4.3 WATER QUALITY

4.3.1 Methods and Impact Definitions

Impacts to the water quality of waterways and groundwater basins within the study area that could potentially be affected by stormwater runoff, erosion, or other methods of contaminant contribution were evaluated using literature review, GIS, loading estimates for Total Suspended Solids (TSS) and nutrients, and best professional judgment. Potential impacts of water quality constituents of concern (e.g., dissolved oxygen, nutrients, total suspended solids, bacteria, salinity, various metals, PAHs, and pesticides) were evaluated as part of the analysis. Average annual pollutant loads for TSS and nutrients (TN and TP) were estimated for the Project site, as outlined in the 60 percent design plans footprint (Figure 4.3-1), and the River Center project site using a GIS-based Pollutant Loading Model that utilizes existing and proposed land use, soils, BMPs, and contributing basin delineations (PBS&J 2010). GIS-based Pollutant Loading Model (Model) calculations for the Project site were based on the 60 percent design plans provided by the Applicant and did not include credit for any treatment of off-site infrastructure improvements (e.g., roadway improvements and modifications). Percent reduction calculations were based on the total basin area contributing to each site. Results were assessed in the context of the DO TMDL revision for the Charleston Harbor, Cooper River, Ashley River, and Wando River (SCDHEC 2013a). Potential interactions of new stormwater infrastructure (e.g., stormwater detention ponds) with contaminated soil or groundwater associated with existing contamination sites (e.g., nearby Superfund Site at the Macalloy property) were evaluated using GIS.

The impact evaluation considers both construction and operation activities associated with the Alternative 1 (Proposed Project) and alternatives. Impacts to water quality were characterized as negligible, minor, or major as defined in Table 4.3-1.

Table 4.3-1
Impact Definitions, Water Quality

Negligible	Minor	Major
Undetectable changes to surface water quality; undetectable change to groundwater recharge or quality.	Changes in surface water quality that do not exceed water quality standards. TMDL load reductions are not compromised. Changes in groundwater recharge and quality that require permitting, treatment, and proper disposal of dewatering effluent to prevent migration of contaminated groundwater into uncontaminated areas.	Changes in surface water quality that exceed regulatory standards. TMDL load reductions are compromised and adverse impacts are long-term. Changes in groundwater recharge that require additional, extensive permitting and federal/state oversight, or changes in water quality that exceed regulatory standards for groundwater and contaminated wells and/or municipal water supplies.

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The impact evaluation considers both construction and operation activities associated with the Alternative 1 (Proposed Project) and alternatives. Impacts to water quality were characterized as negligible, minor, or major as defined in Table 4.3-1.

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4.3.2 No-Action Alternative

4.3.2.1 Surface Waters

For the purposes of this EIS, the Corps assumes that the Project site and River Center project site would continue to include mixed use (residential and commercial) and industrial land uses, such as rail-served warehousing distribution. The current land uses on these sites are heavy industrial district, light industrial district, and planned development; therefore, there are no large-scale changes to land use anticipated; however, an increase in impervious surface, pollutant loading, or the likelihood for accidental spills could result in potential impacts to surface waters of Shipyard Creek, Noisette Creek, and the Lower Cooper River. Water quality constituents of concern would include DO, salinity, TSS, turbidity, nutrients, bacteria, heavy metals, and other toxic contaminants (VOCs, SVOCs, chlorinated pesticides/PCBs, PAHs, and dioxins). The fate of these pollutants is affected by currents, tides, and flow patterns. For example, pollutants entering surface waters downstream of the site may be transported upstream during incoming tides. Potential impacts to water quality would be evaluated with respect to the status of the current TMDL for DO (SCDHEC 2013a).

Dissolved Oxygen

Dissolved Oxygen (DO) concentrations in surface waters could be affected by the No-Action Alternative due to changes in: (1) circulation patterns that can impact re-aeration of the water column and residence time of biodegradable organic compounds, measured as biochemical oxygen demand (BOD), in the river and creeks; (2) pollutant loading that can increase the BOD, resulting in decreased DO; and (3) salinity, which can result in changes in the DO saturation level (oxygen solubility decreases as salinity increases). Under the No-Action Alternative, impacts to DO concentrations in surface waters are unlikely. Furthermore, stormwater facilities and other infrastructure would be required by federal, state, and local authorities for any new development on the site (see Section 8, Regulatory Environment Overview). Additionally, given that any new development on the site would discharge into the Cooper River, all design requirements would need to be in compliance with the TMDL for DO established for the Charleston Harbor, Cooper River, Ashley River, and Wando River (SCDHEC 2013a; City of North Charleston 2008b). Depending on the size of the project, the associated permitting process would go through the City of North Charleston (City of North Charleston 2008b) or the state (SCDHEC 2011). According to the City of North Charleston's Permitting Standards and Procedures Manual (2008b), compliance would require the installation and implementation of measures (structural or non-structural BMPs) that are expected to adequately reduce pollutant loads to levels required by the TMDL (currently expressed as percent reductions) or to prevent further impairment. If the site is greater than 25 acres, a quantitative and qualitative analysis would be performed as part of the stormwater application and would include, at a minimum, calculations that show:

- A site's pollutant load for all pollutants of concern;

- The trapping effectiveness of the chosen BMPs; and/or
- Runoff discharged through the last water quality BMP has a water quality level equal to or better than the in-stream standard, or as required by an applicable TMDL.

As a result, negligible (no) additional adverse impacts to DO would be anticipated under the No-Action Alternative; minor beneficial increases in runoff quality contributing to surface waters due to implementation of current stormwater BMP requirements would be possible.

Salinity

There would be no expected changes to existing salinity gradients under the No-Action Alternative.

Total Suspended Solids and Turbidity

Suspended sediments levels in surface waters may increase temporarily due to stormwater runoff from disturbed lands during upland construction activities and during construction in or adjacent to Shipyard Creek or Noisette Creek. Upland construction activities could potentially involve the disturbance and transport of large quantities of earth, resulting in a short-term increase in TSS and turbidity from stormwater runoff; however, all activities would be performed in compliance with state and local stormwater regulations. Construction within Shipyard or Noisette Creek may disturb the respective creek bottoms and banks, resulting in short-term increases in TSS and turbidity. Implementation of surface water monitoring and the use of appropriate temporary stormwater management/erosion and dust control BMPs (e.g., temporary silt fences and turbidity curtains, sprinkling/irrigation) would help control turbidity during construction and protect surface waters. As a result, impacts to surface waters resulting from stormwater runoff during construction would be negligible and localized.

Long-term changes in pollutant loading from stormwater runoff caused by an alteration of land topography, decreased soil permeability and vegetative cover, and increased impervious surface also may lead to increased TSS and turbidity levels in Shipyard and Noisette creeks and the Lower Cooper River. These impacts would be compounded by the already slightly increasing trend in TSS in Shipyard Creek; data are not available to determine potential trends in TSS in Noisette Creek (see Section 3.3.2.4). Although these types of land use changes would be expected to cause an increase in stormwater runoff suspended sediment concentrations, on-site stormwater management would be in compliance with current state and local stormwater regulations. In addition, adverse impacts would be reduced because the NPDES stormwater permitting process requires a SWPPP and Stormwater Master Plan. As stormwater treatment does not currently exist on the sites, the addition of stormwater management practices would result in a beneficial impact through minor to moderate reductions in suspended sediment concentrations in Shipyard Creek, Noisette Creek, and the Lower Cooper River.

Nutrients

Sources of nutrients in surface waters primarily include wastewater and fertilizers. Pollutant loading from stormwater runoff resulting from land use changes associated with the No-Action Alternative may lead to increased nutrient levels in surface waters of Shipyard Creek, Noisette Creek, and the Lower Cooper River. Potential increases in nutrient concentrations would be compounded by an already existing increasing trend in TP at Station MD-045 in the Lower Cooper River; data are not available to determine potential trends in nutrients in Noisette Creek (see Section 3.3.2.4). Despite the potential for increased nutrient concentrations in stormwater runoff, on-site stormwater management would be in compliance with state and local stormwater regulations and the site's SWPPP and Stormwater Master Plan. As there is currently no stormwater treatment provided on the Project site (Figure 4.3-1), based on available aerials, the addition of stormwater management practices and the implementation of the local TMDL for DO (SCDHEC 2013a) would be expected to result in a beneficial impact through minor to moderate reductions in nutrient concentrations in Shipyard Creek, Noisette Creek, and the Lower Cooper River.

