
**UNEXPLODED ORDNANCE
SITE INVESTIGATION
FINAL SUMMARY REPORT**

**OPERABLE UNIT (OU) #3
ALAMEDA POINT
ALAMEDA, CALIFORNIA**

**FINAL
October 22, 1999**

**SPORTS ENVIRONMENTAL DETACHMENT
VALLEJO, CALIFORNIA**



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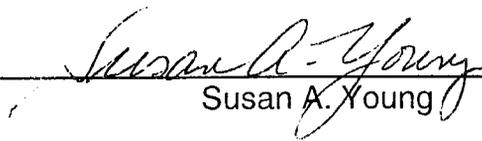
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UNEXPLODED ORDNANCE SITE INVESTIGATION
SITES IR-1 AND IR-2 AT
ALAMEDA POINT, CALIFORNIA

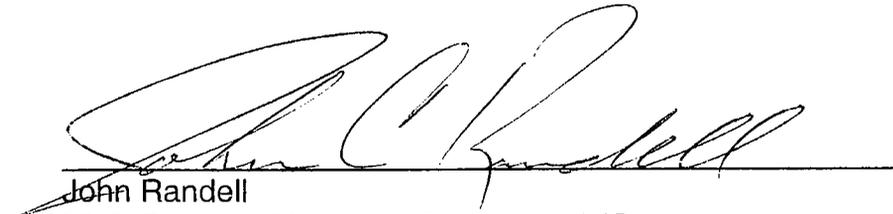
Review and Approval:

Review and Approval:

Prepared by: 
Susan A. Young

Date 10/22/99

SSPORTS Environmental Detachment Vallejo
Code 120 UXO, Building A-216
Vallejo, CA 94592-0135


John Randell
UXO Program Manager, Code 120 UXO
SSPORTS Environmental Detachment Vallejo

Date 10/25/99

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EXECUTIVE SUMMARY

Alameda Point is located on the western edge of Alameda Island, which lies east of San Francisco Bay, adjacent to the City of Oakland. Sites IR-1 and IR-2 are located within Alameda Point.

During a radiological survey of Site IR-1 conducted in September 1998, a number of 20mm high explosive projectiles were discovered. As a result, Unexploded Ordnance (UXO) Specialists from Supervisor of Shipbuilding, Conversion and Repair, Portsmouth, Virginia (SSPORTS) Environmental Detachment in Vallejo, California conducted an emergency removal action at Site IR-1. A total of 335 live 20mm high explosive projectiles and 2 live small arms cartridges (one .45 caliber ball round, and one .30 caliber ball round) were recovered during the removal action. Additional inert ordnance material recovered included 12,259 20mm projectiles, 1,686 .50 caliber armor piercing projectiles and 359 assorted brass cartridges. Also discovered during the preliminary surface sweep was a portion of the arming mechanism from a 40mm high explosive dual purpose (HEDP) grenade fuze together with the remains of electric blasting cap leads, packaging, and firing wire. This would indicate that ordnance disposal operations had been conducted in the area at some time.

A delivery order was awarded to SSSPORTS Environmental Detachment Vallejo in March 1999. The scope of work (SOW) was to determine if buried unexploded ordnance exists at Sites IR-1 and IR-2. The following activities were performed to accomplish Tasks 1 through 4 of the Scope of Work: develop and provide a Survey Work Plan, perform a surface sweep of Sites IR-1 and IR-2, conduct personnel interviews and review archive data to determine site history, perform a geophysical survey to identify subsurface anomalies. This Final Summary Report accomplishes Task 5 of the SOW.

The surface search was conducted to visually locate, identify, and remove all exposed ordnance materials that may present a danger to site workers. The surface search methodology utilized pre-established baselines for sites IR-1 and IR-2 and a search grid system relative to the baselines. A qualified search team and UXO Specialists from SSSPORTS Environmental Detachment performed the surface search. The search team walked the area at a search line separation of no more than six feet to ensure that all visible ordnance and ordnance-related materials were located. No ordnance and ordnance-related materials were recovered during the surface search of sites IR-1 and IR-2. The UXO Specialist in an attempted to define the landfill boundaries of both sites using a MK 26 magnetometer. Due to existing site conditions, the UXO Specialist was unable to determine the extent of the landfill boundaries. Significant contacts identified by the MK 26 magnetometer survey were marked and recorded using a real-time differential global positioning system (DGPS).

Although no ordnance or ordnance-related materials were recovered during the surface search, it was determined that a geophysical survey of suspect areas within each site should be accomplished. The UXO Specialist identified two primary areas of concern

based on information identified during the review of archive data, personnel interviews, and the known previous use of the sites.

The purpose of the geophysical survey was to identify subsurface anomalies that may indicate the presence of buried unexploded ordnance. The geophysical survey for each area of concern was accomplished utilizing a Geometrics G-858 Cesium Sensor Magnetometer in conjunction with a Trimble ProXR Differential Global Position System (DGPS). The subsurface profile of each area of concern identified various masses or pockets and discrete anomalies, which may warrant further investigation, through intrusive sampling or other means, to determine the presence of unexploded ordnance.

The following report contains a detailed description of the ordnance preliminary assessment and site investigation accomplished at Sites IR-1 and IR-2 at Alameda Point, Alameda, California.

UNEXPLODED ORDNANCE SITE INVESTIGATION SITES IR-1 AND IR-2 AT ALAMEDA POINT, CALIFORNIA

FINAL SUMMARY REPORT

1. INTRODUCTION

This report describes the unexploded ordnance (UXO) site investigation accomplished at Sites IR-1 and IR-2 at Alameda Point, Alameda, California (Figure 1). The site investigation consisted of an archive data review and personnel interviews, a surface search of Sites IR-1 and IR-2, and a geophysical survey of each area of concern.

Sections 1 through 4 describe the background of the project including site history, site description, geographical setting, ecological and archeological concerns, available site characterization data, and an assessment of the risk posed by the presence of hazardous ordnance material. Sections 5 through 10 summarize the intrusive investigation objectives, site work procedures, site controls, areas of concern, geophysical survey results, deviations from the original work plan, site investigation quality assurance, site restoration and site mapping procedures. Section 11 is a summary of the site investigation and Section 12 is a general outline for a proposed intrusive investigation to remove and dispose of ordnance at Sites IR-1 and IR-2.

1.1 PURPOSE

The purpose of the site investigation was to investigate and determine if buried unexploded ordnance exists at Sites IR-1 and IR-2. The site investigation was authorized when the presence of ordnance and ordnance materials was confirmed during a radiological survey of Site IR-1 in September 1998. As a result, Superintendent of Shipbuilding, Conversion, and Repair, Portsmouth, Virginia (SSPORTS) UXO Specialists conducted an emergency removal action (Figure 2) to dispose of the recovered ordnance. Ordnance and ordnance related items at the site pose a potential hazard to public safety and the environment.

The site investigation was accomplished by qualified personnel from SSSPORTS Environmental Detachment Vallejo under contract to Engineering Field Activity West (EFAW) through Naval Facilities Engineering Command (NAVFAC). The site investigation fulfilled all actions specified by the EFA West Statement of Work dated 17 February 1999 for Sites IR-1 and IR-2 at Alameda Point, Alameda, California

