

5090  
Ser 09ER3GM/L5096  
4 Apr 1995

From: Commanding Officer, Engineering Field Activity West, Naval Facilities  
Engineering Command

To: Distribution

Subj: DOCUMENT SUMMARY FOR DRAFT REMEDIAL  
INVESTIGATION/FEASIBILITY STUDY AQUIFER TESTING WORKPLAN,  
NAVAL AIR STATION (NAS), ALAMEDA, CALIFORNIA

Encl: (1) Document Summary for Draft Remedial Investigation/Feasibility Study  
Aquifer Testing Workplan dated March 1995

1. Enclosure (1) is a Document Summary and is submitted for your information. A Document Summary is an abstract of an upcoming report or workplan. The Document Summary is meant to provide the reader with a brief description and highlights of the report or workplan.
2. The draft Aquifer Testing Workplan will be submitted for a 30-day review to the regulatory agencies in early April 1995. The RAB Co-chair and Focus Group Leaders will also receive a copy of the draft Aquifer Testing Workplan. This workplan is provided for information and does not require review or comment; however, if after reviewing enclosure (1), you would like a copy of the workplan, please make your request directly to me, by phone (415) 244-2555 or (415) 244-2524 or FAX (415) 244-2561.
3. If you have any questions regarding this matter please give me a call.

Original signed by:

GARY J. MUNEKAWA  
Remedial Project Manager  
By direction of  
the Commanding Officer

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NAVAL AIR STATION (NAS), ALAMEDA, CALIFORNIA

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RAB Early Actions Focus Group Leader (Chris Bacina)  
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**REMEDIAL INVESTIGATION/FEASIBILITY STUDY  
AQUIFER TESTING WORK PLAN**

**DOCUMENT SUMMARY**

**Document Type:** Work plan

**Date:** March 1995

**Version:** Draft

**Summary:** This work plan describes aquifer tests to be conducted at Naval Air Station (NAS) Alameda. The aquifer tests are being conducted as one part of the overall remedial investigation underway at NAS Alameda. The remedial investigation is a comprehensive study to fully characterize the extent and type of contaminants in the soils and groundwater.

An aquifer is a subsurface reservoir of water; it is typically the result of water penetrating surface soils and moving downward with gravity. The standard tests described in this work plan are used to collect information about how water moves in the aquifer, specifically in what direction the water moves, how fast it moves, and how the flow of the water will change when water is pumped out of the aquifer. The data collected from these aquifer tests will be used in at least two ways: (1) the aquifer test results will help determine how contaminants in the groundwater may be moving (migrating); and (2) if necessary, the aquifer test results will also be used to design groundwater treatment systems that will prevent further migration of contaminants. The results will be useful in designing systems that pump water out of the aquifer and treat it to remove or destroy contaminants.

This work plan proposes tests in existing wells at the following sites:

<b>Site number and name</b>	<b>Aquifer tests to be conducted</b>
Site 1 1943-1956 Disposal Site	Slug test, step drawdown test, constant discharge test
Site 2 West Beach Landfill	Constant discharge test
Site 5 Building 5, Plating Shop	Slug test, step drawdown test, constant discharge test
Site 13 Former Oil Refinery	Slug test, step drawdown test, constant discharge test

A slug test was performed at Site 2 in 1991. These standard tests are defined in a glossary attached to this summary.

The sites proposed for aquifer testing were selected because they are located in different geographic areas within the installation and are expected to represent the movement and condition of the groundwater (hydrogeologic conditions) across the base. Furthermore, it is anticipated that some groundwater cleanup will be needed near these sites; therefore, collecting aquifer information from these sites now will allow for earlier and appropriate design of groundwater treatment systems, if necessary. The aquifer tests will be performed in existing wells that were constructed to monitor groundwater. The attached figures show the areas where aquifer testing is proposed, a map for each area, and the proposed wells to be tested.

The aquifer testing work plan requires review and approval by the following agencies:

California Environmental Protection Agency, Department of Toxic Substances Control  
U.S. Environmental Protection Agency  
California Regional Water Quality Control Board

Aquifer testing is proposed to occur in summer 1995; results will be published in fall 1995.

## Glossary

**Slug test** is an aquifer test that involves initiating an instantaneous change in groundwater level in a well by either removing a "slug" (set volume of water) or adding a slug of water. Once the slug is removed or added, the water level in the well is monitored until it returns to its initial level. The measurement is used in calculations that help determine the aquifer's hydraulic conductivity and other aquifer properties. Hydraulic conductivity refers to the aquifer's capacity to transmit water.

