DRAFT

Environmental Assessment

Suffolk County Water Authority Watch Hill Well Replacement

Fire Island, Suffolk County, NY

Lead Agency: National Park Service
Fire Island National Seashore
120 Laurel Street
Patchogue, NY 11772
(631) 687-4750
Contact: Diane Abell, R.L.A., Landscape Architect/Park Planner

Prepared By: Land Use Ecological Services, Inc.
Suffolk County Water Authority
Fire Island National Seashore

Date of Preparation: December 2, 2010
Date(s) of Revision: December 14, 2010
December 21, 2010
January 6, 2011

Date of Acceptance:

DRAFT

Summary

Suffolk County Water Authority (SCWA) proposes to replace the existing Watch Hill Well #1 that provides potable water to the community of Davis Park and the National Park Service (NPS) facilities and housing at Watch Hill. Well #1 is a 470' deep artesian well that has provided potable water for these areas since its installation in 1975. In October 2007, an inspection revealed that the well was in poor condition due to age and neglect. Repairs to the well were undertaken in 2009, in an effort to provide the most cost-effective solution to the problem. However, SCWA Engineering Department concluded after repairs that the overall condition of the well casing is poor, which could lead to future failures. Based on the condition of the well and its importance in providing a backup potable water source for the community of Davis Park and NPS facilities and housing at Watch Hill, SCWA is proposing to abandon the existing well and install a new well with modern construction techniques, utilizing a PVC casing that will ensure its long-term viability.

The National Park Service (NPS)/Fire Island National Seashore (FIIS) must issue a Right-of-Way (ROW) Permit before any utility project(s) may be undertaken within the boundaries of FIIS. Prior to issuance of a ROW Permit, FIIS must comply with the National Environmental Policy Act (NEPA), Director's Order 12, Director's Order 53 (Special Park Use Permits), National Park Service Management Policies, and other relevant statutes and regulations. This Environmental Assessment (EA) was prepared in accordance with guidelines set forth under NEPA and the NPS Director's Order 12 (DO 12), NEPA guidelines. SCWA already has a ROW Permit for the water distribution lines and well operation at Watch Hill, and therefore, a revision to that permit is all that is needed for this project.

Chapter 1 describes the project location and setting; the purpose and need for the project, including results of the well investigation performed in 2009; and the issues considered when developing alternatives.

Chapter 2 provides a discussion of all alternatives presented. Alternatives considered in this EA include No Action, Well Replacement Scheme 2 (Preferred Alternative), and Well Replacement Scheme 2 with Atlantic Ocean Discharge. Alternatives considered but eliminated from detailed analysis included Well and Pump Station at Davis Park, Well Replacement Scheme 1; Water Main Route 1; and Water Discharge [from drilling] to Freshwater Wetlands.

Chapter 3 of this EA discusses in detail the potential resources that may be affected by alternatives, including soils, groundwater and water quality, floodplains, wetlands, vegetation, wildlife, special status species, cultural resources, and community and visitor services.

Chapter 4 is the impact analysis. Prior to discussion of impacts, the methodology used to predict impacts, and the relevant laws and regulations is presented. Impacts are analyzed for the No Action, Well Replacement Scheme 2 (Preferred Alternative), and Well Replacement Scheme 2 with Atlantic Ocean Discharge alternatives. Finally, a summary of proposed mitigation is provided in this chapter. The No Action alternative has the potential to impact community and visitor services. Well Replacement Scheme 2 (Preferred Alternative) and Well Replacement Scheme 2 with Atlantic Ocean Discharge have the potential to impact wetlands, vegetation, and wildlife. Groundwater and water quality will not be affected, as it is replacement of an existing well.

Following the analysis of potential impacts of alternatives on resources, Chapter 5 outlines the consultation and coordination undertaken as part of the project, including persons, agencies, and organizations contacted for information and assistance in identifying issues, developing alternatives, and analyzing impacts; and public involvement, including public notices. Chapter 6 lists references used for environmental analysis, and Chapter 7 provides a list of preparers.

Table of Contents

Appendices

List of Figures

List of Tables

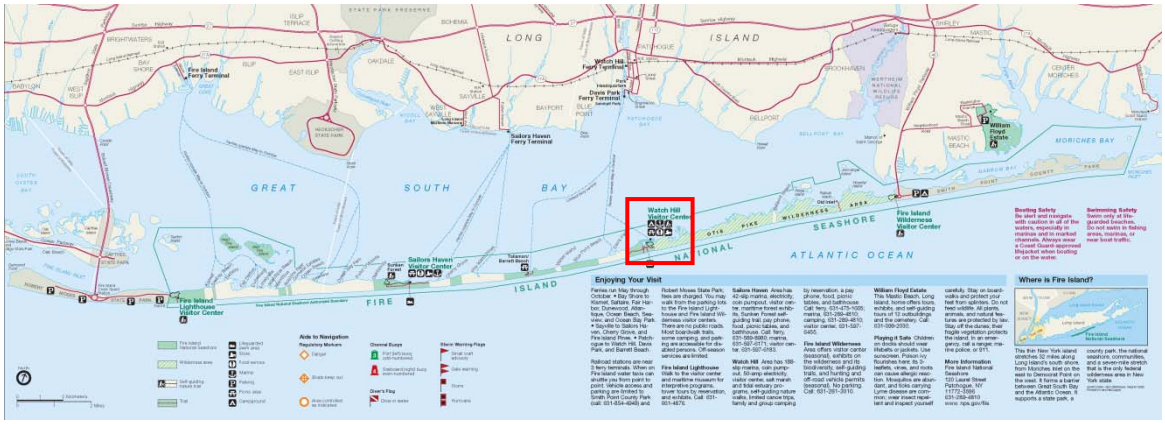
Chapter 1—Project Purpose and Need

1.1 Location and Setting

Watch Hill is a major NPS facility within the boundaries of Fire island National Seashore (FIIS). It is located in the middle of Fire Island, approximately one mile east of Davis Park on the western edge of the Otis Pike Fire Island High Dune Wilderness Area, and across the Great South Bay south from Patchogue, Suffolk County, NY (Figure 1). Access to Watch Hill is by private boat or by seasonal ferry service from Patchogue, NY.

Three (3) public supply wells located at East Walk in Davis Park provide primary service to the community of Davis Park and the NPS facilities and housing at Watch Hill; Watch Hill Well #1 provides emergency backup service for these areas (Figure 1b). Watch Hill is a seasonal recreational area that is owned and operated by the Fire Island National Seashore (FIIS), National Park Service (NPS). Davis Park is one of seventeen communities on Fire Island.

Figure 1. Location of Watch Hill, Fire Island, NY.
Top: Map taken from http://www.nps.gov/fiis/planyourvisit/upload/FIIS_Map2_5-2006.pdf.



Bottom: Aerial photograph of Watch Hill taken from Google Earth © 2010.

Figure 1b. Location of public supply wells in Davis Park and Watch Hill, Fire Island, NY.

1.2 Purpose and Need for Project

SCWA operates and maintains four (4) wells in Davis Park Distribution Area 55, each with a pumping capacity of 200 gpm. Three (3) of these wells are located at East Walk in Davis Park and provide the primary source of potable water for Davis Park and Watch Hill; the fourth well (Well #1) is located in Watch Hill and is a redundant/backup well for the system. Watch Hill Well #1 is in need of replacement as described in the following paragraphs. The proposed replacement well will provide emergency backup service for Davis Park and Watch Hill in case of a service problem with the three wells in Davis Park, and during periods of high demand in the summer. Redundancy is important for a well-engineered water system to maintain a level of service under a variety of conditions.

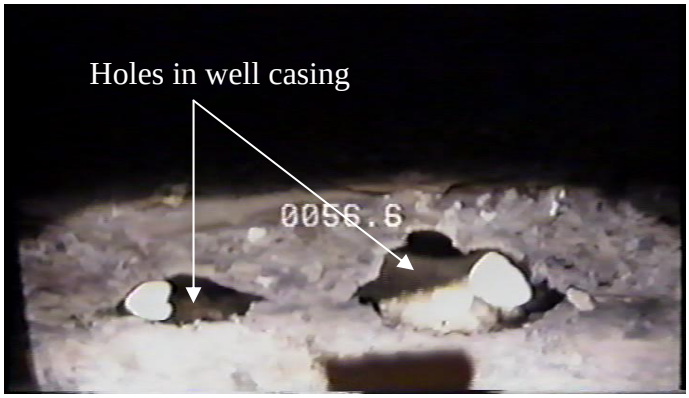
SCWA conducted an initial inspection and sand pumping investigation of the existing well, followed by action taken to repair the well. An initial inspection of this well conducted in October of 2007 indicated that the well had no obvious major failures but was in poor shape due to its age and neglect. Minor test pumping of the well at 100 gpm was done at that time but no other tests could be conducted because the well had its original submersible pump still installed, preventing the well from being examined directly.

After significant investment to upgrade and modernize the pumping equipment used in this well it was determined that the well pumped sand at the permitted capacity of 200 gpm. The well was blown to waste (well was pumped and water discharged to the ground) by the Production Control Department in July 2009 and immediately began pumping sand and turbid water. The Engineering Department began an investigation of this problem in August 2009. Tests performed during that time indicated the possibility of hole(s) in the well casing. Figure 2 shows the well free flowing with sand and gravel visible after the well was mechanically agitated to confirm the existence of a hole.

Figure 2. Free flowing well (sand and gravel visible after mechanical agitation).

In order to better diagnose the problem a camera log was installed on the well. The log revealed that the well had multiple holes in the 6" steel casing. Some of the holes discovered during inspection are shown in Figure 3 as seen from the side view of the submersible camera.

Figure 3. Holes visible through side view of submersible camera.



After careful consideration, SCWA determined that the most cost effective solution would be to line the damaged sections of the 6" well casing with 4" PVC pipe. This type of liner was chosen because lining the entire well would have presented numerous logistical problems caused by the location and artesian conditions at the site, resulting in an investment in the repair as large as the cost of a new well with no guarantee of success and would have precluded the use of a 200 gpm submersible pump.

