3.0 AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

This section describes those resources at Fort Baker that may experience or cause impact if the Proposed Action or alternatives are implemented.

3.1 GEOLOGY AND SOILS

Information for the following description was obtained primarily from the *Geotechnical Feasibility Investigation* (Harlan Tait Associates, 1998), and from information provided by the California Department of Conservation, California Division of Mines and Geology in their comment letter on the DEIS.

3.1.1 Regional Geologic and Seismic Setting

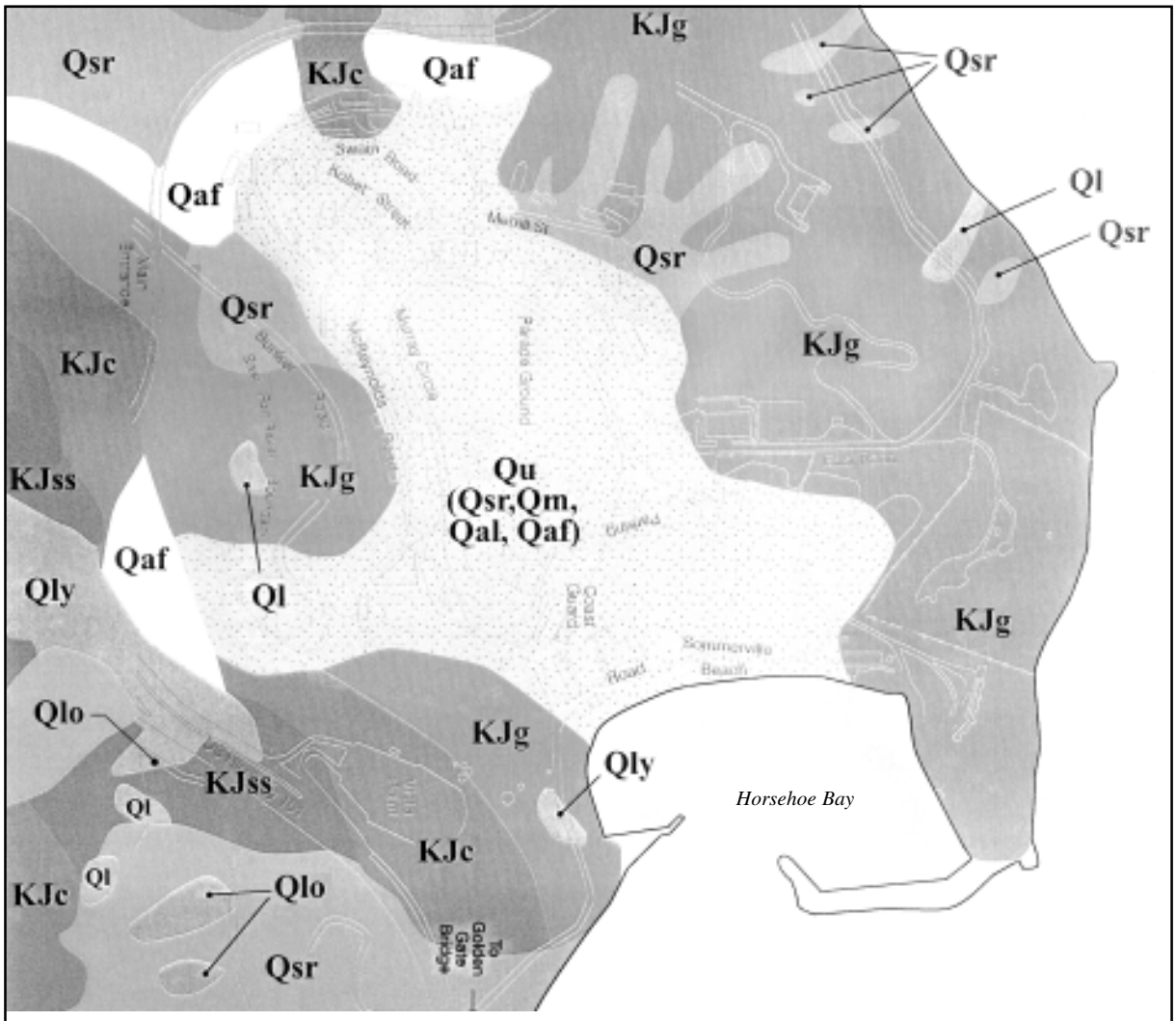
Fort Baker is located in the Marin Headlands portion of the Coast Ranges geologic province. The structure of the Coast Ranges in this region consists of northwest-trending folds and faults resulting from the collision of the Farallon and North American plates and subsequent translational shearing along the San Andreas fault system. The Marin Headlands are part of a block of folded and faulted marine sedimentary and volcanic rocks of Cretaceous and Jurassic age comprising the Franciscan Complex and overlying geologically younger sediments. The site includes areas of bedrock, exposed on hillslopes, and unconsolidated sediments such as colluvium (slopewash deposits) and landslide deposits. Regional geologic maps show the site as being underlain primarily by greenstone (metamorphosed volcanic rocks) and chert. However, the area immediately north of Horseshoe Bay is underlain by soft Quaternary sediments. This is important due to the high potential for earthquake ground motion associated with soft Quaternary sediments to affect most the Fort's buildings that are located on sites with those soils. A geologic map of Fort Baker and vicinity is provided in Figure 3-1.

Fort Baker is located in a seismically active region of northern California (Figure 3-2). The active, northwest-trending San Andreas fault zone is located approximately 6½ miles southwest of the site. The active Hayward/Rodgers Creek fault zone is located approximately 12 miles northeast of the site. No active faults are mapped traversing the site.

The closest large-magnitude historic earthquake occurred on April 18, 1906, along the San Andreas fault zone. This earthquake had an estimated magnitude of 8.3, and caused ground shaking of Modified Mercalli Intensity VIII in the site vicinity. The 1898 "Mare Island" earthquake (estimated magnitude 6.7) likely occurred on the Rodgers Creek fault, and generated ground shaking of Modified Mercalli Intensity VI in the site vicinity. The 1868 earthquake on the Hayward fault zone generated ground shaking of Modified Mercalli Intensity VII or less in the site vicinity. Strong ground shaking at the site has accompanied numerous other large-magnitude historic earthquakes in the region. It is likely that a similar pattern of seismicity will persist into the foreseeable future. For development purposes, the controlling fault is the San Andreas fault zone. The U.S. Geological Survey (USGS) Working Group (1990) has estimated that during the 30-year period ending in 2020, the probability of a magnitude 7 or larger earthquake in the greater San Francisco Bay area is 30%.

3.1.2 Site Conditions

Topography and Landform. Topographically, Fort Baker is located in a northwest-trending valley, which drains southeastward toward the San Francisco Bay. Alexander Avenue, which is constructed partially on large fill embankments, crosses the valley, partially in bedrock cuts. The site forms a natural amphitheater of steep hills that shelter Horseshoe Bay from the winter storms and waves that



Qaf	Holocene (<11,000 yrs) Artificial Fill
Qu	Surficial deposits including Quaternary Alluvium, dune sand, artificial fill, Bay Mud
Qsr	Slope debris and Ravine fill
Ql, Qlo, Qlr	Landslide deposits Qlo = older deposits, Qly = young deposits
KJg	Franciscan formation, greenstone, altered volcanic rocks
KJc	Radiolarian chert and shale of the Franciscan formation
KJss	Franciscan formation, Graywacke sandstone

Figure 3-1 Geologic Map

N Not to Scale

Source: Schlocker, J., et. al., 1974

DATE: October 1998

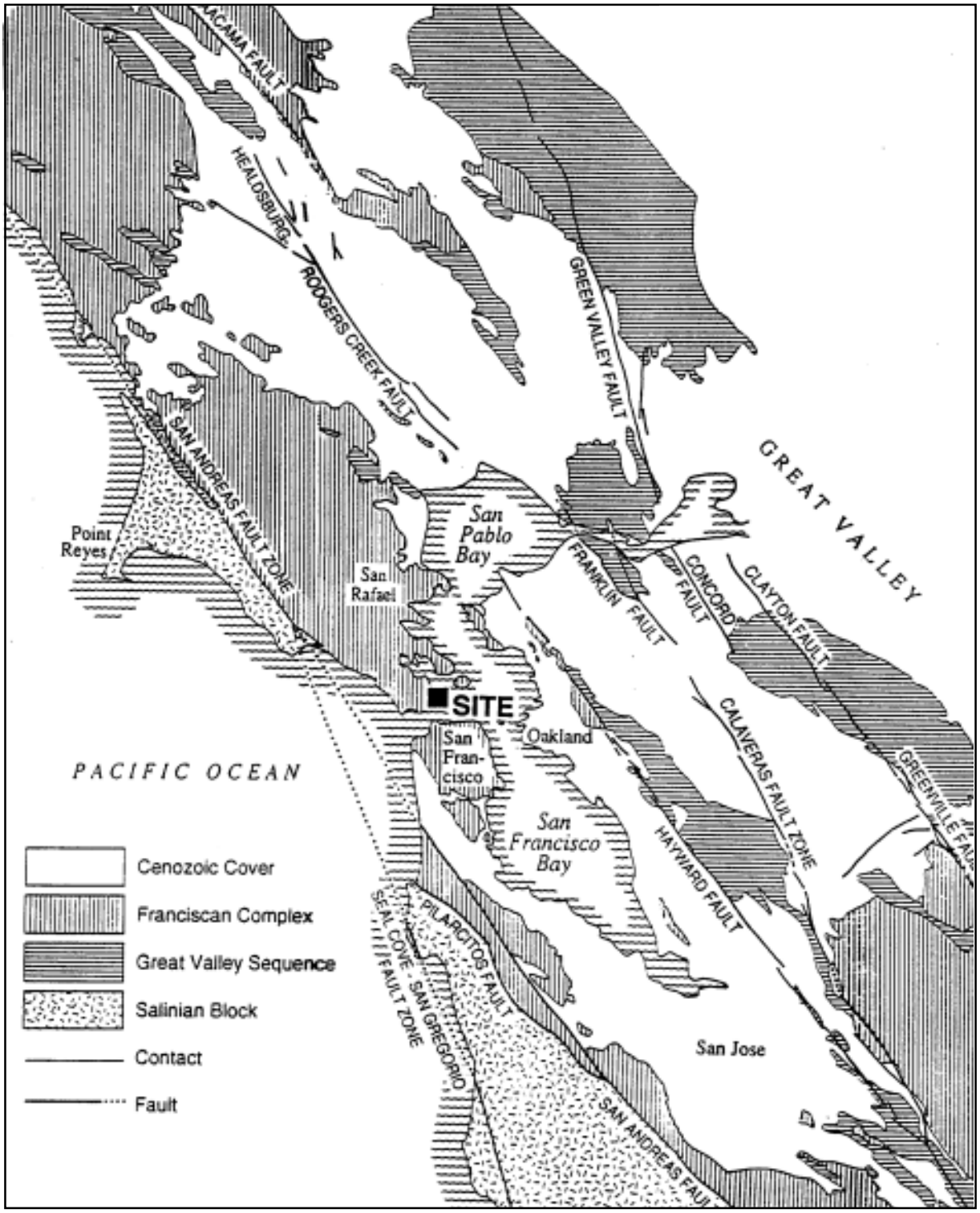


Figure 3-2 Principal Active Regional Faults

N

Approx. Scale in Miles
0 5 10

Source: Harlan Tait Associates

DATE: October 1998

batter the outer coast. The crest of the hills is highest on the west, where the peak elevation is about 800 feet, and slopes down to about 200 feet on the east. The site covers most of the mildly sloping land at the base of the hills. Hillslopes within the property are generally less than 30%.

Geologic Hazards. Soil creep (the gradual downslope movement of soil and colluvium by gravity) occurs on steeper slopes, in colluvium-filled swales and on landslide deposits. Soil creep is occurring on many hillslopes at the site.

Landslides are classified according to: a) state of activity; b) certainty of identification; c) dominant type of movement; and d) thickness of deposit. Landslides at the site range in activity from active historical landslides to ancient or dormant landslides which, in their existing configuration, may undergo sporadic reactivation in times of intense rainfall or earthquake ground shaking. All of the landslides appear to be relatively slow-moving, consistent with the relatively clay-rich surficial deposits typically formed on weathered greenstone bedrock. There is no evidence of relatively fast-moving debris flow landslides.

The toe of a large, dormant landslide is located in the northern part of the site and appears to extend upslope beneath Seiter Road and Alexander Avenue, with the headscarp and the majority of the landslide located upslope (north) of Alexander Avenue. This landslide, classified as a dormant earthflow, is likely several thousand years old. There is no evidence of reactivation of this landslide since construction of improvements (roads, buildings) on the landslide. It is likely that landslide deposits were not removed prior to placement of Alexander Avenue fill.

A second landslide at the site appears to underlie the Merrill Street cul-de-sac area in a large swale near the eastern end of the site. This landslide, classified as an active earthflow, may have been active in historical times as evidenced by the landslide's young geomorphic expression and the crib wall constructed in the area.

Landslide deposits were also observed in a second swale on the northeastern valley hillslope, north of Merrill Street. The landslide, classified as an active earthflow, is upslope of existing improvements. Relatively small, shallow (less than 5 feet) soil slip landslides and apparent cut slope failure scars are evident on other hillslopes at the site.

Tsunami are seismic sea waves resulting from massive movement of underwater land masses. They are not necessarily breaking waves. Tsunami may be long-period waves originating at great distances, which cause a relatively gradual rise in water level, or they may be large breaking waves commonly referred to as "tidal waves." Nineteen tsunami were recorded in the San Francisco Bay Area in the 100-year period ending in 1968, with a maximum run-up reported at 7.4 feet. Estimates of maximum run-up at the Golden Gate due to tsunamis are under 7 feet about every 50 years; 10 feet about once every 100 years; 20 feet every 200 years; and 30 feet every 300 years (U.S. Army, 1983). These estimates represent worst-case conditions based on coincidence of high tides and a tsunami. This assumption significantly decreases the probability of occurrence compared with tsunami run-up alone. Mean higher high water in the outer San Francisco Bay is about 3 feet higher than mean sea level.

The piers, roads and seawalls surrounding Horseshoe Bay lie within the zone of run-up for the 100-year tsunami. Structures south of East Road lie near or within the 20-foot run-up zone of the 200-year tsunami.

One-hundred year high tides in the Fort Baker area are estimated at about 6.2 feet above mean sea level (U.S. Army Corps of Engineers, 1997). Tides can be expected to rise approximately 7 inches by 2050 due to sea level rise associated with global warming (U.S. EPA, 1995).

Soils. The soils at Fort Baker are predominantly Tamalpais-Barnabe, very gravely loams. These soils formed on ridge tops and side slopes underlain by sandstone and chert. Slopes range from 15% to 75%. The depth to bedrock typically ranges from 10 to 40 inches. Permeability is moderate, runoff is rapid, and the hazard of soil erosion is high. These soils have severe limitations both for building site development and recreational use due to the steep slope and the erosion hazard.

Slopes to the northwest of the site contain a mixture of Cronkhite and Barnabe soils. Cronkhite soil is a deep clay loam developed in areas containing sandstone and shale. Depth to bedrock is typically 40 to 60 inches. Permeability is slow, runoff is rapid, and the soil erosion is high. Soils in the beach/waterfront areas of the site are classified as xerorthents, which are disturbed soils containing human-made debris. The properties of these soils are variable. Figure 3-3 shows the distribution of soils at the site.

