



National Park Service
U.S. Department of the Interior
Cape Hatteras National Seashore

Construct Septic System in Buxton Housing Area Environmental Assessment

April 2018



Aerial of Buxton District, Cape Hatteras National Seashore

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CHAPTER 1: PURPOSE AND NEED

Purpose and Need for Action

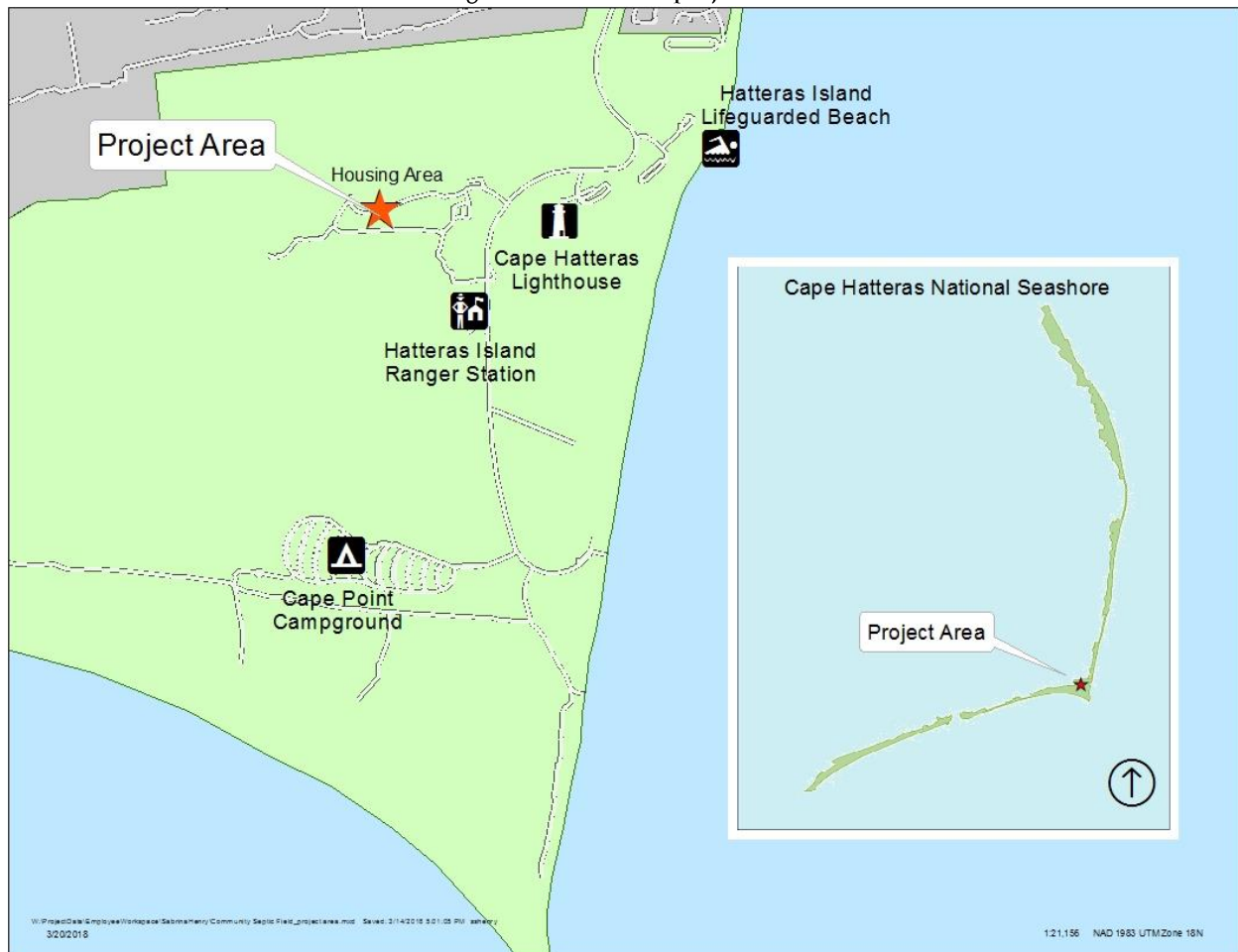
Cape Hatteras National Seashore (Seashore) is proposing to replace the current septic system serving the park housing near the Cape Hatteras Lighthouse in Buxton, NC (Figure 1). This system includes a lift station, septic drain fields and wastewater systems, and all associated electrical facilities.

The Seashore's 13 seasonal housing units are served by an existing gravity and pressurized sanitary sewer system, septic tanks, and a septic drain field located near the Buxton Ranger Station (Figure 2). The housing units drain by gravity through lateral lines into a 12-inch PVC main line running in front of the housing units. The 12-inch line dumps into a lift station on Loggerhead Lane. The lift station was replaced in 2012. Currently, sewage is pumped approximately 2,000 feet from the lift station to a series of two large holding tanks adjacent to the Ranger Station and draining into one large drainfield.

These septic systems have been in operation since the late 1960's, except for the lift station which was replaced in 2012. The systems are out of compliance with public health and safety regulations and have been noted as a discrepancy in the Seashore's annual Public Health Assessment report (NPS 2016). Pumps and alarm systems are failing and require more maintenance than the Seashore is able to provide with the limited number of staff available.

The existing septic drain field across from the Ranger Station occasionally floods during rain and storm events. When the septic drain field becomes saturated and remains saturated due to standing water for several weeks at a time they do not function properly. As a result, the Seashore must cease the use of the septic system's drainfield until water dissipates. These systems need to be replaced for the health and safety of persons utilizing these services, and failure to upgrade this septic system could result in a complete loss of service.

Figure 1. Location of project area.



Summary of Project Objectives

- Relocate the housing septic system out of flood prone areas so that so that housing occupants can remain in place with an operational septic system that is more resilient to local flooding.
- Create a long-term septic system that would be in compliance with Public Health and Safety Regulations
- Improve maintenance operations of the housing septic facilities and septic drain fields

Impact Topics Retained for Further Analysis

The following topics are carried forward for further analysis in this EA:

- Soils
- Vegetation
- Wildlife

Impact Topics Dismissed from Further Analysis

The following topics are dismissed from further analysis in this EA for the reasons provided below. Unless otherwise noted, no impacts are associated under the no action alternative.

Air Quality & Green House Gas Emissions

Cape Hatteras National Seashore is located in an area classified by the US Environmental Protection Agency (EPA) as being in attainment for all six criteria air pollutants under the Clean Air Act (CAA). This means this area is protected under several provisions of the CAA including the National Ambient Air Quality Standards (NAAQS) and the Prevention of Significant Deterioration (PSD) of Air Quality Program.

The project would result in a negligible increase of Green House Gas emissions (GHGs) from the use of construction equipment. Construction related activities would result in a localized increase of vehicle exhaust, emissions, and fugitive dust throughout the construction period. Periodic use (i.e. hourly) of various types of equipment (excavators, backhoes, trucks) over the construction period would produce limited emissions relative to those produced from visitor and local transportation within the park, and would make an inconsequential contribution to the park's overall emissions profile. Any increase in GHGs would cease once construction is complete; therefore, no long-term contribution of GHGs would occur under either Alternative discussed in this EA.