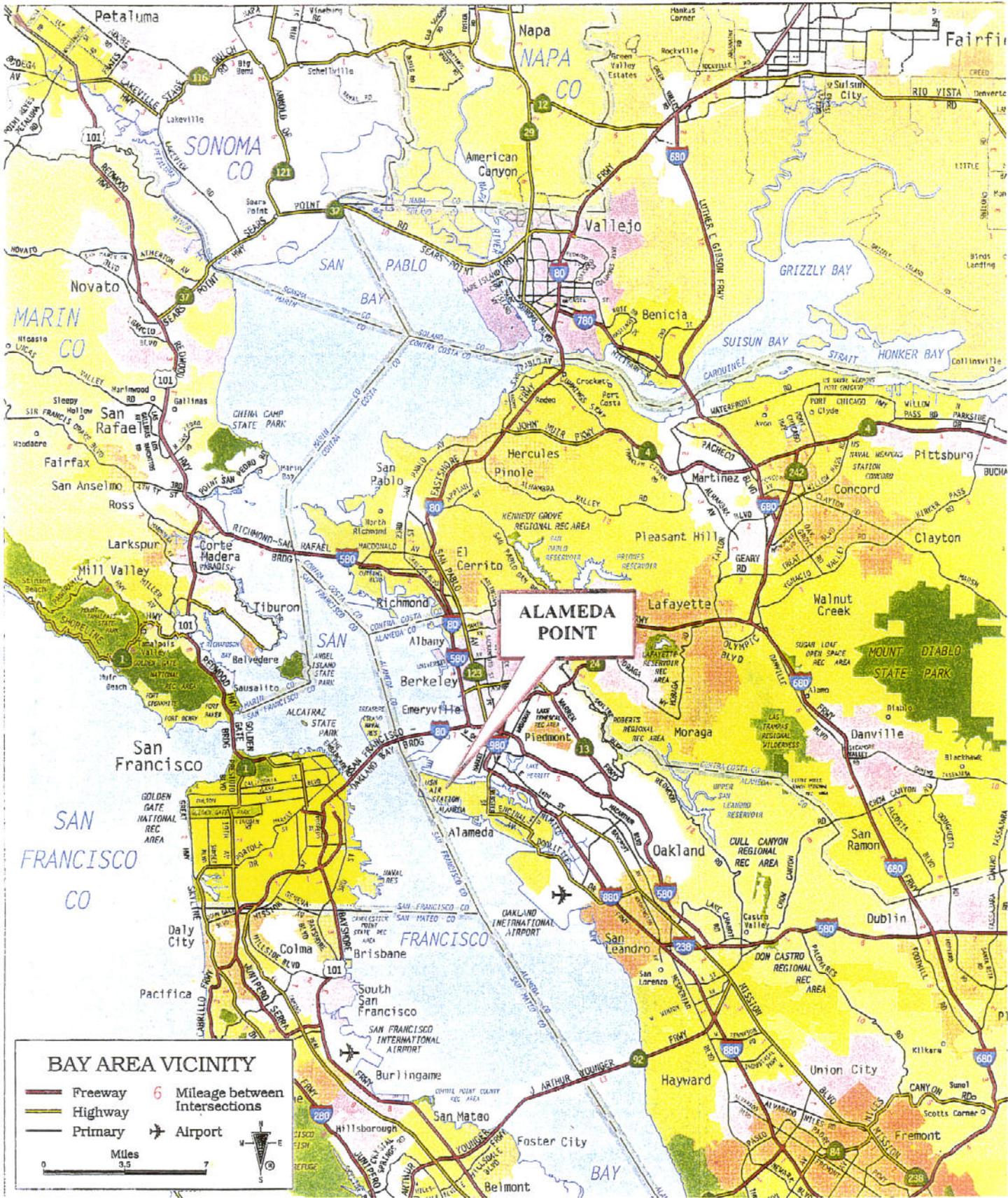


FIGURE 1. ALAMEDA POINT LOCATION MAP



This photo shows the treatment by open detonation of 335 live ordnance items recovered during the emergency removal action at Alameda Point. The disposal operation was conducted by qualified UXO Specialists from SSPORTS Environmental Detachment Vallejo. The ordnance items were discovered during a radiological survey and subsequent preliminary surface sweep of Site IR-1. All other ordnance items recovered were certified inert by the UXO Specialist and disposed of as scrap material. (SSPORTS UXO Photo, 12/98)

FIGURE 2. EMERGENCY REMOVAL ACTION

1.2 BACKGROUND

The U.S. Navy conducted a remedial investigation (RI) from 1988 to 1995, with oversight from the California Department of Toxic Substances Control (DTSC), the San Francisco Bay Regional Water Quality Control Board (RWQCB), in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (EPA 1988a). As a result of these investigations, extensive radiological surveys were performed at Alameda Point.

During a radiological survey of Site IR-1 conducted in September 1998 (reference 6), a number of 20mm high explosive projectiles were discovered. UXO Specialists from SSPORTS Environmental Detachment Vallejo conducted an emergency removal action on Site IR-1 (Figure 2) in accordance with SSPORTS Standard Operating Procedure (SOP) No. 140, Immediate/Emergency Response On-Site Demolition Operation. A total of 335 live 20mm high explosive projectiles and 2 live small arms cartridges (one .45 caliber ball round, and one .30 caliber ball round) were recovered during the removal action. Additional inert ordnance material recovered included 12,259 20mm projectiles, 1,686 .50 caliber armor piercing projectiles and 359 assorted brass cartridges. Also discovered during the preliminary surface sweep was a portion of the arming mechanism from a 40mm high explosive dual purpose (HEDP) grenade fuze together with the remains of electric blasting cap leads, packaging, and firing wire.

2. ARCHIVE SEARCH

An archive records search was conducted in May 1999. The search of available historical files and archive data uncovered documentation to validate that Sites IR-1 and IR-2 were previously used as landfill disposal areas. The following information was obtained during a review of available historical data and from personnel interviews to determine the history of Sites IR-1 and IR-2.

2.1 SITE IR-1

2.1.1 LOCATION AND CONSTRUCTION HISTORY

Site IR-1, the "1943-1956 Disposal Area" (Figure 3), is a former landfill area located in the northwestern corner of Alameda Point. The site was operated between 1943 and 1956 as NAS Alameda's main site for waste disposal. Historical aerial photographs and early maps show that prior to 1940, the area occupied by the landfill was covered by the San Francisco Bay. A geodetic survey chart for NAS Alameda from 1942 shows water as deep as 20 feet at what is now the western shoreline at Site IR-1. A rock seawall, originally a jetty protecting the harbor entrance, lies at the northern perimeter of the landfill and was in place prior to 1915. Construction history obtained from Alameda Point archival drawings and aerial photos show that sunken barges and pontoons were placed along the western side of the site adjacent to the Bay. Natural sedimentation of clayey and silty material likely built up along the barges, which provided structures for

NAVAL AIR STATION ALAMEDA, CA

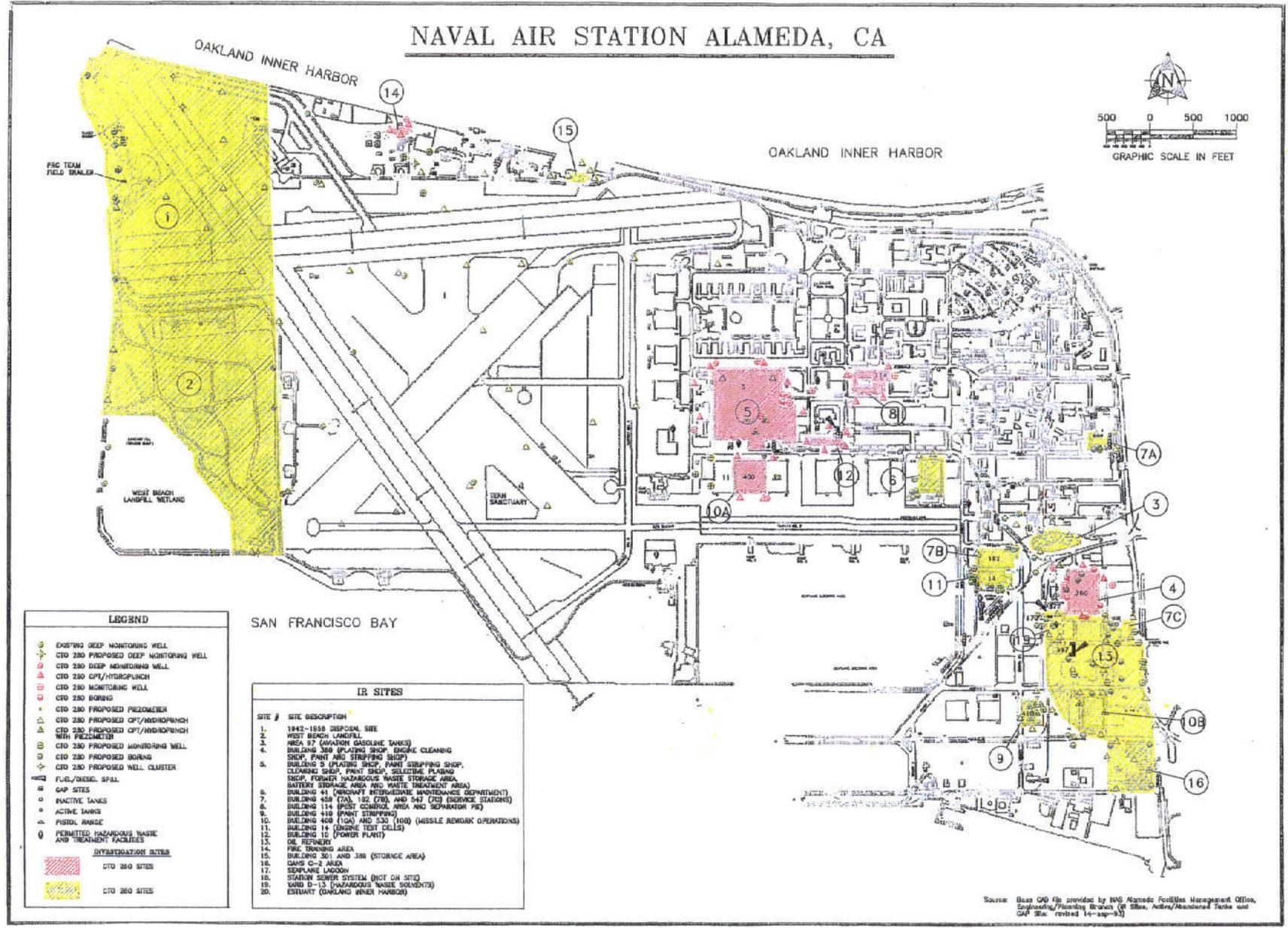


FIGURE 3. SITES IR-1 AND IR-2

Source: Base O&M provided by NAS Alameda Facilities Management Office, Engineering/Planning Branch (IR Sites, Active/Abandoned Tanks and CAP Sites revised 14-sep-93)

placing hydraulic fill. The disposal area was originally filled with dredge spoils during the early 1940's. Evidence of disposal operations is shown in aerial photos taken during WWII. In the 1950s, new runways and taxiways were extended over a portion of the landfill (Figure 4). According to a screening questionnaire completed by the Navy on June 21, 1988, the landfill has no liner, and the depth of waste is unknown. In addition, no maintenance was performed at the site.

