[redacted]

MODEL- F7F-3N

(Rev. 9-45)

AIRPLANE CHARACTERISTICS & PERFORMANCE

BUREAU OF AERONAUTICS, NAVY DEPT.

COLUMN NUMBER		5	6	7	8
LOADING CONDITION		FIGHTER One 300 Gal. Fuselage Tank External	TORPEDO 1 MK13-3 Two 150 Gal. Wing Tanks Ext.	BOMBER 1-2000# Fuse. 2-1000# Wings	ROCKET 8-5" HVAR One 300 Gal. Fuse.Tank Ext.
GROSS WEIGHT	LBS.	23537	25846	25476	24681
EMPTY WEIGHT -Calculated-	LBS.	16400			
FUEL/OIL	GALS.	675/39	675/39	375/21	675/39
FIXED GUNS/AMMUNITION		4 - 20mm/800 rds			
FLEXIBLE GUNS/AMMUNITION		None			
ENGINE POWER USED FOR PERFORMANCE		NORMAL	NORMAL	NORMAL	NORMAL
WING LOADING	LBS/SQ.FT.	51.7	56.8	56.0	54.2
POWER LOADING (1)	LBS./BHP.	7.8	8.6	8.5	8.2
V-MAX. SEA LEVEL	MPH.	319	292	294	304
V-MAX./ CRITICAL ALT.	MPH./ FT.	389/23000	354/22700	357/22700	370/22900
V-STALL. GROSS WEIGHT (2)	MPH.	95.1	99.6	99.0	97.4
V-STALL. WITHOUT FUEL (2)	MPH.	86.4	91.5	94.6	89.0
TIME-TO-CLIMB -10000 FT.-	MIN.	3.7	4.4	4.2	3.9
TIME-TO-CLIMB -20000 FT.-	MIN.	8.1	9.9	9.5	8.9
SERVICE CEILING	FT.	37700	35900	36000	36700
TAKE-OFF DISTANCE -CALM-	FT.	799	1053	1013	962
TAKE-OFF DISTANCE -15 KN.-	FT.	544	730	700	667
TAKE-OFF DISTANCE -25 KN.-	FT.	397	544	521	496
TAKE-OFF DISTANCE -50 FT. OBST.	FT.				
TAKE-OFF DISTANCE	SECONDS				
RATE OF CLIMB -SL-	FT./MIN.	2850	2410	2470	2630
AX. RANGE / V-AV. (3)	ST. MI./ MPH.				
RANGE / V-AV. -60% NSP-(3)-	ST. MI./ MPH.	1595/181	1270/179	700/181	1430/181
SEARCH RADIUS/V-AV. -20% R-	NMI./KN.				
A. S. W. RADIUS/V-AV. -20% R-	NMI./KN.				
SCOUT RADIUS	NMI.				
COMBAT RADIUS	NMI.	330	295	0	310

PERFORMANCE IS BASED ON - Flight Tests of F7F-1 & F7F-3N Airplanes

RANGE & RADIUS ARE BASED ON PRELIMINARY A.E.L. FUEL CONSUMPTION DATA INCREASED BY 15 PERCENT TO CONFORM WITH PAST EXPERIENCE.

*COMBAT CONDITION: Two faired MK51-7 wing bomb racks and sway-bracing plus fuselage shackle and sway-bracing aboard; rocket launchers not aboard. At Combat Power - Combat Condition plus 8 MK-9 launchers - Vmax/SL - 355; Vmax - 418/21900.

CLEAN CONDITION: Combat Condition with all bomb racks and sway-bracing removed. At Combat Power - Vmax/SL - 369; Vmax - 435/22000.

ROCKET CONDITION: Rockets suspended from MK-9 launchers.

FERRY CONDITION: Armor & Armament removed; Gross Weight - 23444, Fuel - 975 Gals. Maximum range at 1500 ft. is 2370 st. mi. at 173 mph.

FUEL TRANSFER: Provisions are incorporated for fuel transfer from droppable to main tanks after take-off.

SPOTTING: 210 ft. length is required to spot 15 airplanes on the 96 ft. wide deck immediately aft of the forward ramp on CV-9 Class Carriers.

WATER CAPACITY: Water available for approximately 12 minutes at Combat Power.

NOTE: Rocket launchers carried in rocket condition only.
Two faired wing bomb racks and sway bracing plus fuselage shackle and sway bracing aboard in all conditions except CLEAN.

AIRPLANE CHARACTERISTICS & PERFORMANCE

BUREAU OF AERONAUTICS, NAVY DEPT.

FIGHTER COMBAT RADIUS FORMULA NO. F-1-CONDITIONS NOS.- RADIUS = CLIMB + CRUISE-OUT = CRUISE BACK

WARM-UP	RENDEZVOUS	CLIMB	CRUISE OUT	DROP TANKS	COMBAT	CRUISE BACK	RESERVE
20 min. TAKE-OFF 1 min.	20 min. at sea level at 60% N.S.P. Auto Lean.	to 15000 ft. at 60% N.S.P. Auto LEAN.	at 15000 ft. Vel.for Max. Range Auto Lean.	and BOMBS FIRE ROCKETS	20 min. at 15000 ft. 10 min. WEP. 10 min.Mil.Pr. and descend	at 1500 ft. 170 kts.TAS MANUAL LEAN	60 min. at Vel.for Max. Range MANUAL LEAN

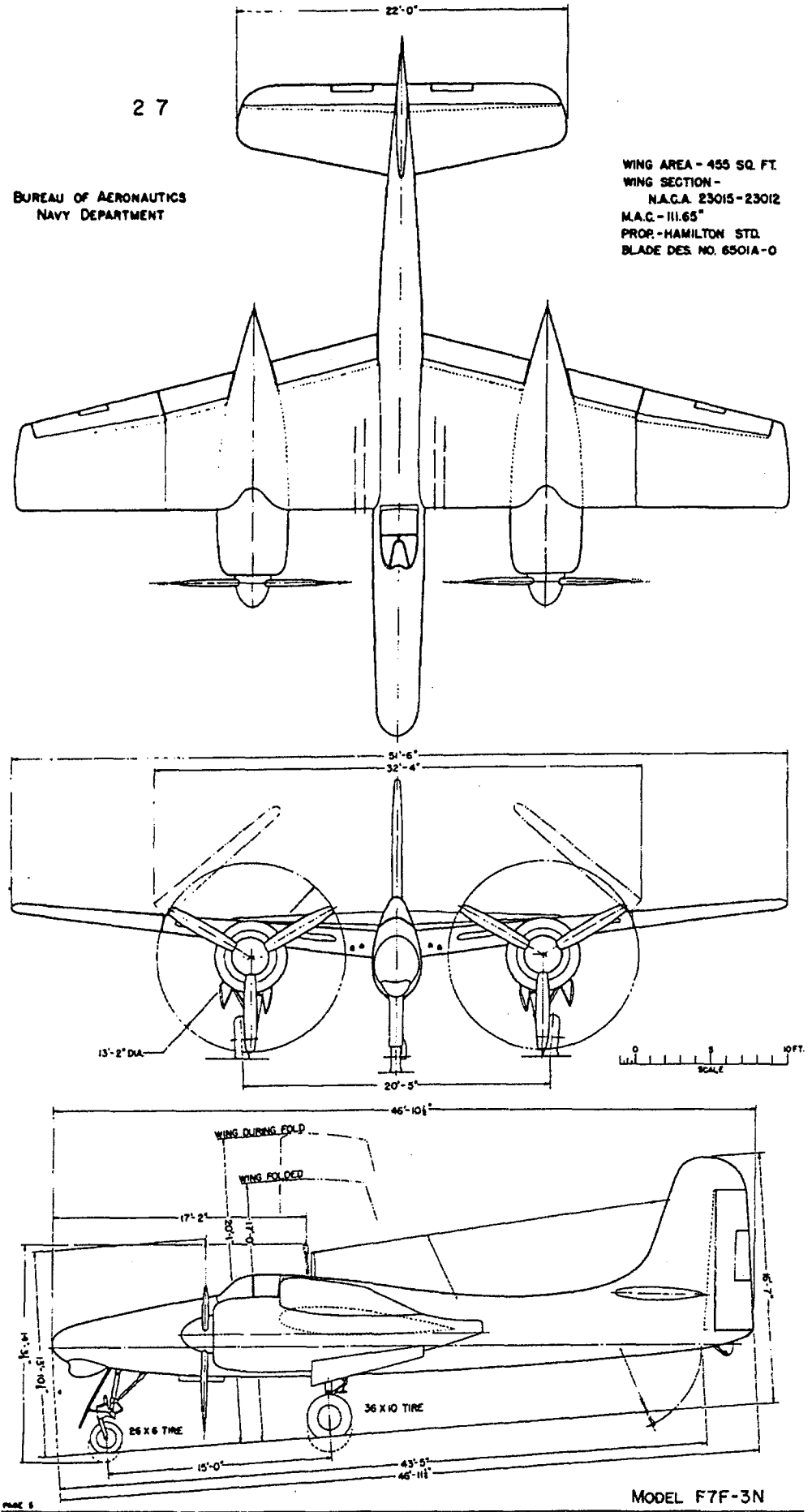
NOTE ON COMBAT RADIUS:

The present carburetor on the R-2800-22W and -34W engines is designed to give sufficient enrichment at low power in automatic lean setting to provide satisfactory engine operation and entails a penalty in specific fuel consumption increasing rapidly below 635 H.P. Therefore, in order to obtain greater combat radii, it will be necessary to use manual lean adjustment during cruise back and rendezvous.

DECLASSIFIED

BUREAU OF AERONAUTICS
NAVY DEPARTMENT

WING AREA - 455 SQ. FT.
WING SECTION -
N.A.C.A. 23015-23012
M.A.C. - 111.65"
PROP. - HAMILTON STD.
BLADE DES. NO. 6501A-0



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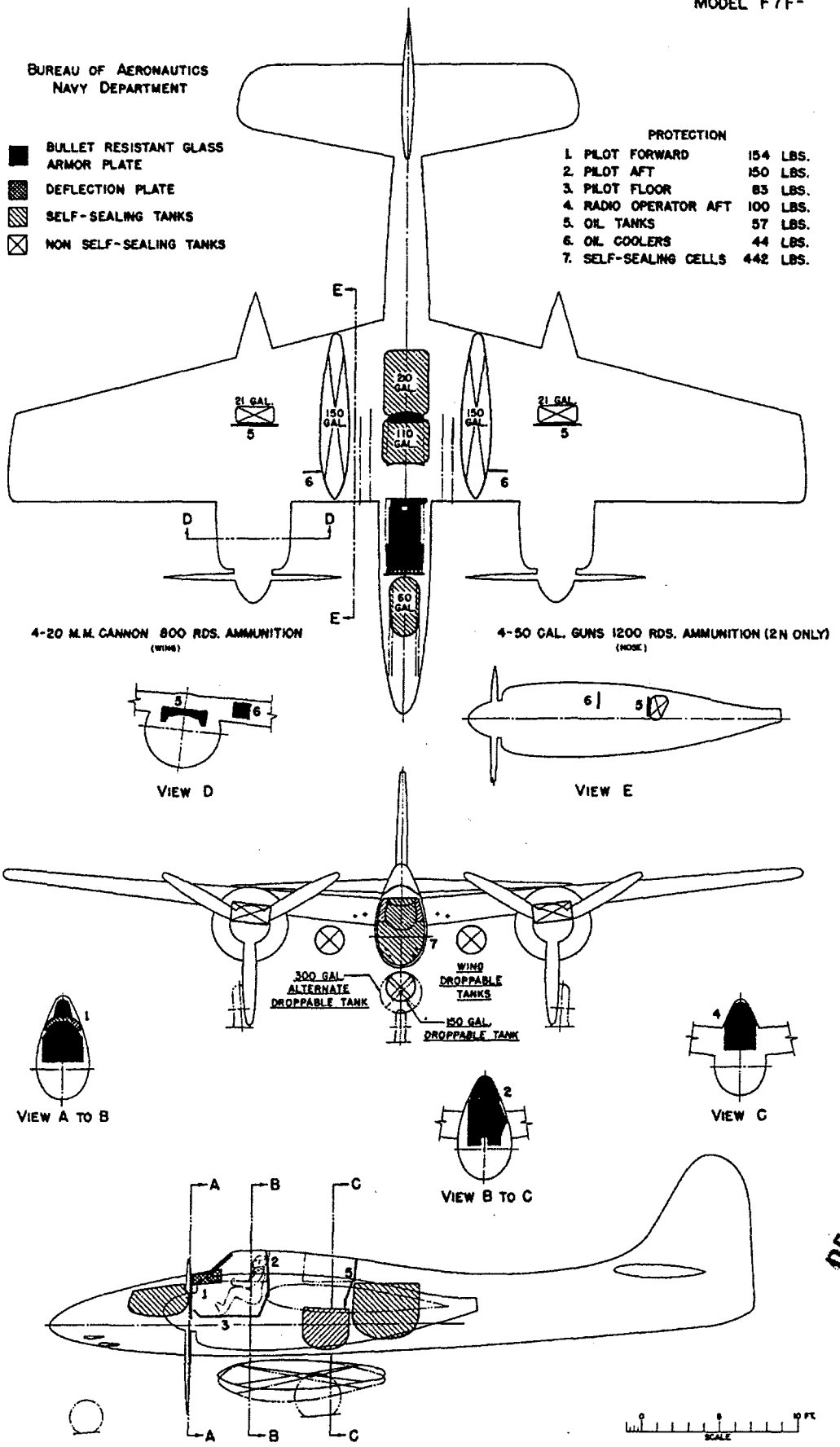
MODEL F7F-3N



DECLASSIFIED

F6F Hellcat

By Hal Andrews

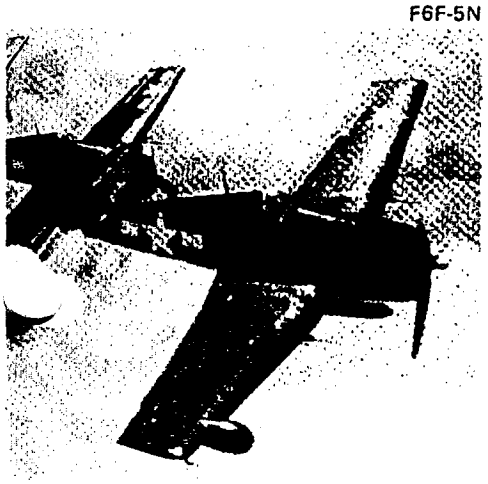
Among naval aircraft, the WW II F6F *Hellcat* achieved a fighter record that remains unsurpassed: it was the fighter flown by Naval Aviators when credited with downing 5,155 enemy aircraft — by far the largest number credited to pilots flying any Navy fighter. This record was achieved in less than two years of combat operations, an indication of the intensity of air combat in the Pacific. It wasn't the fastest WW II fighter, and one can argue how it might have fared in the European air war, what the capabilities were in the second half of the Pacific war, or many other "what ifs," but the record stands.

The F6F was clearly the right airplane at the right time. An earlier appearance in Pacific combat would have been welcomed, but it would have been a different and less capable fighter, so even that issue joins the other "what ifs." And Grumman's record of getting the F6F from first contract into combat in only a little over [illegible] years, while incorporating post-[illegible]rl Harbor combat dictated changes, was outstanding, even by the standards of that era. Admittedly, its roots trace back some additional years — but not the development of the final F6F.

In 1938, with the Grumman XF4F-2 in flight test, the Navy and Grumman began looking at putting a larger engine in the F4F. When it became clear that the F4F needed more wing area to take full advantage of its basic design and engine, resulting in the ultimately successful XF4F-3, the design studies for the follow-on shifted to reflect that experience.

In the 1939-40 time period, the Navy and Grumman focused their attention elsewhere for the next generation fighter — to Vought's inverted gull-wing XF4U-1 and Grumman's twin-engine XF5F-1. But single-engine fighter studies continued at Grumman, taking into account growing European wartime experience. The advent of folding wings introduced with the F4F-4 pointed the way for another desirable feature on what was becoming a much larger carrier aircraft.

F6F-5N



With considerable push from the Navy, designs concentrated on use of the 1,700-horsepower Wright R-2600 Cyclone 14. The R-2600 was also being incorporated in Grumman's XTBF-1 torpedo bomber, already being built. But with their F4F experience, Grumman's engineers didn't follow the usual fighter dictum — the smallest fighter possible — for their evolving design.

By the end of 1940, circumstances and the status of the design work reached the stage where serious Grumman-Navy discussions began for a new fighter project. The XF5F-1 attracted a lot of press attention, but it didn't look like a next fighter project for Grumman. With its usual desire for two competing models in development/production, preferably with different engines (so all its airplanes wouldn't be grounded in the event of engine problems), the Navy looked to Grumman for another answer. In June 1941, with details resolved, two R-2600-powered XF6F-1 prototypes were ordered.

Development proceeded normally during the rest of 1941, accelerating after December 7. By early 1942, plans had been initiated for production F6F-1s, while prototype construction was underway. Interest in turbosuperchargers for increased altitude performance led to the design of an XF6F-2 with a turbosupercharged R-2600. March brought a production contract. By this time, a 2,000-horsepower, P&W R-2800-powered version was recognized as more promising than the turbosupercharged R-2600 aircraft, and revision of the second XF6F-1 was initiated, as the XF6F-3 with an R-2800 engine. Production plans were also shifted to the -3 model.

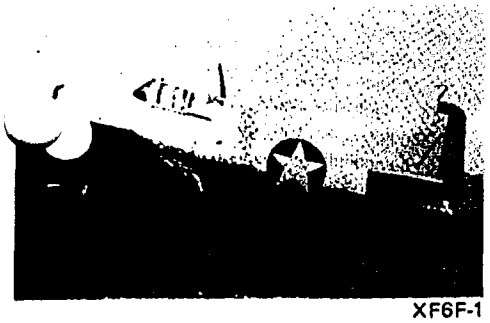
The first flight of Grumman's new *Hellcat*, the XF6F-1, took place on June 26, 1942. Six weeks later, it was joined by the XF6F-3. The first production F6F-3 flew in September. With 10 delivered by the end of the year, production increased rapidly in 1943, as Navy fighter squadrons were introduced to the Navy's newest fighter, and development testing continued.

A low-wing monoplane with wing-mounted, rearward-retracting landing gear, the cockpit was above the main fuel tank which placed the canopy high on the fuselage. Downthrust of three degrees for the engine and propeller improved the forward visibility. While many details changed as improvements were made, the configuration changed very little for all the production *Hellcats* to come.

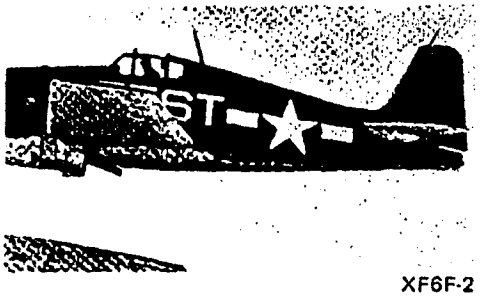
Changes dictated by tests and squadron experience were introduced into the production line as output climbed through 1943. In August, VF-5 and VF-9 pilots flew their *Hellcats* into combat for the first time and rapid transition of all Pacific CV fighter squadrons followed. Advances in radar led to two radar-equipped versions. Those with AIA/APS-6 airborne intercept radar in a nacelle, well outboard on the starboard wing, became F6F-3Ns, while others were -3Es with ASH/APS-4 search/attack radar in a "bomb unit" carried on a mid-span starboard wing rack. The British Royal Navy's Fleet Air Arm also received F6F-3s as *Hellcat Is* for operations from their carriers.

Provisions for water injection to increase combat power were added in late 1943, as production -10W engines fitted for it became available. Wing stub racks were added for bombs, or for additional fuel tanks, to supplement the single centerline belly tank that had become a standard operational feature. In April 1944, when necessary strengthening of the rear fuselage and horizontal stabilizer were incorporated, along with other improvements — including engine cowling changes to reduce drag and aileron spring tabs to reduce roll stick force in combat maneuvers — the designation of the production aircraft was changed to F6F-5. With the structural changes, dive speed and pull out restrictions on the *Hellcat* were removed.

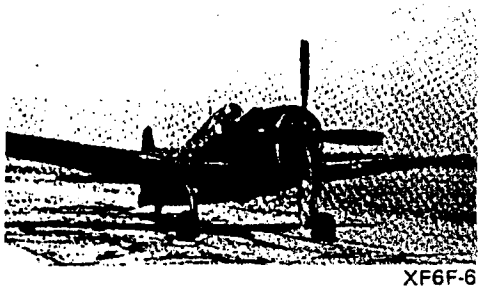
A four-cannon armament installation was tested on the first prototype. Already modified with an R-2800 engine as an XF6F-3, it was redesignated XF6F-4 when testing the cannon installation. While the four-cannon configuration didn't go into production, a two-cannon, four-gun armament could be fitted to later production F6Fs and was carried by many F6F-5Ns.



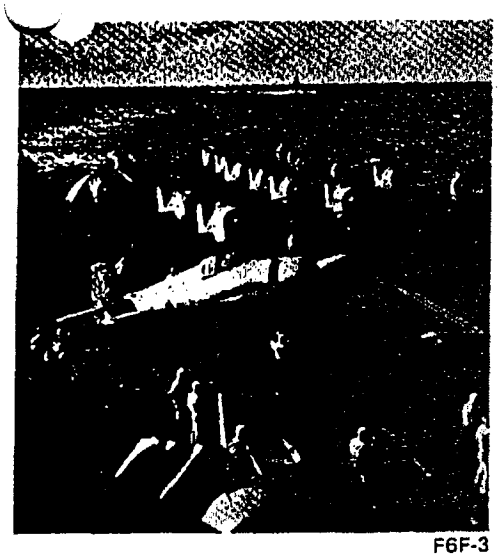
XF6F-1



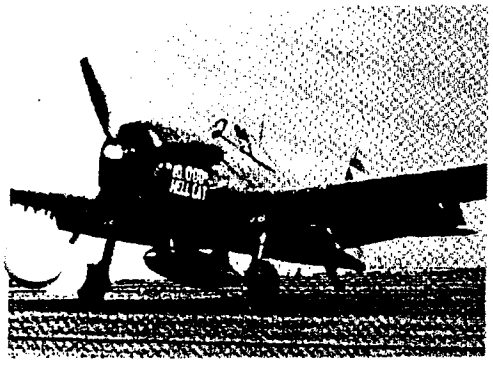
XF6F-2



XF6F-6



F6F-3



Continued interest in turbo-supercharged engines resulted in a -3 being fitted with one using the early XF6F-2 designation, though the engine used was an R-2800 rather than the original R-2600. The new "C" model R-2800 engine promised sufficient performance improvement to result in two F6F-5s being converted to XF6F-6s with -18W engines; they flew in summer 1944. Production changeover plans were shelved, however, and -5/-5N production continued to increase, reaching a peak of 605 delivered in March 1945.

Along with the *Hellcats'* principal role as day fighters and their growing night fighter use, both -3s and -5s were converted for photographic missions to -3Ps and -5Ps. They retained their wing gun armament. The British also received -5s and -5Ns as *Hellcat IIs* for RN carrier operations in the Far East.

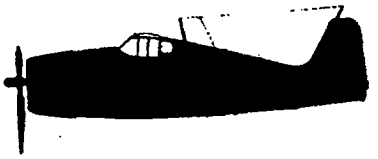
After the March peak, with production of the F8F *Bearcat* getting underway and *Corsairs* finally assuming a larger role in U.S. carrier operations, F6F production began to drop off and -5Ns became a larger proportion of those delivered. Following the August VJ day terminations, a small group of nearly completed *Hellcats*, mostly -5Ns, were finished up in October and November 1945 to bring production to a close. With the two X prototypes, a total of 12,275 *Hellcats* were built. Unlike most WW II fighters, except for the two Xs and the first few production airplanes, all were rolled out of one plant — the largest number of a single model of fighter ever built in one factory.

At war's end, the already underway conversion of remaining F6F-3s to -3K drones continued. Most -3s joined the rows of surplus aircraft waiting for the smelters. F6F-5s were standardized for postwar use, including conversion to -5K drones. Early use of -5Ks was in Operation Crossroads, the 1946 "atomic bomb" tests. Fighter squadrons, both Navy and Marine, continued to use -5s and -5Ns, while *Bearcats* and improved *Corsairs* came off the line and into the fleet. The first carrier jet fighters weren't far behind.

Hellcats became mainstays of fighter squadrons in the postwar Naval Reserve. Already widely used for advanced training, they took over the tactical training role in the training command. The -5Ks expanded their target role and explored potential assault drone operations, used by research and development and fleet organizations, as the missile age dawned. Other *Hellcats* became drone controller -5Ds.

As the Korean War unfolded, *Hellcats* were out of the fleet, except for a limited number of -5Ns among the many types in composite all-weather fighter squadrons, -5Ds and -5Ks in utility squadrons, and a small group of -5Ks in a combat demonstration of assault drone potential against North Korean targets in August-September 1952.

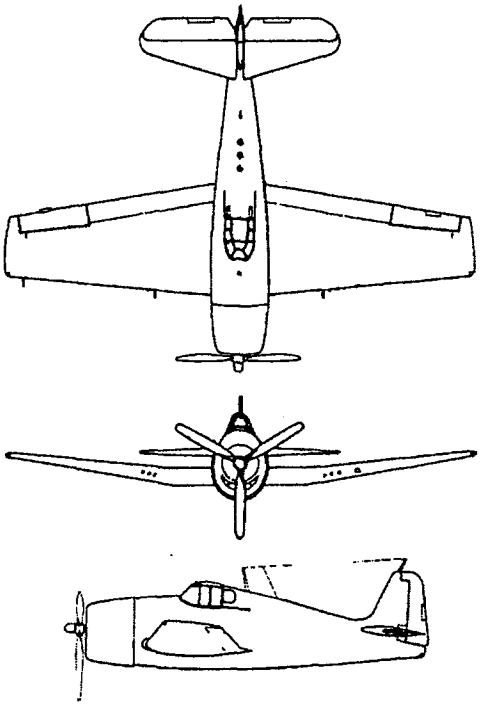
From this time on, F6Fs were gradually phased out; the last from composite squadrons in late summer 1953 and from the advanced training command in spring 1956. Conversions to -5Ks at O&R Pensacola, Fla., ended in 1957. Four years later, in May 1961, the last flying Navy *Hellcat* made its final drone flight at Point Mugu, Calif.■

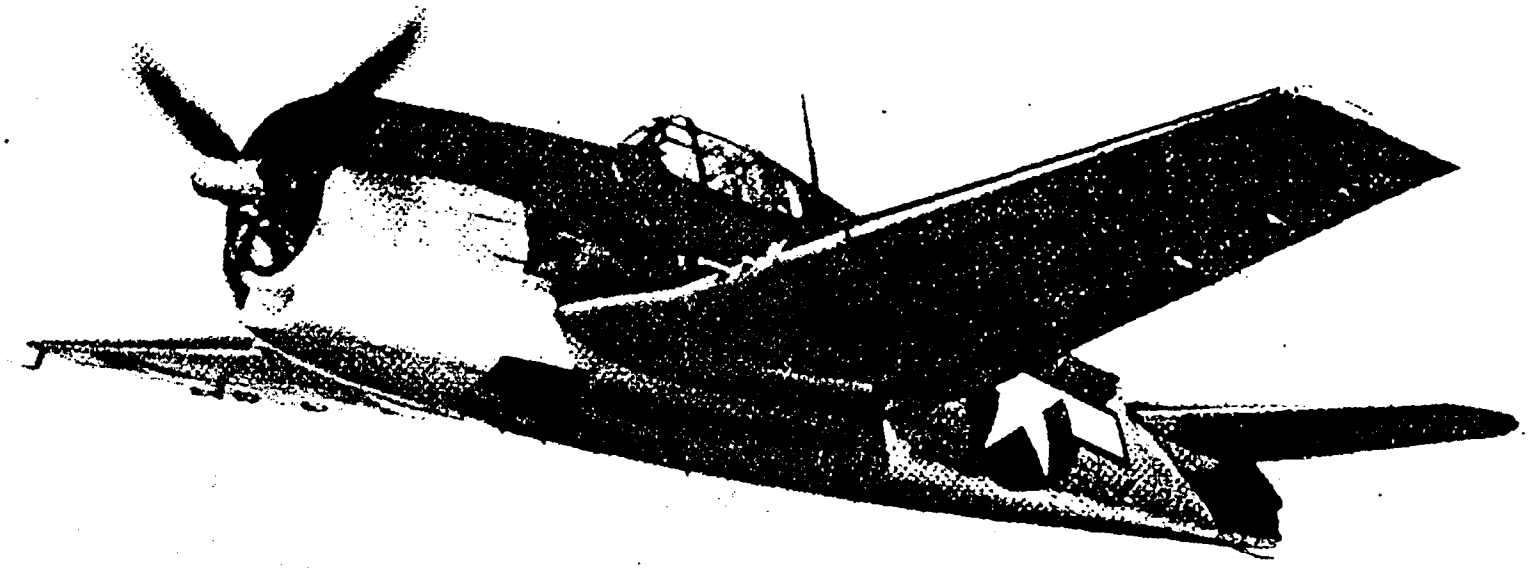


	F6F-3	F6F-5
Span	42'10"	42'10"
Length	33'7"	33'7"
Height	13'1"	13'1"
Engine: P&W R-2800-10W, 2,000 hp		
Maximum speed (mil)	370 mph	380 mph
Service ceiling	37,200'	37,300'
Maximum range		
Clean	1,090 mi	1,130 mi
150-gal. tank	1,590 mi	1,650 mi

Armament: Six .50 machine guns or two 20mm cannon and four guns; up to two 1,000-lb. bombs; and six five-inch rockets.

Crew: One



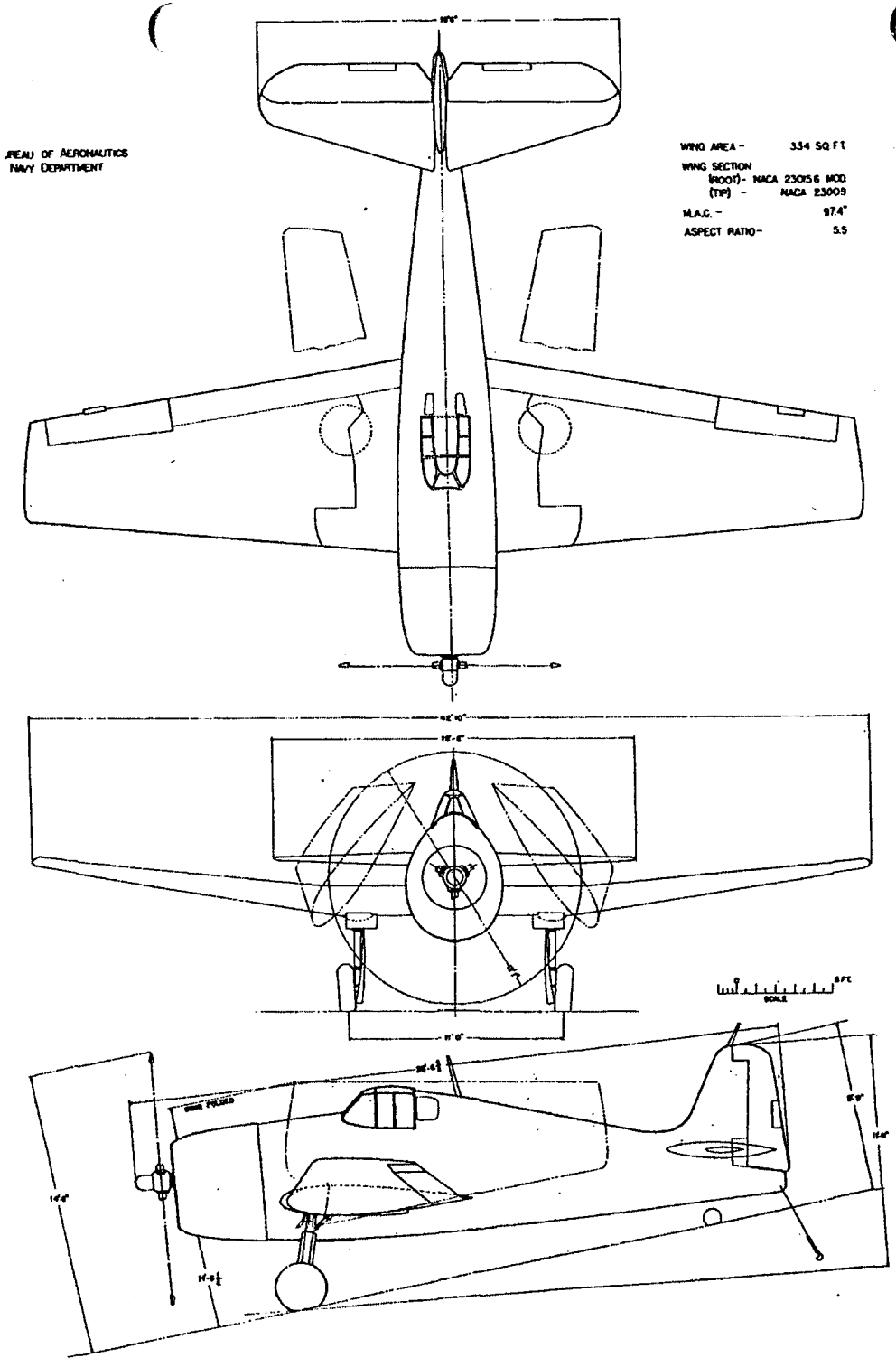


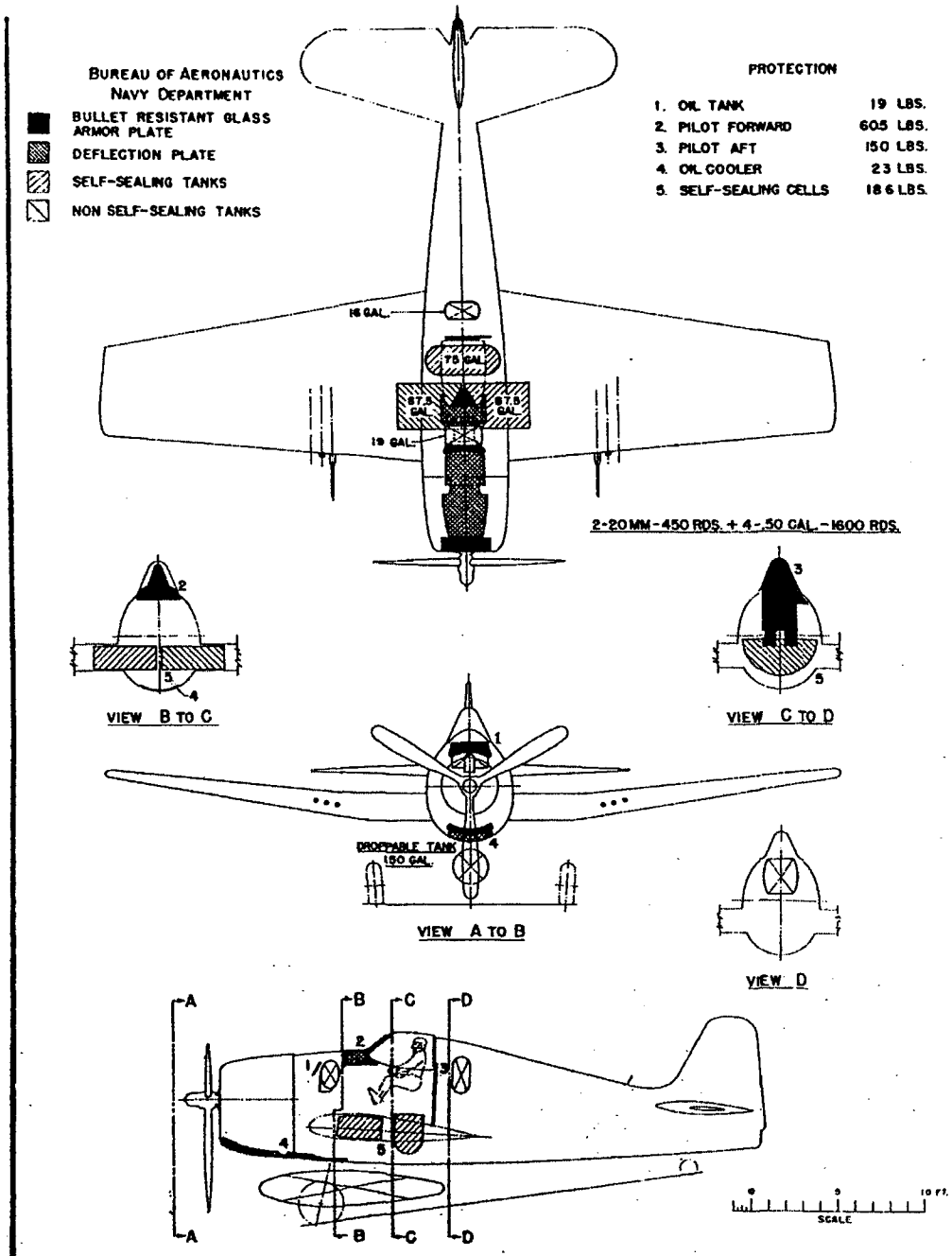
STANDARD AIRCRAFT CHARACTERISTICS

F6F-5 "HELLCAT"

GRUMMAN

DOPY LACKING





ARMAMENT & TANKS

MISSION AND DESCRIPTION

The F6F-5 airplane is a general purpose fighter intended to destroy enemy aircraft and installations. It is capable of bombing and rocket attacks. It is now a second-line fighter and trainer, having been superseded by the F8F as a first-line aircraft.

It is designed for catapulting and for arrested landings aboard a carrier. The airplane is conventional in design and structure, with aluminum alloy two-spar wing and monocoque fuselage. Landing gear, slotted blow-up flaps, gun charging and oil cooler doors are hydraulically operated. Spring type balancing tabs are provided on both ailerons. The left tab is controllable in flight by the pilot. The rudder and elevators are provided with trim tabs adjustable in flight by the pilot. Capacity of 16 gallons of water is supplied for water injection.

Service use started in 1944.

DIMENSIONS

WING AREA	334 sq. ft.
SPAN	42' - 10"
LENGTH	33' - 7"
HEIGHT	14' - 5"
TREAD	11' - 0"
M.A.C.	8' - 1"

WEIGHTS

Loadings	Lbs.	L.F.
EMPTY	9,238	
BASIC	10,035	
DESIGN	11,000	7.0
COMBAT	12,740	6.6
MAX.T.O.	15,300	5.5
MAX.LAND	15,000	

All weights are actual.

FUEL AND OIL

Gals.	No. Tanks	Location
250	3	Fus;,Prot.
150	1	Fus.,Drop
300	2	Wing,Drop

FUEL GRADE.....100/130
FUEL SPEC...MIL-F-5572

OIL

CAPACITY (Gals.).....19
GRADE.....1100/1120
SPEC.....MIL-O-6082

ELECTRONICS

RANGE RECEIVER AND
MF TRANS. & REC.....AN/ARC-5
VHF COMMAND.....AN/ARC-1
IFF.....AN/APX-1
HOMING.....AN/ARR-2

UNCLASSIFIED
DECLASSIFIED

POWER PLANT

NO. & MODEL...(1, R-2800-10W
MFR.....Pratt and Whitney
SUPERCH.....2 Stage, 2 Speed
PROP. GEAR RATIO.....2:1
PROP. MFR.....Ham. Std.
PROP. DES. NO.....6501A-0
BL./DIA.....3/13'-1"

RATINGS

	Bhp	@ Rpm	@ Alt.
T. O.	2,000	2,700	S. L.
MIL.	2,000	2,700	1,000'
	1,800	2,700	15,500'
	1,650	2,700	22,500'
NORM.	1,675	2,550	5,500'
	1,625	2,550	17,000'
	1,550	2,550	22,500'

SPEC. NO. N-8056
(See Note)

ORDNANCE

GUNS

No.	Size	Location	Rds.
2	20 mm	Wings	450
4	.50 cal.	Wings	1,600

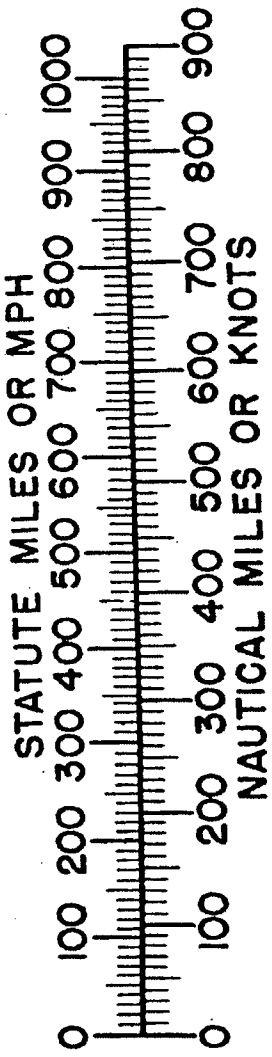
*Some planes have 6-.50 cal. guns instead of mixed battery

BOMBS AND ROCKETS

Type	Size	Location	No.
Bombs	2,000#	Fuselage	1
Bombs	500#	Fuselage	1
Torp.	Mk.13-3	Fuselage	1
A.R.	11.75"	Fuselage	1
Bombs	1,000#	Wings	2
Bombs	250#	Wings	2
Bombs	100#	Wings	6
A.R.	11.75"	Wings	2
HVAR	5"	Wings	6

FIRE CONTROL

Illum. Sight.....Mk. 8
MAX. BOMB CAPACITY..4,000 lbs.