Archeological Resources

In accordance with Sections 110 and 106 of the National Historic Preservation Act, archeological testing was conducted by the Archeological Investigations and Compliance division of the NPS Southeast Archeological Center (SEAC) on April 10, 2017 at the proposed installation site of the community septic drain field within the Buxton seasonal housing area. Two shovel tests were conducted to assess the possibility that previously unrecognized archeological resources would be impacted by the creation of the septic drain fields. The shovel test sites were judgmentally placed a little less than 20 meters apart in the wooded area located between housing unit 7 and a large water tower. Shovel Test 1 (ST1) was dug to 95 cm, and Shovel Test 2 (ST2) was dug to 100 cm. Both shovel tests exhibited an upper humic zone that varied from 10 to 15 cm thick. Below this zone, the two shovel tests revealed only sterile aeolian sands. There was no evidence of past human occupation of the area and it was determined that this undertaking would have no adverse effect on historic properties (Prentice, 2017), if historic properties were present. Therefore a No Historic Properties Affected determination was made.

The park's Cultural Resources staff would be notified and additional consultation with the State Historic Preservation Office (SHPO) would occur in accordance with federal legislation, regulations, and NPS policy if cultural resources were discovered during construction activities.

Historic Structures

Section 106 of the NHPA of 1966, as amended (54 USC 306108, et seq.) and its implementing regulations under 36 CFR 800 require all federal agencies to consider the effects of federal undertakings on historic properties, including historic structures eligible for or listed in the National Register of Historic Places. In

order for a structure to be listed in the National Register, it must be associated with an important historic event, person(s), or embody distinctive characteristics or qualities of workmanship. Cultural resource investigations found no historic structures within the area of potential effect eligible for listing on the National Register (NPS 1985; Prentice, 2006).

Cultural Landscapes

According to the NPS Directors Order 28: *Cultural Resource Management Guideline* (NPS 1998) , a cultural landscape is a reflection of human adaptation and use of natural resources, and is often expressed in the way land is organized and divided as patterns of settlement, land use, systems of circulation, and in the types of structures that are built. A cultural landscape inventory has not been conducted for the project area; however, as previously described, there are no historic structures in the vicinity. Due to the absence of historic structures, which limit the potential for a landscape, cultural landscapes were dismissed from further analysis in this document.

Ethnographic Resources

The NPS defines ethnographic resources as any “site, subsistence, or other significance in the cultural system of a group traditionally associated with it” (NPS 1998). According to NPS Cultural resource staff and the general management plan (NPS 1984) to date no ethnographic resources within the park have been determined eligible for listing in the National Register.

Indian Trust Resources and Sacred Sites

Trust resources are those natural resources reserved by or for Indian tribes through treaties, statutes, judicial decisions, and executive orders, which are protected by fiduciary obligation on the part of the United States (NPS 2006). There are no Indian trust resources in the Seashore. Sacred sites are those places having established religious meaning and as locales of private ceremonial activities (NPS 2006). Through consultation efforts (see Ethnographic Resources), the park has not been made aware of any Indian sacred sites at or near the project site. In summary, no Indian Trust Resources or Sacred sites would be impacted as a result of implementing either Alternative discussed in this EA.

Environmental Justice

In accordance with the National Office of Environmental Policy and Compliance (OEPC) Environmental Compliance Memorandum 95-3, Buxton, NC was assessed to contain both minority and low-income populations. However, this environmental assessment demonstrates that the impacts that could result from implementation of the alternatives would be few and would not be disproportionately high with regard to human health or environmental impacts on minorities or low-income populations. The proposed actions would allow the use of the area by all people regardless of race or income, and any construction workforces would not be hired based on race or income. Furthermore, the park staff and planning team actively solicited public participation as part of the planning process and gave equal consideration to all input from persons regardless of age, race, income status, or other socioeconomic or demographic factors. In summary, environmental justice would not be impacted as a result of implementing either Alternative discussed in this EA.

Soundscapes

Natural sounds (e.g. flowing water, wind blowing through trees, birds calling) predominate the Seashore, where visitors have opportunities throughout most of the park to experience natural sounds in an unimpaired condition. The sounds of civilization (mechanical and other human-created sounds) are generally confined to developed areas of the Seashore. Within the project area, residents intermittently experience the sounds of vehicles and other people that at times interfere with the natural sounds of the Seashore. The project would cause temporary and intermittent negative impacts to natural soundscapes during construction. Periodic use (i.e. hourly) of various types of equipment (bobcats, trucks, power equipment, etc.) over the construction period would produce sounds that are comparatively isolated to those produced from visitor developed areas within the park, and would make a minor contribution to the park's overall soundscape profile (see Best Management Practices). Some wildlife would be impacted by sounds produced from construction and maintenance activities and would be presented in the *Wildlife and Wildlife Habitat* section. Any increase in construction noise would cease once construction or maintenance activities are complete; therefore, no long-term impact to the soundscape would occur under Alternatives discussed in this EA.

Lightscapes

In accordance with 2006 *Management Policies*, NPS strives to preserve natural ambient lightscapes, which are natural resources and have values that exist in the absence of human caused light (NPS 2006). The park strives to limit the use of artificial outdoor lighting to that which is necessary for basic safety requirements. The park also strives to ensure that all outdoor lighting is shielded to the maximum extent possible, in order to keep light on the intended subject and out of the night sky. No outdoor lighting is proposed as part of this project and no night work would occur that would affect the night sky. In summary, no lightscapes would be impacted as a result of implementing either Alternative discussed in this EA.

Species of Special Concern

An official federal species list (consultation code 04EN2000-2018-SLI-0364) was obtained from the U.S. Fish and Wildlife (USFWS) Information for Planning and Conservation (IpaC) website (<https://ecos.fws.gov/ipac/>) on February 16, 2018. The list identified 14 threatened, endangered, or candidate species with the potential to occur within the project area. There are no critical habitats identified in the project area. A search was also conducted within the North Carolina Heritage Program database to identify any state sensitive species within the project area.

Habitat for the federally threatened piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), roseate tern (*Sterna dougallii dougallii*), green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) sea turtles and seabeach amaranth (*Amaranthus pumilus*); the federally endangered West Indian manatee (*Trichechus manatus*), Hawksbill (*Eretmochelys imbricate*), Kemp's Ridley (*Lepidochelys kempii*) and Leatherback (*Dermochelys coriacea*) sea turtles and experimental red wolf (*Canis rufus*), do not occur within the project area and project actions would have no effect on these special species of concern.

The federally endangered Red-cockaded woodpecker (*Picoides borealis*) occurs in Dare County, however, there are no records for this species on the Outer Banks. The proposed project would likely have no effect on the Red-cockaded woodpecker.

There are recent element occurrences for the federally threatened northern long-eared Bat (*Myotis septentrionalis*) in Dare County within Alligator River National Wildlife Refuge. However, there are no known hibernation or roost sites in Dare County. As a part of the action, the NPS would only carry out tree/limb removal outside of avian nesting season (April 1 through August 31). This time frame is inclusive of the period when any maternity roost trees would be the most sensitive to disturbance (June 1 through July 31). The proposed project would have no effect on the northern long-eared bat.