Mineral Resources. The principal mineral resource of the area is crushed or broken rock. A former rock quarry is located near the eastern boundary of the site. Chert within the Franciscan Complex contains localized manganese deposits. However, no known manganese deposits exist on the site.

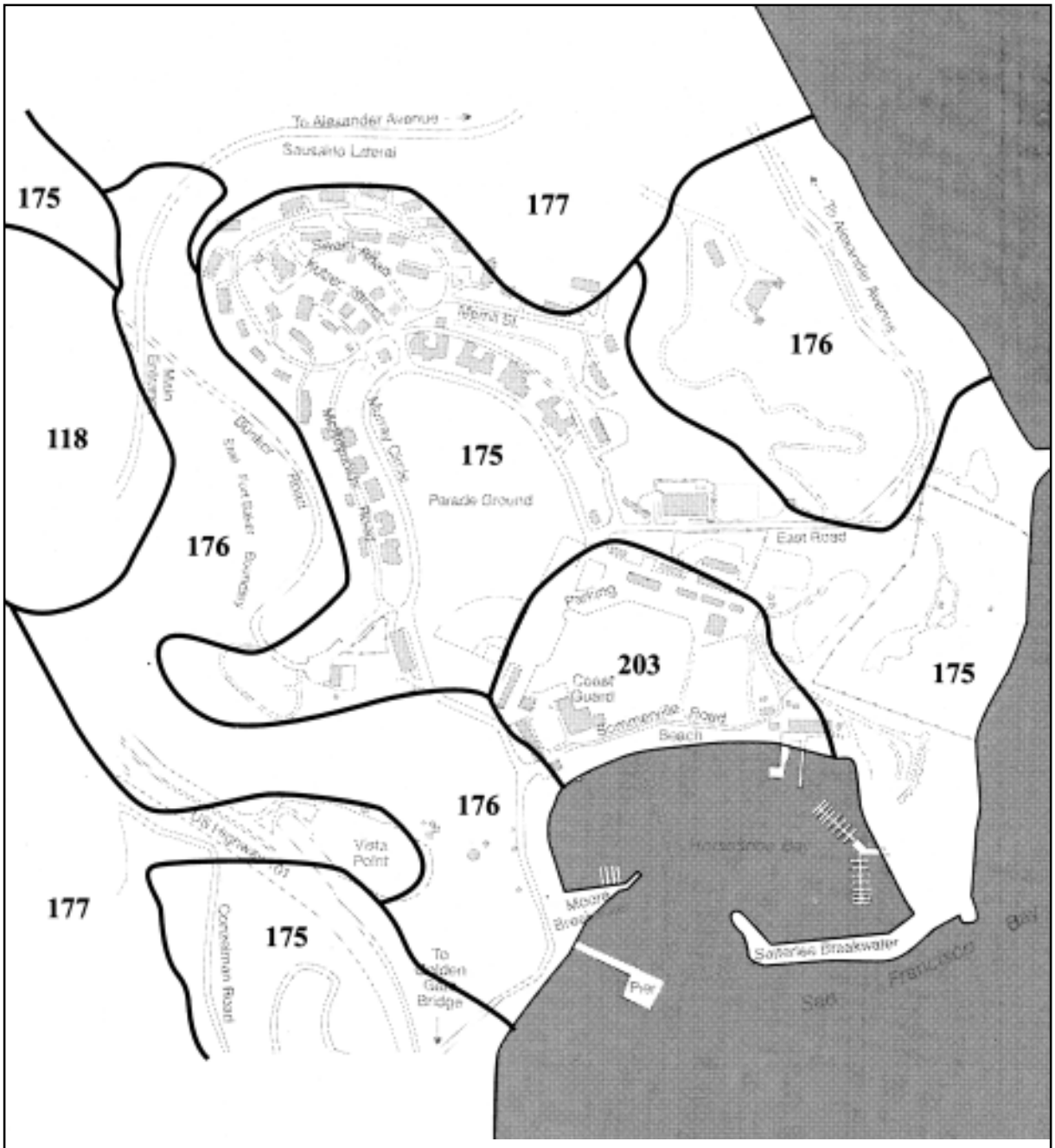
3.2 COASTAL PROCESSES

Information for the following description was obtained primarily from the *Beach and Wetlands Feasibility Study* (Moffatt & Nichol Engineers, 1998).

Horseshoe Bay, a south-facing cove, is located between Point Cavallo on the east and Lime Point on the west. A 750-foot-long rubble-mound breakwater extends from Point Cavallo to the west. A second 300-foot-long rubble-mound breakwater is located on the west side of Horseshoe Bay where the Coast Guard Station is located. Historically, a tidal marsh with a slough existed on the shoreline of Horseshoe Bay. The wetland was filled in 1903 and a bulkhead was constructed to protect the filled-in wetland from waves and high tides. This bulkhead was replaced in 1929 with a concrete seawall which was extended to the east in 1932. A timber bulkhead was constructed bayward of the concrete seawall in the 1940s (it is not known if the earlier structures have been removed). The bulkhead has rubble toe protection that begins about 6 feet below the top of the wall. The bulkhead has been repaired a number of times. At some locations along the wall the backfill has washed out, causing sinkholes, and at other locations the timber may have deteriorated.

A beach approximately 200 feet long lies along the western shoreline of Horseshoe Bay. The beach is composed of fine sand brought in by wave- and tide-induced currents, and by two creeks draining into Horseshoe Bay. The creeks discharge through culverts on the shoreline.

Horseshoe Bay is a shallow cove, encompassing a water area of 16.6 acres, with water depths ranging from 6 to 12 feet below mean lower low water level (MLLW). The bottom slope of Horseshoe Bay is relatively flat, varying from about 1:20 to 1:50 (vertical to horizontal). Bottom materials in Horseshoe Bay consist of cobble and gravel in the intertidal zone grading to silt and sand with gravel pockets in the subtidal zone. The Coast Guard maintains a 10- to 12-foot-deep (at MLLW) navigation channel for



118 Cronkite - Barnabe complex, 50-75% slopes
175 Tamalpais-Barnabe variant very gravelly loams, 15-30% slopes
176 Tamalpais-Barnabe variant very gravelly loams, 30-50% slopes
177 Tamalpais-Barnabe variant very gravelly loams, 50-75% slopes
203 Xerorthants, fill

Tamalpais-barnabe very gravelly loams have severe limitations for both building site development and recreational use due to the steep slope and erosion hazards.

Figure 3-3 Map of Soil Types

N

Approx. Scale in Feet
0 275 550

Source: Kashiwagi, 1985

DATE: October 1998

their berthing facilities. Periodic dredging (about every 5 to 7 years) is required to maintain depths for small craft navigation in Horseshoe Bay. The most recent dredging occurred in July 1994 adjacent to the Coast Guard pier and entrance channel. About 15,000 cubic yards of material was removed. The dredged sediments were disposed of at the Alcatraz dredge disposal site (Corps, 1997a). The existing marina (Presidio Yacht Club) has also required minor dredging in the past, in the range of 700 to 800 cubic yards per event. Records reflect that this minor dredging activity has been required on a schedule of approximately every 10 years, with the last dredging of 800 cubic yards occurring in 1993, prior to that approximately 775 cubic yards was dredged in 1983. Such dredging has been performed in the area between the main dock and the shore (pers. comm., Duane McQuilliams, PYC 1999).

Horseshoe Bay is generally well protected from wave action by the Marin Headlands on the west as well as the two breakwaters at the opening of the cove. Average wave heights are about 2 feet or less, with a 2 to 3 second period, inside Horseshoe Bay. However, wave-generated surge (horizontal oscillation) can be severe under storm conditions and has damaged both boats and slips. This surge is generated by wave amplification caused by wave reflection, superposition and resonance within the cove. The timber bulkhead opposite the entrance between the breakwaters reflects incoming waves into Horseshoe Bay without absorbing much energy. This effect is greatest during high tide. Tidal currents are the predominant currents in Horseshoe Bay. Maximum current velocities at the entrance between the breakwaters do not exceed two knots according to local boat operators. There is a strong eddy component of the ebb tidal current which, coupled with the flood tide current, drives water and floating debris into the east portion of the cove. Other currents include longshore currents flowing both east and west along the north shore, and freshwater inflow at the northwest corner or the cove. There is evidence of wave-generated erosion at the toe of the north seawall west of the boat launching ramp, at the base of the boat launching ramp itself, and along the toe of the timber bulkhead. The toe of the timber bulkhead is directly opposite the entrance between the breakwaters and is subjected to the strongest wave attack.

In the Fort Baker area, 100-year high tides are estimated at about 6.2 feet above mean sea level (Corps, 1997a).

3.3 WATER RESOURCES

This section describes the regulatory framework for water resources, surface water and groundwater, water quality and flooding potential at Fort Baker.

3.3.1 Regulatory Framework

The San Francisco Regional Water Quality Control Board (RWQCB) is the state agency with primary responsibility and authority for ensuring that the beneficial uses of water resources are protected from potential adverse impacts of development at Fort Baker. Applicable water quality objectives for surface water and groundwater at Fort Baker are based on protection of human health and the environment, including aquatic life. Unless otherwise designated by the RWQCB, all groundwaters are considered suitable, or potentially suitable, for municipal or domestic use. California Maximum Contaminant Levels (MCLs) and secondary MCLs, as appropriate, are applicable drinking water standards.

The RWQCB is also the primary agency for granting, administering and enforcing a variety of waste discharge permits, including National Pollutant Discharge Elimination System (NPDES) permits.

Construction projects that disturb an area greater than 5 acres would be subject to an NPDES permit for general construction activity.

The RWQCB and the U.S. Environmental Protection Agency (EPA) are responsible for determining appropriate dredged material discharge standards and for assuring that dredging and the disposal of dredged materials are consistent with the maintenance of bay water quality. The EPA and the U.S. Army Corps of Engineers (Corps) have joint federal responsibility for regulating ocean, bay and wetland disposal. The Long Term Management Strategy (LTMS), initiated by the Corps in 1991, provides the basis for uniform federal and state dredged material disposal policies and regulations.

Construction activities required for shoreline modifications would be subject to federal regulation under Section 404 of the Clean Water Act.

3.3.2 Surface Water

Fort Baker lies within a rectangular watershed about 0.5 square mile in area. Very little comprehensive information exists for Fort Baker regarding historical characteristics of surface water resources. Natural stream channels once discharged to a large marsh that extended the length of shoreline at the existing location of Horseshoe Bay (located at the northern end of San Francisco Bay and east of the Golden Gate). Changes made to topography, vegetation, watercourses, roads and buildings have substantially altered the rates and volumes of drainage and recharge characteristics of the groundwater aquifer of Fort Baker. The marsh was filled to facilitate development of the waterfront and, subsequently, the natural streamflows were routed through buried culverts to outfalls at several locations along the shoreline.

Most of the stormwater within the watershed runs off into Horseshoe Bay or recharges the shallow groundwater in the alluvial fill at the base of the hills, ultimately discharging to the bay. There are no permanent streams or ponds at Fort Baker. A rectangular reservoir is located near Battery Duncan, near the northeast boundary of the site.

3.3.3 Groundwater

No wells are known to be on the site. The underlying Franciscan bedrock is relatively impermeable; therefore, nearly all of the water that falls on the watershed of the site must flow to the bay across or beneath the 1,000-foot length of waterfront on Horseshoe Bay. The direction of groundwater movement is expected to mimic the slope of the ground surface. Groundwater reportedly occurs at shallow depth beneath the southern portion of the site. Groundwater was found at 5 to 6 feet below the ground surface during the excavation and removal of underground tanks (Corps, 1997a). The water table is reported to be tidally influenced in the lower areas of the site.

3.3.4 Water Quality

Surface and Groundwater. To date, sampling and analysis of groundwater quality has been limited. The NPS has recommended that the Army perform additional groundwater investigations at the down-gradient edge of Fort Baker to verify that chemical plumes are not migrating into Horseshoe Bay. Analytical results of groundwater sampling should be compared to established water quality objectives (Erler & Kalinowski, Inc., 1998).

Saltwater. Chemicals have likely been introduced into Horseshoe Bay by boat maintenance activities, groundwater flow and the storm drain system. Army boat maintenance activities were conducted until the 1950s and included washing, sanding, repairing and painting. Since 1959, the Presidio Yacht

Club used the docks and maintenance facilities located in the cove, performing essentially the same boat maintenance activities previously performed by the Army. Maintenance dredging is periodically

performed in Horseshoe Bay. The Army has collected 19 sediment samples from the perimeter of Horseshoe Bay and has found elevated levels of polyaromatic hydrocarbons, arsenic, copper, lead and mercury. Elevated concentrations of chemicals were primarily located near the docks. Applicable saltwater quality objectives can be obtained from the RWQCB's 1995 Basin Plan, the National Toxics Rule as applicable to the San Francisco Bay region, and the proposed California Toxics Rule, in this order of priority (Erler & Kalinowski, Inc., 1998).

3.3.5 Flooding

Fort Baker contains no areas subject to flooding by stormwater runoff and is not located in a 100-year flood zone area (Corps, 1997).

3.4 BIOLOGICAL RESOURCES

The information provided in this discussion is based on field surveys, a review of information about the area, pertinent literature and contacts with knowledgeable individuals as compiled in the *Natural Resource Inventory* (EDAW, 1998) and the *Assessment of Baseline Vegetation Potential* (May Consulting Services, 1998) conducted for Fort Baker.

3.4.1 Regulatory Framework

Natural resources at Fort Baker are protected in accordance with NPS authorities and other statutory authorities [such as the Endangered Species Act (16 USC 1531 et seq.), the Marine Mammal Protection Act (16 USC 1361 et seq.), the National Environmental Policy Act (42 USC 4321 et seq.), Executive Order 11990, "Protection of Wetlands" (42 USC 4321)], NPS Natural Resource Management Guidelines (NPS-77) and NPS analysis of limited or easily affected resources. These resources at Fort Baker include shorebird habitat along the cliffs bordering the eastern side of the site, bird-resting habitat in Horseshoe Bay and habitat for the endangered mission blue butterfly. The NPS is committed to working cooperatively with federal, state and local agencies; user groups; and others in the management of biological resources and will seek to establish formal and informal lines of communication and consultation to better achieve biological resource management objectives.

3.4.2 Overview of Biological Resources

Bordering San Francisco Bay, Fort Baker is located in the Central Coast subregion of the California Floristic Province. This subregion extends along the coast from Bodega Bay to Point Conception and supports an array of habitats dependent on or adapted to coastal influences such as summer fog, maritime temperatures, salt spray and strong winds.

Biological resources at Fort Baker include a variety of vegetation and wildlife, including some sensitive species and habitats. The site is bordered on three sides by undeveloped lands managed by the NPS and on the south by Horseshoe Bay. The location of Fort Baker at the junction of the San Francisco Bay with the Pacific Ocean puts it in proximity to fish migration routes and wintering habitat for water birds. The project site is moderately developed and located within the Marin Headlands. The area is characterized by undeveloped areas, including tall grasses, scrub, planted and naturally occurring stands of trees, developed areas generally comprised of nonnative landscape plantings near buildings and open water bays.