PERFORMANCE SUMMARY

LOADING CONDITION		(1) FIGHTER 1-150 Gal.Tank			
TAKE-OFF WEIGHT	lbs.	13,797			
Fuel (Fixed/Drop)	lbs.	1,500/900			
Bombs	lbs.	—			
Wing/Power Loading (A) lbs/sq.ft; lbs/bhp.		41.3/8.9			
Stall Speed—Power off	kn.	79.2			
Stall Speed—Power off - No Fuel	kn.	72.0			
Stall Speed—Power on	kn.	72.2			
Maximum Speed/Alt (B)	kn/ft.	308/23,900			
Take-off Distance, deck — calm	ft.	799			
Take-off Distance, deck 25 kn.	ft.	384			
Take-off Distance, Airport	ft.	—			
Rate of climb — sea level (B)	ft/min.	2,010			
Service Ceiling (B)	ft.	35,100			
Time-to-climb 10,000 ft. (B)	min.	5.2			
Time-to-climb 20,000 ft. (B)	min.	11.2			
Combat Range/V av 15,000 ft.	n.mi/kn.	950/178			
Combat Radius/V av (F-1) ft.	n.mi/kn.	340/173			
LOADING CONDITION		(2) COMBAT	(3) COMBAT	(4) COMBAT	
GROSS WEIGHT	lbs.	12,740	12,740	12,740	
Engine power		Combat	Military	Normal	
Fuel	lbs.	1,500	1,500	1,500	
Bombs/Tanks		None	None	None	
Max. speed at sea level	kn.	276	273	260	
Max. speed/Alt	kn/ft.	330/23,400	330/23,400	325/24,100	
Combat speed/Alt	kn/ft.	318/15,000	311/15,000	302/15,000	
Rate of climb SL	ft/min.	2,980	2,850	2,290	
Ceiling for 500 fpm R/C	ft.	33,700	33,700	32,900	
Time-to-climb/Alt.	min/ft.	7.7/20,000	8.4/20,000	9.7/20,000	

NOTES

(A) BHP at Maximum Critical Altitude
(B) Normal BHP

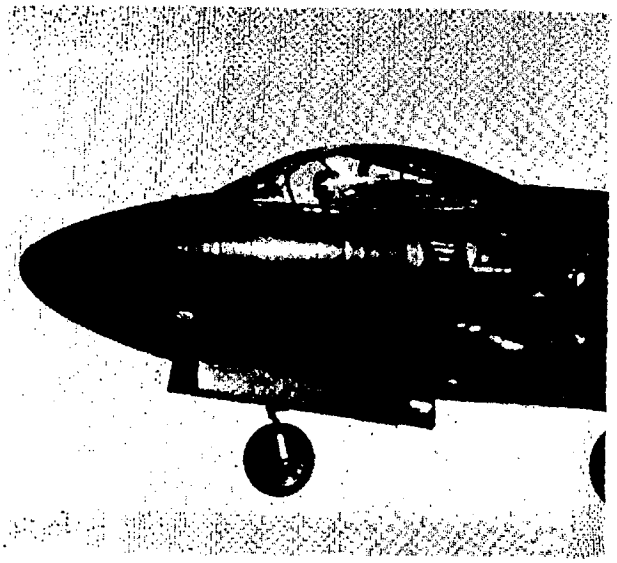
Performance is based on flight test of F6F-3 and F6F-5 airplanes.

Range and radius are based on F6F-5 flight test fuel consumption data increased by 5%.

Combat conditions include fuselage bomb shackles and "T" bracing, faired wing bomb-racks and sway bracing.

1952 - 1960

NEWS naval aircraft



Never one of the most glamorous of Navy/Marine fighters, the Douglas F3D *Skyknight* shared with its Douglas stablemate, the AD *Skyraider*, the distinction of serving with combat squadrons in both the Korean and Vietnamese Conflicts.

The Navy turned to jet power after WW II for its carrier fighters. A night fighter was needed. Douglas received a contract for three prototype XF3D-1s in April 1946. The first flew in March 1948. Typical of early jet fighters, it was a straight wing design. A wide cabin providing side-by-side seats for pilot and radar operator, engines semi-buried in each side of the lower fuselage, four 20mm guns under the radar in the nose and large internal fuel capacity resulted in a bulky fuselage. An unusual feature was the escape system — depending primarily on a bailout chute, out through the bottom of the fuselage.

Subsequent flight testing confirmed the basic soundness of the design and led to correction of problems unearthed in initial carrier operation of this large carrier jet aircraft.

Although underpowered with its two Westinghouse J34 jet engines, 28 aircraft were bought while the -2 was being developed to use the higher powered Westinghouse J46. Delays in the J46 program led to use of uprated J34s and the *Skyknight* was never a high performance aircraft.

Initial flights of production F3D-1s in early 1950 led to service introduction late in the year, with VC-3 and VMF(N)-542. A swept wing version, the F3D-3 was also contracted for but was destined to be stillborn, being cancelled before reaching flight.

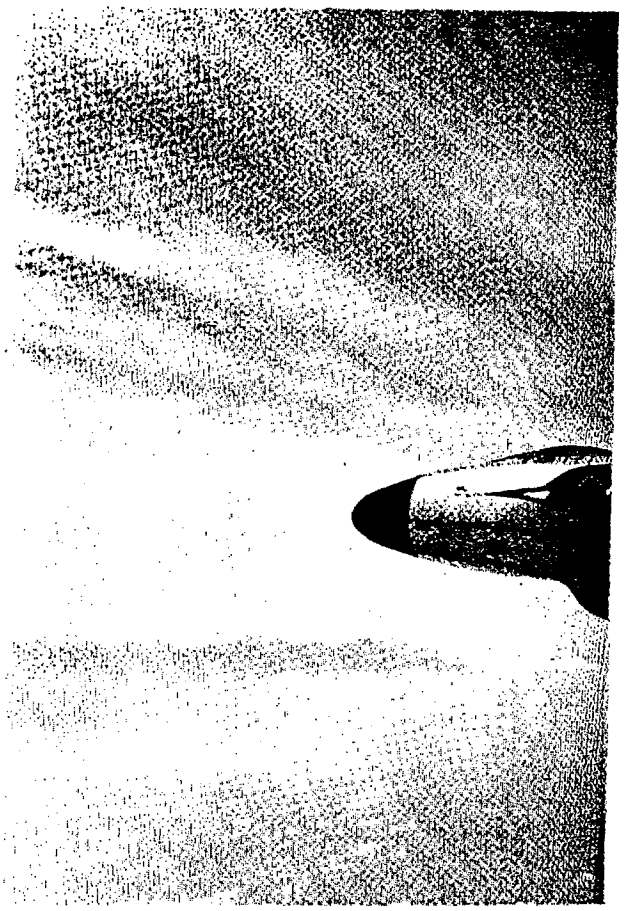
Another foresighted project involved the F3D in 1950: one of the XF3D-1s was modified to carry and fire four *Sparrow Is*.

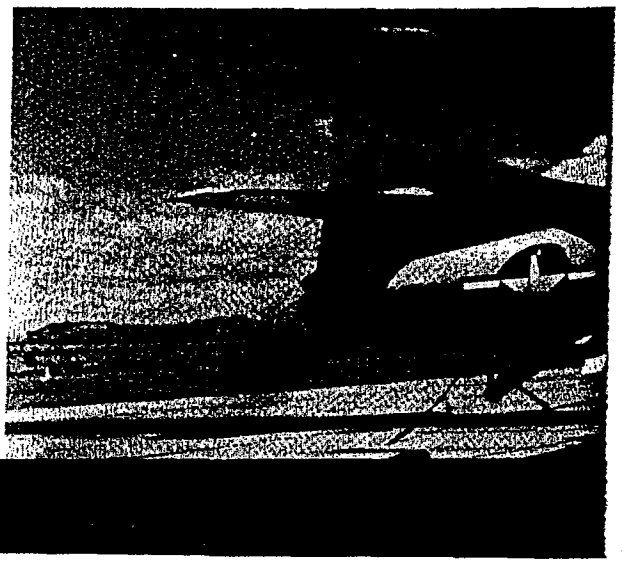
The first F3D-2 flew in February 1951. Over the next two years, 237 were delivered. Sixteen of these were F3D-2Ms in the *Sparrow I* configuration, prototyped by the one XF3D-1M in 1950. The F3D-2s served with Navy composite and Marine night fighter squadrons, but went into combat in Korea only with Marine land-based squadrons, in the fall of 1952.

As land-based night fighters, the F3Ds were effective, destroying both jet and prop aircraft in night engagements. However, for carrier use, smaller, single-place night fighters were considered more satisfactory.

By the late Fifties, as the F4D (*NANews*, April 1975) and F3H (*NANews*, March 1974) came into service, the *Skyknights* were converted for trainers and electronic warfare. F3D-2Ts and -2T2s, depending on the radar and fire control system installed, were used for training *Demon* and *Skyray* pilots in radar intercept techniques. The Marines used converted F3D-2Qs as tactical ECM aircraft.

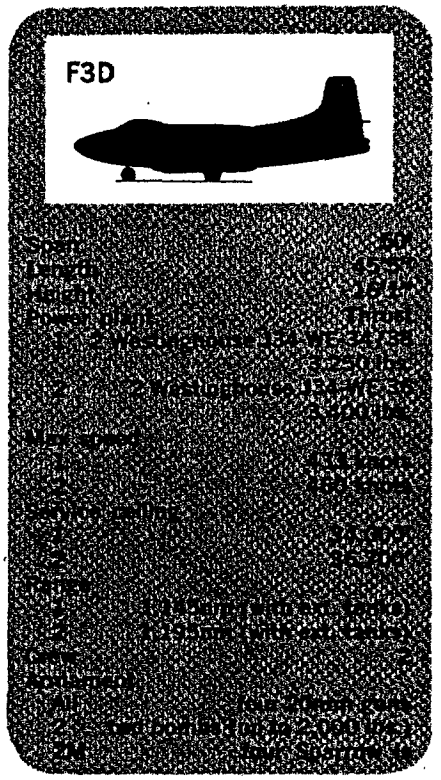
By 1960, the F3Ds were being replaced by later designs. With the DoD redesignations in 1962, the -2Qs became EF-10Bs, and the -2T2s still in service became TF-10Bs. The TFs lasted until late 1963. The EFs continued, flying combat through much of the Vietnam conflict before their retirement.

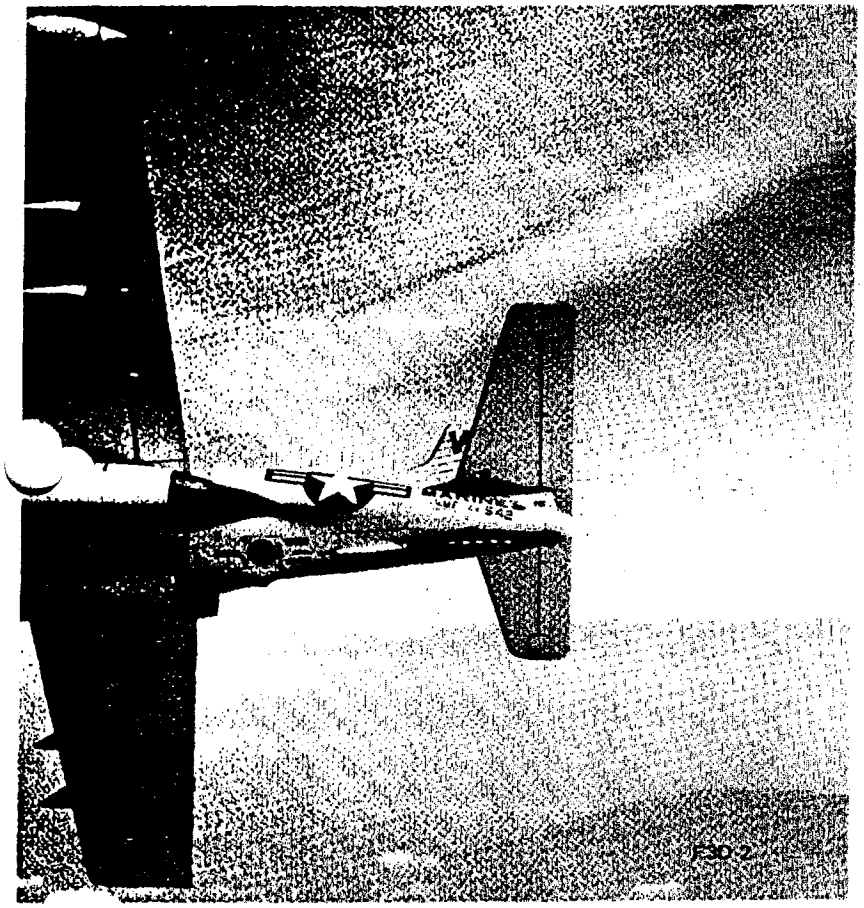




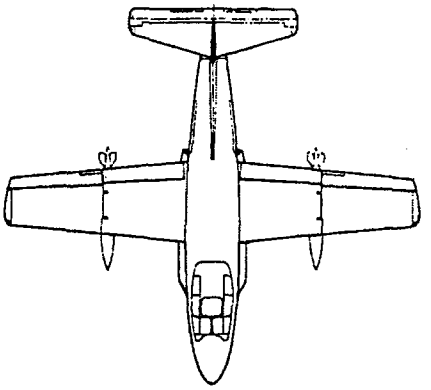
kyknight

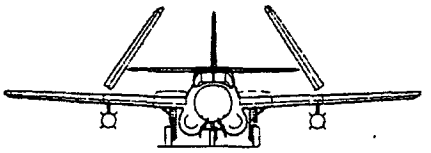
XF3D-1

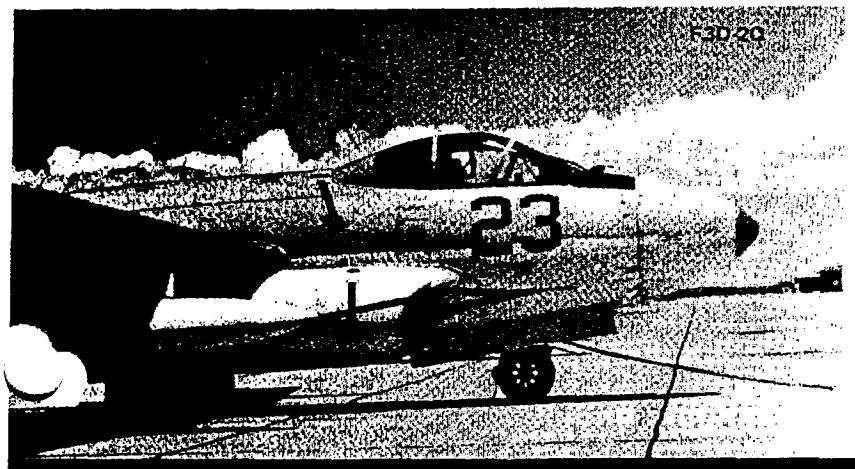




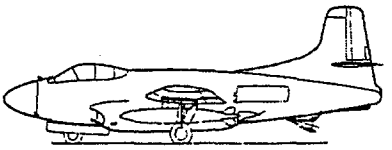
F3D-2

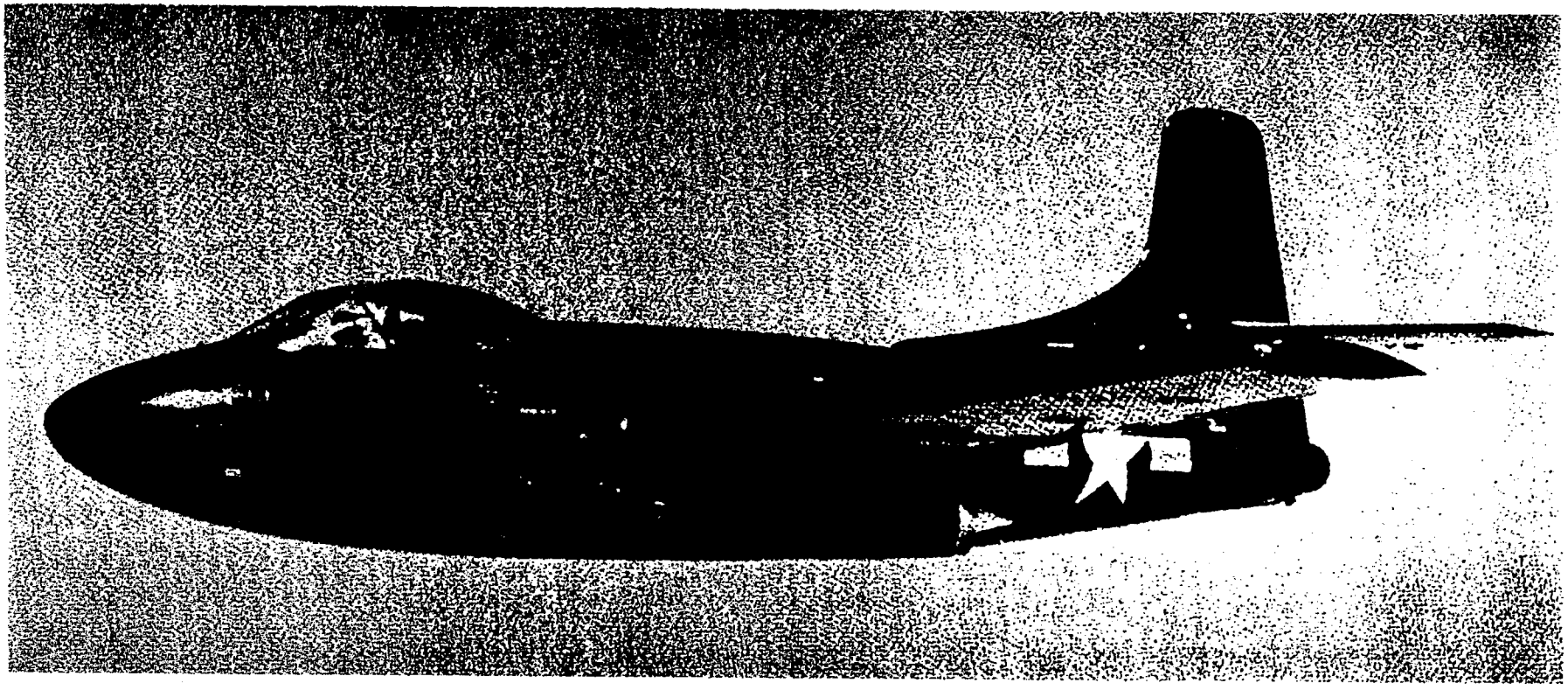






F3D-2Q





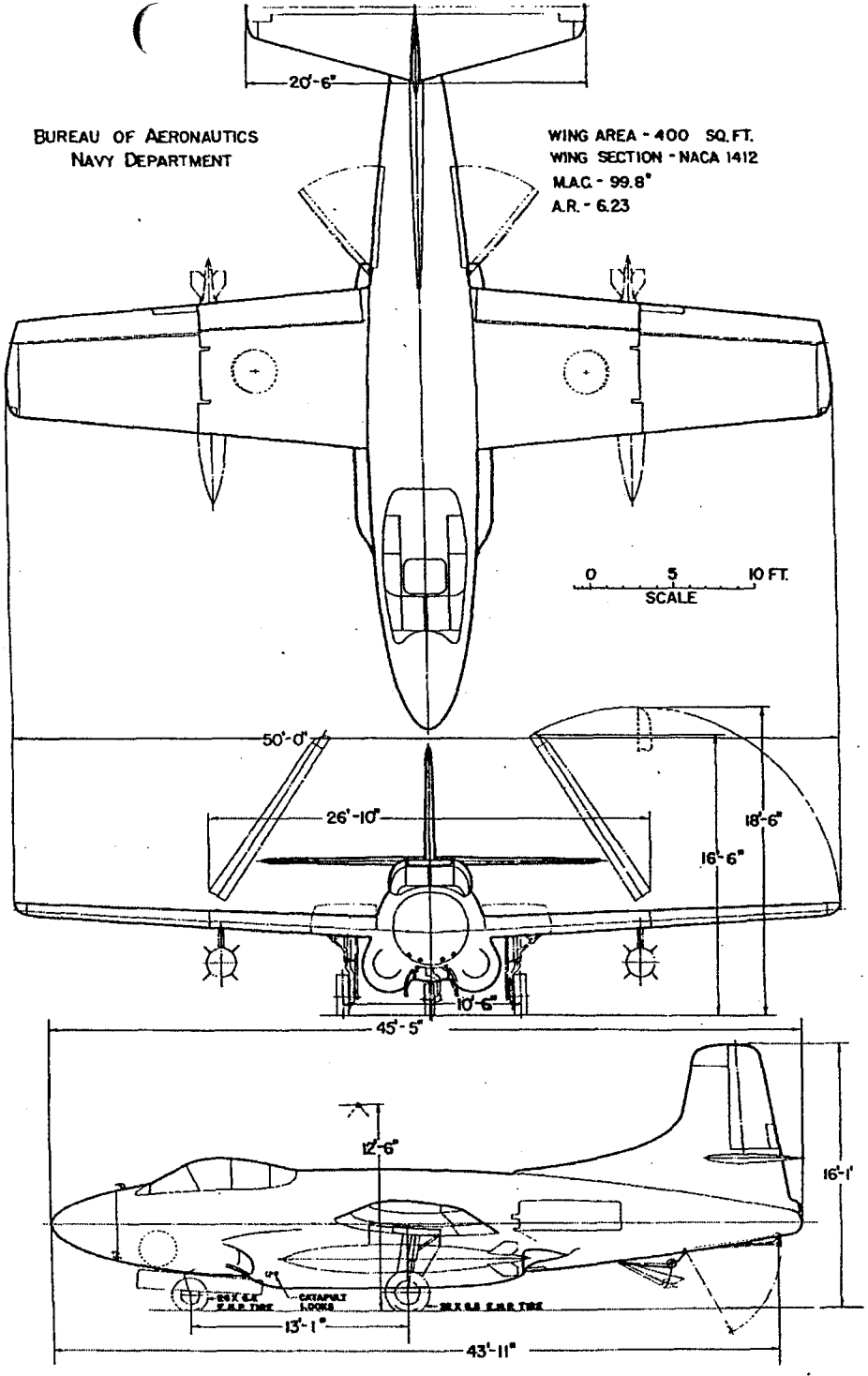
STANDARD AIRCRAFT CHARACTERISTICS

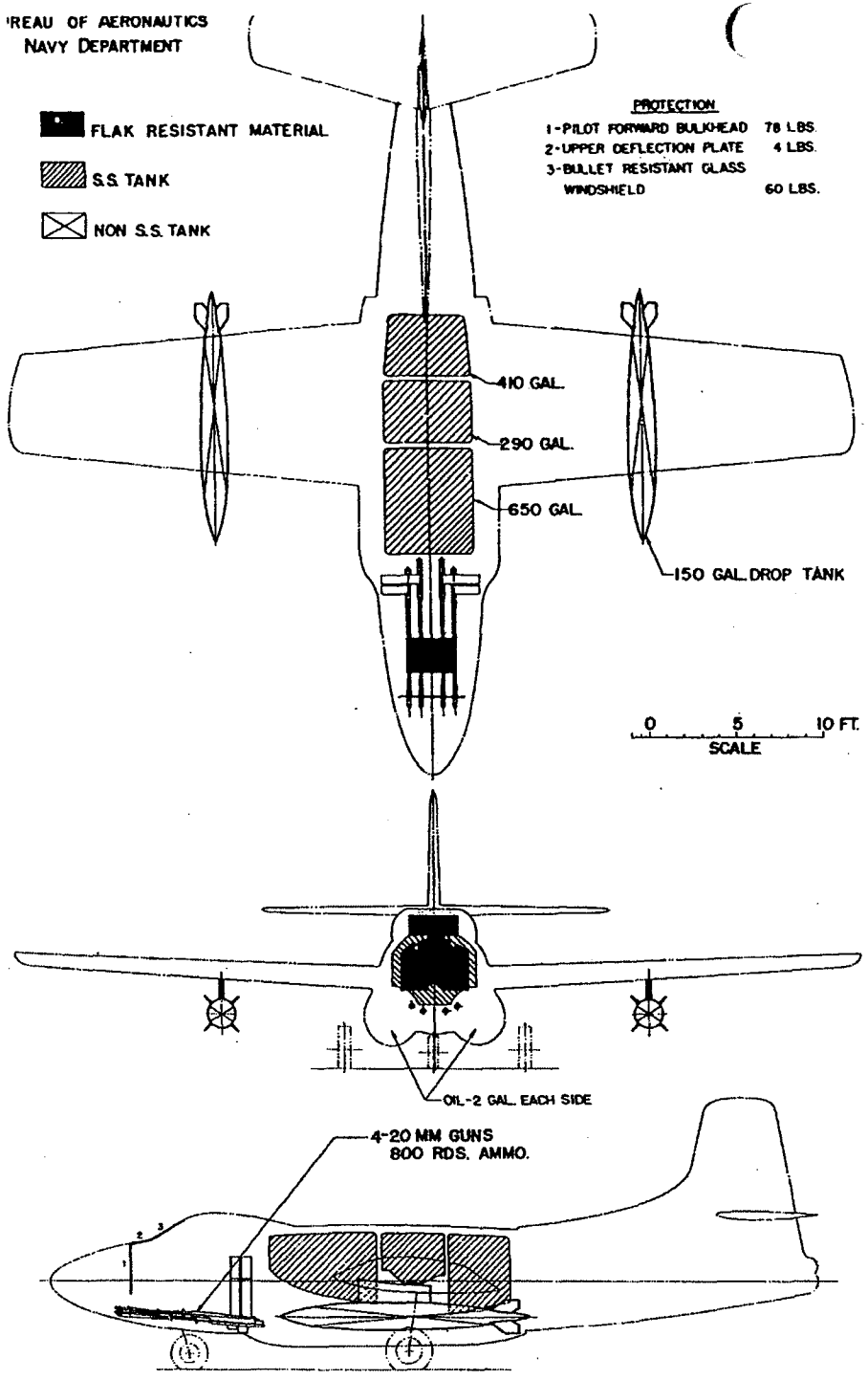
F3D-2 "SKYKNIGHT"

DOUGLAS

DECLASSIFIED

TECHNICAL ACCEPTED





DECLASSIFIED

ARMAMENT & TANKS

POWER PLANT

NO. & MODEL.....(2) J34-WE-36
MFR.....Westinghouse
TYPE.....11 Stg. Axial Compr.
2 Stg. Turbine

RATINGS

	Lbs.	@ Rpm	@ Alt.
T. O.	3,400	12,500	S.S.L.
MIL.	3,400	12,500	S.S.L.
NORM.	3,000	11,930	S.S.L.

SPEC. NO. WAGT-24C4E-2B

ORDNANCE

GUNS

No.	Size	Location	Rds.
4	20 mm	Nose	800

Mk. 20 Mod. 0 Gunsight

BOMBS AND ROCKETS

Type	Size	Location	No.
Bomb	2,000#	Inner Wing	2
Bomb	1,000#	Inner Wing	2
Bomb	500#	Inner Wing	2
A.R.	11.75"	Inner Wing	2

MAX. BOMB CAP. 4,000 lbs.

MISSION & DESCRIPTION

The mission of the F3D-2 airplane is to search out and destroy enemy aircraft at night.

This twin-jet fighter is designed to operate from aircraft carriers with the aid of a catapult, or from land bases.

Side by side accommodations are provided for the pilot and a radar operator.

The airplane is conventional in structure with all-metal two-spar wing and semi-monocoque fuselage. Tricycle landing gear, slotted flaps and wing folding are hydraulically operated.

Hydraulically operated fuselage speed-retarding brakes with hand controls are provided. These may be used for maneuvering or to increase the angle of descent.

Pilot escape provisions are furnished both through the power operated escape hatch and through a special high speed bail-out chute on the bottom of the fuselage.

DIMENSIONS

WING AREA.....400 sq. ft.
SPAN.....50' - 0"
FOLDED SPAN.....26' - 10"
LENGTH.....45' - 5"
HEIGHT.....16' - 1"
HEIGHT*.....16' - 6"
TREAD.....10' - 6"
M.A.C.....8' - 4"

* Wings Folded

WEIGHTS

Loadings	lbs.	L.F.
EMPTY	14,989	
BASIC	15,500	
DESIGN	19,700	5.5
COMBAT	21,374	5.1
MAX.T.O. (Field)	26,731*	4.0
MAX.LAND (Field)	24,500	

All weights are actual.

*Maximum anticipated loading.

FUEL AND OIL

Gals.	No. Tanks	Location
650	1 (Seal.)	Fuse., Fwd.
290	1 (Seal.)	Fuse., Ctr.
410	1 (Seal.)	Fuse., Aft
300	2	Wing, Drop

FUEL GRADE....115/145
FUEL SPEC..MIL-F-5572

OIL

CAPACITY (Gals.).....4.0
GRADE.....1010
SPEC.....MIL-O-6081

ELECTRONICS

VHF COMMAND.....(2) AN/ARC-1
UHF COMMAND.....AN/ARC-27
(With provisions for alternate installation of (1) AN/ARC-1 VHF) P.S.I.
(Replaces (2) AN/ARC-1)
INTERPHONE.....AN/AIC-4, -4A
D.F. EQUIPMENT.....AN/ARN-6
HOMING.....AN/ARN-21
(P.S.I., Repl. for AN/ARR-2A and AN/ARN-6)
HOMING REC.....AN/ARR-2A

(Continued on NOTES sheet)

PERFORMANCE SUMMARY

TAKE-OFF LOADING CONDITION		(1) FIGHTER Full Internal Fuel	(2) FIGHTER 2-150 Gallon External Tanks			
TAKE-OFF WEIGHT	lb.	24,614	26,731			
Fuel	lb.	8,100	8,100/1,800			
Payload (Ammunition)	lb.	450	450			
Wing loading	lb./sq.ft.	61.5	66.8			
Stall speed - power-off	kn.	97.1	101.2			
Take-off run at S.L. - calm	ft.	2,080	2,500			
Take-off run at S.L. 25 kn. wind	ft.	1,270	1,530			
Take-off to clear 50 ft. - calm	ft.	--	--			
Max. speed/altitude (1)	kn./ft.	426/15,000	387/10,000			
Rate of climb at S.L. (2)	fpm	2,970	2,375			
Time: S.L. to 20,000 ft. (2)	min.	9.9	13.7			
Time: S.L. to 30,000 ft. (2)	min.	20.9	31.6			
Service ceiling (100 fpm) (2)	ft.	36,700	32,400			
Combat range	n.mi.	995	1,195			
Average cruising speed	kn.	395	395			
Cruising altitude(s)	ft.	34,100/39,800	31,250/39,200			
Combat radius	n.mi.	415	520			
Average cruising speed	kn.	395	395			
COMBAT LOADING CONDITION		(2) CLEAN				
COMBAT WEIGHT	lb.	21,374				
Engine power		Military				
Fuel	lb.	4,860				
Combat speed/combat altitude	kn./ft.	428/35,000				
Rate of climb/combat altitude	fpm/ft.	550/35,000				
Combat ceiling (500 fpm)	ft.	35,500				
Rate of climb at S.L.	fpm	3,570				
Max. speed at S.L.	kn.	458				
Max. speed/altitude	kn./ft.	460/10,000				
LANDING WEIGHT	lb.	17,799				
Fuel	lb.	1,285				
Stall speed - power-off	kn.	82.6				
Stall speed - with approach power	kn.	80.6				

NOTES

(1) Normal Power
(2) Military Power

Performance is based on calculations and preliminary NATC flight test of F3D-2 airplane.

Range and radius are based on engine specification fuel consumption data increased by 5%.

External store pylons are not included in conditions (1) and (2)

F9F PANTHER

With the *Panther,* Grumman maintained its position into the jet age as a major supplier of Navy carrier fighter aircraft. The *Panther* never enjoyed the recognition of Grumman's last piston engine fighter, the F8F *Bearcat,* as a spectacular performer. However, it did extend Grumman's reputation for building rugged, effective fighter aircraft.

The F9F series began when development was initiated on the large two-place four-jet XF9F-1 night fighter. Before design work was completed, the XF9F-1 was dropped and the project shifted to the single-place, single-jet XF9F-2 day fighter. The imported Rolls-Royce *Nene* jet engines of the two XF9F-2 prototypes were replaced in production F9F-2s by Pratt & Whitney-built J42 *Nenes.* In the XF9F-3 and production F9F-3s, an Allison J33 replaced the *Nene.* Only engine installation details differed between the -2 and -3 *Panthers.* Permanently attached tip-mounted external fuel tanks were the most obvious change added to all *Panthers* early in the program.

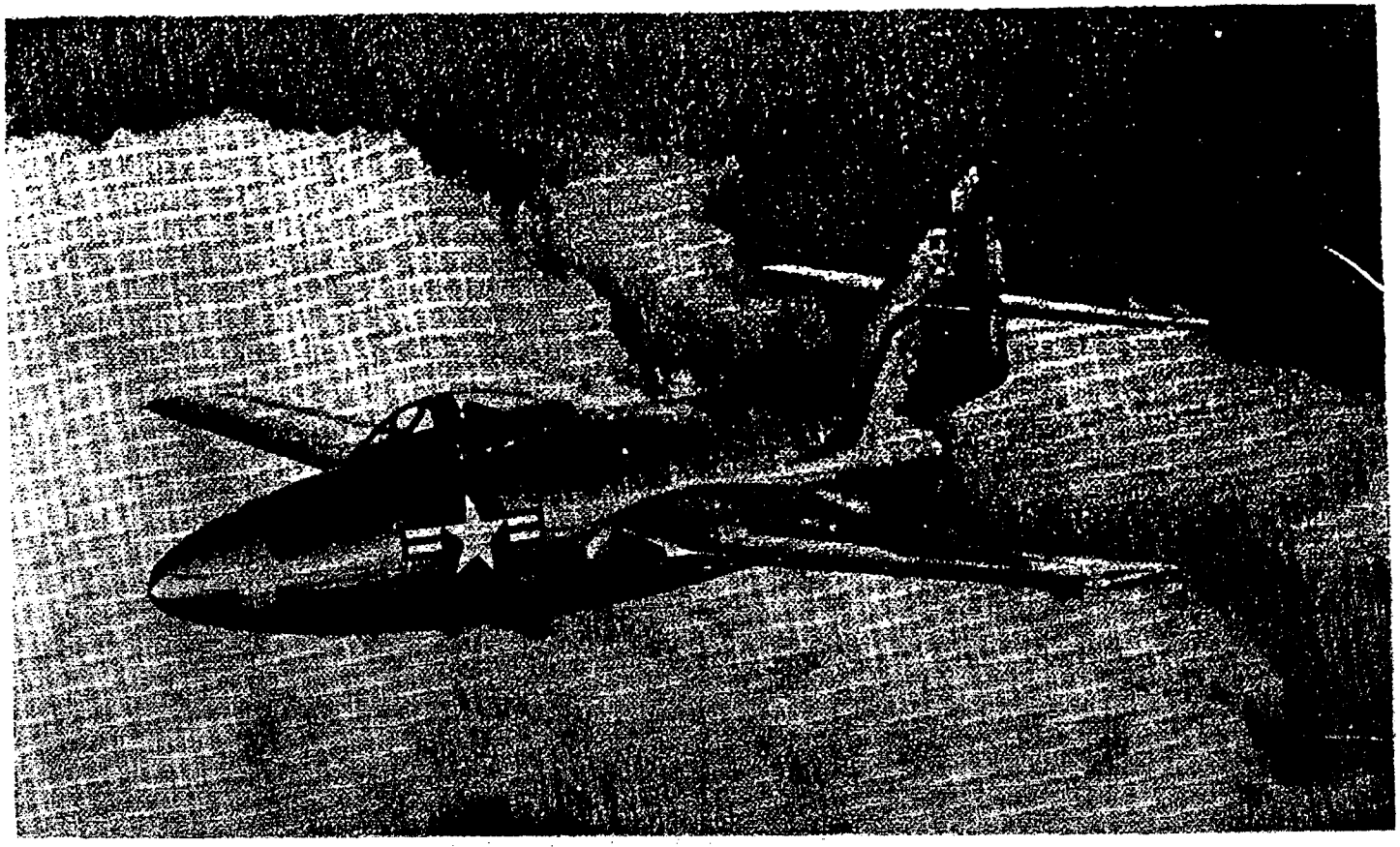
While the first aircraft to see squadron service were the -3s, which VF-51 received in May 1949, the *Nene*-powered -2 became the sole production version following early deliveries.

An increased thrust version of the Allison J33 led to the -4 with a longer fuselage and increased area vertical tail. The same airframe with the P&W-produced J48 version of the Rolls-Royce *Tay* engine became the F9F-5. The -5s joined the -2s as the major production versions. Photo versions, the Navy-modified -2P and Grumman-built -5P, also served in carrier air groups of the early Fifties. A total of 1,385 *Panthers* were delivered to the Navy.

The *Panthers* became a mainstay of Navy and Marine forces in Korea. They were the first carrier jets to fly in combat, shooting down two YAK-9s on their first mission in July 1950. Later, in November, LCdr. W. T. Amen, C.O. of VF-111, was the first carrier jet pilot to shoot down a MiG-15.

As the -4 and -5 *Panthers* replaced the -2s in carrier squadrons, the -2s took over advanced training, drone/drone control, reserve squadron and other duties, followed in turn by the -4s and -5s as they were replaced by their swept-wing F9F-6 successors. The last Marine combat squadrons to use *Panthers* kept their -5s until late 1957, and a few drone F9F-5KDs remained to be redesignated DF-9Fs under the 1962 DOD redesignations.

UNCLASSIFIED DECLASSIFIED



UNCLASSIFIED

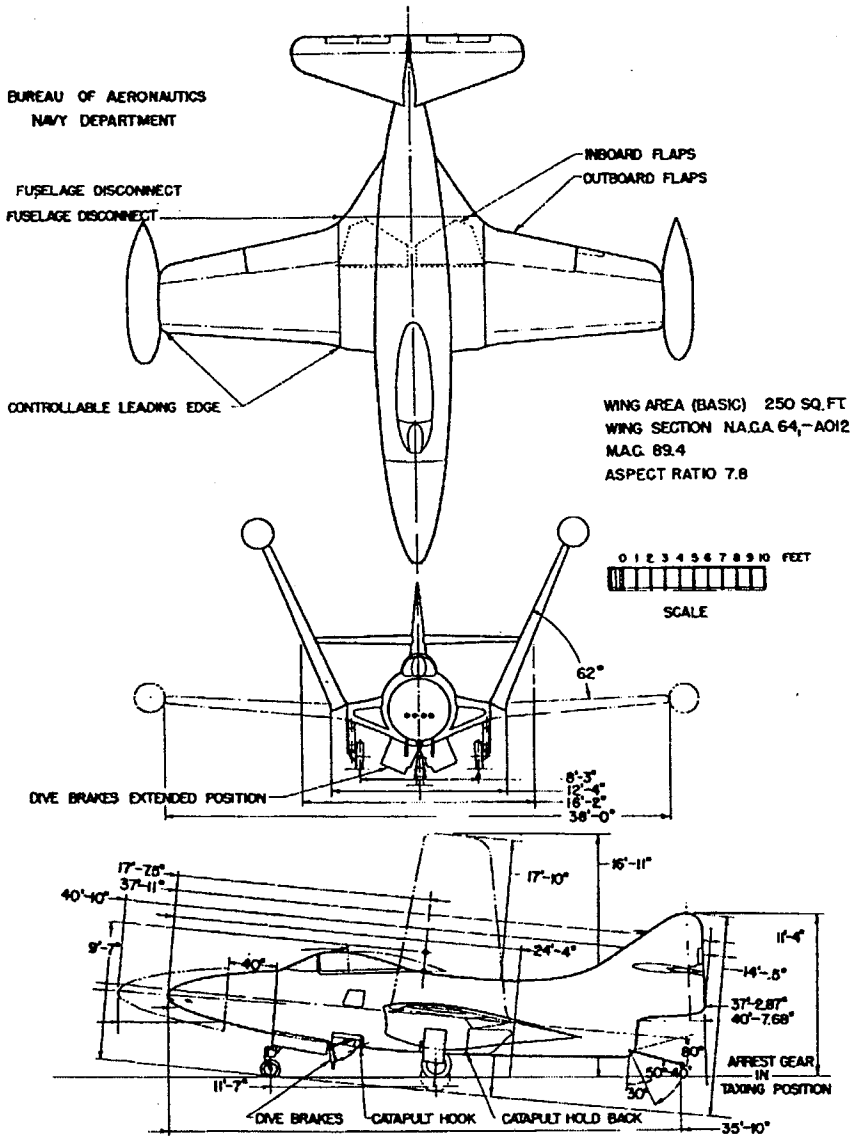
STANDARD AIRCRAFT CHARACTERISTICS

F9F-2 "PANTHER"

GRUMMAN

DECLASSIFIED

andard Aircraft Characteristics NAVAER 1335A (REV. 1-49)



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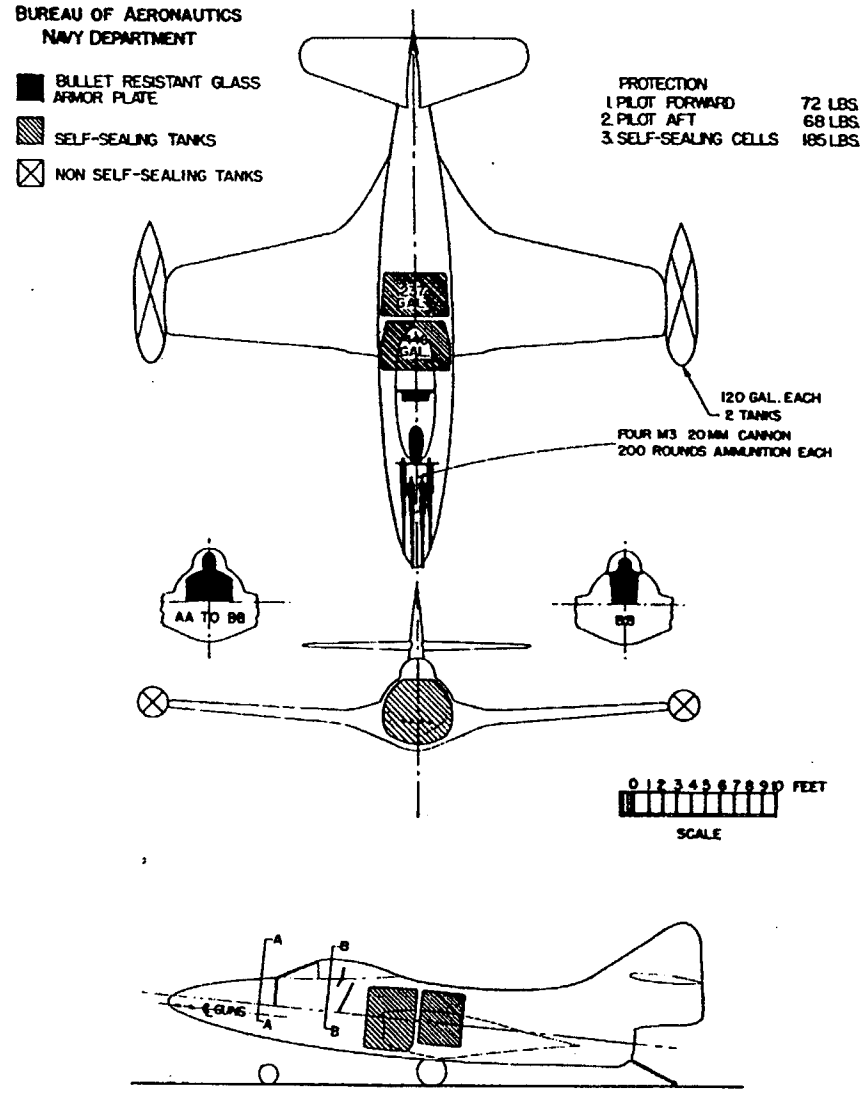


ARMAMENT & TANKS

POWER PLANT

NO. & MODEL.....(1) J42-P-8
MFR.....Pratt & Whitney
ENG. LENGTH.....104"
ENG. DIAMETER.....50"

RATINGS

	Lbs.	@ Rpm	@ Alt.
T. O. (Wet)	5,750	12,300	S.S.L.
T. O.	5,000	12,300	S.S.L.
MIL.	5,000	12,300	S.S.L.
NORM.	4,000	11,600	S.S.L.