The Buxton Woods white-footed mouse (*Peromyscus leucopus buxtoni*), listed by the State of North Carolina as rare has been known to occur within the Buxton Woods State Natural Heritage Area near the project area. The State has also listed this species as a Federal Species of Concern (FSC). Although this term is not defined in the federal Endangered Species Act, in North Carolina, the Asheville and Raleigh Field Offices of the US Fish and Wildlife Service (Service) define FSC as those species that appear to be in decline or otherwise in need of conservation and are under consideration for listing or for which there is insufficient information to support listing at this time. Subsumed under the term "FSC" are all species petitioned by outside parties and other selected focal species identified in Service strategic plans, State Wildlife Action Plans, or Natural Heritage Program Lists. In consultation with State Natural Heritage Program, it was determined that this project would only have minimal short-term impacts to this species or its habitat during construction related activities.

The park also surveyed for special status plants within this project area and although the state's critically imperiled shortleaf basket grass (*Oplismenus setarius*) had been previously surveyed (Sorrie, 2014) near the project area none was found within the project site itself. This project would have no impacts to this state rare plant species. No other plant species of state concern were found within this project area.

Because of these determinations, species of special status was dismissed from further analysis in this EA.

Water Resources including Wetlands and Floodplains

National Park Service policies require protection of water quality consistent with the Clean Water Act (NPS 2006). The purpose of the Clean Water Act is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." It establishes effluent limitation for new and existing discharge into U.S. waters, and authorizes states to substitute their own water quality management plans developed under Section 208 of the act for federal controls. This act also provides an enforcement procedure for water pollution abatement and requires conformance to a permit required under Section 404 for actions that may result in discharge of dredged or fill material into a tributary, a wetland, or to an associated water source for a navigable river. Section 4.6 of 2006 *Management Policies* addresses water resource management including the protection of surface waters and ground water, water rights, water quality, and watershed and stream processes.

Wastewater treatment systems can influence groundwater and surface water nutrient and bacteria concentrations in some settings. Coastal soils are sandy and relatively shallow, increasing the potential for groundwater transport of pollutants from onsite systems to surface waters.

Project actions would not affect water resources within the project area. Soil borings taken at a depth of 84 inches within the proposed area for a new septic drain field did not encounter evidence of a seasonal high water table according to the soil suitability analysis performed (Edwards 2017). The proposed site for the new community septic drain field is located at an elevation of 20 feet above sea level and drain fields are only required to be constructed at least three feet about ground water levels. The new septic drain field location would have sufficient protection from effluent leaching into the ground water table. Project actions at the existing septic drain field would remain the same as currently anticipated. During times of extreme flooding, the current septic drain field may not be usable but back up operations would shut down the use of the septic drain field and waste would be pumped out of the existing septic tanks, therefore no impacts to ground water resources would be expected. For these reasons, the topic of water resources was dismissed from further analysis.

Executive Order 11990 Protection of Wetlands requires federal agencies to avoid, where possible, adversely impacting wetlands. NPS policies for wetlands, as stated in 2006 *Management Policies* and Director's Order 77-1 *Wetlands Protection*, strive to prevent the loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In accordance with DO 77-1 *Wetlands Protection*, proposed actions that have the potential to adversely affect wetlands must be addressed in a Statement of Findings for wetlands. A site visit was conducted in July 2017 to determine if the project site was located within a wetland. The project site is located 65 feet upslope from a freshwater forest/shrub wetland. The elevation difference between the project area and the wetland is approximately 10 feet. North Carolina state regulations (15A NCAC 18A.1950) requires septic disposal systems to have at least 50 foot setback from a water source classified as WS-I, which are waters within natural and undeveloped watersheds in public ownership. Due to the location and distance of the project area, no impacts as described in DO 77-1 are expected. Therefore, no Statement of Findings would be prepared and the topic of wetlands was dismissed from further analysis.

Executive Order 11988 Floodplain Management requires all federal agencies to avoid construction within the 100-year floodplain unless no other practicable alternative exists. The NPS, guided by the 2006 *Management Policies* and Director's Order 77-2 *Floodplain Management*, will strive to preserve floodplain values and minimize hazardous floodplain conditions. According to Director's Order 77-2 *Floodplain Management*, certain construction within a 100-year floodplain requires preparation of a Statement of Findings for floodplains. The project site is not within a 100-year floodplain, and downstream floodplain function would not be affected. Therefore, a Statement of Findings for floodplains would not be prepared, and the topic of floodplains was dismissed from further analysis.

Socioeconomics

The park staff and planning team does not anticipate any impacts on the socioeconomic environment to alter the physical or social structure of nearby communities because the implementation of either

alternative would neither change local or regional land use nor appreciably affect local business or other agencies.

Visitor Use and Experience

Cape Hatteras National Seashore served over 2 million visitors in 2017 from all over the country and internationally (NPS 2017b). Visitors come to enjoy many features of the park and the wide variety of experiences offered by the Park. Most visitors enjoy the 70 miles of beaches by swimming, fishing, nature viewing, beach combing and beach driving. The park boasts lighthouses that are seasonally open to climbing, visitor centers, and seasonal campgrounds. There are several trails available throughout the park open to hiking and biking. In the fall and winter, duck hunting is permitted. The project area is within an administrative use area where visitor services are not provided. No visitors would be impacted as a result of implementing either Alternative discussed in this EA and therefore, this topic was dismissed from further analysis.

CHAPTER 2: ALTERNATIVES

Two alternatives, action and no action, are carried forward for evaluation in this EA. A number of suggestions and alternate designs were also considered and dismissed (see the Alternatives Considered and Dismissed section).