3.4.3 Presettlement Habitats and Historical Changes

When Mexico gained its independence from Spain in 1822, the area around Punta Caballo and Punta de San Carlos remained outwardly similar to its natural state, but nonnative annuals had begun to largely replace native perennial bunch grasses as cattle grazing spread over the lands. Its hills and valleys were typically vegetated with coastal scrub and grassland species. A small coastal marsh also existed behind a fringing beach on the north side of present day Horseshoe Bay (Figure 3-4), fed from several hillside springs to the north.

The natural landscape of the developed area of Fort Baker was significantly altered in 1903, when the stream running through the present Parade Ground into the marsh was culverted, covered over and seeded with rye grass. In addition, the marsh that formed the transition from the bay to grassland valley was filled. The concrete seawall was constructed in 1929 (Figure 3-5).

3.4.4 Existing Biological Habitats and Resources

The Fort Baker site is characterized by eight habitats: annual grassland, native perennial grassland, coastal scrub, urban/disturbed, estuarine, Monterey cypress and pine stands, nonnative eucalyptus stands and native oak woodland. The locations of these habitats are shown in Figure 3-6 and described below.

Annual Grassland. These areas occur on the hillsides and are dominated by such grass species as wild oats (*Avena fatua* and *Avena barbata*), soft chess (*Bromus mollis*), ripgut brome (*Bromus diandrus*) and Italian wildrye (*Lolium multiflorum*). These grass species are often interspersed with occasional native bunch grasses including purple needle grass (*Nasella pulchra*), California oat grass (*Danthonia californica*) and California brome (*Bromus carinatus*). In addition, other native and nonnative herbaceous species are found within this community type, including English plantain (*Plantago lanceolata*), yarrow (*Achillea millefolium*), Italian thistle (*Carduus pycnocephalus*), common mustard (*Brassica campestris*) and California poppy (*Eschscholtzia californica*). Several lupines are also found within the annual grassland community, including *Lupinus albifrons*, *Lupinus variicolor* and *Lupinus formosa*. These lupines, in particular *Lupinus albifrons*, serve as host plants for the mission blue butterfly (*Icaricia icariodes missionensis*).

Perennial Grassland. Perennial grassland habitat (purple needlegrass series) occurs on ridge tops and on the upper slopes of the surrounding hillsides. It is an herbaceous plant community that is dominated by perennial grass species, with occasional shrub species. The habitat is dominated by purple needle grass, with other grasses including California oat grass, California mellic (*Mellica californica*), California brome and blue wild rye (*Elymus glaucus*). Native forbs including Douglas iris (*Iris douglasii*) yarrow, footsteps of spring (*Sanicula arctopoides*), California poppy and California buttercup (*Ranunculus californica*) also comprise this community type. Several lupines are also found within the annual grassland community, including *Lupinus albifrons*, *Lupinus variicolor* and *Lupinus formosa*. These lupines, in particular *Lupinus albifrons*, serve as host plants for the mission blue butterfly.

Common wildlife species expected in the annual and perennial grassland areas are western fence lizards (*Sceloporus occidentalis*), gopher snakes (*Pituophis melanoleucus*), mice (*Peromyscus* spp.), raccoons (*Procyon lotor*), mule deer (*Odocoileus hemionus*), sparrows, and raptors such as great horned owls (*Bubo virginianus*) and Northern harriers (*Circus cyaneus*). American badgers (*Taxidea taxus*) have been observed using the grasslands of Wolfback Ridge.

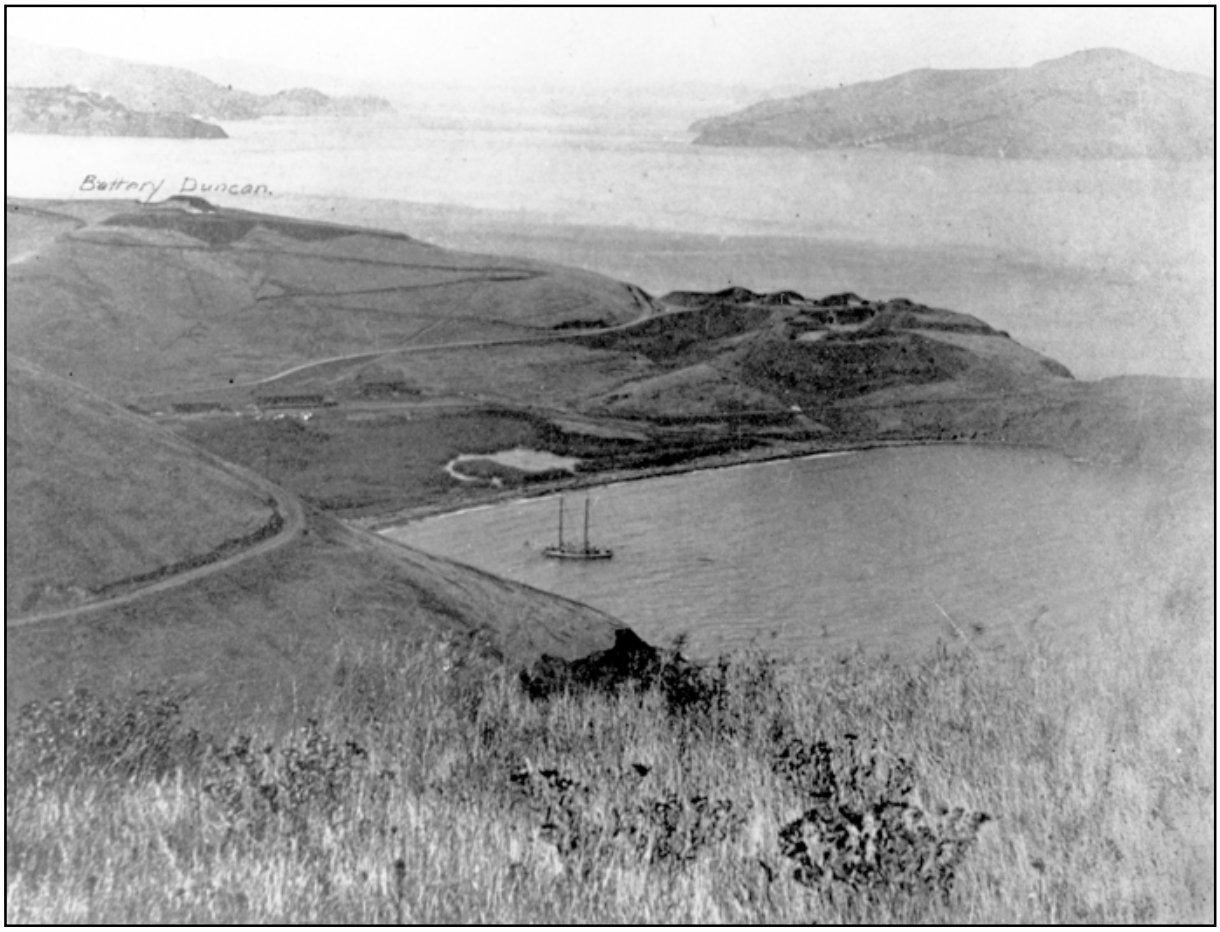


Figure 3-4 Horseshoe Bay with the Marsh, Circa 1900

Source: GGNRA

DATE: October 1998

Figure 3-5 Construction of Seawall on Westernmost Edge of Horseshoe Cove, Circa 1929

Source: GGNRA

DATE: October 1998

Figure 3-6 Vegetation and Habitat Map

DATE: October 1998

N

Not to Scale

Source: EDAW, Inc.

Coastal Scrub. These areas are dominated by coyote brush (*Baccharis pilularis*) and nonnative annual grasses. Other species that occur in coastal scrub are poison oak (*Toxicodendron diversalobum*), California sagebrush (*Artemisia californica*) and bush monkey flower (*Mimulus aurantiacus*). Broom (*Cytisus monspessulanus*) and pampas grass (*Cortaderia selloana*) are invading coastal scrub areas.

Common wildlife species expected in these areas are western fence lizards, gopher snakes, common king snakes (*Lampropeltis getulus*), deer mice (*Peromyscus maniculatus*), mule deer, Anna's hummingbird (*Calypte anna*), sparrows and raptors.

American badgers have been observed in the grasslands and could use the scrub areas. Mission blue butterflies may use these areas if the host lupine plants are available.

Urban/Disturbed. Historic land use has heavily affected most of Fort Baker. In these urban/disturbed areas most of the native vegetation has been removed for the buildings, Parade Ground and adjoining landscaping. Some areas have been re-landscaped with ornamental species, and other areas have been left as bare ground. In these neglected areas, or areas that received periodic disturbance, weeds such as pampas grass, ivy (*Senecio mikanioides* and *Hedera helix*), broom (*Cytisus monspessulanus* and *C. scoparius*), sweet fennel (*Fonoecium vulgare*) and common mustard dominate, intermixed with annual grasses. However, the area immediately outside Battery Cavallo supports a healthy population of *Lupinus albifrons* which provides habitat for the mission blue butterfly. Butterflies have been observed actively using this area.

Urban and disturbed areas are not typically considered important habitat for wildlife species. However, species that are adapted to developed settings may forage, rest and breed in this area. Wildlife in the urban/disturbed areas of Fort Baker are typical of urban settings, and include scrub jays *(Aphelocoma coerulescens)*, American robins *(Turdus migratorius)*, mice, rats, sparrows and pigeons *(Columba livia)*. Some of the buildings located at Fort Baker are not occupied and may support animals, such as bats, which normally are wary of human contact.

Several species of bats have been documented using buildings within the Marin Headlands, including Townsend's western big-eared bat (*Plecotus townsendii townsendii*) and Yuma myotis (*Myotis yumanensis*), two federal species of concern. Brazilian free-tailed bats (*Tadarida brasiliensis*) have been documented foraging within Marin Headlands. Numerous other bat species have been documented in Marin County. Many of these species may occupy abandoned or minimally occupied buildings, attics and tile roofs within Fort Baker. No bat surveys have been conducted at Fort Baker.

Estuarine (Horseshoe Bay and Rocky Intertidal Area outside Horseshoe Bay). Horseshoe Bay contains a number of habitat types. Very little terrestrial vegetation is established around the perimeter of Horseshoe Bay, although patches of sweet fennel are conspicuous near the Presidio Yacht Club, on the bulkhead and near the fishing pier. Horseshoe Bay itself has a variety of different intertidal habitats, including protected and semi-exposed rocky intertidal, sandy-gravel beaches and wharf pilings. The rocky intertidal areas support many species of algae (22 or more) and invertebrates (Cosentino 1997). Kelp, sea lettuce (*Ulva lactuca*), turkish towel (*Gigartina exasperata*), and other seaweeds and algae grow on intertidal rocks. The cove collects decomposing algal drift (algal wracks) along the west facing beach, which attracts invertebrates such as the beach hopper (*Orchestoidea* sp.), an important consumer of the high intertidal.

The National Marine Fisheries Service (NMFS) has indicated that Horseshoe Bay is located within the designated critical habitat area for the winter run of the Sacramento River winter-run chinook salmon (*Oncorhynchus tschawytscha*). The Dungeness crab (*Cancer magister*) and Pacific herring (*Clupea harengus pallasii*) are the most important species of commercial marine resources found seasonally in Horseshoe Bay. Horseshoe Bay is part of the Dungeness crab migratory corridor between the gulf of the Farrallones and San Francisco Bay. Horseshoe Bay is considered an important crab-settling area for juvenile crabs, where piers, jetties and boat launching facilities offer food and protection for the young crabs.

Horseshoe Bay and the bay waters adjacent to Fort Baker are located in the Sausalito to Lime Point Pacific herring spawning zone, one of the most important herring spawning zones and commercial fishing areas on the Pacific Coast (NPS, 1986). The herring spawn in San Francisco Bay is usually limited to water depths of 10 feet or less.

Approximately 260 eelgrass plants (*Zostera marina*) were mapped within Horseshoe Bay (Kitting, 1998) (Figure 3-6). The California Department of Fish and Game (CDFG) considers eelgrass beds a special aquatic resource both because of its rarity and the high quality habitat it provides to aquatic organisms such as Pacific herring.

The open water of Horseshoe Bay also supports a number fish, bird and mammal species common to the San Francisco Bay. Birds commonly found in Horseshoe Bay include western grebes (*Aechmophorus occidentalis*), cormorants (*Phalacrocorax* spp.), gulls, California brown pelicans (*Pelecanus occidentalis californicus*) and terns. The Needles, just offshore along the San Francisco Bay Trail to Lime Point, provides nesting habitat for western gulls and roosting for brown pelicans and other marine birds. The coastal cliffs near Lime Point may also support nesting western gulls and pelagic cormorants (*Phalcrocorax pelagicus*). Sea lions (*Zalophus californianus*) and harbor seals (*Phoca vitalina*)are also common visitors to Horseshoe Bay.

The rocky intertidal area outside Horseshoe Bay along Point Cavallo contains one of the richest and most pristine assemblages of algae within the GGNRA (Silva, 1979).

Monterey Cypress and Pine Stands. Not naturally occurring in the area, both Monterey cypress (*Cupressus macrocarpa*) and Monterey pines (*Pinus radiata*) were planted at Fort Baker, and these groves have grown very dense. The Monterey pines have been spreading, resulting in a wide range of age diversity. The understory of these planted stands consists mostly of escaped ornamental plants and nonnative grasses. English ivy (*Hedera helix*) and Cape ivy (*Senecio mikanioides*) cover a large portion of the understory. The average height of these stands was reported by McBride (1985) as 65 feet, and the average diameter at breast height (dbh) was 15 inches. The Monterey pines are spreading by seed and in some places encroaching on other habitats.

Common wildlife species found in these stands are raptors, woodpeckers (*Colaptes auratus*), deer mice, raccoon and gopher snakes.

Eucalyptus Stands. Eucalyptus (*Eucalyptus globulus*) trees were planted at Fort Baker and have spread to a number of locations. The average height of these stands was reported by McBride (1985) as 50 feet, and the average dbh was 36 inches. The understory of these stands consists primarily of escaped ornamental exotic species, including French broom (*Genista monspessulana*), cotoneaster (*Cotoneaster pannosa*), vinca (*Vinca major*) and English ivy, and several native species including

California blackberry (*Rubus ursinus*), poison oak, toyon (*Heteromeles arbutifolia*) and several native herbaceous species.

Common wildlife species found in these stands are raptors, deer mice and raccoons. Monarch butterflies (*Danaus plexippus*) form autumn clusters during their south migration within the eucalyptus stands behind the fenced area of Battery Duncan at Fort Baker. The clusters are small but consistent through the last 15 years of monitoring and are considered by the CDFG as a "Special Phenomena."

Oak Woodland. The oak woodland on the east side of Fort Baker is dominated by coast live oaks (*Quercus agrifolia*) and toyon. It is assumed that this woodland has never been cleared because it did not restrict military activity and the slope was too steep for development. The average height of these stands was reported by McBride (1985) as 25 feet, and the average dbh was 12 inches.

Common wildlife species found in these stands are raptors, scrub jays, mule deer, gopher snakes, woodpeckers and warblers. Although there are no known rare species that depend on this oak woodland, it probably supports the highest diversity of species of all habitats at Fort Baker.