SPEC. NO. N-1603

ORDNANCE

GUNS

No.	Size	Location	Rds.
4	20 mm	Fuselage	800

FIRE CONTROL

AFCS.....Mk. 6, Mod. 0
Radar Ranging Equip... AN/APG-30

BOMBS AND ROCKETS

Type	Size	Location	No.
HVAR	5"	Outer Wing	6
Bombs	250#	Outer Wing	6
Bombs	500#	Outer Wing	4
Bombs	1000#	Inner Wing (On Mk. 51 racks)	2

Any combination of above not to exceed 2,800 pounds.

MISSION AND DESCRIPTION

The F9F-2 is a single seat carrier-based fighter airplane whose mission is the destruction of opposing aircraft and ground support. Water injection is available to aid in take-off. A droop nose is fitted for take-off and landings.

Guns and radio are accessible by sliding forward the movable nose. The engine is serviced or changed quickly by removal of the tail section of the fuselage.

All internal fuel is in two interconnected tanks and two removable tip tanks also feed automatically into the main fuel tank.

The pressurized cabin has temperature control and a Grumman ejection seat.

For normal aileron control a hydraulic boost system is provided. In case of hydraulic failure a mechanical boost is available. The canopy is hydraulically operated.

Dive brakes are located under the fuselage. All control surfaces are metal covered and spot welded. All control surfaces are equipped with conventional trim tabs.

DIMENSIONS

WING AREA.....250 sq. ft.
SPAN.....38' - 0"
LENGTH.....37' - 3"
HEIGHT.....11' - 4"
TREAD.....8' - 3"
M.A.C.....7' - 5"

UNCLASSIFIED

WEIGHTS

Loadings	Lbs.	L.F.
EMPTY	9,303	
BASIC	10,107	
DESIGN	13,000	7.0
COMBAT	14,235	7.0
MAX.T.O..(Field)	19,494*	6.0
MAX.LAND.(Field)	14,200	

All weights are actual.

* Maximum anticipated loading

FUEL AND OIL

Gal.	No. Tanks	Location
683	2	Fuselage (S.S.)
240	2	Wing, Tip

FUEL GRADE.....100/130
FUEL SPEC....MIL-F-5572

OIL

CAPACITY (Gals.).....2.2
GRADE.....1010
SPEC.....MIL-O-6081

ELECTRONICS

VHF COMM.....AN/ARC-1,-1A
HOMING.....AN/ARR-2A
ADF.....AN/ARN-6
IFF.....AN/APX-6
RADIO ALTIMETER.....AN/APN-1

UHF D.F.....AN/ARA-25
(Service Installation)
UHF.....AN/ARC-27
(Replacement for AN/ARC-1)
HOMING.....AN/ARN-21
(Replacement for AN/ARR-2A and AN/ARN-6)

PERFORMANCE SUMMARY

TAKE-OFF LOADING CONDITION		(1) FIGHTER 2 - 120 Gal. Tip Tanks	(3) SUPPORT 2-1,000# Bombs 6-5# HVAR Rocks Tip Tanks			
TAKE-OFF WEIGHT	lb.	16,450	19,494			
Fuel (Internal/Fixed Tip)	lb.	4,098/1,440	4,098/1,440			
Payload (Ammunition, Bombs, Rockets)	lb.	450	3,306			
Wing loading	lb./sq.ft.	65.8	78			
Stall speed - power-off	kn.	112	122			
Take-off run at S.L. - calm	ft.	(Dry) 2,330	(Dry) 3,450			
Take-off run at S.L. 25 kn. wind	ft.	(Dry) 1,450	(Dry) 2,253			
Take-off to clear 50 ft. - calm	ft.	—	—			
Max. speed/altitude (1)	kn./ft.	457/22,000	342/S.L.			
Rate of climb at S.L. (2)	fpm	5,140	3,000			
Time: S.L. to 20,000 ft. (2)	min.	5.3	10.7			
Time: S.L. to 30,000 ft. (2)	min.	10.3	—			
Service ceiling (100 fpm) (2)	ft.	44,600	27,600			
Combat range	n.mi.	1,175	485			
Average cruising speed	kn.	423	290			
Cruising altitude(s)	ft.	40,800/43,000	25,000/20,000			
Combat radius	n.mi.	465	150			
Average cruising speed	kn.	435	294			
COMBAT LOADING CONDITION		(2) Tip Tanks	(4) 2-Mk 51 Racks 6-Mk 9 Launchers			
COMBAT WEIGHT	lb.	14,235	14,423			
Engine power		Military	Military			
Fuel	lb.	3,323	3,323			
Combat speed/combat altitude	kn./ft.	460/35,000	459/S.L.			
Rate of climb/combat altitude	fpm/ft.	1,360/35,000	5,600/S.L.			
Combat ceiling (500 fpm)	ft.	43,400	40,000			
Rate of climb at S.L.	fpm	6,000	5,600			
Max. speed at S.L.	kn.	500	459			
Max. speed/altitude	kn./ft.	500/S.L.	462/15,000			
LANDING WEIGHT	lb.	11,477				
Fuel	lb.	1,036				
Stall speed - power-off	kn.	94.3				
Stall speed - with approach power	kn.	91.3				

NOTES

(1) Normal Power
(2) Military Power

Performance is based on NATC flight test of the F9F-2 airplane.

Range and radius are based on flight test fuel consumption increased by 5%.

Spotting: 200 ft. length is required to spot 28 airplanes on the 96 ft. wide deck immediately aft of

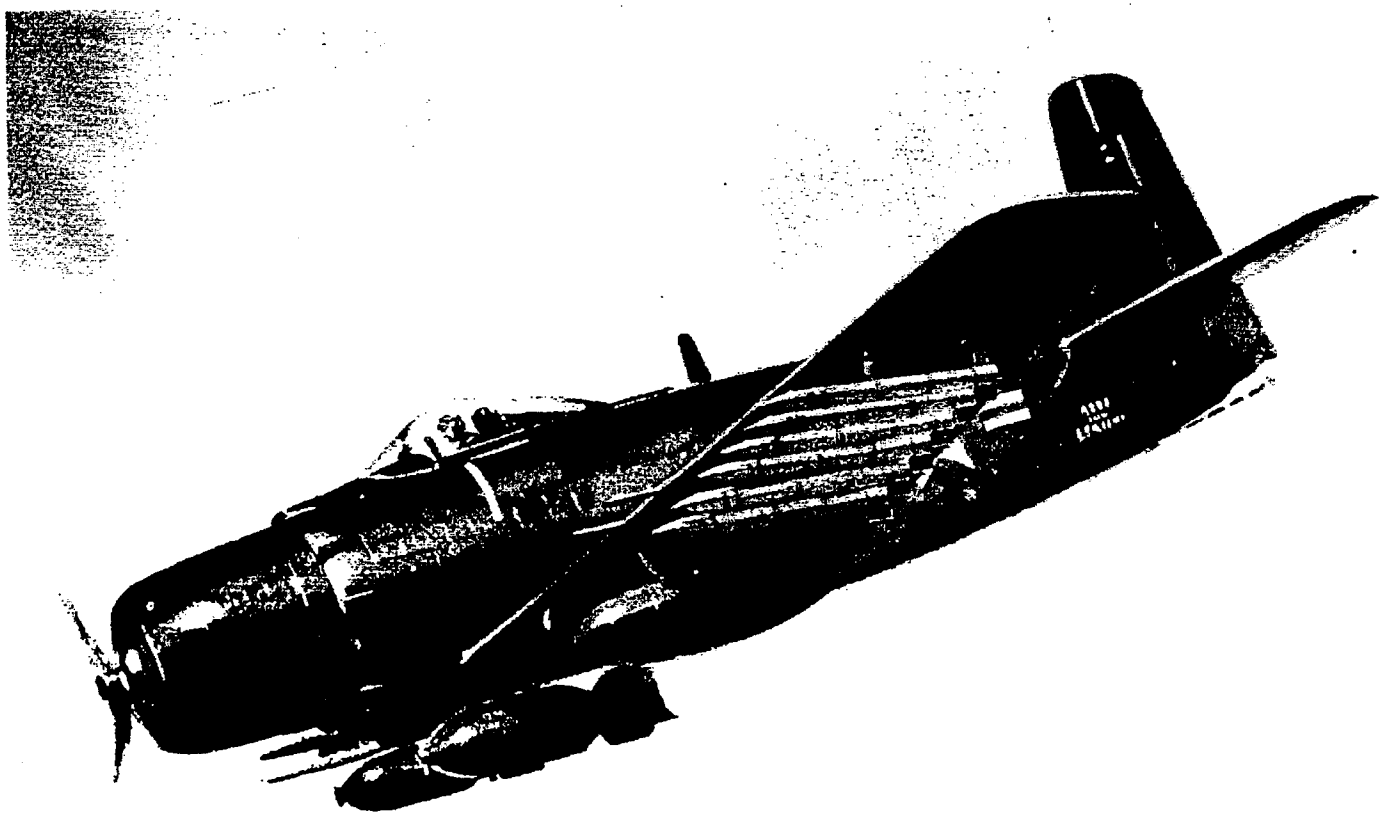
Brief Skyraider History (AD/A-1)

Originally designed to meet World War II requirements for a carrier-based, single-place, long-range, high performance dive bomber/torpedo-carrier, the Skyraider was ordered in July 1944 as the XBT2D-1. In April 1945, one month after its first flight, it was evaluated at NATC, and in December 1946, after redesignation to AD-1, delivery of the first AD to a fleet squadron was made to VA-19A.

Though the Skyraider was produced too late to take part in World War II, it became the backbone of naval air attack forces in Korea, with the first AD's going into action from USS *Valley Forge*. Its ability to employ a wide variety of weapons allowed it to be used against nearly all Korean targets, earning the Skyraider the reputation of the most effective close support aircraft in the world at that time.

Skyraiders continued in first line service well into the Vietnam conflict, where they once again became star performers in a close air support role. By this time, the Skyraider had picked up a new designation. It had become the A-1 in the 1962 redesignation of naval aircraft. The last Skyraider left active service late in 1971.

Throughout its long life, the Skyraider, in addition to earning many nicknames, including Able Dog and Spad, was produced in a wide variety of models calling for a regular alphabet soup of designations. The AD-1's and AD-2's were also produced with ECM equipment, and had an operator behind the pilot as the AD-1Q and AD-2Q. The AD-3 came in four basic variants: AD-3, AD-3N, night attack; AD-3Q, electronic countermeasures; and AD-3W, an AEW radar-toting model. AD-4's and AD-5's were also built in N, Q and W versions. AD-4B's, with a tactical nuclear weapon capability, were produced and some AD-4's were modified to AD-4L's (winterized). AD-4N's saw modification to AD-4NA (day attack) and AD-4NL (winterized). The lengthened AD-5 featured side-by-side seating in the cockpit. Other variants were produced over the years in small numbers. AD-6's and AD-7's completed the series. The last of 3,180 Skyradiers was built in 1957. With the redesignation of naval aircraft in 1962, AD-5's became A-1E's and AD-6's and -7's became A-1H's and J's, respectively. The Skyraiders served in Southeast Asia with the U.S. and Vietnamese Air Forces.

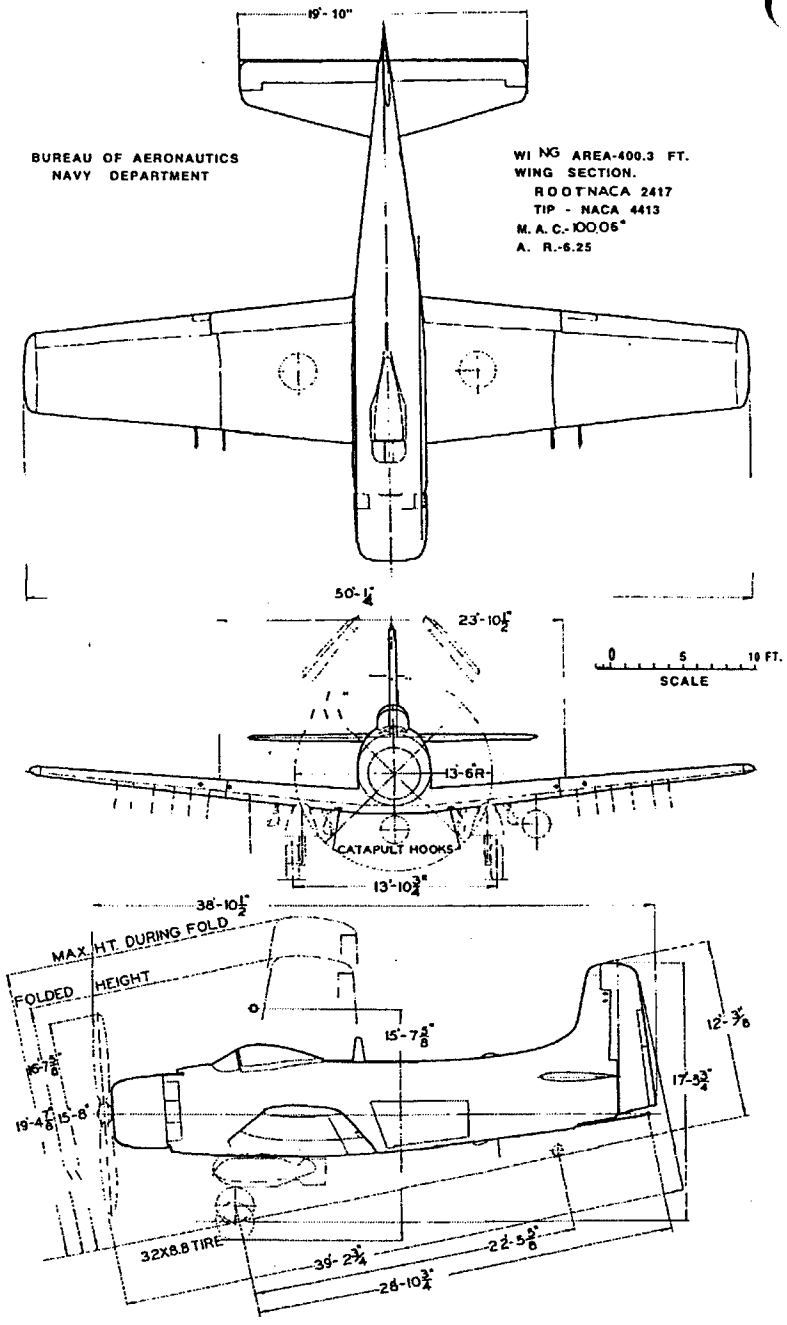


STANDARD AIRCRAFT CHARACTERISTICS

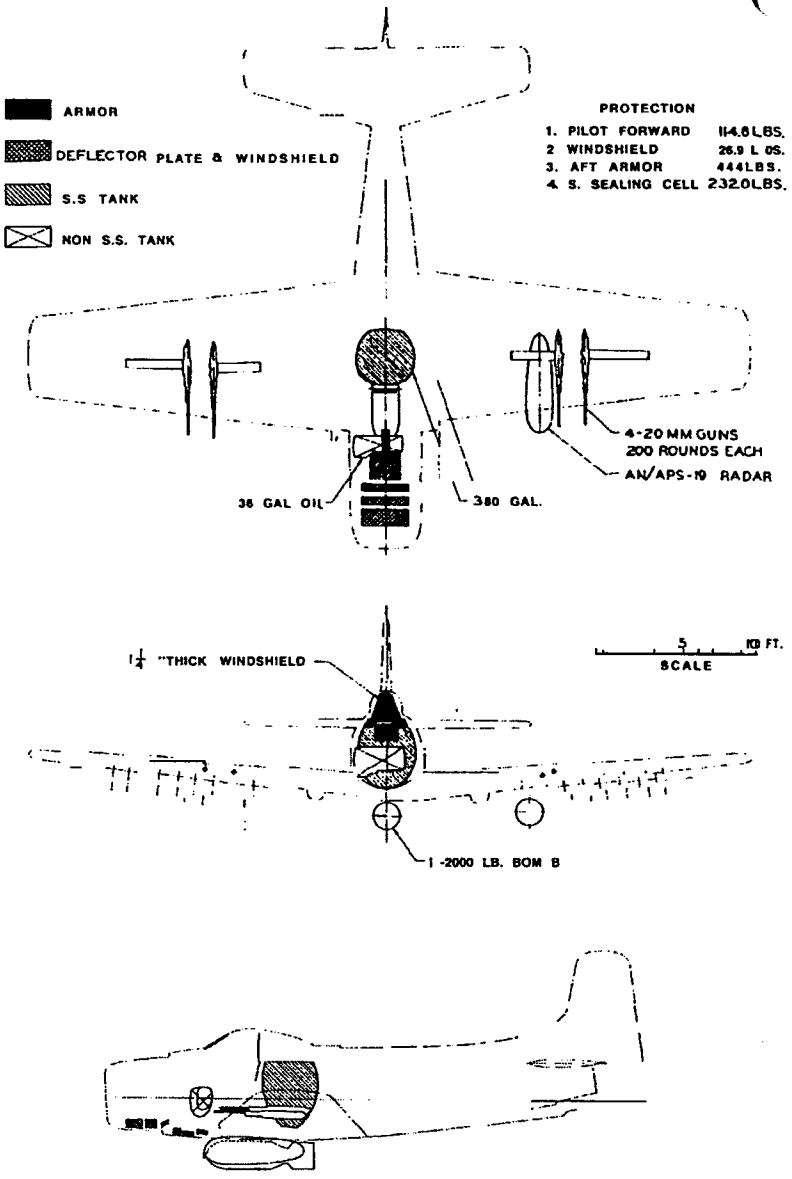
AD-4 "SKYRAIDER"

DOUGLAS

Standard Aircraft Characteristics NAVAER 1335A REV



DESCRIPTIVE ARRANGEMENT



ARMAMENT & TANKS

8

Standard Aircraft Characteristics NAVAER 1325D (Dec 1951)

POWER PLANT

NO. .....(1)
MFR .....
SUPERCH ..... 1 Stage, 2 Speed
RED. RATIO 0.4375
PROP. MFR ..... Aero. Prod.
BLADE DESIGN .....
NO. ..... 4/13' -6"

E-B

2,700 2,900
2,700 2,900

2,100 2,600 11,500
to
NORM.

1,900 2,600
to

NO.

MISSION AND DESCRIPTION

The primary of the destruction and ground targets by dive bombing The of rocket and tactical support The is designed to operate from of naval aircraft or from land . .

It is equipped a strengthened landing gear, provisions, 4-20 cannon, rocket of carrying up

The airplane in and Landing wing folding, and three brakes are hydraulically The pressure-balance type are operated by power The rudder equipped with spring tab system, trim achieved by en electrically adjustable stabilizer. Elevators, power plant, end engine conventional. for five hours is displacing gear at the center-line station powder operated. Twenty gallons of ADI fluid are supplied for

DEVELOPMENT

First ..... June 1949
Service Use ..... July 1949

WEIGHTS

EMPTY .....11,712 .....
BASIC .....11,669 .....
DESIGN .....15,595 .....6.0
.....17,818 .....6.0
MAX. (Field) . .....
(cat.) . ...25,000 .....
MAX. LAND. (Field) ..21,000 .....
(Arrest) 17,500 .....

All are actual.

FUEL AND OIL

380 1 Fuse.,
150 or 300 Drop
150 or 300 2

GRADE 115/145
applicable.

CAPACITY (Gals.) 36
.....1100
..... applicable.

ORDNANCE

1 4

STATION

2,

center 1
Ejector

Aero Outer wing 12
14A

lbs.
(Shore)

DIMENSIONS

KING
AREA..... Sq. ft.
..... - 0"
C..,.....8' -
LENGTH .....39' - 3"
HEIGHT..... -
..... -11"
PROP. .....6"

ELECTRONICS

VHF COMM .....AN/ARC-1 or -1A or

RADIO ALTO .....
RANGE R-23/ARC-5
RADIO AN/ARR-2A
. .AN/APS-19A
.....

PERFORMANCE SUMMARY

TAKE-OFF LOADING CONDITION		(1) LOW ALT. ATTACK 1-2000 lb. Store 12-5 in. HVAR 2-150 gal. ext.tanks	(3) LOW ALT. ATTACK 1-2000 lb. Store AN/APS-19 Radar	(4) LOW ALT. ATTACK 1-2000 lb. Store 2-1000 lb. Stores 12-5 in. HVAR		
TAKE-OFF WEIGHT	lb.	21,483	18,111	21,483		
Fuel (Fixed/Drop)	lb.	2,280/1,800	2,280/ - -	2,280/ --		
Payload (Bombs/Rockets)	lb.	2 000/1,680	2,000/ --	4,000/1,680		
Wing loading	lb./sq.ft.	53.7	45 3	53.7		
Stall speed - power-off	kn.	89.0	80.5	89.0		
Take-off run at S.L. - calm	ft.	1,390	900	1,390		
Take-off run at S.L. 25 kn. wind	ft.	740	450	740		
Take-off to clear ~~50 ft. - calm~~	ft.	2,350	1,550	2,350		
Max. speed/altitude (A)	kn./ft.	256/20,000	244/20,000	255 20,000		
Rate of climb at S. L. (A)	fpm.	1,540	1,960	1,540		
Time: S.L. to 10 000 ft. (A)	min.	7.5	5.5	7.5		
Time: S. L. to 20,000 ft. (A)	min.	22.0	14.5	22.0		
Service ceiling (100 fpm) (A)	ft.	23,500	25,800	21,300		
Combat range	n.mi.	1,170	726	500		
Average cruising speed	kn.	197	189	206		
Cruising altitude (s)	ft.	15,000	15,000	15,000		
Combat radius	n.mi.	540	285	220		
Average cruising speed	kn.	184	177	180		
Mission time	hrs.	6.3	3.5	2.8		

COMBAT LOADING CONDITION		(2) Includes 1-2000 lb. Store				
COMBAT WEIGHT	lb.	17,818				
Engine power		Military				
Fuel	lb.	2,280				
Combat speed/combat altitude	kn./ft.	274/S.L.				
Rate of climb/combat altitude	fpm/ft.	2,880/S.L.				
Combat ceiling (500 fpm)	ft.	25,300				
Rate of climb at S. L.	fpm.	2,880				
Max. speed at S.L.	kn.	274				
Max. speed/altitude	kn./ft.	303/20,000				
LANDING WEIGHT	lb.	13,828				
Fuel	lb.	200				
Stall speed - power-off	kn.	70.5				
Stall speed - with approach power	kn.	68.2				

NOTES

REASON FOR REISSUE: Change in performance due to weight changes and change in combat loading configuration.

(A) Normal Rated Power.

(B) All Loading Conditions include 4-20mm guns, 800 role. of ammunition, and 12 Aero - 14A racks.

(C) PERFORMANCE is based on Contractor's Flight Test data and NATC Evaluation Test data.

SPOTTING: A maximum operating spot aboard a CVA-19 (Angled Deck) class carrier consists of 42 aircraft on the flight deck with elevators and landing area clear and 41 aircraft on the hangar deck with hangar bay fire doors and elevators clear. Total 83 aircraft.

10

NAVAER-1335D (Rev. 1-55)

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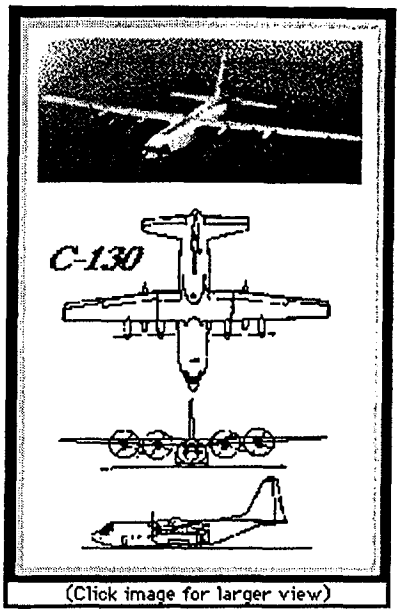
C-130 HERCULES



(Click image for larger view)

Wing span: 133 feet
Length: 98-106 feet
Height: 38 feet
Weight: empty: 75,331 pounds
maximum normal takeoff: 155,000 pounds
maximum overload takeoff: 175,000 pounds
Speed: maximum cruise: 374 mph
economical cruise: 345 mph
Ceiling: 33,000 feet
Range: with maximum payload and allowance for 30 minutes
at sea level: 2,046 nautical miles
with maximum fuel and 20,000 pound payload: 4,460 nautical miles
Power plant: four Allison T56-A-15 turboprop engines
eight JATO (Jet-Assisted Takeoff) units can also be carried
Crew: four
Contractor: Lockheed

The C-130 Hercules first entered naval service in 1960 when four LC-130F's were obtained for Antarctic support missions. These ski-equipped Hercules were soon followed by 46 KC-130F models procured by the Marine Corps in 1962 for the dual role of assault transport and aerial tanker for fighter and attack aircraft. That same year the Navy obtained seven C-130F's without inflight refueling equipment to serve its transport requirements. The Hercules, initially designed to specifications laid down by the USAF Tactical Air Command, first flew as the YC-130 in August 1954. The KC-130F made its first test flight in January 1960 as the GV-1 under the old Navy designation system. The tanker version can refuel two aircraft simultaneously from the 3,600 gallons in its cargo compartment. The fuel is routed to two detachable pylon pods located below the outer wing, containing refueling gear.

The C-130F, identical to the tanker, less refueling equipment, can transport cargo or personnel and deliver its load by either the normal method or by airdrop. An integral cargo ramp/door and removable roller tracks facilitate the handling of palletized loads. In its passenger-carrying role the Hercules can accommodate 92 combat troops or 64 paratroops with equipment. For medical evacuation, 74 litters may be rigged in the cargo area.

In 1965 the Navy procured a number of C-130G's to provide support to Polaris submarines and the exchange of their crews. Essentially the same as the F model, these aircraft have increased structural strength, allowing higher gross weight operation. All models feature crew and cargo compartment pressurization, single-point refueling and a Doppler navigation system.

One other model, the EC-130Q, served in two VQ squadrons. This version had a permanently installed VLF radio transmitter system used to supplement shorebased communications facilities and acted as strategic communications aircraft, communicating with ballistic-missile submarines, under the TACAMO program.

The Hercules also flies with the Coast Guard as the HC-130B, performing air-sea rescue. In addition, C-130's are used by more than 50 foreign countries.

The Hercules probably is the most versatile tactical transport aircraft ever built. Its uses appear almost

limitless: transportation, electronic surveillance, search and rescue, space-capsule recovery, helicopter refueling, landing (with skis) on snow and ice, gun ship and special cargo delivery. It has even landed and taken off from a carrier deck without benefit of arresting gear or catapults.

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31 March 1997

1986 - Pres.

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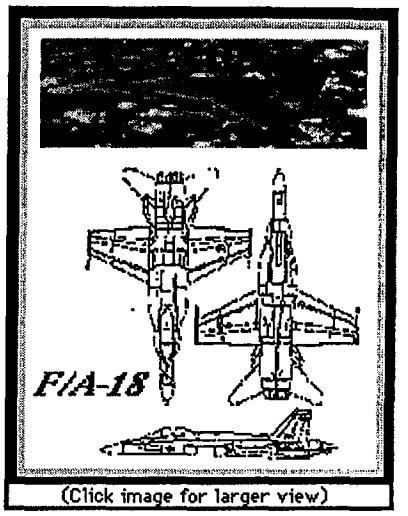
F/A-18 HORNET



(Click image for larger view)

Wing span: 37 feet 5 inches
Length: 56 feet
Height: 15 feet 3 1/2 inches
Weight: Fighter mission takeoff: 36,710 pounds
Attack mission takeoff: 49,224 pounds
Speed: more than 1,360 mph
Ceiling: approximately 50,000 feet
Range: Fighter mission: 400 nautical-mile radius
Attack mission: 575 nautical-mile radius
Ferry range: more than 2,000 nautical miles
Power plant: two GE F404-GE-400 low-bypass turbofan engines
Crew: F/A-18A/C models: one; F/A-18B/D: two
Contractor: prime, McDonnell Douglas; **airframe**, Northrop

The Hornet is a direct descendant of the Cobra. In nature's environment, this statement would not make any sense, but in aviation such relationships are not uncommon. Thus, the McDonnell Douglas F/A-18 Hornet traces its direct ancestry to the Northrop Cobra, a twin engine multimission fighter design developed for the export market in the late 1960s. The Cobra was never built in this form. In 1971, the Air Force requested proposals for a lightweight fighter prototype program; Northrop's entry was derived from the Cobra design. One of the two winners in the Air Force competition, Northrop was awarded a contract in 1972 for two YF-17 prototypes, each powered by two General Electric YJ101 engines. General Dynamics was the other winner, building two single engine YF-16s.

First flight of the YF-17 was in June 1974. By this time, the Air Force had decided to proceed with Air Combat Fighter (ACF) Program, based on flight testing of the YF-16 and YF-17 prototypes. The Navy was also initiating a program to develop a new VFAX in this time period--a strike fighter to replace both the F-4s and A-7s in its carrier air wings.

The following year, 1975, brought major program action: the Air Force selected the F-16 to be produced for the Tactical Air Command, and the Navy was directed by Congress to base the VFAX on either the YF-16 or YF-17 designs. Two of the companies having a major interest in the VFAX, which was redesignated the Navy Air Combat Fighter, paired with the F-16/17 builders; neither of the latter had experience in producing Navy carrier fighters. Vought as a prime contractor teamed with General Dynamics on a single-engined F-16 derivative, while McDonnell Douglas became the prime, paired with Northrop, on an F-17 derivative. To meet Navy requirements, considerable improvements in areas such as combat radius and radar capability were incorporated, in addition to carrier suitability features. The resulting redesign was extensive and, when the McDonnell Douglas design was selected as winner in 1976, it was assigned the F-18A designation. The developed versions of the YF-17's YJ101 engines were redesignated F404s.

While the general configuration of the YF-17 was retained, the F-18 became a completely new airplane. To meet the single-place fighter and attack mission capability, full use was made of new technology in digital computers. Coupled with cathode ray tubes for cockpit displays and appropriate controls based on thorough pilot evaluations in simulators, a single airplane and subsystems configuration for both missions was evolved and the Hornets are now F/A-18s, a new type of designation recognizing their dual capability.

During development, two-place trainer versions were added, to be built in limited numbers as TF/A-18s, intermingled with the basic F/As. Minimum changes were made to incorporate the second cockpit, with the two-seat

airplanes retaining the ability to perform combat missions.

Making the first flight in November 1978, the F/A-18 and its two-place derivative have undergone most of their development testing at the Naval Air Test Center, under the new single-site testing concept. While much attention, both internal and external, was focused on development problems, these have largely been typical of those in any new program with their resolution being part of the development process. For the most part, these have occurred in the basic aircraft hardware rather than in the digital electronic systems.

The initial production airplanes, the first training F/A-18s have been in service with VFA-125 since November 1980. The new capabilities introduced by the F/A-18 have met with an enthusiastic response among operating personnel.

Current F/A-18s in the inventory included F/A-18As, F/A-18Bs, F/A-18Cs and F/A-18Ds. The Hornet is a critical element in the plan to recapitalize the Navy and Marine Corps aviation capability. When the A-6 Intruders and F-14 Tomcats have left the inventory, the F/A-18 Hornet alone will represent the Navy's carrier-based strike fighter capability.

Upgrades and modifications continue to be made and developed for the F/A-18C/D aircraft. These upgrades include radar, advance targeting FLIR, countermeasures dispenser system, standoff land attack missile system, and other electronic systems.

Modernization development is underway for the next Hornet series, the F/A-18E/F, which will provide increased mission radius, endurance, and survivability above that of its predecessor while providing the capacity for twenty-plus years of growth that is unavailable in the current F/A-18C/D. There will be extensive commonality in weapons systems, avionics, and software between the two aircraft and the infrastructure for supporting the new Hornet will grow from in-place organizations. The lethality, flexibility, reliability, and survivability of the F/A-18E/F will make it the aircraft of choice to fulfill the majority of missions associated with regional and littoral scenarios.

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APPENDIX Z

EXTRACT
APPENDIX A, ANALYTICAL RESULTS
SAMPLING VISIT AND
APPENDIX B, BORINGLOCATIOINS MAP
FINAL REPORT, RCRA FACILITY ASSESSMENT

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
This column gives the SWMU/AOC number.	This column briefly describes the purpose or type of area sampled. (The Figure number associated with the SWMU/AOC is presented here. The figures are located in Appendix B.)	This column identifies the boring number, which consists of a letter and a number. The letters represent the following: H = Hand Auger B = 25-ft Vertical Boring A = 60-ft Angle Boring The numbers designate the boring number at the site.	Depth below the ground surface, in feet, at which the sample was collected. Duplicate samples are listed directly below the original samples.	Total petroleum hydrocarbon concentration, in mg/kg, as measured by Method 418.1. ND - Not detected above detection limit of Method 418.1. NA - Not analyzed for TPH.	Total fuel hydrocarbon concentrations in mg/kg, as measured by Method 8015 for diesel and for gasoline. ND - Not detected above detection limit of Method 8015. NA - Not analyzed for TFH. Z - Unknown hydrocarbons.		This column presents the Volatile Organic Compounds detected at each depth. The concentrations are presented in ug/kg. ND - No VOCs were detected above the CRDLs. If compounds are listed, then all other compounds not listed are below detection limits. Qualifiers are defined as follows: B = Analyte is found in associated blank as well as the sample. J = Indicates an estimated value. E = Compound may be above or below linear range of instrument. D = Indicates compound has been diluted to bring the concentration into linear range. X = Indicates the compound concentration has been manually modified or the EPA qualifier has been manually modified or added. * = Indicates compound was eliminated from further consideration due to laboratory contamination.	This column presents the Semivolatile Organic Compounds detected at each depth. The concentrations are presented in ug/kg. ND - No SVOCs were detected above the CRDLs. If compounds are listed, then all other compounds not listed are below detection limits. NA - Not analyzed for SVOCs Qualifiers are defined as follows. B = Analyte is found in associated blank as well as the sample. J = Indicates an estimated value. E = Compound may be above or below linear range of instrument. D = Indicates compound has been diluted to bring the concentration into linear range X = Indicates the compound concentration has been manually modified or the EPA qualifier has been manually modified or added * = Indicates compound was eliminated from further consideration due to laboratory contamination	This column presents the Pesticides/PCBs detected at each depth. The concentrations are presented in ug/kg. ND - No Pesticides/PCBs were detected above the CRDLs. If compounds are listed, then all other compounds not listed are below detection limits. NA - Not analyzed for Pesticides/PCBs Qualifiers are defined as follows: B = Analyte is found in associated blank as well as the sample. J = Indicates an estimated value. E = Compound may be above or below linear range of instrument D = Indicates compound has been diluted to bring the concentration into linear range C = Presence of compound has been confirmed by GC/MS analysis.	This column presents the results of the metals analyses. Concentrations are only presented if at least one sample is above background threshold concentrations. The concentrations are presented in mg/kg. NA - Indicates that samples were not analyzed for metals. NAB - Indicates that metals were analyzed, but concentrations are not above background threshold concentrations Qualifiers are defined as follows B = Reported value was less than the CRDL but greater than the IDL E = Value was estimated due to interference M = Duplicate injection precision not met N = Spiked sample recovery not within control limits	This column presents the recommended action for each site and describes the rationale that led to the recommendation. NFA = No Further Action. CRDL = Contract Required Limit. BGT = Background Threshold Value ETM = El Toro Model PRG = Preliminary Remedial Goals	

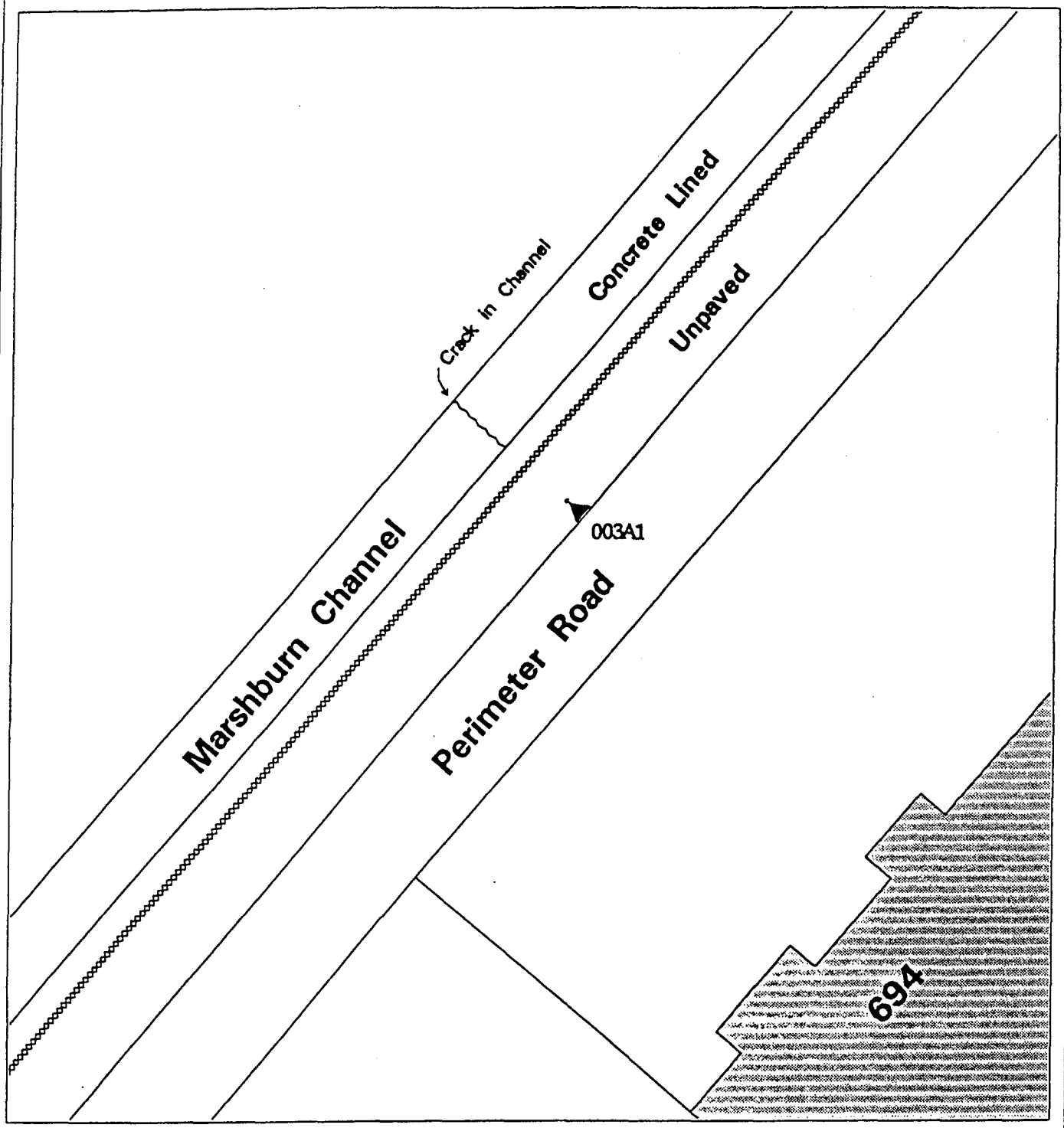


Figure 1 Sample Location Map

SWMU/AOC Number and Type:
3 - Marshburn Channel

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

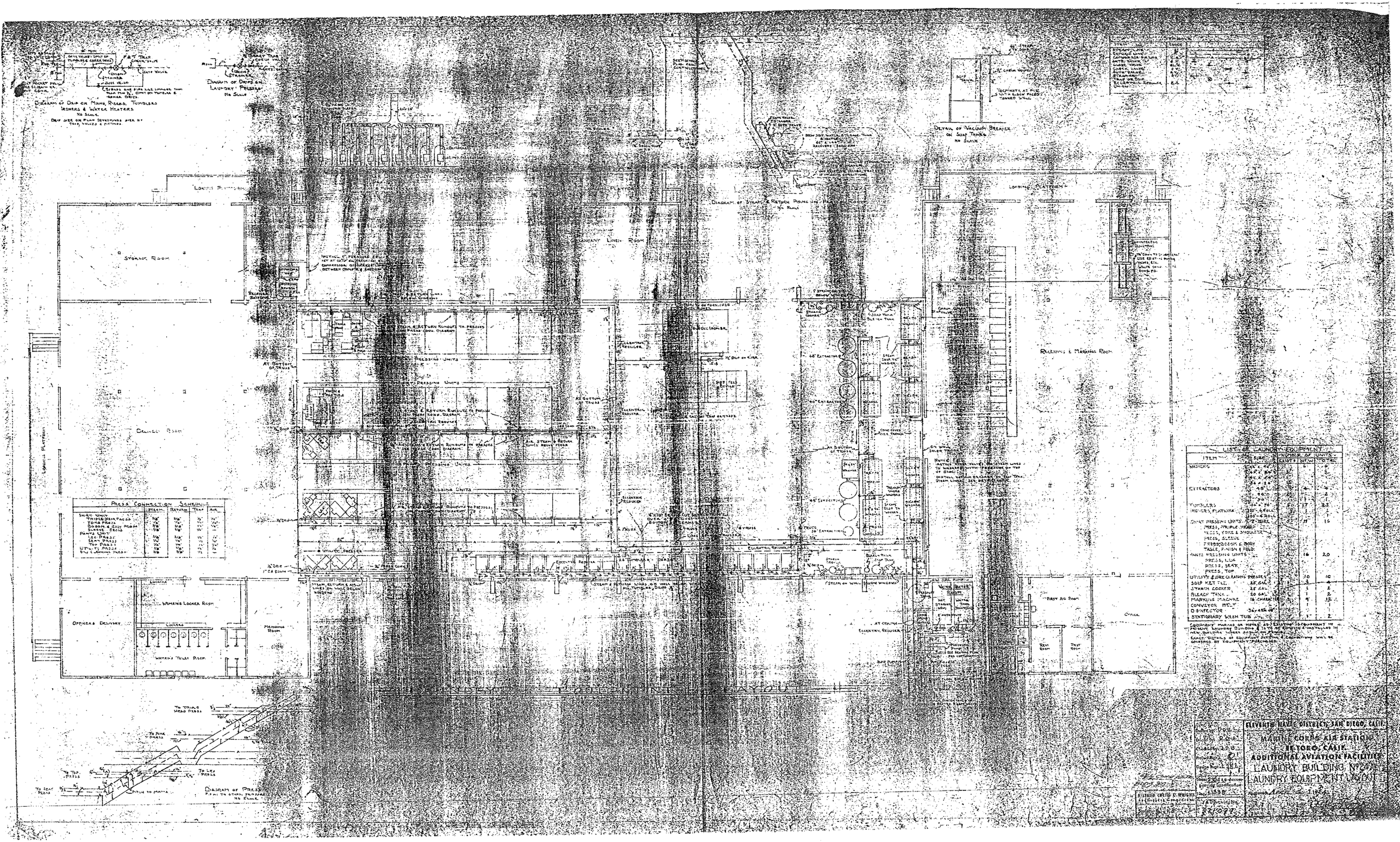
Scale

0 20 40 80 Feet

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
3	Marshburn Channel (1)	A1	10	38.8	ND	ND	Methylene Chloride-6 BJ * Acetone-3 BJ *	ND	ND	NAB	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < BGT
			20	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-8 BJ * Toluene-2 J	ND	ND	NAB		
			20 (Duplicate)	ND	ND	ND	Methylene Chloride-2 BJ *	Diethylphthalate-88 J	ND	NAB		CRDL - Contract Required Detection Limit BGT - Background Threshold Value
			30	ND	ND	ND	Methylene Chloride-5 BJ * Acetone-8 BJ *	Diethylphthalate-22 BJ * Bis(2-Ethylhexyl)phthalate-39 BJ *	ND	NAB		
			40	ND	ND	ND	Methylene Chloride-5 BJ *	Diethylphthalate-32 J	ND	NAB		
			50	ND	ND	ND	Methylene Chloride-6 BJ * Acetone-8 BJ * Toluene-2 J	Diethylphthalate-20 BJ * Bis(2-Ethylhexyl)phthalate-49 BJ * Butylbenzylphthalate-20 J	ND	NAB		
			60	ND	ND	ND	Methylene Chloride-14 B * Acetone-9 BJ * Toluene-3 J	Diethylphthalate-40 BJ *	ND	NAB		