Liner required for the repair was designed internally at SCWA in collaboration with the well drilling contractor. Figure 4(a) shows some of the 4" PVC pipe used to construct the liner as well as one of the many ribbed neoprene end pieces referred to as K-packers. The K- packers are used to seal the liner to the well and hold the liner in place inside the well. The sections of pipe and K-packers were glued together and forced into the well to the required depth using a slide hammer made of 3" steel pipe.

The installation process is illustrated in Figure 4(b). Approximately 150' of liner was installed inside the well. Test pumping at 225 gpm for 3 days revealed no signs of sand or turbidity indicating that the liner had covered all the holes in the casing.

Figure 4. Left: (a) Well liner materials. Right: (b) Installation of liner during repair of existing Watch Hill well.

Despite the success of the repair performed, the SCWA Engineering Department concluded that the overall condition of the casing is poor, which could lead to further failures in the future. Based on the condition of the well engineers recommended the existing well be abandoned (properly capped and sealed) and a replacement well be installed at this location as soon as possible. The replacement well, constructed with modern well construction techniques and utilizing a PVC casing should ensure the long-term viability of this important source of water.

1.3 Issues Considered When Developing Alternatives

There were several issues considered when developing alternatives, including quality and quantity of potable water; soil conditions that may affect drilling operations; floodplains; wetlands in the vicinity of the project area that may be impacted by construction of the well or changes in groundwater conditions; vegetation, wildlife, and special status species that could be impacted by clearing and construction of the well; cultural resources that may be impacted by construction activities; and community and visitor services that may be impacted.

Issues that were dismissed from consideration included noise; odor; urban quality; socially or economically disadvantaged populations; prime and unique agricultural lands; sacred sites; and Indian Trust resources.

Chapter 2—Alternatives

2.1 No Action

No Action as an alternative would allow the continued use of the existing repaired well without replacement. The existing well is 470' deep, with 20' of 6" diameter screen and 410 feet of 6" diameter casing. It is rated at 200 gpm. Under No Action, only additional maintenance and emergency repairs to the well would be implemented.

2.2 Well Replacement Scheme 2 with Ground Discharge (tentative Preferred Alternative)

The Preferred Alternative is replacement of the existing well with a replacement well utilizing modern construction techniques and materials. Watch Hill Well #1 (existing well) is proposed to be properly sealed and abandoned. The replacement well is proposed to be approximately 465' deep, with 10" diameter screen, and 10" diameter casing. The well will be gravel packed and grouted like all modern SCWA wells. As with the existing well, the replacement well will be rated at 200 gpm.

The replacement well is proposed to be located in a sparsely vegetated area west of the pumping station. An area 80' x 60' is proposed to be cleared for the well, work area, and equipment storage. An additional 15' wide path will be cleared from the existing pump station to the work area to provide access to the work area for equipment and for utilities. Total clearing for the project is 7,998 square feet (0.18 acres).

To construct the well, approximately 23 lengths of 10" diameter x 20' long PVC casing will need to be staged adjacent to the well prior to installation. In addition, 1 pallet of gravel pack and approximately 400 bags of bentonite grout, plus the equipment necessary to emplace these materials, will need to be stored on site. All of these materials will be stored within the 80' x 60' project clearing area, at a height of not more than four feet (4') above grade, landward of any delineated wetlands or significant habitats.

The drilling crew requires a minimum of 20' behind the well to work, in order to set drill pipe and perform the usual tasks. Drill rods are 20' long. For this well, the driller will need a minimum of 23 such rods to drill the required depth. They will have to be staged either behind the 30' x 9' construction rig or adjacent to it. This would take up a large portion of the area to be cleared.

A portable drilling pit (15' long x 10' wide) will most likely be used to minimize clearing and work area required. The pit will be connected to the surface casing by means of a 10' long flow pipe. When construction of the well is complete, the cleared 15' wide path will be used for the water main. Please refer to Appendix A for the Preferred Alternative Site Plan.

Drilling of an 18" diameter borehole to a depth of 465' will result in the excavation of approximately 25 cubic yards of aquifer material consisting mostly of fine to medium sand and clay from the overlying geological strata. A small backhoe will be required to empty the portable drilling pit frequently. Ordinarily, aquifer materials would be stockpiled near the well, and then spread around the drilling site and compacted in place upon completion of the job (approximate cover of less than 2"). However, if required by regulatory agencies, materials will be hauled away for disposal at an approved upland site. If offsite disposal is required, a large dumpster or similar container will need to be stored on site within easy access of the well. It will need to be brought to the drill site initially, emptied at least twice, and ultimately brought off site. A container of this size is typically about 20' long by 10' wide.

Drilling activities will result in discharge of water at a rate of approximately 200 gpm for 8 hours/day for 15 days. The discharge is approximately 96,000 gpd, or a total of 1,440,000 gallons in that 15-day period. Water will be pumped through a 6" diameter fire hose (or similar) to a 10' x 10'

area within the clearing limits that will have a plywood splash pad surrounded by silt fence to retain sediments. Water will percolate into the sand. This methodology has been utilized to test ten prior wells on Fire Island.

Following installation of the well, there will be a permanent water discharge associated with daily operation of the well. Daily discharge water shall be piped to the existing discharge area for Well #1, the freshwater wetland finger identified by FWW 2 and FWW 3 on the site plan (Appendix A). Discharge rate is expected to be similar to the existing Well #1 constant discharge rate of 40 gpm.

Operation of the well requires installation of water and electric lines. Both will be installed belowground within the area cleared for the 15' wide access path described above. Water and electric lines are installed below the frost line and above groundwater elevation. No change in topography is proposed. Trenches for utility lines will be excavated, utility lines installed, and then trenches are covered with the previously excavated material.

Construction Timeline

It is expected that the proposed well replacement will take 4-6 months, as follows: 1 week for mobilization, 3-4 weeks for drilling the well (15 working days of drilling), 2-4 weeks for testing, and 2 months for utilities. Due to the seasonal nature of Watch Hill, construction will commence during winter months, to be completed prior to the mid-May opening of many of Watch Hill's visitor facilities.

Equipment Transport

Construction equipment will be barged to Davis Park and transported overland to the Watch Hill project area.

2.3 Well Replacement Scheme 2 with Atlantic Ocean Discharge

This alternative includes construction of the replacement well as described in Section 2.2 above. The alternative varies in the location of discharge associated with drilling activities. As stated above, drilling activities will result in discharge of water at a rate of approximately 200 gpm for 8 hours/day for 15 days. The discharge is approximately 96,000 gpd, or a total of 1,440,000 gallons over a 19-day period (drilling would occur 5 days per week).

Discharge to Atlantic Ocean would require SCWA to transport approximately 500-1,500 linear feet of discharge pipe (6" diameter hose) to Fire Island for placement either: (1) directly south over maritime heathland and duneland communities to the Atlantic Ocean, which requires approximately 500 linear feet of pipe; or (2) along the boardwalk and Burma Road to avoid impacts to existing maritime dune and heathland communities, which requires approximately 1,500 linear feet of pipe. Placement and maintenance of the discharge pipe would require a three foot (3') wide work corridor. Placement of the discharge pipe across Burma Road would require a temporary bridge be installed over the pipe, to allow passage of vehicles.

2.4 Alternatives Considered but Eliminated from Detailed Analysis

The following alternatives were considered but eliminated from detailed analysis: Well and Pump Station at Davis Park, Well Replacement Scheme 1, Water Main Route 1, Water Discharge [from drilling] to Freshwater Wetlands, and Water Discharge [from drilling] to Atlantic Ocean. Construction of a fourth well at Davis Park would result in all water being supplied to Watch Hill from a single water main from Davis Park; if a problem occurred with the water main, Watch Hill would have no source of potable water. In addition, a fourth well at Davis Park would require a new pump station at Davis Park, which entails finding available land, negotiating the right to use the land, drilling test wells for water quality testing, designing a new facility, obtaining permits for a new facility, and constructing a new

facility. This alternative was dismissed because it does not provide Watch Hill with a backup water source if a problem occurs with the single water main from Davis Park; as well as cost and a 3-4 year timeframe, during which time the water supply to Davis Park and NPS facilities at Watch Hill may be compromised by the deficiencies of Watch Hill Well #1.

Well Replacement Scheme 1 proposed the replacement well northwest of the existing building, within freshwater wetlands. Water Main Route 1 proposed the water main, electric line, and work path running southwest and south through freshwater wetlands. These alternatives, as well as Discharge to Freshwater Wetlands, were dismissed due to impacts to freshwater wetlands from disturbance.

2.5 Environmentally Preferred Alternative

It is required that the environmentally preferred alternative be identified in NEPA documents for public review and comment. The NPS, in accordance with the Department of the Interior policies contained in the Departmental Manual (516 DM 4.10) and the Council on Environmental Quality's (CEQ) NEPA's Forty Most Asked Questions, defines the environmentally preferred alternative (or alternatives) as the alternative that best promotes the national environmental policy expressed in NEPA (Section 101(b) (516 DM 4.10). In their Forty Most Asked Questions, CEQ further clarifies the identification of the environmentally preferred alternative, stating "Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources" (Q6a).

No Action is the environmentally preferred alternative, as it will not result in measurable impacts to natural resources. However, it is not known how long the repaired well will function, or if future repairs would enable continued use of the well. Failure of the existing well will result in a lack of potable water for Davis Park and Watch Hill. Therefore, No Action has negative environmental consequences to community and visitor services.

Well Replacement Scheme 2 will result in some negligible impacts to natural resources as discussed below. However, this alternative will provide for a long-term viable source of potable water, and will therefore have no impact on community and visitor services. For this reason, Well Replacement Scheme 2 is believed to provide the best balance for FIIS to protect the environment and provide for continued community and visitor services.

Chapter 3—Affected Environment

3.1 Natural Resources

3.1.1 Soils

According to the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) web soil survey for Watch Hill (**http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx**), the entire project work area is composed of Dune land (Du) soils. These soils are excessively well drained soils suitable for the proposed well replacement project.