Bacteria

Typical sources of bacteria and pathogens in surface waters include wastewater infrastructure, wildlife, and stormwater. Bacteria and pathogens primarily contribute to stormwater through illicit connections from wastewater infrastructure, poorly functioning septic systems, runoff from specific land uses (e.g., agricultural areas, dog parks), and animal wastes. The No-Action Alternative would not likely include any components or activities that would increase bacteria or pathogen levels above current concentrations. As a result, future activities under the No-Action Alternative should have a negligible effect regarding bacteria in the surface waters of Shipyard Creek, Noisette Creek, and the Lower Cooper River.

Heavy Metals and Other Toxic Contaminants

The No-Action Alternative may result in an increase in the number of trucks and locomotives operating on roads and railways throughout the study area. Oils and grease generated from leaks, heavy metals from vehicle exhaust, worn tires and engine parts, brake pads, or rust—as well as fertilizers, pesticides, and herbicides used alongside roads and railways—would contribute to stormwater runoff pollution (Wilkomirski et al. 2011, Nixon and Saphores 2007). The contribution of additional heavy metals would be compounded by already elevated levels of copper in Shipyard Creek; data are not available to determine potential trends in heavy metals in Noisette Creek (see Section 3.3.2.4). In addition, any potential construction activities within Noisette or Shipyard Creeks could result in the release of sequestered contaminants from sediments (see Section 3.3.3). Implementation of on-site stormwater management practices would be in compliance with state and local stormwater regulations and the site's SWPPP and Stormwater Master Plan. As there is no stormwater treatment currently on the Project site (Figure 4.3-1), the addition of these stormwater

management practices may result in a beneficial impact through minor reductions in concentrations of heavy metals and other toxic contaminants being contributed to Shipyard Creek, Noisette Creek, and the Lower Cooper River. In addition to stormwater management practices, special precautions, as discussed in Section 4.15 (Hazardous Waste and Materials), are also required when excavating or dewatering during construction projects in areas that have Land Use Controls (LUCs) and are part of the Voluntary Cleanup Contract (VCC) between Palmetto Railways and SCDHEC. Although there is potential for both minor adverse and major adverse impacts, compliance with permitting requirements and use of BMPs and spill prevention programs would minimize the potential for adverse impacts.

4.3.2.2 Accidental Spills

Development under the No-Action Alternative may require the use and maintenance of additional fueling facilities and storage of hazardous materials resulting in the potential for accidental spills. These facilities would be operated and maintained (and the chemicals used) in compliance with federal, state, and local regulations, including stormwater regulations and the associated SWPPP and Stormwater Master Plan, thus resulting in minimal to negligible adverse impacts. If more than 1,320 gallons of oil is stored for on-site use, a detailed plan designed to minimize impacts resulting from accidental spills would be provided in a Spill Prevention, Control, and Countermeasures (SPCC) Plan, which would be maintained on-site (40 C.F.R. Part 112.1). As a result of these measures, impacts to surface waters from accidental spills would be minor and localized. Impacts associated with the use and storage of fuel and hazardous materials are addressed in more detail in Section 4.15 – Hazardous, Toxic, and Radioactive Waste.

It is reasonable to assume that if there is additional truck and rail traffic associated with the No-Action Alternative, there may be an increased potential for accidental pollutant spills involving petroleum products or hazardous materials that could impact surface water quality. As a result, additional truck and rail traffic could result in the potential for minor and/or major (depending on location) direct impacts to surface water quality from accidental pollutant spills. However, there are BMPs, mandated requirements, and regulations that cover spills (Section 4.15.3.2); therefore, impacts to surface waters from accidental spills would be minor and localized.

4.3.2.3 Stormwater Runoff

Upland construction activities, as well as construction adjacent to Shipyard or Noisette creeks, could involve the disturbance and transport of large quantities of earth, resulting in a short-term increase in stormwater runoff (TSS and turbidity); however, all activities would be performed in compliance with state and local stormwater regulations. Temporary sediment basins and other temporary stormwater management/erosion control BMPs would be implemented to control runoff and protect surface waters during future construction activities. As a result, short-term impacts to water quality from stormwater runoff during construction would be negligible.

Increased impervious surface and other watershed alterations (e.g., decreased soil permeability and vegetative cover) that may result from the No-Action Alternative would increase runoff quantity and associated non-point source (nps) pollutant concentrations. For example, some of the existing permeable areas may be replaced with impermeable surfaces, resulting in increased stormwater runoff. Stormwater on the sites is currently transported primarily through a series of underground storm sewers that outfall into Shipyard Creek and the Lower Cooper River. Based on available aerials, there is currently no treatment of stormwater runoff on the existing sites within the Project site footprint (Figure 4.3-1) before being discharged through outfalls into Shipyard Creek or the Lower Cooper River. Although there could be an increase in impervious surface, there would also be the addition of stormwater management structures to detain and treat runoff, potentially improving water quality on the site.

A potential increase in vehicular or rail traffic and operating equipment associated with the No-Action Alternative may result in the contribution of various pollutants to stormwater runoff. Common pollutants associated with motor vehicles include used oils, grease, and heavy metals. Van Metre et al. (2000) showed that vehicles are a significant source of PAHs in waterbodies due to tire wear, engine oil leaks, and exhaust, while heavy metals such as zinc and copper are significant pollutants on roadways due to tire and brake wear, respectively (Adachi and Tainosho 2004), contributing to stormwater runoff loads. Similarly, PAHs and heavy metals are the two most important types of pollutants associated with railway transport (Wilkomirski et al. 2011). In addition to those pollutants that originate from the vehicles and locomotives themselves, nutrients, suspended solids, and organics that attach to the outer surfaces or undercarriage also contribute to stormwater runoff from roadway and railway surfaces during rain events. Stormwater management for runoff generated from additional roadways or railways would be in compliance with state and local stormwater regulations and the site's SWPPP and Stormwater Master Plan. As a result, impacts to water quality would be negligible.

4.3.2.4 Sediments

Potential construction activities within or adjacent to Shipyard and Noisette creeks may disturb the aquatic sediments in the respective waterways. Appropriate BMPs would be employed by Palmetto Railways and/or other developers to control the disturbance of sediments and any resulting erosion and sedimentation. Available sediment quality data from the turning basin of Shipyard Creek (Station RO00056; Figure 3.3-2) indicate elevated levels of arsenic, copper, chromium, and eight PAHs in 2000, and moderate levels of contamination (Station NOR09056; Figure 3.3-2) in 2009 (SCECAP 2014); no sediment quality data are available for Noisette Creek (see Section 3.3.3). Because contaminated sediments also are potentially present in areas farther upstream in Shipyard Creek, as well as in Noisette Creek, appropriate management actions may be required to control the potential release of pollutants into the water column during construction. Impacts to water quality would likely be short-term, localized, and minor.

A potential increase in vehicular or rail traffic and operating equipment associated with the No-Action Alternative may result in the contribution of various pollutants to sediments via stormwater runoff (see Section 4.3.2.3). As stormwater management for runoff generated from additional roadways or railways would be in compliance with state and local stormwater regulations and the site's SWPPP and Stormwater Master Plan, impacts to sediment quality would be negligible.