Storage Room
Drying Room
Lockers Platform
Women's Locker Room
Women's Toilet Room
Officers Delivery
Marking Room
Pressing Units
Receiving & Marking Room
First Aid Room
Office
Elevator
Diagram of Drip on Mains, Risers, Tumblers, Ironers & Water Heaters
No Scale
Diagram of Drip on Laundry - Presses
No Scale
Diagram of Vacuum Breaker on Soap Tanks
No Scale
Diagram of Steam & Return Piping
No Scale
Diagram of Presses
No Scale
Press Connection Schedule
List of Laundry Equipment
Eleventh Naval District, San Diego, Calif.
Marine Corps Air Station
El Toro, Calif.
Additional Aviation Facilities
Laundry Building No. 2
Laundry Equipment Layout

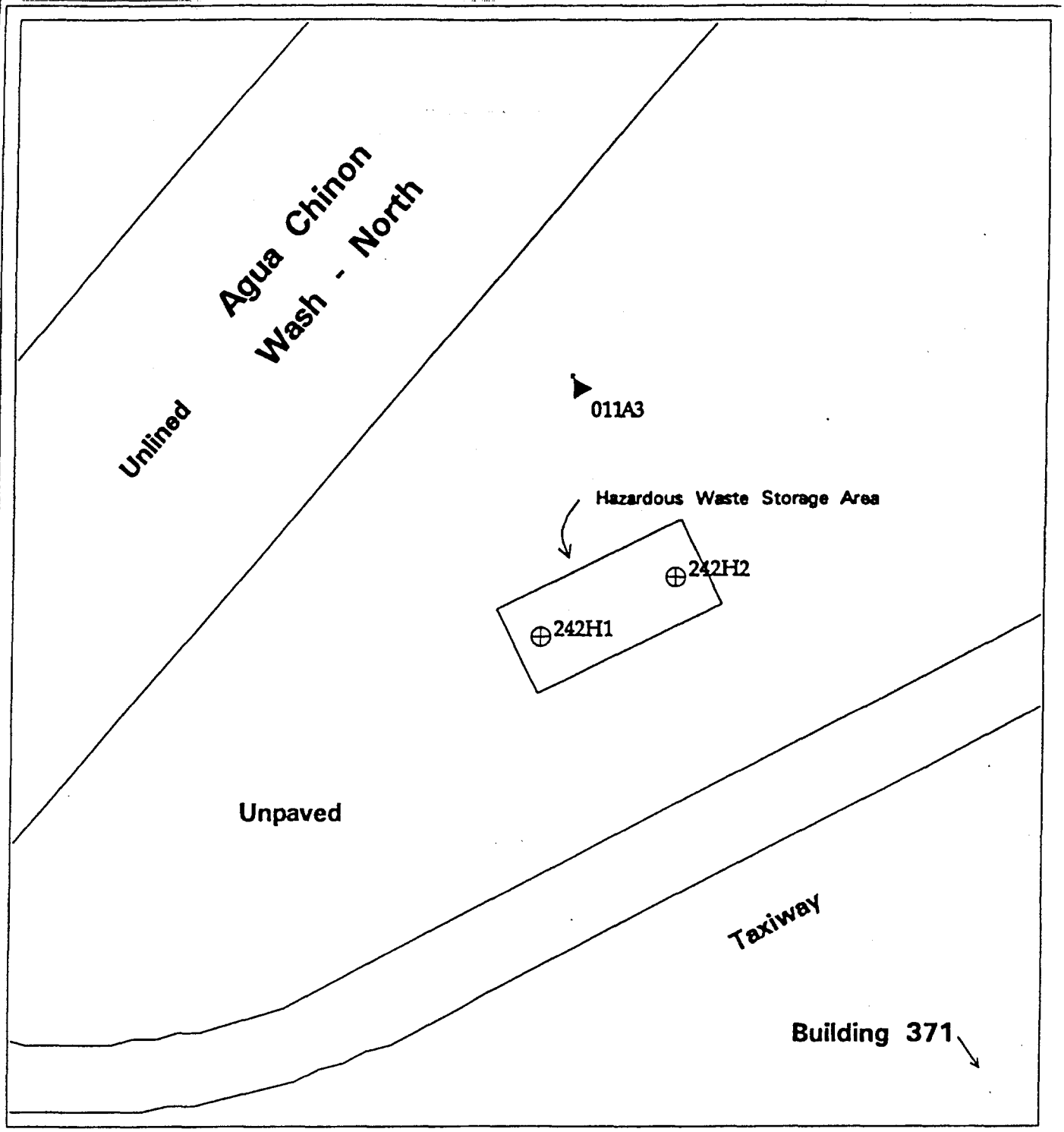


Figure 8 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

SWMU/AOC Number and Type:

11 - Agua Chinon Wash

242 - Hazardous Waste Storage Area

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
11	Agua Chinon Wash (North Reach) (8,9)	A3	10	ND	ND	ND	Methylene Chloride-10 BJ * Acetone-6 BJ * 2-Butanone-4 BJ *	ND	ND	Antimony-ND Silver-ND Barium-23.8 Lead-0.59	NFA	TPH/TFH < 1000 ppm VOCs < CRDL SVOCs < ETM & PRG Pest/PCB < CRDL Metals < ETM & PRG
			20	ND	0.277	ND	Methylene Chloride-13 B * Acetone-6 BJ * 2-Butanone-4 BJ *	ND	ND	Antimony-ND Silver-ND Barium-50.2 Lead-0.61		
			30	ND	ND	ND	Methylene Chloride-14 B * Acetone-10 BJ * 2-Butanone-3 BJ *	ND	ND	Antimony-ND Silver-ND Barium-251 Lead-2.6		CRDL - Contract Required Detection Limit
			40	ND	ND	ND	Methylene Chloride-17 B * Acetone-11 BJ * 2-Butanone-4 BJ *	ND	ND	Antimony-ND Silver-ND Barium-293 Lead-4.5		
			40 (Duplicate)	ND	ND	ND	Methylene Chloride-15 B * Acetone-6 BJ * 2-Butanone-3 BJ *	ND	ND	Antimony-ND Silver-ND Barium-332 Lead-3.2		
			50	ND	ND	ND	Methylene Chloride-22 B * Acetone-11 BJ * 2-Butanone-4 BJ *	Bis(2-Ethylhexyl)phthalate-200 J	ND	Antimony-ND Silver-ND Barium-185 Lead-1.9		
			60	40	0.08	ND	Methylene Chloride-18 B * Acetone-8 BJ * 2-Butanone-4 BJ *	ND	ND	Antimony-ND Silver-ND Barium-151 Lead-2.7		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
242	Hazardous Waste Storage Area (8)	H1	2	ND	ND	ND	Methylene Chloride- 4 BJ * Acetone- 22 B *	Di-n-butylphthalate-61 BJ *	ND	Silver-ND	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < ETM & PRG CRDL - Contract Required Detection Limit
			5	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-10 BJ * 2-Butanone-2 J	Di-n-butylphthalate-170 BJ *	ND	Silver-2.1 B		
		H2	2.	ND	ND	ND	Methylene Chloride- 4 BJ * Acetone-16 B *	Di-n-butylphthalate-38 BJ *	ND	Silver-0.34 B		
			2 (Duplicate)	ND	ND	ND	Methylene Chloride-10 BJ * Acetone-15 B * Toluene-1 J	Di-n-butylphthalate-39 BJ *	ND	Silver-ND		
			5	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-29 B *	Di-n-butylphthalate-45 BJ *	ND	Silver-0.55 B		

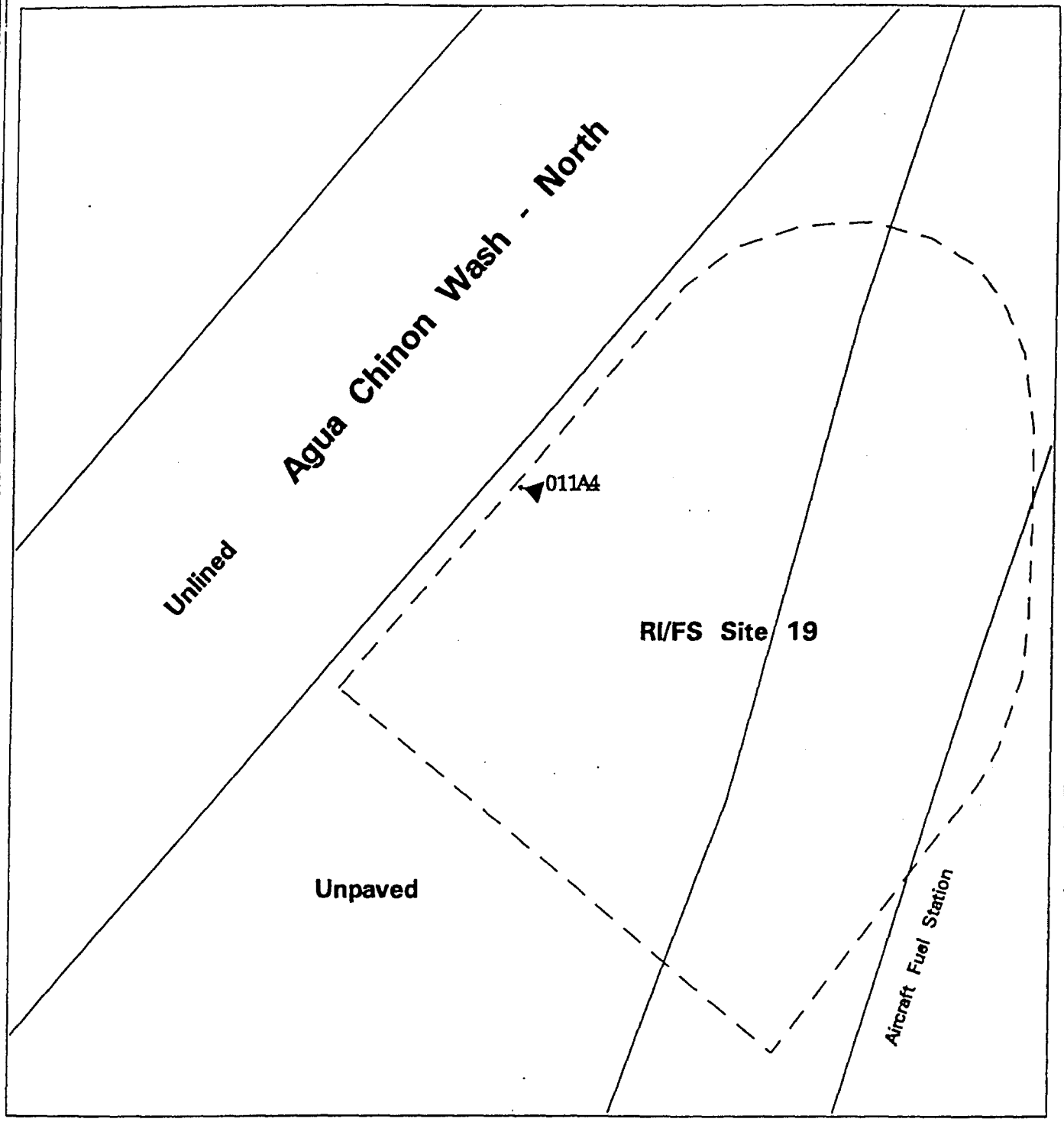


Figure 9 Sample Location Map

SWMU/AOC Number and Type:
11 - Agua Chinon Wash

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
11	Agua Chinon Wash (North Reach) (8,9)	A4	10	223	ND	ND	Methylene Chloride-6 BJ * Acetone-12 BJ *	ND	ND	Antimony-ND Silver-ND Barium-111 Lead-2.1	NFA	TPH/TFH < 1000 ppm VOCs < CRDL SVOCs < ETM & PRG Pest/PCB < CRDL Metals < ETM & PRG
			20	217	ND	ND	Methylene Chloride-5 BJ * Acetone-16 B *	ND	ND	Antimony-ND Silver-ND Barium-51.2 Lead-1.0		
			30	73	ND	ND	Methylene Chloride-8 BJ * Acetone-4 BJ *	ND	ND	Antimony-ND Silver-ND Barium-80.2 Lead-1.6		CRDL - Contract Required Detection Limit
			40	248	ND	ND	Methylene Chloride-7 BJ * Acetone-4 BJ *	ND	ND	Antimony-ND Silver-ND Barium-16.8 Lead-0.51		
			40 (Duplicate)	ND	ND	ND	Methylene Chloride-6 BJ *	ND	ND	Antimony-ND Silver-ND Barium-50.3 Lead-0.95		
			50	65	ND	ND	Methylene Chloride-8 BJ * Acetone-5 BJ *	ND	ND	Antimony-ND Silver-ND Barium-117 Lead-0.68		
			60	210	ND	ND	Methylene Chloride-9 BJ * Acetone-9 BJ *	ND	ND	Antimony-ND Silver-ND Barium-80.4 Lead-2.9		

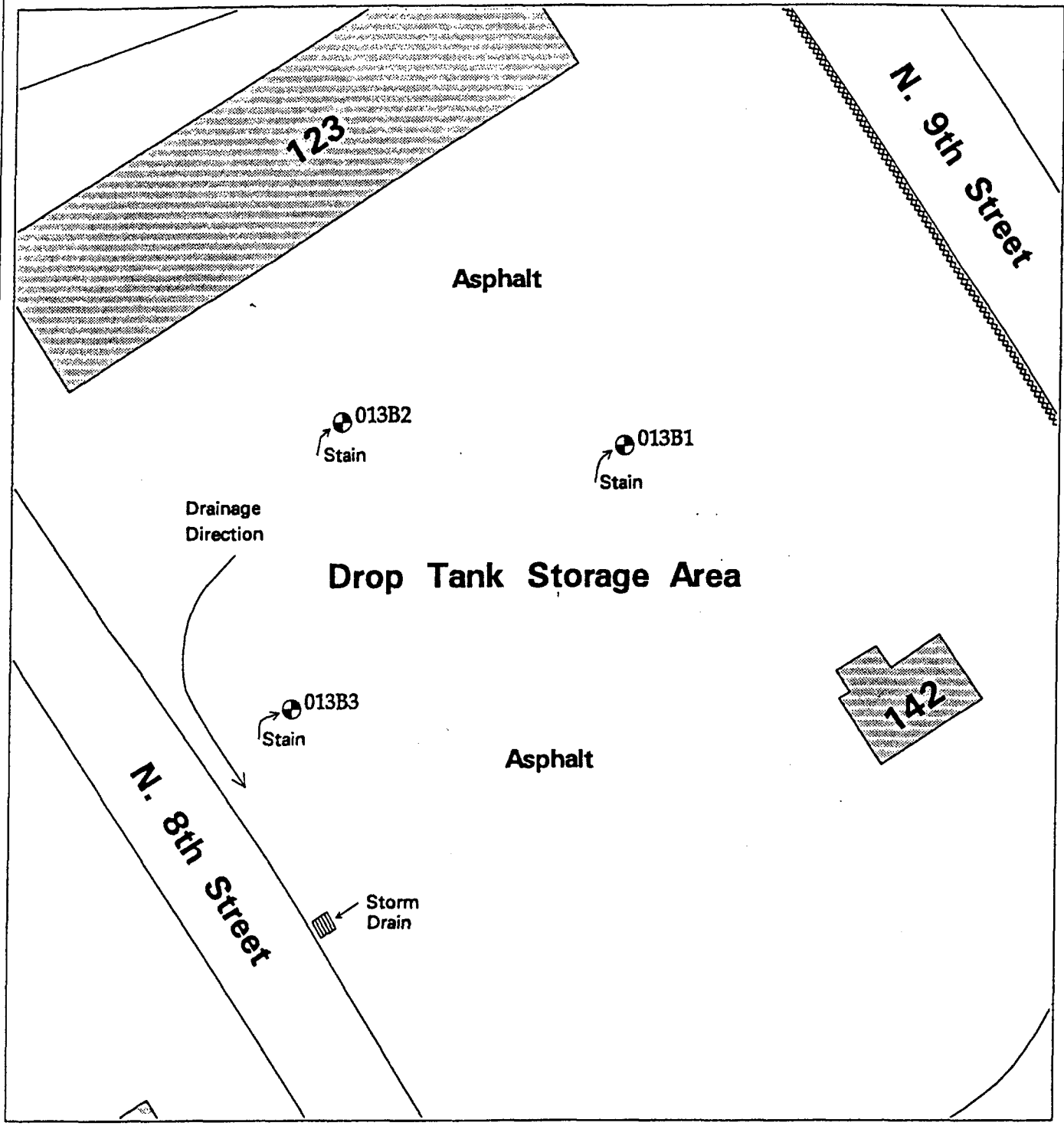


Figure 10 Sample Location Map

SWMU/AOC Number and Type:
13 - Drop Tank Storage Area

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
13	Drop Tank Storage Area (10)	B1	5	NA	ND	ND	Methylene Chloride-4 BJ * Acetone-4 BJ *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	NA	ND	ND	Methylene Chloride-5 J * Acetone-4 * 2-Butanone-1 J	NA	NA	NA		
			10 (Duplicate)	NA	ND	ND	Methylene Chloride-2 BJ * Acetone-2 *	NA	NA	NA		CRDL - Contract Required Detection Limit
			15	NA	ND	ND	Methylene Chloride-2 BJ * Acetone-1 *	NA	NA	NA		
			20	NA	ND	ND	Methylene Chloride-4 J * 2-Butanone-1 J	NA	NA	NA		
			25	NA	ND	ND	Methylene Chloride-3 BJ * Acetone-2 *	NA	NA	NA		
		B2	5	NA	ND	ND	Methylene Chloride-2 BJ * Toluene-2 J 2-Butanone-2 J Xylene-5 J	NA	NA	NA		
			10	NA	ND	ND	Methylene Chloride-3 BJ * Acetone-2 BJ * 2-Butanone-1 J	NA	NA	NA		
			15	NA	ND	ND	Methylene Chloride-2 BJ * Acetone-2 BJ *	NA	NA	NA		
			15 (Duplicate)	NA	ND	ND	Methylene Chloride-4 BJ * Acetone-3 BJ *	NA	NA	NA		
			20	NA	ND	ND	Methylene Chloride-5 J * Acetone-2 BJ * Toluene-1 J	NA	NA	NA		
			25	NA	ND	ND	Methylene Chloride-7 J * Acetone-3 BJ *	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
13	Drop Tank Storage Area (10)	B3	5	NA	ND	ND	Methylene Chloride-3 BJ * Acetone-9 BJ * Toluene-1 J	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	NA	ND	ND	Methylene Chloride-3 BJ * Acetone-5 BJ *	NA	NA	NA		
			15	NA	ND	ND	Methylene Chloride-4 BJ * Acetone-4 BJ *	NA	NA	NA		CRDL - Contract Required Detection Limit
			20	NA	ND	ND	Methylene Chloride-3 BJ *	NA	NA	NA		
			25	NA	ND	ND	Methylene Chloride-3 BJ * Acetone-3 BJ *	NA	NA	NA		

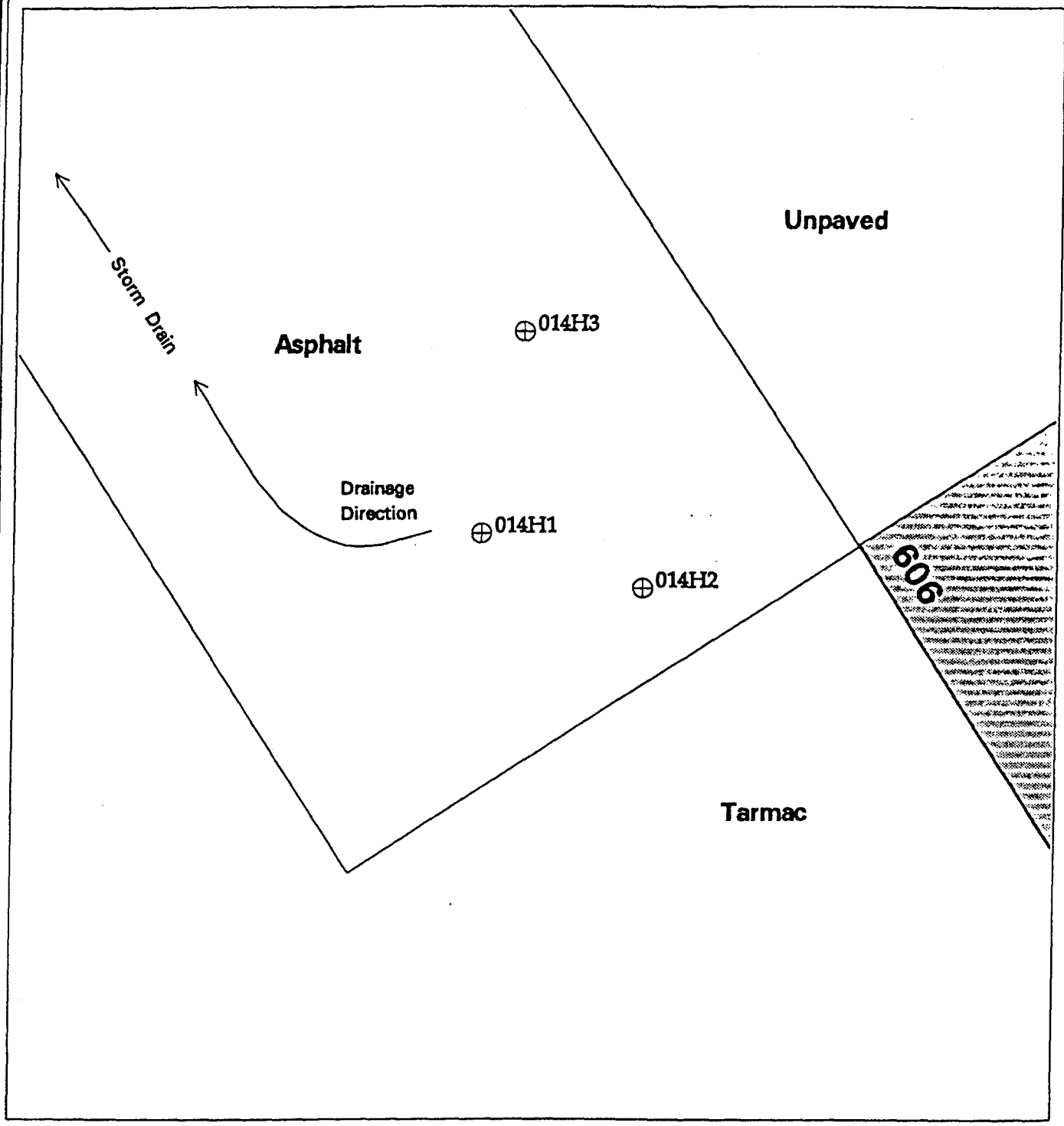


Figure 11 Sample Location Map

SWMU/AOC Number and Type:
14 - Drop Tank Fuel Storage Area

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
14	Drop Tank Fuel Storage Area (11)	H1	2	NA	1.45	ND	Methylene Chloride-10 BJ * Acetone-18 B *	NA	NA	NA	Repair cracks in pavement.	To prevent future migration of petroleum hydrocarbons. TPH/TFH < 1000 ppm VOCs < CRDL CRDL - Contract Required Detection Limit
			5	NA	3.21	ND	Methylene Chloride-4 BJ * Acetone-8 BJ *	NA	NA	NA		
		H2	2	NA	172	20.1	Methylene Chloride-6 BJ * Acetone-52 B *	NA	NA	NA		
			5	NA	2.01	16.1	Methylene Chloride-12 B * Acetone-50 B *	NA	NA	NA		
		H3	2	NA	0.74	ND	Methylene Chloride-4 BJ * Acetone-20 B *	NA	NA	NA		
			5	NA	243	ND	Methylene Chloride-10 BJ * Acetone-21 B *	NA	NA	NA		

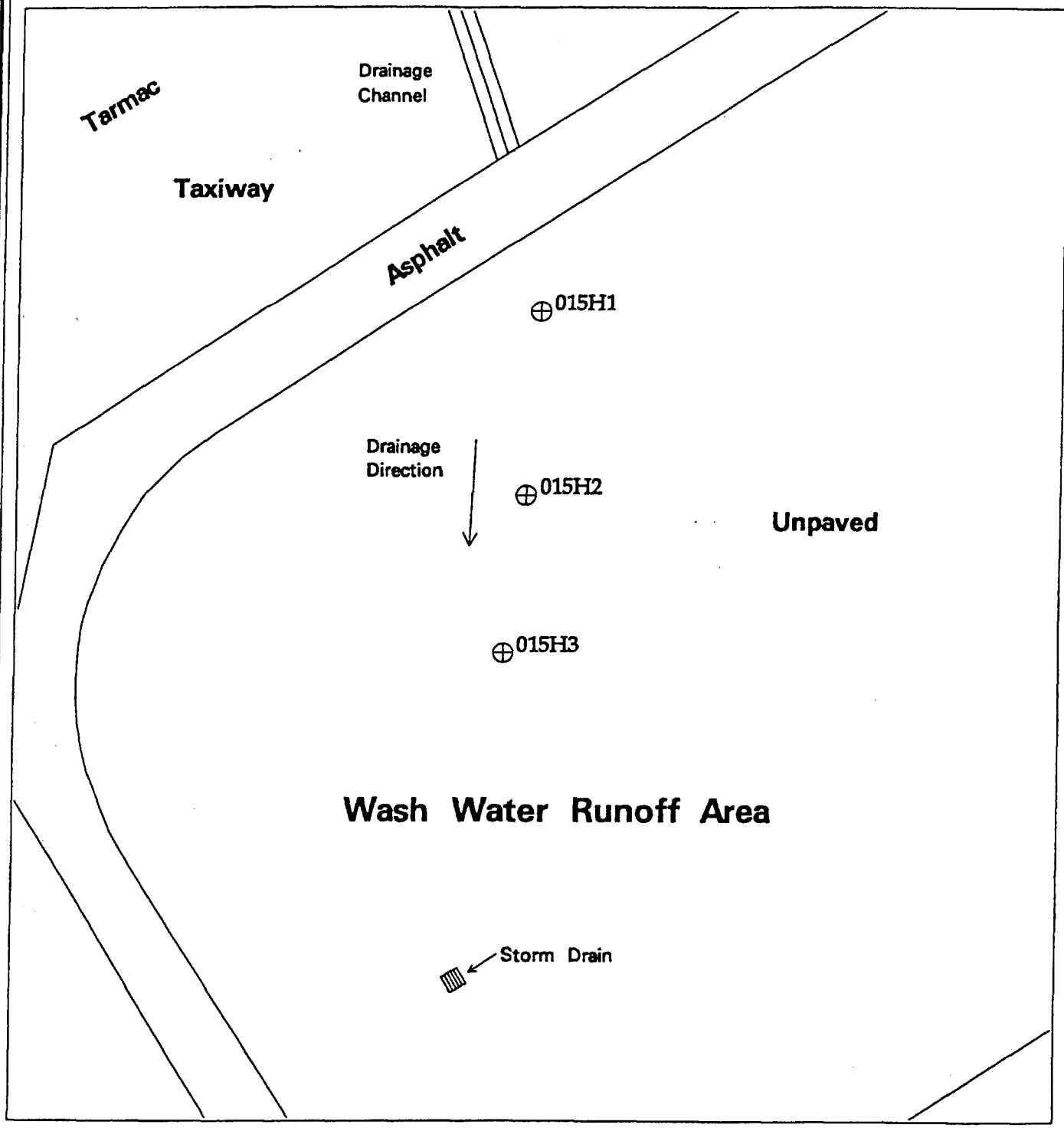


Figure 12 Sample Location Map

SWMU/AOC Number and Type:
15 - Wash Water Runoff Site

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
15	Wash Water Runoff Site (12)	H1	2	NA	ND	ND	Methylene Chloride-4 BJ * Toluene-2 J	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			5	NA	ND	ND	ND	NA	NA	NA		
		H2	2	NA	ND	ND	Methylene Chloride-5 BJ *	NA	NA	NA		CRDL - Contract Required Detection Limit
			5	NA	ND	ND	Methylene Chloride-7 BJ *	NA	NA	NA		
		H3	2	NA	ND	ND	Methylene Chloride-6 BJ *	NA	NA	NA		
			5	NA	ND	ND	Methylene Chloride-8 BJ *	NA	NA	NA		

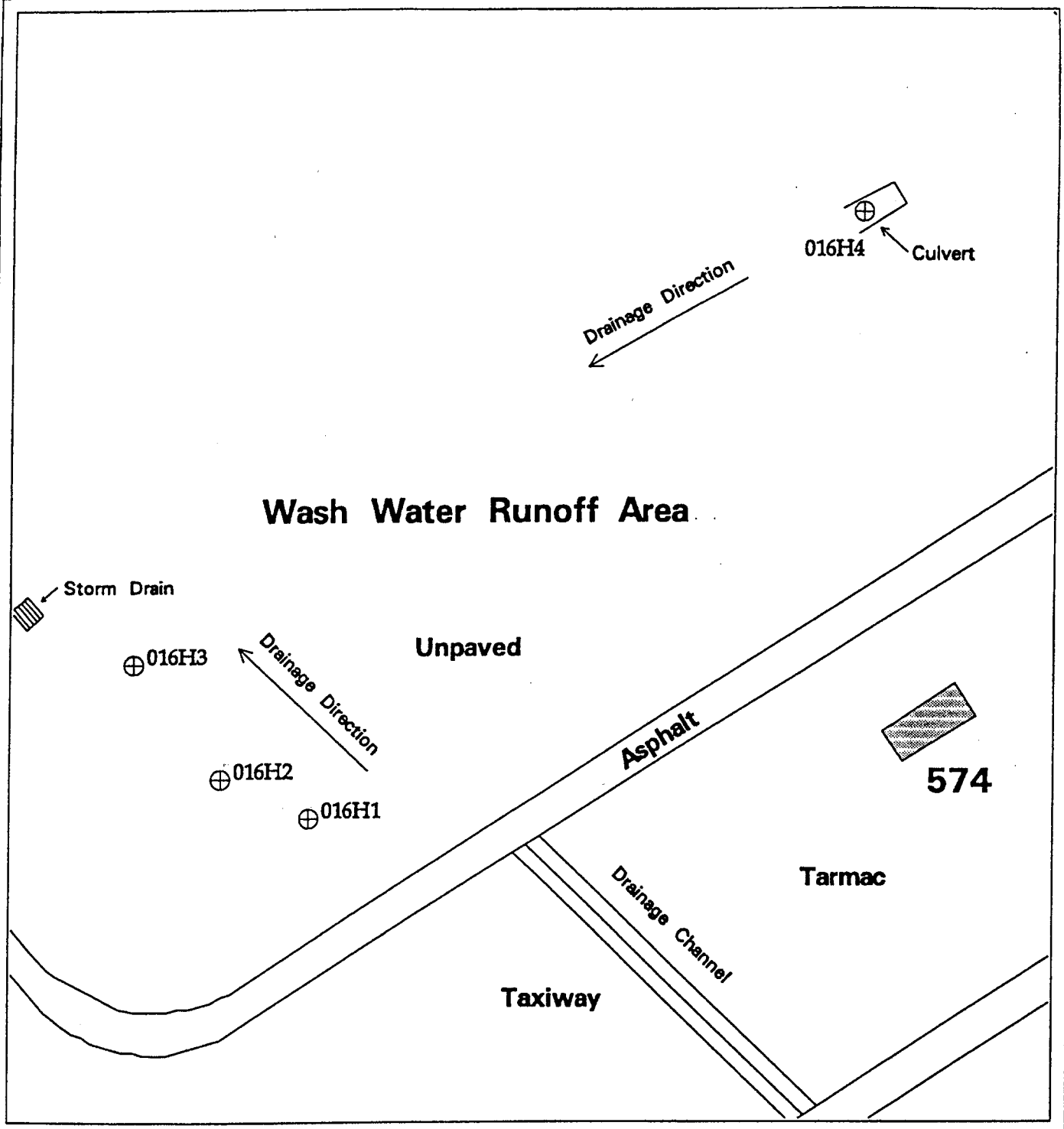


Figure 13 Sample Location Map

SWMU/AOC Number and Type:
16 - Wash Water Runoff Site

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
16	Wash Water Runoff Site (13)	H1	2	NA	ND	ND	Methylene Chloride-6 J * Acetone-24 * Toluene-1 J	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < ETM & PRG
			5	NA	ND	ND	Methylene Chloride-3 BJ *	NA	NA	NA		
		H2	2	NA	ND	ND	Methylene Chloride-6 J * Toluene-2 J	NA	NA	NA		CRDL - Contract Required Detection Limit
			5	NA	ND	ND	Methylene Chloride-2 BJ * Acetone-16 B *	NA	NA	NA		
		H3	2	NA	ND	ND	PCE-1 J Xylene-2 J	NA	NA	NA		
			5	NA	ND	ND	Methylene Chloride-4 J * Toluene-2 J	NA	NA	NA		
		H4	2	NA	ND	ND	Acetone-32 * 4-Methyl-2-Pentanone-15 2-Hexanone-26	NA	NA	NA		
			5	NA	ND	ND	ND	NA	NA	NA		

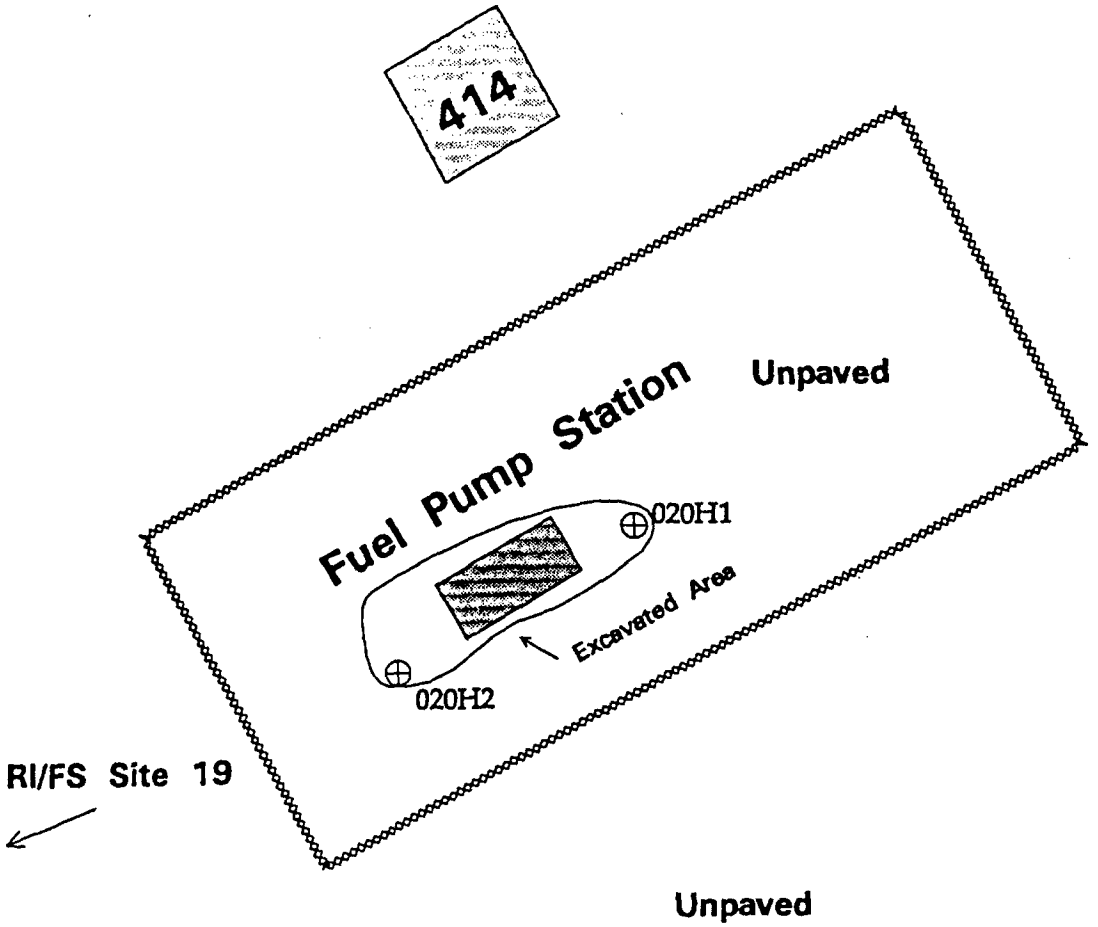


Figure 14 Sample Location Map

SWMU/AOC Number and Type:
20 - Underground Storage Tank

Boring Location and Number:

- ⊕ 123H4 5′ Deep Boring
- ◕ 123B4 25′ Deep Boring
- ▲ 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

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MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
20	Underground Storage Tank (14)	H1	2	NA	91.4	ND	Methylene Chloride-6 BJ * Acetone-34 *	NA	NA	NA	NFA	TPH/TFH < 1000 ppm VOCs < CRDL
			5	NA	ND	ND	Methylene Chloride-5 BJ * Acetone-27 *	NA	NA	NA		
		H2	2	NA	3.27	115	Methylene Chloride-9 BJ * Acetone-16 B *	NA	NA	NA		CRDL - Contract Required Detection Limit
			5	NA	6.24	463	Methylene Chloride-5 BJ *	NA	NA	NA		