3.1.2 Groundwater and Water Quality

Groundwater

Groundwater generally flows from north to south on Fire Island, discharging to the Atlantic Ocean (Leggette, Brashears & Graham, Inc., 1996). However, some researchers have found that there is a groundwater divide on Fire Island. South of this divide, groundwater flows toward the Atlantic Ocean; north of this divide, groundwater flows north toward Great South Bay (FIIS, pers.comm.). Groundwater flow is influenced by topography, local stratigraphy, and density differences between fresh and salt water (Leggette, Brashears & Graham, Inc., 1996).

Long Island's groundwater system consists of three extensive aquifers and several smaller local aquifers (Leggette, Brashears & Graham, Inc., 1996). Beneath Fire Island lie the upper glacial aquifer, Magothy aquifer, and Lloyd aquifer, in descending order. Most of the potable water supply for Fire Island is pumped from the Magothy aquifer and returned to the upper glacial aquifer as described below. Recharge of groundwater to the upper glacial aquifer is primarily by infiltration of precipitation (Leggette, Brashears & Graham, Inc., 1996). Although Fire Island receives less precipitation than the average for Long Island, limited paved surface area or extensive vegetation likely results in lower evaporation/transpiration losses. In addition, potable water is continually recycled to the aquifer in developed areas through septic systems.

Water Quality

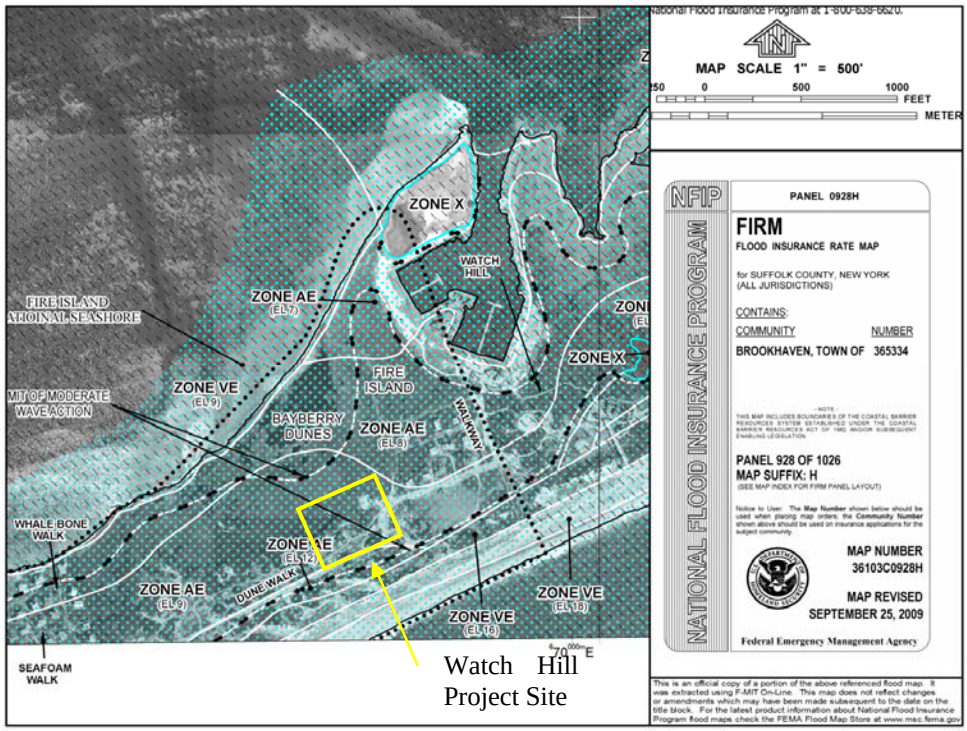
Watch Hill lies within SCWA Distribution Area 55 (Davis Park). There are currently four (4) active wells in this distribution area servicing Davis Park and Watch Hill. According to the SCWA 2010 Annual Drinking Water Quality Report (SCWA, 2010), water quality in the Davis Park distribution area meets both Federal and State drinking water standards.

Monitoring of Watch Hill Well #1 in 2010 indicates that water quality meets primary drinking water standards. As with most wells on Fire Island, this well exceeds maximum contamination levels for iron, which is a secondary drinking standard that does not affect public health. Please refer to Appendix B for the 2010 water quality results for Well #1.

3.1.3 Floodplains

According to FEMA Flood Insurance Rate Map (FIRM) #36103C0928H, the project area is not within a designated floodplain, but does lie within flood zone AE (El. 8) [Figure 5]. It is landward of the limit of moderate wave action (LIMWA) line on both the bay and ocean sides.

Figure 5. FEMA FIRM #36103C0928H, last revised 9/25/2009.



3.1.4 Wetlands

Tidal Wetlands

According to NYSDEC Tidal Wetland Maps #668-504 and 668-506, north of the project vicinity there are state-regulated intertidal marsh (IM) and high marsh (HM) wetlands (Figure 6). However, these maps were drawn using 1974 aerial photography, and conditions at the site have changed. The extensive *Spartina patens*-dominated high marsh and *Spartina alterniflora*-dominated intertidal marsh present in 1974 have degraded to *Phragmites*-dominated high marsh, coastal salt pond, and brackish tidal marsh. This tidal wetland now contains large areas of open water surrounded by *Phragmites* with other salt tolerant species, such as saltmarsh fleabane (*Pluchea odorata*), three-square bulrush (*Schoenoplectus pungens*), straw-colored umbrella sedge (*Carex strigosus*), marsh mallow (*Hibiscus moschuetus*), marsh elder (*Iva frutescens*) and salt hay (*Spartina patens*) interspersed throughout the *Phramgites* stands. The landward limit of these tidal wetland communities is approximately 316 feet from the project area, as shown in Appendix A. Wildlife observed in these tidal wetlands included black duck (*Anas rubripes*), mute swan (*Cygnus olor*), and muskrat (*Ondrata zibethicus*). These tidal wetlands are also expected to provide habitat for great blue heron (*Ardea Herodias)*, Great egret (*Ardea alba*), and snowy egret (*Egretta thula*)

Figure 6. NYSDEC Tidal wetland maps #668-504 and 668-506.

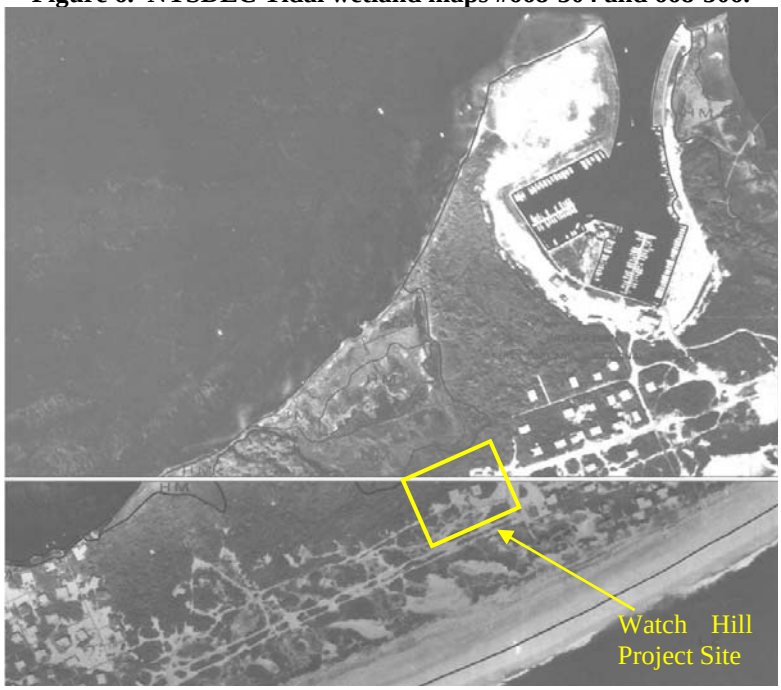
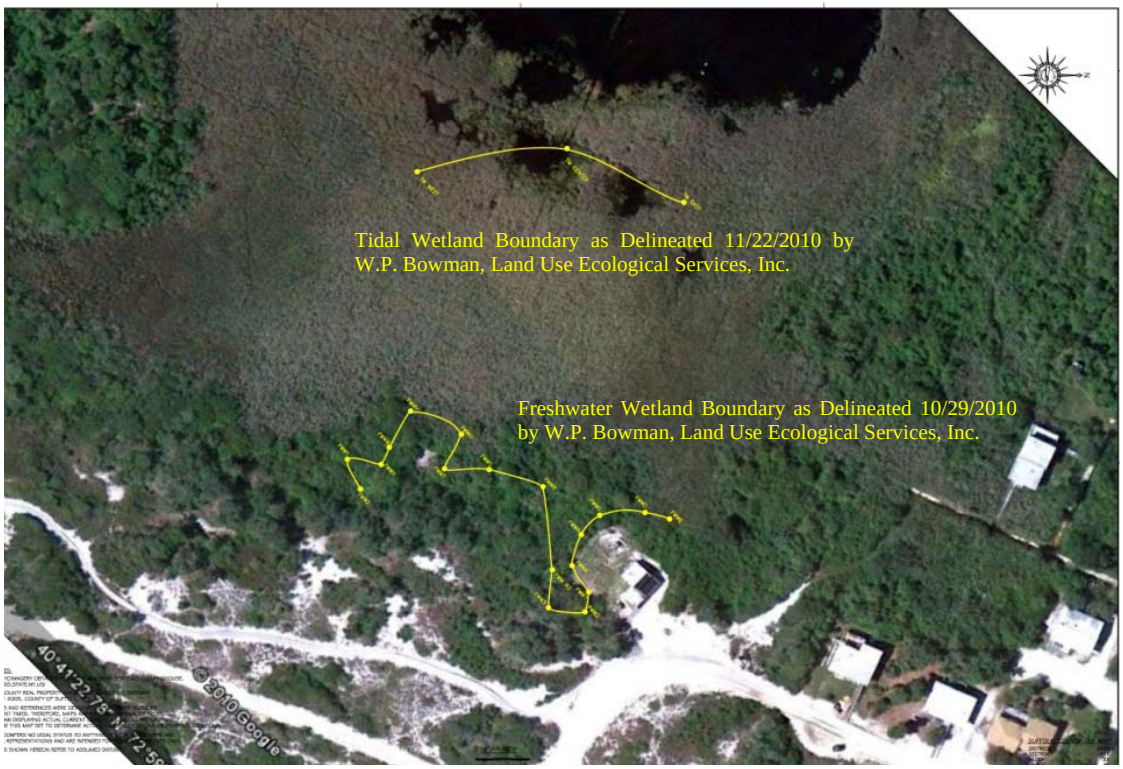


Figure 7. Tidal and freshwater limits as of October 29, 2010 and November 22, 2010.
Wetlands were delineated in the field by William Bowman, PhD., using a Trimble Juno ST hand-held GPS.



