3.5 Hydrology and Water Quality

3.5.1 Existing Conditions

3.5.1.1 Groundwater

Within the state of Colorado, large quantities of groundwater are stored in the four primary aquifers of the Denver Basin, which underlies much of the northeast to north-central region of the county. The amount of available water varies from location to location because of previous use, present rates of pumping activity and the permeability of the subsurface. Much of the water contained in the upper layers and outer boundaries within these formations is considered to be tributary to surface water sources. This water generally is not available except when it is pumped from small exempt wells, or when consumptive use is replaced through an augmentation plan.

Local groundwater supplies most of unincorporated El Paso County. Approximately 25 central systems serve most residents while approximately 25,000 residents utilize individual or small shared wells. These individual wells are located predominantly in the northern half of the county. Availability of groundwater is not fully dependable in large areas of granite or tilted bedrock exposure, which occur in western El Paso County. Failure of septic and leach field systems can also result in pollution of available groundwater (El Paso County 1995).

Throughout El Paso County, alluvial deposits located along stream channels are a significant source of groundwater. In southern areas of the county, the location and thickness of Pierre Shale controls groundwater availability. In these areas, dependable water is often only available at depths ranging from 2,000 to 4,500 feet. Nearly all the water that flows along El Paso County stream channels is owned by downstream water users; only the City of Colorado Springs owns large amounts of surface water (El Paso County 1995).

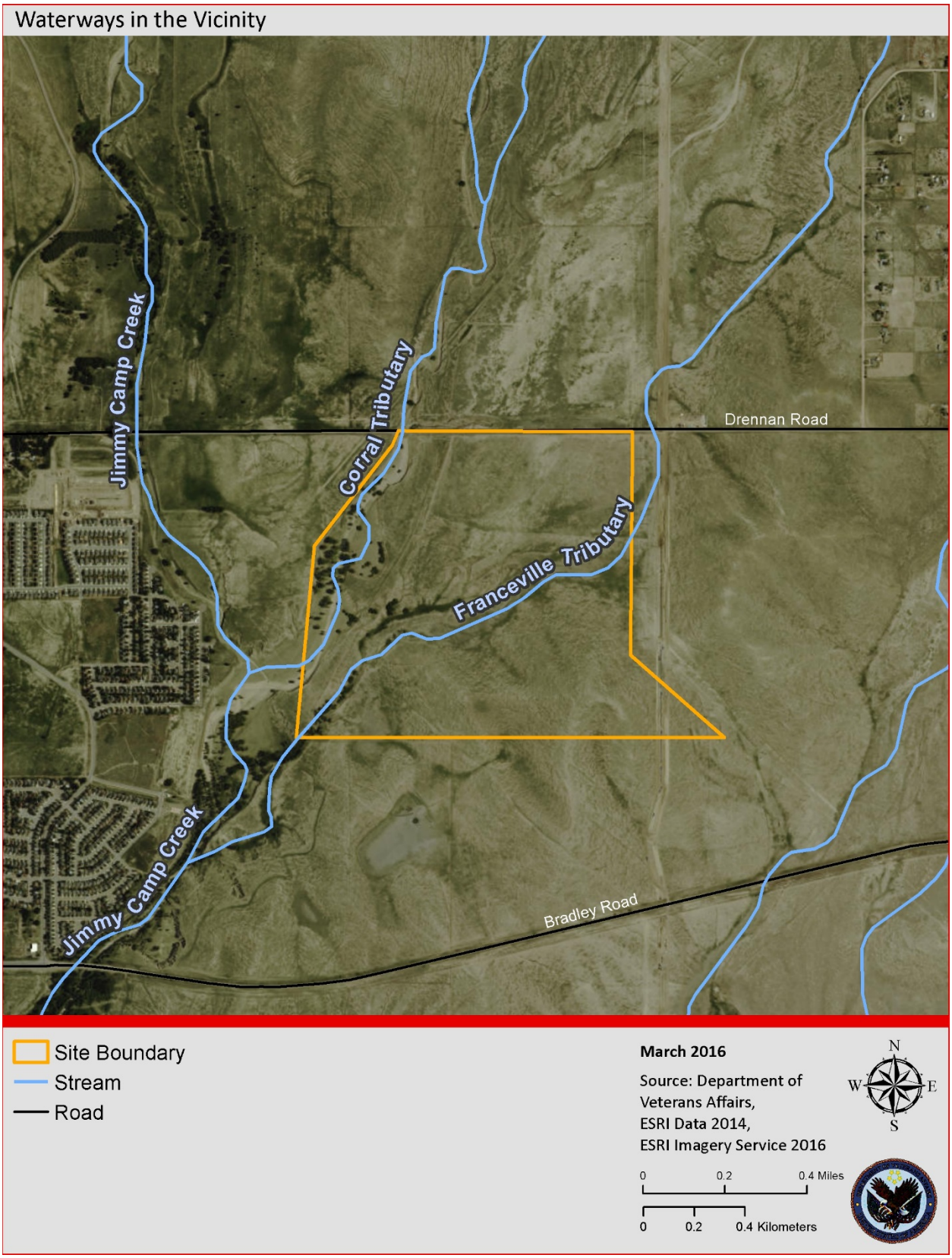
As described in the Final PEA, the proposed site sits above the Pierre Shale and Dakota/Cheyenne sandstone aquifers. The uppermost aquifer is within sands of the sedimentary bedrock of the Pierre shale. The groundwater yield from this formation is typically less than 15 gallons per minute. Where encountered during drilling, groundwater ranged from about 21 to 33 feet below ground surface. These groundwater depths should be considered accurate at the time of drilling only. Groundwater level fluctuations are possible and depend on many factors, including seasonal variations and local precipitation.