2.1.2 WASTE DISPOSAL HISTORY

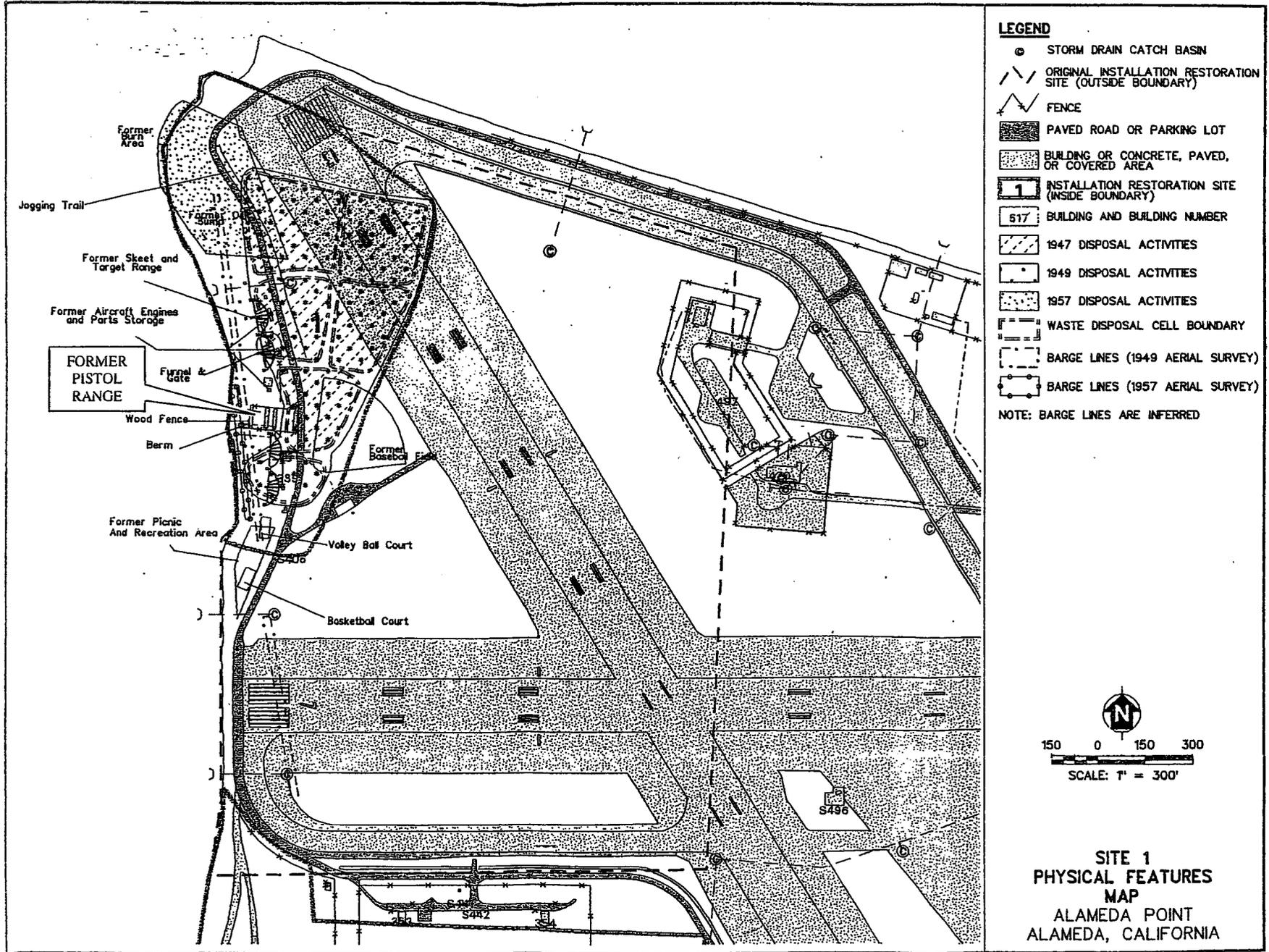
The principal waste disposal method used by former Naval Air Station (NAS) Alameda Public Works personnel consisted of digging trenches to the water table, filling them with waste, and compacting the material with a bulldozer. Cover material was applied on a regular basis, and in the early operations, waste was simply pushed into the water. Estimates of the total amount of waste and the amount of hazardous materials disposed of at both sites varies. Estimates are based largely on individual recollection and judgment; however, some quantification of the amount of hazardous material was possible, based on industrial process information.

An estimated 15,000 to 200,000 tons of waste were placed in Site IR-1, including old aircraft engines, low-level radiological wastes, scrap metal, waste oil, paint wastes, solvents, cleaning compounds, and construction debris. In addition, other naval installations disposed of wastes at this site, including the Oak Knoll Naval Hospital, Naval Supply Center Oakland, and Treasure Island. Materials reportedly disposed of at the landfill included municipal garbage, sludges, plating wastes, acids, mercury, polychlorinated biphenyl (PCB) contaminated fluids, rags, batteries, inert ordnance, spoiled food, asbestos, pesticides, creosote, waste medicines and reagents.

2.1.3 PISTOL RANGE

The pistol range area is located in the western portion of Site IR-1 and consists of a pistol range, a shotgun range, and an area immediately north of the pistol range used for disposal of spent ordnance (20mm, lead bullets and pellets) (Figure 5). An earth impact berm lined with sandbags is located behind the firing lines. The entire pistol range area is approximately 220 feet by 200 feet. The pistol range was in operation between the early 1940s and 1993. According to Navy documents, types of weapons used at the pistol range included .22 caliber, .38 caliber, .45 caliber, 9mm, .357 caliber, .44 caliber, and 12 gauge shotgun. According to employee interviews, during the construction of the pistol range, excavation went to a depth of 8 feet to remove buried debris, i.e., fence material, aircraft engine parts etc. At the same time an unknown number of 55 gallon drums filled with fired 20mm projectiles were dumped in this excavation. These projectiles were also mixed into concrete (as aggregate) used for the pistol range foundations.

FIGURE 4. SITE IR-1 PHYSICAL FEATURES MAP



2.1.4 METALS CONTAMINATION

The Navy conducted a soil investigation of the pistol range area in 1995 and 1996. Soil samples were collected from the berm, behind the berm, target trench, firing lines, and grass areas and analyzed for metals. The soil samples were collected to a depth of 3 feet bgs (vertically into berm) along the berm, and to a depth 1.5 to 2 feet bgs in the target trench and firing lines.

The soil investigation at the pistol range showed total lead, cadmium and zinc concentrations above California Total Threshold Limit Concentrations (TTLC) (Title 22 CFR) of 1,000 mg/kg, 100 mg/kg, and 5,000 mg/kg, respectively. Total lead concentrations were in the range of <10 to 34,000 mg/kg; cadmium was detected at concentrations of 130 mg/kg and zinc at 7,400 mg/kg at two sampling locations.

2.2 SITE IR-2

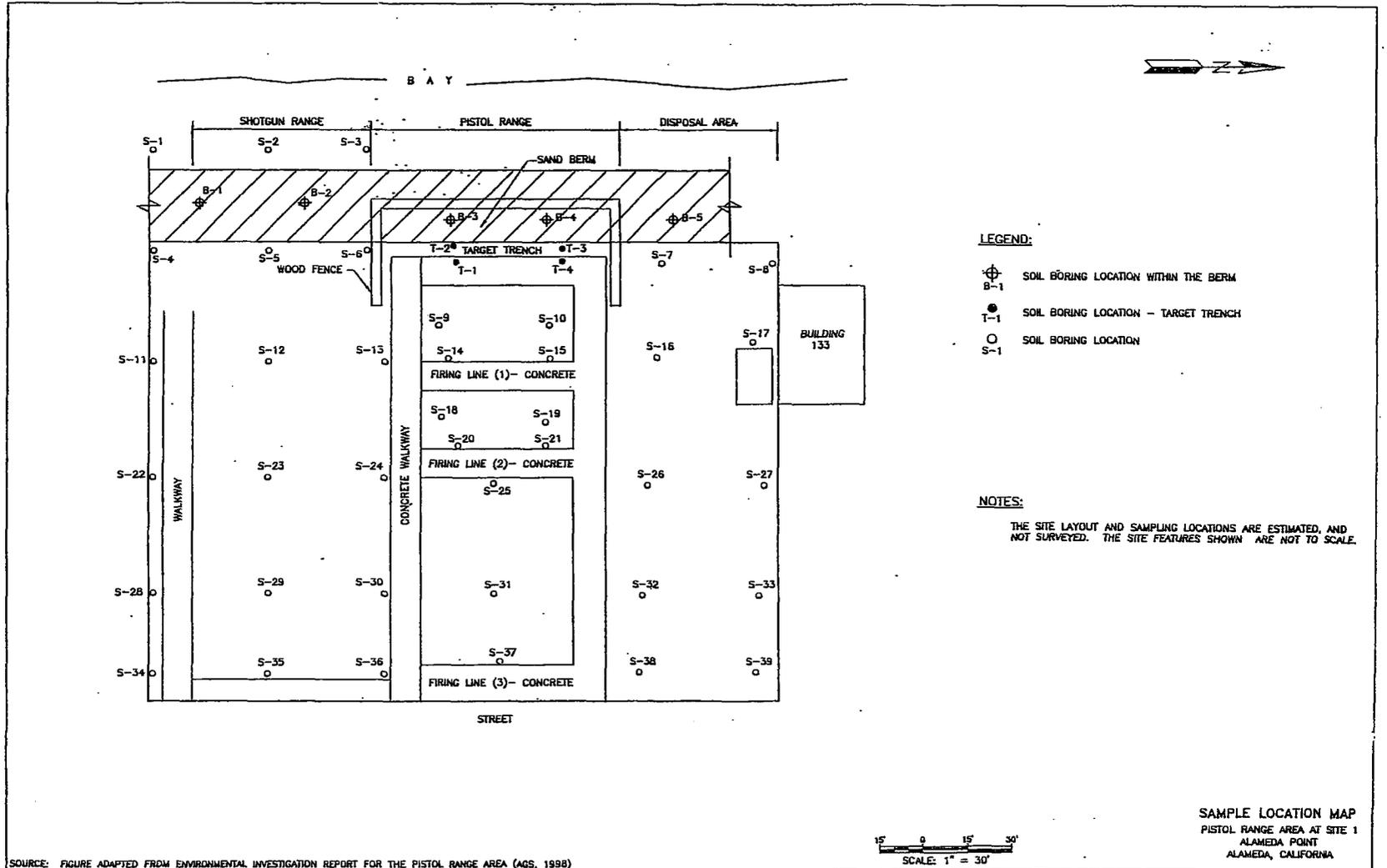
2.2.1 LOCATION AND CONSTRUCTION HISTORY

Site IR-2, the "West Beach Landfill", served as the NAS Alameda disposal area from approximately 1952 through March 1978 (Figure 6), although most disposal of hazardous waste at the landfill had been eliminated by the late 1960s and early 1970s. Archival maps and drawings during the 1940s indicate the west beach landfill was 90% under water at high tide. As the size of the landfill increased, a breakwater was installed around the site, allowing containment of dredge spoils. Some of these dredge spoils originated in the Seaplane basin and the berth and dock areas .