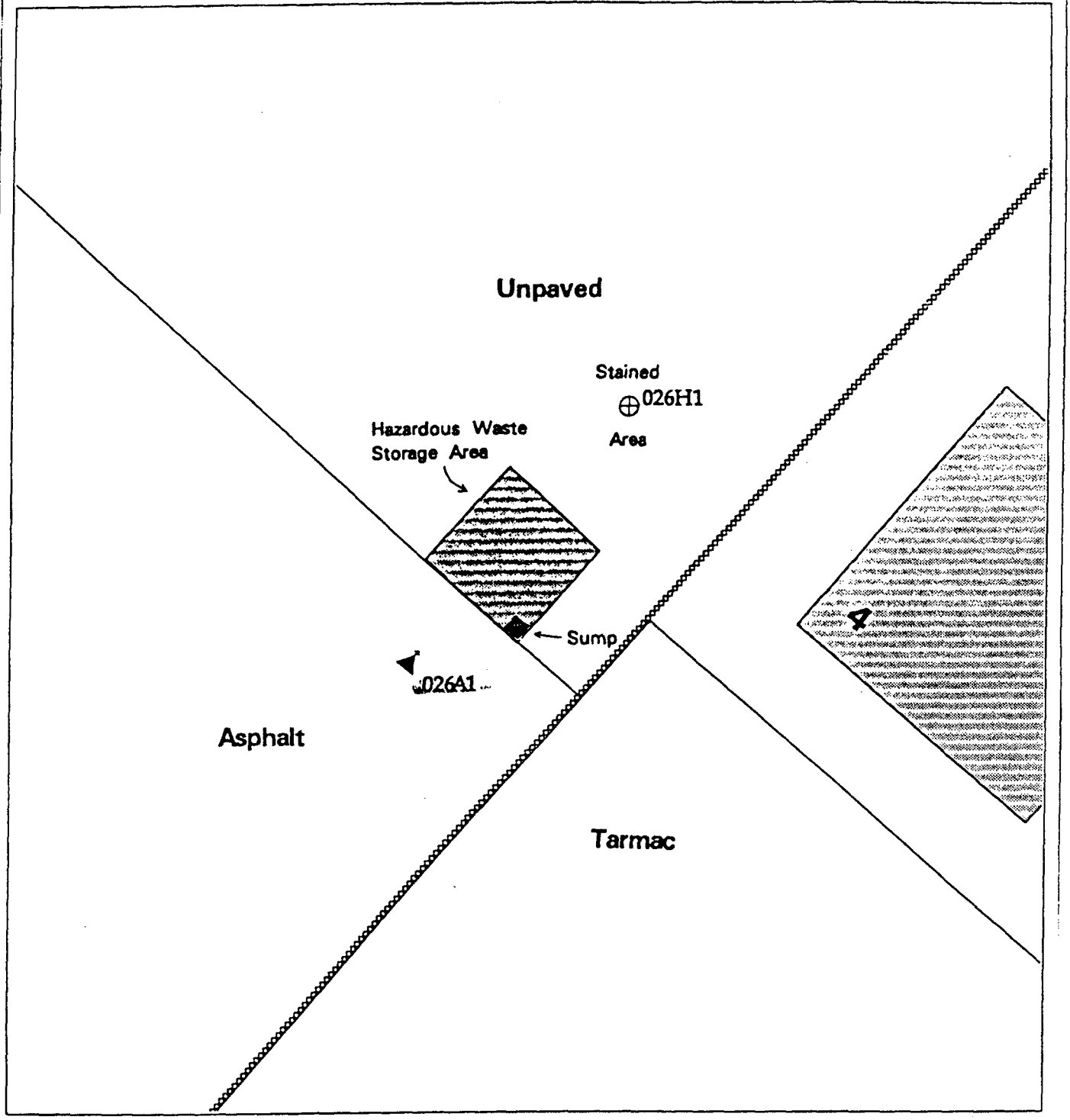

Figure 15 Sample Location Map

SWMU/AOC Number and Type:
26 - Hazardous Waste Storage Area

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
26	Hazardous Waste Storage Area (15)	A1	10	ND	ND	ND	Toluene-2 J	ND	ND	NAB	Excavate shallow, stained soil.	Moderate petroleum hydrocarbon contamination. TPH/TFH < 1000 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < BGT CRDL - Contract Required Detection Limit BGT - Background Threshold Value
			20	ND	ND	ND	Methylene Chloride-3 BJ * Acetone-4 BJ * Toluene-1 J	ND	ND	NAB		
			30	ND	ND	ND	Methylene Chloride-3 BJ * Acetone-3 BJ *	ND	ND	NAB		
			40	ND	ND	ND	Methylene Chloride-3 BJ * Acetone-2 BJ *	ND	ND	NAB		
			50	ND	ND	ND	Methylene Chloride-6 BJ * Acetone-8 BJ *	ND	ND	NAB		
			60	ND	ND	ND	Methylene Chloride-4 BJ * Acetone-4 BJ * 2-Butanone-2 BJ *	ND	ND	NAB		
		H1	2	80	ND	ND	Methylene Chloride-3 BJ * Acetone-7 BJ *	ND	ND	NAB		
			5	520	ND	ND	Methylene Chloride-3 BJ * Acetone-7 BJ * 2-Butanone-3 J	Bis(2-Ethylhexyl)phthalate-39 J	ND	NAB		

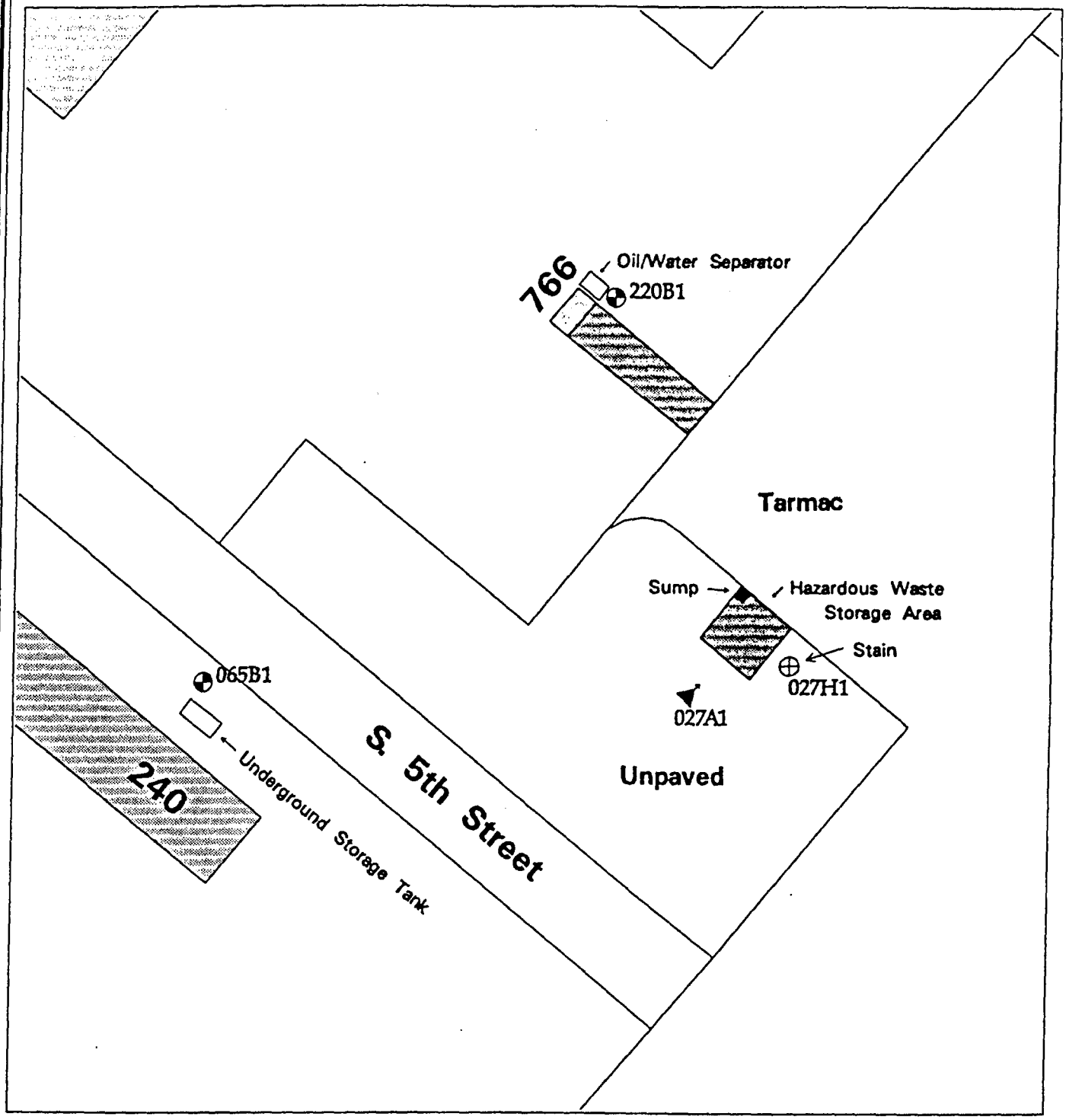

Figure 16 Sample Location Map

Boring Location and Number:

- ⊕ 123H4 5′ Deep Boring
- ◕ 123B4 25′ Deep Boring
- ▲ 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

27 - Hazardous Waste Storage Area

65 - Underground Storage Tank

220 - Oil/Water Separator

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MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
27	Hazardous Waste Storage Area (16)	A1	10	ND	ND	ND	Methylene Chloride-4 BJ *	Diethyphthalate-50 BJ * Di-n-butylphthalate-65 BJ *	ND	Lead-3.5 N	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < ETM & PRG CRDL - Contract Required Detection Limit
			10 (Duplicate)	ND	ND	ND	Methylene Chloride-6 BJ * Acetone-10 J *	Di-n-butylphthalate-18 BJ *	ND	Lead-2.4		
			20	ND	ND	ND	Methylene Chloride-7 BJ * Toluene-2 J	Diethylphthalate-23 BJ * Di-n-butylphthalate-62 BJ *	ND	Lead-4.2 N		
			30	ND	ND	ND	Methylene Chloride-8 BJ * Toluene-1 J	Di-n-butlyphthalate-38 BJ *	ND	Lead-73.6 NS		
			40	ND	ND	ND	Methylene Chloride-6 BJ *	Diethylphthalate-23 BJ * Di-n-butylphthalate-35 BJ * Bis(2-Ethylhexyl)phthalate-290 J	ND	Lead-3.0 N		
			50	ND	ND	ND	Methylene Chloride-5 BJ * Acetone- 11 *	Diethylphthalate-120 BJ * Di-n-butylphthalate-78 BJ * Butylbenzylphthalate-18 J Naphthalene-69 J	ND	Lead-4.7 N		
			60	ND	ND	ND	Methylene Chloride-6 BJ * Acetone-8 J * Toluene-2 J	Diethylphthalate-30 BJ * Di-n-butylphthalate-53 BJ *	ND	Lead-3.3 N		
		H1	2	ND	ND	ND	Methylene Chloride-3 BJ * Acetone-6 BJ *	Bis(2-Ethylhexyl)phthalate-35 J	ND	Lead-12.8		
			5	ND	ND	ND	Methylene Chloride-5 BJ *	Bis(2-Ethylhexyl)phthalate-39 J	ND	Lead-7.5 S		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
220	Oil/Water Separator (16)	B1	5	268	NA	NA	Methylene Chloride-11 B * Acetone-9 BJ * 2-Butanone-3 J	NA	NA	NA	NFA	TPH/TFH < 1000 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-13 B * Acetone-18 B * 2-Butanone-3 J	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-9 BJ * Acetone-16 B * 2-Butanone-2 J	NA	NA	NA		CRDL - Contract Required Detection Limit
			15 (Duplicate)	ND	NA	NA	Methylene Chloride-10 B * Acetone-13 B * 2-Butanone-2 J	NA	NA	NA		
			20	ND	NA	NA	Methylene Chloride-13 B * Acetone-34 B * 2-Butanone-4 J	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-12 B * Acetone-18 B * 2-Butanone-3 J	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
65	Underground Storage Tank (16)	B1	5	ND	NA	NA	Methylene Chloride-25 B * Toluene-4 J	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-9 BJ *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-14 B *	NA	NA	NA		CRDL - Contract Required Detection Limit
			20	ND	NA	NA	Methylene Chloride-16 B * Toluene-4 J	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-10 BJ *	NA	NA	NA		
			25 (Duplicate)	ND	NA	NA	Methylene Chloride-8 BJ * Toluene-2 J	NA	NA	NA		

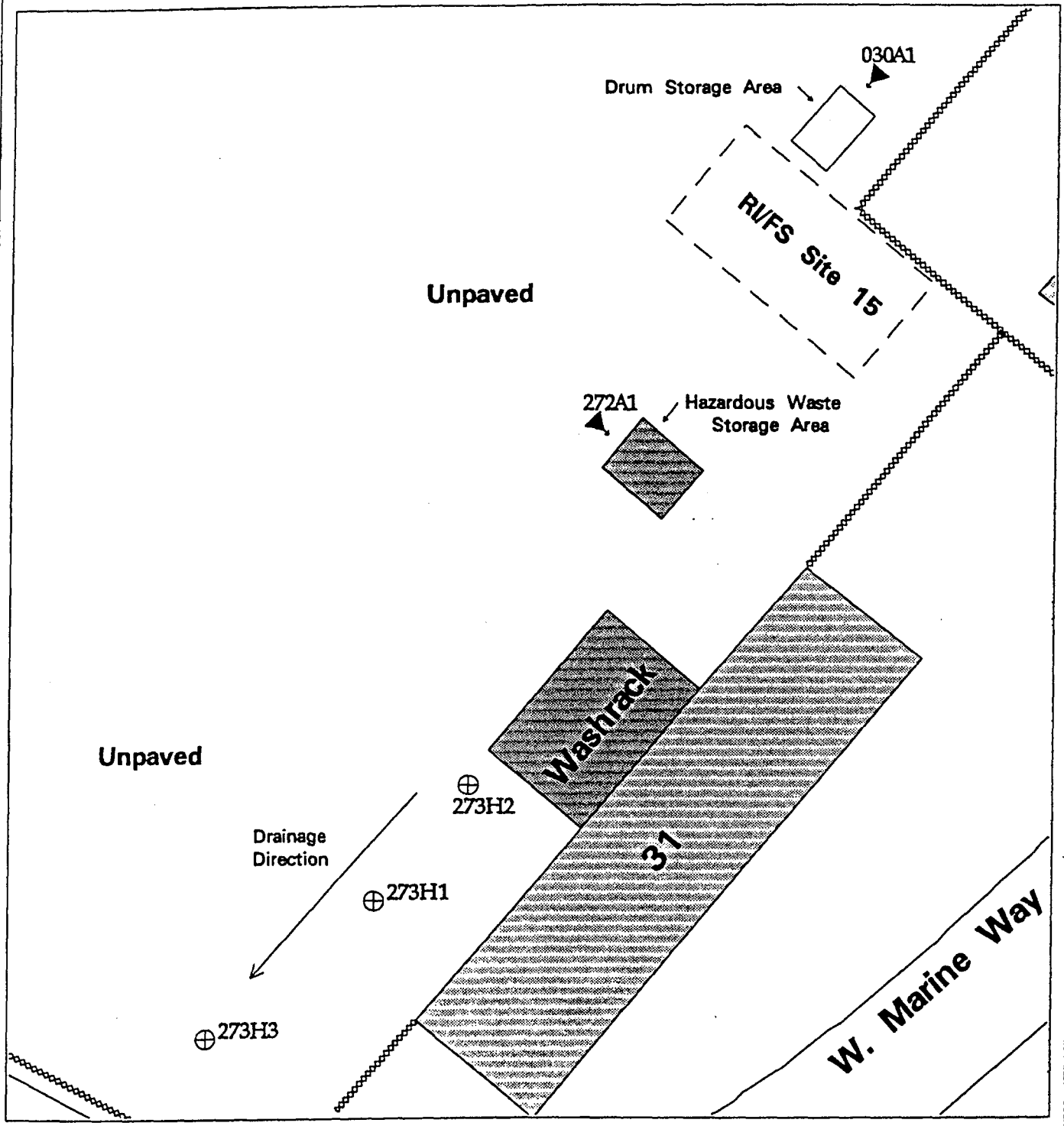

Figure 17 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

30 - Drum Storage Area

272 - Hazardous Waste Storage Area

273 - Washrack

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
30	Drum Storage Area (17)	A1	10	ND	ND	ND	Methylene Chloride-23 B * Acetone-25 B * 2-Butanone-4 BJ *	ND	ND	Barium-289	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < ETM & PRG
			20	ND	ND	ND	Methylene Chloride-34 B * Acetone-60 B * 2-Butanone-11 BJ *	ND	ND	Barium-247		
			30	ND	ND	ND	Methylene Chloride-11 B * Acetone-9 BJ * 2-Butanone-4 BJ *	ND	ND	Barium-197		
			30 (Duplicate)	ND	ND	ND	Methylene Chloride-18 B * Acetone-19 B * 2-Butanone-5 BJ *	ND	ND	Barium-191		
			40	ND	ND	ND	Methylene Chloride-16 B * Acetone-13 B * 2-Butanone-6 BJ *	ND	ND	Barium-252		
			50	ND	0.072	ND	Methylene Chloride-11 B * Acetone-17 B * 2-Butanone-3 BJ *	ND	ND	Barium-59.5		
			60	ND	ND	ND	Methylene Chloride-17 B * Acetone-31 B * 2-Butanone-4 BJ *	ND	ND	Barium-75		

CRDL - Contract Required Detection Limit

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
272	Hazardous Waste Storage Area (17)	A1	10	ND	0.535	ND	Methylene Chloride-78 B * Acetone-36 B * 2-Butanone-3 J	ND	ND	Aluminum-26300	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < ETM & PRG
			20	79	0.225	ND	Methylene Chloride-100 B * Acetone-32 B * 2-Butanone-4 J	ND	ND	Aluminum-16100		
			30	ND	0.067	ND	Methylene Chloride-75 B * Acetone-32 B * 2-Butanone-2 J	ND	ND	Aluminum-3640		CRDL - Contract Required Detection Limit
			40	ND	ND	ND	Methylene Chloride-44 B * Acetone-45 B *	ND	ND	Aluminum-19400		
			50	ND	ND	ND	Methylene Chloride-6 BJ * Acetone-14 B * 2-Butanone-3 BJ *	ND	ND	Aluminum-13500		
			60	ND	ND	ND	Methylene Chloride-5 BJ * Acetone-12 B * 2-Butanone-2 BJ *	ND	ND	Aluminum-16200		

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
273	Wash Rack (17)	H1	2	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-30 *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			5	ND	NA	NA	Methylene Chloride-7 BJ * Acetone-41 *	NA	NA	NA		
		H2	2	ND	NA	NA	Methylene Chloride-7 BJ * Acetone-32 *	NA	NA	NA		CRDL - Contract Required Detection Limit
			5	ND	NA	NA	Methylene Chloride-6 BJ *	NA	NA	NA		
		H3	2	ND	NA	NA	Methylene Chloride-7 BJ * Acetone-56 *	NA	NA	NA		
			5	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-29 *	NA	NA	NA		

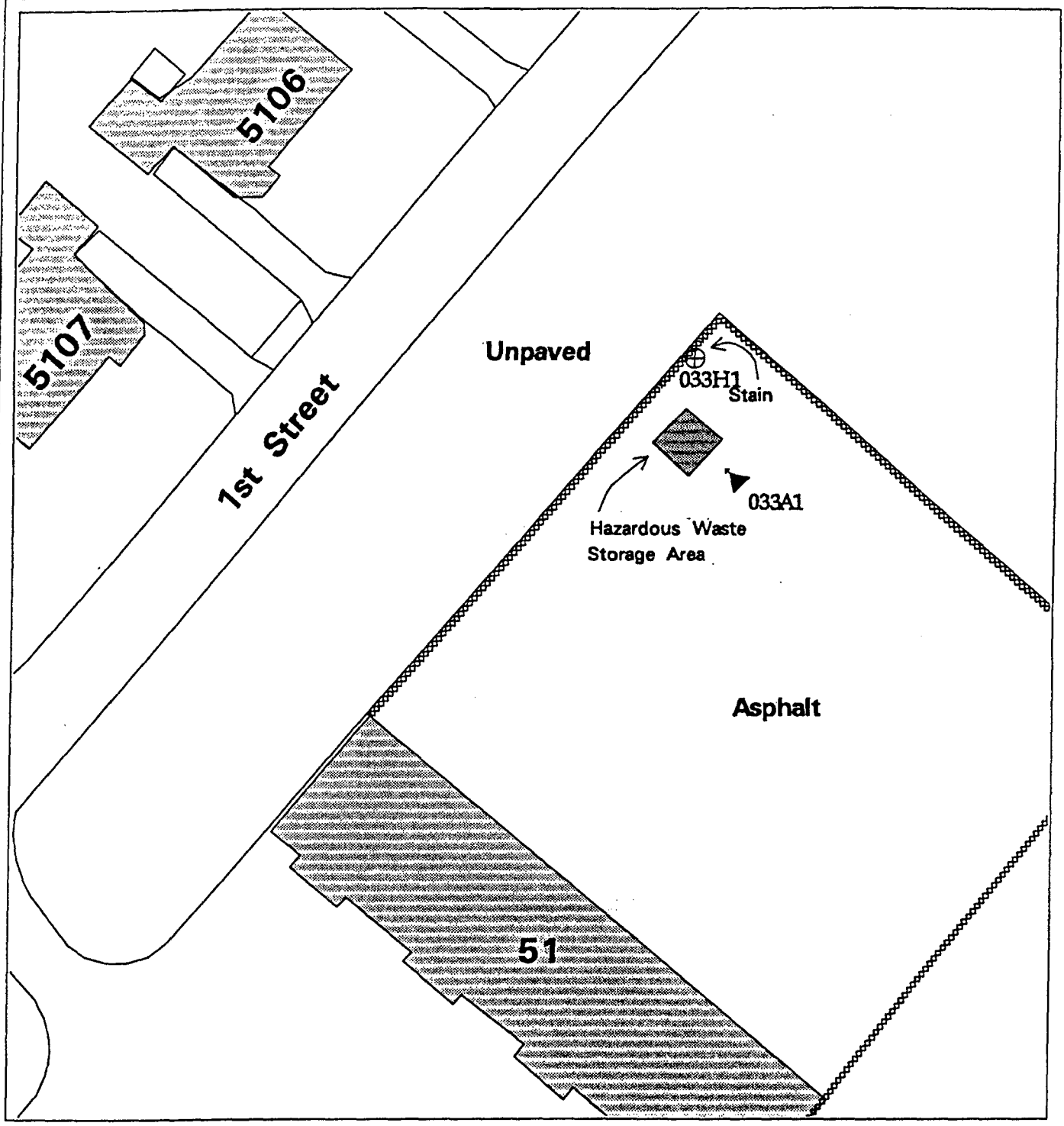

Figure 18 Sample Location Map

SWMU/AOC Number and Type:
33 - Hazardous Waste Storage Area

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
33	Hazardous Waste Storage Area (18)	A1	10	ND	ND	29.9	Methylene Chloride-13 B * Acetone-18 B * 2-Butanone-4 BJ *	ND	ND	NAB	Excavate shallow, stained soil.	Moderate petroleum hydrocarbon contamination. TPH/TFH > 1000 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < BGT CRDL - Contract Required Detection Limit BGT - Background Threshold Value
			20	ND	0.092	14.9	Methylene Chloride-14 B * Acetone-16 B * 2-Butanone-4 BJ *	ND	ND	NAB		
			30	ND	0.203	ND	Methylene Chloride-10 BJ * Acetone-9 BJ * 2-Butanone-4 BJ *	ND	ND	NAB		
			40	ND	0.166	ND	Methylene Chloride-13 B * Acetone-12 B * 2-Butanone-3 BJ *	ND	ND	NAB		
			50	ND	ND	ND	Methylene Chloride-41 B * Acetone-16 B * 2-Butanone-4 BJ *	ND	ND	NAB		
			60	ND	0.123	ND	Methylene Chloride-75 B * Acetone-40 B * 2-Butanone-4 BJ *	ND	ND	NAB		
		H1	2	75	ND	ND	Methylene Chloride-7 BJ * Acetone-7 BJ *	Di-n-butylphthalate-21 BJ *	ND	NAB		
			2 (Duplicate)	1730	ND	390 ZJ	Methylene Chloride-5 BJ * Acetone-10 BJ * Toluene-3 J	Di-n-butylphthalate-22 BJ * Bis(2-Ethylhexyl)phthalate-27 J	ND	NAB		
			5	65	ND	ND	Methylene Chloride-8 BJ * Acetone-8 BJ * Toluene-1 J 2-Butanone-3 J	ND	ND	NAB		

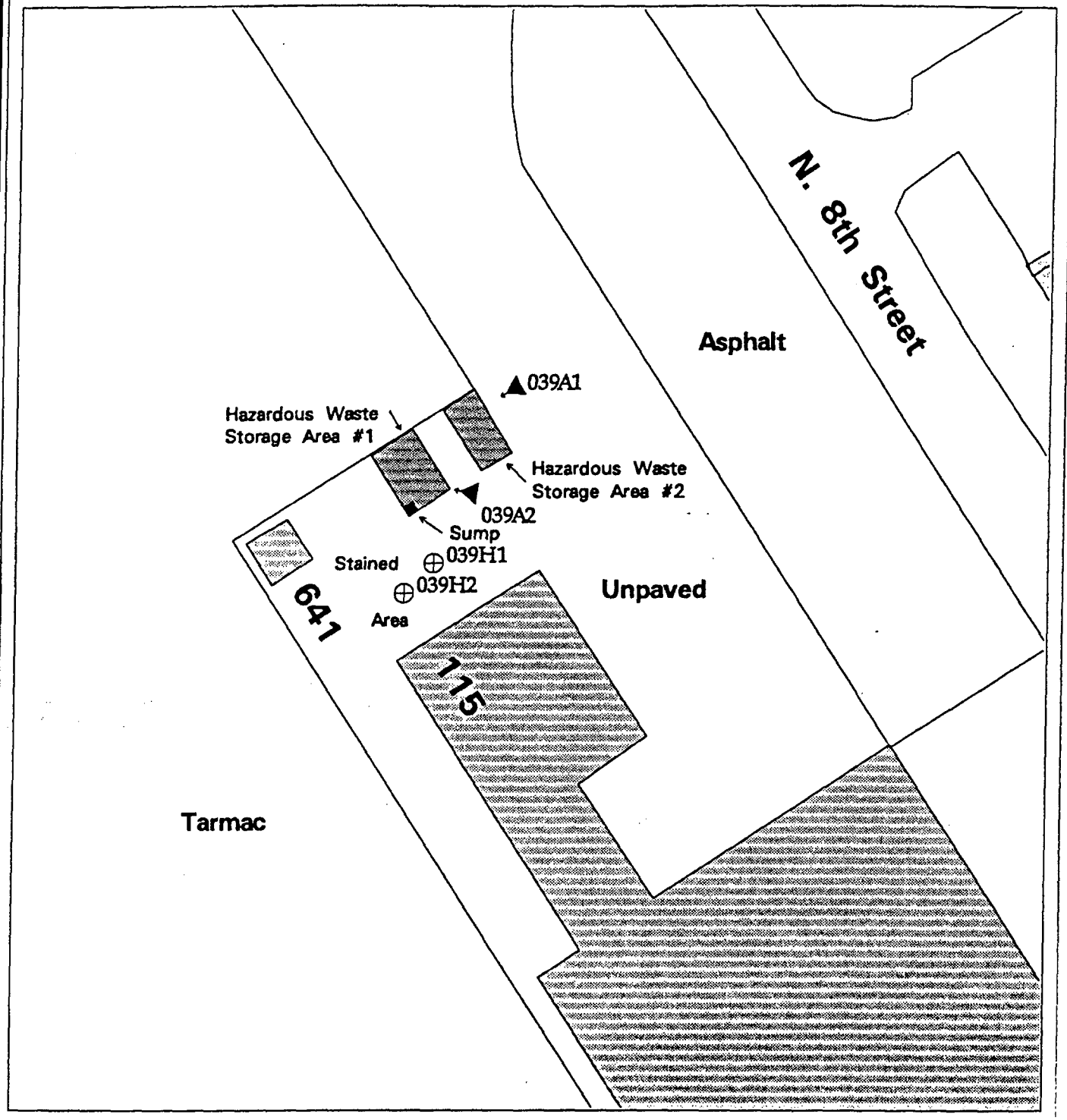

Figure 19 Sample Location Map

SWMU/AOC Number and Type:
39 - Hazardous Waste Storage Area

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

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SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
39	Hazardous Waste Storage Area (19)	A1	10	ND	ND	ND	Methylene Chloride-10 BJ * 1,1,1-Trichloroethane-2J	Diethylphthalate-25 BJ * Di-n-butylphthalate-25 BJ * Bis(2-Ethylhexyl)phthalate-62 J Fluoranthene-29 J Pyrene-36 J Chrysene-24 J	Aroclor(1260)-52 4,4'-DDE-33 4,4'-DDD-1.6 J 4,4'-DDT-7.3	Selenium-ND Silver-ND	Shallow soil borings.	Potential for SVOCs in shallow soil. TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < ETM & PRG Metals < ETM & PRG
			20	ND	ND	ND	Methylene Chloride-7 BJ * Toluene-1 J	Diethylphthalate-19 BJ * Di-n-butylphthalate-35 BJ *	ND	Selenium-ND Silver-0.44 B		
			30	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-20 B * 1,1,1-Trichloroethane-2 J	Di-n-butylphthalate-27 BJ * Butylbenzylphthalate-85 BJ *	ND	Selenium-ND Silver-0.68 B		CRDL - Contract Required Detection Limit
			40	ND	ND	ND	Methylene Chloride-8 BJ * Toluene-1 J 1,1,1-Trichloroethane-2 J	Di-n-butylphthalate-31 BJ * Bis(2-Ethylhexyl)phthalate-30 J Butylbenzylphthalate-130 BJ *	ND	Selenium-ND Silver-ND		
			50	ND	ND	ND	Methylene Chloride-8 BJ * Acetone-7 BJ *	Di-n-butylphthalate-28 BJ *	ND	Selenium-ND Silver-ND		
			60	ND	ND	ND	Methylene Chloride-8 BJ * Acetone-17 BJ *	Diethylphthalate-20 BJ * Di-n-butylphthalate-29 BJ * Bis(2-Ethylhexyl)phthalate-120 J	ND	Selenium-ND Silver-0.43 B		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
39	Hazardous Waste Storage Area (19)	A2	10	ND	ND	11 ZJ	Methylene Chloride-5 BJ *	Di-n-butylphthalate-21 BJ * Bis(2-Ethylhexyl)phthalate-81 J	ND	Selenium-ND Silver-ND	Shallow soil borings.	Potential for SVOCs in shallow soil.
			20	ND	ND	ND	Methylene Chloride-9 BJ * Acetone-6 BJ * Toluene-1 J	Di-n-butylphthalate-25 BJ * Bis(2-Ethylhexyl)phthalate-86 J	ND	Selenium-ND Silver-0.42 B		TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < ETM & PRG Metals < ETM & PRG
			30	ND	ND	ND	Methylene Chloride-19 B * Toluene-1 J	Di-n-butylphthalate-29 BJ * Bis(2-Ethylhexyl)phthalate-60 J Butylbenzylphthalate-110 J	ND	Selenium-ND Silver-0.48 B		CRDL - Contract Required Detection Limit
			40	ND	ND	ND	Methylene Chloride-12 B * Acetone-6 BJ * Toluene-2 J	Diethylphthalate-38 J Di-n-butylphthalate-37 BJ Bis(2-Ethylhexyl)phthalate-58 J	ND	Selenium-ND Silver-0.64 B		
			40 (Duplicate)	ND	ND	ND	Methylene Chloride-8 BJ * Acetone-13 B * Toluene-1 J	Diethylphthalate-19 J Di-n-butylphthalate-22 BJ * Bis(2-Ethylhexyl)phthalate-40 J Butylbenzylphthalate-160 J	ND	Selenium-ND Silver-0.45 B		
			50	ND	ND	ND	Methylene Chloride-11 B *	Di-n-butylphthalate-21 BJ * Bis(2-Ethylhexyl)phthalate-34 J	ND	Selenium-ND Silver-0.63 B		
			60	ND	ND	ND	Methylene Chloride-18 B * Acetone-5 BJ *	Di-n-butylphthalate-32 BJ * Bis(2-Ethylhexyl)phthalate-110 J Butylbenzylphthalate-100 J	ND	Selenium-ND Silver-0.42 B		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
39	Hazardous Waste Storage Area (19)	H1	2	ND	ND	ND	Methylene Chloride-5 BJ * Toluene-1 J	Di-n-butylphthalate-95 BJ	ND	Selenuim-ND Silver-ND	Shallow soil borings.	Potential for SVOCs in shallow soil.
			5	ND	ND	ND	Methylene Chloride-5 J * Acetone-1 J * Toluene-2 J	Di-n-butylphthalate-52 BJ Bis(2-Ethylhexyl)phthalate-37 J	ND	Selenuim-ND Silver-ND		TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < ETM & PRG Metals < ETM & PRG
		H2	2	ND	ND	ND	Methylene Chloride-4 J * Acetone-81 * Toluene-1 J	Di-n-butylphthalate-36 BJ Bis(2-Ethylhexyl)phthalate-71 J	ND	Selenium-0.62 B Silver-4.0		CRDL - Contract Required Detection Limit
			5	46	ND	ND	Methylene Chloride-5 BJ * Toluene-2 J	Di-n-butylphthalate-170 BJ	ND	Selenuim-ND Silver-ND		

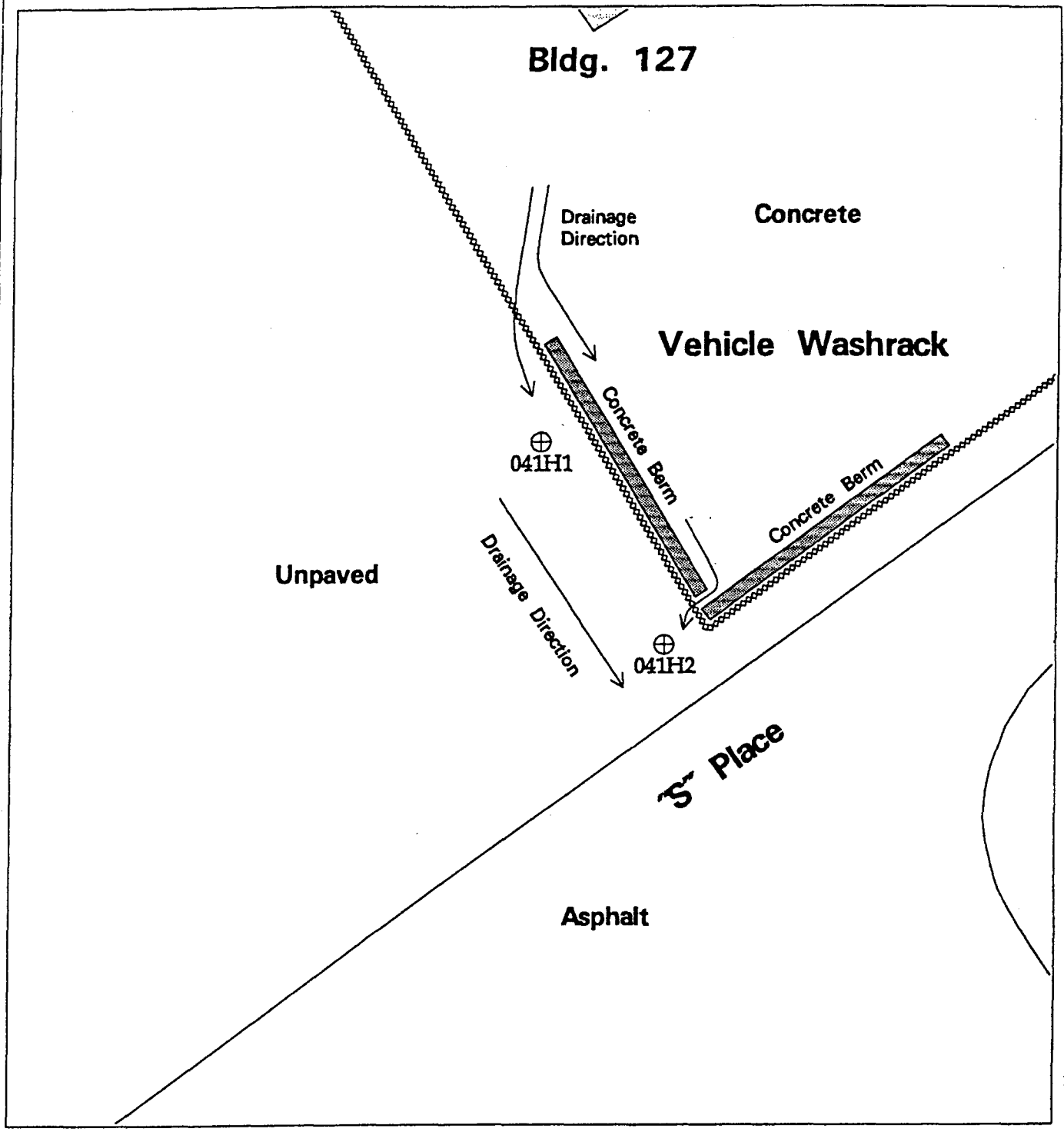

Figure 20 Sample Location Map

SWMU/AOC Number and Type:
41 - Vehicle Washrack

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

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SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
41	Vehicle Wash Rack (20)	H1	2	340	NA	NA	Methylene Chloride-7 BJ * Toluene-2 J	NA	NA	NA	NFA	TPH/TFH < 1000 ppm VOCs < CRDL
			5	ND	NA	NA	Methylene Chloride-4 BJ * Toluene-1 J	NA	NA	NA		
		H2	2	ND	NA	NA	Methylene Chloride-5 BJ * Toluene-1 J	NA	NA	NA		CRDL - Contract Required Detection Limit
			5	ND	NA	NA	Methylene Chloride-6 BJ *	NA	NA	NA		

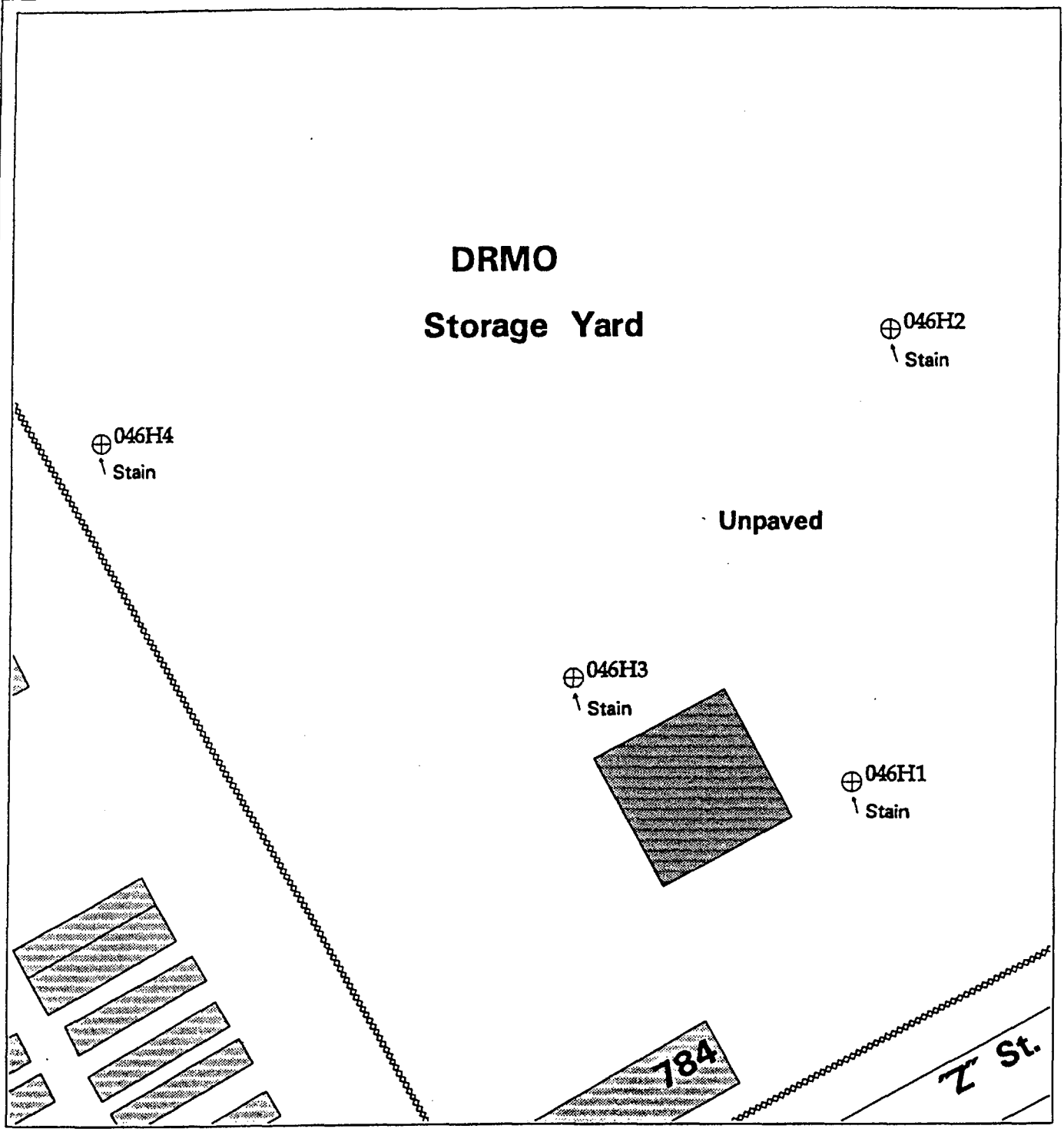

Figure 22 Sample Location Map

SWMU/AOC Number and Type:
46 - Vehicle Maintenance and Parking

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
46	Equipment Storage Yard (22)	H1	2	ND	NA	NA	Methylene Chloride-38 B * Toluene-7 J	NA	NA	NA	Additional borings.	Petroleum hydrocarbon contamination, unknown extent.
			5	ND	NA	NA	Methylene Chloride-31 B * Toluene-2 J	NA	NA	NA		
		H2	2	6660	NA	NA	Methylene Chloride-39 B * Toluene-6 J	NA	NA	NA		TPH/TFH > 1000 ppm VOCs < CRDL
			5	6100	NA	NA	Methylene Chloride-38 B * Toluene-12	NA	NA	NA		CRDL - Contract Required Detection Limit
		H3	2	58.9	NA	NA	Methylene Chloride-41 B * Toluene-4 J	NA	NA	NA		
			5	57	NA	NA	Methylene Chloride-13 B * Toluene-3 J	NA	NA	NA		
		H4	2	174	NA	NA	Methylene Chloride-13 B * Toluene-4 J	NA	NA	NA		
			5	ND	NA	NA	Methylene Chloride-8 B * Toluene-1 J	NA	NA	NA		