The State of Colorado, under Colorado Revised Statutes (C.R.S.) 37-92-101, et seq., regulates the use and allocation of water. The Colorado Department of Natural Resources, Division of Water Resources, is the agency responsible for administering water permits. The El Paso County Health Department monitors the location of wells.

3.5.1.2 Surface Water

The two surface water drainage systems located on the site include the Corral Tributary, an ephemeral arroyo, and the Franceville Tributary, an ephemeral floodway (Figure 3-2). The Corral Tributary begins several miles north of the site, entering at the northwest corner and flowing south until leaving the site. Corral Tributary discharges into Jimmy Camp Creek approximately 1,200 feet southwest of the property. This dry gulch ranges from 50 to 100 feet wide, with eroded banks ranging from 1 to 15 feet high. Mature cottonwoods are scattered along the banks of the gulch across most of the site. The bottomlands are dry, with unconsolidated sand and grass-covered riparian edges.

Figure 3-2. Waterways in the Vicinity of the Proposed Project Site



The Franceville Tributary consists of two arroyos that converge in the southwest portion of the site. These arroyos flow southwest across the central portion of the site and join Jimmy Camp Creek approximately 500 feet downstream of the property. The banks of the Franceville Tributary range from 1 to 15 feet high and 10 to 20 feet wide. Its bottomlands are primarily unconsolidated sands with no indications of standing water or wetlands. There are no other open water bodies, natural or man- made, on the site. The arroyos in the central and western portion of the site, along with a generally flat shortgrass prairie in the northeast portion of the site, are characterized as floodplains and encompass 97.4 acres of the 374.3-acre property.

3.5.1.3 Other Waters

In addition to wetlands, other WOTUS were identified on the site during the Section 404 delineation, including Corral Tributary and two nonvegetated surface waters located in the Franceville Tributary (see Figure 3-2 and Figure 3-3). Corral Tributary exhibits a low-flow channel that meanders within a broader active floodplain. Corral Tributary is characterized by a low slope, with the channel bed and floodplain composed entirely of sand. No water was observed within the channel during the site visit, but evidence of episodic flows were observed in the form of debris deposits and eroding banks.

Both of the open-water features associated with the Franceville Tributary are formed from groundwater that seeps from headcuts, but neither exhibits wetland characteristics (i.e., lacked wetland vegetation). At the time of field investigations, water was approximately two to three feet deep, and measured approximately 0.015 acres and 0.009 acres each at the outside edge of water.

3.5.2 Effects of the Preferred Alternative

The Preferred Alternative would result in minor, short-term adverse impacts on hydrology and water quality. Components of the Preferred Alternative regarding water sources, delivery systems, water quality, and their feasibility have been included in the design of the proposed cemetery and are in compliance with federal and state regulations. No significant changes to hydrology and water quality would be expected from the Preferred Action.

There are no existing water facilities that service the project site. However, the project site overlays and is adjacent to the Jimmy Camp Creek Alluvium, which is used as the source for water for multiple entities. Under the Proposed Action, two wells would be used to provide water sources. One water source would be from an on-site well, and a secondary well would be used as a backup system. The wells would be drilled, operated, and maintained by WWSD. The WWSD has exclusive rights to provide water services at the project site. In addition, the WWSD currently has wells in the area and a water augmentation plan with the State of Colorado. Domestic water service would be provided to the administration/PIC building, the maintenance complex, and the honor guard building. At this time, the water requirements for each building are unknown. Once the building types and sizes are known, the water requirements can be determined. The dual-well system would be sized for capacity to serve the domestic and fire protection water service needs.