2.2.2 WASTE DISPOSAL HISTORY

An estimated 1.6 million tons of garbage and between 30,000 and 500,000 tons of hazardous waste was placed in Site 2. Hazardous wastes included PCBs, solvents, plating wastes, metals, pesticides, inert ordnance, low-level radiological waste, infectious waste, and acids. In 1976, 4 truck loads of inert ordnance ranging in size of 4 feet long and 12 inches wide to smaller ammunition, from the Defense Logistics Agency (DLA), Alameda, was buried in the landfill. A one time disposal of CS (o-Chlorobenzalmalonitrile) riot control agents (in containers as loose powder) from the 1968-1969 Berkeley student demonstrations was accomplished, with the exact location of the disposal area unknown.

FIGURE 5. PISTOL RANGE AREA AT SITE IR-1



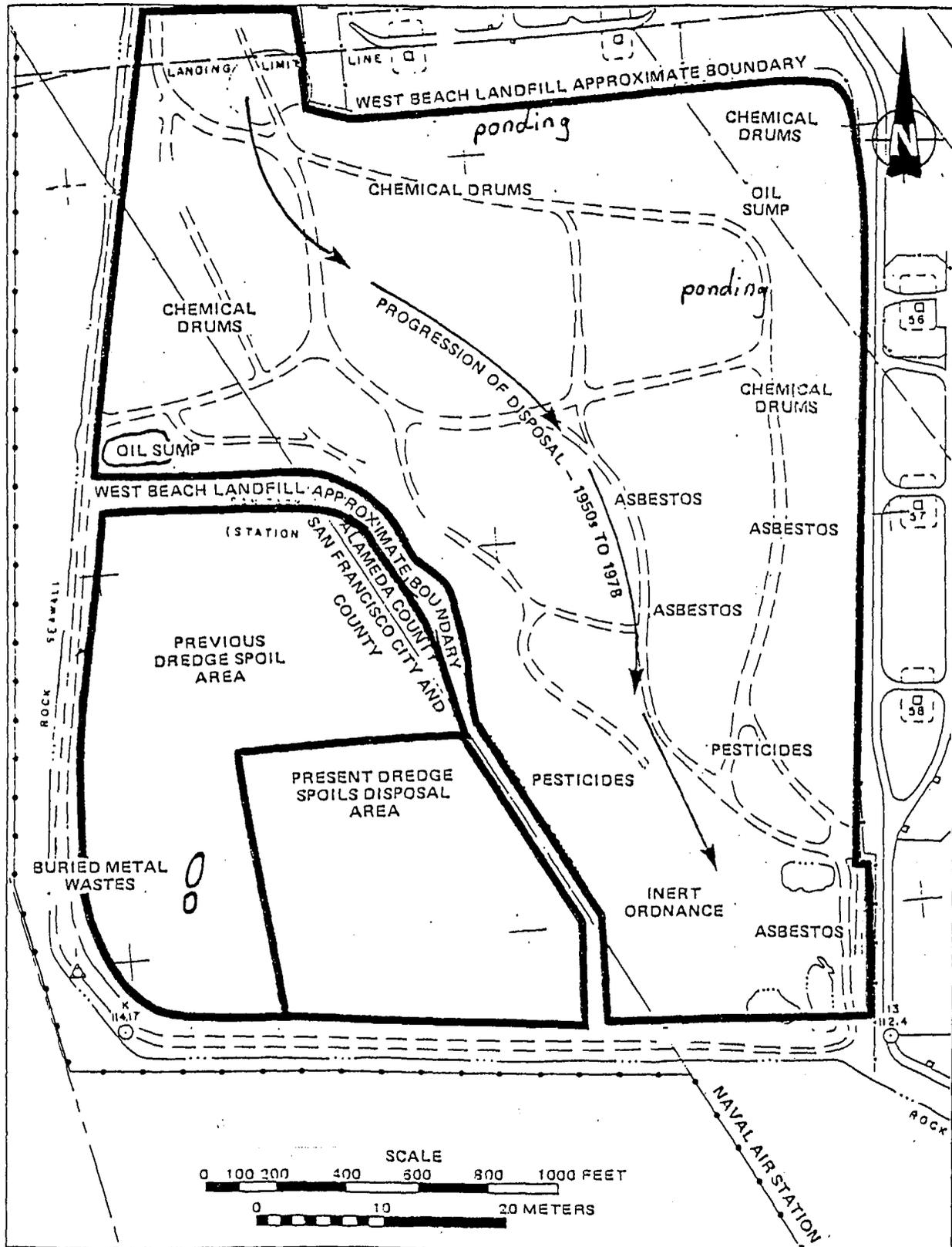


FIGURE 6. 1950-1978 WASTE DISPOSAL OPERATIONS

2.3 PROJECT ORGANIZATION

Site work was accomplished under the direction of the SSPORTS Unexploded Ordnance (UXO) Program Manager assisted by a qualified staff of engineers, technicians, surveyors, and UXO Specialists. The EFA West Navy Engineer in Charge/Remedial Project Manager (EIC/RPM) acted as the customer representative, providing oversight and monitoring the site investigation. All personnel directly involved with the site investigation have been trained in hazardous waste operations, ordnance safety, and environmental awareness and were certified by the SSPORTS Explosive Safety Manager to perform specific work tasks:

- **Program Manager** directed overall policy and safe accomplishment of all project work. The Program Manager coordinated communications with EFA West and the regulatory agencies. As the Explosives Safety Officer (ESO), he was also responsible for the explosive safety aspects of the project and for implementing the Navy Explosives Safety Program of SSPORTS Environmental Detachment Vallejo.
- **Project Manager** coordinated, planned, and managed the intrusive investigation, evaluated techniques used during the progress of the project, initiated engineering solutions for problems as they were encountered, supervised the documentation of project work, managed project data, and generated reports. The Project Manager also assisted the Program Manager, as directed.
- **Site Safety Officer** determined basic policy regarding implementation of the Health and Safety Plan (reference 9) and provided oversight of the On-Site Health and Safety Coordinators.
- **UXO Specialist** performed all operations involving the location, removal, and disposal of ordnance. The UXO Specialist is a graduate of the U.S. Navy Explosive Ordnance Disposal (EOD) School at Indian Head, Maryland. The UXO Specialist also accomplished the duties of On-Site Health and Safety Coordinator and Site Security Officer.
- **Surface Search Team** accomplished the surface search, under the direction of the UXO Specialist, to visually locate ordnance and ordnance materials.
- **Survey Technicians** accomplished the GPS data acquisition, and the documentation and mapping of all ordnance contacts.

3. SITE DESCRIPTION

The history, physical characteristics, ecological and archeological concerns associated with the site are described in this section.

3.1 HISTORY

The western tip of Alameda Island was farmed in the 1800s before becoming an industrial and transit center. Railroad yards and rights-of-way for Southern Pacific, Central Pacific and small local railways were built over the site and sloughs to the north in the late 1800s. The western terminus for the transcontinental railroad was at the

southeast corner of the site for a short period in 1869. Before 1930, at least two large industrial sites (an oil refinery and a borax processing plant) were located at the southwestern tip of Alameda Island.

The U.S. Army acquired the western tip of Alameda from the City of Alameda in 1930 and began construction activities in 1931. In 1936, the Navy acquired title to the land from the Army and began building the Naval Air Station Alameda (NAS Alameda), which was commissioned on 1 November 1940. The construction involved filling the natural tidelands, marshes, and sloughs between the Oakland Inner Harbor and the western tip of Alameda Island. The fill largely consisted of dredge spoils from the surrounding San Francisco Bay and Oakland Inner Harbor. Alameda Point was identified for closure under the Department of Defense Base Realignment and Closure Act (BRAC) in September 1993 and the installation ceased all naval operations in April 1997.

3.2 GEOLOGY

3.2.1 SITE IR-1 GEOLOGY

Site IR-1 is typically flat with slight depressions that temporarily flood during the winter rains. The site consists of paved runway areas, non-native grasslands, disturbed areas, and a jogging trail. Ryegrass, yellow sweet clover, and common plantain dominate the non-native grasslands. The disturbed areas contain uninhabited buildings, building foundations and the former pistol range. Grasses are the dominant vegetation in this area and feral rabbits the dominant animal species.

3.2.2 SITE IR-2 GEOLOGY

The topography of Site IR-2 varies and is directly related to the site's previous use; the upland zones surrounding the wet areas were once a waste disposal area (as evidenced by the significant amount of debris) and the West Beach Landfill Wetland area was a former dredge spoils pond. An existing jogging trail is located at the outer edge of a bermed roadway that surrounds Site IR-2. The berm is approximately 10 - 15 feet higher in elevation than the rest of the site, with the upland zones as much as 5 feet higher in elevation than the West Beach Landfill Wetland area. The thick vegetation of the upland zones is dominated by thistles, *Brassica sp.* (mustard, turnip), coyote bush, and plantain. The wetland area contains standing water throughout most of the year and is dominated by pickleweed, saltgrass, seaside trefoil, and brass buttons.