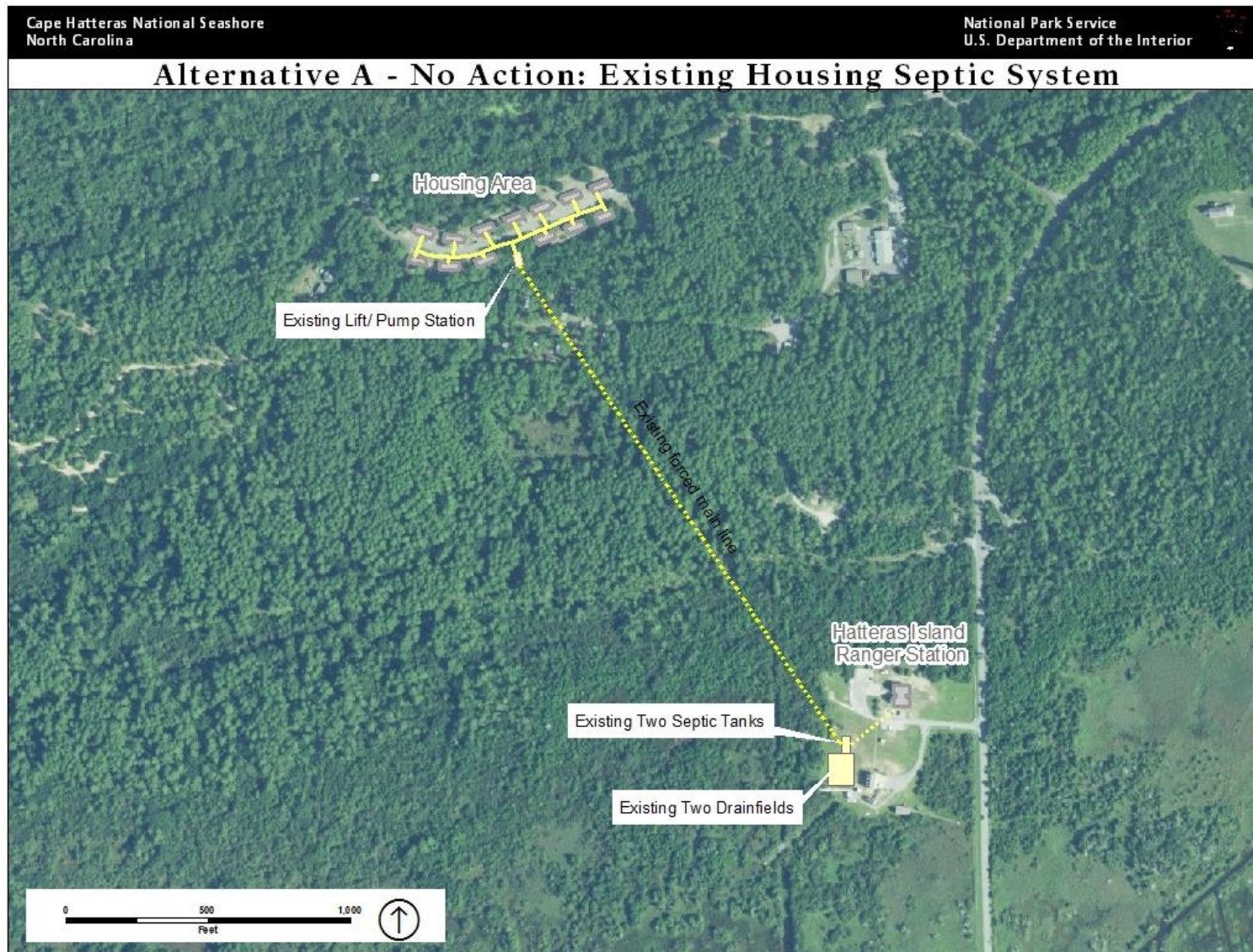
Alternatives Carried Forward

Alternative A – No Action

Alternative A describes the conditions that would exist if septic system facilities were not replaced. Under Alternative A, the NPS would not construct a new septic system in the Buxton Housing area and the current system would remain in place (Figure 1). An existing gravity and pressurized sanitary sewer system, septic tanks, and septic drain field serve the 13 seasonal housing units. The housing units drain by gravity through lateral lines into a 12- inch PVC main line running in front of the housing units. The 12- inch line dumps into a lift station on Loggerhead Lane. The lift station was replaced in 2012. Currently, sewage is pumped approximately 2,000 feet from the lift station to a series of two large holding tanks adjacent to the Cape Hatteras Ranger Station. The first holding tank includes measures approximately 11 feet x 25 feet x 7 feet (15,000 gal). The second tank measures 11 feet x 21 feet x 7 feet (15,000 gal) and includes two submerged pumps that lift fluids to the adjacent septic drain field. An enclosure built over an opening in the second tank houses the pumps and some piping. The septic drain field consists of two leach areas, which are each approximately 45 feet x 90 feet and approximately 20 feet apart from each other. A total of 24 drain lines are in place; the ends of each line are marked with an above ground PVC pipe. This septic system also services the Hatteras Island Ranger Station, which houses administrative offices for the law enforcement, fee operation and resource management divisions.

These septic systems have been in operation since the late 1960's and have far surpassed their life expectancy. Pumps and alarm systems are failing and require frequent maintenance and monitoring. Septic drain fields are starting to fail, as well as causing sewer backups at times. The existing septic drain field across from the Ranger Station occasionally floods during rain and storm events. The septic drain field can become saturated and has remained saturated due to standing water for several weeks at a time. The systems are out of compliance with public health and safety regulations and have been noted as a discrepancy in the Seashore's annual Public Health Assessment report (NPS 2016).

Figure 2: Alternative A - No Action



Alternative B – Construct a New Septic System (NPS Preferred)

Under Alternative B, the construction of a new septic system serving 13 housing units is proposed (Figures 2 and 3). The existing pump station and tank would be modified to meet the requirements of the new proposed septic system. A new septic tank would be installed next to the pump station. This area has already been previously disturbed from the installation of the pump station itself. The existing force main line would be cut and capped off and abandoned in place. Asphalt and concrete patching would be required along asphalt surfaces where trenching is needed to install the new proposed two inch force main line.

Ground disturbing activities would include the installation of new water lines and a total area of 27,443 square feet (.63 acres) would be disturbed for Alternative B (Figure 3). Installation of new lines from the new septic tank to the new septic drain field would disturb 12,197 square feet (.28 acres). Clearing and digging a 15,246 square feet (.35 acres) area of all vegetation would be required for a new septic drain field. A construction access entrance would be temporarily established on the southeast edge of the proposed community septic drain field. Construction vehicles and staging would be restricted to the project area as depicted in Figure 3 and along the housing road. Vegetation would be cleared from the site and would either be hauled away or chipped on site.

This alternative would improve park operations by creating a long-term septic system that would be in compliance with Public Health and Safety Regulations. This alternative would relocate the housing septic system out of flood prone areas so that so that housing occupants can remain in place with an operational septic system that is more resilient to local flooding therefore improve overall long-term maintenance operations of the housing septic facilities and septic drain fields.

Any components of the existing system which would not be reused would be removed within the project limits of new construction. Any components of the existing system which would be outside the new construction limits would be cut and capped, and abandoned in place.

The existing septic drain field and two septic tanks would continue to be used at the Hatteras Island Ranger Station.

The project site would be restored as soon as reasonably possible for housing access and park operations.