The oak woodland is being encroached upon by French broom that could pose future threats if the exotic species are not controlled. The oak woodland has many volunteer social trails that can lead to erosion and threaten the habitat.

3.4.5 Special-Status Species

Special-status species are plants and animals that are legally protected under the state and federal Endangered Species Acts (ESAs) or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such status. The Marine Mammal Protection Act, the Migratory Bird Treaty Act, the California Native Plant Society (CNPS) lists and the California State designations for rare habitats and phenomena also contribute to the species considered to have special status at Fort Baker. The U.S. Fish and Wildlife Service (USFWS) and the NMFS identified species that are federally listed as endangered or threatened or federal candidates with distributions that occur in the USGS 7.5 minute San Francisco North quadrangle map area, where Fort Baker is located (copies of these letters are provided at the end of Section 6, Consultation and Coordination). The habitat and possible occurrence of these species and other sensitive species is considered in Appendix C. Most of the species do not occur at Fort Baker because their required habitat does not exist at Fort Baker or Fort Baker is out of the species' range.

Special-Status Plant Species. Coast rock cress (*Arabis blepharophylla)*, a CNPS list 4 plant, is the only special-status plant species known to occur at Fort Baker (EDAW, 1998). No other special-status plants were observed during the reconnaissance-level field visit.

Five special-status plants are considered to have potential to occur on the project site, based on occurrence in the region and association with habitat types found at Fort Baker. These species are San Francisco wallflower (*Erysimum franciscanum*), San Francisco campion (*Silene verecunda* ssp. v*erecunda*), beach layia (*Layia carnosa*) and San Francisco lessingia (*Lessingia germanorum*). However, suitable microhabitat conditions specific to each of these species do not exist because of long-term disturbances associated with the site. Marsh sandwort *(Arenaria paludicola*), a federally listed and state listed endangered species, may have inhabited the marsh that existed at Fort Baker before the 1904 construction activities but because of filling in the wetland that previously existed, it

does not occur on the site anymore. The USFWS list also includes Presidio manzanita (*Arctostaphylos hookeri* ssp. *Ravenii*), Presidio clarkia (*Clarkia franciscana*) and Marin dwarf flax (*Hesperolinon congestum*) as special-status plant species potentially occurring in the vicinity. Habitat types that support these species, however, do not occur at Fort Baker and did not historically occur.

Special-Status Wildlife Species. The sensitive and special status species known to or likely to occur at Fort Baker are: mission blue butterfly, American peregrine falcon (*Falco peregrinus anatum*), brown pelican, least tern, chinook salmon, coho salmon (*Oncorhynchus kisutch*), steelhead (*Oncorhynchus mykiss)*, harbor seal, California sea lion (*Zalophus californianus*), American badger, monarch butterfly and nesting neotropical migratory birds. Of these species, only the federally endangered mission blue butterfly is known to breed at Fort Baker extensively. The mission blue butterfly is known only from Marin Headlands (Fort Baker), San Bruno Mountain and scattered locations in San Mateo County. The NPS conducts annual surveys for the mission blue butterfly, and both the NPS and the Golden Gate Bridge, Highway and Transportation District have been actively improving its habitat at Fort Baker primarily through removal of invasive plants.

Brown pelicans and least terns (state listed and federally listed as endangered, respectively) are often seen in Horseshoe Bay and offshore in the bay.

The salt marsh harvest mouse (*Reithrodontomys raviventris*) (listed as endangered under the California and federal ESAs), California clapper rail (*Rallus longirostris obsoletus*) (endangered under the California and federal ESAs), saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*) (California species of special concern) and black rail (*Laterallus jamaicensis*) (listed as threatened under the California ESA) occur in salt marsh habitats. Because suitable salt marsh habitat no longer exists at Fort Baker, these species do not occur there. None was ever observed during the field survey.

American peregrine falcons (endangered under the California and federal ESAs) and bald eagles *(Haliaeetus leucocephalus*) (endangered under the California ESA and threatened under the federal ESA) are seen occasionally flying over the bay, but Fort Baker has no peregrine falcon or bald eagle nesting sites. Neither of these species was observed during the field survey.

The San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) (California species of special concern), Bell's sage sparrow (*Amphispiza belli belli*) (California species of special concern) and California horned lizard (*Phrynosoma coronatum frontale*) (California species of special concern) occur in coastal scrub habitats. None of these species were observed during the field surveys.

Six species of bats, known to occur within the Bay Area, are federal species of concern and may occur in buildings at Fort Baker. No surveys have been conducted.

Several species of migratory birds nest at Fort Baker. Most nest in oak woodlands or the grassland/coastal scrub areas; however, cliff swallows (*Hirundo pyrrhonota*) nest on the buildings at Fort Baker. This species can be seen in the spring building nests, and young are fledged by late summer. All of these birds are protected by the Migratory Bird Treaty Act.

Marine mammals that frequent Fort Baker include harbor seals and California sea lions. Other marine mammals visit infrequently. They are protected through the Marine Mammal Protection Act from being disturbed in any way.

Monarch butterflies, considered a rare migratory phenomena by the State of California, use the eucalyptus groves within the fenced area of Battery Duncan as an overwintering site. Their numbers have been small but consistent through the last 15 years of monitoring.

3.5 CULTURAL RESOURCES

Information for the following discussion was obtained primarily from the *Fort Baker Cultural Landscape Report* (NPS, 1997a).

3.5.1 Physical History

Regional Context. The cultural history of the San Francisco Bay region spans prehistoric occupation by indigenous Coast Miwok peoples, to exploration and settlement by Spanish explorers, Mexican independence and rule of Alta California, through the treaty of Guadalupe Hildago ceding California to the United States, westward expansion and the development of San Francisco as a major port and military base after the Gold Rush up to the present day.

Pre-Settlement. The Coast Miwok inhabited the area prior to the exploration and settlement by European explorers. Wetlands, marshes and streams, such as existed on the site before construction of Fort Baker, provided indigenous peoples with many uses and the adjacent land often served as seasonal encampments or villages.

Recorded history begins in 1775, when the earliest known sailing vessel into San Francisco Bay anchored off lee of the rocky headlands during its voyage of exploration. The pilot of the Spanish "fregata" dubbed the point "Punta de San Carlos" after his ship. At the close of the Hispanic era, this point—comprising much of what is now the Marin Headlands and Sausalito, then the southern tip of William Antonio Richardson's vast Rancho Sausalito—passed to real estate speculators.

Fort Establishment 1866-1897. In 1850, President Millard Fillmore issued an executive order designating the point a military reservation and the federal government set out to acquire the site. But intentions to build a major fort here were frustrated by sixteen years of title and price dispute with the land's owners. The Civil War had come and gone before the U.S. Army was finally in a position to fortify the northern side of the Golden Gate (by then christened the Lime Point Military Reservation).

The military made grandiose plans for a multi-tiered fort similar to the one at Fort Point, but the demonstrated ineffectiveness of such brickworks during the Civil War, and the evident expense of building such a structure at the base of towering cliffs, finally dissuaded the Army engineers from pursuing its plans, Not, however, before they had set off the largest noncombat blasting operation yet undertaken: over 25 tons of gun powder were used to shave off the cliff face on the way to Lime Point, where the north tower of the Golden Gate Bridge now stands.

Relatively simple earthwork batteries were constructed at the post in the 1870s, but only a single cannon was ever mounted prior to 1893. One of these fortifications, Battery Cavallo, remains a particularly fine example of the state-of-the-art seacoast fortification in the latter half of the nineteenth century. Its masonry parapets and magazines are arranged in the rough form of an arrowhead. Its little-visited earthwork ramparts have been subjected to vandalism and graffiti that began with its closure. These ramparts provide habitat for the mission blue butterfly, an endangered species.

Fort Development 1898-1937. In the 1890s, the far-reaching plans for modernization of the nation's seacoast defenses, known as the Endicott Era, brought dramatic change to Fort Baker's Horseshoe Bay. The adjutant general of the Army wrote, "it is important that there should be a strong garrison on that side of the harbor, as this is really the Gibraltar of the Pacific Coast." Between 1897 and 1905, five massive concrete batteries for the latest long-range guns were constructed along the bluffs on both sides of Horseshoe Bay to protect San Francisco Bay, its naval yards and port facilities, from attack by a hostile fleet. Two of these batteries, Duncan (once armed with two 8-inch guns) and Yates (six smaller, rapid-fire cannons) are located within the site. In 1897 the post received a new name: the eastern half of the Lime Point reservation was named Fort Baker, in honor of former Senator Edward D. Baker, lost in the Civil War. The attractive small post that we recognize today began to take shape with the turn of the new century. It was the first Army post in the area built specifically to support the important mission of coast defense.

During the brief Spanish American War of 1898, soldiers manning the guns at Fort Baker lived in tents on the site of the Parade Ground. Their greatest excitement may have been putting out a grass fire that blazed through camp that summer. By 1901, contracts had been awarded for eleven buildings based on standard Quartermaster Department plans. By 1910 the post had been essentially completed, laid out in a curve around a grassy parade ground, and the planting of pepper, elm and eucalyptus trees to cut down on the wind and dust had begun. Alcatraz military prisoners labored to construct a road to Sausalito, while the coastal marsh that formed a transition from watery cove to grass valley was filled in—at the instigation of the post surgeon, who considered it a health hazard—and the stream running through the Parade Ground into the marsh was culverted, covered over and the bare ground seeded with rye grass. During World War I, most of the new generation of guns was removed, and the post reverted to caretaker status in the interwar years.

World War II 1938–1948. As world tension increased in the 1930s, rearmament came again to Fort Baker, this time largely in the form of a mine depot: storage buildings, ammunition bunkers, piers and mine-planting vessels to place protective minefields in the waters outside the Golden Gate. Eventually 368 underwater mines guarded the harbor entrance, the Army's "navy" berthed at Fort Baker and the guns of Battery Yates were manned against surprise surface raiders. During the war, the buildings of a temporary hospital for the Coast Artillery garrisons of the Bay Area forts were constructed along the Horseshoe Bay shore.

Post-War to Present 1949–1998. In the years of the Cold War, the buildings at Fort Baker had a dual mission: they were used for training Army Reserve troops and served as headquarters for anti-aircraft missile units which defended the Bay Area. With the post-Cold War drawdown of the defense establishment, the Army's presence at the historic post has grown smaller and smaller. In 1972, legislation establishing the Golden Gate National Recreation Area (GGNRA) included Fort Baker within park boundaries and in 1986, much of the open space surrounding the fort transferred from Army to NPS management. In 1995, the Army announced its intent to relinquish jurisdiction of the remaining acreage at Fort Baker to the NPS, ending its historic tenure at the post. Today, a Coast Guard Station and the popular BADM are located at Fort Baker and the fishing pier is open to the public.

3.5.2 Status of the National Register of Historic Places and the National Historic Landmark

All of Fort Baker was listed as a historic district on the National Register of Historic Places in 1973 as part of "Forts Baker, Barry and Cronkhite National Register of Historic Places." The forts were listed for their significance in the development of the defense systems for San Francisco and the nation. Fifty-five structures associated with Fort Baker are included in the National Register. The association

of the Fort with events important in our nation's history and the architectural integrity of the coastal batteries and supporting structures (i.e., barracks, Officers' quarters, the Parade Ground, the hospital, the mine cable tank building and other mine-related structures) were contributing factors for the eligibility of the district. Beginning in 1992, the NPS conducted a 4-year survey and evaluation of all lands within Golden Gate National Recreation Area to identify properties which are potentially eligible for the National Register. The identified properties were listed in the NPS's List of Classified Structures (LCS). At Forts Baker, Barry, and Cronkhite, the LCS survey identified which of the elements of the built environment contribute to the existing National Register District. The listing provided in Appendix A identifies which elements contained within Fort Baker contribute to the overall historic district.

Numerous fortifications throughout Golden Gate appear to be eligible for listing as part of a coastal fortifications National Historic Landmark district. At Fort Baker, Batteries Cavallo, Duncan and Yates, as well as structures that supported mining of San Francisco Bay during World War II, appear to contribute to this landmark district and will be treated as such.

3.5.3 Status of Compliance With the National Historic Preservation Act

As discussed above, the current NPS LCS identifies contributing elements within the Forts Barry, Baker and Cronkhite National Register District. The list provided in Appendix A not only identifies those elements within the Fort Baker planning area that contribute to the overall National Register District but lists, as well, the treatment for each element within the Proposed Action.

As required by Section 106 of the National Historic Preservation Act, the NPS has initiated consultation with the Advisory Council on Historic Preservation (ACHP) and the California State Historic Preservation Officer (SHPO). The parties to this consultation would take into consideration the effects of all actions that are to occur as part of implementation of the Proposed Action for Fort Baker, including building demolition, beach restoration, restoration of the Parade Ground, and rehabilitation of remaining historic structures, on the historic qualities of the historic district. It is anticipated that the outcome of consultations would result in a Memorandum of Agreement which stipulates how the identified effects to which all consulting parties agree would be taken into account by the NPS. It is also anticipated that the consultation for the Proposed Action, along with other consultations occurring concurrently for undertakings throughout Golden Gate, would result in a revision to the GGNRA Programmatic Agreement that would provide for review and certification by park historic preservation staff for a broad range of activities that would affect historic resources throughout the park.

3.5.4 Archaeological Resources

Archaeological sites and features found in Fort Baker can provide, in concert with historic and other research, important contributions to the prehistory of the region and to the social, economic and physical history of the Lime Point and Fort Baker military reservations. To date, 16 archaeological clearances for projects of various sizes have been conducted in the Fort Baker vicinity without the discovery of archaeological resources. Two informal surveys on the eastern side of the area have found two historic archaeological sites.

An inventory of archaeologically sensitive areas has been developed to assist in conserving significant resources during future planning for Fort Baker. These areas would require more detailed analysis and investigation to identify, evaluate and protect actual archaeological resources. Unexpected discoveries may occur outside of these zones, and routine archaeological clearances would be

required of all areas within Fort Baker. The inventory is based on preliminary work completed by NPS archaeologists in 1980 and 1997 and on work completed by the Sausalito Historical Society in 1996. Analysis included generalizations drawn from prehistoric site geography in the San Francisco Bay region, existing historic data and similar historic period archaeological sites in North America.

Archaeological resource predictions for Fort Baker include a variety of property types that range in complexity from individual features (e.g., isolated prehistoric artifacts, a privy pit or a bivouac dump) to larger groupings of associated features (e.g., a prehistoric encampment with pit ovens and shell midden, or an engineer's camp with associated residences, shops, dumps, privies and wharf). The following list of general archaeological property types are among those expected at Fort Baker:

- prehistoric sites
- isolated artifacts
- privy pits/refuse deposits
- foundations
- linear system elements (spring workings, tunnels)
- discrete/specialized refuse sheet scatter or pit dumps
- generalized multi-purpose dumps
- activity areas with multiple features
- underwater artifacts

Specific historic areas most sensitive to the discovery of prehistoric or historic archaeological sites and/or features have been inventoried. Preliminary location numbers have been provided until actual archaeological features are found. When archaeological sites and features have been verified, they would be recorded on California State Archaeological Site Inventory forms, and entered in the NPS Archaeological Sites Management Information System.