3.3 ECOLOGICAL CONCERNS

Many different species of wildlife are found at Alameda Point. Birds are by far the most prominent wildlife since the area provides rookeries and safe feeding grounds for large populations of sea birds and waterfowl. Black-tailed jackrabbits, Canada geese, and European starlings are the dominant animal species at Site IR-1. The runway tarmac provides an important nesting habitat for sensitive species such as the California Least

Tern. The wetland area at Site IR-2 is a haven for a variety of waterfowl including sensitive species and habitats such as the Caspian tern (*Sterna caspia*).

Because of the species known to exist at IR-1 and IR-2, and the nature of the site investigation, no significant ecological impact was anticipated. All SSPORTS personnel involved with the site investigation received environmental awareness briefings prior to the start of site investigation operations so that disruption of native plants and wildlife was minimized.

Vegetation at Site IR-2 required trimming in order to facilitate the geophysical survey. The vegetation was trimmed to no less than 4 inches to protect the natural habitat of the area and accomplished manually without the use of motorized or mechanized equipment to prevent disturbing the nesting birds and waterfowl. There was no vegetation at Site IR-1 that required trimming.

3.4 ARCHEOLOGY

There were no known archeological or historical features near Sites IR-1 and IR-2.

4. SITE RISK ASSESSMENT

Unexploded ordnance and the ecological risk due to exposure to ordnance compounds were the only environmental hazards suspected to be present at the site. However, since there were no intrusive operations involved and there was no ordnance or ordnance material recovered during any phase of the site investigation, the risk of exposure to ordnance compounds was non-existent.

Although historical data revealed that hazardous waste was placed in site IR-2 from 1952 through 1978 and a 1995 soil investigation conducted by the Navy at the former pistol range located in Site IR-1 showed total lead, cadmium and zinc concentrations above California Total Threshold Limit Concentrations (TTLC) (Title 22 CFR) of 1,000 mg/kg, 100 mg/kg, and 5,000 mg/kg, respectively, the risk of exposure to chemical hazards was minimal since there were no intrusive operations involved during the site investigation.

Since the extent of the potential UXO contamination is not known, the surface search was extended to the outer site boundaries shown in Figure 3 and did not include the 8 acres previously searched during the October 1998 emergency removal action.

5. SITE WORK

The UXO site investigation and described in this Section was accomplished in compliance with the UXO Site Investigation Survey Work Plan dated May 2, 1999.

5.1 SITE CONTROLS

Since there were no intrusive operations performed, site restrictions were not required to conduct the site investigation of Sites IR-1 and IR-2. The existing site control measures were utilized to prevent public access and to protect nesting habitats and wildlife. Site IR-1 and the West Beach Landfill Area at Site IR-2 are secured by chain link fencing with locked gates.

5.2 SURFACE SEARCH

The surface search was accomplished to visually locate, identify, and remove all exposed ordnance materials that may present a danger to site workers during the project. The surface search utilized pre-established baselines for both sites and a search grid system relative to the baselines (Figures 7 and 8). The search grids were used to guide the survey teams, and act as a reference system for recording located ordnance materials and potential ordnance anomalies identified during the geophysical survey. The nominal size of each search grid was 100 feet x 100 feet. The shoreline determined the size of the grids located on the western-most edge of each site. The surface search along the shoreline extended to, but did not include the rip rap due to the dangers presented by the area. Tidal fluctuations did not affect the search of the grids along the shoreline.

During the surface search, the UXO Specialist utilized a MK 26 magnetometer to define the landfill boundaries at Sites IR-1 and IR-2. The MK 26 is a standard Navy ferromagnetic magnetometer and was operated in accordance with the operating instructions contained in the operating manual. The MK 26 can detect a .50 caliber cartridge to a depth of approximately one foot. Larger objects, depending on size and mass, can be detected to a depth of up to approximately 20 feet. The MK 26 was calibrated before the start of the surface search in accordance with the operation manual and the sensitivity set at a level that would allow detection of masses at the greatest possible depth without producing error signals. However, due to site and soil conditions, the UXO Specialist could not make a positive determination of the landfill boundaries. No ordnance or ordnance materials were located during the surface search.

5.3 GEOPHYSICAL SURVEY

The geophysical surveys were performed by four qualified surveyors: one magnetometer operator, one differential global positioning system operator and two additional survey personnel to assist the instrument operators, as necessary, with