Figure 3: Alternative B - Construct New Septic System

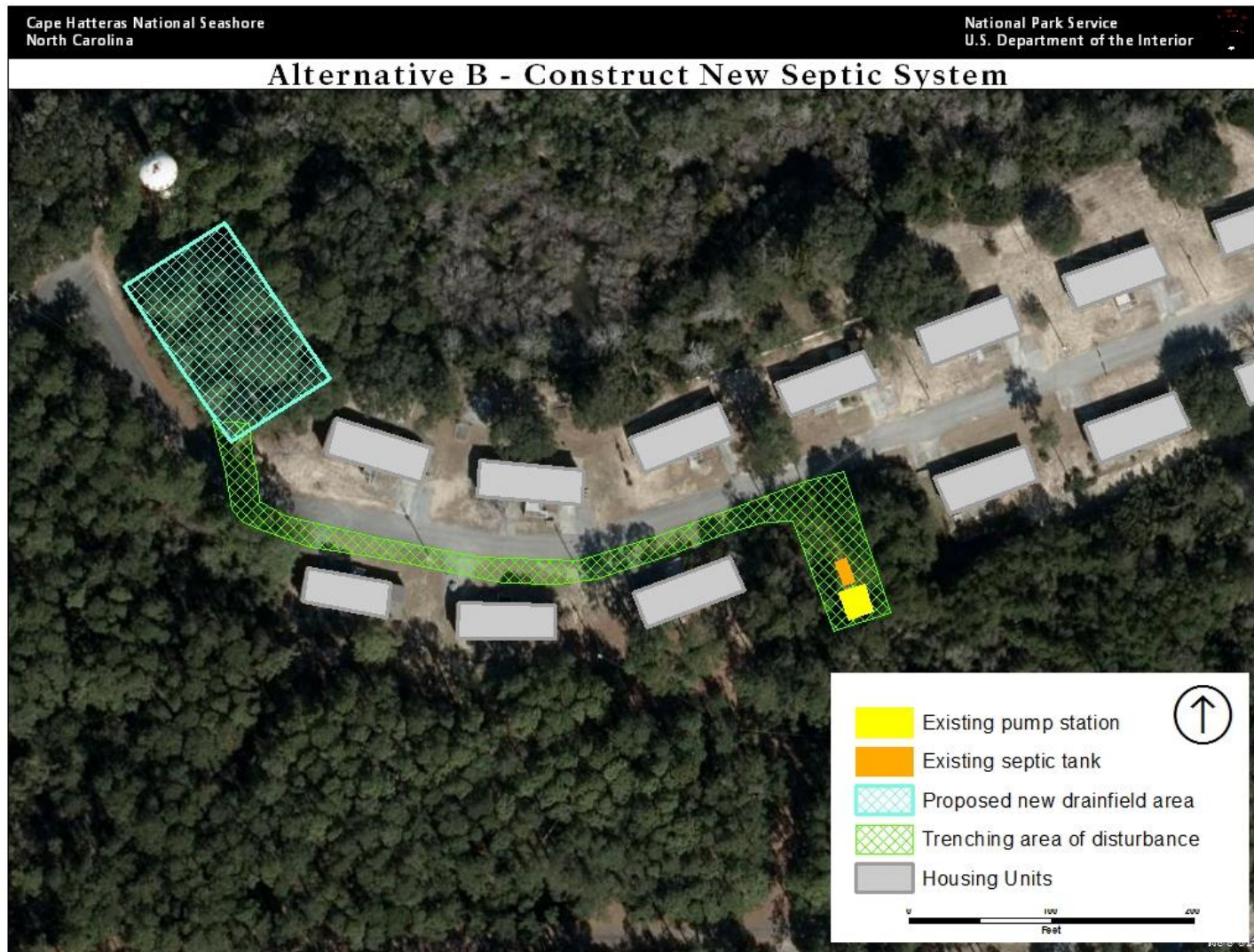
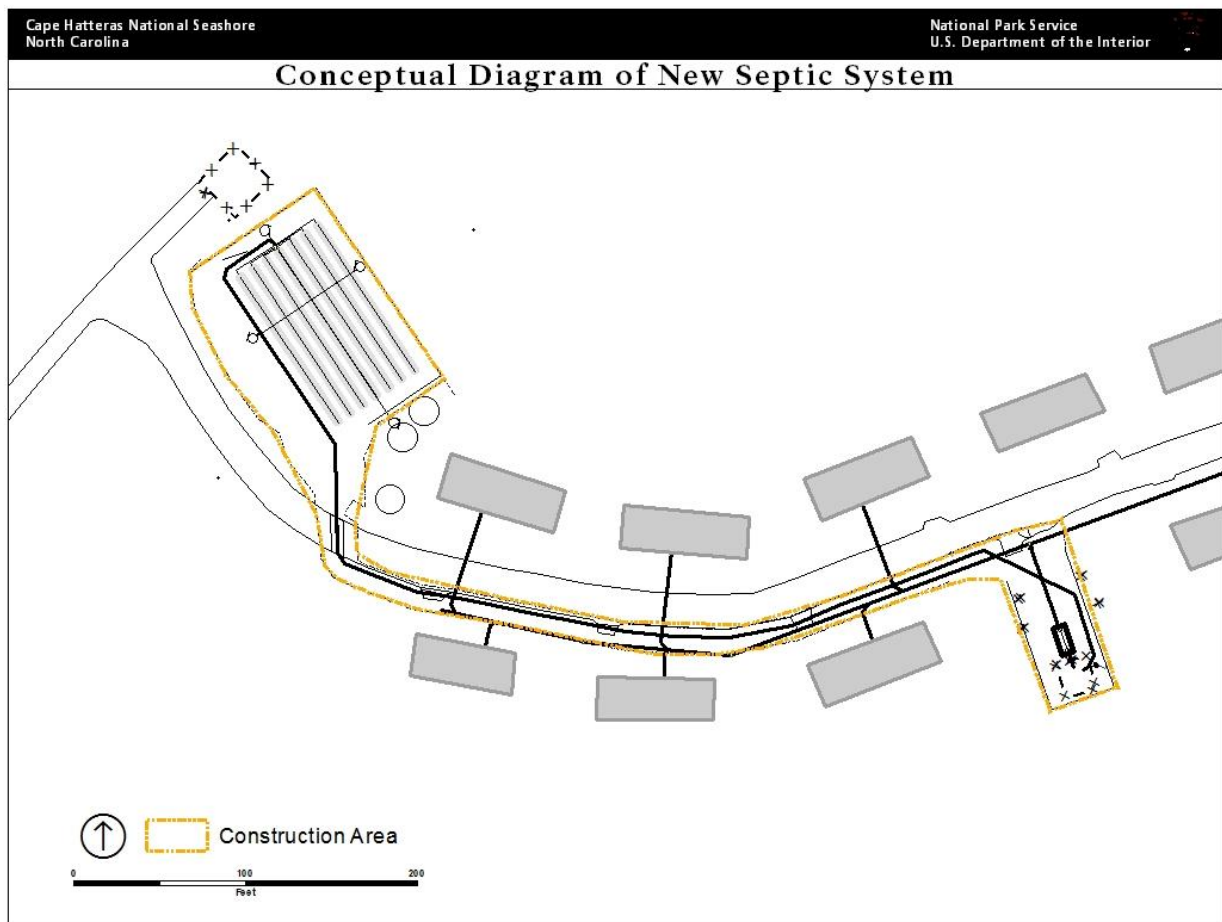


Figure 4: Proposed Design of Septic System



Alternatives Considered and Dismissed

As described in Table 1 below, the following suggestions and alternative locations for the project were considered but dismissed from further consideration. These include suggestions from public scoping, as well as from the project planning team.

Table 1: Suggestions and alternative locations dismissed from further consideration.

Suggestions/Alternative Locations Dismissed	Reason for Dismissal
Convert the tennis court to a new community septic drain field	This site is an already disturbed site located on the east side of the housing area. However, this site is at a lower elevation with insufficient groundwater separation from the housing units, and would require a substantial amount of fill to elevate the community septic drain field (~3,215 cuyd) at a level required that would not affect the ground water table at this site. In addition, fill would need to be placed behind nearby housing units to prevent effluent vectoring and breaking out at the ground surface. This alternative was determined to be significantly more expensive than Alternative B, economically infeasible, and would not meet project objectives.
Construct individual septic drain fields at each housing unit	This alternative would require multiple septic tanks, lines, and manholes for individual systems, deeper leaching systems due to the dependence on the invert of the gravity sewer exiting at the housing units, and more than twice as much fill as needed with the community system. In addition, a future housing project is proposed to remove the current units and replace them with dorm style units, which would require the construction of a community septic drain field. For these reasons, this alternative was determined to be economically infeasible and would not meet project objectives.

Best Management Practices for Action Alternative

The following best management practices would minimize the degree and/or extent of adverse impacts and would be implemented if the action alternative were selected.

General Construction

- The NPS is responsible for any testing, surveying, digging, measuring, verifying of existing conditions, etc. necessary to perform the complete design and construction of the selected alternative. Percolation and other soil tests, inspection of existing system for suitability and serviceability tree clearing, air or pipe tests, etc. would also occur within the scope of work.
- The NPS is responsible for abiding by the permit granted through the Dare County Public Health Office.