4.3.2.5 Groundwater Resources

The No-Action Alternative would result in a negligible impact with regard to groundwater recharge. Although there would be an increase in the impervious areas at the sites (Section 4.2 – Hydrology)—thereby reducing local infiltration and surficial aquifer recharge—there are no active groundwater wells utilizing the underlying aquifers for public potable water use within or near the sites. In addition, additional demands on groundwater resources would not likely occur under the No-Action Alternative. The two wells that are located within the Project site, CHN-2 and CHN-476, are indicated for industrial use and currently unused, respectively (SCDNR 2007). Both wells are at depths exceeding 300 feet. Surficial aquifers are shallow (typically less than 50 feet [USGS 2016]) and vulnerable to contamination associated with anthropogenic activities. As these wells are located outside of the surficial aquifer, protection is provided by the Cooper Formation, which functions as an effective confining unit, inhibiting downward movement of groundwater (Park 1985).

Groundwater resources could be impacted by fertilizers, pesticides, and spills or leaks at or near the land surface that can move quickly to the water table, especially in areas where sandy soils offer little opportunity for filtration or degradation of pollutants. Impacts resulting from accidental spills would be minimized through the use of a SPCC Plan. As a result, impacts to groundwater from accidental spills would be minor and localized. Excavation and use of stormwater infrastructure or ponds in areas that have LUCs and are part of the VCC would require permitting, treatment, and proper disposal of the dewatering effluent to prevent migration of contaminated groundwater into uncontaminated areas. Avoidance and minimization measures would help to keep impacts to a minimum; however, there would be the potential for both minor adverse and major adverse impacts. Potential groundwater contamination issues are addressed in more detail in Section 4.15 – Hazardous, Toxic, and Radioactive Waste.

4.3.3 Alternative 1: Proposed Project (South via Milford / North via Hospital District)

Construction and operation activities associated with the Navy Base ICTF under Alternative 1 (Proposed Project) would have the potential to impact water quality in Shipyard Creek, Noisette Creek, and the Cooper River. For Alternative 1 (Proposed Project), five dry detention ponds (A, B, C, D1, and D2) and two sediment forebays associated with pond A, along with a treatment swale and associated underdrains (hereafter the Stormwater Management System) would be used for on-site pollutant and sediment removal.

These proposed BMPs by Palmetto Railways were considered to provide treatment levels in compliance with local (City of North Charleston Standards and Procedures Manual 2008a) and state regulations (SCDHEC 2012c).

Stormwater treatment for off-site infrastructure (e.g., roadway improvement and modifications) will include:

- new inlets with permanent inlet filters;
- manufactured treatment devices (MTD) for major outlets where stormwater leaves the ROW with mildly sloped grassed shoulders and grass-lined ditches along roadways (e.g., segments of North Hobson Avenue, all of the relocated Bainbridge Avenue, portions of the drayage road that are not on ridge structures) to filter sheet flow for suspended pollutants before draining to the outfall; and
- enhanced riprap structures in three of the grass-lined ditches to create detention and allow for further pollutant removal and water quality treatment before draining to the outlet.

4.3.3.1 Surface Waters

Alternative 1 (Proposed Project) would result in impacts to surface waters of Shipyard Creek, Noisette Creek, and the Lower Cooper River that are similar to the No-Action Alternative, with a few exceptions. Potential impacts to water quality are discussed in the following subsections and are evaluated with respect to the status of the current TMDL for DO (SCDHEC 2013a).

Dissolved Oxygen

Palmetto Railways has committed to designing culverts and/or bridges to maintain existing surface drainage patterns and to prevent erosion, limit the placement of pilings for bridges within waterways (where possible), and to design culverts (e.g., under the arrival/departure tracks) and bridges to maintain existing flow and hydrology for wetland areas and to prevent flooding upstream. The addition of a new bridge over Shipyard Creek for the drayage road would be pile supported and not result in a hydrologic constriction that could adversely impact flow patterns in Shipyard Creek. The construction of arrival/departure tracks crossing tidal marsh habitat upstream of Shipyard Creek, however, may slightly reduce localized tidal flushing, resulting in the potential for negligible changes in the range of BOD and salinity levels of Shipyard Creek.

Pollutant loading, which can increase the BOD and result in decreased DO, may increase locally due to rail traffic crossing of respective sections of Noisette Creek. Short-term effects may be experienced upstream through the transport of pollutants during incoming tides. In addition, pollutant loading, including increased nutrient concentrations from stormwater runoff resulting from land use changes, is a possibility; however, the incorporation of the Stormwater Management System would provide pretreatment of stormwater runoff before it discharges to the primary water quantity and quality control. The Stormwater Management System would result in a reduction of TN, TP, and TSS as

compared to existing and future without-Project conditions. As with the No-Action Alternative, all design requirements would need to be in compliance with the TMDL for DO established for the Charleston Harbor, Cooper River, Ashley River, and Wando River (SCDHEC 2013a; City of North Charleston 2008b) and state regulations (SCDHEC 2012c). As a result, Alternative 1 (Proposed Project) is expected to cause negligible decreases in DO conditions throughout the study area, and minor direct beneficial increases in runoff quality contributing to surface waters due to implementation of current stormwater BMP requirements and the construction of the Stormwater Management System.

Salinity

Construction of the bridges associated with the drayage road over Shipyard Creek, as well as new arrival/departure tracks across the creek's associated tidal salt marsh, would not result in channel impacts that would significantly change circulation patterns. As a result, potential changes to existing salinity gradients within Shipyard Creek under Alternative 1 (Proposed Project) would be negligible.

Total Suspended Solids and Turbidity

As with the No-Action Alternative, TSS and turbidity levels in Shipyard and Noisette creeks may increase temporarily due to the deposition of dredge or fill material during construction and stormwater runoff from disturbed lands during upland construction activities under Alternative 1 (Proposed Project). Similarly, temporary increases in TSS and turbidity are expected due to the disturbance of the bottoms and banks of Shipyard and Noisette creeks during construction of the drayage road over Shipyard Creek and rehabilitation of the existing railroad bridge over Noisette Creek. Palmetto Railways' implementation of construction sequencing BMPs would include installation of a silt fence along the perimeter of the site, as well as the stabilization of construction entrances prior to commencing construction operations. Previously installed BMPs would be maintained and incorporated into subsequent construction phases. During grading operations and stormwater construction, inlet filters and inlet/outlet rip-rap would be installed as work progresses. Silt fencing would be used during the lifespan of all construction activities. Temporary and permanent seeding would also be used during the stabilization phase. Implementation of any required surface water monitoring and the use of the above appropriate temporary stormwater management/erosion control BMPs would reduce impacts, resulting in negligible to minor, direct short-term localized impacts to surface waters during construction.

Long-term impacts to TSS and turbidity levels in Shipyard Creek and the Lower Cooper River under Alternative 1 (Proposed Project) would be similar to those under the No-Action Alternative. An increase in impervious features may cause higher flows, which in turn may result in increased river bank erosion and elevated TSS and turbidity; however, per stormwater permit requirements, connection of the proposed stormwater management system to the existing or natural system would result in no net increase in the rate of discharge or associated riverbank erosion and TSS or turbidity

levels. The Model (PBS&J 2010) implemented specifically for this Project site indicates that the use of the Stormwater Management System, designed in compliance with state regulations (SCDHEC 2011, SCDHEC 2012c) would result in a 57 percent reduction in TSS at the Project site compared to existing conditions. In addition, potential adverse impacts would be reduced through use of a SWPPP and Stormwater Master Plan. As stormwater treatment does not currently exist on the Project site, the addition of the Stormwater Management System would result in a direct beneficial impact through minor reductions in suspended sediment concentrations in Shipyard Creek and the Lower Cooper River.

Nutrients

Impacts to nutrient concentrations in Shipyard Creek, Noisette Creek, and the Lower Cooper River as a result of Alternative 1 (Proposed Project) would be similar to those under the No-Action Alternative. The Model (PBS&J 2010) implemented for this site shows that the Stormwater Management System would reduce overall TN and TP concentrations from both treated and untreated areas within the Project site by approximately 28 and 36 percent, respectively, compared to existing conditions; as there is currently no stormwater treatment provided on the Project site (Figure 4.3-1), based on available aerials. The addition of these stormwater management practices and the implementation of the local TMDL for DO (SCDHEC 2013a) would result in a direct beneficial impact through minor reductions in nutrient concentrations in Shipyard Creek and the Lower Cooper River.