The well water in the area is high in manganese; therefore, a treatment system would be required. There are two options that could be employed to treat the water. One option is to connect to an existing water treatment facility; the second option is to build an on-site treatment plant. The Colorado Centre water treatment plant is located less than 1,320 feet (¼ mile) west of the project site and will have excess capacity. The proposed water system at the project site could be permanently connected to this plant to treat the manganese. However, the connection would have

to cross under Jimmy Camp Creek. The WWSD is looking at various options to connect to the Colorado Centre water treatment plant. One option involves routing one of the irrigation water pipelines from the water treatment plant to the irrigation pond; in this case the potable water line could parallel that pipe. Since well water would be used for both irrigation and domestic purposes, the design and installation of treatment system must be coordinated. Conceptually, the manganese treatment system could be sized for the maximum well capacity to meet irrigation needs. Downstream of the manganese treatment, the piping would separate to irrigation and domestic. Any additional treatment required for domestic use could then be sized accordingly.

Since there is no water source at the project site, well water would be used for irrigation and domestic purposes. The wells would have an estimated flow of 120 to 180 gallons per minute, which would not be enough capacity to meet the irrigation peak needs. Therefore, the proposed plan for irrigation in the short-term is to transfer water from the wells to an on-site pond, where it would be stored. Then, a pumping system would pump water at a rate to meet a six- to eight-hour watering window. Because this project has a phased development plan, the project site would be divided into two sections. There would be a north and south section divided by an existing floodway; these sections would each have their own irrigation pond and pumping systems. In the long-term, water from Big Johnson Reservoir would be used for irrigation. Big Johnson Reservoir is located approximately four miles southwest of the project site. Ditch water stored in this reservoir does not have the manganese issues that the well water does, so it is better suited for irrigation.

The State of Colorado, under C.R.S. 37-92-101, et seq., regulates the use and allocation of water. The Colorado Department of Natural Resources, Division of Water Resources, is the agency responsible for administering water permits. The County, through its Health Department, monitors the location of wells. A permit issued by the Colorado State Engineer is required prior to constructing a new well and prior to the repair, replacement, or modification of an existing well (State of Colorado 2005). According to the Colorado Revised Statutes (C.R.S. 37-90-108), after a conditional permit has been received, the applicant has one year to construct the well. Once construction is complete, the applicant must provide information including the depth of the well, the water-bearing formations intercepted by the well, and the maximum sustained pumping rate in gallons per minute.

The design of several drainage channels and ponds within planned areas of the site, would allow for surface water to flow to the drainage basin channel located on the east end of the site, only after appropriate BMPs have been incorporated. Once the overall site design is finalized, roads and the surface area and design would determine which required systems (e.g., underground storm sewer) will best convey the site drainage in order to address the potential for impacts on WOTUS. Through the installation of soil reinforcement BMPs (i.e., grass stabilization, soil reinforced geotextiles) and straw wattles around the downslope of dirt stock piles, implemented erosion control measures would ensure that nearby stream areas would be appropriately addressed. Based on recent WOTUS analysis and BMP project design measures, no long-term adverse impacts to surface water quality would be expected.

3.5.3 Effects of the No Action Alternative

Under the No Action Alternative, no construction by the VA would occur, and no impacts on hydrology or water quality would be expected.

3.5.4 Minimization/Management Measures

To further reduce potential impact on water resources, recommended BMPs to be employed during project construction and operations are provided in Section 5. The following management measures would be undertaken during Phase 1 activities:

- Implement BMPs such as sediment control logs, where needed, to prevent sediment-laden runoff from the project sites from adversely affecting receiving waters.
- Measure the pre-development sediment content of bodies of water adjacent to the work area that will receive drainage from the work area.
- Perform erosion and sediment control according to the source development plan and the Storm Water Pollution Prevention Plan or Erosion Control Plan.
- Comply with the terms and conditions of any permits that are issued for the performance of work within the jurisdictional wetlands and WOTUS.
- Prohibit the operation of equipment or discharge of material within the boundaries of wetlands and the WOTUS, as defined by the federal and state regulatory agencies.
- Construct barriers in work areas and in material sources to prevent sediment, petroleum products, chemicals, and other liquids and solids from entering jurisdictional wetlands or WOTUS.
- Clear ephemeral drainages and intermittent and perennial streams of all work items, debris, or other obstructions placed by, or resulting from, construction operations.
- Locate machinery servicing and refueling areas away from streambeds and washes to reduce the possibility and minimize the impacts of accidental spills or discharges.
- Inspect and maintain construction vehicles in good working order and maintain a spill kit.
- Apply turf establishment to finished slopes and ditches after completion of construction on a portion of the site.
- Explore options to increase reuse of potable water.