SAN FRANCISCO BAY

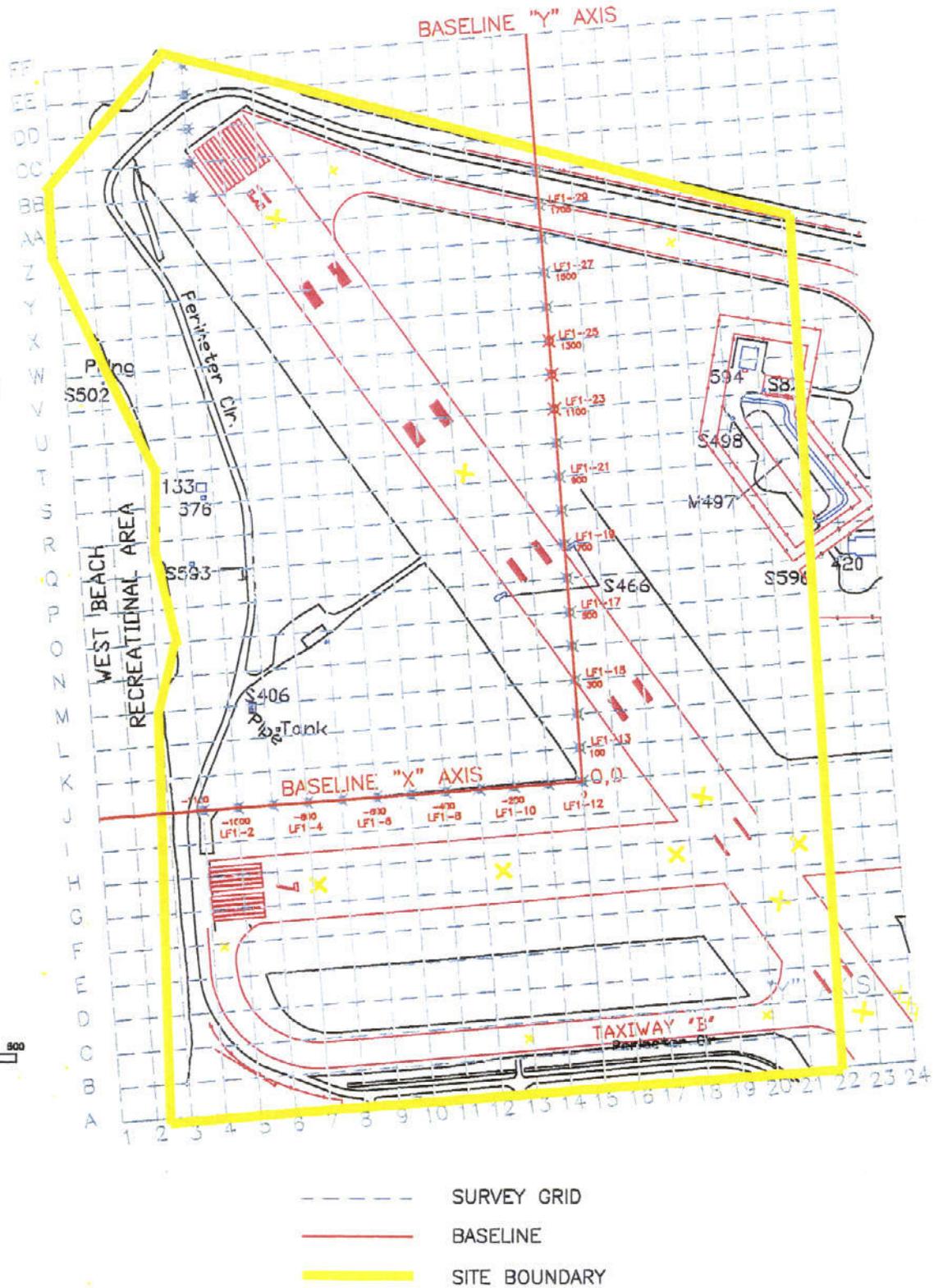


FIGURE 7. SITE IR-1 SURVEY BASELINES AND SEARCH GRIDS

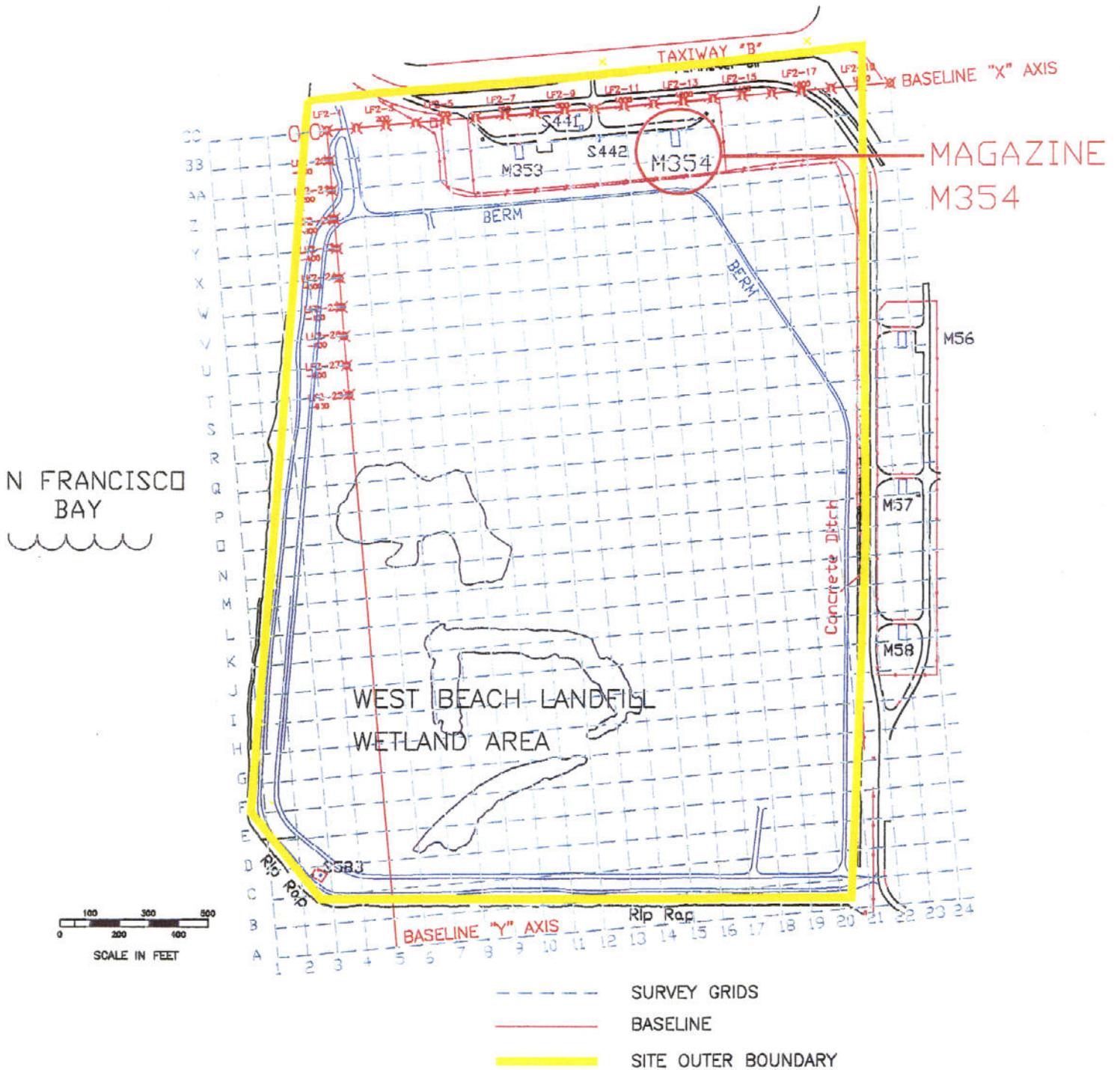


FIGURE 8. SITE IR-2 SURVEY BASELINES AND SEARCH GRIDS

navigation and other tasks. The established baselines for each site were used to develop the search grid parameters for the surveys. The geophysical survey incorporated a Cartesian coordinate system (x,y) with the search lanes spaced approximately 2 feet apart. The search lanes were walked in a North-South direction and data collected at approximately 10 measurements per second at a walking pace of approximately 1 meter per second.

The geophysical survey was accomplished using a Geometrics G-858 Portable Cesium Sensor Magnetometer in a gradiometer configuration. The G-858 was used in conjunction with a Trimble ProXR Real-Time Differential Global Positioning System (DGPS) to simultaneously acquire DGPS positions and subsurface magnetic data. The DGPS operator walked behind the magnetometer operator at a distance (approximately 20 feet) that would not interfere with the magnetic data acquisition and influence or distort the magnetic data. Specific details of both instruments and their capabilities are described in Section 5.5 of the Survey Work Plan, as well as the data processing and mapping software used to develop the final product.

6. AREAS OF CONCERN

Although no ordnance or ordnance materials were recovered during the surface search, the UXO Specialist identified two sites that warranted further investigation and recommended that geophysical surveys be performed at each site. The recommendation was based on the findings of the previous 8-acre surface sweep accomplished as part of the October 1998 emergency removal action, historical data, personnel interviews and the previous use of each site.

The two primary areas of concern are the former pistol range area at Site IR-1 and an area in the West Beach Landfill at Site IR-2 where waste disposal operations took place between 1950 and 1978 (Figure 9). The UXO Specialist used flagged wooden stakes to mark the estimated boundaries of the areas requiring a geophysical survey. Survey personnel utilized DGPS to record the location of each stake and to further define the geophysical survey boundaries.

Figures 10 and 11 are a representation of magnetic anomalies detected at each area of concern in Site IR-1 and Site IR-2.

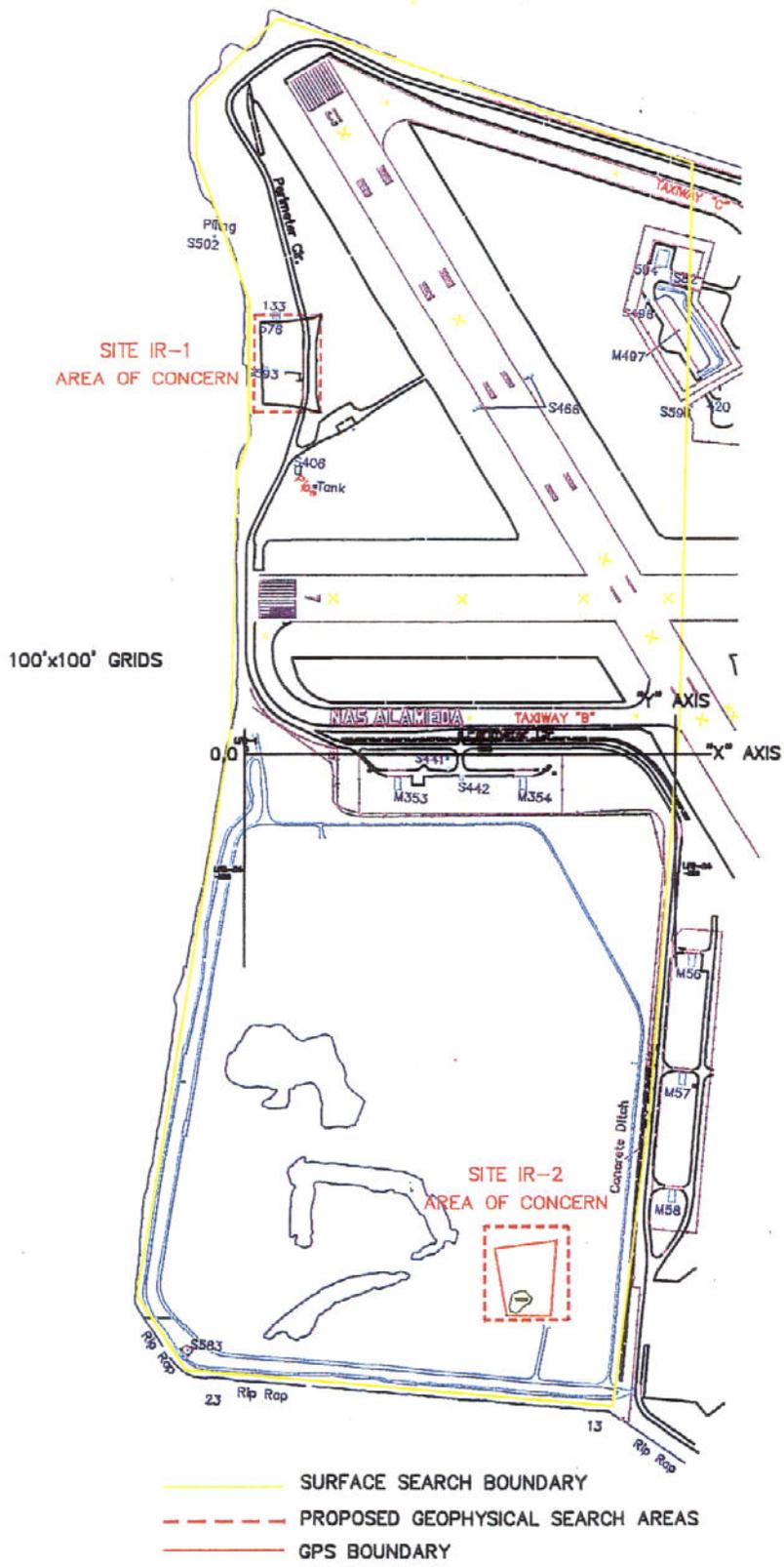


FIGURE 9. SITES IR-1 AND IR-2 AREAS OF CONCERN

6.1 SITE IR-1 AREA OF CONCERN

The results of the geophysical survey accomplished at Site IR-1 are shown Figure 10. The survey area encompassed the former pistol range where a preliminary surface sweep was conducted after numerous 20mm high explosive projectiles were discovered resulting in an emergency removal action that disposed of 335 live 20mm high explosive projectiles and 2 live small arms cartridges. The total area surveyed at Site IR-1 was approximately 3 acres.

The geophysical survey data identified several mass subsurface anomalies which may be an indication of buried unexploded ordnance. These mass anomalies are consistent with reports from employee interviews that during construction of the pistol range, excavations went to a depth of approximately 8 feet to remove buried debris, and that an unknown number of 55 gallon drums filled with fired 20mm projectiles were dumped in the excavation. It was also reported that fired projectiles were mixed into the concrete as aggregate and used for the pistol range foundations.

