

SECTION 2

Site Description and History

The following sections provide the site-specific information on historical background and environmental conditions for the former tank farm within the POL Hill Outparcel. This information is intended to facilitate an understanding of the historical activities and physical characteristics of the site, and to provide a basis for evaluating the nature and extent of contamination as well as remedial activities described in Section 3.

2.1 Hamilton Army Airfield Facility Description

The HAAF was a 1,600-acre military installation located approximately 22 miles north of San Francisco on San Pablo Bay in Marin County, California (see Figure 1-1). The military installation was bounded on the north by the North Antenna Field (a formerly used defense site), private agricultural lands, and a private residential community (Bel Marin Keys); on the east by state-owned land and San Pablo Bay; on the south by private agricultural fields; and on the west by Nave Drive, which parallels State Highway 101.

The 7.84-acre POL Hill Outparcel has been addressed along with other BRAC sites; however, the outparcel is separate from the contiguous Main BRAC Property (see Figure 1-2). The POL Hill Outparcel is located on the north side of a ridge known as Reservoir Hill, and the adjacent lowlands southwest of West Boundary Road. The Outparcel is bounded by the GSA Phase II Sale Area. The former tank farm is located on the lowlands adjacent to Reservoir Hill (see Figure 1-3).

Hamilton Army Airfield (Base) was constructed on reclaimed tidal mud flats by the Army Air Corps in 1932. The site, previously known as Marin Meadows, had been used as ranch and farm land since the Mexican Land Grant (USACE, undated). Military operations began in December 1932, first as a base for bombers, and later as a base for transport and fighter aircraft. The Base played a major role during World War II as a training field and staging area for Pacific operations. During the war (i.e., early and mid-1940s), the Base hospital served as an acute care and rehabilitation facility for thousands of war casualties per month.

The Base was renamed Hamilton Air Force Base in 1947, when it was transferred to the newly created U.S. Air Force (USAF). The USAF used the Base primarily as a training and fighter installation until 1975. The USAF ended military operations at the Base in 1976, and the property was declared surplus by the Department of Defense (Hamilton Field Association, Inc. 1988). In 1976, the U.S. Department of the Army (Army) began aircraft operations at the airfield and supporting facilities with permission from the USAF. In 1984, the airfield property was officially transferred back to the Army and renamed Hamilton Army Airfield. The Base was declared surplus under the BRAC Act of 1988. The Army continued to use the airfield primarily for Army Reserve aircraft operations until March 1994. Currently, the BRAC Property is managed by the Department of the Army, I Corps, at Fort Lewis, Washington.

2.2 Description of Former Tank Farm Area

The former underground tank farm is located on the lowlands adjacent to Reservoir Hill (Figure 1-3). The former AST-2 on Reservoir Hill supplied JP-4 jet fuel to 20 25,000-gallon underground storage tanks within the tank farm. Three above ground storage tanks (ASTs) were also located in the former tank farm areas during operation. A series of pumps and pipes supported the fuel distribution system. A number of investigations and remedial actions were conducted at the former below-ground tank farm between 1985 and 1996. All of the USTs and ASTs associated with the tank farm have been removed. To the extent physically possible, soil with TPH concentrations greater than 100 ppm has been removed and replaced with fill.

There were 20 25,000-gallon USTs (UST-1 to UST-20) located in the main fuel storage area. The tanks were arranged in two rows of 10 (see Section 3.2 and Figure 3-2). Each tank was supported by four 3-foot-high concrete footings built on the original grade of the lowlands along Reservoir Hill. The tanks were buried beneath 20 feet of soil, which totally covered the tanks and created a hill that blended into the natural hillside of Reservoir Hill (Woodward-Clyde 1985). One 750-gallon UST (UST-21) was located approximately 150 feet north of the main tank farm area. All USTs in the former tank farm are known to have contained JP-4 except for the 750 gallon UST-21. Although the original contents of the 750-gallon UST are not documented, the contents observed during tank removal activities are reported to have resembled JP-4 (IT 1987).