- The NPS must ensure the contractor would comply with all local, State, and Federal laws, and regulations.
- The project shall include a pre-construction meeting and a final inspection meeting, in addition to regularly scheduled project meetings and site visits.
- All construction generated debris (not including vegetation) would be removed from the park to an approved landfill.
- Equipment must be free of any fluid leaks (fuel, oil, hydraulic fluid, etc.) upon arrival to the work site and would be inspected at the beginning of each shift for leaks. Leaking equipment would be removed off site for necessary repairs before the commencement of work.
- All construction equipment that would leave paved or dirt roads would be pressure-washed prior to entering the park and shall be clean of any soil, plant matter, or other materials. NPS natural resource specialists or the project manager shall inspect the vehicles prior to entry into the park.
- Fueling of any type, whether equipment or vehicles, must be done either on non-pervious surfaces such as concrete or asphalt, or deploy a spill containment pad.
- Equipment, material, and supply storage would be within approved areas only.
- Parking of personal vehicles would be within designated areas only.
- Any park infrastructure affected during construction, including, but not limited to paved and unpaved roadways, walkways, and turf, would be restored to pre-construction conditions upon completion of the project.
- Construction zone would be clearly marked. Fencing or other type of NPS approved temporary barriers would be installed. At completion of action/project all temporary marking/fencing/flagging must be removed.

Air Quality

- To reduce noise and pollution emissions, construction equipment would not idle any longer than is necessary for safety and/or mechanical reasons.
- All haul loads must be trapped.

Archeological Resources

- Should construction unearth cultural resources, work would be stopped in the area of discovery and the park would consult with the park Cultural Program Manager, State Historic Preservation Office (SHPO) in accordance with §36 CFR 800.13, Post Review Discoveries.
- In the unlikely event that human remains are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed.

Lightscares and Soundscapes

- Hours of outdoor construction would be limited to hours between sunrise and sunset; therefore, no artificial lighting would be needed.

Soils and Vegetation

- Construction zones would be identified (i.e. flagging, construction tape, etc.) to confine activity to the minimum work area required.

- All construction vehicles (including tires, chassis, etc.) must be washed prior to entry into the park and project area to reduce the spread of invasive and exotic plants.
- Construction sites would abide by best management practices regarding avoidance of tree damage. Trees would have fencing established to prevent vehicle damage to main stem, root pruning would be used to trim roots within below grade work zones, and care would be given to avoid compaction of soils over root systems.
- Soil disturbance shall be minimized to the greatest extent possible to reduce disturbance to native plants and reduce the potential for the introduction or spread of invasive non-native plant species.
- To minimize the amount of ground disturbance, staging and stockpiling areas shall be located in previously disturbed sites approved by the National Park Service. All staging and stockpiling areas shall be returned to pre-construction conditions following construction.
- Erosion control measures that provide for soil stability and prevent movement of soils would be implemented, such as installing silt fencing along the edge of construction.
- Soil and fill material would be weed-free and from a source approved by the National Park Service.
- Exposed soil shall be seeded and mulched as soon as possible to prevent the establishment of invasive plants.
- Vegetation material removed during the project that is unusable for revegetation efforts shall be cut and shredded onsite for use as mulch in the project area. If the material needs to be stored off-site, NPS staff shall work with the project manager to determine the appropriate location.
- Chipping activities shall broadcast the wood chips. No chip deposits shall be over three inches deep.
- Any transplant and revegetation efforts would be coordinated through the Resource Management program to echo the existing, native landscape.

Wildlife

- Tree/limb removal would only occur outside of avian nesting season (April 1 through August 31).
- Construction personnel would be oriented on appropriate behavior in the presence of wildlife and the proper handling and disposal of food and/or other attractants.
- Park resource staff throughout the duration of the project would monitor construction site and staging areas in case any special status species unexpectedly appear in the project area. Should any appear, and if park staff become concerned about potential adverse impacts on the species from construction or other project related activities, work would stop and not resume until necessary protective steps are taken to avoid any impacts to the special status species.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment (existing setting or baseline conditions) and analyzes the potential environmental consequences (direct, indirect, and cumulative impacts or effects) that would occur as a result of implementing the alternatives.

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). In order to determine the cumulative impacts it was necessary to examine past, present, and reasonably foreseeable future actions at Cape Hatteras National Seashore. Cumulative impacts are considered for the no action and the preferred alternative. The following projects were identified for the purpose of conducting the cumulative effects analysis:

Past Actions

- 1973 – Current septic system constructed near Ranger Station serving 9 housing units
- 1974 – Housing area was constructed with trailers and grounds were graded, seeded and trees planted.
- 1988 – Water tank plant was constructed near housing area
- 2001 – Housing area was connected to city water and elevated water tank plant was abandoned.
- Major flood events have affected current septic drain field since the 1990’s.

Present Actions

- Continued maintenance issues with the current septic system – Maintenance staff continues to deal with broken sewer lines along the main force line due to root damage and mechanical issues with sewer pumps. The septic drain field has been clogged several occasions and had to be flushed and cleared.

Foreseeable Future Actions

- Replacement of Trailer Houses – The Park proposes to remove all of the trailer units located in Buxton Housing area. Proposed new housing would be one six-plex unit, two four-plex units and one four-bedroom house. The work would include the demolition and removal of the trailer houses and any structural and/or utility work that would be necessary to serve a multi-unit housing structure.
- Demolition of water tank near housing area – The 35 foot high elevated water storage tank is no longer in service nor is needed for future use. This project proposes to remove the water plant tank and all components, including buildings, and to restore the landscape back to natural conditions.

Soils

Affected Environment

NPS policy is to actively seek to understand and preserve the soil resources of parks, and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil or its contamination of other resources. The NPS *Management Policies* and other NPS and Cape Hatteras National Seashore policies provide general direction for the protection of soils.

According to the Natural Resources Conservation Service Web Soil Survey (WSS), retrieved January 3, 2017, two sandy soil types are present in the project area: Newhan fine sand (NeC) and Ousley fine sand (OuB). The Newhan fine sand (NeC) soil type is found typically on the backs and sides of 0 to 10 percent slopes. Fine sands 0 to 50 inches depth and sands from 50 to 80 inches depth characterize the grain size profile. This soil type is excessively drained, rarely flooding and never ponding. The Ousley fine sand (OuB) is found typically on the backs and sides of 0 to 6 percent slope. Fine sands 0 to 80 inches depth characterize the grain size profile. This soil type is moderately well drained, rarely flooding and never ponding.

Soil suitability analysis was completed in 2017 by VHB and Edwin Andrews & Associates, P.C to evaluate several drainfield site locations within the project area for permit by the state of North Carolina. All of the hand soil borings (16) were completed to a depth of 84 inches and confirmed the soil had sandy texture with single grained texture, without evidence of any clay minerals. The soil was considered suitable with respect to texture, structure, soil wetness, soil depth and restrictive horizons for a new septic system.

Impacts of Alternative A—No Action

Under Alternative A, there would be no action and no measureable impacts on soils within the project area. Soils would continue to exist in its present state until repairs and rehabilitation activities would require short-term adverse and negligible impacts to soils if and when areas need to be dug up to replace deteriorated components of the septic system. After these minor repairs, these areas would be backfilled with existing soils.