Freshwater Wetlands

According to the NYSDEC Environmental Resource Mapper (http://www.dec.ny.gov/imsmaps/ERM/ viewer.htm), there are no state-regulated freshwater wetlands in the project area. However, freshwater wetlands are present within and adjacent to the project area as

delineated by William Bowman, PhD., using a Trimble Juno ST hand-held GPS on October 29, 2010 and November 22, 2010. At the landward margin, this freshwater wetland is dominated by highbush blueberry (*Vaccinium corymbosum*), cinnamon fern (*Osmunda cinnamomea*), and common reed (*Phragmites australis*). Other freshwater wetland vegetation observed included red maple (*Acer rubrum*), red chokeberry (*Photinia pyrifolia*), maleberry (*Lyonia ligustrina*), marsh fern (*Thelypteris palustris*), and woolgrass (*Scirpus cyperinus*). At its northern margin with the previously described tidal wetlands, this freshwater wetland is dominated by *Phragmites* with marsh fern (*Thelypteris palustris*), royal fern (*Osmunda regalis*), marsh mallow (*Hibiscus moschuetus*), and blue flag iris (*Iris versicolor*). Please refer to Table 1 for a complete list of wetland plant species found in the project vicinity.

The main body of the freshwater wetland is approximately 61' from the project limits. However, there is a finger of freshwater wetlands, likely resulting from discharge associated Watch Hill Well #1, which is approximately 12' from the proposed project limits (Appendix A).

3.1.5 Vegetation

Upland communities within the project area include maritime dune, maritime heathland, and maritime shrubland communities, as defined in *Ecological Communities of New York State*, Second Edition (Edinger et.al., 2002). The maritime dune community is found along the southern portion of the project site, transitioning north to maritime heathland within the proposed clearing area, continuing to the north into maritime shrubland and then to freshwater and tidal wetland areas as described above. Table 1 lists the wetland and upland plant species observed in the project area.

Table 1. Plant species (wetland and upland) observed in the project vicinity.

Type	Scientific Name	Common Name
Trees	*Acer rubrum*	Red maple
	Pinus rigida	Pitch pine
	Rhus copallinum	Winged sumac
	Prunus serotina	Black cherry
	Sassafras albidum	Sassafras
	Vaccinium corymbosum	Highbush blueberry
	Photinia pyrifolia	Red chokeberry
	Lyonia ligustrina	Maleberry
	Amelanchier arborea	Shadbush
	Morella pensylvanica	Northern bayberry
	Smilax rotundifolia	Catbriar
	Toxicodendron radicans	Poison ivy
	Ilex glabra	Inkberry
	Ilex opaca	American holly
	Rubus flagellaris	Prickly dewberry
	Iva frutescens	Marsh elder
	Baccharis halimifolia	Groundsel-tree
	Hudsonia tomentosa	Beach heather
	Lonicera japonica	Japanese honeysuckle
	Hibiscus moschuetus	Marsh mallow
	Viburnum recognitum	Arrowwood
Grasses and Herbaceous Plants	*Pluchea odorata*	Saltmarsh fleabane
	Schoenoplectus pungens	Three-square bulrush
	Osmunda cinnamomea	Cinnamon fern
	Phragmites	Reed
	Scirpus cyperinus	Woolgrass
	Thelypteris palustris	Marsh fern
	Carex strigosus	Colored umbrella sedge
	Carex pensylvanica	Pennsylvania sedge
	Carex scoparia	Broom sedge
	Cyperus esculentus	Yellow nut sedge
	Juncus canadensis	Canadian rush
	Solidago graminifolia	Slender-leaved goldenrod
	Schizachyrium scoparium	Little bluestem
	Aster sp.	Aster
	Panicum virgatum	Switchgrass
	Ammophila breviligulata	American beach grass
	Spartina alterniflora	Low marsh cordgrass
	Spartina patens	Salt hay

3.1.6 Wildlife

Birds

The diverse upland, wetland, beach, and nearshore habitats present on Fire Island are utilized by many species of residential and migratory birds at various times of the year. In fact, 110 avian species are considered to be abundant or common on Fire Island with another 165 species expected to be observed uncommonly, occasionally, or rarely on Fire Island (FIIS, 1999).

During field inspections of the project area in October and November 2010, biologists observed American crow, yellow rumped warbler, black capped chickadee (*Poecile atricapilla*), northern junco (*Junco hyemalis*), and golden crowned kinglets (*Regulus satrapa*) in the project area.

The maritime dune, heahland, and shrublands present at the project site are also expected to provide habitat for a variety of passerines and woodpeckers including song sparrow (M*elospiza*

melodia), Eastern towhee (*Piplio erythrophthalmus*), northern mockingbird (*Mimus polyglotta*), gray catbird (*Dumatella carolinensis*), brown thrasher (*Toxostoma rufum*), common yellowthroat (*Geothlypis trichas*), yellow warbler (*Dendroica petechia*), cedar waxwing (*Bombycilla cedrorum*), European starling (*Sternus vulgaris*), American robin (*Turdus migratorius*), house finch (*Carodacus mexicanus*), American goldfinch (*Carduelis psaltria*), Northern cardinal (*Cardinalis cardinalis*), common grackle (*Quiscalus quiscula*), Carolina wren (*Thryothorus ludovicianus*), barn swallow *Hirundo rustica*, tree swallow (*Tachycineta bicolor*), American crow (*Corvus brachyrynchos*), fish crow (*Corvus ossifragus*), blue jay (*Cyanocitta cristata*), eastern kingbird *Tyrannus tyrannus*, mourning dove *Zenaida macroura*), and northern flicker (*Colaptes aura*). Raptors and owls expected to utilize the project area during the breeding season or migration periods include northern harrier (*Circus cyaneus*), great horned owl (*Bubo virginicus*), eastern screeh owl, sharp-shinned hawk (*Accipter striatus*), merlin (*Falco columbarius*), peregrine falcon (*Falco peregrinus*), Cooper's hawk (*Accipter cooperii*), red-tailed hawk (*Buteo jamaicensis*), broad-winged hawk (*Buteo platypterus*), rough-legged hawk (*Buteo lagopus*), and American kestrel (*Falco sparverius*).

The shrub-dominated freshwater wetlands adjacent to the project site and the *Phragmites*-domianted freshwater wetlands located to the north are likely to provide habitat for red-winged blackbird (*Agelaius phoeniceus*), common yellowthroat (common yellowthroat (*Geothlypis trichas*), yellow warbler (*Dendroica petechia*), song sparrow (M*elospiza melodia*), and marsh wren (*Cistothorus palustris*).

The open water and vegetated edges of the tidal wetlands located to the north of the prohject area are likely to be utilized as habitat by great blue heron (*Ardea Herodias),* Great Egret (*Ardea alba*), and snowy egret (*Egretta thula*), American black duck (*Anas rubripes*), mallard (*Anas platyrynchos*), clapper rail (*Rallus longirostris*), and willet (*Catoptrophorus semipalmatus*).

Mammals and Herpetiles

A variety of mammal and herpetile species are known to utilize the diverse upland and wetland habitat present on Fire Island. A USACOE study (2004) found that small mammals tended to be most abundant in heavily vegetated habitats including *Phragmites* marshes, shrub thickets, high marshes, and woodlands. Accordingly, small mammals expected to be found at or near the project site include white-footed mouse (*Peromyscus leucopus*), meadow vole (*Pennsylvaniana maniculatus*), masked shrew (*Sorex cinerus*), house mouse (*Mus musculus*), and Norway rat (*Rattus norvegicus*).. Larger mammals likely to be present in these habitats include white-tailed deer (*Odocoileus virginianus*), cottontail rabbit (*Sylvilagus floridanus*), red fox (*Vulpes vulpes*), raccoon (*Procryon lotor*), opossum (*Didelphius marsupialis*), and striped skunk (*Mephitis mephitis*). Evidence of muskrats (*Ondatra zibethicus*) was observed in the tidal wetlands to the north of the project site.

Herpetiles expected to be found in the maritime dune, heathlands, and shrublands present on or near the project site include Fowler's toad (*Bufo woodhousei*), Eastern garter snake (*Thamnophis sirtalis*), black racer (*Coluber constrictor*), and Eastern box turtle (*Terrapene carolina*). An Eastern box turtle (*Terrapene Carolina*) was observed during the field inspection of the subject property in the maritime heath vegetation.

Diamondback terrapin (*Malaclemys terrapin terrapin*) and spotted turtles (*Clemmys guttata*) are not expected in the project area. Diamondback terrapin inhabit tidal marshes bordering tidal waters and creeks. They nest in the dry, sandy uplands adjacent to these tidal waters. A diamondback terrapin was recorded in the tidal wetland to the north of the project site (Cook et.al., 2010). However, the large freshwater shrub swamp adjacent to the site does not provide suitable habitat for diamondback terrapin and serves as a barrier preventing the sandy uplands at the site from being used as nesting habitat for diamondback terrapin.