Bacteria

Typical sources of bacteria and pathogens in surface waters include wastewater infrastructure, wildlife, and stormwater. Bacteria and pathogens primarily contribute to stormwater through illicit discharges from wastewater infrastructure, poorly functioning septic systems, runoff from specific land uses (e.g., agricultural areas, dog parks), and animal wastes. Alternative 1 (Proposed Project) would likely not include any components or activities that would increase bacteria or pathogen levels above current concentrations. As a result, impacts to bacteria concentrations in Shipyard Creek, Noisette Creek, and the Lower Cooper River under Alternative 1 (Proposed Project) would be similar to those under the No-Action Alternative. In addition, the five dry detention ponds surrounding the Project site would be designed to remove between 20 and 50 percent of the bacteria and pathogens from stormwater entering the ponds before discharging to surface waters (SCDHEC 2005a). As a result, there would be a negligible effect of bacteria in the surface waters of Shipyard Creek and the Lower Cooper River.

Heavy Metals and Other Toxic Contaminants

Impacts to heavy metals and other toxic contaminants in Shipyard Creek, Noisette Creek, and the Lower Cooper River under Alternative 1 (Proposed Project) would be similar to those under the No-

Action Alternative. In addition, release of sequestered contaminants from sediments may occur during construction of the drayage road over Shipyard Creek and from rehabilitation of the existing railroad bridge over Noisette Creek. According to pollutant removal estimates for standard BMPs, the vegetated swale that would be used to treat runoff from the track and ballast sections of the Proposed Project would be designed to remove 40 to 50 percent of metals (SCDHEC 2005b) prior to discharge to the Lower Cooper River. Flow from the McMillan Avenue Bridge would be directed to nearby dry detention ponds; runoff from all other off-site infrastructure improvements (e.g., roadway improvement and modifications) would not contribute to the Stormwater Management System. Stormwater treatment for off-site infrastructure (e.g., roadway improvement and modifications) would include permanent inlet filters, MTDs, grassed shoulders and grass-lined ditches, and enhanced riprap structures as described in Section 4.3.3. Deck runoff from the drayage road bridges would be discharged via scuppers, with the exception of sections located over open waters, where runoff would be carried along the bridge length through a closed system to drainage inlets located outside of open water limits. The five proposed stormwater treatment ponds would each be designed to remove an average of 41 percent of the heavy metal pollutants (SCDHEC 2005b) entering the pond prior to discharge to the surface waters of the Lower Cooper River. Additionally, an oil/water separator would be employed at the locomotive shop, and light duty repairs in the vicinity of the "repair in place" tracks would include proper spill protection (e.g., spill kit, collector pans) to ensure treatment of oily waste from on-terminal equipment maintenance activities. Assuming the separator is part of the Stormwater Management System prior to discharge, it would be included in the Individual Section 402 NPDES permit for the facility. Adverse impacts also would be minimized through the actions identified in the mandatory SWPPP and Stormwater Master Plan. As there is no stormwater treatment currently on the Project site (Figure 4.3-1), only minor increases in the concentrations of heavy metals and other toxic contaminants contributed to Shipyard Creek and the Lower Cooper River would occur under Alternative 1 (Proposed Project), resulting in a negligible to minor direct adverse impact.

Construction in areas involving contaminated soils would require testing and proper disposal of the soils if regulatory thresholds are exceeded. This would minimize any resulting transport of contaminants to surface waters during rainfall events. In addition, runoff would be directed to on-site stormwater management facilities for treatment, in compliance with state and local stormwater regulations, before discharging to surface waters. Clean fill would be used on the Project site, which would then predominantly be capped with pavement to mitigate the spread of existing contaminants during operation activities.

4.3.3.2 Accidental Spills

Impacts to surface waters from accidental spills associated with the use and maintenance of fueling facilities and storage of hazardous materials under Alternative 1 (Proposed Project) are expected to

be similar to those under the No-Action Alternative; impacts to surface waters from accidental spills would be minor and localized.

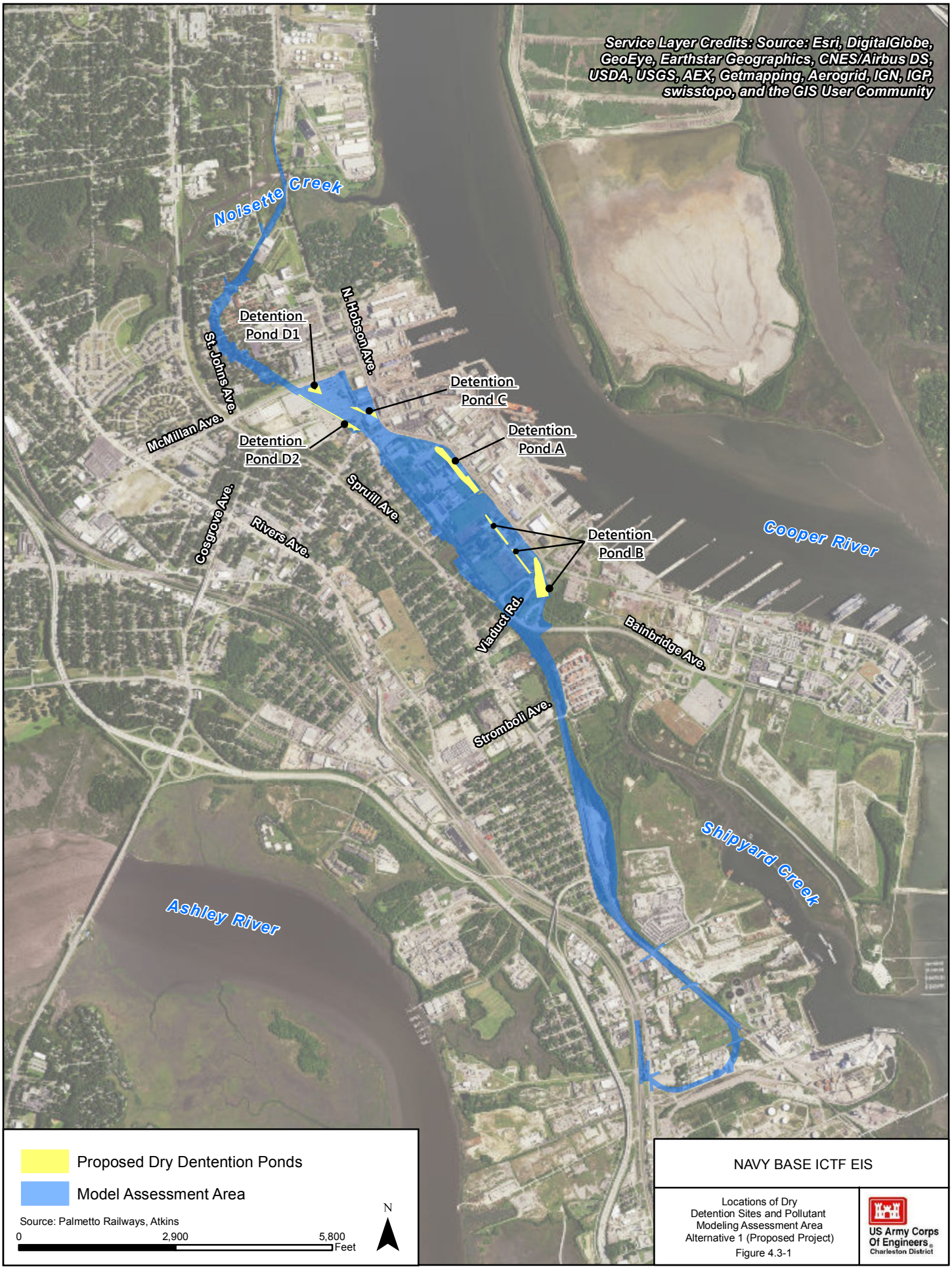
4.3.3.3 Stormwater Runoff

Impacts from stormwater runoff during construction of Alternative 1 (Proposed Project) would be similar to those under the No-Action Alternative. The addition of impervious surface and other watershed alterations, which can decrease soil permeability and vegetative cover, would increase runoff quantity and associated nps pollutant concentrations. Although there would be an increase in impervious surface, Alternative 1 (Proposed Project) includes the addition of five stormwater treatment ponds (A, B, C, D1, and D2) as part of a Stormwater Management System to detain and treat runoff, thereby improving water quality on the site. Two sediment forebays would also be included in the Stormwater Management System to provide pretreatment of stormwater runoff before it discharges to pond A. A sediment forebay is a settling basin constructed at the incoming discharge points of a stormwater BMP. The purpose of a sediment forebay is to allow sediment to settle from the incoming stormwater runoff before it is delivered to the balance of the BMP. A sediment forebay helps to isolate the sediment deposition in an accessible area, which facilitates BMP maintenance efforts.