3.6 TRAFFIC AND CIRCULATION

The existing transportation setting and conditions associated with the Fort Baker area are described below. Information for the description was obtained primarily from the *Fort Baker EIS Transportation Report* (Wilbur Smith Associates, 1998), *Supplemental Traffic Analysis for Fort Baker* (Robert Bernstein, P.E., 1999), *Fort Baker EIS—Addendum to Final Transportation Report of August 7, 1998* (Wilbur Smith Associates, 1999), *Fort Baker Roadway Level of Service Technical Memorandum* (Wilbur Smith Associates, 1999), and *Fort Baker Queuing Study* (Fehr & Peers, 1999).

The level of service (LOS) is a measure of the ability of an intersection or roadway segment to accommodate traffic volumes. Levels of service range from LOS A, which indicates free-flow conditions with little overall delay, to LOS F, which indicates congested conditions with extremely long delays. LOS A, B, C, and D are generally considered excellent to satisfactory service levels. LOS E and LOS F conditions are typically considered unacceptable.

3.6.1 Regional Roadway Network

Fort Baker is within reasonable commute distance from San Francisco and most Marin County communities. Access to Fort Baker is provided from Highway 101 via Alexander Avenue and Danes Drive, and from Sausalito via Alexander Avenue and East Road. A brief overview of the regional

network is provided below, and supplemented by Figure 3-7 and Table 3-1. For information on the existing traffic conditions including levels of service, refer to Section 3.6.3.

U.S. Highway 101 is an eight-lane major north-south freeway that serves Fort Baker. To the north, Highway 101 directly connects Marin County and parts of the East Bay (via the Richmond–San Rafael Bridge) with Fort Baker. To the south, it provides access to San Francisco and other communities along San Francisco Bay.

Alexander Avenue is a two-lane arterial running between Highway 101 and Sausalito. Access to Fort Baker is provided from Alexander Avenue via Danes Drive (and Bunker Road) and East Road.

Bunker Road is a narrow and winding two-lane rural road that runs between Rodeo Valley and Fort Baker. To the north, it provides access to the Marin Headlands through the one-lane Baker-Barry tunnel between Fort Baker and the Fort Barry area. Motor vehicles travel through the tunnel alternating between eastbound and westbound traffic, controlled by traffic signals located on both ends of the tunnel. Four-foot wide bicycle lanes are provided on both sides of the tunnel. Access to Fort Baker from the west side of Highway 101 is also possible via Conzelman Road, under the Golden Gate Bridge.

Conzelman Road is a narrow and winding unstriped rural road that connects the Marin Headlands on the west to East Road and to Fort Baker on the east. This road is used extensively by bicycles and pedestrians. As of September 1999, the portion of Conzelman Road extending beneath the Golden Gate Bridge to Fort Baker was closed at all times due to construction activity associated with the Golden Gate Bridge seismic and wind retrofit project. This segment of Conzelman Road is expected to remain closed to all traffic until July 2000.

East Road is a two-lane two-way north-south rural roadway, approximately one-mile in length between Alexander Avenue and the Fort Baker parade ground. East Road provides access to and from Fort Baker to Alexander Avenue.

3.6.2 Onsite Roadways

Existing onsite roadways at Fort Baker are shown in Figure 3-7, and described in Table 3-1. The onsite roadway system was developed for the military and does not generally conform to modern civilian standards. Thus, onsite roadways can be characterized by narrow streets, irregular layouts and lack of sidewalks in most sections. All intersections are controlled by stop signs. Posted speeds are generally 25 mph. As mentioned above, access to Fort Baker is currently possible from two points: Bunker Road and East Road, which connect to the primary roadway in Fort Baker, Murray Circle.

3.6.3 Existing Traffic Conditions

This section describes the current traffic conditions on the local roadway network. Information on general traffic volumes for roadway segments and intersections, as well as levels of service (LOS) are presented below. Data was obtained from the documents listed in the introduction to this section or as otherwise referenced below.

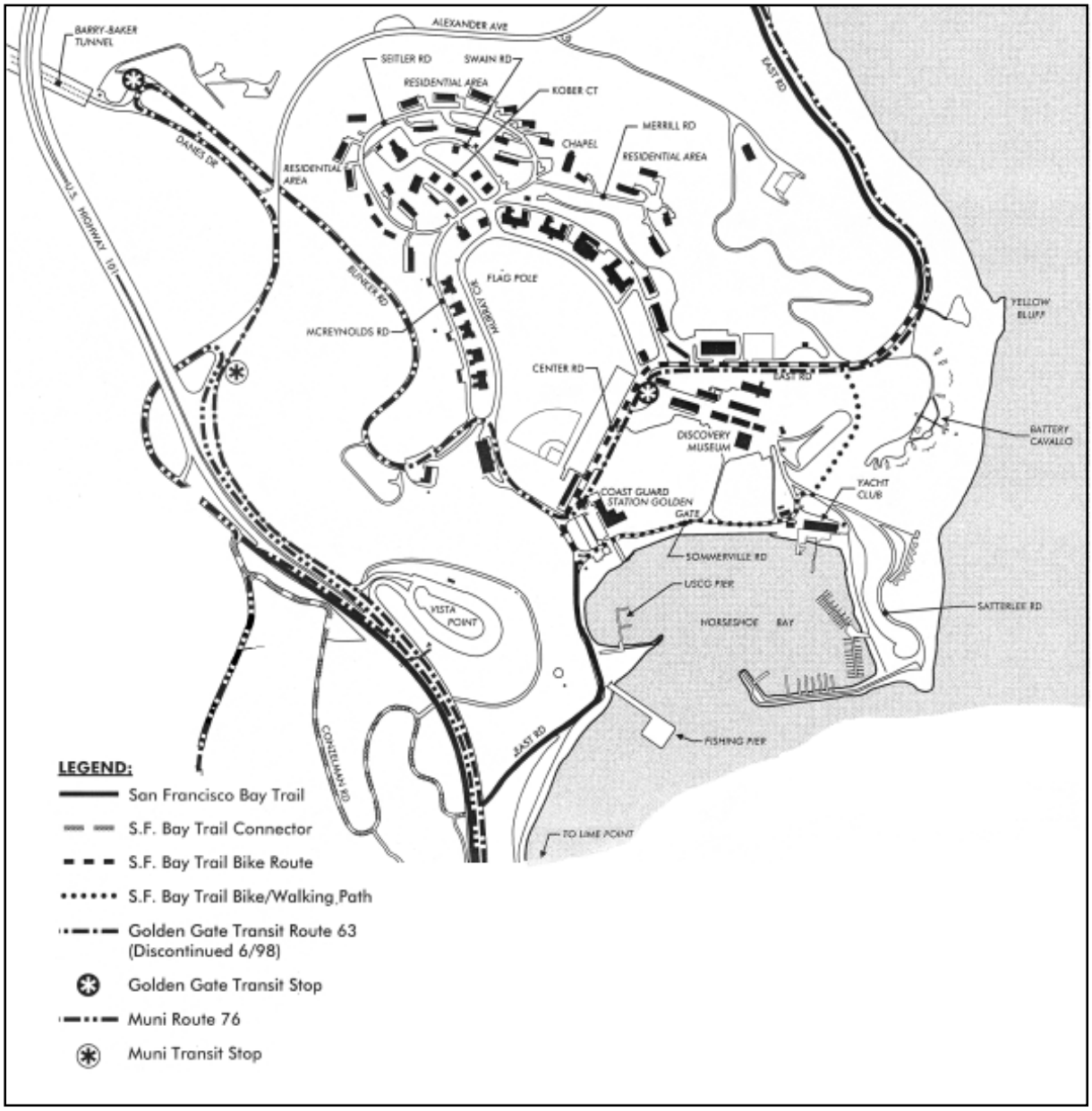


Figure 3-7 Existing Fort Baker Layout

N

APPROXIMATE SCALE IN FEET

0 500 1000

Source: Wilbur Smith Associates

DATE: October 1998

Table 3-1
Primary Fort Baker Roadways

Roadways	Primary Orientation	Primary Function	Segment Width (feet)	Median/Island (Typical Section)	Notes
Regional Segments					
Highway 101	N-S	8-Lane freeway	Greater than 100	Yes	Often congested.
Alexander Ave.	NE-SW	2-Lane arterial	Approx. 40 including shoulders	No	Provides access from Hwy. 101 to Sausalito, and to Fort Baker via Bunker Road.
Bunker Road	NW-SE	2-Lane local road	Approx. 22-24	Striped	Main connector between Marin Headlands and Fort Baker.
East Road	NE-SW	2-Lane local road	Approx. 20	No	Provides access from Sausalito. Street width is more than 20 ft in several places where pullouts are located.
Conzelman Road	NE-SE	2-Lane local road	Approx. 20	No	Provides access from Marin Headlands.
Currently closed due to construction activity on the northern section of the Golden Gate Bridge.					
Onsite Local Segments					
Murray Circle	Follows parade ground	2-Lane, one-way westbound road Class II	Approx. 20	No	Main access to administrative buildings. Connector/Access Roadway.
Bunker Road Entrance	NW-SE	2-Lane local road Class I	Approx. 24	Striped	Road relatively narrow with no shoulders. Connects to Murray Circle. Main access roadway.
McReynolds Road	Parallels Murray Circle	2-Lane minor road Class III	Approx. 20-24	No	Service road that provides access to administrative and officer housing areas. Also connects to Seiter Rd., Swain Rd. and Kober St.
Seiter Road	Circle	1-Lane, one-way minor road Class II	Approx. 15-20	No	Generally without sidewalks or shoulders. Segments provide access to residential areas.
Swain Road	SE-NW	1-Lane, one-way minor road Class III	Approx. 12-15	No	
Kober Road	N-S	2-Lane minor road Class II	Approx. 15-20	No	
Merrill Road	W - E	2-Lane minor road Class III	Approx. 15-20	No	
Sommerville Rd.	W-E	1-Lane minor road Class III	Approx. 12-15	No	Along access to waterfront area.
Saterlee Road	N-S	1 Lane Class III	Approx. 15-20 ft.	No	One-way circle, historic boat shop area access.

Source: Wilbur Smith Associates, 1998

US Highway 101. The average weekday daily traffic between the San Francisco Golden Gate Bridge Toll Plaza and the South Sausalito Interchange is about 115,000 vehicles in both directions. According to traffic data from the Marin County Congestion Management Agency, weekday p.m. peak hour traffic volumes on Highway 101 in the vicinity of the Alexander Avenue interchange are about 6,910 vehicles (northbound) and 3,670 (southbound)[1]. Weekday daily traffic volumes at the Highway 101/Alexander Avenue interchange for both northbound (NB) and southbound (SB) directions are 5,200 (NB Off), 1,400 (NB On), 1,950 (SB Off) and 6,700 (SB On)[2] Highway 101 frequently experiences congestion, particularly between the Waldo Tunnel and the Golden Gate Bridge Toll Plaza. According to Caltrans traffic data, heavy congested conditions are experienced in the southbound direction during both the a.m. (7:00 to 9:00) and p.m. (4:00 to 6:00) peak commute periods. Travel speeds begin to reduce substantially at the Waldo Tunnel and continue to drop through the Alexander Avenue interchange.

Adjacent Roadways. To determine existing traffic volumes on the Alexander Avenue machine counts were conducted in January and February 1998. Because traffic counts were taken during the winter, it was necessary to account for seasonal variation. Seasonal variation refers to the fluctuation of traffic volumes throughout the year. In general, roadways used mostly for commuter travel show less seasonal variation (about 10 percent or less) than other types of roadways. Roadways that are used by recreational travel experience a higher seasonal variation; the actual percentage being a function of the specific nature of the traffic and the surrounding land uses.

For the purposes of this analysis, seasonal variation factors were based on the ratio of total December 1997 traffic volume on East Fort Baker Bunker Road to the average of total June, July, and August 1997 traffic volume on East Fort Baker Bunker Road. The resulting seasonal adjustment factor obtained was 120%; that is, a factor of 1.2 was applied to the actual intersection turning movement counts for all approaches at all intersections. This factor was compared to other available data from the Golden Gate Bridge Highway and Transportation District (for tollbooth volumes) and the California Department of Transportation (for US 101 in the vicinity of Alexander Avenue). The comparison showed that the 1.2 factor was reasonable and the seasonally adjusted turning movement traffic volumes were then used to perform all of the intersection level of service (LOS) calculations and the queuing analysis for the project.

Based on the data collected, the highest one-hour weekday volume occurs during the a.m. peak commute. The highest average one-hour two-way roadway weekday volume (730) occurs between 7:30 and 8:30 a.m., with the southbound traffic exhibiting the highest traffic flow (580 vehicles) which is consistent with morning commute patterns to San Francisco. On weekends, the highest average one-hour volume of vehicles (685) was observed during the p.m. period between 5:00 and 6:00 p.m., with a similar distribution of traffic in the northbound and the southbound directions. Based on these results, turning movement traffic counts were taken during weekday a.m. and weekend p.m. peak periods. Section 4.6 presents this data in tabular form, along the Proposed Action's projected contribution. The average total weekday and weekend daily traffic volumes for the segment of Alexander Avenue south of East Road are 7,700 and 7,000 vehicles, respectively.[3]

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[1] Marin County Public Works Department, 1998

[2] Caltrans, 1995

[3] Wilbur Smith Associates, 1998.

During periods of peak congestion (i.e., summer weekend evenings) southbound traffic on US Highway 101 can become congested causing traffic to back up from the on-ramp approach onto Alexander Avenue. Informal reports and general knowledge of the local conditions indicate that during periods of severe congestion, the queue can extend to the Alexander Avenue/East Road intersection or beyond. No data or analyses documenting the frequency, duration or extent of this event was available at the time the Draft EIS was prepared. During the review period for the Draft EIS, the City of Sausalito raised this periodic event and the potential effect the Proposed Action would have on it as a subject of concern. Based on this concern, the NPS conducted additional traffic counts and a queuing analysis during summer 1999 as summarized below. In order to develop a sound understanding of this regional problem, however, a long-term, comprehensive approach will be necessary. The NPS has already taken an active role in regional transportation planning in other areas including Marin County, and as described in Section 2.6.6, would work relevant regional transportation agencies and the City of Sausalito to monitor and manage regional transportation issues in the vicinity of Fort Baker.

The additional counts were taken during a weekend in September 1999. The weekend was selected because it coincided with a planned Army Reserve Drill at Fort Baker, during which approximately 180 people would arrive and depart Fort Baker at roughly the same time. A summary of the conditions observed during this analysis is provided below. For additional information, refer to the *Fort Baker Queuing Study* (Fehr & Peers, 1999). Queuing observations were made on Saturday, September 18 and Sunday, September 19, 1999 between 2:00pm and 6:00pm. Queues extending on Alexander Avenue from the U.S. 101 southbound on-ramp were observed to be longest at 5:45pm. The maximum observed queue at this location on Saturday was 21 vehicles in length, and did not extend to the tunnel beneath U.S. 101. The maximum queue observed on Sunday was 40 vehicles, which causes cars to back up into the tunnel beneath U.S. 101 but they did not extend beyond the eastern portal of the tunnel. It is estimated that a queue of approximately 70 cars in length would be necessary to reach the Alexander Avenue/Danes Drive intersection. To reach the East Road/Alexander Avenue intersection, roughly 195 cars would have to queue from the US 101 on-ramp (Fehr & Peers, 1999).