Spotted turtles inhabit a variety of freshwater wetland habitats in New York including marshy meadows, bogs, swamps, ponds, ditches, or other small bodies of still water. A spotted turtle was recorded in Watch Hill Pond, approximately 0.25 miles northeast of the project site, in 2002 (Cook et.al., 2010). The freshwater wetlands adjacent to the project site feature a dense closed canopy of wetland shrubs. The shady wetland habitat adjacent project site does not provide sunny microhabitats for spotted turtles to bask during the day. Based on the absence of sunny, open wetland areas and the absence of relatively permanent, standing freshwater, the wetland adjacent to the project site are not expected to provide suitable habitat for spotted turtles.

3.1.7 Special Status Species

Federally listed terrestrial wildlife and plants documented on FIIS include the threatened piping plover (*Charadrius melodus*), endangered roseate tern (*Sterna dougallii*), peregrine falcon (*Falco peregrinus*), and seabeach amaranth (*Amaranthus pumilus*). According to the New York Natural Heritage Program (NYNHP), New York State listed species with the potential to occur on FIIS include the aforementioned species as well as threatened common tern (*Sterna hirundo*) and least tern (*Sternula antillarum*). Please refer to Appendix C for the complete NYNHP report. Although these species occur on Fire Island, they are found on the open beaches or bays (piping plover, terns, seabeach amaranth), or are transient species (peregrine falcon).

3.2 Cultural Resources

3.2.1 History of Fire Island

History of Human Settlement

Native Americans first travelled to Fire Island for fishing, shellfishing, and hunting. These and other early uses, such as whaling and harvesting of salt hay, did not require settlements.

Controversy over land ownership also discouraged formation of settlements on Fire Island. Fire Island was not included in the Patent of 1686, which conveyed shore lands and lands under water to the Towns. Instead, William Tangier Smith claimed ownership of Fire Island, Great South Bay, and Moriches Bay in 1693 (USACOE, 1999). In 1845, David Sammis purchased land to build a hotel on Fire Island, which led to controversy over land ownership and eventual litigation (USACOE, 1999).
The Great Partition of 1878 provided a mechanism to settle lawsuits and controversy over land ownership. It allowed secure purchase and ownership of land, which opened land along the west end of Fire Island for development and creation of communities (USACOE, 1999). Point O' Woods was the first community developed in 1894, and Dunewood the last in 1958. In 1928, approximately 950 structures were found in the communities, which quickly grew to 1,260 in 1955, 2,400 in 1962, 3,500 in the 1970's and approximately 4,150 in 1999 (USACOE, 1999).

Ethnographic Resources

Native Americans travelled to Fire Island some 8,000 - 10,000 years ago seasonally for fishing, shellfishing, hunting, and whaling. To date, no archeological sites from the pre-contact period have been discovered.

There are two Native American entities within the project vicinity. The Shinnecock Nation and the Unkechaug Nation are NY State recognized tribes; the Shinnecock Nation was federally recognized in June 2010. The park's approved Ethnographic Overview and Assessment (Ethnographic Overview and Assessment, Fire Island National Seashore, Public Space Research Group of the Center of Human Environments, 2006) provides detailed information on the Unkechaug's areas of current interest and concerns within the park's boundaries. Specifically, Chief Harry Wallace stated that the Unkechaug were interested in "Fireplace" (an area in Brookhaven Hamlet), the Carmans River and Pattersquash

Island. The Shinnecock Nation is traditionally associated with the Town of Southampton. Based on information in, "We Are Still Here! The Algonquian Peoples of Long Island Today", there is no evidence of the project area being associated with the Shinnecock.

Terrestrial Sites

Analysis of historical records and environmental data indicated that Fire Island was sparsely inhabited during the prehistoric and pre-modern eras (Barber, 1980). Furthermore, modern impacts from natural and man-made sources have altered much of the existing landform. As a result, researchers (Barber, 1980) determined that the archaeological potential of the project area is very low and recommended no further investigation.

In all, thirteen historic-period sites have been identified on Fire Island, including remnants of life-saving stations, refuse middens and stratified deposits, a farm boundary, and the remains of recreational facilities and residences (USACE, 1999). However, only portions of two are located on the ocean side of the barrier island and are situated in the dunes bordering Great South Beach (JMA, 2000). Site A103-05-000605 is the remains of a recreational facility built for handicapped children in the early 20th century, which was destroyed by the Hurricane of 1938. The site is located in the dunes east of Robert Moses State Park and the Fire Island Lighthouse, and west of Kismet, outside of the project area. Site A103-02-1579 consists of remains of structures used by the Coast Guard dating back to the mid-19th century and is situated in the dunes near Whalehouse Point in the Otis Pike Fire Island High Dune Wilderness. Both sites are outside the project area and will not be affected by the proposed project.

Fire Island Light Station is the only property listed on the National Register of Historic Places. This site is well west of the project area, and therefore not affected by the proposed well replacement.

3.2.2 Archaeological Resources within the Watch Hill Project Area

Tracker Archaeology Services, Inc. performed a Phase I archaeological investigation of the Watch Hill project area. Phase IA is the Archaeological Documentary Summary, consisting of an archival study of pertinent environmental, prehistoric, and historic literature and maps, as well as a state file search on the project area. Phase IB is the Field Testing, Mapping, and Site Delineation. No prehistoric or historic archaeological resources are present on this site. The complete report from Tracker Archaeology Services, Inc. can be found in Appendix D.

3.3 Community and Visitor Services

3.3.1 Water Service

Watch Hill lies within SCWA Distribution Area 55 (Davis Park). There are currently four (4) active wells in Distribution Area 55: three wells at East Walk in Davis Park provide the primary source of public water to Davis Park and Watch Hill, and one well at Watch Hill (Well #1) provides emergency backup supply for these areas. Per the ROW Permit issued by FIIS for Watch Hill Well #1, it is intended to be used as a backup redundant system during an emergency or failure of wells located in Davis Park. Davis Park and Watch Hill accommodate thousands of people seasonally (May-October); this drops to less than 100 during the off-season (November-April) as described in Section 1.1.

Watch Hill facilities that obtain water from the supply wells in SCWA Distribution Area 55 include a visitor center and ranger office; convenience store and snack bar; The Pier at Watch Hill restaurant; campground with 26 family campsites and 1 group campsite; 195-slip marina; picnic area; and bathhouse.

Davis Park has approximately 250 homes, a 200+ slip marina, convenience store, the Casino restaurant, a snack bar, church, post office, fire department, police station, and medical center serviced by public water supplied by wells in SCWA Distribution Area 55.

3.3.2 Transportation

The majority of visitors to Fire Island arrive via ferry or boat to one of several locations throughout the island. Visitors to Davis Park and Watch Hill utilize ferries departing from Patchogue, or private boats that are docked in public marinas present at both sites.

Once on the island, visitors typically walk or ride bicycles to their destination. During summer months, walkways and beaches are crowded with visitors to Fire Island. Approximately two million people visit the island annually, most during summer months.

Fire Island does not feature a network of highly developed roadways for transportation between communities. Dozens of wide walkways can accommodate vehicles when necessary, but the majority of overland transport on Fire Island is conducted along the beaches, including emergency response, essential services (utilities, garbage collection), residents, and contractors. Emergency response and essential service vehicles are permitted to drive year-round on the beach, absent the presence of any threatened or endangered species, although time of day restrictions are in place for all but emergency vehicles. Residents, contractors, and essential services are issued oversand vehicle permits for restricted driving on Fire Island. According to FIIS (J. Mahoney, pers. comm.), 145 residential permits, 100 part-time residential permits (to be phased out annually), 85 municipal permits, 80 contractor permits, and 30 essential services permits are permitted to be issued annually per off-road vehicle regulations. Transportation along the beaches is restricted for contractors and residents as follows:

- Driving permitted in lieu of alternate transportation from the day after Columbus Day to the Thursday before Memorial Day weekend. Driving is permitted on weekdays only in May.
- Driving is not permitted from the Friday of Memorial Day weekend through Columbus Day.
- Smith Point access is not permitted from mid-March through Columbus Day.

Construction equipment is typically transported to Fire Island along the beach during permitted driving windows (above); or via barge when driving is prohibited on the beach. Recreational driving does not affect the proposed well replacement project area.

3.3.3 Visitor Experience

Fire Island is a seasonal recreation area, with a seasonal economy from April through October. Peak economic activity occurs during summer months of June, July, and August. The majority of economic activity occurs in the retail sector, as well as ferry terminals and marinas on the island, which are the only access points during summer months for residents and day visitors.

Watch Hill is a seasonal recreational area that is owned and operated by the Fire Island National Seashore (FIIS), National Park Service (NPS). It is open from mid-May through mid-October, and closed the remainder of the year. Facilities and services include a visitor center and ranger office; convenience store and snack bar; campground with 26 family campsites and 1 group campsite; 185-slip marina with water, electric, and pump-out station; picnic area; self-guiding nature trail; seasonally lifeguarded beach; and bathhouse. The Pier at Watch Hill is a concession-operated full service restaurant with seating for 90. Fresh water is needed for sanitation (restrooms/showers/marina hook-ups/staff housing), food preparation (restaurant/snack bar), and for public consumption (water fountains/campground sites/marina/housing).

Davis Park is one of seventeen Fire Island communities, with approximately 250 homes, a 200+ slip marina, convenience store, the Casino restaurant, a snack bar, church, post office, fire department, police station, medical center, and public beach areas that are seasonally lifeguarded. During the summer season, over 10,000 people visit Davis Park as homeowners, renters, boaters, and day visitors. Visitors utilize the natural environment within Davis Park and Watch Hill for a variety of recreational purposes, including swimming, surfing, sunbathing, beach-combing, clamming, nature viewing, hiking and fishing.

Chapter 4—Impacts

4.1 Methodology

This chapter provides an analysis of potential impacts of the alternatives presented in Chapter 2. As required by NEPA, potential impacts are described in terms of type, context, duration, and level of intensity. These terms are defined below. Overall, these impact analyses and conclusions were based on the review of the existing literature and Park studies, information provided by on-site experts and other agencies, professional judgment and park staff knowledge and insight.