Three ASTs were historically present in the former tank farm area. AST-1 was a 25,000 gallon tank that contained JP-4. Two ASTs (2,500 and 600 gallon capacities) were located in an area called the AST-3 area. These ASTs were not assigned individual numbers. The contents of the 2,500 and 600 gallon ASTs are not known (CH2MHILL, 2000). The 25,000 gallon JP-4 AST was operational until the early 1990s and was used to refuel occasional aircraft that were using the runway (Jordan 1990).

A series of pipelines, pumps, a sump, meters, and small structures supported and connected the features of the fuel supply and distribution system for aircraft operations. The structures located in the former tank farm were designated as Buildings 715, 717, 736, 737, and 738. Truck fill stands (pipes) were located along the western edge of the former tank farm area adjacent to Reservoir Hill. A groundwater treatment facility for the adjacent Landfill 26 was constructed in 1994 on land previously occupied by Buildings 736, 737, and 738.

2.3 Surface Water

HAAF is situated within the Novato Creek drainage basin, which is bounded by the Petaluma River basin to the north, San Pablo Bay to the east, the Coast Range hills to the west and southwest, and the Las Gallinas Creek drainage system to the south. The Coast Range hills act as the principal source of groundwater recharge and surface water drainage for the basin. Mean annual precipitation is 28 inches. The winter influx of rain results in an elevated groundwater table and some surface flooding. During summer months, rainfall averages less than 0.1 inch per month. This results in the evaporation of surface waters, a drop in the groundwater table, and extensive desiccation of shallow soil horizons (Woodward-Clyde 1996).

Reservoir Hill is located on outcroppings of a relatively steep, elevated bedrock knob. The low-lying portions of HAAF are drained by a system of concrete-lined ditches and storm drains that

tie into a perimeter drainage system. This perimeter drainage system directs flows to a pumping station where water is pumped to San Pablo Bay (Earth Tech 1994). The only perennial surface water feature in the vicinity of the POL Hill Outparcel is a drainage ditch that lies just outside the northwestern boundary of the area. This ditch collects runoff water that flows northward across the northern portion of the POL Hill Outparcel and groundwater seepage. The ditch originates from the area immediately to the east of the POL Hill Outparcel, then drains westward under Aberdeen Road and into the main HAAF perimeter drainage system (Woodward-Clyde 1995a).

2.4 Hydrogeology

2.4.1 Geology

HAAF lies within the northern coastal range geomorphic province of California, which consists of a series of generally fault-bounded, northwest-trending upland areas separated by intermontane valleys. Bedrock knobs present at the installation consist of yellow and buff clastic rocks that have been interpreted as serpentinite and sandstone bedrock from the Franciscan Complex of Jurassic to Cretaceous age.

The lowland areas of HAAF lie on former wetlands bordering San Pablo Bay. The bay occupies a valley between upland bedrock areas described above. The valley has been partially infilled with clastic sediments deposited in alluvial, fluvial, and shallow-marine environments. The principal surficial geology in this area is a dark, organic-rich, highly plastic, silty clay unit that was deposited in intertidal and shallow subtidal depositional environments. This unit, referred to as Bay Mud, may extend to depths as great as 90+ feet below ground surface in the eastern portion of the HAAF BRAC Property.

Soil types found at HAAF include Novato Clay, Reyes Clay, Saurin-Bonnydon complex, Saurin-Urban Land Bonnydon complex, Urban Land Xerothents complex, Xerothents Fill, and Xerothents-Urban Land complex. A major component of shallow soils at HAAF is artificial fill that has been used for a variety of purposes, including levee construction, landfill cap materials, and road/taxiway base rock. This material is highly heterogeneous, consisting of variable proportions of clay, sand, gravel, and cobble-sized material (Earth Tech 1994).

Four distinct geologic units have been identified at POL Hill: three unconsolidated units underlain by bedrock. The pebbly sandy clay fill (0 to 7 feet thick) occurs in the gently sloping low-lying areas surrounding Reservoir Hill to a depth of 7 feet (IT 1999). Bay Mud lies under this fill (0 to 4 feet thick) in the lowlands of POL Hill Outparcel, where it is not disturbed by excavation. Sediments weathered from the sandstone bedrock underlie the Bay Mud in portions of the POL Hill Outparcel (Woodward-Clyde 1985). A weathered shaley sandstone bedrock lies beneath the unconsolidated materials in the lowlands and outcrops at Reservoir Hill (Woodward-Clyde 1995a). Unconsolidated sediments and soils are not thicker than 25 feet in any portion of POL Hill (IT 1999). The bedrock located beneath these units is the relatively impermeable, well indurated, fractured Franciscan Sandstone (IT 1999).