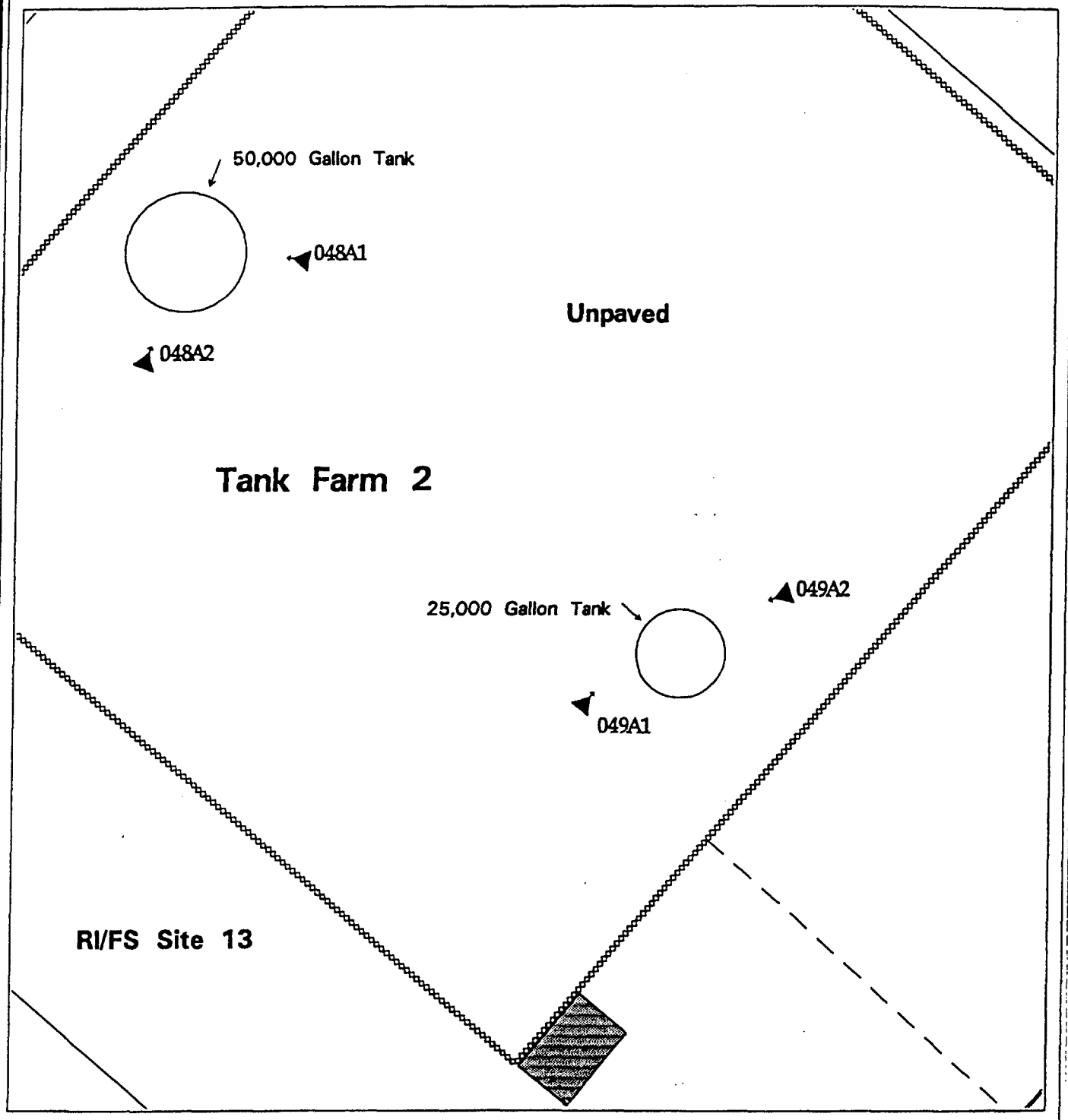

Figure 23 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

48 - Underground Storage Tank

49 - Underground Storage Tank

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SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
48	Underground Storage Tank (23)	A1	10	822	NA	NA	Methylene Chloride-5 BJ * Acetone-10 BJ *	NA	NA	NA	NFA	TPH/TFH < 1000 ppm VOCs < CRDL
			20	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-25 B *	NA	NA	NA		
			30	88	NA	NA	Methylene Chloride-6 BJ * Acetone-14 B *	NA	NA	NA		CRDL - Contract Required Detection Limit
			40	ND	NA	NA	Methylene Chloride-3 BJ *	NA	NA	NA		
			50	ND	NA	NA	Methylene Chloride-4 BJ * Acetone-10 BJ *	NA	NA	NA		
			60	126	NA	NA	Methylene Chloride-4 BJ * Acetone-6 BJ *	NA	NA	NA		
		A2	10	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-10 J *	NA	NA	NA		
			20	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-16 *	NA	NA	NA		
			20 (Duplicate)	ND	NA	NA	Methylene Chloride-7 BJ * Acetone-18 *	NA	NA	NA		
			30	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-11 J *	NA	NA	NA		
			40	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-17 *	NA	NA	NA		
			50	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-16 *	NA	NA	NA		
			60	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-2 J *	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
49	Underground Storage Tank (23)	A1	10	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-20 *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			20	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-41 *	NA	NA	NA		
			30	72	NA	NA	Methylene Chloride-4 BJ * Acetone-13 *	NA	NA	NA		CRDL - Contract Required Detection Limit
			40	ND	NA	NA	Methylene Chloride-4 BJ * Acetone-13 *	NA	NA	NA		
			50	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-18 *	NA	NA	NA		
			60	63	NA	NA	Methylene Chloride-5 BJ * Acetone-22 *	NA	NA	NA		
			60 (Duplicate)	ND	NA	NA	Methylene Chloride-8 BJ * Acetone-19 *	NA	NA	NA		
		A2	10	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-18 B *	NA	NA	NA		
			20	ND	NA	NA	Methylene Chloride-8 BJ *	NA	NA	NA		
			30	38	NA	NA	Methylene Chloride-6 BJ * Acetone-54 B *	NA	NA	NA		
			40	ND	NA	NA	Methylene Chloride-7 BJ * Acetone-20 *	NA	NA	NA		
			50	ND	NA	NA	Methylene Chloride-7 BJ * Acetone-13 *	NA	NA	NA		
			60	ND	NA	NA	Methylene Chloride-4 BJ * Acetone-9 BJ *	NA	NA	NA		

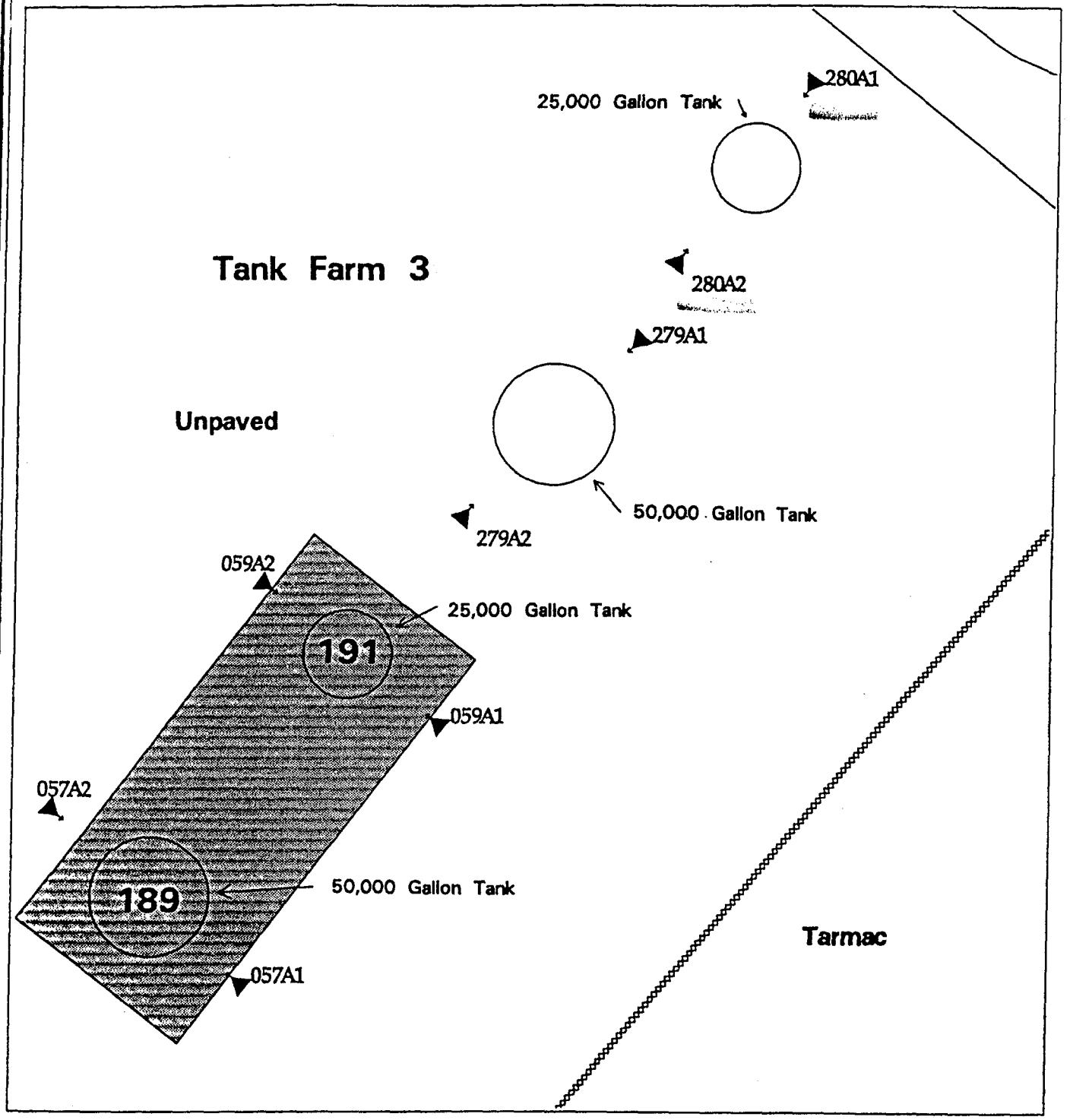

Figure 24 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

57 - Underground Storage Tank
59 - Underground Storage Tank
279 - Underground Storage Tank
280 - Underground Storage Tank

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SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
57	Underground Storage Tank (24)	A1	10	ND	NA	NA	Methylene Chloride-17 B * Acetone-13 B *	NA	NA	NA	NFA	TPH/TFH < 1000 ppm VOCs < CRDL
			20	166	NA	NA	Methylene Chloride-14 B * Acetone-10 BJ *	NA	NA	NA		
			30	ND	NA	NA	Methylene Chloride-13 B * Acetone-14 B *	NA	NA	NA		CRDL - Contract Required Detection Limit
			40	98	NA	NA	Methylene Chloride-12 B * Acetone-7 BJ *	NA	NA	NA		
			50	ND	NA	NA	Methylene Chloride-13 B * Acetone-12 B *	NA	NA	NA		
			60	ND	NA	NA	Methylene Chloride-12 B * Acetone-18 B *	NA	NA	NA		
		A2	10	474	NA	NA	Acetone-16 B *	NA	NA	NA		
			20	118	NA	NA	Methylene Chloride-3 BJ * Acetone-19 B *	NA	NA	NA		
			30	ND	NA	NA	Methylene Chloride-3 BJ *	NA	NA	NA		
			40	ND	NA	NA	Acetone-64 B *	NA	NA	NA		
			50	ND	NA	NA	Methylene Chloride-3 BJ * Acetone-41 B *	NA	NA	NA		
			60	ND	NA	NA	Methylene Chloride-3 BJ * Acetone-31 B *	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
59	Underground Storage Tank (24)	A1	10	91	NA	NA	MethyleneChloride-9 BJ * Acetone-17 B *	NA	NA	NA	NFA	TPH/TFH < 1000 ppm VOCs < CRDL
			20	ND	NA	NA	MethyleneChloride-7 BJ * Acetone-9 BJ *	NA	NA	NA		
			30	ND	NA	NA	MethyleneChloride-11 BJ *	NA	NA	NA		CRDL - Contract Required Detection Limit
			40	ND	NA	NA	MethyleneChloride-17 B * Acetone-45 *	NA	NA	NA		
			40 (Duplicate)	ND	NA	NA	MethyleneChloride-8 BJ * Acetone-12 B *	NA	NA	NA		
			50	ND	NA	NA	MethyleneChloride-10 BJ * Acetone-15 *	NA	NA	NA		
			60	ND	NA	NA	MethyleneChloride-12 B * Acetone-22 *	NA	NA	NA		
		A2	10	80	NA	NA	ND	NA	NA	NA		
			20	139	NA	NA	Acetone-8 BJ *	NA	NA	NA		
			30	94	NA	NA	MethyleneChloride-2 BJ * Acetone-7 BJ *	NA	NA	NA		
			40	ND	NA	NA	Acetone-7 BJ *	NA	NA	NA		
			50	ND	NA	NA	Acetone-5 BJ *	NA	NA	NA		
			60	116	NA	NA	Acetone-13 B *	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
279	Underground Storage Tank (24)	A1	10	ND	ND	ND	Methylene Chloride-6 BJ * Toluene-4 J	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			20	ND	ND	ND	Methylene Chloride-8 BJ *	NA	NA	NA		
			30	ND	ND	ND	Methylene Chloride-13 B * Toluene-2 J	NA	NA	NA		CRDL - Contract Required Detection Limit
			40	ND	ND	ND	Methylene Chloride-9 BJ *	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-9 BJ *	NA	NA	NA		
			50 (Duplicate)	ND	ND	ND	Methylene Chloride-6 BJ * Toluene-4 J Xylene-2 J	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-11 BJ * Toluene-1 J	NA	NA	NA		
		A2	10	ND	ND	ND	Methylene Chloride-8 BJ * Toluene-3 BJ * Ethylbenzene-1 J Xylene-5 BJ *	NA	NA	NA		
			20	ND	ND	ND	Methylene Chloride-8 BJ * Toluene-2 BJ *	NA	NA	NA		
			30	ND	ND	ND	Methylene Chloride-6 BJ * Toluene-1 J	NA	NA	NA		
			40	ND	ND	ND	Methylene Chloride-5 BJ * Toluene-2 J	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-5 BJ *	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-13 B * Toluene-2 BJ *	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
280	Underground Storage Tank (24)	A1	10	38.6	ND	ND	Methylene Chloride-6 BJ * Toluene-3 J Xylene-2 J	NA	NA	NA	Additional borings	Petroleum hydrocarbon contamination, unknown extent TPH/TFH > 1000 ppm VOCs < ETM & PRG
			20	ND	ND	ND	Methylene Chloride-5 BJ * Toluene-4 J	NA	NA	NA		
			30	ND	ND	ND	Methylene Chloride-4 BJ * Toluene-1 J	NA	NA	NA		
			40	ND	ND	ND	Methylene Chloride-5 BJ * Toluene-3 J	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-7 BJ * Toluene-2 J	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-4 BJ * Toluene-2 J	NA	NA	NA		
		A2	10	ND	ND	ND	Methylene Chloride-20 B *	NA	NA	NA		
			20	ND	ND	ND	Methylene Chloride-4 BJ * Toluene-2 J	NA	NA	NA		
			30	ND	ND	ND	Methylene Chloride-19 B * Toluene-6 J	NA	NA	NA		
			40	ND	ND	ND	Methylene Chloride-16 B * Toluene-2 J	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-20 B * Acetone-7 J *	NA	NA	NA		
			60	1440	4880 Z	480 Z	Methylene Chloride-860 BJ * Toluene-210 J Ethylbenzene-9300 Xylene-49000	NA	NA	NA		
			60 (Duplicate)	592	2280 Z	390 Z	Methylene Chloride-1000 BJ Ethylbenzene-7700 Xylene-38000	NA	NA	NA		

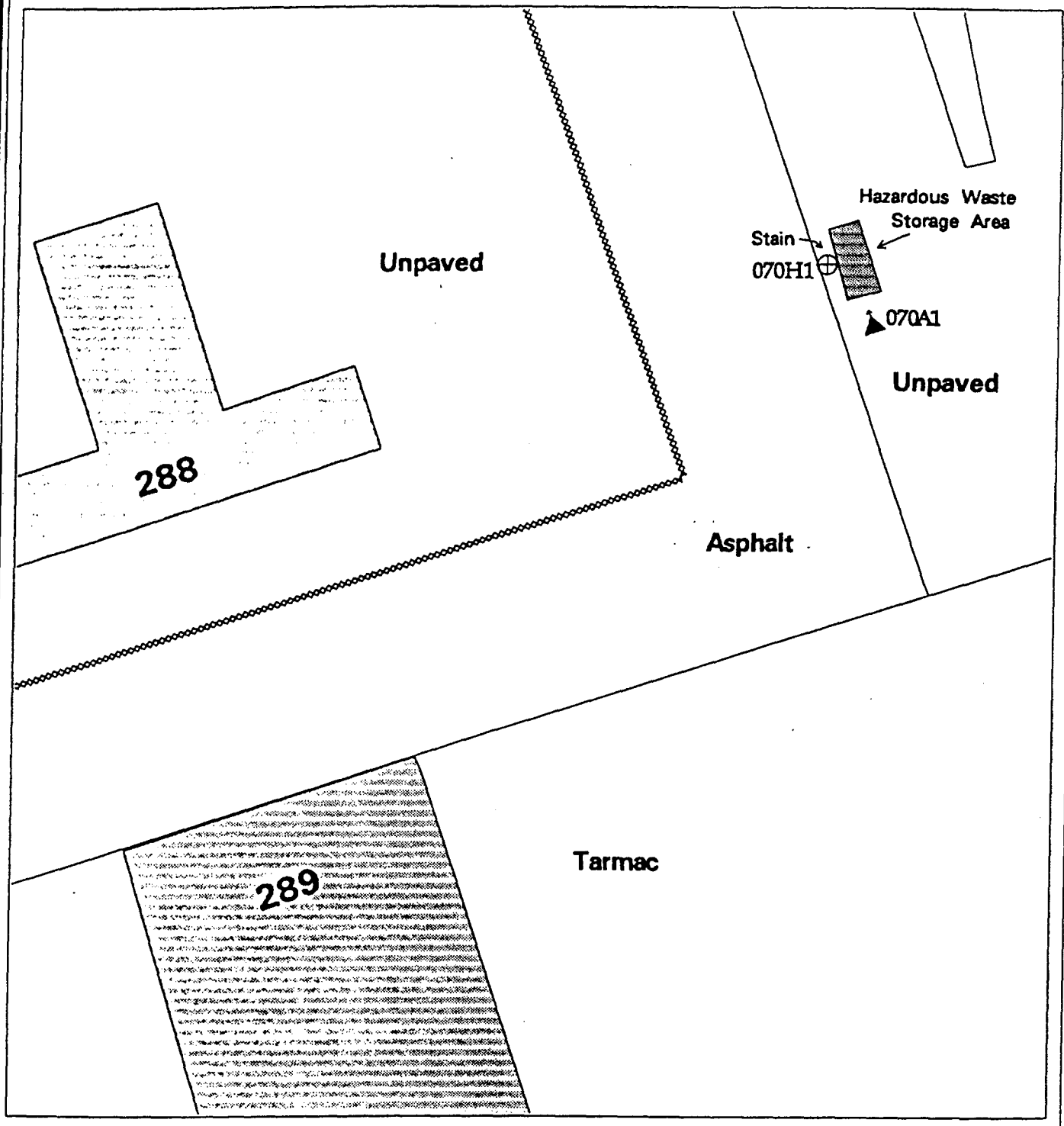

Figure 25 Sample Location Map

SWMU/AOC Number and Type:
70 - Hazardous Waste Storage Area

Boring Location and Number:

- ⊕ 123H4 5′ Deep Boring
- ◕ 123B4 25′ Deep Boring
- ▲ 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

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MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
70	Hazardous Waste Storage Area (25)	A1	10	ND	ND	ND	Methylene Chloride-9 BJ * Acetone-15 B *	ND	ND	NAB	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < ETM & PRG Pest/PCB < CRDL Metals < BGT CRDL - Contract Required Detection Limit BGT - Background Threshold Value
			20	49	ND	ND	Methylene Chloride-16 B * Acetone-18 B * Toluene-2 J 2-Butanone-4 J	Bis(2-Ethylhexyl)phthalate-230 J	ND	NAB		
			30	ND	ND	ND	Methylene Chloride-12 B * Acetone-7 BJ *. 2-Butanone-3 J	ND	ND	NAB		
			40	ND	ND	ND	Methylene Chloride-9 BJ * Acetone-9 BJ * 2-Butanone-2 J	ND	ND	NAB		
			50	ND	ND	ND	Methylene Chloride-9 BJ * Acetone-12 B * 2-Butanone-3 J	ND	ND	NAB		
			60	ND	ND	ND	Methylene Chloride-16 B * Acetone-35 B * 2-Butanone-3 J	Bis(2-Ethylhexyl)phthalate-820	ND	NAB		
		H1	2	ND	ND	ND	Methylene Chloride-9 BJ * Acetone-12 B * Toluene-2 J	Di-n-butylphthalate-22 BJ *	ND	NAB		
			5	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-11 B *	Di-n-butylphthalate-19 BJ * Bis(2-Ethylhexyl)phthalate-19 J	ND	NAB		

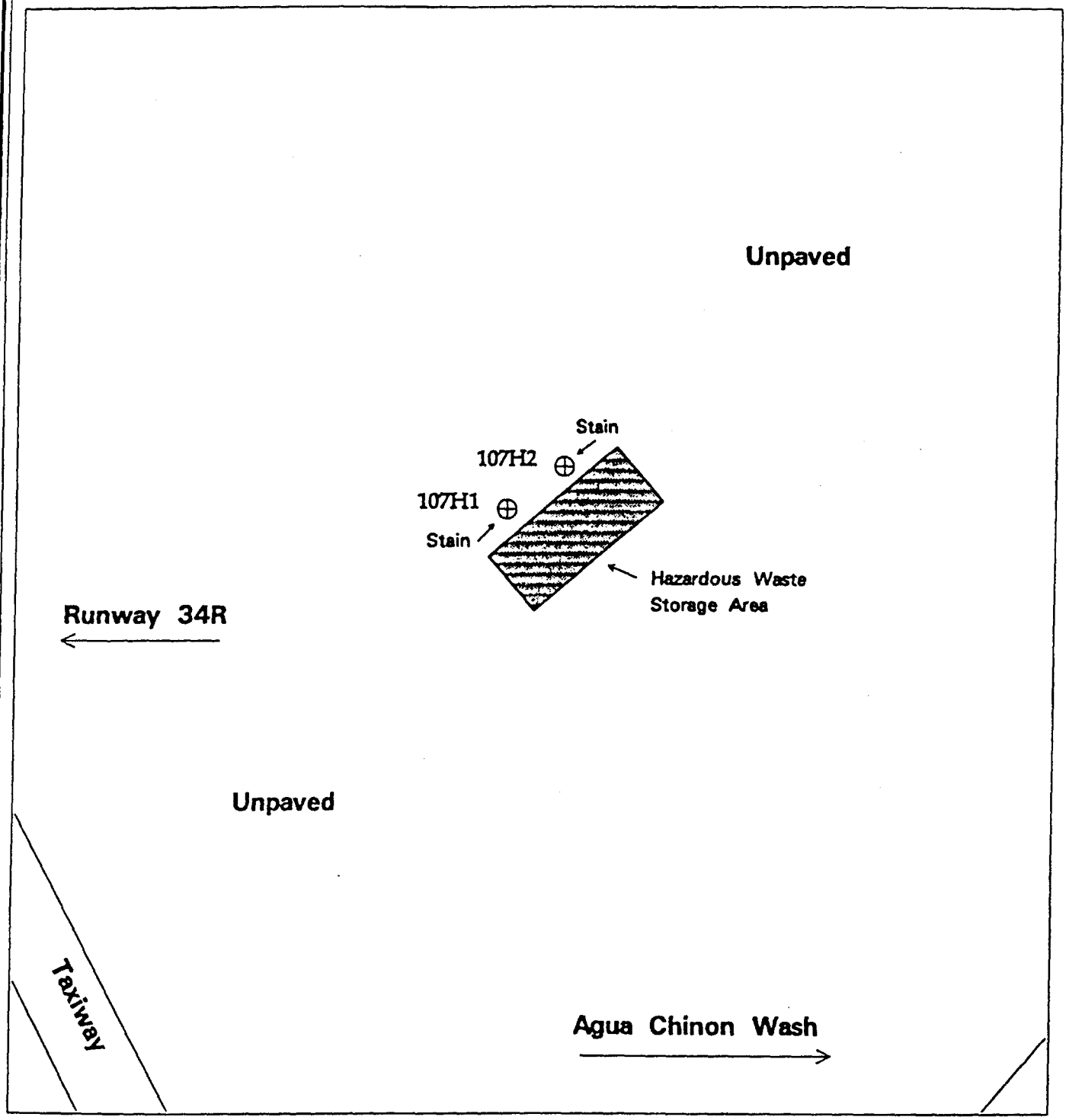

Figure 34 Sample Location Map

SWMU/AOC Number and Type:
107 - Hazardous Waste Storage Area

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

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MCAS EL TORO RCRA FACILITY ASSESSMENT - - SAMPLING VISIT RESULTS													
SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
107	Hazardous Waste Storage Area (34)	H1	2	ND	ND	ND	Methylene Chloride-4 BJ * Acetone-10 BJ * 2-Butanone-3 J	Di-n-butylphthalate-120 BJ *	ND	NAB	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < BGT
			5	ND	ND	ND	Methylene Chloride-5 BJ * Acetone-8 BJ *	ND	ND	NAB		
		H2	2	ND	ND	ND	Methylene Chloride-6 BJ * Acetone-10 BJ *	ND	ND	NAB		CRDL - Contract Required Detection Limit BGT - Background Threshold Value
			5	ND	ND	ND	Methylene Chloride-5 BJ * Acetone-10 BJ *	Di-n-butylphthalate-43 BJ *	ND	NAB		

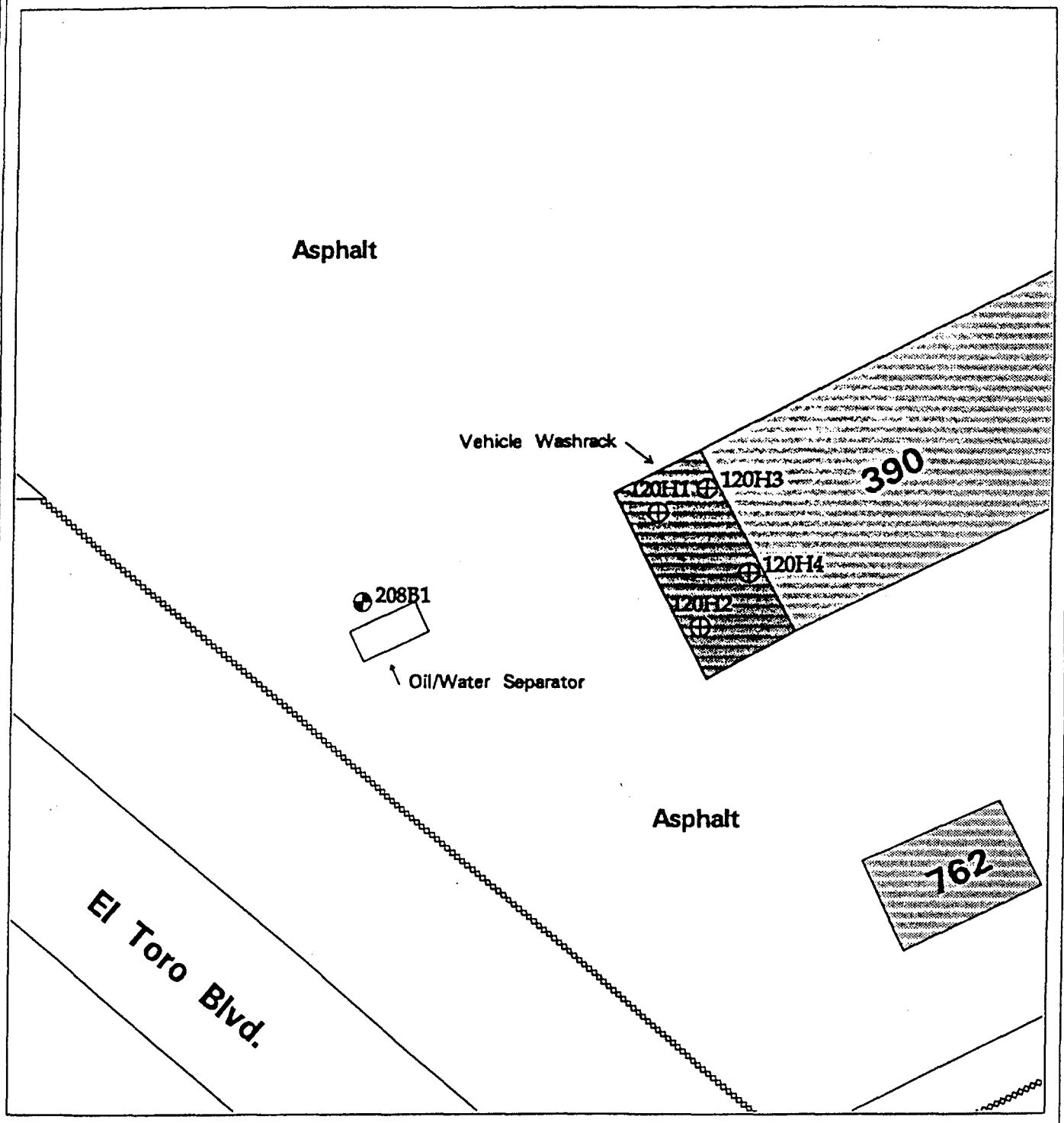

Figure 36 Sample Location Map

Boring Location and Number:

- 123H4 5' Deep Boring
- 123B4 25' Deep Boring
- 123A4 60' Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

SWMU/AOC Number and Type:

120 - Vehicle Washrack

208 - Oil/Water Separator

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SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
120	Vehicle Wash Rack (36)	H1	2	ND	NA	NA	Methylene Chloride-9 BJ * Acetone-63 B * 2-Butanone-3 BJ *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			5	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-20 B * 2-Butanone-2 BJ *	NA	NA	NA		
			5 (Duplicate)	ND	NA	NA	Methylene Chloride-46 B * Acetone-7 BJ *	NA	NA	NA		CRDL - Contract Required Detection Limit
		H2	2	ND	NA	NA	Methylene Chloride-8 BJ * Acetone-67 B * 2-Butanone-2 BJ *	NA	NA	NA		
			5	ND	NA	NA	Methylene Chloride-24 B * Acetone-6 BJ * 2-Butanone-2 J	NA	NA	NA		
		H3	2	ND	NA	NA	Methylene Chloride-58 B * Acetone-16 B * 2-Butanone-3 J	NA	NA	NA		
			5	ND	NA	NA	Methylene Chloride-71 B * Acetone-9 BJ * 2-Butanone-2 J	NA	NA	NA		
		H4	2	ND	NA	NA	Methylene Chloride-21 B * Acetone-4 BJ * 2-Butanone-3 BJ *	NA	NA	NA		
			5	ND	NA	NA	Methylene Chloride-52 B * Acetone-10 BJ *	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
208	Oil/Water Separator (36)	B1	5	ND	NA	NA	Methylene Chloride-8 BJ * Acetone-9 BJ *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-7 BJ * Acetone-14 B *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-10 BJ * Acetone-22 B *	NA	NA	NA		
			20	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-15 B *	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-17 B *	NA	NA	NA		

CRDL - Contract Required Detection Limit

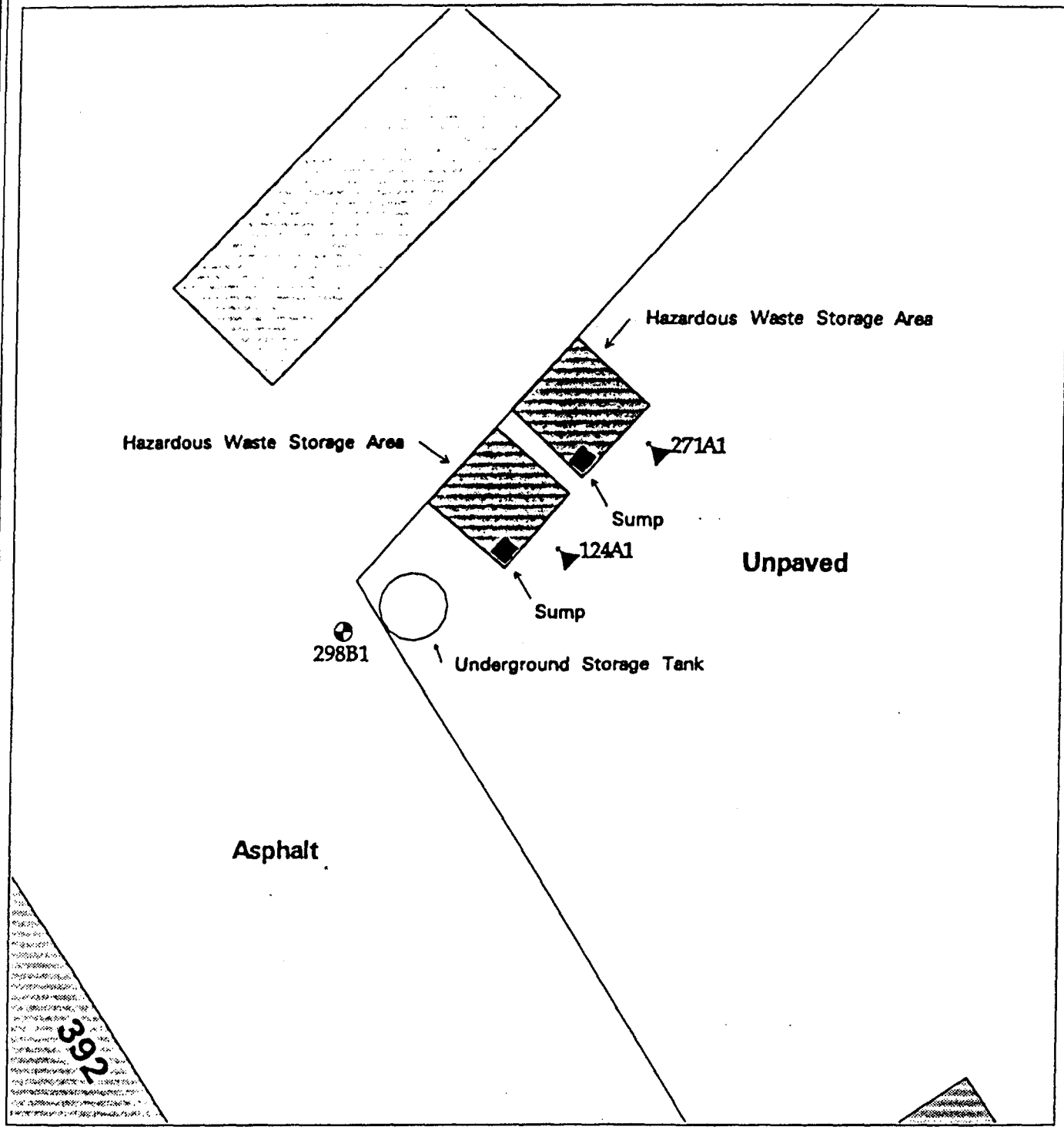

Figure 37 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

SWMU/AOC Number and Type:

124 - Hazardous Waste Storage Area

271 - Hazardous Waste Storage Area

298 - Underground Storage Tank

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SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
271	Hazardous Waste Storage Area (37)	A1	10	ND	ND	ND	Methylene Chloride- 6 BJ * Acetone-14 *	Diethylphthalate-150 J Di-n-butylphthalate-23 BJ * Bis(2-Ethylhexyl)phthalate-71 J	ND	Barium-116 Silver-0 34 B	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < ETM & PRG Pest/PCB < CRDL Metals < ETM & PRG CRDL - Contract Required Detection Limit
			20	ND	ND	ND	Methylene Chloride-5 BJ * Acetone-9 J *	Diethylphthalate-1100 Di-n-butylphthalate-45 BJ * Dimethylphthalate-48 J Butylbenzylphthalate-210 J	ND	Barium-111 Silver-0 35 B		
			30	ND	ND	ND	Methylene Chloride- 6 BJ * Toluene-1 J	Diethylphthalate-1000 Di-n-butylphthalate-32 BJ * Dimethylphthalate-48 J	ND	Barium-109 Silver-ND		
			40	ND	ND	ND	Methylene Chloride- 6 BJ *	Diethylphthalate-1000 Di-n-butylphthalate-36 BJ * Butylbenzylphthalate-140 J Dimethylphthalate-47 J	ND	Barium-80 1 Silver-ND		
			40 (Duplicate)	ND	ND	ND	Methylene Chloride- 11 BJ * Toluene-1 J 1,1,1-Trichloroethane-3 J	Di-n-butylphthalate-35 BJ * Bis(2-Ethylhexyl)phthalate-35 J	ND	Barium-239 Silver0 78 B		
			50	53.8	ND	ND	Methylene Chloride-6 BJ * Acetone- 21 B * Toluene-2 J	Diethylphthalate-1100 Di-n-butylphthalate-45 BJ * Bis(2-Ethylhexyl)phthalate-29 J Dimethylphthalate-62 J	ND	Barium-854 Silver-ND		
			60	ND	ND	ND	Methylene Chloride-4 BJ * Toluene-1 J	Diethylphthalate-140 J Di-n-butylphthalate-28 BJ * Bis(2-Ethylhexyl)phthalate-36 J	ND	Barium-117 Silver-0.36 B		

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
298	Underground Storage Tank (37)	B1	5	ND	NA	NA	Methylene Chloride-4 BJ *	NA	NA	NA	Leak test/ inspection of UST	Moderate petroleum hydrocarbon contamination at 20-foot depth TPH/TFH > 1000 ppm VOCs < ETM & PRG
			10	989	NA	NA	Methylene Chloride-4 BJ * Acetone-19 B *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-22 B * Acetone-27 * Toluene-4 J 2-Butanone-7 J 4-Methyl-2-Pentanone-8 J 2-Hexanone-42 Xylene-8 J	NA	NA	NA		
			20	3690	NA	NA	Methylene Chloride-5 BJ * Acetone-21 B *	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-22 B *	NA	NA	NA		

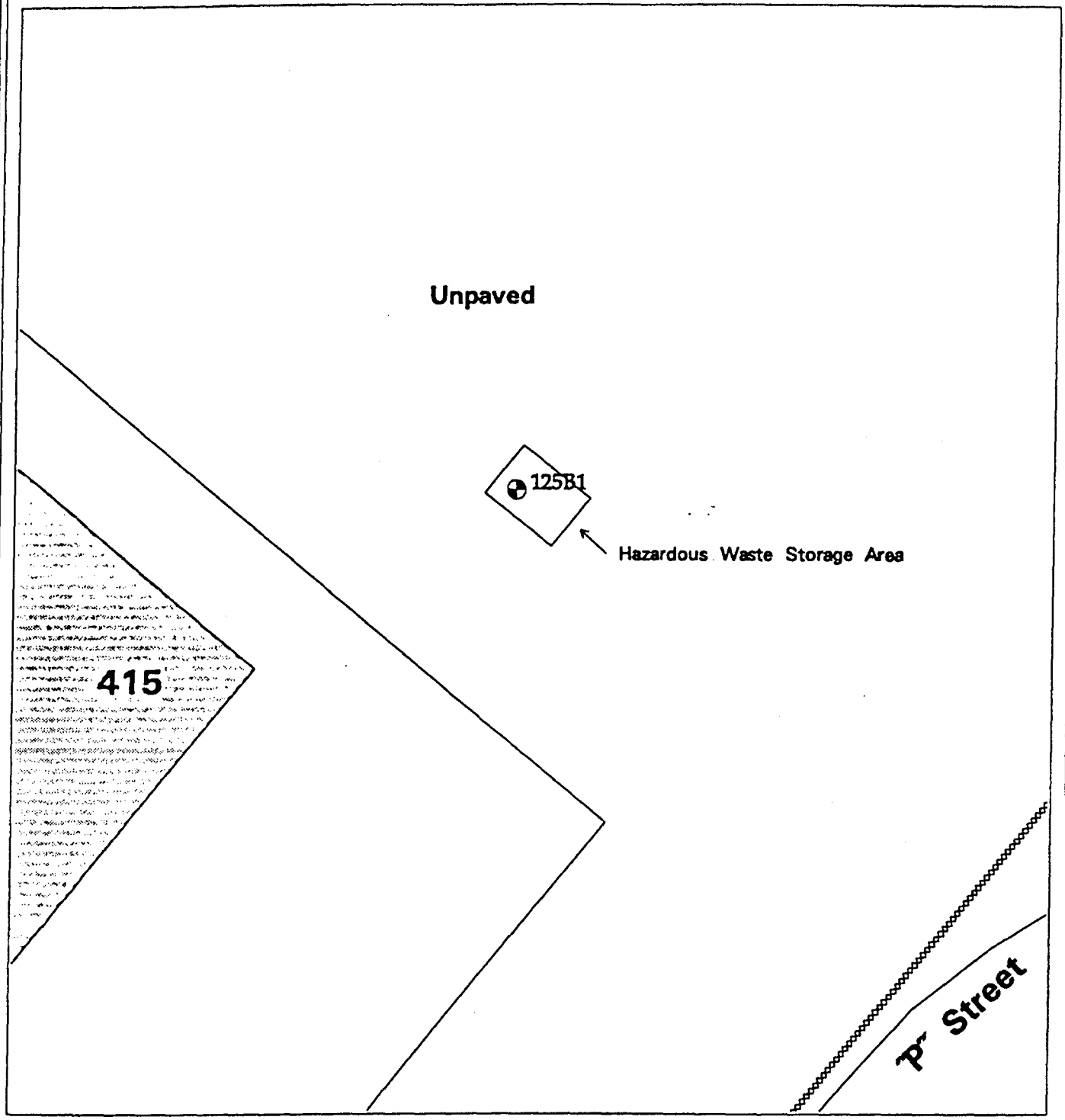

Figure 38 Sample Location Map

SWMU/AOC Number and Type:
125 - Hazardous Waste Storage Area

Boring Location and Number:

- 123H4 5' Deep Boring
- 123B4 25' Deep Boring
- 123A4 60' Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

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MCAS EL TORO RCRA FACILITY ASSESSMENT - - SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
125	Hazardous Waste Storage Area (38)	B1	5	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-8 BJ *	Diethylphthalate-27 J Di-n-butylphthalate-30 J Bis(2-Ethylhexyl)phthalate-28 J	ND	NAB	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < BGT
			10	ND	ND	ND	Methylene Chloride-8 BJ * Acetone-7 BJ * Toluene-1 J	Diethylphthalate-31 BJ * Di-n-butylphthalate-60 BJ *	ND	NAB		
			15	ND	ND	ND	Methylene Chloride-6 BJ * Acetone-9 BJ *	Di-n-butylphthalate-28 J Bis(2-Ethylhexyl)phthalate-24 J	ND	NAB		
			20	ND	ND	ND	Methylene Chloride-6 BJ * Acetone-5 BJ *	Diethylphthalate-42 J Di-n-butylphthalate-30 J Bis(2-Ethylhexyl)phthalate-32 J	ND	NAB		
			25	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-5 BJ *	Diethylphthalate-19 J Di-n-butylphthalate-25 J Bis(2-Ethylhexyl)phthalate-80 J	ND	NAB		