Cumulative Effects

Past actions such as the construction of the housing area and buildings and structures associated with the water tank had adverse impacts on the soils near the project area. Continued routine repairs and rehabilitation to the aging septic system would continue to have local adverse impacts to soils from compaction. Future projects, such as the construction of a new housing complex, that would reduce the overall developed footprint within the already disturbed housing area, and the removal of the water tank along with its associated facilities would overall have beneficial affects to the restoration of the these areas and reduce long-term adverse impacts to soils. Because Alternative A results in little or no disturbance to soils in relation to project related activities, it would not incrementally add to the overall adverse cumulative effect when included with other past, present, and reasonably foreseeable future actions within the project area.

Impacts of Alternative B— (NPS Preferred)

Under Alternative B, a permanent and temporary disturbance of .63 acres of soil would result from the installation of a new community septic drain field, installation of new water lines and a new septic tank. Preparation of the 15,246 square feet site (.35 acres) for the new septic drain field is expected to result in long-term slight adverse impacts to soils. Vegetation clearing and digging would stir surface soils and allow them to mitigate more easily. Migration of soils would be controlled by limiting the area of potential disturbance in concert with the maintenance of silt fencing during and after construction activities.

Establishment of the mound septic system would require the import of 120 cubic yards of rock in accordance with applicable state (15A NCAC 18A) and federal regulations. Approximately 170 cubic yards of soil onsite would be excavated and reused within the project area. Soil and fill material would be weed-free and from a source approved by the NPS (See Best Management Practices section). Rock used in soil absorption systems would be clean, washed gravel or crushed stone and graded or sized in accordance with applicable state and federal regulations. Soil used in soil absorption systems is required to have a soil texture of sand or loamy sand. The top six inches of the mound system is required to have a finer texture for the establishment of vegetation cover. The slope of the site is required not exceed two percent.

After the construction of the community septic drain field, the soils would be stabilized with mulch along with seeding or planting of native grasses. Some small shrubs with shallow roots systems would be allowed to become reestablished within the septic drain field area, which would also improve soil stability within the site. Trenching during construction would excavate soils within an approximate 12,197 square foot area (.28 acres), but, following construction, this area would be backfilled with excavated soil and then the surface would be reseeded and/or planted with grasses currently present in the project area to stabilize the soils. Overall, the impact to soils in the short-term would be moderate and adverse but for the long-term adverse impacts of soil function and values would be minor.

Cumulative Effects

Past actions, such as the construction of the housing area and buildings and structures associated with the water tank, had adverse impacts on the soils near the project area. Continued routine repairs and rehabilitation to the aging septic system would collectively have local adverse impacts to soils. Future projects, such as the construction of a new housing complex, that would reduce the overall developed footprint within the already disturbed housing area, and the removal of the water tank along with its associated facilities would overall have beneficial affects to the restoration of the these areas and reduce long-term adverse impacts to soils. Because Alternative B results in long-term adverse disturbance to soil in relation to project related activities, it would only incrementally add to the overall adverse cumulative effect when included with other past, present, and reasonably foreseeable future actions within the project area but overall impacts would be less than significant.

Vegetation

Affected Environment

The NPS 2006 *Management Policies* (NPS 2006) and other NPS and Cape Hatteras National Seashore policies, provides general direction for the protection of vegetation. NPS policy states each park unit is to protect and maintain the natural abundance and diversity of all naturally occurring vegetation within plant communities. The Seashore maintains a vegetation database that outlines all the vegetative communities present within the Seashore. In addition, the North Carolina National Heritage Program identifies natural areas that have special importance for the preservation of the natural biodiversity of North Carolina. Cape Hatteras National Seashore has a registry agreement with the State of North Carolina as a mutual understanding between the NPS and North Carolina Department of Environment and Natural Resources to protect outstanding examples of the natural diversity occurring in North Carolina and to preserve unique and unusual natural features (NCDENR 2014).

The vast majority of the project area is within the developed housing area where vegetation is established. Most vegetation is comprised of some native and non-native species growing in compacted dirt. The community septic drain field is proposed to be located on dune ridges just on the edge of the Buxton Woods Natural Heritage Area. This ridge is forested and represents relict sand dunes from previous shorelines of Cape Hatteras. The majority of the vegetation within the project area is a Maritime Evergreen Forest, which is a pine-hardwood forest community. Vegetation is dominated by the combination of live oak (*Quercus virginiana*), sand live oak (*Q. hemishaerica*), loblolly pine (*Pinus taeda*), and coastal red cedar (*Juniperus virginiana* var. *siliciola*). Red bay (*Persea palustris*), ironwood (*Carpinus caroliniana*), yaupon holly (*Illex vomitoria*), wax murtle (*Morella cerifera* spp) and yucca (*Yucca gloriosa*) are present within the understory. Woody vines of poison ivy (*Toxicodendron radicans*), catbriers (*Smilax* spp), and Virginia creeper (*Parthenocissus quinquefolia*) also are present throughout. Common herbaceous species found within the project area are a variety of witchgrasses (*Dichanthelium boscii* and *D. commutatum*), longleaf spikegrass (*Chasmanthium sessiliflorum*), Florida sedge (*Carex floridana*), flaccid nutsedge (*Scleria flaccida*), partridgeberry (*Mitchella repens*), and hispid bedstraw (*Galium hispidulum*). Turf grass such as a hybrid Bermuda grass is also present.

Impacts of Alternative A—No Action

Under Alternative A, there would be no action and no measureable impacts on vegetation within the project area. Vegetation would continue to exist in its present state until repairs and rehabilitation activities would require short-term adverse and negligible impacts to vegetation when areas need to be dug up to replace deteriorated components of the septic system. After these minor repairs, these areas would be reseeded or allowed to revegetate on their own depending on the scale of repair.

Cumulative Effects

Past actions such as the construction of the housing area and buildings and structures associated with the water tank had adverse impacts on the vegetation near the project area. Continued routine repairs and rehabilitation to the aging septic system would have local adverse impacts to vegetation. Future projects, such as the construction of a new housing complex, that would reduce the overall developed footprint

within the already disturbed housing area, and the removal of the water tank along with its associated facilities would overall have beneficial affects to the restoration of the these areas and reduce long-term adverse impacts to vegetation. Because Alternative A results in little or no disturbance to vegetation in relation to project related activities, it would not incrementally add to the overall adverse cumulative effect when included with other past, present, and reasonably foreseeable future actions within the project area.

Impacts of Alternative B— (NPS Preferred)

Under Alternative B, a permanent loss of 15,246 square feet (.35 acres) of vegetation would result from the installation of a new community septic drain field. Preparation of the site for the new septic drain field is expected to result in long-term removal of all woody vegetation and temporary disturbance of herbaceous vegetation. After the construction of the community septic drain field, the site would be revegetated with native grasses. Some small shrubs with shallow roots systems may be allowed to become reestablished within drain field area. Two large live oaks (*Quercus virginiana*) within the project area were excluded from removal. These live oaks are at least 100 years old and their removal would slightly increase the long-term adverse impact to vegetation within the project area. Leaving them in place would allow this well established vegetation to remain within the project area to create a visual buffer between housing units and the community septic drain field and would help reduce the adverse effects of vegetation clearing. These trees would be protected from removal during construction activities by fencing.

Trenching during construction also would disturb an approximate 12,197 square foot area (.28 acres). Following construction, this area would be revegetated by seeding and/or planting it with grasses currently present in the project area.