Increased vehicular and rail traffic and operating equipment associated with Alternative 1 (Proposed Project) would also contribute various pollutants to stormwater runoff, as described under the No-Action Alternative.

Stormwater Management at the Proposed Project

Under Alternative 1 (Proposed Project), stormwater from the proposed facility would be collected by a network of pipes and inlets and routed into the five dry detention ponds (A, B, C, D1, and D2) located at the topographical low points of the site and in close proximity to the existing outfalls; two sediment forebays would provide pretreatment of stormwater runoff before it discharges to pond A. Ponds A and B would be constructed along the east side of the facility, while Ponds D1, D2, and C would be constructed in the northern portion of the ICTF (Figure 4.3-1). Ponds would be sized to temporarily store the run-off volume to reduce the post-development peak flow to pre-development conditions and meet water quality requirements. Currently, according to available aerials, there is no treatment on the Project site (Figure 4.3-1); post-construction stormwater management facility treatment would exceed pre-development treatment levels. Load reduction estimates for the pond treatment were assumed consistent with state regulations (SCDHEC 2011, SCDHEC 2012c). The stormwater runoff would be temporarily detained as per state standards and released through outfall structures, each including a small orifice at the bottom pond elevation to sufficiently drain the dry detention pond. The treated water would then discharge into the existing box culvert that outfalls into the Lower Cooper River at the east end of Supply Street. Based on a review of historic


Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Noisette Creek
Detention Pond D1
N. Hobson Ave.
St. Johns Ave.
Detention Pond C
McMillan Ave.
Detention Pond D2
Detention Pond A
Spruill Ave.
Cosgrove Ave.
Rivers Ave.
Detention Pond B
Cooper River
Viaduct Rd.
Bainbridge Ave.
Stromboli Ave.
Shipyard Creek
Ashley River
Proposed Dry Dentention Ponds
Model Assessment Area
Source: Palmetto Railways, Atkins
0
2,900
5,800
Feet
N
NAVY BASE ICTF EIS
Locations of Dry Detention Sites and Pollutant Modeling Assessment Area Alternative 1 (Proposed Project)
Figure 4.3-1
US Army Corps Of Engineers
Charleston District

groundwater elevations by Palmetto Railways, analysis determined that the proposed elevations for the dry detention ponds allow for sufficient elevations difference between groundwater and pond bottom. As a result, the ponds would not be lined (personal communication, Matthew Gehman, TranSystems, February 22, 2016).

At a minimum, each pond would be designed to store and release the first 1 inch of runoff from the Project site over a minimum period of 24 hours. As per City of North Charleston standards (2008b), the minimum designed sediment removal efficiency for each pond would be 80 percent suspended solids. The design storm event would be the 10-year, 24-hour design event. An emergency spillway would be included in the design to pass the 100-year storm event and to protect the area from damage during overtopping.

Stormwater management for runoff generated from the on-site roadways and railways would be provided by the Stormwater Management System. Water from tracks and ballast sections of the Project would filter through the ballast and be conveyed via sheet flow before being collected and transported to a vegetated swale on the west side of the Project site. Water in the swale would be collected at grated drop inlets and fed into a pipe that outlets into a junction box at the mouth of the culvert for discharge into the Lower Cooper River. Roadway runoff, including that from the McMillan Avenue Bridge, would primarily be directed to the five dry detention ponds and two sediment forebays associated with pond A; runoff from all other off-site roadway improvements would not contribute to the Stormwater Management System. Stormwater treatment for off-site infrastructure (e.g., roadway improvement and modifications) would include permanent inlet filters, MTDs, grassed shoulders and grass-lined ditches, and enhanced riprap structures as described in Section 4.3.3. Deck runoff from the drayage road bridges would be discharged via scuppers, with the exception of sections located over open waters, where runoff would be carried along the bridge length through a closed system to drainage inlets located outside of open water limits.

Palmetto Railways has committed to ensuring that all drainage infrastructure—including forebays, ponds, outlet control structures, and storm sewers—would be constructed as part of Phase I construction. Sediment basins would be used during construction with temporary diversion ditches to divert runoff to the sediment basins. Silt fencing and other appropriate erosion control BMPs also would be used where needed.

Pollutant Removal Efficiencies

The five (A, B, C, D1, and D2) dry detention ponds would serve to temporarily detain stormwater runoff from the facility and most associated roadways during and immediately following a storm event. Pollutants would be removed within the basins primarily through sedimentation during dewatering of the pond following the storm event, thereby reducing the amount of pollutants entering receiving waters. Pond A would include two upstream forebays to provide pretreatment for pollutant removal. Pre-treatment serves to decrease incoming velocities and allows for the capture

of coarser sediments, trash, and debris (SCDHEC 2005b). The vegetative/treatment swale would remove pollutants through filtration of particulate pollutants and infiltration of dissolved constituents. There is a range of removal efficiencies for dry detention for typical pollutants associated with stormwater; as the pollutant removal capability of vegetated filter strips (i.e., grass filters, grass filter strips, buffer strips, vegetated buffer zones, riparian vegetated buffer strips, constructed filter strips) depends upon the filter length (SCDHEC 2005b). Although removal efficiencies are not available for PAHs, it is anticipated that, because PAHs are often sediment-bound (Perrin 2012), some of these pollutants would be removed by the detention ponds and vegetative swales. Further pollution loading of stormwater would be reduced through the utilization of additional BMPs, such as wet detention. Per permit conditions, the changes in surface water quality would maintain in compliance with state water quality standards and impacts would be negligible.

Results of the Model (PBS&J 2010) for calculating overall TN, TP, and TSS loads from both treated and untreated areas within the Project site demonstrate that loads would be reduced by approximately 28, 36, and 57 percent, respectively, compared with the existing condition.

4.3.3.4 Sediments

The development of the drayage road under Alternative 1 (Proposed Project) would require bridge construction over Shipyard Creek and associated tidal marsh. Alternative 1 (Proposed Project) would also include rehabilitation of the existing rail bridge over Noisette Creek. Construction of pile supports for the proposed bridges in Shipyard Creek and rehabilitation of the existing rail bridge over Noisette Creek may disturb the aquatic sediments in the respective waterways. As described under the No-Action Alternative, appropriate BMPs would be employed to control the disturbance of sediments and any resulting erosion and sedimentation. Since contaminated sediments are currently present in the turning basin of Shipyard Creek and also are potentially present in areas farther upstream in Shipyard Creek and in Noisette Creek, appropriate BMPs (e.g., floating semi-permeable turbidity curtain) may be required to control the potential release of pollutants into the water column during construction. The Applicant will employ those BMPs, if necessary. Adverse impacts would be similar to those under the No-Action Alternative with the use of BMPs.

4.3.3.5 Groundwater Resources

Impacts to groundwater recharge and quality under Alternative 1 (Proposed Project) would be similar to those under the No-Action Alternative; however, multiple areas with groundwater monitoring would be impacted as well as more potentially contaminated sites. In addition, contaminated groundwater may be encountered in areas of deeper excavations (e.g., the 5 dry detention ponds, roadway and rail pilings) which would require permitting, treatment, and proper disposal of dewatering effluent as described in Section 4.15 (Hazardous, Toxic, and Radioactive Waste). With the use of avoidance and minimization measures, adverse direct and indirect impacts would be minor.