CRDL - Contract Required Detection Limit
BGT - Background Threshold Value

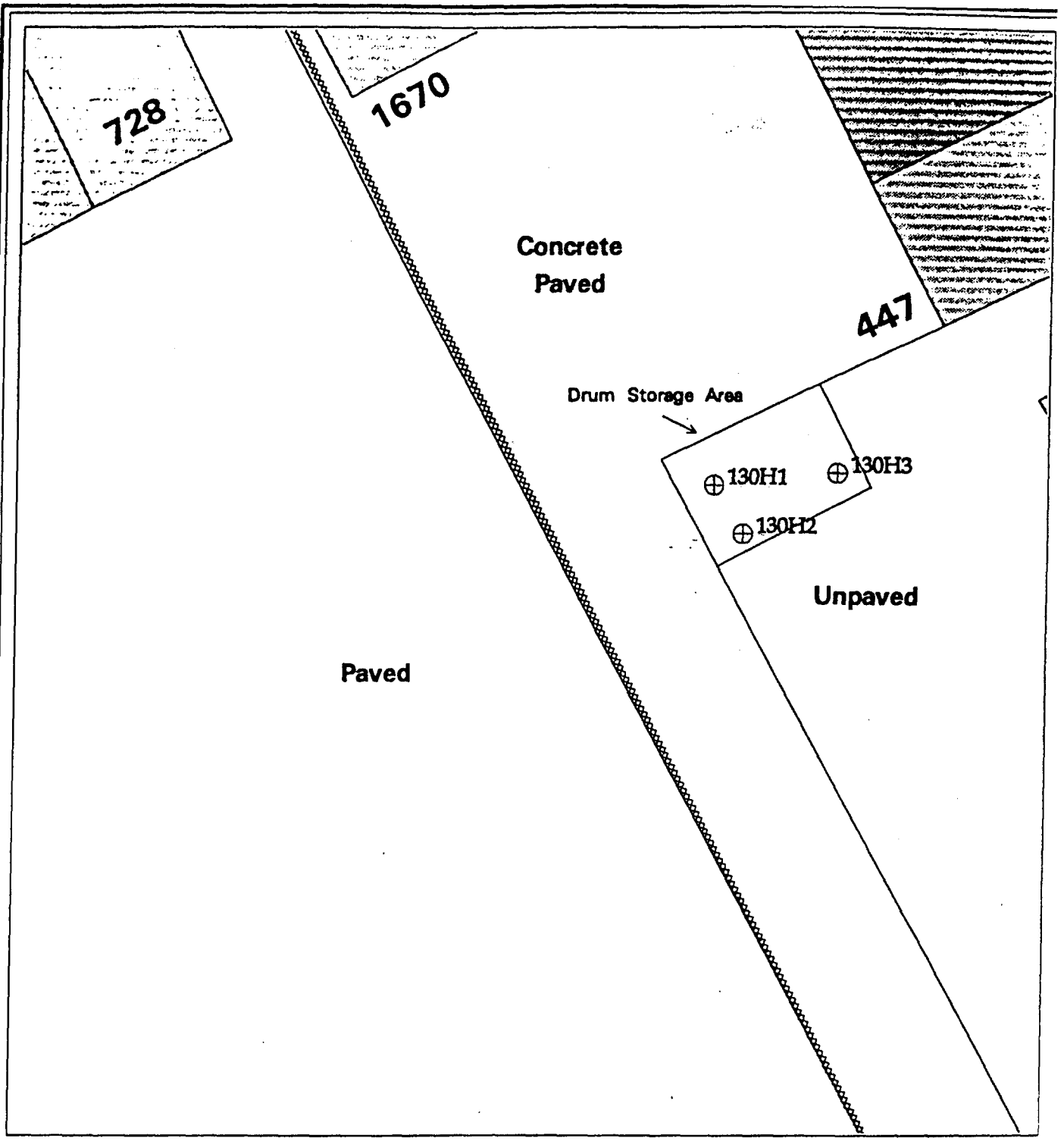

Figure 40 Sample Location Map

SWMU/AOC Number and Type:
130 - Drum Storage Area

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
130	Drum Storage Area (40)	H1	2	ND	ND	ND	Methylene Chloride-3 BJ * Acetone-5 BJ *	Di-n-butylphthalate-48 J	ND	Antimony-ND Selenium-ND Silver-ND	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < ETM & PRG
			5	ND	ND	ND	Methylene Chloride-6 J * Acetone-3 BJ * Toluene-2 J	ND	ND	Antimony-ND Selenium-ND Silver-0.79 B		
		H2	2	ND	ND	ND	Methylene Chloride-6 J * Acetone-6 BJ * Toluene-2 J	ND	ND	Antimony-ND Selenium-ND Silver-0.55 B		CRDL - Contract Required Detection Limit
			5	ND	ND	ND	Methylene Chloride-3 BJ * Acetone-5 BJ * Toluene-3 J	Bis(2-Ethylhexyl)phthalate-290 J	ND	Antimony-ND Selenium-0.79 B Silver-1.0 B		
		H3	2	ND	ND	ND	Methyene Chloride-5 J * Acetone-6 BJ * 2-Butanone-2 J	Diethylphthalate-210 J	ND	Antimony-ND Selenium-ND Silver-ND		
			5	ND	ND	ND	Methylene Chloride-7 J * Acetone-5 BJ * Toluene-2 J	Bis(2-Ethylhexyl)phthalate-320 J	ND	Antimony-11 B Selenium-ND Silver-ND		

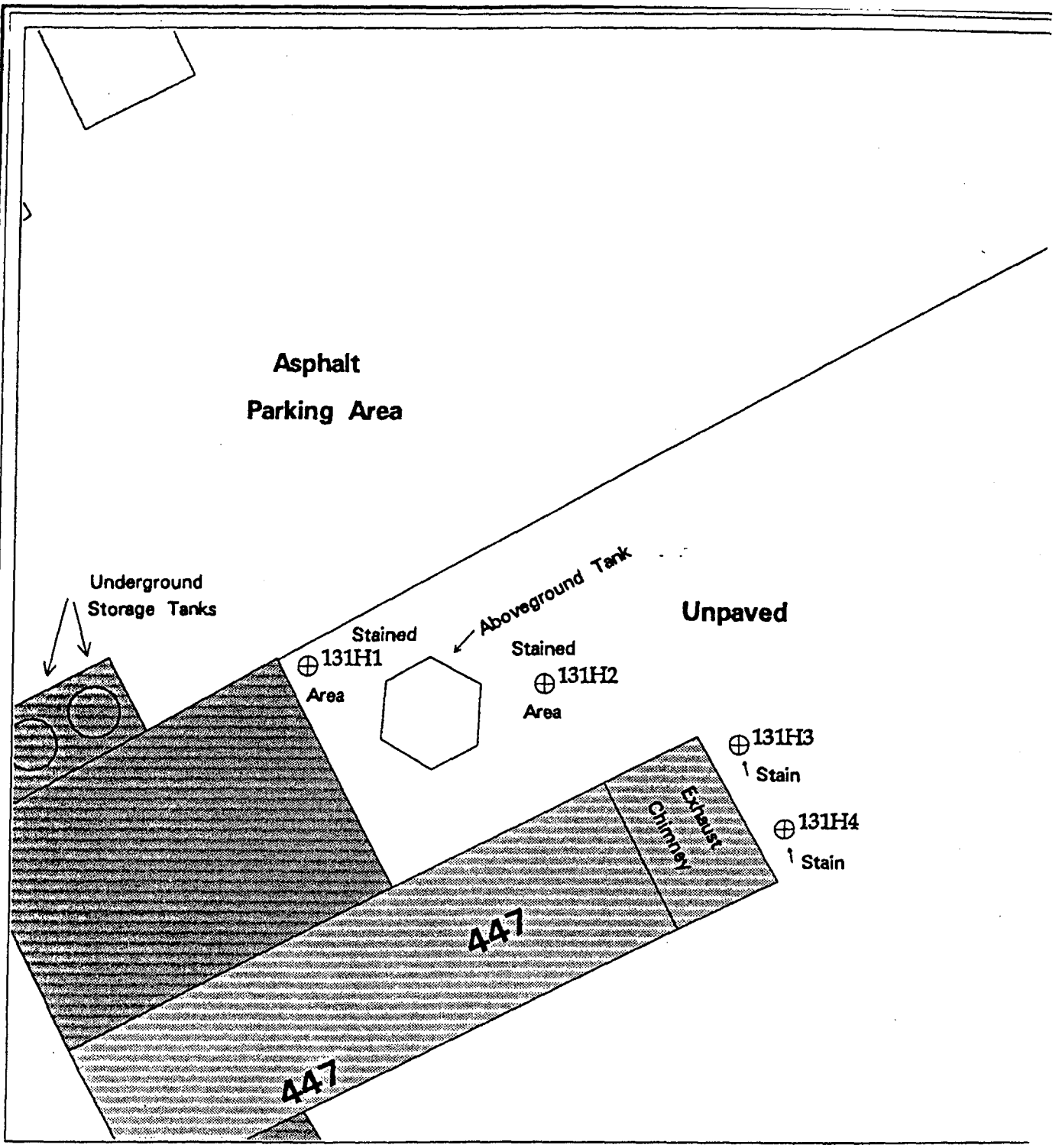

Figure 41 Sample Location Map

SWMU/AOC Number and Type:
131 - Engine Test Cell

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
131	Engine Test Cell (41)	H1	2	220	ND	ND	Methylene Chloride-5 BJ * Acetone-27 B *	Bis(2-Ethylhexyl)phthalate-160 J Butylbenzylphthalate-45 J Phenanthrene-270 J Fluoranthene-2000 Pyrene-1400 Benzo(a) Anthracene-1400 Chrysene-790 Benzo(b)Fluoranthene-1900 Benzo(k)Fluoranthene-350 Benzo(a) Pyrene-670 Indeno(1,2,3-cd)Pyrene-500 Benzo(g,h,i) Perylene-370 Anthracene-77 J Carbozole-41 J Dibenz(a,h)Anthracene-94 J	Aroclor(1260)-67 P 4,4'-DDT-6.3	Selenium-ND Silver-ND Lead-50.4	Shallow soil borings.	TPH/TFH < 1000 ppm VOCs < CRDL SVOCs > ETM & PRG CRDL - Contract Required Detection Limit
			2 (Duplicate)	ND	ND	ND	Methylene Chloride-6 J * Acetone-4 BJ * Toluene-1 J	Bis(2-Ethylhexyl)phthalate-180 J Butylbenzylphthalate-100 J Phenanthrene-290 J Fluoranthene-1900 Pyrene-1400 Benzo(a) Anthracene-1300 Chrysene-1100 Benzo(b)Fluoranthene-1800 Benzo(k)Fluoranthene-400 Benzo(a) Pyrene-780 Indeno(1,2,3-cd)Pyrene-540 Benzo(g,h,i) Perylene-420 Anthracene-83 J Carbozole-50 J Dibenz(a,h)Anthracene-120 J	Aroclor(1260)-62 P 4,4'-DDT-6.9	Selenium-ND Silver-ND Lead-48.0		
			5	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-19 B *	ND	ND	Selenium-ND Silver-ND Lead-4.6		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
131	Engine Test Cell (41)	H2	2	ND	ND	ND	Methylene Chloride-5 BJ * Acetone-30 B *	Di-n-butylphthalate-39 BJ *	ND	Selenium-ND Silver-ND Lead-3.1	Shallow soil borings.	TPH/TFH < 1000 ppm VOCs < CRDL SVOCs > ETM & PRG
			5	ND	ND	ND	Methylene Chloride-5 BJ * Acetone-26 B *	ND	ND	Selenium-ND Silver-0.40 B Lead-3.7		
			5 (Duplicate)	ND	ND	ND	Methylene Chloride-5 BJ * Acetone-15 B *	ND	ND	Selenium-ND Silver-ND Lead-3.6		CRDL - Contract Required Detection Limit
		H3	2	ND	ND	ND	Methylene Chloride-6 BJ * Acetone-15 B * 2-Butanone-2 BJ * Carbon Disulfide-1 J	Bis(2-Ethylhexyl)phthalate-48 BJ	ND	Selenium-ND Silver-ND Lead-2.6		
			5	ND	ND	ND	Methylene Chloride-4 BJ * Acetone-7 BJ *	ND	ND	Selenium-0.67 B Silver-ND Lead-2.8		
		H4	2	ND	ND	ND	Methylene Chloride-3 BJ * Acetone-7 BJ *	ND	ND	Selenium-ND Silver-ND Lead-2.8		
			5	ND	ND	ND	Methylene Chloride-4 BJ * Acetone-7 BJ *	ND	ND	Selenium-ND Silver-0.88 B Lead-2.8		

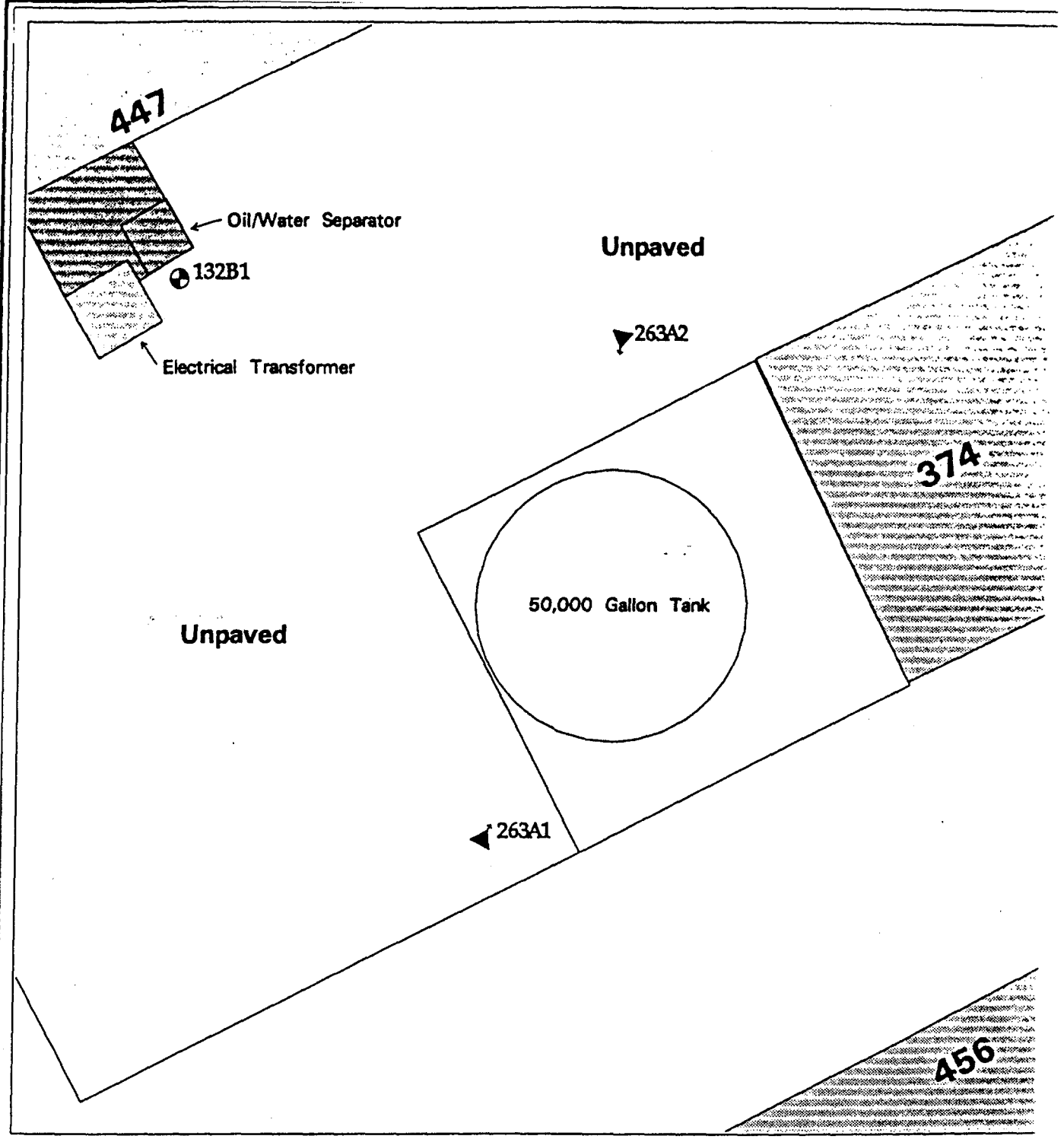

Figure 42 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

SWMU/AOC Number and Type:

132 - Oil/Water Separator

263 - Underground Storage Tank

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
132	Oil/water Separator (42)	B1	5	ND	NA	NA	Methylene Chloride-4 BJ * Acetone-7 J *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-6 BJ *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-11 BJ * Acetone-10 J *	NA	NA	NA		CRDL - Contract Required Detection Limit
			20	ND	NA	NA	Methylene Chloride-13 B * Acetone-27 B *	NA	NA	NA		
			20 (Duplicate)	ND	NA	NA	Methylene Chloride-13 BJ * Acetone-47 B * Toluene-4 J	NA	NA	NA		
			25	ND	ND	ND	Methylene Chloride-9 BJ * Acetone-13 B *	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
263	Underground Storage Area (42)	A1	10	NA	ND	ND	Methylene Chloride-14 B * Toluene-2 J	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			20	NA	ND	ND	Methylene Chloride-13 B *	NA	NA	NA		
			20 (Duplicate)	NA	ND	ND	Methylene Chloride-8 BJ * Toluene-2 J	NA	NA	NA		CRDL - Contract Required Detection Limit
			30	NA	ND	ND	Methylene Chloride-12 B *	NA	NA	NA		
			40	NA	ND	ND	Methylene Chloride-11 BJ * Toluene-1 J	NA	NA	NA		
			50	NA	ND	ND	Methylene Chloride-11 BJ *	NA	NA	NA		
			60	NA	ND	ND	Methylene Chloride-6 BJ *	NA	NA	NA		
		A2	10	NA	ND	ND	Methylene Chloride-7 BJ *	NA	NA	NA		
			20	NA	ND	ND	Methylene Chloride-7 BJ *	NA	NA	NA		
			30	NA	ND	ND	Methylene Chloride-7 BJ *	NA	NA	NA		
			40	NA	ND	ND	Methylene Chloride-8 BJ *	NA	NA	NA		
			50	NA	ND	ND	Methylene Chloride-18 B *	NA	NA	NA		
			60	NA	ND	ND	Methylene Chloride-17 B *	NA	NA	NA		

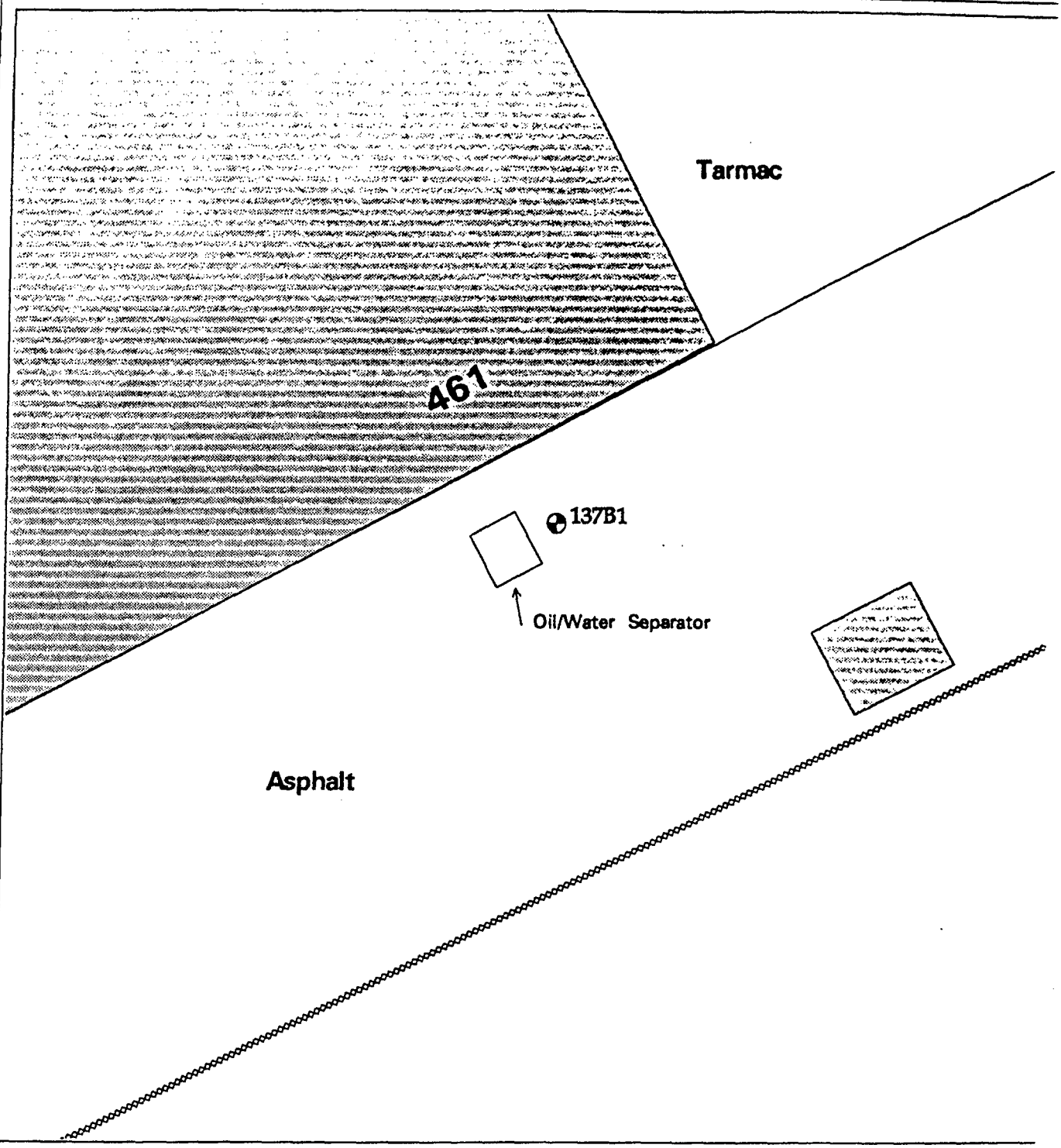

Figure 43 Sample Location Map

SWMU/AOC Number and Type:
137 - Oil/Water Separator

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
137	Oil/water Separator (43)	B1	5	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-13 B *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-14 B *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-4 BJ * Acetone-13 B *	NA	NA	NA		CRDL - Contract Required Detection Limit
			15 (Duplicate)	ND	NA	NA	Methylene Chloride-36 B * Acetone-16 B *	NA	NA	NA		
			20	ND	NA	NA	Methylene Chloride-9 BJ * Acetone-18 B *	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-12 B * Acetone-7 BJ *	NA	NA	NA		

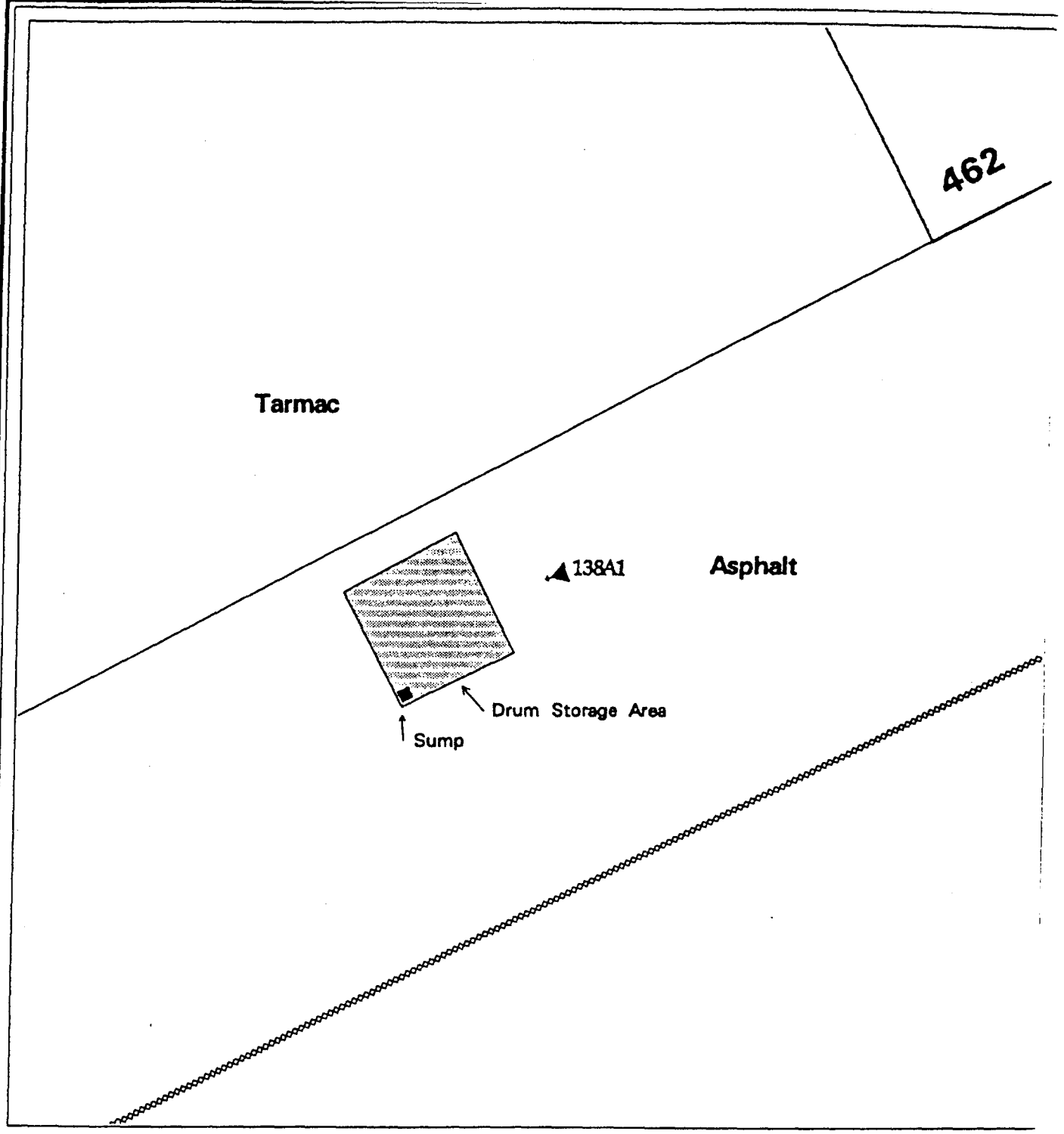

Figure 44 Sample Location Map

SWMU/AOC Number and Type:
138 - Drum Storage Area

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

MCAS El Toro
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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
138	Drum Storage Area (44)	A1	10	32.8	ND	ND	Methylene Chloride-9 BJ * Acetone-10 BJ *	Diethylphthalate-150 BJ * Di-n-butylphthalate-29 BJ *	ND	NAB	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < BGT CRDL - Contract Required Detection Limit BGT - Background Threshold Value
			20	ND	ND	ND	Methylene Chloride-6 BJ * Acetone-12 B *	Diethylphthalate-33 J Di-n-butylphthalate-34 BJ * Bis(2-Ethylhexyl)phthalate-25 BJ *	ND	NAB		
			20 (Duplicate)	ND	ND	ND	Methylene Chloride-9 BJ * Toluene-1 J	Di-n-butylphthalate-26 BJ * Bis(2-Ethylhexyl)phthalate-190 BJ *	ND	NAB		
			30	ND	ND	ND	Methylene Chloride-8 BJ * Acetone-7 BJ *	Di-n-butylphthalate-23 BJ * Bis(2-Ethylhexyl)phthalate-19 BJ *	ND	NAB		
			40	ND	ND	ND	Methylene Chloride-9 BJ * Acetone-12 BJ * Toluene-1 J	Diethylphthalate-31 J Di-n-butylphthalate-39 BJ * Bis(2-Ethylhexyl)phthalate-64 BJ * Butylbenzylphthalate-27 J	ND	NAB		
			50	ND	ND	ND	Methylene Chloride-11 B *	Diethylphthalate-34 J Di-n-butylphthalate-39 BJ * Bis(2-Ethylhexyl)phthalate-31 BJ *	ND	NAB		
			60	ND	ND	ND	Methylene Chloride-9 BJ *	Di-n-butylphthalate-24 BJ * Bis(2-Ethylhexyl)phthalate-120 BJ *	ND	NAB		

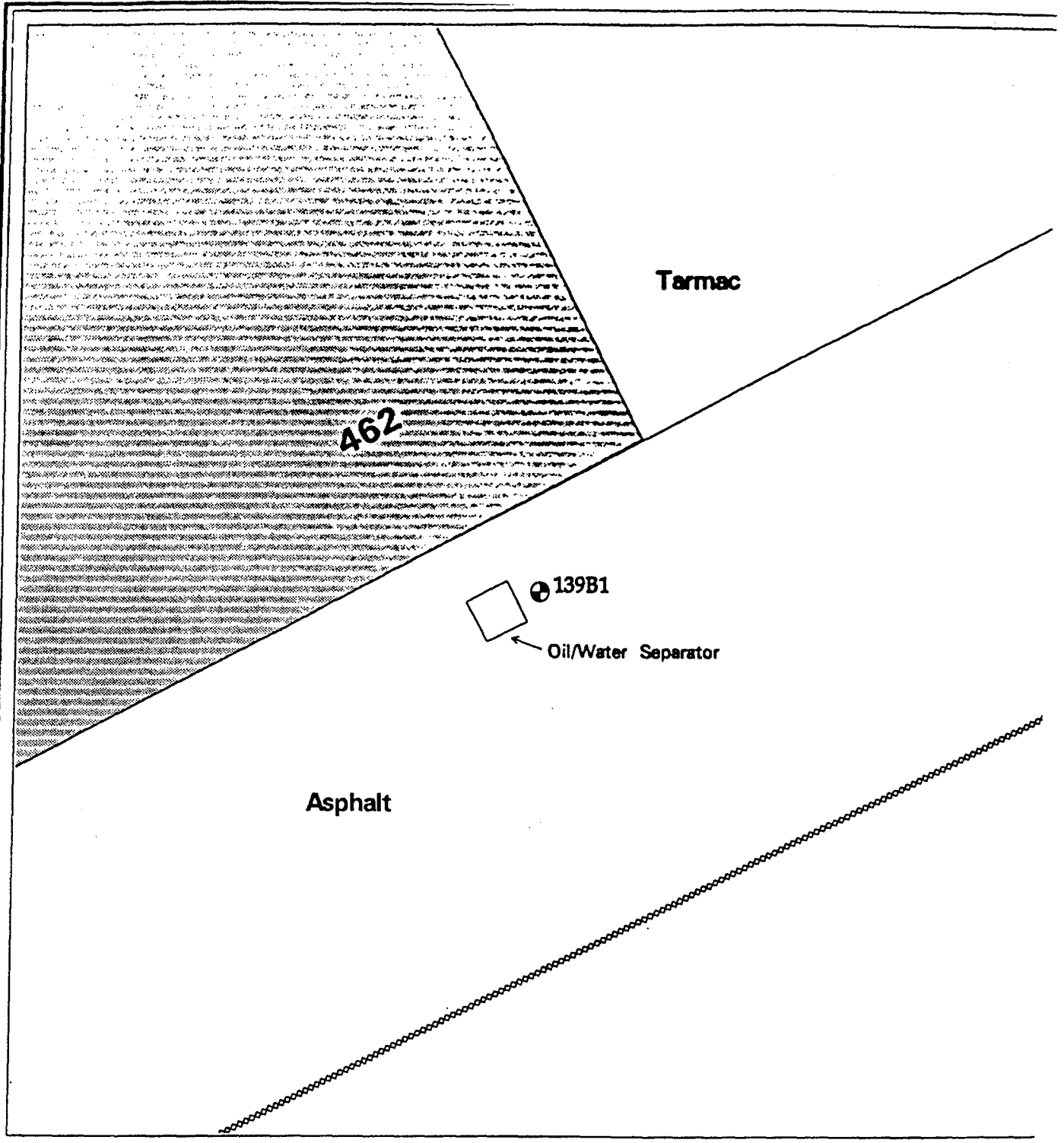

Figure 45 Sample Location Map

SWMU/AOC Number and Type:
139 - Oil/Water Separator

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

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RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
139	Oil/Water Separator (45)	B1	5	ND	NA	NA	Methylene Chloride-10 BJ * Acetone-28 B *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-17 B *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-12 BJ * Acetone-16 B *	NA	NA	NA		CRDL - Contract Required Detection Limit
			20	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-16 B *	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-11 B * Acetone-33 B *	NA	NA	NA		

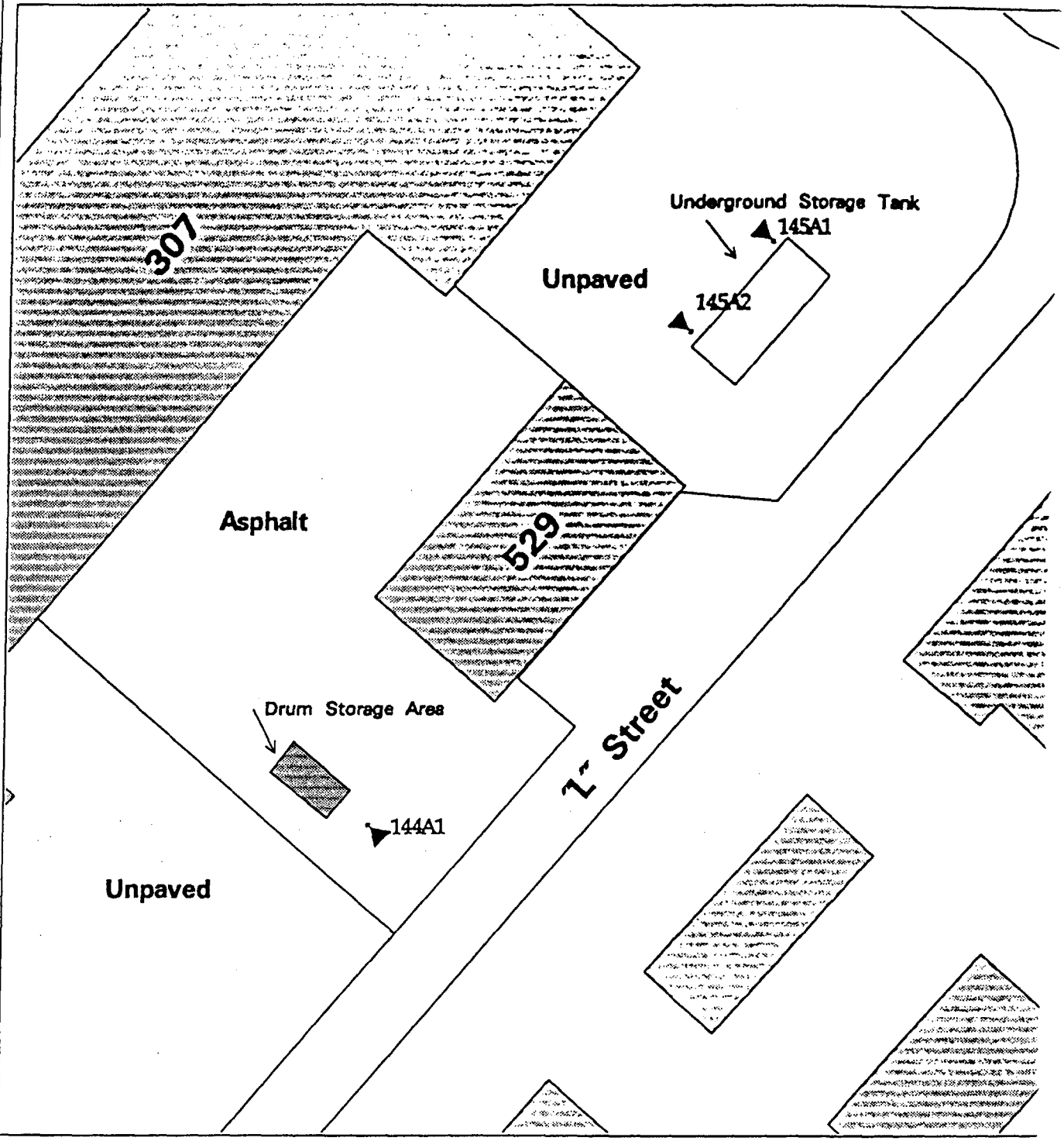

Figure 46 Sample Location Map

Boring Location and Number:

- 123H4 5' Deep Boring
- 123B4 25' Deep Boring
- 123A4 60' Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

144 - Drum Storage Area

145 - Underground Storage Tank

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RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
144	Drum Storage Area (46)	A1	10	ND	ND	ND	Methylene Chloride-11 BJ * Acetone-23 B *	ND	ND	NAB	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCBs < CRDL Metals < BGT CRDL - Contract Required Detection Limit BGT - Background Threshold Value
			20	ND	ND	ND	Methylene Chloride-5 BJ *	ND	ND	NAB		
			30	ND	ND	ND	Methylene Chloride-4 BJ * Acetone-11 BJ *	ND	ND	NAB		
			30 (Duplicate)	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-7 BJ *	ND	ND	NAB		
			40	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-8 BJ *	ND	ND	NAB		
			50	81	ND	ND	Methylene Chloride-6 BJ * Acetone-8 BJ *	ND	ND	NAB		
			60	ND	ND	ND	Methylene Chloride-6 BJ *	ND	ND	NAB		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS: TPH (mg/kg)	TFH (mg/kg) Gasoline	TFH (mg/kg) Diesel	VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	RECOMMENDATIONS: Action	RECOMMENDATIONS: Rationale
145	Underground Storage Tank (46)	A1	10	ND	NA	NA	Methylene Chloride-15 B * Acetone-8 BJ *	NA	NA	NA	Additional borings.	Petroleum hydrocarbon contamination, unknown extent. TPF/TFH > 1000 ppm VOCs < ETM & PRG
			20	12292	NA	NA	Methylene Chloride-10 BJ * Acetone-17 * Toluene-9 J PCE-4 J	NA	NA	NA		
			20 (Duplicate)	1575	NA	NA	Methylene Chloride-8 BJ * Acetone-18 * Toluene-4 J	NA	NA	NA		
			30	27526	NA	NA	Methylene Chloride-1100 BJ * Acetone-1700 B * Toluene-1300 J 2-Butanone-5000 Ethylbenzene-1300 J Xylene-8200	NA	NA	NA		
			40	14138	NA	NA	Methylene Chloride-880 BJ * Acetone-1300 BJ * Toluene-2100 2-Butanone-4200 Ethylbenzene-1900 Xylene-13000	NA	NA	NA		
			50	8245	NA	NA	Methylene Chloride-900 BJ * Acetone-1400 BJ Toluene-570 J 2-Butanone-4400 Ethylbenzene-600 J Xylene-4900	NA	NA	NA		
			60	7169	NA	NA	Methylene Chloride-810 BJ * Acetone-930 BJ * Toluene-1200 J 2-Butanone-3800 Ethylbenzene-1100 J Xylene-8200	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
145	Underground Storage Tank (46)	A2	10	ND	NA	NA	Methylene Chloride-18 B *	NA	NA	NA	Additional borings.	Petroleum hydrocarbon contamination, unknown extent. TPF/TFH > 1000 ppm VOCs < ETM & PRG
			20	17843	NA	NA	Methylene Chloride-1300 BJ * Acetone-1500 BJ 2-Butanone-5000 Ethylbenzene-970 J Xylene-4100	NA	NA	NA		
			30	11087	NA	NA	Methylene Chloride-820 BJ * Acetone-1200 BJ * 2-Butanone-5500 Ethylbenzene-750 J	NA	NA	NA		
			30 (Duplicate)	8774	NA	NA	Methylene Chloride-1200 BJ * Acetone-1600 B * 2-Butanone-6200 Ethylbenzene-1300 J	NA	NA	NA		
			40	3350	NA	NA	Methylene Chloride-870 BJ * Acetone-980 BJ * 2-Butanone-3600 Ethylbenzene-360 J	NA	NA	NA		
			50	8609	NA	NA	Methylene Chloride-810 BJ * Acetone-1100 BJ * 2-Butanone-5000 Ethylbenzene-530 J	NA	NA	NA		
			60	9330	NA	NA	Methylene Chloride-940 BJ * Acetone-1600 BJ * 2-Butanone-5000 Ethylbenzene-980 J	NA	NA	NA		