2.4.2 Groundwater

Groundwater at the POL Hill Outparcel occurs within the weathered bedrock along the flanks of Reservoir Hill. Recharge occurs as a result of rainfall on the top and slopes of the hill. Groundwater percolates into the weathered material and fractures in the bedrock.

Flow within the bedrock is assumed to be controlled by fractures. Production rates are generally less than 2 gallons per day (IT 1999). Groundwater in this site does not meet the criteria as a suitable source of drinking water because of the low yields and high salinity (SFRWQCB 2001). Groundwater in the vicinity of the former AST-2 occurs in the bedrock at a depth of approximately 20 to 35 feet below ground surface. In the vicinity of the former tank farm, groundwater occurs in the fill material below Reservoir Hill at increasingly shallower depths at lateral distances away from the toe of Reservoir Hill.

The water table surface appears to be unconfined beneath the hill and semi-confined in the gently sloping, low-lying areas that surround the hill. Groundwater data from wells near the drainage ditch along the northern boundary of POL Hill suggest that an upward hydraulic gradient exists between the shallower and deeper units of the area (IT 1997, 1999).

Hydraulic conductivity was evaluated at POL Hill Outparcel by the Army in 1997. Hydraulic conductivities were derived from slug tests at 12 wells, and recovery pump tests at 2 wells. The Bower and Rice (1976) slug test, and Jacob (1963) recovery methods were used to determine hydraulic conductivity in this area. The methods are most accurate in the determination of hydraulic conductivity in low-yield aquifers for small-scale (hundreds of feet) investigations (Batu 1998). The values of conductivity are low. They average 7.3×10^{-2} feet per day (2.6×10^{-8} meters per second), and range from 0.0028 to 5.3 feet per day (1.0×10^{-8} to 1.9×10^{-5} meters per second) (IT 1999).

The ground surface at the POL Hill Outparcel slopes downward to the north from the elevated AST-2 Area. Moving north, the ground surface elevation changes from 24.8 feet above mean sea level (MSL) at PL-MW-104 (the approximate northern boundary of the AST-2 Area) to 1.7 feet above MSL at MW-112A (S) (near the northern boundary of the POL Hill Outparcel). Moving west from the western fence line of the AST-2 Area, the ground surface elevations range from approximately 20 feet above MSL to approximately 18 feet above MSL near the southwest corner of the POL Hill Outparcel. The estimated 18-foot ground surface elevation at this point is interpolated from the ground surface at MW-POLA-119 (19.3 feet above MSL) and the ground surface at the abandoned PL-MW-110 (17.5 feet above MSL). Ground surface information was derived from previous IT Corporation reports (IT 1999).

The groundwater levels at the POL Hill Outparcel ranged 7.88 feet above MSL at PL-MW-104 to approximately 2 feet below MSL at PL-MW-112A(S) based on measurements shown on a site cross section by IT Corporation in March 1997. The highest water level elevations at PL-MW-104 were 10.75 feet above MSL in February 2002 and the lowest water level elevations were 5.77 feet above MSL in September 2001 (SOTA 2002). The lowest measured groundwater level at the POL Hill Outparcel was 3.17 feet below MSL at PL-MW-112A(S) in May 1997 (IT 1999).

Groundwater elevations indicate that flow is generally northward and flows to the lower elevation areas. In June of 1985, water elevations were shallow and close to sea level in the former tank farm area. Army data indicate that water levels dropped by 2 to 3 feet in this area from 1987 to 1990 (Woodward-Clyde 1985; IT 1999). Water elevation measurements in February 1991 show that water levels had risen 3 to 4 feet after excavation (ESI 1993). Water levels change very little (less than 1 foot) from one year to the next after 1994 (IT 1999).