Since the Proposed Action would not present any significant adverse effects on geology and soils, specific minimization measures would not be required.

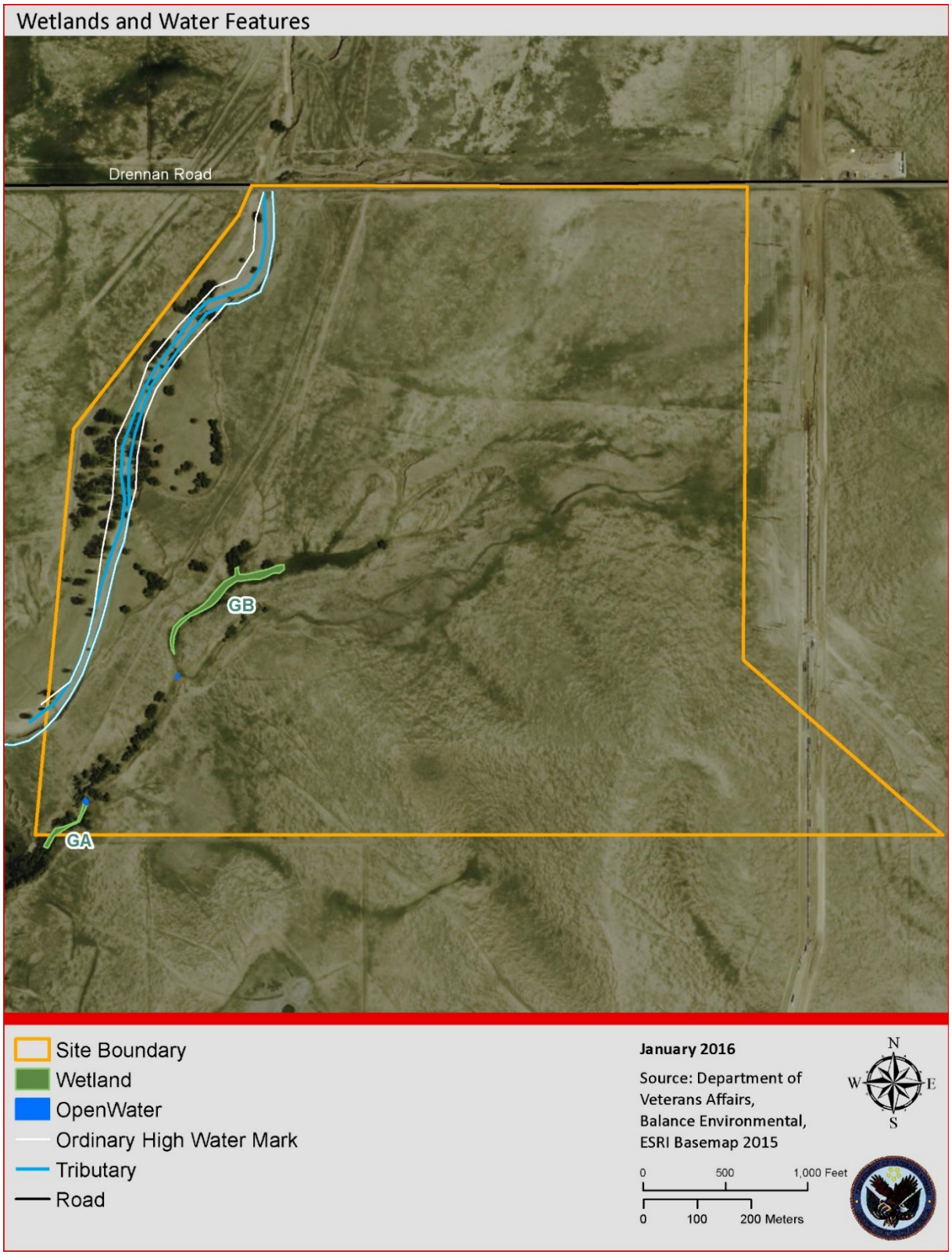
3.6 Floodplains and Wetlands

3.6.1 Existing Conditions

In May 2015, Atkins Global delineated the Section 404 jurisdictional wetlands and other WOTUS along Corral Tributary and Franceville Tributary, according to guidelines in the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region. The purpose was to determine U.S. Army Corps of Engineers (USACE) jurisdictional areas within the site of the Proposed Action. The delineation identified two wetlands (GA and GB) totaling approximately 0.90 acres (39,383 square feet) and the Corral Tributary as jurisdictional wetlands/WOTUS (see Figure 3-3) (Atkins 2015b). The wetlands delineation is included in Appendix D.

Both wetlands are located within Franceville Tributary. At Drennan Road, Franceville Tributary has been diverted from its historic path to drain into Corral Tributary. Undiverted flow passes south over Drennan Road and across an undefined floodplain. Approximately 1,500 feet south of Drennan Road, surface flows could outfall into Franceville Tributary. The drainage becomes progressively narrower with steeper slopes forming semi-eroded banks. There is no defined channel within Franceville Tributary, but several groundwater seeps located in that area provide water for wetlands present within the drainage.

Figure 3-3. Wetlands and Waters of the United States, Southern Colorado National Cemetery, Colorado



Wetland GA is located within Franceville Tributary near the southern site boundary, where groundwater discharges from a headcut that spans the entire width of the drainage. The water collects in an unvegetated, open water basin, and overflows into Wetland GA. Wetland GB also is fed by a groundwater seep located at the northern end of the wetland boundary.

The hydric soil indicator for Wetlands GA and GB were loamy gleyed matrix (Indicator F2). Surface water was present at both Wetlands GA and GB. Additional secondary hydrological indicators noted at one or both wetlands included soil saturation, salt crust, and algal mat. Wetlands GA and GB are both classified as PEM wetlands by Cowardin due to the dominance of erect, rooted, herbaceous vegetation. Four floodplains associated with the Jimmy Camp Creek tributaries have been mapped through Federal Emergency Management Agency Flood Insurance Rate Maps (Figure 3-4). The floodplains are identified as Zone A (100-year flood) adjacent to the streams.

The site is not subject to Coastal Zone Management Act regulations.

3.6.2 Effects of the Preferred Alternative