Any transplant and revegetation efforts would be coordinated through the Seashore's Resource Management program to echo the existing, native landscape (see Best Management Practices section). Any exotic or non-native vegetation located in the project area throughout revegetation efforts would be removed, thereby reducing competition with native plants and preventing the establishment of additional exotic vegetation.

Cumulative Effects

Past actions such as the construction of the housing area and buildings and structures associated with the water tank have had adverse impacts on the vegetation near the project area. The removal of .63 acres of woody vegetation would exacerbate already adverse impacts to vegetation within the project area. Future projects, such as the construction of a new housing complex, that would reduce the overall developed footprint within the already disturbed housing area, and the removal of the water tank along with its associated facilities would overall have beneficial affects to the restoration of the these areas and reduce long-term adverse impacts to vegetation. Due to this decrease in the development footprint the majority of the area would be revegetated and restored with native vegetation therefore creating a long-term benefit to reducing adverse impacts vegetation removal within the project site. Because Alternative B results in long-term adverse disturbance to vegetation in relation to project related activities, it would only incrementally add to the overall adverse cumulative effect when included with other past, present,

and reasonably foreseeable future actions within the project area but overall impacts would be less than significant.

Wildlife and Wildlife Habitat

Affected Environment

NPS policy is to protect the natural abundance and diversity of all naturally occurring communities. The 2006 NPS *Management Policies* and other NPS and Cape Hatteras National Seashore policies provide general direction for the protection of wildlife and wildlife habitat. The project area includes one vegetation community (Maritime Evergreen Forest) that is characteristic of this barrier island system in North Carolina and does support typical native wildlife species.

Various falcons (e.g., *Falco peregrines*, *Falco sparverius*), songbirds (families *Hirundinidae*, *Emberizidae*, *Fringillidae*, *Icteridae*, *Laniidae*, *Corvidae*) are frequently observed at the site. Cedar waxwings (*Bombycilla cedrorum*), Carolina wrens (*Thryothorus ludovicianus*), warblers (family *Parulidae*), eastern meadowlarks (*Sturnella magna*), thrushes (family *Turdidae*), and northern cardinals (*Cardinalis cardinalis*) have been known to occur within the Maritime Evergreen Forest habitat. Various butterflies, including monarchs (*Danaus plexippus*), swallowtails (family *Papilionidae*), sulfurs (family *Pieridae*), and dragonflies are also frequently observed. Mammals observed near the site include coyotes (*Canis latrans*), Eastern grey squirrels (*Sciurus carolinensis*), raccoon (*Procyon lotor*), opossum (*Didelphis marsupialis*), eastern cottontail rabbits (*Sylvilagus floridanus*), various mice (*Peromyscus* spp.), and white-tailed deer (*Odocoileus virginianus*).

Impacts of Alternative A—No Action

Under Alternative A, there would be no action and no measurable impacts to wildlife or wildlife habitats. Wildlife would continue to exist within the project area. Repairs and rehabilitation activities would cause short-term adverse and negligible impact to wildlife from mechanized sounds associated with project activities. Some wildlife may leave the area temporarily during project activities but would return upon completion of the projects. No permanent habitat alteration would occur.

Cumulative Effects

Past actions such as the construction of the housing area and buildings and structures associated with the water tank had adverse impacts on the wildlife and wildlife habitat near the project area. Continued routine repairs and rehabilitation of the aging septic system would continue to have local short-term adverse impacts to wildlife. Future projects, such as the construction of a new housing complex, that would reduce the overall developed footprint within the already disturbed housing area, and the removal of the water tank along with its associated facilities would overall have beneficial affects to the restoration of the these areas and reduce long-term adverse impacts to wildlife and their habitat. Because Alternative A results in little or no disturbance to wildlife and wildlife habitat in relation to project related activities, it would not incrementally add to the overall adverse cumulative effect when included with other past, present, and reasonably foreseeable future actions within the project area.

Impacts of Alternative B— (NPS Preferred)

Under Alternative B, habitat alteration and displacement of wildlife species that are commonly encountered within the Seashore would result from the proposed action. Construction related activities and noise might cause wildlife to completely avoid the project area for the 90-180 days the project is expected to take. Construction activities include vegetation clearing and digging and construction vehicle access to the site and ground disturbance. Project activities would be limited to the daylight hours. Wildlife and wildlife habitat within the vicinity would be disturbed temporarily and permanently. As previously mentioned in the vegetation and soil section above, there would be 15,246 square feet (.35 acres) of habitat alteration from the construction of the new community septic drain field. However, the Maritime forest habitat is common throughout the adjacent Buxton Woods Natural Heritage Area, which includes approximately 2,583 acres of protected habitat, and project activities would not cause a significant loss of wildlife habitat (NCDENR 2014). Wildlife utilizing the area are acclimated to some level of vehicle and employee use and would be temporarily or permanently displaced to the nearby Buxton Woods during and after project activities. Since wildlife disturbance is associated with site preparation activities, adverse impacts are expected to be temporary and minor to wildlife and wildlife habitat in the vicinity. During the evening hours, wildlife could potentially return to the project area.

Larger wildlife may benefit in the long-term from the removal of vegetation found in the project area since this would create a small fragmented habitat that may benefit them by improving forage.

Cumulative Effects

Past actions, such as the construction of the housing area and buildings and structures associated with the water tank, had adverse impacts on the wildlife and wildlife habitat near the project area. Continued routine repairs and rehabilitation to the aging septic system would continue to have local short-term adverse impacts to wildlife. Future projects, such as the construction of a new housing complex, that would reduce the overall developed footprint within the already disturbed housing area, and the removal of the water tank along with its associated facilities would overall have beneficial affects to the restoration of the these areas and reduce long-term adverse impacts to wildlife and wildlife habitat. Because Alternative B results in short-term adverse impacts from disturbance to wildlife and wildlife habitat in relation to project related activities, it would only incrementally add to the overall adverse cumulative effect when included with other past, present, and reasonably foreseeable future actions within the project area.

CHAPTER 4: CONSULTATION AND COORDINATION

List of Agencies and Persons Contacted

Name	Title, Agency
Renee Glehill-Earley	Environmental Review Coordinator, North Carolina Department of Natural and Cultural Resources/State Historic Preservation Office
John Hammond	Biologist, US Fish and Wildlife Service
Michael Schafale	Biologist, North Carolina Department of Natural and Cultural Resources, Natural Heritage Program
Steven Wright	Regional Environmental Reviewer, NPS Southeast Regional Office, Planning and Compliance Division
Beth Byrd	Regional Section 106 Coordinator, NPS Southeast Regional Office,
Timothy Pinion	Wildlife Biologist/Endangered Species Coordinator, NPS Southeast Regional Office
David Hallac	Superintendent, Cape Hatteras National Seashore
Mark Dowdle	Deputy Superintendent/Acting Chief of Resource Management, Cape Hatteras National Seashore
John Kowlok	Chief Of Facility Management, Cape Hatteras National Seashore
William Pendleton	Engineer/COR, Cape Hatteras National Seashore
Shelly Rollinson	Maintenance Mechanic Supervisor, Cape Hatteras National Seashore
William Thompson	Lead Biological Science Technician, Cape Hatteras National Seashore
Jami Lanier	Cultural Program Manager, Cape Hatteras National Seashore
Sabrina Henry	Environmental Protection Specialist, Cape Hatteras National Seashore

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