- ***Type of Impact****:* Impacts can be beneficial or adverse. Beneficial impacts would improve resource conditions while adverse impacts would deplete or negatively alter resources.
- ***Context:*** Context is the setting within which an impact occurs and can be site specific, local, parkwide, or regionwide. Site-specific impacts would occur at the location of the action, local impacts would occur within the general vicinity of the project area, parkwide impacts would affect a greater portion of the Park and regionwide impacts would extend beyond Park boundaries.
- ***Intensity:*** Impact intensity is the degree to which a resource would be adversely affected. Because level of intensity definitions (negligible, minor, moderate, major) varies by resource, separate definitions are provided for each impact topic analyzed. The criteria that were used to rate the intensity of the impacts for each resource topic is presented below under "impact thresholds". Beneficial impacts do not receive intensity definitions.
    - Negligible: Impacts would be at the lowest levels of detection and would have no perceptible effect on resources, values, or processes.
    - Minor: Impacts would be perceptible but slight and localized. If mitigation were needed to offset any adverse effects, it would be relatively simple to implement and would likely be successful.
    - Moderate: Impacts would be readily apparent and measurable. The resource might deviate from normal levels but would remain viable. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.
    - Major: Impacts would be readily apparent and widespread, and would result in a substantial alteration or loss of resources, values, or processes and would likely be permanent. Mitigation measures to offset adverse effects would be necessary, extensive, and their success could not be guaranteed.
- ***Duration:*** Depending on the resource, impacts would last as long as construction was taking place, for a single year or growing season, or longer. Impacts can be either short term or long term. A short-term impact would be temporary in duration and would be associated with construction. Long-term impacts last beyond the construction period, and the resources may not resume their pre-construction conditions for a longer period of time following construction. Impact duration for each resource is unique to that resource and is presented for each resource topic.
- ***Direct and Indirect Impacts:*** DO-12 requires that direct and indirect impacts be considered, but not specifically identified. A direct impact is caused by an action and occurs at the same time and place. An indirect impact is caused by an action later in time, but still reasonably foreseeable and farther removed in distance.
- ***Cumulative Impacts:*** The Council on Environmental Quality regulations, which implement NEPA, requires assessment of cumulative impacts in the decision making process for Federal projects. Cumulative impacts are defined as "the impact on the environment which results from the

incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts are analyzed for each alternative.

4.2 Relevant Laws & Regulations

Please also refer to Table 2 for a list of permits/approvals required.

4.2.1 Enabling Legislation for Fire Island National Seashore Title 16 U.S. Code Sec. 459e

In 1964, Fire Island National Seashore was established by Congress for the purpose of conserving and preserving for the use of future generations certain relatively unspoiled and undeveloped beaches, dunes, and other natural features within Suffolk County, New York, which possess high values to the Nation as examples of unspoiled areas of great natural beauty in close proximity to large concentrations of urban population. Section 3 of the enabling legislation states that the Secretary of the Interior shall issue regulations specifying standards, consistent with the purposes of the Act, for zoning ordinances. [36 CFR Ch. I, Part 28] Refer to: http://www.nps.gov/fiis/parkmgmt/lawsandpolicies.htm.

4.2.2 National Park Service Organic Act

The 1916 Organic Act was enacted to create the National Park Service within the Department of the Interior. The purpose of the NPS is to promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations (http://www.nps.gov/legacy/organic-act.htm).

The Organic Act and its mandates afford the NPS latitude when making resource decisions that balance visitor recreation and resource preservation. However, resource preservation takes precedence over visitor recreation, as dictated in the NPS Management Policies and upheld in several court decisions (NPS, 2003). NPS has discretion to allow negative impacts to park resources and values when necessary, and when that impact does not cause impairment of a resource. To determine impairment, NPS must evaluate “the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effect of the impact in question and other impacts” (NPS, 2000). This EA analyzes the context, duration, and intensity of impacts related to the well replacement project as required in Director’s Order 12.

4.2.3 National Park Service Regulations, Directors Orders and Management Plans

National Park Service Regulations, 36 CFR Parts 2.1 and 2.2

Section 2.1 prohibits the processing, destroying, injuring defacing, removing, digging, or disturbing from its natural state, all natural, cultural, and archeological resources. This includes all wildlife and plants, either dead or alive, as well as ensuring the preservation of all natural features, paleontological resources, cultural or archeological resources, and mineral resources. Superintendents are allowed to specify certain parameters where specific actions are allowed for each park.

Section 2.2 prohibits the taking of wildlife, except by authorized hunting and trapping activities; feeding, touching, teasing, frightening, or intentional disturbing of wildlife nesting, breeding or other activities; possessing unlawfully taken wildlife or portions thereof.

Special Vehicle Use Regulations (36 CFR Ch. I, Section 7.20)

This section regulates the number and type of off-road vehicle permits issued by FIIS. Contractor(s) will need to obtain ORV permits to transport equipment and vehicles along the beaches to the Watch Hill project area.

NPS Director's Order #28: Cultural Resource Management

NPS DO-28 requires the NPS to protect and manage cultural resources in its custody through a comprehensive program of research, planning, and stewardship and in accordance with the policies and principles contained within the *NPS Management Policies, 2006.* The Order also requires the NPS to comply with the requirements described in the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation and with the 1995 Servicewide Programmatic Agreement with the Advisory Council for Historic Preservation and the National Conference of State Historic Preservation Officers.

The park actively manages its cultural resources by conducting research to identify, evaluate, document and register basic information about its cultural resources, and sets priorities for stewardship to ensure resources are protected, preserved, maintained and made available for public understanding and enjoyment. The park consults and coordinates with outside entities where appropriate regarding cultural resource management.

Director's Order #77-1: Wetland Protection

The Wetland Protection Procedural Manual was developed for use by the National Park Service (NPS) in carrying out its responsibilities under Executive Order (E.O.) 11990 to protect wetlands. It contains two main elements: 1) the text of Director's Order (D.O.) #77-1: Wetland Protection (last issued in 2002) and 2) detailed procedures (in Sections 3–5) by which the NPS will implement D.O. #77-1 (http://www.nature.nps.gov/water/wetlands/Wetlands_Protection_Manuals.cfm).

The National Park Service's Procedure Manual 77-1 (Wetland Protection) outlines regulations and procedures to minimize the destruction, loss, and degradation of wetlands, to maintain wetlands and their importance within the ecosystem, and to avoid development in wetland areas, if possible. Activities that have the potential to cause wetland degradation are subject to this procedure manual. The procedure manual provides a sequence of actions to follow. First, it is required that wetland impacts are avoided, minimized, and compensated. Second, all actions must be recorded in a Statement of Findings, which should contain a map of the area, proper wetland delineation records, description and evaluation of the wetland area, discussion of alternative actions, and details concerning proposed wetland compensation. A Statement of Findings is not required for this project, as all work shall be landward of the delineated wetland boundary.

Director's Order #77-2: Floodplain Management

National Park Service Executive Order 11988 (Floodplain Management) and Director's Order #77-2 (Floodplain Management) outline Procedural Manual 77-2 (Floodplain Management), which provides a guide for the protection and management of floodplains. It is NPS policy to preserve floodplain values and minimize potentially hazardous conditions associated with flooding. The manual provides information concerning how to define a floodplain, how to detect potential hazards associated with the floodplain, and floodplain management requirements.

A National Park Service floodplain policy must be instituted whenever performing actions that could directly or indirectly affect a floodplain. In order to implement a floodplain policy, the actions or work that will take place must be classified into one of three "regulatory floodplains" (100-year, 500-year, or Extreme). If a proposed action is found to be in an applicable regulatory floodplain and relocating the action to a non-floodplain site is not considered a viable alternative, then flood conditions and associated hazards must be quantified as a basis for management decisions and a formal Statement

of Findings must be prepared and must describe the rationale for selection of a floodplain site, disclose the amount of risk associated with the chosen site, and explain flood mitigation plans. Although this site is located within a FEMA flood zone, it is not located within a regulated floodplain, and therefore, a Statement of Findings is not required for this project.

1977 General Management Plan (Fire Island National Seashore)

Fire Island National Seashore (FIIS) was established in 1964 "for the purpose of conserving and preserving for the use of future generations certain relatively unspoiled and undeveloped beaches, dunes, and other natural features…". The 1977 General Management Plan (GMP) was created to provide an environmentally sound management foundation for the national seashore. The plan ensures the protection and preservation of beaches, dunes, and other natural features, as well as provides reasonable access and facilities for recreational uses.

Strategic Plan, Fiscal Years 2007-2012

The Strategic Plan addresses the mission of Fire Island National Seashore, goals to accomplish this mission, and strategies for achieving these goals from 2001-2005. Fire Island National Seashore's goals are categorized as follows: (1) preserve park resources, (2) provide for visitor experience at the park, (3) strengthen and preserve natural and cultural resources and enhance recreational opportunities, and (4) Ensure organizational effectiveness. The Strategic Plan addresses the mission of FIIS and goals and strategies to accomplish and maintain these goals, and makes recommendations to address the goals listed above.

4.2.4 Federal Laws and Management Policies

Environmental Justice

Executive Order 12898 directs Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. The population in the vicinity of FIIS is evaluated to determine the potential for the project to adversely affect minority and/or low-income populations. The demographic study area comprises all census tracts wholly or partly on Fire Island (NPS, 2003).

The census tracts that include Fire Island (excluding the west end of Robert Moses State Park) have a total population of 9,205 with median household incomes of $31,500 and $52,939 (NPS, 2003). The population of the census tracts including Fire Island is largely white (96.4-98.7%) with few minorities. The seasonal population during summer months is estimated at over 20,000; the racial composition of seasonal residents is assumed to be similar to that of permanent residents, with no significant concentrations of low-income households or minority populations (NPS, 2003).