**Constant discharge test** is an aquifer test that involves pumping water from a well at a constant rate (for example, gallons per minute). While the well is being pumped, nearby wells are monitored to record changes in water level at set distances away from the pumping well. The changes in water level are plotted versus time (feet per hour or feet per second). These results are used in calculations that help determine transmissivity and storage. Transmissivity is a measurement of the rate at which water moves through the aquifer. Storage relates to the amount of water that could be reliably pumped from the aquifer over time.

**Step drawdown test** is an aquifer test that involves pumping water from a well at several different rates. For example, a well may be pumped at a rate of 100 gallons per minute for 2 hours; 200 gallons per minute for the next 2 hours; and 400 gallons per minute for the next 2 hours. As with the constant discharge test, nearby wells are monitored for changing water levels. This step drawdown test indicates how reliably the pumping well can be pumped over long periods of time, and at which rate it might be most reliable. Reliability of pumping changes with time in most aquifers, and this may result in being able to get less water from the well as time passes. This information is essential in designing systems that pump water out of the aquifer and treat the water to remove or destroy contaminants (called "pump and treat" systems).

Site 1  
Aquifer Test Area

1

Alameda County  
San Francisco County

2

Site 2  
Aquifer Test Area

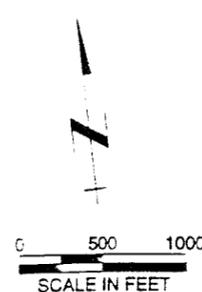
Site 5  
Aquifer Test Area

Site 13  
Aquifer Test Area

LEGEND:

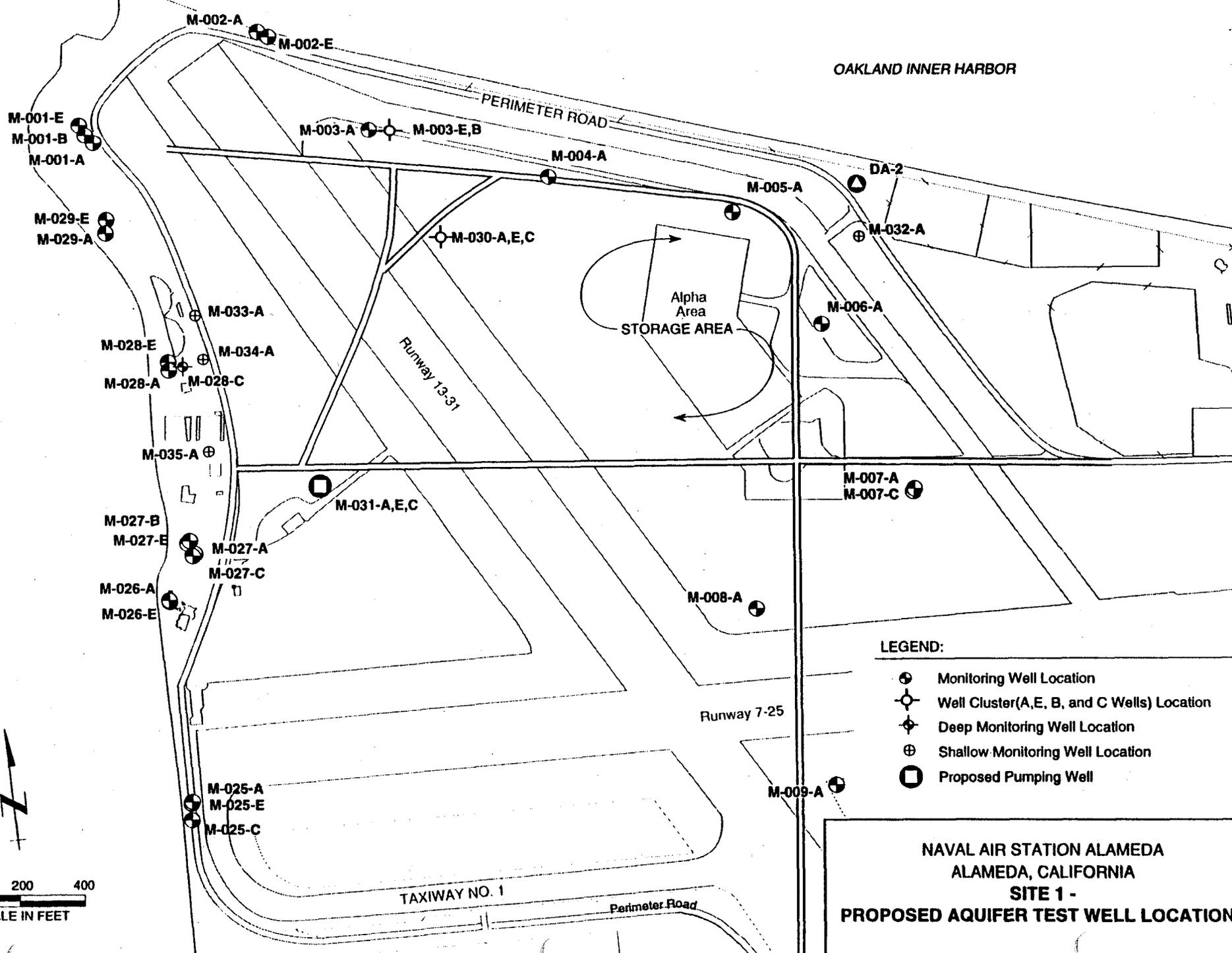
SITE NO.	SITE DESCRIPTION
1	1943-1956 Disposal Site
2	West Beach Landfill
3	Area 97 (Aviation gasoline tanks)
4	Building 360 (Plating shop, engine cleaning shop, paint shop, and paint stripping shop)
5	Building 5 (Plating shop, paint stripping shop, cleaning shop, and paint shop)
6	Building 41 (Aircraft intermediate maintenance department)
7	Buildings 459 (7A), 162 (7B), and 547 (7C) (Service stations)
8	Building 114 (Pest control area and separator pit)
9	Building 410 (Paint stripping)
10	Buildings 400 (10A) and 530 (10B) (Missile rework operations)
11	Building 14 (Engine test cell)
12	Building 10 (Power plant)
13	Oil refinery
14	Fire training area
15	Buildings 301 and 389 (Storage area)
16	Cans C-2 area
17	Seaplane Lagoon
18	Station Sewer System (Not shown on map)
19	Yard D-13 (Hazardous waste solvents)
20	Estuary (Oakland Inner Harbor)