6.2 SITE IR-2 AREA OF CONCERN

The results of the geophysical survey accomplished at Site IR-2 is shown in Figure 11. This area is located in the southeastern corner of the West Beach Landfill at Site IR-2 and was identified in an interview with former personnel of Naval Air Station Alameda as an area where inert ordnance was previously disposed. During the interview, Mr. Winkleman, former General Foreman of the Weapons Shop in 1974 and presently the Ordnance Officer at Naval Air Station Lemoore in Fresno, California, revealed the following information:

“Fifty-five (55) gallon drums filled with 20mm projectiles (fired target practice) were added to the concrete used to build the small arms range. Excavation for the range resulted in 4-foot to 8-foot hole after removal of the buried scrap metal. The area between Runway 7 and the Wetlands was a Superfund site that was discovered when efforts to drill in the area resulted in a methane detonation. Entire area contained methane vents and test wells.

Area between Runway 13 and Runway 7 was cleared and the material transported to a burial site south of Runway 7 (5 ton trucks full of aluminum piston aircraft engine cylinders, etc.).”

The geophysical survey data for Site IR-2 revealed several large subsurface masses and discrete subsurface anomalies which are consistent with the known previous use of the site, as well as from visual observation of existing conditions, that the area was used as a landfill. Efforts to discriminate the anomalies identified by the geophysical survey as ordnance or landfill debris were unsuccessful due to the high background noise of the area and the amount of debris located at the site. However, information obtained from personnel interviews and from archive data that the area was once used as an inert ordnance disposal area, indicates that buried unexploded ordnance may be present at the site.

APPROXIMATE DIMENSIONS OF AREA OF CONCERN
ARE 250 FEET BY 400 FEET, OR APPROX. 2 ACRES

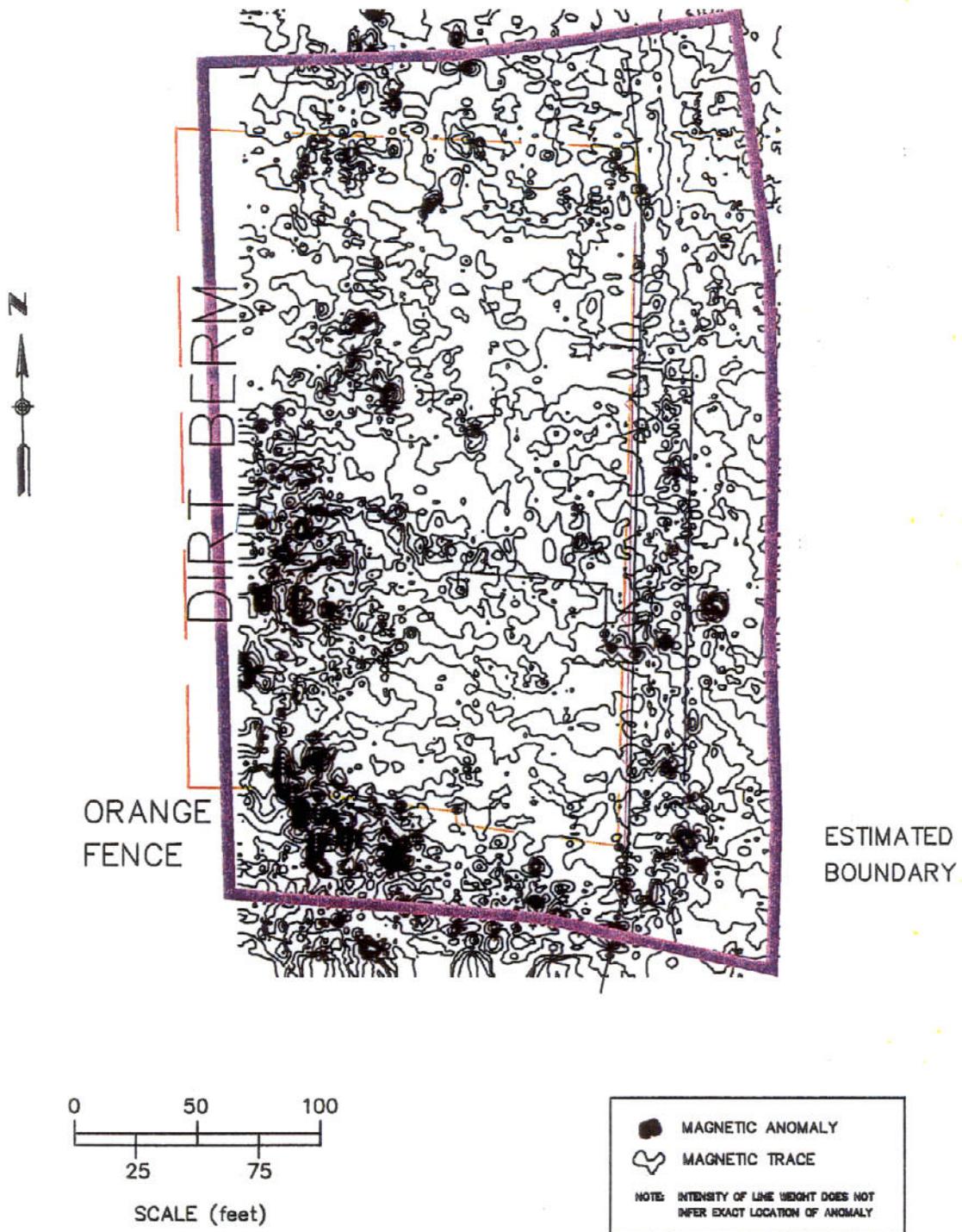


FIGURE 10. GEOPHYSICAL SURVEY OF SITE IR-1 AREA OF CONCERN

APPROXIMATE DIMENSIONS OF AREA OF CONCERN
ARE 300 FEET BY 350 FEET, OR 2.25 ACRES

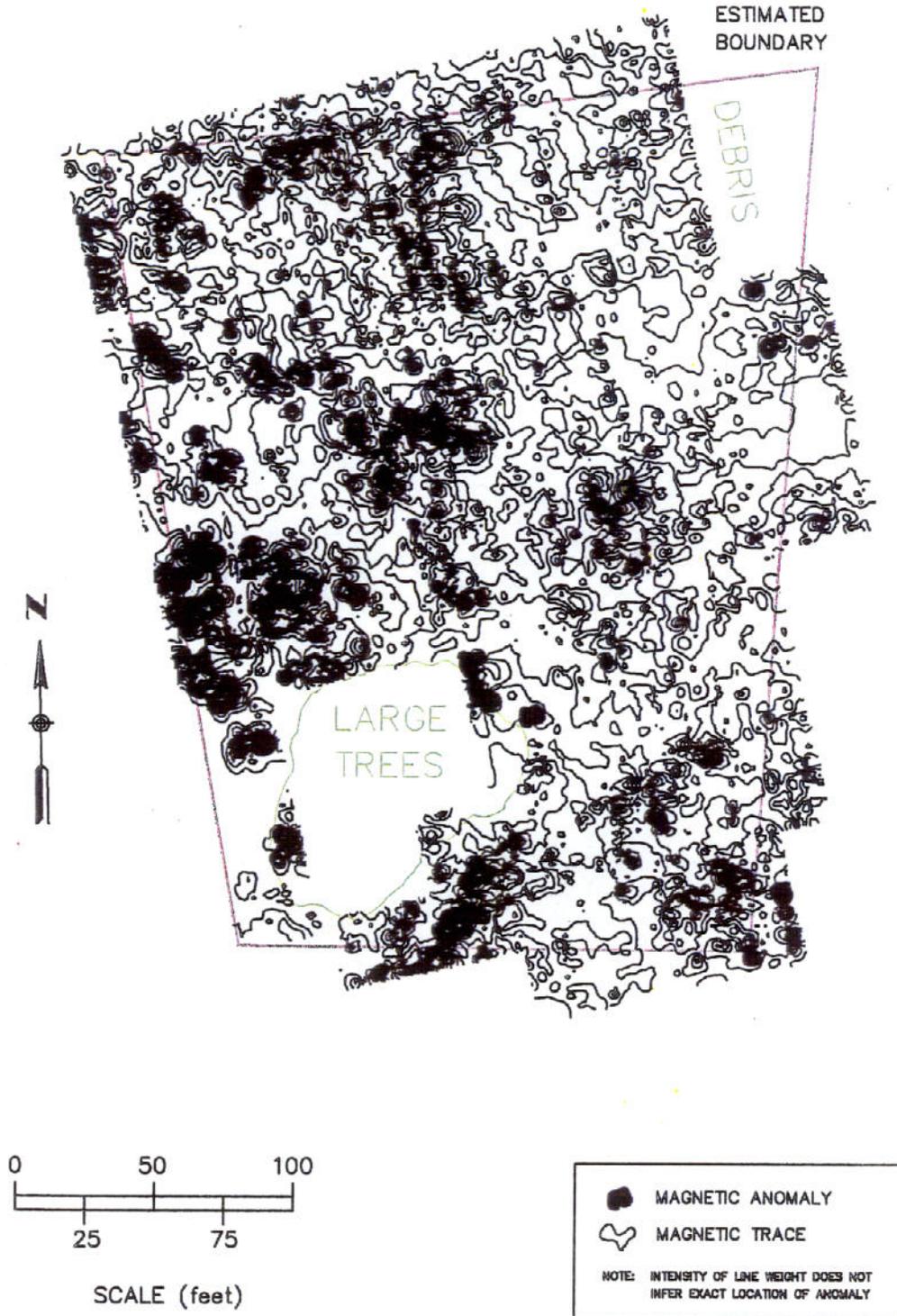


FIGURE 11. GEOPHYSICAL SURVEY OF SITE IR-2 AREA OF CONCERN

7. DEVIATIONS FROM THE WORK PLAN

There were no deviations from the Work Plan.

8. SITE INVESTIGATION QUALITY ASSURANCE

The following activities were performed to ensure survey and data quality.

