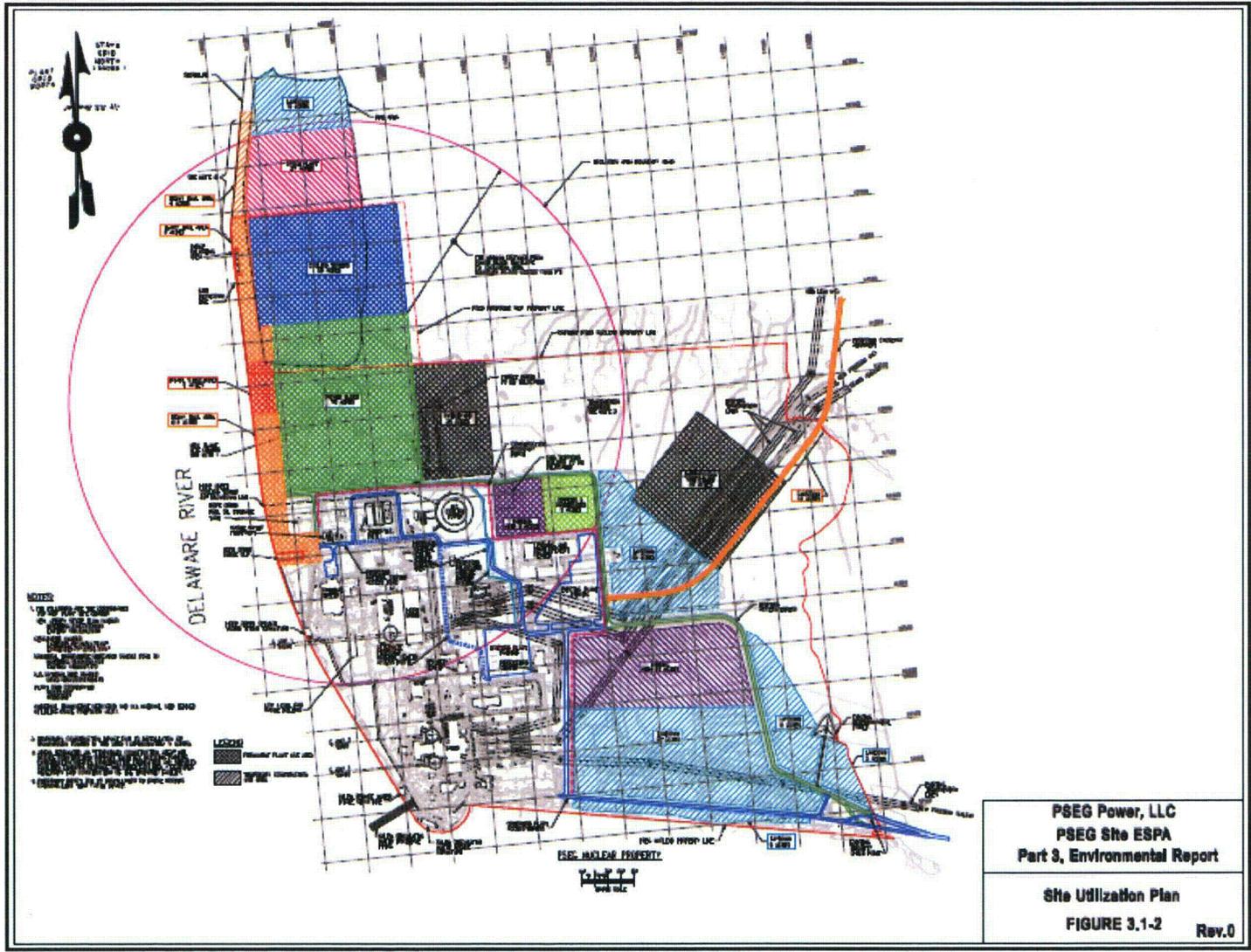


Figure 7. Site Utilization Plan for the PSEG ESP Site (Site 7-4)
 (Source: PSEG 2010)

During plant operations, groundwater would be used for potable needs and fire suppression (210 gpm average and 953 gpm maximum). Based on information in PSEG's ER and general knowledge of the water bearing properties of the geologic units at the PSEG ESP site, there should not be any difficulty in satisfying the requirements. The number and depth of wells will depend on the specific yield of the coastal plain geologic zones encountered.

Ecology (Terrestrial and Aquatic)

Two artificial lakes are present in the vicinity of the HCGS firing range tower. Bird species using the northern larger pond at the time of the visit included mute swan, Canada goose, black duck and great egret. Other bird species noted around these ponds included northern mockingbird, common yellowthroat, northern cardinal, field sparrow, song sparrow and chipping sparrow. Muskrat sign (scat) was also noted in the vicinity of the ponds. The vegetation around these ponds is mainly *Phragmites*, with scattered shrubs (including autumn olive and sumac).

The Artificial Island CDF is dominated by *Phragmites*, with large areas of disturbed bare soils. Bird species noted in this area included red-winged blackbird and northern cardinal. Other bird species noted at the PSEG ESP site included herring gull and fish crow.

PSEG's information notes that endangered Atlantic sturgeon and shortnose sturgeon are found in the vicinity of the PSEG ESP site, as well as threatened and endangered sea turtles.

The continued monitoring of the nearby SGS provides a useful indication of the potential levels of entrainment and impingement at the PSEG ESP site. The intake screens are monitored for impinged organisms three times weekly, and there may be occasional monitoring of smaller, entrained organisms by pumping water into a conical net.

5. Alternative Sites Discussions During the Environmental Site Audit

NRC staff will conduct additional discussions about the alternative sites with PSEG staff during the PSEG Environmental Site Audit, which is scheduled for May 7-11, 2012. The results of the Alternative Sites Audit, as well as any additional discussions about the alternative sites at the Environmental Site Audit, will be summarized in the Environmental Site Audit trip report.

6. References

PSEG (PSEG Power LLC and PSEG Nuclear LLC). 2010. *PSEG Site Early Site Permit Application, Part 3 Environmental Report, Revision 0*. May 25.

S&L (Sargent & Lundy). 2010. *Alternative Site Evaluation Study*. Prepared for PSEG Power, LLC. Report SL-010099. Project 12380-008. March 2010.

**Appendix A. PSEG ESP Alternative Sites Audit
April 17, 2012 Attendee List**

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