Local and regional businesses, residents, and tourists determine the socioeconomic climate at and near FIIS, which is located in the most densely populated area of the U.S. Although park visitation is high, alternatives evaluated in this EA may have a negligible effect on local and regional tourism and would not affect socially or economically disadvantaged populations.

1918 Migratory Bird Treaty Act

This Act protects migratory birds with treaties signed by the U.S. and Canada, Japan, Mexico, and the former Soviet Union. Under the Act and associated treaties, it is unlawful to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird." (16

U.S.C. 703) The proposed project will have to comply with the Migratory Bird Act, although no permit or authorization is required.

1973 Endangered Species Act

The Endangered Species Act of 1973 was passed by Congress to provide strong protections for species listed as threatened or endangered under the Act. It is illegal to harass, hunt, capture, kill, or possess plants or animals, or parts thereof, protected by the Act. In addition, Section 7 of the Endangered Species Act mandates that all Federal agencies consider potential impacts of their actions on listed species. Consultation with the U.S. Fish and Wildlife Service (USFWS) is required for any actions that may impact a listed species, to ensure that the action will not jeopardize that species' habitat or existence. If it is determined that a Federal action is likely to result in a "take" of a listed species, the USFWS may describe conditions which must be met in order for that activity to proceed. A "take" is defined as harming or harassing a species resulting in interference of normal breeding, feeding, or sheltering behaviors.

The proposed well replacement project will not impact Federally listed species, and therefore, no Section 7 consultation is required.

National Historic Preservation Act of 1966 (Section 106)

Section 106 of the National Historic Preservation Act requires federal agencies to consider the impacts of their proposals on historic properties, and to provide state and tribal historic preservation officers and, as appropriate, Advisory Council for Historic Preservation and the public reasonable opportunity to review and comment on these actions. The park maintains an active relationship with the NY State Historic Preservation Office (SHPO) regarding cultural resource issues and has notified the NY SHPO regarding the initiation of this EA and the intention of using this document for compliance with Section 106. As part of the NYSDEC application process, NY SHPO was also contacted for evaluation of this project.

4.2.5 State and Local Laws and Management Policies

NYSDEC Tidal Wetlands Regulations (Article 25 of the Environmental Conservation Law)

In 1977, Article 25 of the Environmental Conservation Law (ECL) was enacted to regulate activities on or adjacent to tidal wetlands in New York State. Article 25 regulates activities within 300' of a tidal wetland boundary, including construction and reconstruction of structures and infrastructure and removal of vegetation. The proposed well replacement project is greater than 300' landward of the delineated tidal wetland boundary, and therefore, no permit is required.

NYSDEC Freshwater Wetlands Regulations (Article 24 of the Environmental Conservation Law)

In 1975, Article 24 of the Environmental Conservation Law (ECL) was enacted to regulate activities on or adjacent to freshwater wetlands in New York State. Article 24 regulates activities within 100' of a state-regulated freshwater wetland boundary, including construction and reconstruction of structures and infrastructure and removal of vegetation. Although freshwater wetlands are present within 100' of freshwater wetlands, they are not state regulated wetlands, and therefore, no permit is required.

NYSDEC Water Supply (Article 15, Title 15 of the Environmental Conservation Law)

Article 15, Title 15 of the ECL was enacted to regulate the public water supply program for New York State. The Public Water Supply Program was first established in 1905 and now administered by the NYSDEC to protect and conserve available water supplies by ensuring equitable and wise use of these

supplies by those who distribute potable (drinkable) water to the public for domestic, municipal, and other purposes. NYSDEC issued a permit for the proposed well replacement project on November 30, 2010 (#1-4722-04843/00004, Appendix E).

NYS Historic Preservation Office

NYS Historic Preservation Office (NYSHPO) reviews all projects that have the potential to impact prehistoric or historic resources within New York State. Although no permit is issued by NYSHPO, they provide comments during the NEPA and SEQRA review processes. A Project Review Form was submitted to NYSHPO with the Tracker Archaeology report on December 7, 2010. Comments are pending as of the date of this EA and will be provided as an Appendix or Addendum upon receipt.

Endangered and Threatened Species of Fish and Wildlife; Species of Special Concern

Part 182 of 6NYCRR is the Endangered and Threatened Species of Fish and Wildlife; Species of Special Concern. This part states that all parties must avoid disrupting state listed threatened and endangered species. New York Natural Heritage Program issued a report detailing state listed species; none of the species listed in the report are found in the habitats present in the project area (Refer to Section 3.1.7).

4.2.6 Regulatory Approvals Required

Table 2 provides a list of the permits required for this project, as well as contact information for each permitting agency.

Table 2. Permits/permissions required and obtained from each of the above Federal and state agencies.

Agency	Contact	Permits/Permissions Required
National Park Service/ Fire Island National Seashore	Ms. Diane Abell Landscape Architect, Park Planner 120 Laurel Avenue Patchogue, NY 11772	Right-of-Way Permit for well replacement and construction activities. Vehicle Access Permits for construction equipment and personnel.
NYSDEC	Mr. Mark Carrara Deputy Permit Administrator Division of Environmental Permits SUNY—50 Circle Road Stony Brook, NY 11790-3409	Article 15, Title 15 (Water Supply)
Town of Brookhaven	Mr. Tom Carrano Dept. Environmental Protection 1 Independence Hill Farmingville, NY 11738	Chapter 81 (Wetlands & Waterways)

4.3 Special Status Species Analysis

This project is expected to have no impact on species listed federally or by New York State as endangered or threatened.

4.4 Impacts of the No Action Alternative

4.4.1 Impacts on Natural Resources

No Action may result in impacts to groundwater, wetlands, and vegetation if the existing well failed, resulting in additional discharge of water into the artificially created finger wetland. Additional discharge of water could raise shallow groundwater elevations in the area of the existing well, which could in turn result in the creation of additional artificial wetland area. Expansion of the finger wetland

could result in changes to vegetative species composition, from upland species to wetland species. According to FIIS (D. Abell, pers. comm.), this has occurred with past wells on Fire Island, resulting in the need to abandon, cap, and seal the well.

4.4.2 Impacts on Cultural Resources

No Action will not result in impacts to cultural resources, as there are no cultural resources present in the project area.

4.4.3 Impacts on Community and Visitor Services

No Action may lead to a failure of the existing well, which would have minor to moderate direct impacts on public water supply for FIIS facilities at Watch Hill and the community of Davis Park. According to SCWA, public demand for water during the peak summer season is at, and sometimes exceeds, the three wells in Davis Park, resulting in the need to use the Watch Hill well. If the Watch Hill well fails, demand for water may not be met for Davis Park and Watch Hill during the peak summer season.

Well failure would also result in minor to moderate direct impacts on community and visitor services, some of which may be disrupted by a lack of water described above. Finally, well failure may have a minor indirect impact on tourism, if fewer people are able to visit Davis Park or Watch Hill due to a lack of water supply. These impacts would be long-term under a No Action alternative.

4.4.4 Cumulative Impacts

Cumulative impacts to the water supply, and community and visitor services would be realized if additional wells in this system failed, resulting in diminishing water supply for Watch Hill and Davis Park. Cumulative impacts could be moderate to major if all wells failed and were not replaced.

4.5 Impacts of Well Replacement Scheme 2 (Preferred Alternative)

4.5.1 Impacts on Natural Resources

Well Replacement Scheme 2 (Preferred Alternative) will result in negligible to minor impacts to natural resources. Specifically, a total of approximately 7,998 square feet (0.18 acres) of maritime dune, heathland, and/or shrubland will be cleared for construction; this area includes the entire 80’ x 60’ work area and access/utility route from the existing pump station to the work area. No change in topography is expected with this project. These habitats are therefore expected to completely recover within two growing seasons after construction is complete for warm season grasses (short-term impact); recovery of shrubs is likely to occur within 5-10 growing seasons (long-term impact); beach heather may also recolonize bare patches between warm season grasses, but may not recolonize site due to shading by these grasses (long-term impact).

No direct impacts to freshwater or tidal wetlands are expected to result from the well replacement, as all construction activities will be a minimum of 12’ landward of freshwater wetlands and 316’ landward of tidal wetlands.

Direct and indirect impacts to maritime dune, heathland, and/or shrubland from discharge of water during drilling operations are expected to be negligible and short-term in duration. Water shall be discharged to a 10’ x 10’ area with a plywood splash pad surrounded by silt fencing to retain sediments. In addition, silt fencing will be installed around the outer edge of the project footprint. Water will certainly flow beyond the 10’ x 10’ discharge area during the 8-hour per day, 15-day discharge period and is likely to flow beyond the project footprint. If water does flow beyond the project footprint, the flow is expected to be diffuse and low velocity as it will have passed through two rows of silt fencing. The volume (96,000 gallons per day) and duration of discharge (8 hours per day for 15 days) are insufficient to cause the loss of additional vegetation in these ecological communities. This is because

discharge water shall infiltrate quickly into the sandy soils of the project site and its surrounding areas, and halting of discharge at night and on weekends shall provide time for water to drain completely through the soil column. As a result of the rapid infiltration of discharge water, ponding of discharge waters is not expected to occur in the maritime grasslands, heathlands, or shrublands surrounding the project area. Ponding of discharge for long periods of time could result in adverse impacts to the upland plant species in these communities; however, long-term ponding is not expected.

The diffuse and low velocity discharge flow may also reach the freshwater wetlands located to the north of the project areas. Wetland plants are physiologically adapted to periodic and/or permanent inundation of soils. Accordingly, discharge of water from drilling is not of sufficient volume or duration to impact freshwater wetland communities.

Constant discharge from the well associated with daily operation is expected to be similar to the existing Well #1 discharge of 40 gpm. Water will be piped to discharge in the same area as the current well discharge, the freshwater wetland finger identified by FWW 2 and FWW 3 on the site plan (Appendix A). Due to proposed discharge of similar rate in the same location, no additional impacts associated with daily discharge are expected to natural resources.