Intersections. Intersection volume counts were taken during the weekday a.m. peak period between 7:30 and 9:30 a.m. on Wednesday, February 4, 1998 at the intersections of Alexander Avenue/Danes Drive, Bunker Road/Danes Drive, Bunker Road/McReynolds Road, and East Road/Murray Circle and McReynolds Road (see Figure 3-8). As indicated in the figure, 873 vehicles were observed at the intersection of Alexander Avenue/Danes Drive during the weekday a.m. peak hour (7:30 to 8:30 a.m.), and 138 vehicles were observed at the intersection of Bunker Road/Danes Drive during the same period. All other intersections experienced relatively low volumes indicating very little incoming traffic to Fort Baker during the a.m. period. Approximately 55 vehicles were observed and recorded heading to and from the Fort Baker Area to existing military offices, the BADM and to locations in the marina during the weekday a.m. peak hour, via Bunker Road.

Weekend counts were also taken at two intersections during the weekend p.m. peak period (4:00 to 6:00) on Saturday, January 31, 1998. The volumes were collected at Alexander Avenue/Danes Drive, and Bunker Road/Danes Drive. Weekend volumes at both intersections, as expected, reflect a much higher inflow of visitors than weekday traveling to the Marin Headlands. The total intersection volumes during the p.m. peak hour (5:00 to 6:00 p.m.) on Alexander Avenue/Danes Drive and Bunker Road/Danes Drive were 1,043 and 454, respectively. Approximately 130 vehicles were observed and recorded heading to and from the Fort Baker Area to existing military offices, the BADM and to locations in the marina during the weekend p.m. peak hour, via Bunker Road.

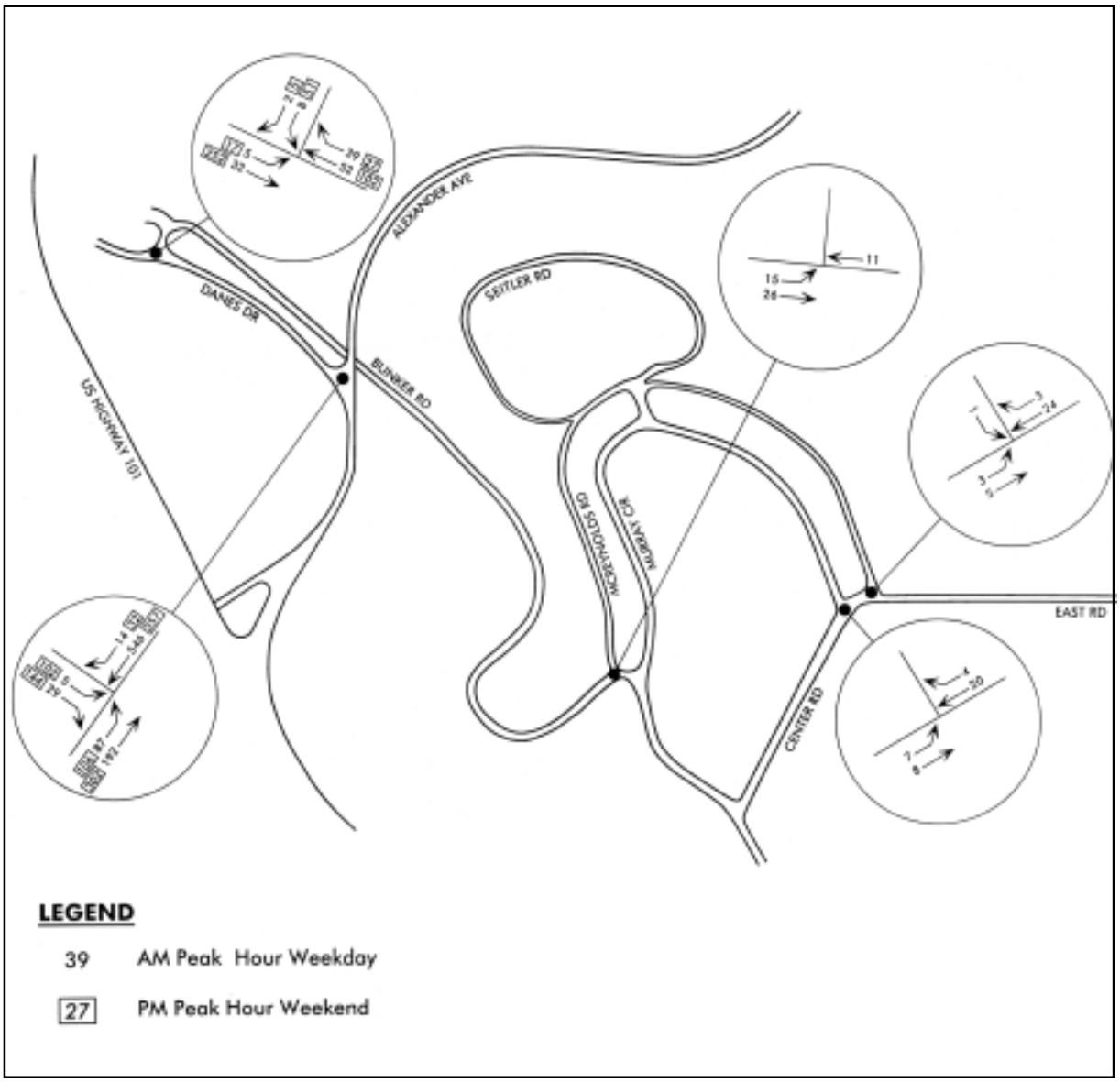

Figure 3-8 Existing Intersection Volumes

N Not to Scale

Source: Wilbur Smith Associates

DATE: October 1998

Levels of Service (LOS). According to traffic data from the Marin County Congestion Management Agency[4], Highway 101 operates at a LOS D (v/c=0.86) in the northbound (peak) direction, during the weekday p.m. peak hour, between the north end of the Golden Gate Bridge and Spencer Avenue. Highway 101 in the southbound (non-peak) direction operates at LOS B (v/c=0.46) during the same period.

Intersection LOS was calculated for one intersection using the Unsignalized Methodology described in *1994 Highway Capacity Manual.* For analysis purposes, LOS was calculated for the a.m. peak hour between 7:30 and 8:30 and weekend p.m. peak hour between 5:00 and 6:00, based on weekday and weekend intersection traffic counts. Weekday and weekend existing LOS conditions for Alexander Avenue/Danes Drive are shown in Table 3-2. The table indicates that the intersection currently operates at acceptable level of service during weekday and weekend peak hour conditions.

Table 3-2
Existing Intersection Levels of Service

	Weekday A.M. Peak		Weekend P.M. Peak	
Intersection	**LOS**	**Overall Ave. Delay**	**LOS**	**Overall Ave. Delay**
Alexander Avenue/Danes Drive	A	1.0 sec.	B	2.5 sec.

Delay in seconds per vehicle
Source: Wilbur Smith Associates, 1998

Levels of Service for the local roadways in the vicinity of Fort Baker were also calculated using the methodology for two-lane roadways described in *1994 Highway Capacity Manual*. The LOS was calculated for the a.m. peak hour between 7:30 and 8:30 and weekend p.m. peak hour between 5:00 and 6:00. All of these roadways currently operate at acceptable levels of service during weekday and weekend peak hour conditions. Section 4.6 presents this information along with the Proposed Action's effect on existing LOS.

3.6.4 Parking Facilities

There are 127 on-street and 506 off-street parking spaces throughout the site. Parking is available in surface lots, unpaved open areas and residential areas within the Capehart Area, and in other locations within the waterfront and marina/historic boat shop areas. Additional parking is also located on two lots totaling 185 parking spaces associated with the BADM. There are no parking structures on the site.

3.1.5 Public Transportation

Golden Gate Transit Service is the primary provider of public transit services in Marin County. Direct service to Fort Baker was provided by Golden Gate Transit on a limited basis on weekends and holidays only between 8:30 a.m. and 5:30 p.m. (Route 63). This route was discontinued on June 14, 1998 due to low ridership although service could be reinstated if transit demand is warranted.[5] Route

[4] Marin County Public Works Department, 1999

[5] Performance measurement conducted by Golden Gate Transit for Route 63. Conversation with Alan Zahradnik, Golden Gate Transit Planner, July 8, 1998.

63 provided service between Audubon Canyon Ranch and the Golden Gate Bridge Toll Plaza. At Fort Baker, the BADM served as the only stop for Route 63.

Transit access to the area is also provided by MUNI Route 76. This route provides limited service on Sundays and holidays only (9:30 a.m. to 7:00 p.m.) between Fort Cronkhite Parking Lot and 4th Street/Townsend in San Francisco. Route 76 transit stops are provided at the Alexander Avenue northbound off-ramp and at points along Conzelman Road (west section), McCullough Road and Bunker Road near Fort Cronkhite (refer to Figure 3-7; see page 3-22).

In 1995 and 1996, minibus service was provided every day in July, August and September by the Sausalito Chamber of Commerce. The minibus ran between the Sausalito ferry terminal to the Golden Gate Bridge west parking lot between 11 a.m. and 2 p.m. At Fort Baker, the BADM served as the only stop for the shuttle. Ridership for the 1996 season was approximately 1,900 passengers. In 1996, the shuttle service was operated by Super Sightseeing Tours at a cost of $36 per hour.[6] No other transit or ferry service to the site is currently available.

3.6.5 Bike and Pedestrian Trails

Most onsite roadways are generally too narrow to include bicycle lanes. Based on park standards, a recommended minimum shoulder width for bikeways is 4 feet per direction for roadways that serve as primary access and circulation segments like Bunker Road and East Road. The 4-foot-shoulder bikeways should be provided on both sides of the roadway, clearly delineated and marked. Such standards would require the roadways to be at least 24 feet wide with 4-foot separated bikeways in both directions. This standard is not met on either Bunker Road or East Road. For roadways that can be characterized with relatively low volumes and driveways, the sharing of travel lanes is acceptable based on park standards.

Current bike and pedestrian access to and through Fort Baker is provided by a multi-use route identified by the San Francisco Bay Trail Plan. As indicated in Figure 3-7, from San Francisco the trail offers walkers/runners and cyclists access to Fort Baker via Conzelman Road. After crossing the San Francisco Bay Bridge, it continues on Conzelman Road until connecting to East Road under the Golden Gate Bridge. On East Road, the trail continues easterly until reaching the fishing pier. From the pier the trail splits into two directions. The route, identified for bicycles, continues through Fort Baker along East Road, eventually reaching South Alexander Avenue in Sausalito. The other trail roughly parallels Horseshoe Bay, then continues north to Sausalito via East Road to Alexander Avenue. A former military service road provides trail access between East Road and Battery Duncan, terminating near Alexander Avenue.

3.7 AIR QUALITY

The following is a discussion of the applicable air quality regulations and the existing regional air quality conditions in the vicinity of Fort Baker.

3.7.1 Regulatory Framework

The federal Clean Air Act (42 USC 7401 et seq.) and the California Clean Air Act mandate the establishment of national and state ambient air quality standards, respectively, for six criteria

[6] Sausalito Chamber of Commerce, March 1997.

pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), inhalable particulate matter (PM_{10}) and lead. Areas in which the standards are not met are known as nonattainment areas. The County of Marin is designated as a federal nonattainment area for ozone and a state nonattainment area for ozone and PM_{10}.

After Fort Baker's undeveloped area became a part of the GGNRA in 1985, the site's air quality designation changed from Class III to a Class II clean air area as defined by the federal Clean Air Act and amendments. Class II designation allows for smaller amounts of degradation of existing air quality within limits based on the standards compared to Class III. Both the 1916 Organic Act and the Clean Air Act require federal land managers to protect a park's air quality values from adverse impacts. Section 118 of the Clean Air Act requires that federal facilities comply with existing federal, state, and local air pollution control laws and regulations. GGNRA managers must ensure that all in-park activities meet existing laws and regulations and that external sources of air pollution are controlled to the extent possible to protect the air quality and resource values of the GGNRA, including Fort Baker.

3.7.2 Air Quality Pollutants and Ambient Air Quality Standards

Both the State of California and the federal government have established ambient air quality standards for several pollutants. For some pollutants, separate standards have been set for different periods. Most standards have been set to protect public health. For some pollutants, standards have been based on other values (such as protection of crops, protection of materials, or avoidance of nuisance conditions). The pollutants of greatest concern in Marin County are CO, ozone and PM_{10}. A summary of state and federal ambient air quality standards is shown in Table 3-3.

3.7.3 Existing Air Quality Conditions

Winds at Fort Baker vary seasonally. Prevailing winds during the summer are westerly, while winter wind directions are more variable with northeast and west winds interrupted by periodic southeast gales. During storms, winds may reach speeds of 60 miles per hour or more. Local topography shapes the wind and, to a large extent, the microclimate at Fort Baker but generally speaking, its location allows for excellent air circulation. Because there are no pollution sources west of Fort Baker, the air moving into the area is of very high quality.

The primary source of air pollution at Fort Baker is motor vehicle traffic. When extreme traffic congestion coincides with stagnant air, localized CO levels may exceed state and federal standards. High traffic volumes and congestion occur regularly on U.S. Highway 101 above Fort Baker. However, violations of the CO standards at sensitive receptors at Fort Baker (such as the Parade Ground) would not be expected because of the low background concentrations and the distance from the congested highway.

3.7.4 Air Quality Monitoring

The Bay Area Air Quality Management District (BAAQMD) operates a regional air quality monitoring network for the Bay Area Air Basin, which consists of San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Napa, and Marin counties and portions of Sonoma and Solano counties. The district has 29 sites in the Bay Area Air Basin. Monitoring data are available from the San Rafael station, the closest representative monitoring station. A summary of recent air quality monitoring data from the San Rafael monitoring station is shown in Table 3-4. These data indicate that between 1992 and 1996, monitored ozone, CO and NO_2 levels did not exceed state and federal standards, while PM_{10} levels have exceeded the state 24-hour standard from 0% to 8% of the time. Federal PM_{10} standards were not exceeded during this period.

Table 3-3
Ambient Air Quality Standards

California [1]		National [2]	
Air Pollutant	**Concentration**	**Primary (>)**	**Secondary (>)**
Ozone	0.09 ppm, 1-hr avg	0.12 ppm, 1-hr avg	0.12 ppm, 1-hr avg
		0.08 ppm, 8-hr avg.[3]	0.08 ppm, 8-hr avg.[3]
Carbon Monoxide	9 ppm, 8-hr avg	9 ppm, 8-hr avg	9 ppm, 8-hr avg
	20 ppm, 1-hr avg	35 ppm, 1-hr avg	35 ppm, 1-hr avg
Nitrogen Dioxide	0.25 ppm, 1-hr avg	100 µg/m^3 annual	100 µg/m^3 annual
Sulfur Dioxide	0.04 ppm, 24-hr avg	0.03 ppm, annual avg	0.5 ppm, 3-hr avg
	0.25 ppm, 1-hr avg	0.14 ppm, 24-hr avg	
Suspended Particulate Matter (PM_{10})	30 µg/m^3 annual geometric mean	50 µg/m^3 annual arithmetic mean	50 µg/m^3 annual arithmetic mean
	50 µg/m^3, 24-hr avg	150 µg/m^3, 24-hr avg	150 µg/m^3, 24-hr avg
Suspended Particulate Matter ($PM_{2.5}$)	--	15 µg/m^3 annual arithmetic mean	15 µg/m^3 annual arithmetic mean
		65 µg/m^3, 24-hr avg	65 µg /m^3, 24-hr avg
Lead	1.5 µg/m^3,	1.5 µg/m^3	1.5 µg/m^3
	30-day avg	calendar quarter	calendar quarter
Sulfates	25 µg/m^3, 24-hr avg	--	--
Hydrogen Sulfide	0.03 ppm, 1-hr avg	--	--
Vinyl Chloride	0.01 ppm, 24-hr avg	--	--
Visibility Reducing Particles	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%.	--	--

[1] California standards for ozone, carbon monoxide, sulfur dioxide (1-hour), suspended particulate matter-PM_{10} visibility reducing particles, are values that are not to be exceeded. The sulfur dioxide (24-hour), sulfates, lead, hydrogen sulfide and vinyl chloride standards are not to be equaled or exceeded.