4.3.4 Alternative 2: Proposed Project Site (South via Milford / North via S-line)

Under Alternative 2, construction and operation of the Navy Base ICTF would alter the surface water, stormwater runoff, sediments, and groundwater resources in the study area and vicinity, resulting in a range of potential impacts on water-related resources that are similar to those described for Alternative 1 (Proposed Project). The construction of a new rail bridge over Noisette Creek under Alternative 2 may result in additional short-term negligible to minor direct impacts to TSS and turbidity as well as minor indirect impacts from heavy metals and other toxic contaminants due to the release of sequestered contaminants from sediments.

4.3.5 Alternative 3: Proposed Project Site (South via Kingsworth / North via Hospital)

Under Alternative 3, construction and operation of the Navy Base ICTF would alter the surface water, stormwater runoff, and sediments in the study area and vicinity, resulting in a range of potential impacts on water-related resources that are similar to those described for Alternative 1 (Proposed Project). Impacts to groundwater quality would be similar to the No-Action Alternative (see Section 4.15 – Hazardous, Toxic, and Radioactive Waste).

4.3.6 Alternative 4: Proposed Project Site (South via Milford)

Under Alternative 4, construction and operation of the Navy Base ICTF would alter the surface water, stormwater runoff, sediments, and groundwater resources in the study area and vicinity, resulting in a range of potential impacts on water-related resources that are similar to those described for Alternative 1 (Proposed Project); however, since the existing rail bridge over Noisette Creek would not be rehabilitated for this alternative, direct and indirect impacts to surface waters of Noisette Creek would be negligible to minor, and limited to those associated with a short-term increase in stormwater runoff from disturbed lands during upland construction activities.

4.3.7 Alternative 5: River Center Project Site (South via Milford / North via Hospital District)

4.3.7.1 Surface Waters

Under Alternative 5, construction and operation activities at the River Center project site would result in impacts to surface waters of Shipyard Creek, Noisette Creek, and the Lower Cooper River that are similar to the No-Action Alternative and Alternative 1 (Proposed Project), with a few exceptions. As with Alternative 1 (Proposed Project), stormwater treatment does not currently exist on the River Center project site. The addition of stormwater management practices under Alternative 5 would be similar to those under Alternative 1 (Proposed Project), including the use of pre-treatment and five dry detention ponds located at the topographical low points of the River Center

project site and in close proximity to the existing outfalls (Figure 4.3-2), along with a treatment swale and associated underdrains. In addition, like the Project site, the River Center project site would discharge either directly or indirectly into the Cooper River. As such, all design requirements would need to be in compliance with the TMDL for DO established for the Charleston Harbor, Cooper River, Ashley River, and Wando River (SCDHEC 2013a; City of North Charleston 2008b) and state regulations (SCDHEC 2012c). Potential impacts to water quality are discussed in the following sub-sections and are evaluated with respect to the status of the current TMDL for DO (SCDHEC 2013a).

Dissolved Oxygen, Salinity, and Bacteria

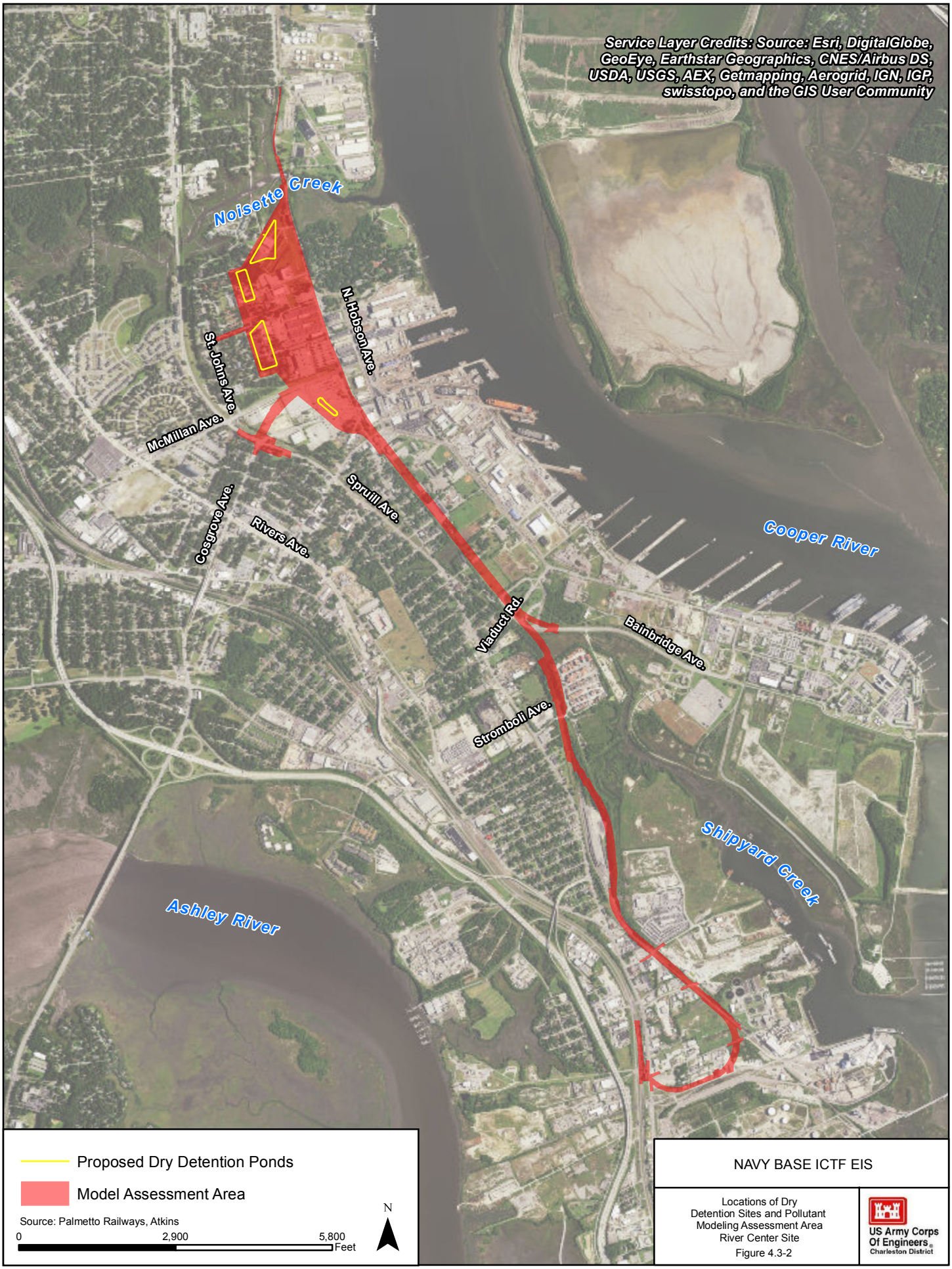
Construction and operation of the River Center ICTF at the River Center project site under Alternative 5 would not introduce any new elements that would appreciably change circulation patterns of, or pollutant loading to, surface waters as compared to Alternative 1 (Proposed Project). As a result, associated impacts to DO and salinity concentrations as well as bacteria in surface waters would be the same as those under Alternative 1 (Proposed Project).

Total Suspended Solids and Turbidity

Impacts to TSS and turbidity in Noisette and Shipyard creeks for the River Center project site under Alternative 5 would be similar to those under Alternative 1 (Proposed Project).

The Model (PBS&J 2010) implemented for the River Center project site indicates that the use of BMPs similar to those proposed for Alternative 1 (Proposed Project) during operation would result in a 76 percent reduction in TSS. Percent reduction levels at the River Center project site would be slightly higher than those at the Project site and the resulting discharge would have lower levels of TSS than the existing condition.