No impacts to wetland and upland communities associated with increases in nutrient or contaminant loading due to water discharge activities are expected. Groundwater quality at this site has been tested and found to have no contaminants or excessive levels of nutrients. Impacts to wetland and upland communities could result if the velocity of discharge water was sufficient to erode and transport sediments. Installation of silt fence around the discharge area, and a second row of silt fence around the construction area, will trap most silt and sediments to prevent transport into undisturbed areas. The silt fence will slow the velocity of discharge waters and to prevent scouring of sediments outside of the project area.

Impacts to birds and wildlife are expected to be negligible. All species are mobile and will likely avoid construction activities, relocating to similar undisturbed habitat in the vicinity of the project area.

There are expected to be no impacts to groundwater or water quality, as the project is replacement of an existing well that will draw at the same volume and rate. Water quality has been tested and meets all primary drinking standards.

Water discharged from drilling activities is expected to percolate through the sandy soils quickly, before it would have a chance to freeze. As stated above, sand is an excessively drained soil type. SCWA has performed approximately ten well replacement projects on Fire Island during the winter and early spring season; freezing of discharge water has never occurred.

4.5.2 Impacts on Cultural Resources

Well Replacement Scheme 2 (Preferred Alternative) will not result in impacts to cultural resources, as there are no cultural resources present in the project area. Please refer to Appendix D (Tracker Archaeology report).

4.5.3 Impacts on Community and Visitor Services

Well Replacement Scheme 2 (Preferred Alternative) will result in continued long-term water supply for Davis Park and Watch Hill, and will therefore have no impacts on community or visitor services.

4.5.4 Cumulative Impacts

At this time, there are no cumulative impacts anticipated with Well Replacement Scheme 2 (Preferred Alternative). However, if future well replacement projects are required, it is anticipated that they will have similar impacts to natural resources as described above.

SCWA has no plans or proposals to increase the number or capacity of wells within SCWA Distribution Area 55. Therefore, cumulative impacts due to additional water usage were not analyzed.

Sea level rise and shoreline change/storm damage reduction were not modeled or analyzed. This project will not be affected by sea level rise during its lifespan, and will have no impact on shoreline change or storm damage reduction.

4.6 Impacts of Well Replacement Scheme 2 with Atlantic Ocean Discharge

4.6.1 Impacts on Natural Resources

Impacts to natural resources for this alternative are the same for the construction work area and post-construction discharge of water as those described in Section 4.5.1 above. Impacts of this alternative differ with respect to discharge of water associated with drilling activities. Atlantic Ocean discharge requires placement of 500-1,500 linear feet of 6" diameter discharge pipe, as described in Section 2.3. This results in an additional area of disturbance to maritime heathland and duneland communities of 1,500-4,500 square feet, given a 3' path/work area along the length of the pipe. Direct and indirect impacts to maritime dune, heathland, and/or shrubland from discharge of water to the Atlantic Ocean are expected to be negligible and short-term in duration. Vegetation trampled or covered by the pipe will likely recover during the spring growing season.

4.6.2 Impacts on Cultural Resources

Well Replacement Scheme 2 with Atlantic Ocean Discharge will not result in impacts to cultural resources. There are no cultural resources present in the well replacement area. Discharge pipe shall be placed on grade, and would therefore not impact any buried resources. Please refer to Appendix D (Tracker Archaeology report).

4.6.3 Impacts on Community and Visitor Services

Well Replacement Scheme 2 with Atlantic Ocean Discharge will result in continued long-term water supply for Davis Park and Watch Hill, and will therefore have no impacts on water service or visitor experience. Placement of the discharge pipe may have short-term negligible impacts on transportation along Burma Road, and possibly along the ocean beaches, depending on beach and tidal conditions. However, impacts to transportation are expected for only 3-4 weeks, and will cease once drilling is complete and the discharge pipe removed.

4.6.4 Cumulative Impacts

At this time, there are no cumulative impacts anticipated with Well Replacement Scheme 2 with Atlantic Ocean Discharge. However, if future well replacement projects are required, it is anticipated that they will have similar impacts to natural resources as described above.

SCWA has no plans or proposals to increase the number or capacity of wells within SCWA Distribution Area 55. Therefore, cumulative impacts due to additional water usage were not analyzed.

Sea level rise and shoreline change/storm damage reduction were not modeled or analyzed. This project will not be affected by sea level rise during its lifespan, and will have no impact on shoreline change or storm damage reduction.

4.7 Mitigation

Mitigation for the well replacement project includes installation and maintenance of staked silt fencing around the clearing limits, and a second row of silt fencing around the upland water discharge area (no silt fence is proposed around the Atlantic Ocean discharge area). This will prevent sediments from entering wetlands and natural habitats.

In addition, cleared areas will be seeded with a 50-50 mixture of little bluestem (*Schizachyrium scoparium)* and broom sedge (*Carex scoparia*) at a rate of 15 lbs per acre, if construction is complete by June 15th. If construction is not complete at that time, seeding shall occur in the fall if necessary based

on the recovery of native species at that time. Both species are currently found in abundance in the project area; seeding shall therefore facilitate re-growth of this native vegetation.

Chapter 5—Consultation and Coordination

Coordination with the following agencies was conducted for this project:

- Fire Island National Seashore (FIIS). Project sponsor and consultant had meetings and discussions regarding the format and content of the EA, issues related to wetlands in the project area, and issues relating to project construction.
- NYSDEC. FIIS coordination with the Bureau of Habitat regarding tidal and freshwater wetlands in the vicinity of the project area. FIIS coordination with Division of Environmental Permits to obtain the Article 15 (Water Supply) permit.
- NYS NHP. Consultation included submission of a request for information on species listed as threatened or endangered in the project area; both federal and state listed species accounts were provided by NYSNHP in the report annexed hereto as Appendix C.
- NY State Historic Preservation Office (NYSHPO). Consultation includes submission of the Phase I Archeological Report for review of this project. Comments received from NYSHPO shall be annexed to this EA upon receipt.
- Town of Brookhaven. FIIS coordination with Division of Environmental Protection regarding permit(s) required for the project.

There were no public scoping or review meetings held for this project, but a Public Notice has been issued.

Chapter 6—References

Cook, R. P., D. K. Brotherton, and J. L. Behler. 2010. Inventory of amphibians and reptiles at Fire Island National Seashore. Natural Resource Technical Report NPS/NCBN/NRTR—2010/378. National Park Service, Fort Collins, Colorado. 89 pages.

Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A. M. Olivero (editors). 2002. Ecological Communities of New York State. Second Edition. A revised and expanded edition of Carol Reschke's *Ecological Communities of New York State* (Draft for review). New York Natural Heritage Program, New York Department of Environmental Conservation, Albany, NY.

Leggette, Brashears & Graham, Inc. 1996. Ground-water resources of Fire Island, New York. Report prepared for the Suffolk County Water Authority. 12 pages.

Fire Island National Seashore. 2008. Environmental Assessment: Fire Island Community Short-term Storm Protection, Fire Island, Suffolk County, NY. 202 pages.

Fire Island National Seashore. 1999. Checklist of the Birds of Fire Island National Seashore. Compiled by S. Mitra and J. Putnam. 2 pages.

Suffolk County Water Authority. 2010. 2010 Annual Drinking Water Quality Report. 15 pages.

USACOE. 1999. Draft Environmental Impact Statement. Atlantic Coast of Long Island, Fire Island to Montauk Point. Reach I-Evalutaion of Interim Plan for Storm Damage Reduction. USACOE. New York District. 151 pages.

USACOE. 2004. Final Small Mammal and Herpetile Survey Summary Report, May-August 2002. USACOE. New York District. 63 pages.

Chapter 7—List of Preparers

William Bowman, PhD
Senior Scientist
Land Use Ecological Services, Inc.

Dr. Bowman's credentials include:
PhD, Ecology and Evolutionary Biology, Columbia University, NY (2005)
MA, Ecology and Evolutionary Biology, Columbia University, NY (2003)
BA, Biology, Colgate University, NY (1997)
Methodology for Wetland Delineation. Rutgers University- Cook College, 2006
Erosion & Sediment Control Practices for Contractors. NYC Soil & Water Conservation District, 2007
USFWS and NYSDEC Certified shorebird and piping plover monitor
PADI Certified Open Water Diver

Dr. Bowman has over thirteen years experience working primarily as a wetland and terrestrial ecologist in the New York area. His areas of expertise include tidal and freshwater wetland ecology, plant physiological ecology, forest ecology, and invasive plant management. At Land Use, Dr. Bowman is primarily responsible for the design and oversight of ecological restoration and invasive plant control projects, conducting natural resource inventories, evaluating and assessing impacts to habitats of rare or protected species, conducting wetland delineations, and the implementation of "soft" solutions to shoreline erosion. His knowledge of Long Island's ecological communities, plant physiology, and interactions within biological communities allow him to provide solutions through all stages of the ecological restoration. His passion for biology has lead him to become involved with many environmental education programs including coordinating ecology cruises in the Peconic Estuary and participating in a National Science Foundation program to improve science and math education in New York City public schools. Currently, Dr. Bowman is an adjunct professor at the State University of New York at Stony Brook and teaches a course in restoration ecology.

Steven Colabufo
Lead Hydrogeologist
Suffolk County Water Authority

Mr. Colabufo's credentials include:
Bachelor of Science degree in Geology from Boston College, 1983
Master of Science degree in Geology from SUNY Stony Brook, 1993
Certified Professional Geologist with the American Institute of Professional Geologists.

26 total years working as a Hydrogeologist, 24 of which are with the Suffolk County Water Authority, the largest entirely potable groundwater supplier in the world. During that time, I have designed and supervised approximately 200 well construction projects and an additional 250 well reconditioning/rehabilitation projects. Every one of those required extensive test pumping at the end of the project, similar to what is planned for the Watch Hill project.

Kelly Risotto
Senior Ecologist
Land Use Ecological Services, Inc.

Diane Abell, RLA
Landscape Architect/Park Planner
Fire Island National Seashore

Michael Bilecki
Chief of Resources Management
Fire Island National Seashore