[2] National standards, other than ozone and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

[3] Based on newly established 8-hour EPA standard. The 0.12 ppm 1-hour standard will not be revoked in a given area until that area has achieved 3 consecutive years of air quality data meeting the 1-hour standard.

ppm= parts per million by volume
µg/m^3= micrograms per cubic meter

Source: California Air Resources Board 1998

Table 3-4
Summary of Annual Air Quality Data, San Rafael Air Monitoring Station

Pollutant Standards	1992	1993	1994	1995	1996
Ozone (O_3)					
State standard (1-hr avg > 0.09 ppm)					
National standard (1-hr/8-hr avg > 0.12/0.08 ppm)					
Maximum concentration (ppm)	0.07	0.07	0.08	0.09	0.09
Number of days state standard exceeded	0	0	0	0	0
Number of days federal standard (1-hr/8-hr) exceeded	0/0	0/0	0/0	0/0	0/0
Carbon Monoxide (CO)					
State standard (1-hr/8-hr avg > 20/9 ppm)					
National standard (1-hr/8-hr avg >35/≥9.5 ppm)					
Maximum concentration, 1-hr/8-hr period (ppm)	8/5.0	9/4.0	6/3.0	6/3.3	7/4.0
Number of days state (1-hr/8-hr) standard exceeded	0/0	0/0	0/0	0/0	0/0
Number of days federal (1-hr/8-hr) standard exceeded	0/0	0/0	0/0	0/0	0/0
Nitrogen Dioxide (NO_2)					
State standard (1-hour average > 0.25 ppm)					
National standard (0.0543 AAM in ppm)					
Maximum 1-hour concentration (ppm)	0.08	0.08	0.08	0.06	0.07
Number of days state standard exceeded	0	0	0	0	0
Annual arithmetic mean	0.021	0.021	0.020	0.018	0.019
Did the AAM exceed federal standard?	NO	NO	NO	NO	NO
Suspended Particulates (PM_{10})					
State standard (24-hour average > 50 $\mu g/m^3$					
National standard (24-hour average > 150 $\mu g/m^3$					
Maximum 24-hour concentration $\mu g/m^3$)	63	69	72	74	50
Percent samples exceeding state standard	8	2	7	2	0
Percent samples exceeding federal standard	0	0	0	0	0

AAM Annual Arithmetic Mean
$\mu g/m^3$ micrograms per cubic meter
ppm parts per million

Source: CARB, 1993, 1994, 1996, 1997, 1998

3.8 NOISE

The following is a discussion of applicable noise regulations and the existing noise conditions in the Fort Baker vicinity.

3.8.1 Regulatory Framework

Guidelines for assessing noise impacts of traffic have been established by the Federal Highway Administration. These standards, known as noise abatement criteria (NAC) and contained in 23 CFR 772, must be followed by an agency that is performing noise studies for actions involving federal-aid funds. The standards specify design noise levels and relate them to various land uses and/or

activities. Land use category B of the NAC includes noise-sensitive receptors, such as outdoor recreation areas and residences. The standard for this category is 67 decibels (dBA)[7].

The NPS is committed to complying with local noise ordinances. Both Marin County and City of Sausalito noise programs restrict hours for construction-related activities involving the use of machinery, power tools or hammering to acceptable time periods. The City of Sausalito prohibits noise-generating construction activities between the hours of 7 p.m. and 8 a.m. the next day, except on Saturdays, Sundays, or holidays when construction devices are not to be operated before 9 a.m.. To minimize construction noise, Marin County limits construction hours to 7 a.m. to 5 p.m. on weekdays and 9 a.m. to 4 p.m. on Saturdays, with no work allowed on Sundays. The NPS would determine the hours of construction based on the type of construction, site location and noise-sensitivity of nearby land uses. The conditions of approval (or in the case of federal actions, environmental commitments or mitigation measures) would specify hours for staging and type of construction activities.

3.8.2 Existing Natural Quiet Resources and Noise Objectives

Traffic noise and natural sources such as wind and waves dominate the existing noise environment at Fort Baker. Managing ambient urban noise is difficult because of the unpredictability of the sources and the dispersal throughout the landscape. Preserving natural quiet (and natural sounds) and reducing human-caused sounds, including those from cars and buses, is a major NPS objective. Although Fort Baker is adjacent to a highway, it has a quiet and secluded atmosphere that is serene and inspirational. Much of this has to do with the quietness of the site. Sitting at the waterfront allows for the ability to hear the waves, wind and birds and not be distracted by loud activities. It is a contemplative place, mostly because of the presence of natural quiet.

Background noise levels at Fort Baker can be expected to be in the range of 55 to 60 dBA. The quietest areas of Fort Baker are on the eastern side where natural sources dominate the environment. The western end of the site has more ambient urban noise from traffic along U.S. Highway 101.

3.8.3 Noise Sensitive Areas

Noise-sensitive areas are land uses that are sensitive to environmental noise. Such land uses include residences, schools, libraries, hospitals, parks and open space. Within and adjacent to the Fort Baker plan area, noise sensitive areas include:

1. Recreational use areas at Fort Baker;
2. The BADM; and
3. The Coast Guard Station.

3.9 LAND USE AND COMMUNITY SERVICES

The following is a discussion of land use, population and employment, and public safety services in the Fort Baker area.

[7] Sound level measurements are established according to a logarithmic scale of decibels (dB). Separate measurements can be made for different sound frequency ranges, the most common being the A-weighted scale, which approximates the way the human ear responds to noise levels. Measurements on the A-weighted scale are expressed as dBA.

3.9.1 Land Use

Geographic Setting and Location. Fort Baker is located in the San Francisco Bay Area at the north end of the Golden Gate Bridge facing the city and county of San Francisco. The 335-acre site is within Marin County, on the southern tip of the Marin peninsula, and is within the designated boundaries of the GGNRA, a unit of the national park system. The city limits of Sausalito are about a mile to the north, the city of San Rafael is about 10 miles to the north, and the city and county of San Francisco is across San Francisco Bay, about 1.5 miles to the south.

Onsite Land Use. The predominant land uses at Fort Baker are park-related uses including recreation and habitat restoration. Remaining military uses include Army administrative functions in several Parade Ground structures, and the military-supported Presidio Yacht Club and marina. Army uses at Fort Baker will terminate by 2001, when the remainder of the site transfers to the NPS.

Horseshoe Bay, at the south end of the site, is a small (10-acre), shallow, small craft marina protected by two rubblemound breakwaters (the Moore and Satterlee breakwaters). Shoreside facilities clustered around Horseshoe Bay include the Coast Guard Station, the historic boat shop and the fishing pier. The BADM buildings are located adjacent to the northern boundary of Horseshoe Bay. Existing shore structures include Coast Guard berthing facilities located in the lee of the Moore breakwater.

Surrounding Land Use. Fort Baker is surrounded by the GGNRA, an urban national park that extends north of the Golden Gate to Tomales Bay in Marin County and south to the San Francisco watershed lands in San Mateo. Its boundary encompasses 76,500 acres of land and water, including 50 miles of bay and ocean shoreline, and Fort Point National Historic Site, Muir Woods National Monument, Alcatraz Island and the Presidio of San Francisco. These park lands represent one of the nation's largest coastal preserves, which attracts 20 million visitors each year, more than any other unit of the national park system.

GGNRA facilities in the vicinity of Fort Baker include Fort Cronkhite, Fort Barry, Nike Missile Sites, World War II barracks and several bunkers within the rugged hillside terrain of the Marin Headlands. In addition to the recreational usage and historic significance of GGNRA lands, facilities such as the Headlands Center for the Arts and the Marine Mammal Center operate within park boundaries.

3.9.2 Population and Employment

Population/Demographics. At the time of 1990 census, the population of Marin County was 230,096. The population distribution of Marin County residents is concentrated along the U.S. 101 corridor. This highway extends in a north-south orientation and provides a key transportation link between the employment centers of San Francisco and the suburban cities of Marin County. Extensive portions of central and western Marin County are sparsely populated with low-density residential, agricultural and recreational open space areas. Population growth in the County between 1980 and 1990 was low, with 7,500 people and 6,200 households added to the County's population. County population could increase to nearly 260,000 in the future if the land designated for residential development were developed and occupied. Household size is expected to continue decreasing in the future.

The closest community to Fort Baker is the City of Sausalito. Based on 1990 census data, the City of Sausalito had a population of 7,152. The racial and ethnic distribution of Sausalito's population was approximately 94% white, 3% Asian or Pacific Islander, 1% black, and less than 1% for both American Indian, Eskimo or Aleut and "other race." The median household income in 1990 was

$60,471 in Sausalito, as compared to $48,544 in the county. Both averages were well above the US Department of Commerce's definition of poverty in 1990, which was defined as $8,794 for a two-person household (US Department of Commerce, 1992).

Job Development. The number of County residents holding jobs and the number of jobs in the County both increased during the 1980s. In 1980, Marin had 1.52 employed residents for every job in the County. By 1990, Marin had 1.26 employed residents for every job in the County. When the number of employed residents per job nears 1.0, more employed residents could be working on jobs in the County. However, if job salaries do not match the cost of living in Marin, Marin residents will need to commute out of the County to higher paying jobs, while workers from other counties will commute into Marin.

Commercial/Industrial Development. Historically, Marin served as a bedroom community for commuters with jobs in San Francisco. As commuters moved north to take advantage of lower housing costs in the growing cities of Petaluma, Rohnert Park and Santa Rosa, traffic through the County increased. By the early 1980s, however, job development in Marin began attracting increasing numbers of local commuters and commuters from Sonoma, although the number of commuters to San Francisco did not increase significantly. The increase in jobs in the County will be made possible by the development of land designated for commercial and industrial activities. Approximately 14 million square feet are designated for development, mainly in Novato and East San Rafael. Hamilton Air Force Base in Novato is the largest single site available for commercial and industrial development.

Housing. There is a potential for about 20,000 new housing units countywide, both in single-family and multi-family developments. The greatest potential for housing development is in the Richardson Bay, Las Gallinas Valley and Novato planning areas. Currently, no housing is provided at Fort Baker. All residential units at the site have been vacated.

City of Sausalito. The City of Sausalito has nearly reached its maximum build-out potential. In 1992, strictly residential land uses comprised 360 acres. Sausalito commercial and industrial land uses covered approximately 115 acres and commercial buildings totaled approximately 1,778,176 square feet. Future building will involve redevelopment or reuse of existing developed areas. General plan policies anticipate limited additional residential, commercial and industrial development in the City. The City's employment base continues to be dominated by retail trade, followed in importance by the service sector. The City recognizes the importance of the visitor-serving commercial area of its downtown to the health and vitality of the local economy, but at the same time recognizes the importance of assuring a mix of retail activity serving both the visitor and resident market.

3.9.3 Public Safety Services

Fire Services. Fort Baker fire services are provided by the NPS Fire Department. Fire Station 2, located west of Fort Baker at Fort Cronkhite, has primary responsibility for fire protection of the area. This station is staffed by three fire fighters 24 hours a day and is equipped with one fire engine. The Presidio Fire Station, located on the main post of the Presidio of San Francisco, south of Fort Baker, provides reinforcements to Fire Station 2. The two-company station is in the process of being expanded and is currently equipped with an aerial ladder truck, two pumpers, a rescue truck, a haz-mat truck, a cargo trailer and four sedans. The Presidio Fire Station is staffed by three firefighters and one paramedic. Additionally, the NPS Fire Department maintains a formal mutual aid agreement with the City of Sausalito Fire Department.

The following fire codes have been adopted within the GGNRA to prescribe regulations consistent with nationally recognized good practices for the safeguarding to a reasonable degree of life and property from the hazards of fire and explosion arising from the storage, handling and use of hazardous substances, materials and devices and from conditions hazardous to life or property in the use or occupancy of buildings or premises:

- National Fire Protection Association Code, Volumes 1 through 12
- Uniform Building Code
- Uniform Fire Code
- California State Historic Building Code

Where a conflict exists in the interpretation of selected codes, the most stringent standard applies for code enforcement. The State Historic Building Code may allow variances/equivalencies during the rehabilitation of historic structures.

Security and Police Protection. The NPS provides police services to Fort Baker through the U.S. Park Police and NPS Rangers, both of which have memorandums of understanding with the Marin County Sheriff's Office. Fort Baker is in U.S. Park Police Beat 813 that incorporates all NPS-controlled property in the Marin Headlands. One U.S. Park Police officer in a patrol car patrols Beat 813 24 hours a day and spends approximately 30 percent of the time patrolling Fort Baker. The U.S. Park Police headquarters is located at the U.S. Park Police Station at Fort Scott, at the Presidio of San Francisco, south of Fort Baker.

NPS Rangers patrol all GGNRA property in Marin County, generally from 8:00 a.m. to 1½ hours past sunset on weekdays and until 12:30 a.m. on Friday and Saturday nights. Several park ranger beats encompass Fort Baker; park rangers in patrol cars from these beats patrol the site for approximately two hours on an average day. The NPS Rangers headquarters is located at Fort Cronkhite, west of Fort Baker.

Emergency Services. Emergency 911 telephone calls are routed through the Marin County 911 dispatch center. The GGNRA Fire Department and the Southern Marin Emergency Medical Paramedic System (SMEMPS) currently provide joint response to emergency medical calls at Fort Baker. In the past, the NPS responded with basic emergency medical services and the SMEMPS provided advanced emergency care and ambulance transportation. The NPS is currently working with Marin County to route all calls for emergency response to the NPS dispatch for first response. The GGNRA now has a 2-person EMT equipped ambulance available for 24-hour response. Emergency medical patients are transported to Marin General Hospital on Sir Francis Drake Boulevard in Greenbrae, approximately 10 miles from Fort Baker.

3.10 VISUAL AND AESTHETIC RESOURCES

The following is a discussion of the visual character and aesthetic quality of Fort Baker and surrounding region from key viewing locations. Views of the site as well as views of the surrounding area from the site are discussed.

3.10.1 Character of Fort Baker

Fort Baker is nestled in a tranquil valley at the northern entrance to San Francisco Bay, adjacent to the Golden Gate. A cluster of historic buildings arranged around the 10-acre Parade Ground lend it a

campus-like appearance. According to many of its visitors, Fort Baker has a special quality. This special quality is due to its rich tapestry of historic structures, scenic views, natural features and recreational opportunities and the impression of peacefulness, serenity, and seclusion. Intangible qualities that contribute to the character of Fort Baker include natural quiet, solitude, sounds of nature and natural darkness.