The Preferred Alternative would be expected to have minor, short-term adverse impacts on wetlands, which is consistent with the findings in the PEA. Impacts would largely result from site disturbance, stormwater runoff, and sedimentation of on-site wetlands. To the extent practicable, the master plan avoids impacts on wetlands per Section 404 of the Clean Water Act (CWA). Negligible long-term beneficial impacts on wetlands would also be expected, as improvements to the site's stormwater and surface hydrology would help to protect wetlands from rapid flooding events common in the region.

As described in Section 2.1.2, the employment of environmental and engineering BMPs, watershed-sensitive site design techniques, and direct consultation with pertinent federal, state, and local regulatory agencies would help minimize temporary adverse impacts associated with construction and operation of the National Cemetery. The site planning of roads, structures, and facilities specifically avoids sensitive wetland resources and floodplains. Grading contours direct stormwater flows to an artificial channel adjacent to the Franceville Tributary that would convey stormwater flow to a retention pond, allowing infiltration into the pond and minimizing sedimentation or pollutant discharge into wetlands. Any modifications to site plans or future development phase construction activities that would result in unavoidable impacts on jurisdictional wetlands or waterways greater than 0.1 acre but less than 0.5 acre would be coordinated through the USACE through the Nationwide Permit System.

The Preferred Alternative would be expected to have minor adverse short-term and minor beneficial long-term impacts on floodplains. The master plan utilizes a combination of waterway engineering and watershed-sensitive site design techniques. Floodplain modifications would result in diversion of the Franceville Tributary, eliminating the on-site portions of that tributary's floodplain. The development of a 500-year channel would allow the diversion of surface flows to stormwater channels and ponds. The stormwater management techniques integrated into the master plan would allow the prevention of offsite stormwater discharge for all flooding scenarios not exceeding 500-year flood conditions. Following the drainage improvements associated with Phase 1, future development of the site would include one road crossing over the Franceville floodway to future development sections in the southern portion of the property. Modifications to the site's stormwater and surface water hydrology are expected to enhance the predictability of flooding scenarios, protecting existing wetlands from future scour or rapid flooding common with this region of the country, thus resulting in overall minor beneficial impacts on floodplains.