The increased distance of the drayage road and number of yard trucks required for the River Center project site would lead to increased quantities of stormwater runoff from the roadway and associated TSS and turbidity levels from off-site improvement areas, as compared to Alternative 1 (Proposed Project). Although these changes would cause a rise in stormwater runoff suspended sediment concentrations, the roadway runoff would be directed to on-site stormwater management facilities for treatment, in compliance with state and local stormwater regulations, before discharging to surface waters.


Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Noisette Creek
N. Hobson Ave.
St. Johns Ave.
McMillan Ave.
Spruill Ave.
Cosgrove Ave.
Rivers Ave.
Cooper River
Viaduct Rd.
Bainbridge Ave.
Stromboli Ave.
Shipyard Creek
Ashley River
Proposed Dry Detention Ponds
Model Assessment Area
Source: Palmetto Railways, Atkins
0
2,900
5,800
Feet
N
NAVY BASE ICTF EIS
Locations of Dry Detention Sites and Pollutant Modeling Assessment Area River Center Site
Figure 4.3-2
US Army Corps Of Engineers
Charleston District

Nutrients

Under Alternative 5, the River Center ICTF would generate approximately the same runoff nutrient load as that generated under Alternative 1 (Proposed Project). According to the Model (PBS&J 2010) implemented for the River Center project site, the use of BMPs on this site would reduce TN and TP concentrations by approximately 44 and 52 percent, respectively (see Section 4.3.4.3). Percent reduction levels at the River Center project site would be slightly higher than those at the Project site for both TN and TP. As with Alternative 1 (Proposed Project), a beneficial impact to water quality through minor reductions in nutrient concentrations in local surface waters would occur.

The drayage road required for the River Center project site under Alternative 5 would be approximately twice as long as that for Alternative 1 (Proposed Project). This increased length would generate greater stormwater runoff nutrient pollution loading to Shipyard Creek and the Lower Cooper River than Alternative 1 (Proposed Project); however, as with Alternative 1 (Proposed Project), appropriate stormwater measures would be implemented, resulting in minimal adverse impacts to surface water quality.

Heavy Metals and Other Toxic Contaminants

Impacts to heavy metals and other toxic contaminants in Noisette Creek for the River Center project site under Alternative 5 would be the same as those for Alternative 1 (Proposed Project). The River Center project site would involve a larger number of trucks operating along a longer drayage road. As a result, levels of oils, grease, and other toxic contaminants generated through vehicle operation—as well as fertilizers, pesticides, and herbicides used along the drayage road—would increase stormwater runoff pollution (Wilkomirski et al. 2011, Nixon and Saphores 2007). As a result, impacts to heavy metals and other toxic contaminants in Shipyard Creek and the Lower Cooper River would likely be higher than those under Alternative 1 (Proposed Project).

The use of pretreatment and stormwater treatment ponds similar to those described for Alternative 1 (Proposed Project), and other actions identified in the mandatory SWPPP, would minimize surface water impacts. As a result, impacts to water quality from concentrations of heavy metals and other toxic contaminants in surface waters for the River Center project site under Alternative 5 would be similar to those for Alternative 1 (Proposed Project).

4.3.7.2 Accidental Spills

The risk of accidental spills and associated impacts under Alternative 5 would be similar to those under the No-Action Alternative.

4.3.7.3 Stormwater Runoff

Construction of a longer drayage road under Alternative 5 would involve the disturbance and transport of larger quantities of earth and sediments, resulting in a temporary increase in stormwater runoff TSS and turbidity and suspended sediments; however, as with Alternative 1 (Proposed Project), all activities would be performed in compliance with state and local stormwater regulations. Temporary sediment basins and other temporary stormwater management/erosion control BMPs would be implemented to control runoff and protect surface waters during construction. As a result, impacts to water quality from stormwater runoff during construction should be similar to those under Alternative 1 (Proposed Project).

Increased impervious surface and vehicular traffic associated with the longer drayage road from the River Center project site would generate greater runoff quantity, suspended sediment runoff pollution, and associated nps pollutant concentrations (e.g., used oils, grease, and heavy metals) contributing to surface waters than Alternative 1 (Proposed Project). Stormwater along the drayage road would be conveyed to on-site detention basins for treatment prior to discharge to surface waters. As a result, impacts to water quality associated with stormwater runoff for the River Center project site under Alternative 5 would be similar to those under Alternative 1 (Proposed Project).

Results of the Model (PBS&J 2010) for calculating TN, TP, and TSS loads at the River Center project site demonstrate load reductions for the basin of approximately 44, 52, and 76 percent for TN, TP, and TSS, respectively. As a result, a beneficial impact to water quality would occur.

4.3.7.4 Sediments

Impacts to sediments in Noisette and Shipyard Creeks for the River Center project site under Alternative 5 would be the same as those under Alternative 1 (Proposed Project).

4.3.7.5 Groundwater Resources

Impacts to groundwater capacity and quality for the River Center project site under Alternative 5 would be similar to those under Alternative 1 (Proposed Project), but with fewer areas with existing groundwater contamination and monitoring wells (see Section 4.15.3, HTRW).

4.3.8 Alternative 6: River Center Project Site (South via Kingsworth / North via Hospital District)

Under Alternative 6, construction and operation of the River Center ICTF would alter the surface water, stormwater runoff, sediments, and groundwater resources in the study area and vicinity, resulting in a range of potential impacts on water-related resources that are similar to those described for Alternative 5.

4.3.9 Alternative 7: River Center Project Site (South via Milford)

Under Alternative 7, construction and operation of the River Center ICTF would alter the surface water, stormwater runoff, and sediments in the study area and vicinity, resulting in a range of potential impacts on water-related resources that are similar to those described for Alternative 4. Impacts to Shipyard Creek and the Lower Cooper River associated with the increased distance of the drayage road and number of yard trucks required for the River Center project site would be similar to those under Alternative 5. Impacts to groundwater resources as a result of the River Center ICTF under Alternative 7 would also be similar to those under Alternative 5.

4.3.10 Related Activities

New track would be constructed on a section of unimproved CSX ROW to accept intermodal trains at the proposed new at-grade crossing at Meeting Street under Alternatives 1, 2, 4, 5, and 7 and would result in negligible impacts to surface water, stormwater runoff, sediments, and groundwater resources in the study area and vicinity. Similarly, construction associated with Related Activities under Alternatives 3 and 6 would also result in negligible impacts to these resources.

The addition of a Related Activity involving reactivation of an out-of-service ROW and construction of a new railroad trestle bridge across a portion of marsh, which drains to Noisette Creek, under Alternative 2 would result in additional impacts to Noisette Creek surface waters. Temporary increases in TSS and turbidity are expected due to disturbance of the bottoms and banks of Noisette Creek during construction of the new railroad bridge. Release of sequestered contaminants from sediments in the Noisette Creek marsh may also occur during construction of the new railroad bridge. Since contaminated sediments are potentially present in Noisette Creek, appropriate BMPs may be required to control the potential release of pollutants into the water column during construction. Negligible decreases in DO conditions are also expected due to additional pollutant loading from increased rail traffic crossing Noisette Creek. Use of appropriate temporary stormwater management/erosion control BMPs by the North Charleston Terminal Company (NCTC) would result in negligible to minor, direct and indirect, short-term localized impacts to surface waters of Noisette Creek during construction.

The addition of a new railroad bridge would increase impervious surface resulting in increased stormwater runoff and associated nps pollutant concentrations into Noisette Creek; however, implementation of on-site stormwater management practices would be in compliance with state and local stormwater regulations, the SWPPP, and Stormwater Master Plan, resulting in negligible to minor direct adverse impacts.

The addition of a new railroad trestle bridge across the Noisette Creek marsh as a Related Activity under Alternative 2 would also impact sediments. Construction of pile supports for the bridge may disturb aquatic sediments in Noisette Creek. Appropriate BMPs would likely be employed by the

North Charleston Terminal Company (NCTC) to control the disturbance of sediments and any resulting erosion and sedimentation. Direct adverse impacts are expected to be localized and minor.