3.10.2 Views of Fort Baker

The visual character of Fort Baker is representative of the California coastal mountain range, with steep wooded slopes rising away from San Francisco Bay. The site's bayfront location affords awe-inspiring views of the scenic landscape of the Bay Area and is itself highly visible from the surrounding area.

Important locations with views of Fort Baker include the Golden Gate Bridge, an overlook between the Golden Gate Bridge and Fort Baker and the bay (e.g., views of boaters and windsurfers). Fort Baker figures prominently in scenic views from the Golden Gate Bridge for pedestrians and bicyclists overlooking the bay and the Marin headlands. Motorists traveling along U.S. 101 have brief views of Fort Baker from the roadway.

Fort Baker retains the integrity of its original design primarily in the retention of the Parade Ground, the layout of the buildings around the Parade Ground and the circulation system. The massing of cypress and eucalyptus trees for wind breaks is still discernible although it is greatly increased in density and scope.

3.10.3 Views from Fort Baker

Within Fort Baker, many sites provide views of features that are of local, regional, national and international prominence. Principal viewing locations are primarily along the waterfront area at the southern portion of the site; these include expansive views to the southwest, south and east (Figure 3-10. Views to the southwest include the Golden Gate Bridge, the Pacific Ocean and the northwest shore of the San Francisco peninsula. Views to the south include San Francisco Bay, the northern shoreline of San Francisco and the San Francisco skyline. Views to the east include the San Francisco-Oakland Bay Bridge, Alcatraz Island, the Berkeley Hills and Angel Island.

East Road also offers spectacular views of the bay. In fact, East Road was originally built to provide the residents of Sausalito with a scenic pleasure drive. Extra-wide shoulders provide room for parking, picnic tables and benches.

Many of the views from Fort Baker have been obstructed by overgrown vegetation, particularly from Battery Duncan (marred by overgrown eucalyptus and French broom), and East Road and Bunker Road (both lined with overgrown vegetation which blocks views). Many of the original views from the Parade Ground to the waterfront and beyond have been obscured by tree plantings (mostly eucalyptus and acacia trees) and nonhistoric structures. Center Road and the parking lot associated with it also create a visual barrier between the Parade Ground and the waterfront.

3.11 RECREATION AND VISITOR ENJOYMENT

The following discussion of recreation use patterns, visitation levels and visitor experiences is based in part from the report on *Visitor and Recreational Trends at Fort Baker* (Knauer, 1997).

3.11.1 Use Patterns and Visitation Levels

Fort Baker's quiet ambiance, minimal development, waterfront access and spectacular cityscape viewsheds provide locals and tourists with many recreational opportunities within a few minutes of downtown San Francisco. Even as an active military base, Fort Baker receives moderate use by the general public as a recreation area. Current recreational facilities include a boat launching area, docks and fishing along the shoreline, and the open grassy area at the historic Parade Ground. The shoreline attracts visitors for such activities as fishing/crabbing, kayaking, wind surfing, jet skiing, walking/hiking, dog walking, photography and quiet refuge.

Fort Baker's network of paths used for recreational purposes is minimally developed but includes a portion of the San Francisco Bay Trail. Pathways and roads throughout Fort Baker are used for walking, jogging and bicycling, although many bicyclists appear to use the site as connector rather than a destination (see the "Bike and Pedestrian Trails" section for more information on these uses). Recreational activities are listed in Table 3-5.

Table 3-5
Recreational Activities at Fort Baker

Active Land-Based Activities	Water-Based Activities
Bicycling	Fishing/crabbing
Dog activities	Boating/kayaking
Jogging/running	Wind surfing
Informal field sports (frisbee, softball)	
Passive Land-Based Activities	**Other Activities**
Hiking/walking	Flying model planes and kites
Sightseeing	Beach play
Photography	Roller blading
Picnicking	Wading

Source: Knauer, 1997

3.11.2 Visitor Experiences

Presently there is confusion about areas that are open or off limits to the public. The NPS's presence at the site is minimal and visitor services are not adequate. In spite of this, many visitors have discovered the charm and quiet character of Fort Baker, and the varied opportunities for experiences ranging from those based on quiet and solitude to more active recreational pursuits.

Bay Area Discovery Museum and Presidio Yacht Club. The BADM, located near the foot of Battery Cavallo, provides opportunities to children for discoveries in art, science and media. The BADM, a park partner since 1990, draws over 170,000 visitors annually to the site. Its mission is "to educate children and to serve as a resource for parents, educators and all who seek to enrich the lives of children." The Presidio Yacht Club offers a range of marina-related member services and limited public services, including some food service on weekends.

3.12 INFRASTRUCTURE

This following describes utility systems at Fort Baker, including water supply and distribution, wastewater collection and treatment, stormwater drainage and energy systems. Information for the description of utility systems was obtained primarily from the *Fort Baker Sustainable Infrastructure Plan* (Esherick Homsey Dodge & Davis, 1998).

3.12.1 Water Supply and Distribution

The potable water distribution system serving Fort Baker is gravity fed from a 400,000-gallon reinforced concrete storage tank located on the site. It consists of underground cast iron water mains of various sizes and ages. The system is supplied with water from the Marin Municipal Water District via a metered (4-inch meter) 8-inch diameter water main with a reported supply capacity of 500 gallons per minute (gpm) or 720,000 gallons per day (gpd). The water entering the storage tank is re-chlorinated using an adjacent liquid chlorination facility as it enters the storage tank. Average daily use, taken from meter readings at Fort Baker from January 1992 to June 1994, is approximately 49,400 gpd (Corps, 1997a).

The water distribution system's condition and capacity to meet existing and future water needs were evaluated in an engineering study of the Marin Headlands Water Distribution System prepared for the NPS in 1996. The study indicated that the primary deficiency with the water system was its inability to provide adequate fire flows in the event of a fire in one of the larger historic structures at the Fort without sprinklers. Repair/rehabilitation of the system would be required to provide adequate fire flow.

3.12.2 Wastewater Collection and Treatment

The wastewater management system serving Fort Baker is a gravity sewer collection system that drains to a wastewater pumping station on the site. The gravity collection system consists of a network of underground gravity sewer pipelines of various sizes and ages. The wastewater pumping station conveys the collected wastewater via a force main (a pressurized pipeline) to the Sausalito-Marin City Sanitary District's (SMCSD) wastewater treatment plant for treatment and disposal.

Wastewater flows from Forts Barry and Cronkhite are pumped into the Fort Baker collection system and thereby conveyed to the Fort Baker pumping station for joint discharge to the SMSCD treatment plant. Wastewater flows from the BADM are also sent to the Fort Baker pumping station.

The wastewater collection system's condition and capacity to meet existing and future wastewater needs were evaluated in an engineering study prepared for the NPS in 1996 and updated in 1997. This study indicated that the primary problems with the existing system were:

- Excessively high wet weather flows in the system (up to 10 times the amount of wastewater generated) which could cause localized system overflows and currently causes the system to exceed its contractual maximum discharge to the SMCSD treatment plant.

- Insufficient wet weather and emergency standby pumping capacity at the pumping station.

The high wet weather flow rates were attributed to the infiltration and inflow of surface water and groundwater into the sewer system during the wet weather season. This occurred due to the age, poor condition and lack of maintenance of the existing wastewater collection system including the

upstream systems at Forts Barry and Cronkhite. The study identified a number of improvements to the Fort Baker system that should be undertaken. These include:

- Future engineering analysis as to the nature and source of the existing infiltration and inflow and development of a plan for its correction.
- Replacement of a total of 1,290 linear feet of existing 6-inch, 8-inch and 10-inch diameter sanitary sewer with new 8-inch, 10-inch and 12-inch diameter sewer, respectively.
- Replacement of the existing pumps, motor starters and emergency power generator at the pumping station.

Specific details of these improvements and their estimated construction costs, with the exception of the infiltration and inflow correction, were presented in the 1996/1997 study.

3.12.3 Stormwater Drainage

A streambed originally flowed through the site. This central stream was fed by a series of small tributaries from each of the site's adjacent folded sloping valleys. Given the area's dry summers, it is likely that these streams were ephemeral, though some may have received some spring-fed moisture year round. This streambed was filled for the construction of the original structures and Parade Ground along Murray Drive, and the drainage was diverted to an underground pipe system that remains today. Over time, a trunk line drainage system was developed to serve the entire developed area. This trunk line system consists of catch basins, pipes and concrete lined swales. The system gathers and diverts stormwater from the site and adjacent hillslopes to four major storm drain outfalls along the seawall at Horseshoe Bay. The system does not involve any pumps and is drained entirely by gravity flow.

The drainage system was evaluated in a technical memorandum prepared for the NPS in 1996. The study concluded that the system is in good structural condition with the following few exceptions. The system has been poorly maintained and needs cleaning and refurbishing. Cross-connections to the sewer system are suspected and require further study. Many of the buildings have poor drainage, with gutters and downspouts either deteriorating or leading to unknown outfalls. The system lacks capacity to handle storms greater than the 10-year event in certain locations where flooding would be expected.

Current survey information suggests that between 10 and 30% of the lower Fort Baker watershed is covered with impervious area (principally rooftops, roads, and parking areas) that creates runoff that would otherwise be absorbed into the permeable earth. (As a rule of thumb, watersheds with less than 10% impervious coverage are considered "protected," impervious coverage between 10 and 30% is considered "impacted," and watersheds with greater than 30% impervious land coverage are considered "degraded.")

3.12.4 Energy Systems

Fort Baker receives electric power from a Pacific Gas and Electric Company (PG&E) substation located on the northern edge of its property. A 12-kilovolt (KV) feed connects this substation to a substation at building 526 where the system changes to 4 KV. An underground feed connects building 526 to a switch station at building 502 where four radial feeds extend underground to supply electricity to separate areas. Annual electric power usage totals approximately 1.3 million kilowatt-

hours. The capacity of the electrical system is estimated to be approximately 1,500 and 1,800 kilovolt amperes.

The electrical system is substandard, in fair to poor condition, and in need of upgrades and repairs, having last been serviced in 1982. Repeated outages occur in the winter and occasionally in good weather as well. Most of the transformers are old and may contain PCBs. The underground electric supply to the buildings immediately adjacent to the Parade Ground shows considerable evidence of water intrusion. Natural light is plentiful in the existing buildings.

Natural gas is purchased from PG&E and is transmitted to Fort Baker through a gas main routed generally along the shore of San Francisco Bay from Sausalito to Fort Baker. This gas main was installed in 1993 and replaced the old gas main routed through the Baker-Barry Tunnel. The present line connects to a 4-inch distribution main at the intersection of McReynolds Road and East Road. The majority of the gas distribution system needs replacement. The existing heating systems mostly consist of localized standard efficiency natural gas-fired boilers with pumps circulating hot water to radiators. No cooling is provided in the existing buildings.

3.13 HUMAN HEALTH, SAFETY AND THE ENVIRONMENT

Several areas within Fort Baker are impacted by hazardous substances released during military occupation of the site. Contamination of soil and possible impacts to groundwater in these areas could affect implementation of the proposed land uses, development of recreational facilities and restoration of the beach. The purpose of this section is to summarize the status of the Army's environmental remediation efforts at Fort Baker. Analysis of the remediation efforts is covered in the Army's separate environmental documentation. The primary sources of information used for this summary are reports generated by Army consultants for hazardous substance investigation and cleanup at Fort Baker (Corps, 1998; Corps, 1997a; Reidel, 1995; RCI, 1998a, 1998b, 1998c, 1996) and material provided by NPS consultants (Erler & Kalinowski, Inc., 1998).

3.13.1 Regulatory Framework

The U.S. Army is the lead agency conducting the investigation and cleanup of areas at Fort Baker contaminated by hazardous materials as a result of military operations. The Army is conducting investigation and remediation actions in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), the Base Realignment and Closure Act (BRAC), the California Health and Safety Code, the California Water Code and other relevant authorities. The California Department of Toxic Substances Control (DTSC) is the lead agency for oversight of the Army cleanup activities, and the San Francisco RWQCB works in conjunction with the DTSC on issues of water quality.

The Army is required to cleanup impacted areas to a level protective of human health and the environment. As part of the remediation process, the Army has conducted a site investigation of Fort Baker and will proceed with a remedial investigation (RI) and feasibility study (FS) for several chemically impacted areas at Fort Baker. The RI/FS will be followed by development of a remedial action plan (RAP) and a record of decision (ROD) for the preferred remedial alternative. Remedial actions (RAs) of these chemically impacted areas will then proceed. In addition, interim remedial actions (IRAs) will be performed at several impacted areas to accelerate remediation of the site. Detailed information about the presence of hazardous substances and the Army's overall cleanup activities at Fort Baker can be obtained by contacting the following:

U.S. Army
BRAC Environmental Office
604 East Murray Circle Drive
Fort Baker
Sausalito, CA 94965

3.13.2 Areas of Concern

During its site investigation of Fort Baker to date, the Army has identified eight areas impacted by chemical releases from Army activities. Elevated concentrations of polycyclic aromatic hydrocarbons (PAHs), pesticides, metals, and petroleum hydrocarbons were detected in soil. Of the eight areas, four have been recommended for advancement to an RI/FS investigation. These areas include the storm drain system, Horseshoe Bay, a petroleum tank site located near building 637, and a concrete basin near building 407. The four remaining areas have been identified as locations where the extent of the impact is well defined, and interim removal actions will be performed to remove the chemically impacted soil in advance of cleanup of other sites. These areas include an engine repair shop, a small paint shed, soil beneath the deck of the historic boat shop, and the vehicle washrack adjacent to building 691. In addition, a number of petroleum release sites have been identified and are being addressed by the Army.

3.13.3 Coordination of Remediation Activities with Planned Land Use

The NPS and the Army are coordinating plans for additional investigation and remediation with respect to the NPS's planned land use at Fort Baker. Plans include implementation of soil removal actions before initiation of construction activities associated with implementation of the NPS's re-use plan. The NPS is currently working with the Army to develop a schedule of planned activities associated with remediation and re-use of Fort Baker.

3.13.4 Other Site Investigation Issues

In addition to areas of concern identified by the Army, the NPS has identified other issues of concern relating to potential chemical impacts in soil and groundwater at Fort Baker. These issues include:

- potential chemicals of concern in fill material present in the waterfront area which would be restored;
- the potential presence of chemicals of concern in other historical chemical use areas not investigated by the Army;
- the presence of PAHs in soil at numerous areas sampled along the waterfront; and
- the potential presence of chemicals of concern in groundwater.

The NPS is also reviewing investigations and remedial measures being conducted by the Army at Fort Baker under other programs. Issues include fuel distribution lines, lead-based paint and asbestos, waste oil tanks, and issues related to work being conducted within the Formerly Used Defense Sites (FUDS) program. The FUDS area consists of 264 acres surrounding the central area of Fort Baker (i.e., the area that was transferred to the NPS under the BRAC Act in 1985). The Army is independently addressing environmental issues within the FUDS area. These issues primarily consist of petroleum releases associated with former aboveground and underground tanks.

3.13.5 Schedule

The NPS has requested that the Army prepare an "Action Plan" and schedule that will summarize all environmental cleanup work being considered. This will be reviewed by the NPS for consistency with the re-use plan and its schedule.