San Francisco Bay



NAVAL AIR STATION ALAMEDA  
ALAMEDA, CALIFORNIA  
INSTALLATION RESTORATION  
SITES LOCATION MAP

OAKLAND INNER HARBOR

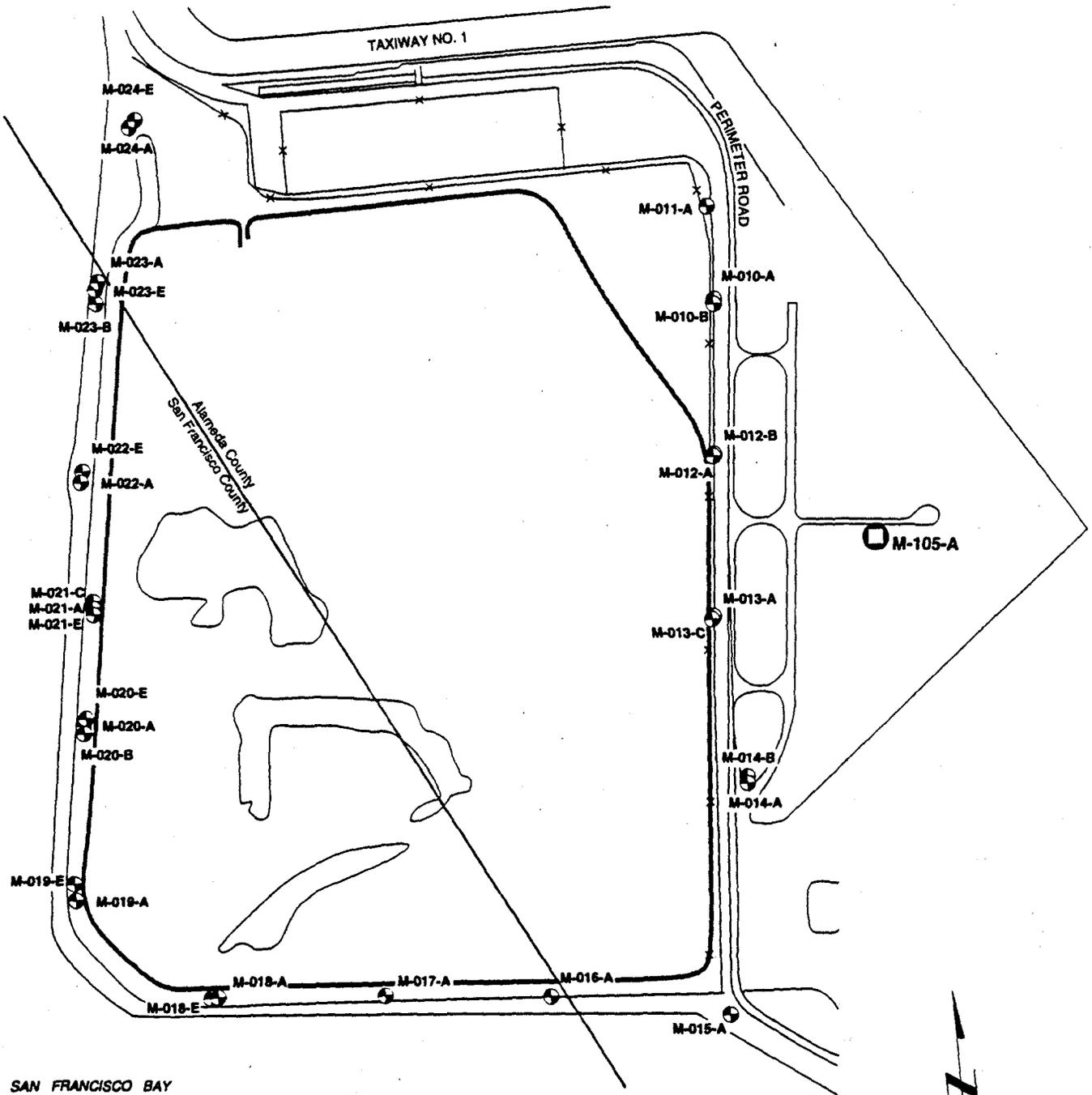


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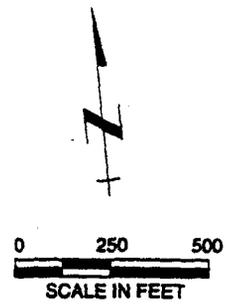
- ⊕ Monitoring Well Location
- ⊕ Well Cluster (A, E, B, and C Wells) Location