- Prior to the start of data collection, survey personnel (especially instrument operators) were demagnetized to prevent distortion of the magnetic data.
- Equipment given proper warm-up time, batteries checked and sensors adjusted for proper operating orientation.
- Proper instrument operation verified prior to the start of data collection in accordance with the instrument's operating manual. Geophysical and GPS equipment normally calibrated by the manufacturer in accordance with the manufacturer's calibration schedule.
- Operators navigate to a known reference point or control monument to ensure GPS equipment is operating properly.
- Survey data taken on a test grid at the start and end of each day to ensure data repeatability and quality, and to ensure proper system operation.
- During the survey, operator(s) frequently checked instrument console to ensure that data is correct (i.e., line that operator is on agrees with the line number recorded in the data, walking in the same direction as shown on the data console, etc.).
- Additional survey personnel were utilized to guide the operator(s) for accurate tracking along the survey lines and to ensure safety.
- The raw survey data was downloaded daily and examined to ensure that line numbers were correct and data corrections have been properly executed.
- Finished data was reviewed to ensure that start/stop points were correct and there were no data gaps.
- Selected anomalies were reacquired to ensure proper location.

9. SITE RESTORATION

A goal of the site investigation was to preserve the site as a habitat for native species of plants and animals. Existing vegetation in Site IR-2 was affected only when necessary to safely accomplish the ordnance site investigation geophysical survey. Disruption of native animal species was minimized whenever possible.

10. SITE MAPPING

A differential global positioning system (DGPS) was used to record the location of the subsurface anomalies identified during the geophysical survey. DGPS data was collected simultaneously with the magnetic data using a Trimble ProXR Global Positioning System and a Pathfinder Community Base Station to record the errors for each available satellite.

The DGPS data for the areas of concern were collected in U.S. State Plane, California Zone 3, NAD 27 coordinates and imported into an AutoCAD map of Alameda Point developed in the same coordinate system.

11. SUMMARY

The purpose of the preliminary UXO site investigation was to facilitate the reuse of property by eliminating the threat of exposure to unexploded ordnance. The presence of unexploded ordnance was confirmed by visual observation in September 1998 during a radiological survey of Site IR-1, resulting in an initial surface sweep of approximately 8 acres and a subsequent emergency removal action. The emergency removal action recovered a total of 335 live 20mm high explosive projectiles, 2 live small arms cartridges, and over 12,000 inert ordnance items.

This discovery of unexploded ordnance at Site IR-1 prompted a more extensive and non-intrusive preliminary UXO investigation of Sites IR-1 and IR-2. The preliminary UXO investigation consisted of an archive data review, personnel interviews, a surface search to locate ordnance and ordnance materials on the surface of each site, and a geophysical survey to determine the presence of buried unexploded ordnance in two primary areas of concern. The 8 acres searched during the initial surface sweep and emergency removal action were not included in the preliminary UXO investigation.

Although there were no ordnance or ordnance materials recovered during the preliminary surface search, information obtained from personnel interviews, the archive data, the known previous use of each site and visual observation was used to identify two primary areas of concern that warranted a geophysical survey. The two primary areas of concern are the former pistol range at Site IR-1 and an area located in the southeast corner of the West Beach Landfill at Site IR-2 where waste disposal operations took place between 1950 and 1978.

The geophysical survey data for each area of concern identified several mass and discrete subsurface anomalies, which may indicate the presence of buried unexploded ordnance. However, geophysical methods can only indicate the presence of ferrous and non-ferrous metals at a limited distance below the surface, depending on the detection capability of the instrument used. Due to the existing site conditions, the geophysical survey data alone cannot verify the presence of buried unexploded ordnance and based on all data and information obtained from the UXO preliminary assessment and site investigation, a further investigation is warranted.

12. RECOMMENDATIONS

In order to satisfy the requirements for the transfer of government-owned land contaminated by ordnance material for public use, a comprehensive and detailed UXO intrusive investigation of each area of concern within Site IR-1 and Site IR-2 is proposed.

The primary goal of an unexploded ordnance intrusive investigation is to locate and remove all ordnance and ordnance materials to a minimum required ordnance clearance depth specified by the Department of Defense Explosive Safety Board (DDESB) in accordance with Chapter 12 of DoD Standard 6055.9 in order to maintain public safety. Determination of the required remediation depth is based on the planned reuse of the specific parcel and on information concerning the types of ordnance known or suspected to be present. In accordance with DoD Standard 6055.9, the minimum ordnance clearance depth for Site IR-1 is 4 feet based on the planned reuse of the site as a recreational area and 1 foot for Site IR-2 based on the planned reuse of the area as a wildlife preserve. All significant subsurface anomalies detected during the geophysical surveys that cannot be associated to a known source (i.e., utility, piping, fencing, etc.), will be investigated to the minimum required clearance depth or until each suspect anomaly has been located, identified and removed.

A secondary goal, incidental to the ordnance intrusive investigation, is to remediate any chemical contamination discovered during the intrusive investigation. Unexploded ordnance and the ecological risk from ordnance compounds are suspected to be present at the site. In areas where UXO contamination might be present, there is a risk due to exposure to chemicals associated with different types of ordnance. Lead and radiological hazards are also present at Site IR-1.

The following is a general outline of the proposed intrusive investigation and ordnance removal action for Sites IR-1 and IR-2:

- Only qualified personnel under the supervision of qualified UXO Specialists will accomplish the intrusive investigation and removal action.
- Ordnance items recovered during the intrusive investigation will be inspected and evaluated by the UXO Specialist as being hazardous or non-hazardous. All ordnance items recovered during the intrusive investigation will be documented.
- Hazardous ordnance items will be transported by the UXO Specialist to an approved and certified on-site magazine for short term storage pending disposal. Hazardous ordnance items determined unsafe for transport to the on-site magazine will be disposed of in-place.
- Hazardous ordnance items will be handled and disposed of on-site by qualified UXO Specialists. During all intrusive and ordnance disposal operations, the required explosive safety quantity distance (ESQD) arcs and exclusion zones will be invoked.

- Magazine M354 was authorized by the Naval Ordnance Center (NOC) as the on-site temporary storage for recovered UXO material during the preliminary site investigation at Alameda Point. Magazine M354 located near the landfill area (Figure 8), was previously sited for the storage of Class 1 Division 1 material prior to base closure, and was authorized by for use during the 1998 emergency removal action.
- Ordnance items that are not considered hazardous will be segregated, certified inert by the UXO Specialist and recycled or disposed of as scrap material.
- After the removal of ordnance items, the excavated soil and the bottom and sides of each excavation will be verified clear of detections of ordnance. Additional contacts will be investigated and removed.
- Soil sampling will be accomplished, as necessary, by field screening methods. Excavated soil exceeding action levels for the contaminants of concern will not be used as backfill and will be disposed of at a licensed and permitted disposal facility.
- Excavated soil that is verified clean of chemical contaminants to agreed upon action levels and determined not to contain ordnance will be used as backfill for each excavation.

GLOSSARY OF TERMS

ANOMALY - An object or area suspected to represent ordnance material because of historical evidence and/or physical characteristics such as location, magnetic signature, or other properties.

CALIBER - The diameter of a small arms projectile expressed in hundredths of an inch.

EXPLOSIVE - Chemical compound or mechanical mixture which, when subjected to heat, impact, friction, detonation or other suitable initiation, undergoes a very rapid chemical change with the evolution of large volumes of highly heated gases which exert pressures in the surrounding medium.

HIGH EXPLOSIVE - A substance that, once initiated, reacts with virtually instantaneous and continuous speed through the total mass, causing very high blast pressures and a widespread shattering effect.

INERT - The term used to describe ordnance that does not contain explosive material. Ordnance is considered to be live unless certified inert by competent authority (qualified Explosive Ordnance Disposal personnel).

ORDNANCE - Any device (or component of a device) which contains or is designed to contain explosive material. This includes propellant, projectiles, bulk explosive, primers, fuzes, small arms ammunition, pyrotechnics, etc.

ORDNANCE CONTAMINATION - Term describing the uncontrolled presence of ordnance items or components in an area. In the context of this work plan, the term does not imply chemical contamination of soil or structures attributed to explosive material (unless specifically stated).

STANDARD OPERATING PROCEDURE - A document that prescribes exact instructions for personnel to follow in performing a specific task involving explosives.

REFERENCES

1. Engineering Field Activity West Scope of Work, Ordnance Preliminary Assessment at Operable Unit 3, Alameda Point, Alameda, California dated 17 February 1999
2. Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA)
3. U.S. Army Corps of Engineers, Safety and Health Requirements Manual, Number EM 385-1-1
4. Navy Occupational Safety and Health Program Manual, OPNAVINST 5100.23E
5. Prevention and Treatment of Heat and Cold Stress Injuries Technical Manual, Navy Environmental Health Center Manual, NEHC-TM92-6
6. SSPTS Environmental Detachment Radiological Survey at Alameda Point, Alameda, California, 28 September 1998
7. SSPTS Environmental Detachment, Standard Operating Procedure (SOP) Number 140, Immediate/Emergency Response On-site Demolition Operation, dated 28 November 1998
8. Department of Defense Base Realignment and Closure (BRAC) Act of 1993
9. SSPTS Environmental Detachment, Standard Operating Procedure (SOP) Number 180, Procedure for On-Base Handling, Transportation and Temporary Storage of Unexploded Ordnance at Operable Unit 3 Alameda Point
10. SSPTS Environmental Detachment letter 5090 Ser 120/175 dated 22 Apr 99
11. NOC letter 8020 Ser N7112/720 dated 6 Nov 98
12. DOD 6055.9-STD, Ammunition and Explosives Safety Standards
13. OPNAVINST 11320.23, Firefighting Responsibilities and Authorities
14. DOD 4145.26M, DOD Contractors Safety Manual for Ammunition and Explosives