Impacts to groundwater recharge and quality as a result of the Related Activities under Alternative 2 would be negligible.

4.3.11 Summary of Impacts Table

Table 4.3-3 summarizes the environmental consequences to water quality from Alternative 1 (Proposed Project) and all the alternatives.

Table 4.3-2
Summary of Impacts, Water Quality

Alternative	Surface Water Quality Impacts	Stormwater Runoff Impacts	Sediment Quality Impacts	Groundwater Resources Impacts
No-Action	Negligible effect in vicinity of the project, downstream, and throughout tidal segments of on-site creeks from potential changes in runoff, watershed alterations, and increased vehicular and rail traffic. Possible beneficial effect on DO, TSS, and concentrations of nutrients, heavy metals and other toxic contaminants in downstream waters. Minor and/or major direct impacts from accidental spills.	Negligible effect on water quality from stormwater runoff with implementation of current stormwater management practices. Possible beneficial effect on DO, TSS, and concentrations of nutrients, heavy metals and other toxic contaminants in downstream waters.	Minor short-term effect during construction activities from disturbance of sediments and associated release of pollutants into the water column.	Negligible effect on groundwater recharge. Minor direct impact on groundwater quality from accidental spills. Minor effect on groundwater quality due to excavation and use of stormwater infrastructure and ponds in vicinity of contaminated groundwater.

Alternative	Surface Water Quality Impacts	Stormwater Runoff Impacts	Sediment Quality Impacts	Groundwater Resources Impacts
1: Proposed Project: South via Milford / North via Hospital District	Similar to the No-Action Alternative, with few exceptions. Negligible to minor short-term effect on TSS, turbidity and concentrations of heavy metals and other toxic contaminants due to disturbance of sediments in Shipyard Creek (during new bridge construction) and Noisette Creek (during bridge rehabilitation).	Similar to the No-Action Alternative. Beneficial effect on DO, TSS, and concentrations of nutrients, heavy metals and other toxic contaminants in downstream waters compared to the existing condition.	Similar to the No-Action Alternative	Similar to the No-Action Alternative. Multiple areas with groundwater monitoring that would be impacted and more potentially contaminated sites.
2: South via Milford / North via S-line	Similar to Alternative 1 (Proposed Project). Impacts to surface waters may be slightly increased as a new bridge would be constructed over Noisette Creek.	Similar to Alternative 1 (Proposed Project)	Similar to the Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)
3: South via Kingsworth / North via Hospital	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to the No-Action Alternative
4: South via Milford	Similar to Alternative 1 (Proposed Project). Impacts to surface waters of Noisette Creek would be negligible to minor and limited to those associated with a short-term increase in stormwater runoff from disturbed lands during upland construction activities.	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)	Similar to Alternative 1 (Proposed Project)

Alternative	Surface Water Quality Impacts	Stormwater Runoff Impacts	Sediment Quality Impacts	Groundwater Resources Impacts
5: River Center Project Site: South via Milford / North via Hospital District	Similar to the No-Action Alternative, with few exceptions. Negligible to minor short-term effect on TSS, turbidity, and concentrations of heavy metals and other toxic contaminants due to disturbance of sediments in Shipyard Creek (during new bridge construction) and Noisette Creek (during bridge rehabilitation).	Similar to the No-Action Alternative with beneficial effect on DO, TSS, and concentrations of nutrients, heavy metals and other toxic contaminants in downstream waters.	Similar to the No-Action Alternative	Similar to the No-Action Alternative.
6: River Center Project Site: South via Kingsworth / North via Hospital	Similar to Alternative 5	Similar to Alternative 5	Similar to Alternative 5	Similar to Alternative 5 but with 12 fewer potentially contaminated sites impacted.
7: River Center Project Site: South via – Milford	Similar to Alternative 5. Impacts to surface waters of Noisette Creek would be negligible to minor and limited to those associated with a short-term increase in stormwater runoff from disturbed lands during upland construction activities.	Similar to Alternative 5	Similar to Alternative 5	Similar to Alternative 5

Water Quality Impact Definitions

Negligible = Undetectable changes to surface water quality; undetectable change to groundwater recharge or quality.

Minor = Changes in surface water quality that do not exceed water quality standards. TMDL load reductions are not compromised. Changes in groundwater recharge and quality that require permitting, treatment, and proper disposal of dewatering effluent to prevent migration of contaminated groundwater into uncontaminated areas.

Major = Changes in surface water quality that exceed regulatory standards. TMDL load reductions are compromised and adverse impacts are long-term. Changes in groundwater recharge that require additional, extensive permitting and federal/state oversight, or changes in water quality that exceed regulatory standards for groundwater and contaminated wells and/or municipal water supplies.

4.3.12 Mitigation

4.3.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are taken from Palmetto Railways Mitigation Plan provided in Appendix N. Some of these measures are required under federal, state, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Comply with requirements of the Individual Section 402 NPDES permit, including applicable groundwater and surface monitoring. (Minimization)
- Employ the use of oil-water separator at the locomotive shop and proper spill protection (e.g., spill kit, collector pans) for light duty repairs in the vicinity of the "repair in place" tracks to ensure treatment of any oily waste from on-terminal equipment maintenance activities. (Minimization)
- Implement a SWPPP and Stormwater Master Plan as required by the Individual Section 402 NPDES permit. (Minimization)
- Inclusion of forebay in stormwater management system to provide pretreatment of stormwater runoff before it discharges to Pond A. (Minimization)
- Construct five stormwater detention ponds located at the topographical low points of the site and in close proximity to the existing outfalls to contain and manage stormwater runoff. (Minimization)
- Implement sediment and erosion control measures to mitigate sediment and sediment-associated pollutant loading from disturbed areas. (Minimization)
- Cap much of the Project site with pavement to mitigate spread of existing contaminants. (Minimization)
- Implement dust control measures for roads and construction areas. (Minimization)
- Use clean fill material. (Minimization)
- Design for the facility includes approximately 83,375 linear feet of new pipe or underdrain and five dry detention ponds (A, B. C, D1, and D2), including one forebay, totaling approximately 1,527,000 CF. (Minimization)
- A SWPPP and Best Management Practices (BMPs) will be implemented to manage stormwater on-site during construction of the intermodal facility. (Avoidance and Minimization)

These avoidance and minimization measures, except the items noted with an asterisk (*), have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures related to water quality is also provided in Chapter 6.

4.3.12.2 Additional Potential Mitigation Measures

No additional mitigation measures are proposed for Water Quality by the Corps. Additional avoidance, minimization, and mitigation may be considered by the Corps in its decision-making process. Final mitigation measures may be adopted as conditions of the DA permit and documented in the Record of Decision (ROD).

4.4 VEGETATION AND WILDLIFE

This section describes the potential impacts of Alternative 1 (Proposed Project) and all the alternatives on terrestrial vegetation and wildlife resources in the Vegetation and Wildlife study area. Impacts on terrestrial vegetation include clearing and removal of natural and previously disturbed land cover types and direct and indirect impacts on wildlife and/or their habitat during construction and operation of the Navy Base ICTF.

4.4.1 Methods and Impact Definitions

Impacts to vegetation and wildlife were evaluated through GIS analyses of land cover types and species richness that were verified during the field surveys. The impact evaluation considers both construction and operation activities for the Navy Base ICTF within the Vegetation and Wildlife study area, and evaluates potential impacts related to habitat loss; alteration, and/or fragmentation; displacement and/or mortality of wildlife species; and the introduction of invasive, noxious weeds, and non-native species. The type and severity of impacts on terrestrial resources depend on the characteristics of the disturbance (type, timing, and duration), where the disturbance occurs (the habitat type present and existing site characteristics), the species present, their sensitivity, habituation, and resilience to disturbance (Table 4.4-1).

Anticipated changes in the existing conditions for terrestrial resources in the Vegetation and Wildlife study area under each alternative were identified and assessed quantitatively for resources for which quantitative data were available, including land cover types, wildlife habitat, and raptor nests. For terrestrial resources where no quantitative data were available, impacts are described qualitatively.