- ⊕ Deep Monitoring Well Location
- ⊕ Shallow Monitoring Well Location
- ⊕ Proposed Pumping Well

NAVAL AIR STATION ALAMEDA  
 ALAMEDA, CALIFORNIA  
 SITE 1 -  
 PROPOSED AQUIFER TEST WELL LOCATIONS





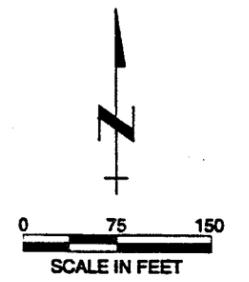
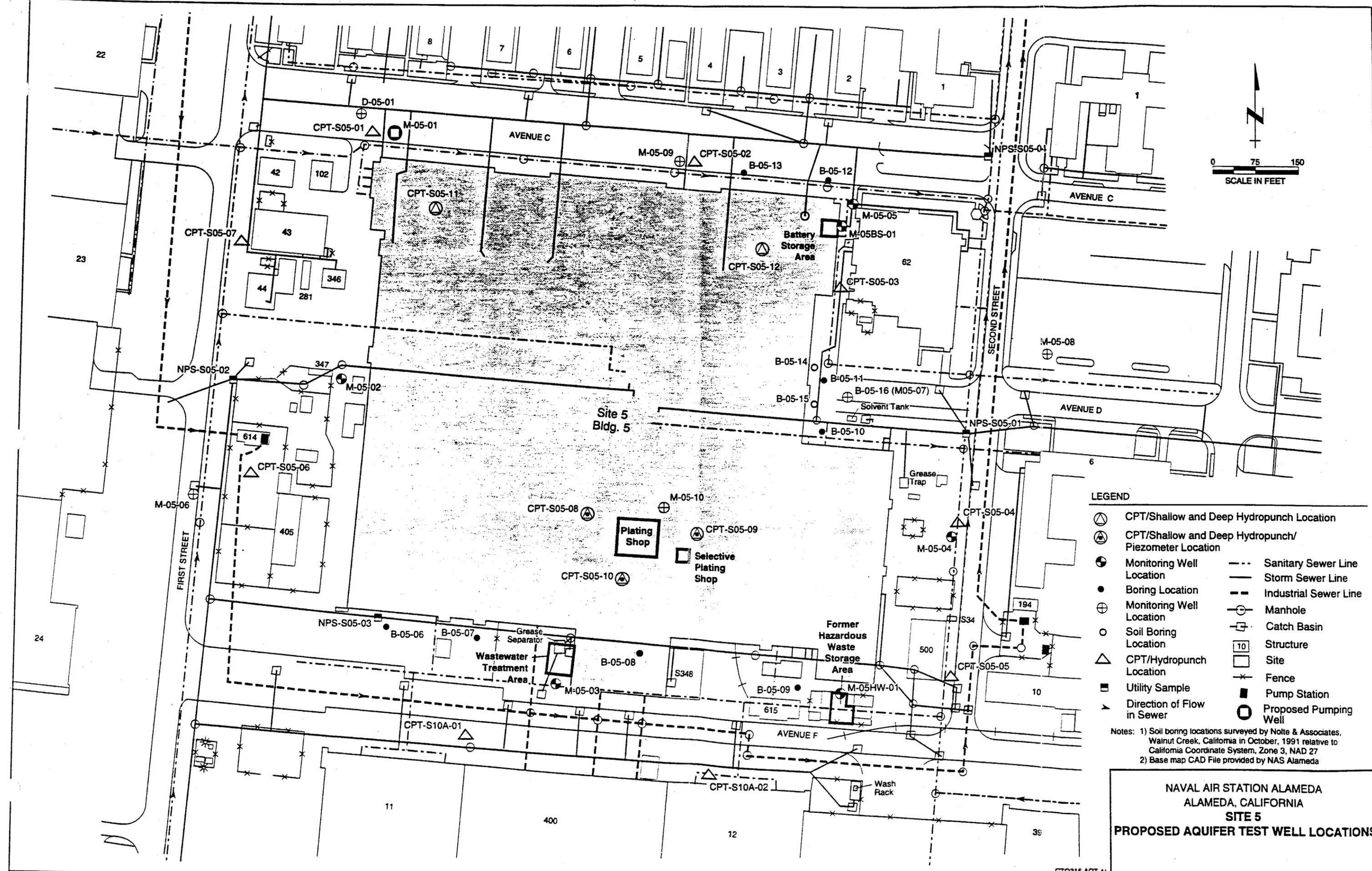
SAN FRANCISCO BAY



**LEGEND**

- ⊕ Monitoring Well Location
- ◻ Proposed Pumping Well

**NAVAL AIR STATION ALAMEDA  
ALAMEDA, CALIFORNIA  
SITE 2  
PROPOSED AQUIFER TEST WELL LOCATIONS**



- LEGEND**
- ⊕ CPT/Shallow and Deep Hydropunch Location
  - ⊗ CPT/Shallow and Deep Hydropunch/  
Piezometer Location
  - ⊙ Monitoring Well Location
  - Boring Location
  - ⊕ Monitoring Well Location
  - Soil Boring Location
  - △ CPT/Hydropunch Location
  - Utility Sample
  - Direction of Flow in Sewer
  - Sanitary Sewer Line
  - Storm Sewer Line
  - - - Industrial Sewer Line
  - ⊙ Manhole
  - ⊕ Catch Basin
  - Structure
  - Site
  - ✕ Fence
  - Pump Station
  - ⊙ Proposed Pumping Well

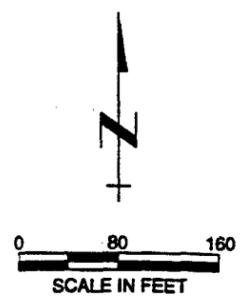
Notes: 1) Soil boring locations surveyed by Nolte & Associates, Walnut Creek, California in October, 1991 relative to California Coordinate System, Zone 3, NAD 27  
 2) Base map CAD File provided by NAS Alameda

**NAVAL AIR STATION ALAMEDA  
 ALAMEDA, CALIFORNIA  
 SITE 5  
 PROPOSED AQUIFER TEST WELL LOCATIONS**



- LEGEND**
- Canorie Soil Boring Location
  - ⊕ Canorie Monitoring Well Location
  - x HLA Boring Location (Only B-7 Shown)
  - ⊕ HLA Monitoring Well Location
  - ⊕ IMF Site Monitoring Well Location
  - Boring Location
  - ⊕ Monitoring Well Location
  - △ CPT/Hydropunch Location
  - ⊕ CPT/Shallow Hydropunch Location
  - ⊕ Proposed Pumping Well
  - ⊕ Utility Sample Location
  - Direction of Flow in Sewer
  - \* Fence
  - - - Sanitary Sewer Line
  - - - Storm Sewer Line
  - ≡ Railroad
  - Manhole
  - Catch Basin
  - ▨ Site 7C
  - Site 10B
  - ▨ Site 19
  - Site 13

Boring and monitoring well locations were obtained from a base map provided by Canonie Environmental. The individual locations were digitized onto a base map CAD file provided by NAS Alameda.



NAVAL AIR STATION ALAMEDA  
ALAMEDA, CALIFORNIA  
**SITE 13**  
**PROPOSED AQUIFER TEST WELL LOCATIONS**