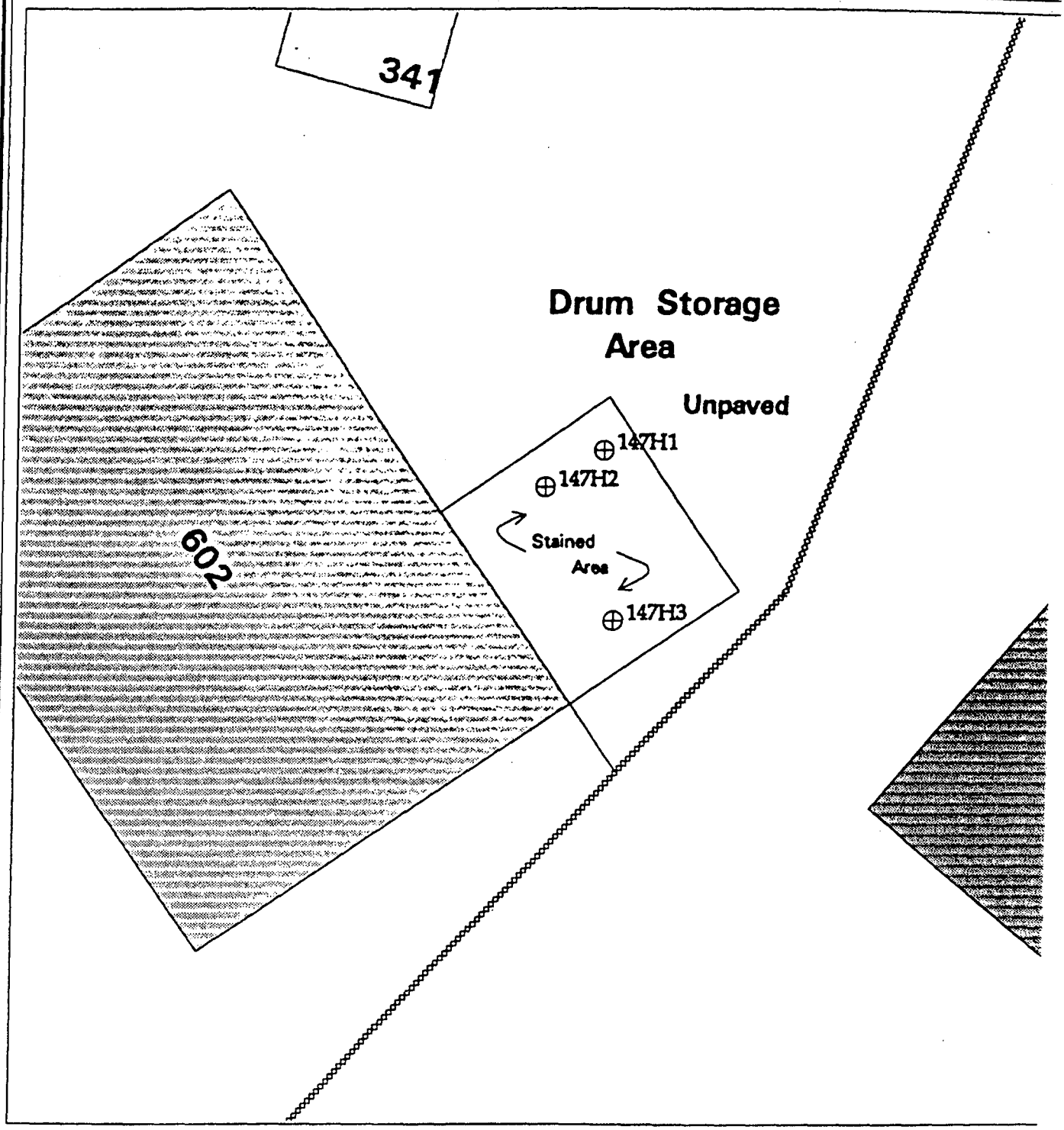

Figure 47 Sample Location Map

SWMU/AOC Number and Type:
147 - Drum Storage Area

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
147	Drum Storage Area (47)	H1	2	ND	ND	75 Z	Methylene Chloride-5 BJ * Toluene-1 J	Diethylphthalate-180 J	ND	NAB	NFA	TPH/TFH < 1000 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < BGT CRDL - Contract Required Detection Limit BGT - Background Threshold Value
			5	ND	ND	31 Z	Methylene Chloride-5 BJ * Acetone-13 *	Di-n-butylphthalate-48 BJ *	ND	NAB		
		H2	2	160	ND	66 Z	Methylene Chloride-5 J * Acetone-8 J * Toluene-1 J	ND	ND	NAB		
			5	ND	ND	ND	Methylene Chloride-16 B * Acetone-8 BJ *	Di-n-butylphthalate-120 BJ *	ND	NAB		
		H3	2	ND	ND	16 Z	Methylene Chloride-5 J * Acetone-9 J *	Di-n-butylphthalate-86 BJ *	ND	NAB		
			5	ND	ND	ND	Methylene Chloride-5 BJ * Toluene-1 J	Di-n-butylphthalate-76 BJ *	ND	NAB		

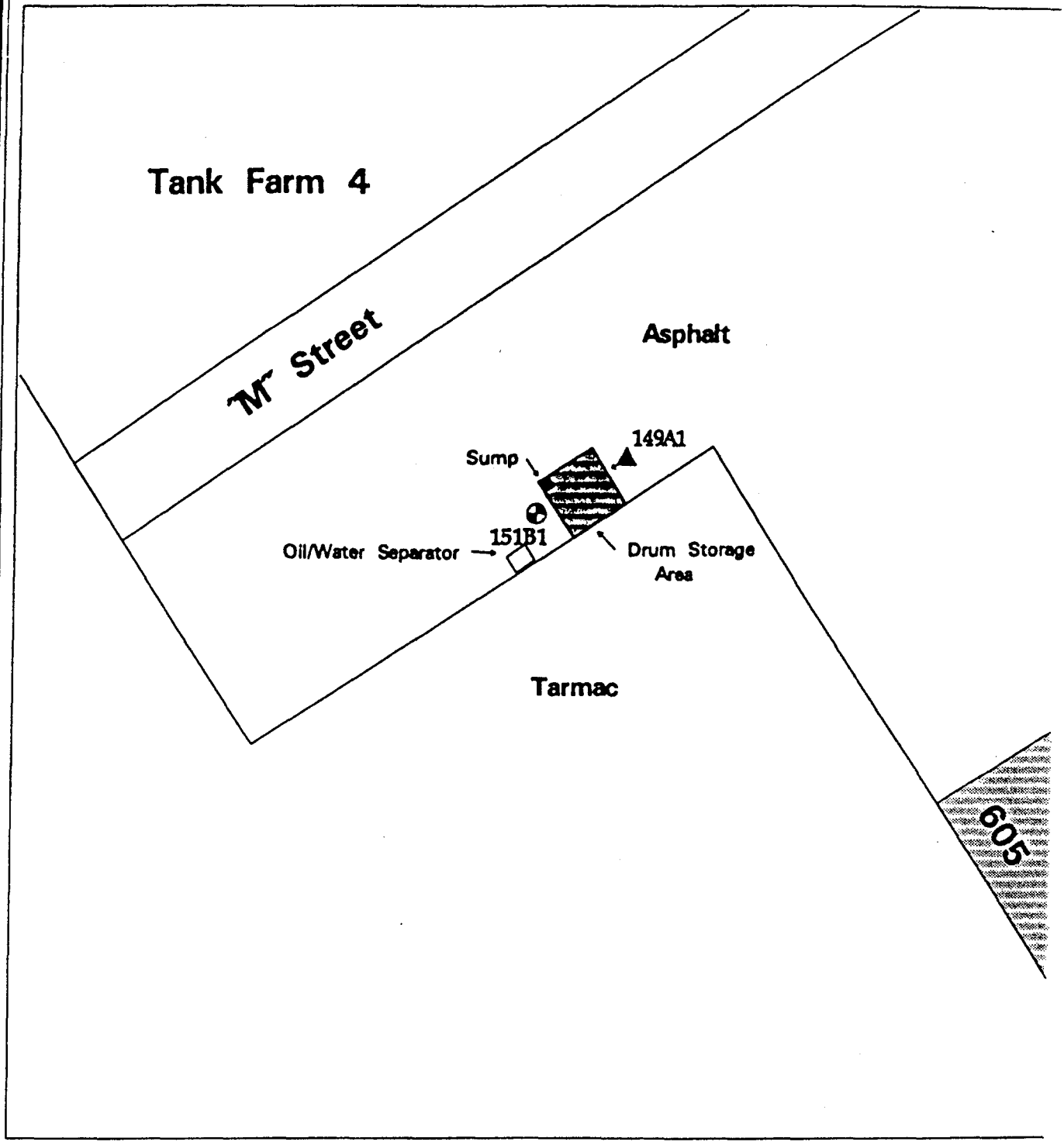

Figure 48 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

149 - Drum Storage Area

151 - Oil/Water Separator

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
149	Drum Storage Area (48)	A1	10	ND	ND	ND	Methylene Chloride-4 BJ * Acetone- 5 BJ * 2-Butanone-2 J	Bis(2-Ethylhexyl)phthalate-610 B *	ND	Antimony-ND	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < ETM & PRG Pest/PCBs < CRDL Metals < ETM & PRG CRDL - Contract Required Detection Limit
			20	ND	ND	ND	Methylene Chloride-5 J * Acetone-2 BJ *	Bis(2-Ethylhexyl)phthalate-640 B * 2-Methylnaphthalene-34 J	ND	Antimony-ND		
			32	ND	ND	ND	Methylene Chloride-6 J * Acetone-2 BJ * 2-Butanone-1 J	Bis(2-Ethylhexyl)phthalate-520 B *	ND	Antimony-ND		
			32 (Duplicate)	ND	ND	ND	Methylene Chloride-1 BJ * Acetone-4 BJ * 2-Butanone-1 BJ *	Di-n-butylphthalate-47 J	ND	Antimony-ND		
			40	ND	ND	ND	Methylene Chloride-7 J * Acetone-4 BJ * Toluene-1 J 2-Butanone-1 J	Bis(2-Ethylhexyl)phthalate-3000 B	ND	Antimony-ND		
			50	ND	ND	ND	Acetone-5 BJ * 2-Butanone-2 BJ *	Bis(2-Ethylhexyl)phthalate-1600 B *	ND	Antimony-ND		
			60	ND	ND	ND	Methylene Chloride-3 BJ * Acetone-4 BJ *	Di-n-butylphthalate-61 J Bis(2-Ethylhexyl)phthalate-400 B *	ND	Antimony-6.0 B		

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
151	Oil/Water Separator (48)	B1	5	ND	NA	NA	Methylene Chloride-7 BJ *	NA	NA	NA	Leak test/ inspection of separator.	Moderate petroleum hydrocarbon contamination at 10-foot depth TPH/TFH < 1000 ppm VOCs < CRDL CRDL - Contract Required Detection Limit
			10	779	NA	NA	Methylene Chloride-8 BJ * Acetone-26 B *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-20 B * Acetone-48 B *	NA	NA	NA		
			20	ND	NA	NA	Methylene Chloride-6 BJ *	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-26 B * Acetone-32 B *	NA	NA	NA		
			25 (Duplicate)	ND	NA	NA	Methylene Chloride-28 B * Acetone-45 B *	NA	NA	NA		

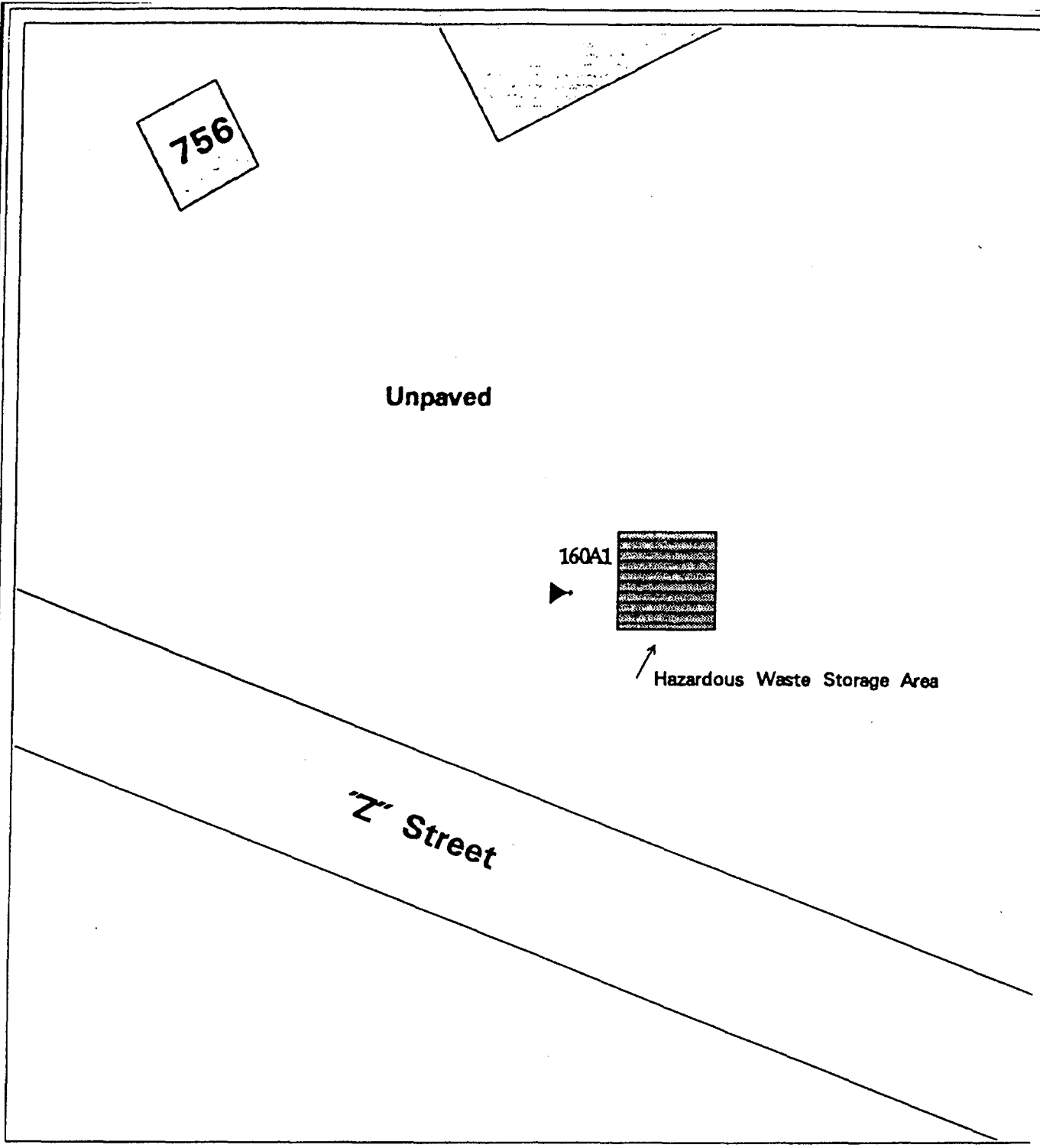

Figure 49 Sample Location Map

SWMU/AOC Number and Type:
160 - Hazardous Waste Storage Area

Boring Location and Number:

- 123H4 5' Deep Boring
- 123B4 25' Deep Boring
- 123A4 60' Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
160	Hazardous Waste Storage Area (49)	A1	10	ND	ND	ND	Methylene Chloride-5 J * Acetone-8 BJ *	Di-n-butylphthalate-2200 Bis(2-Ethylhexyl)phthalate-490 B * Butylbenzylphthalate-2900	ND	NAB	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < ETM & PRG Pest/PCBs < CRDL Metals < BGT CRDL - Contract Required Detection Limit BGT - Background Threshold Value
			20	ND	ND	ND	Methylene Chloride-3 J *	Di-n-butylphthalate-2600 Bis(2-Ethylhexyl)phthalate-370 B * Butylbenzylphthalate-2600	ND	NAB		
			20 (Duplicate)	ND	ND	ND	Methylene Chloride-3 J * Acetone-4 BJ *	Bis(2-Ethylhexyl)phthalate-480 B *	ND	NAB		
			30	ND	ND	ND	Methylene Chloride-4 BJ * Acetone-3 BJ * 2-Butanone-2 BJ *	Di-n-butylphthalate-5500 Bis(2-Ethylhexyl)phthalate-350 B * Butylbenzylphthalate-920	ND	NAB		
			40	ND	ND	ND	Methylene Chloride-3 BJ * Acetone-2 BJ * 2-Butanone-1 BJ *	Di-n-butylphthalate-3500 Bis(2-Ethylhexyl)phthalate-350 B * Butylbenzylphthalate-2200	ND	NAB		
			50	ND	ND	ND	Methylene Chloride-4 BJ * Acetone-3 BJ * 2-Butanone-2 BJ *	Di-n-butylphthalate-2200 Bis(2-Ethylhexyl)phthalate-380 B * Butylbenzylphthalate-860	ND	NAB		
			60	ND	ND	ND	Methylene Chloride-4 BJ * Acetone-3 BJ * 2-Butanone-2 BJ *	Bis(2-Ethylhexyl)phthalate-440 B *	ND	NAB		

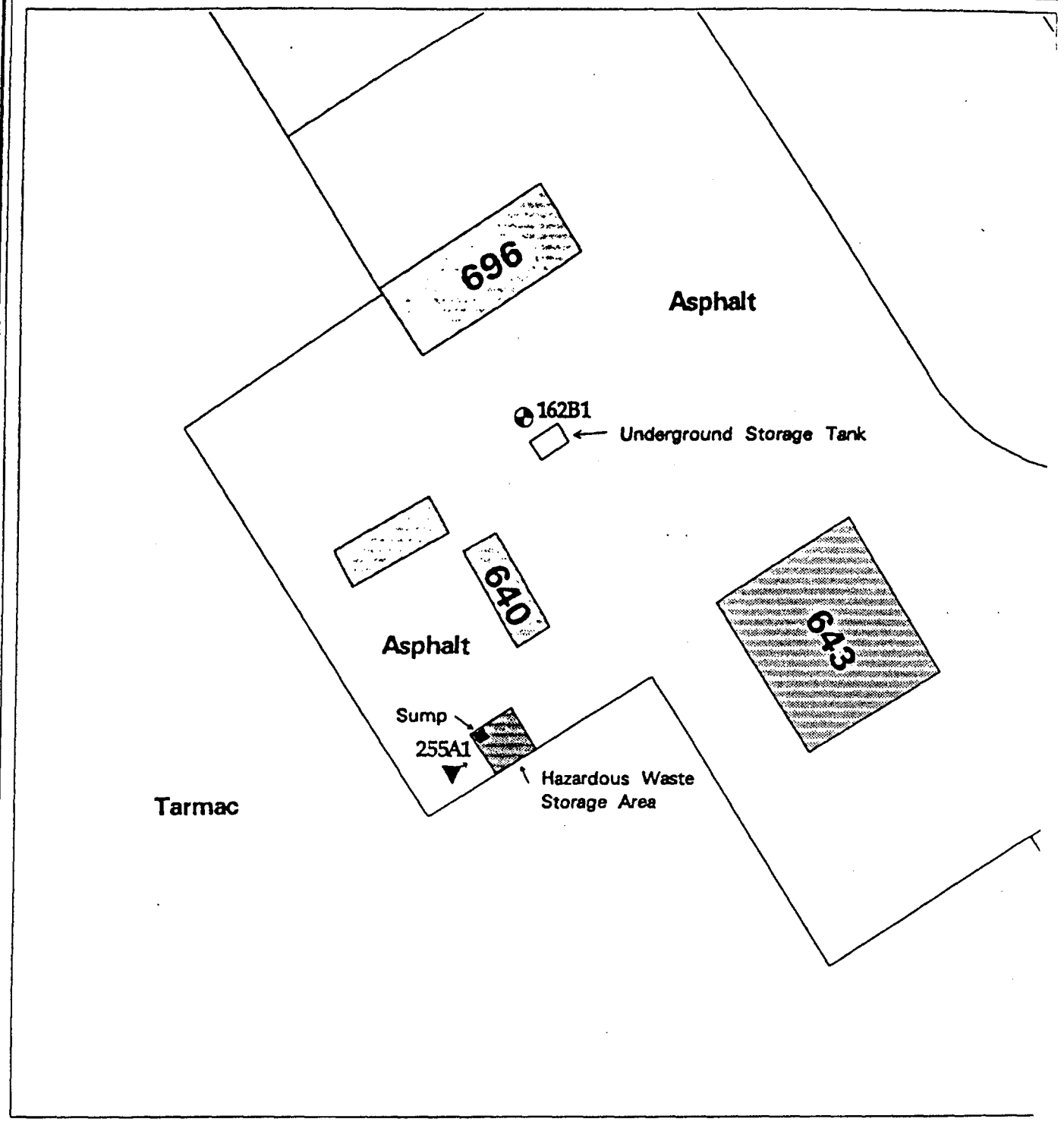

Figure 50 Sample Location Map

Boring Location and Number:

- 123H4 5' Deep Boring
- 123B4 25' Deep Boring
- 123A4 60' Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

162 - Underground Storage Tank

255 - Hazardous Waste Storage Area

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SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
162	Underground Storage Tank (50)	B1	5	ND	NA	NA	Methylene Chloride-6 BJ *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-8 BJ *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-7 BJ *	NA	NA	NA		CRDL - Contract Required Detection Limit
			20	ND	NA	NA	Methylene Chloride-4 BJ *	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-5 BJ *	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
255	Hazardous Waste Storage Area (50)	A1	10	ND	ND	ND	Methylene Chloride-5 BJ * Acetone-9 BJ *	ND	ND	NAB	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < BGT
			20	ND	ND	ND	Methylene Chloride-8 BJ * Acetone-21 B * 2-Butanone-2 BJ *	ND	ND	NAB		
			30	ND	ND	ND	Methylene Chloride-6 BJ * Acetone-15 B *	ND	ND	NAB		
			40	ND	ND	ND	Methylene Chloride-5 BJ * Acetone-3 BJ * Toluene-1 J 2-Butanone-2 BJ *	ND	ND	NAB		
			50	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-9 BJ * Toluene-1 J	ND	ND	NAB		
			50 (Duplicate)	ND	ND	ND	Methylene Chloride-8 BJ * Acetone-9 BJ *	ND	ND	NAB		
			60	ND	ND	ND	Methylene Chloride-5 BJ * Acetone-3 BJ * 2-Butanone-2 BJ *	Bis(2-Ethylhexyl)phthalate-34 J *	ND	NAB		

CRDL - Contract Required Detection Limit
BGT - Background Threshold Value

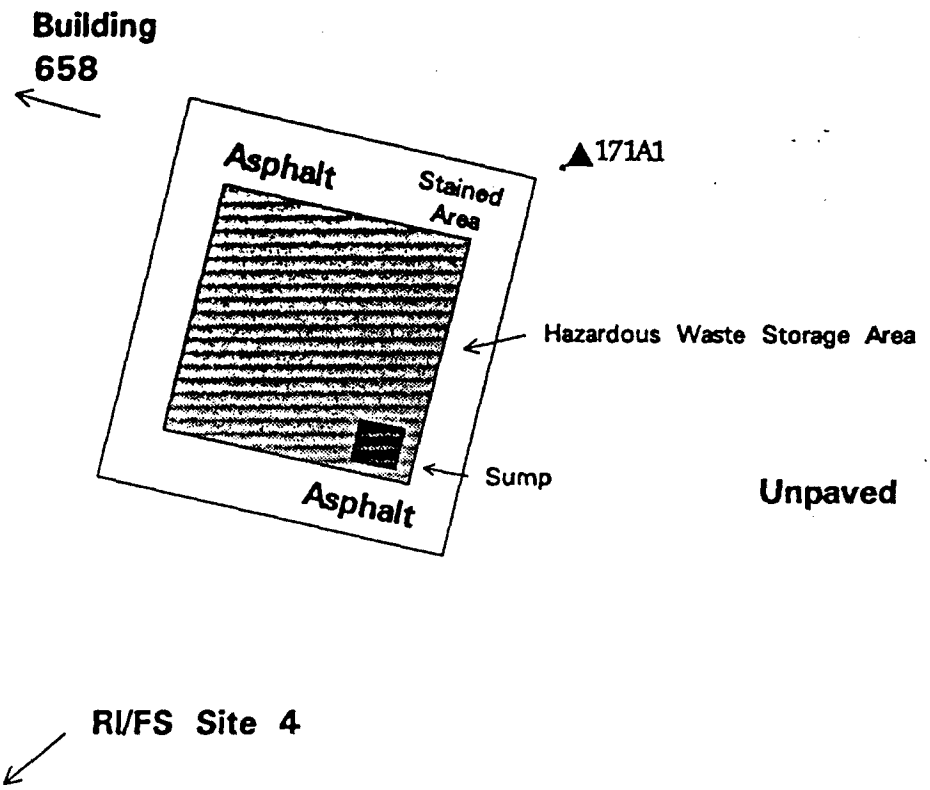

Figure 52 Sample Location Map

SWMU/AOC Number and Type:
171 - Hazardous Waste Storage Area

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
171	Hazardous Waste Storage Area (52)	A1	10	ND	ND	ND	Methylene Chloride-7 BJ *	Diethylphthalate-20 BJ * Di-n-butylphthalate-35 BJ * 2-Methylnaphthalene-34 J Phenanthrene-51 J Pyrene-45 J Chrysene-62 J Benzo(a)Pyrene-72 J Bis(2-Ethylhexyl)phthalate-710 B	4,4-DDE-7 J	Barium-90.5	Shallow soil borings.	Potential for SVOCs in shallow soil. TPH/TFH < 100 ppm VOCs < CRDL SVOCs < ETM & PRG Pest/PCBs < CRDL Metals < ETM & PRG CRDL - Contract Required Detection Limit
			20	ND	ND	ND	Methylene Chloride-9 BJ *	Diethylphthalate-67 BJ * Di-n-butylphthalate-20 BJ *	ND	Barium-67.5		
			30	ND	ND	ND	Methylene Chloride-14 B * Acetone-9 BJ *	Di-n-butylphthalate-24 BJ * Bis(2-Ethylhexyl)phthalate-49 BJ *	ND	Barium-128		
			30 (Duplicate)	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-7 J *	Diethylphthalate-180 BJ * Bis(2-Ethylhexyl)phthalate-10000	ND	Barium-794		
			40	ND	ND	ND	Methylene Chloride-11 BJ * Acetone-9 BJ *	Diethylphthalate-75 BJ * Bis(2-Ethylhexyl)phthalate-1700 Di-n-butylphthalate-33 J	ND	Barium-132		
			50	34.9	ND	ND	Methylene Chloride-8 BJ * Acetone-7 J *	Diethylphthalate-46 BJ * Bis(2-Ethylhexyl)phthalate-37 J	ND	Barium-111		
			60	ND	ND	ND	Methylene Chloride-5 BJ * Toluene-2 J	Diethylphthalate-20 BJ * Di-n-butylphthalate-20 BJ * Bis(2-Ethylhexyl)phthalate-40 BJ *	ND	Barium-98.2		

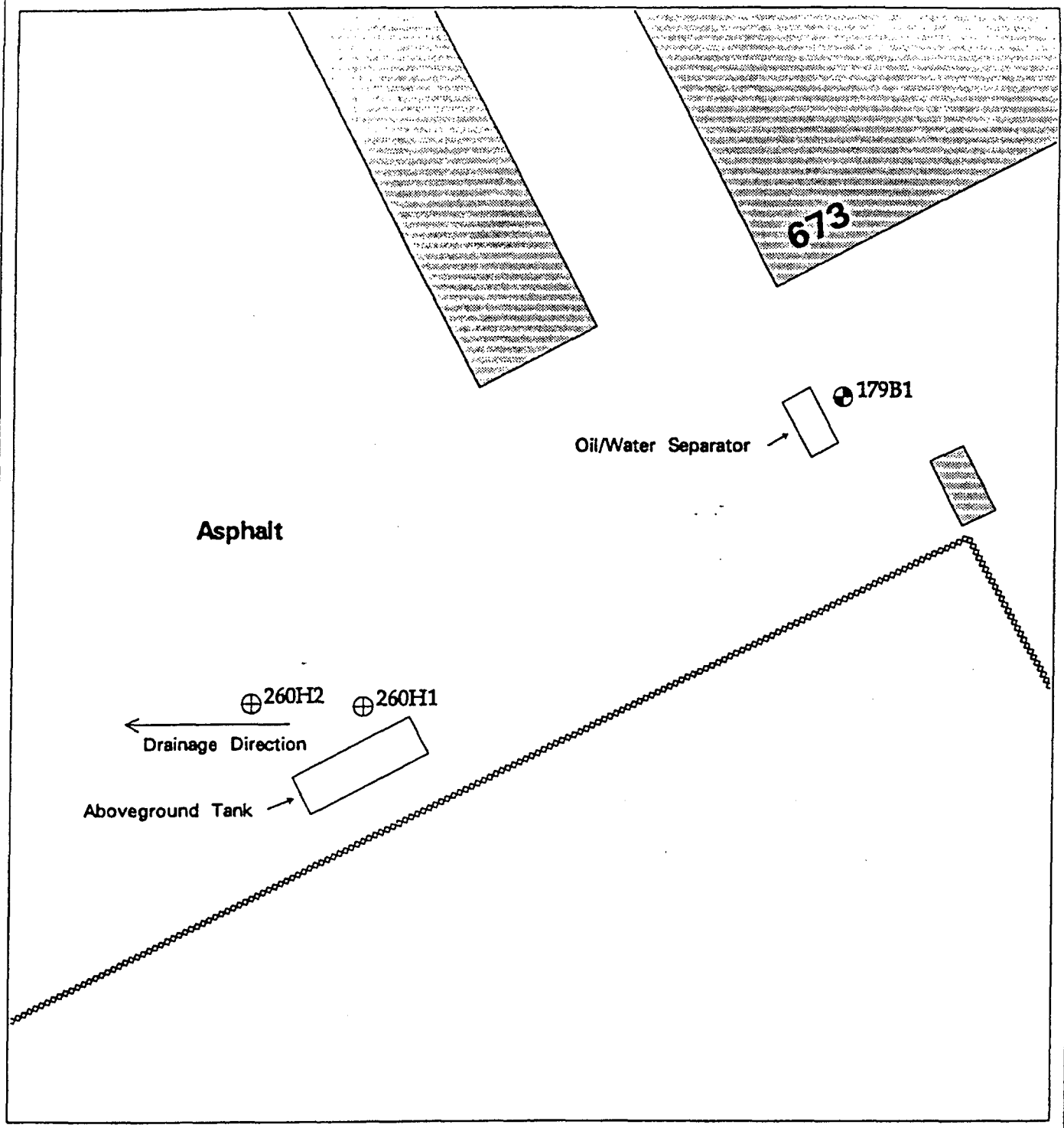

Figure 55 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

179 - Oil/Water Separator

260 - Aboveground Storage Tank

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SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
179	Oil/Water Separator (55)	B1	5	ND	NA	NA	Methylene Chloride-7 BJ * Acetone-31 *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-11 BJ * Acetone-34 *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-12 B * Acetone-25 * Toluene-6 J Carbon Tetrachloride-2J	NA	NA	NA		
			20	ND	NA	NA	Methylene Chloride-18 B * Acetone-24 *	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-12 B * Acetone-21 *	NA	NA	NA		

CRDL - Contract Required Detection Limit

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
260	Above Ground Storage Tank (55)	H1	2	NA	ND	ND	Methylene Chloride-7 BJ * Acetone-20 B *	NA	NA	NA	Repair cracks in pavement.	To prevent future migration of petroleum hydrocarbons. TPH/TFH < 1000 ppm VOCs < CRDL CRDL - Contract Required Detection Limit
			5	NA	45.4	ND	Methylene Chloride-7 BJ * Acetone-86 B *	NA	NA	NA		
			5 (Duplicate)	NA	385	191	Methylene Chloride-16 B * Acetone-43 B *	NA	NA	NA		
		H2	2	NA	ND	ND	Methylene Chloride-13 B * Acetone-36 B *	NA	NA	NA		
			5	NA	ND	ND	Methylene Chloride-9 BJ * Acetone-41 B *	NA	NA	NA		

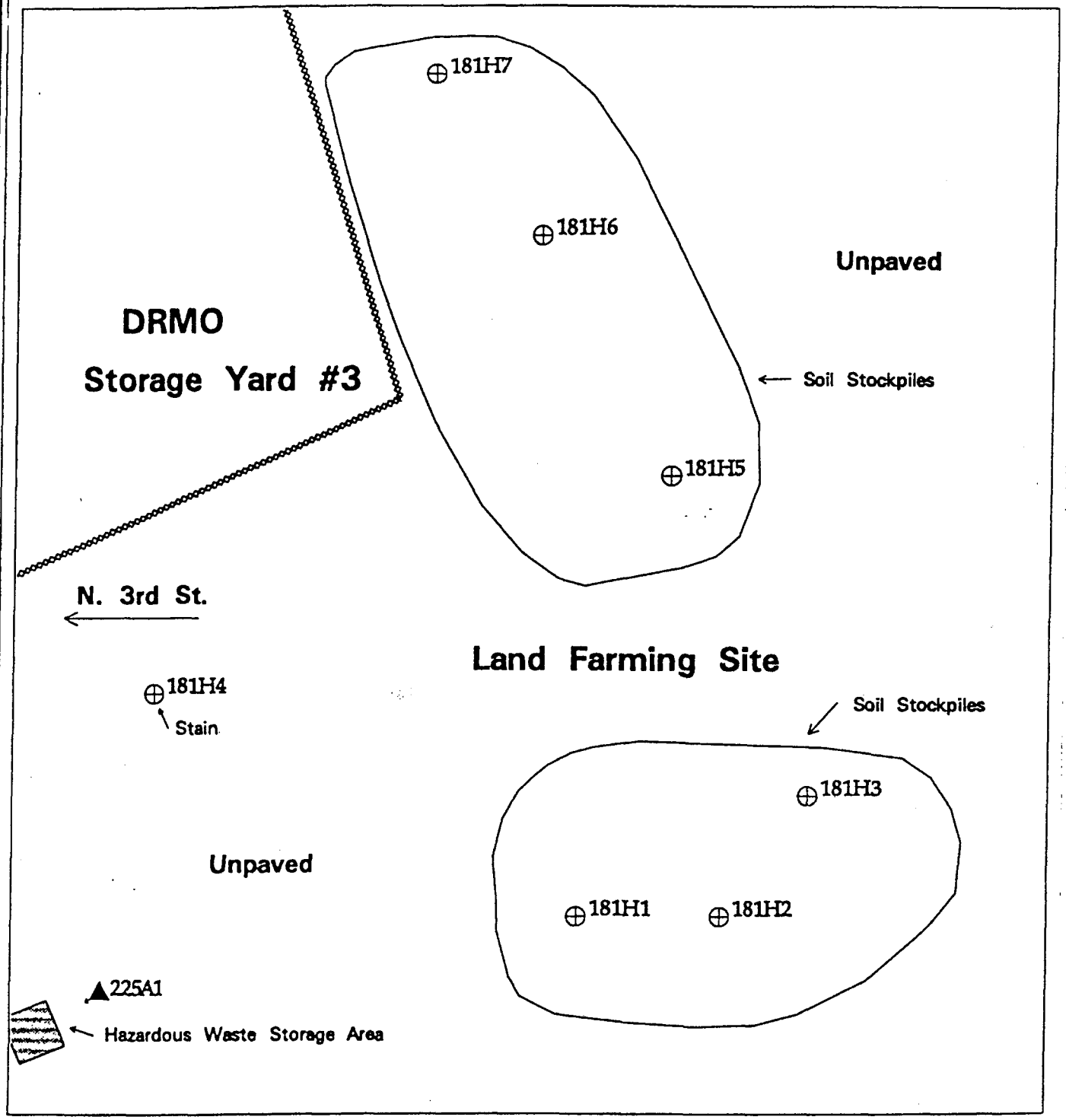

Figure 56 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

181 - Landfarming Area

225 - Hazardous Waste Storage Area

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MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
181	Landfarming Site (56)	H1	2	NA	ND	ND	Methylene Chloride-1 BJ * Acetone-8 BJ * Toluene-1 J	NA	NA	NA	NFA	TPH/TFH < 1000 ppm VOCs < CRDL
			5	NA	ND	ND	Methylene Chloride-4 BJ * Acetone-9 BJ *	NA	NA	NA		
		H2	2	NA	ND	ND	Methylene Chloride-1 BJ * Acetone-12 B * Toluene-1 J	NA	NA	NA		CRDL - Contract Required Detection Limit
			5	NA	ND	ND	ND	NA	NA	NA		
			5 (Duplicate)	NA	ND	ND	Methylene Chloride-1 BJ * Acetone-6 BJ *	NA	NA	NA		
		H3	2	NA	ND	ND	Methylene Chloride-1 BJ * Acetone-16 B * Toluene-1 J	NA	NA	NA		
			5	NA	ND	ND	Methylene Chloride-1 BJ * Acetone-23 B * Toluene-2 J	NA	NA	NA		
		H4	2	NA	ND	ND	Methylene Chloride-1 BJ * Acetone-15 B * Toluene-2 J	NA	NA	NA		
			5	NA	ND	ND	Methylene Chloride-1 BJ * Acetone-10 BJ *	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
181	Landfarming Site (56)	H5	3	NA	ND	ND	Methylene Chloride-2 BJ * Acetone-26 B * Toluene-2 J	NA	NA	NA	NFA	TPH/TFH < 1000 ppm VOCs < CRDL
			7	NA	ND	ND	Acetone-15 B *	NA	NA	NA		
		H6	2	NA	ND	ND	Methylene Chloride-4 BJ * Acetone-14 B * Toluene-1 J	NA	NA	NA		
			5	NA	ND	ND	Methylene Chloride-1 BJ * Acetone-11 B * Toluene-1 J Xylene-2 J	NA	NA	NA		
		H7	2	NA	300 Z	ND	Acetone-18 B * Toluene-2 J PCE-2 J Xylene-2 J	NA	NA	NA		
			5	NA	ND	ND	Methylene Chloride-1 BJ * Acetone-7 BJ * 2-Butanone-3 J	NA	NA	NA		

CRDL - Contract Required Detection Limit

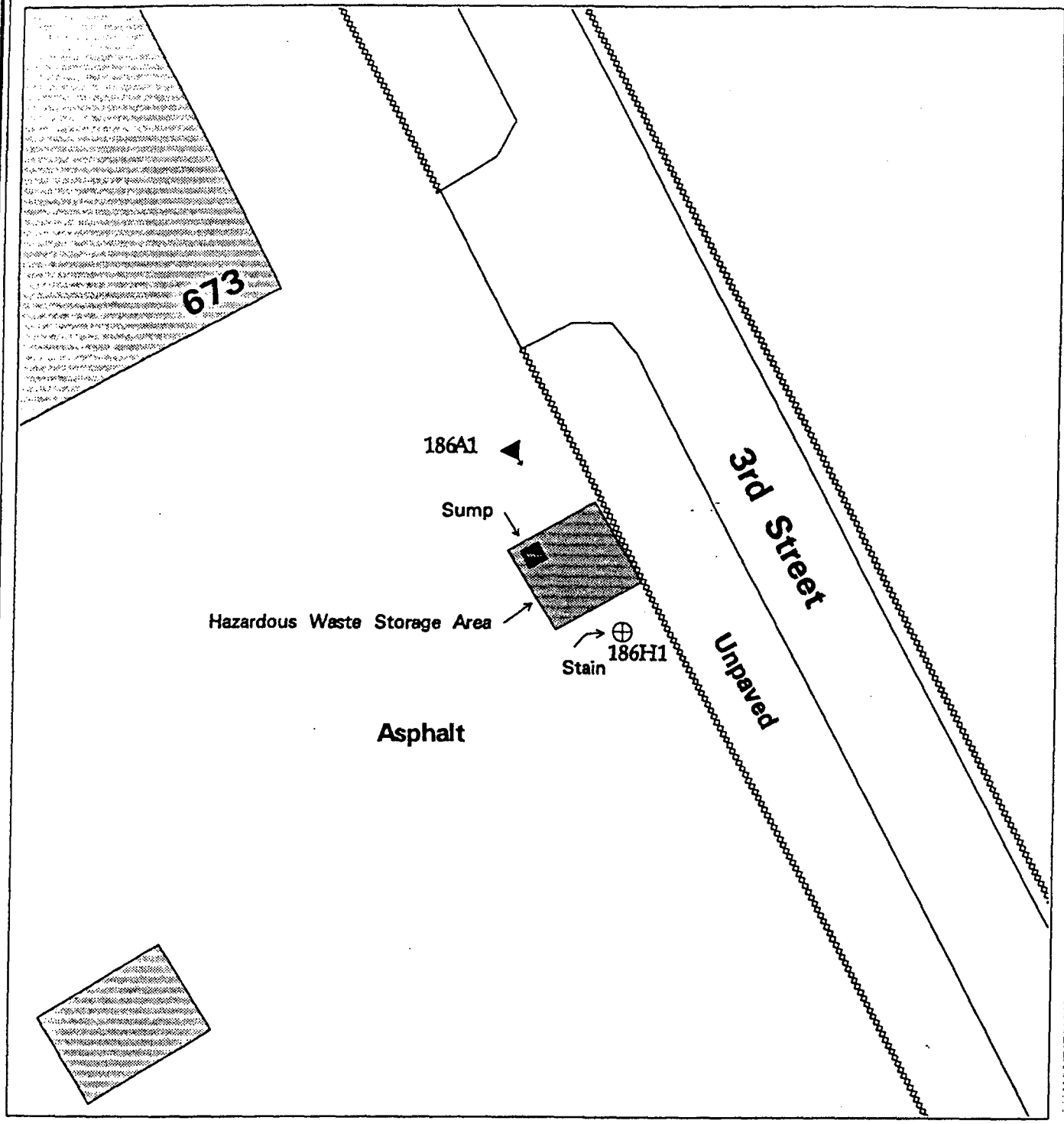

Figure 57 Sample Location Map

SWMU/AOC Number and Type:
186 - Hazardous Waste Storage Area

Boring Location and Number:

- 123H4 5' Deep Boring
- 123B4 25' Deep Boring
- 123A4 60' Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
186	Hazardous Waste Storage Area (57)	A1	10	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-8 BJ *	Diethylphthalate-47 J Di-n-butylphthalate-45 BJ *	ND	NAB	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < BGT CRDL - Contract Required Detection Limit BGT - Background Threshold Value
			20	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-8 BJ *	Diethylphthalate-40 J	ND	NAB		
			30	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-8 BJ *	Diethylphthalate-40 J	ND	NAB		
			40	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-8 BJ *	Diethylphthalate-37 J Di-n-butylphthalate-32 BJ *	ND	NAB		
			50	ND	ND	ND	Methylene Chloride-7 BJ *	Diethylphthalate-52 J	ND	NAB		
			60	ND	ND	ND	Methylene Chloride-9 BJ * Acetone-4 BJ *	Diethylphthalate-41 J	ND	NAB		
		H1	2	ND	ND	ND	Methylene Chloride-2 BJ * Acetone-6 BJ *	Di-n-butylphthalate-20 BJ * Bis(2-Ethylhexyl)phthalate-22 BJ * Naphthalene-87 J	ND	NAB		
			5	ND	ND	ND	Methylene Chloride-26 B * Toluene-2 J	Diethylphthalate-18 J Di-n-butylphthalate-24 J Bis(2-Ethylhexyl)phthalate-18 BJ *	Dieldrin-6.2 J	NAB		
			5 (Duplicate)	ND	ND	ND	Methylene Chloride-30 B * Toluene-1 J	Naphthalene-61 J	ND	NAB		

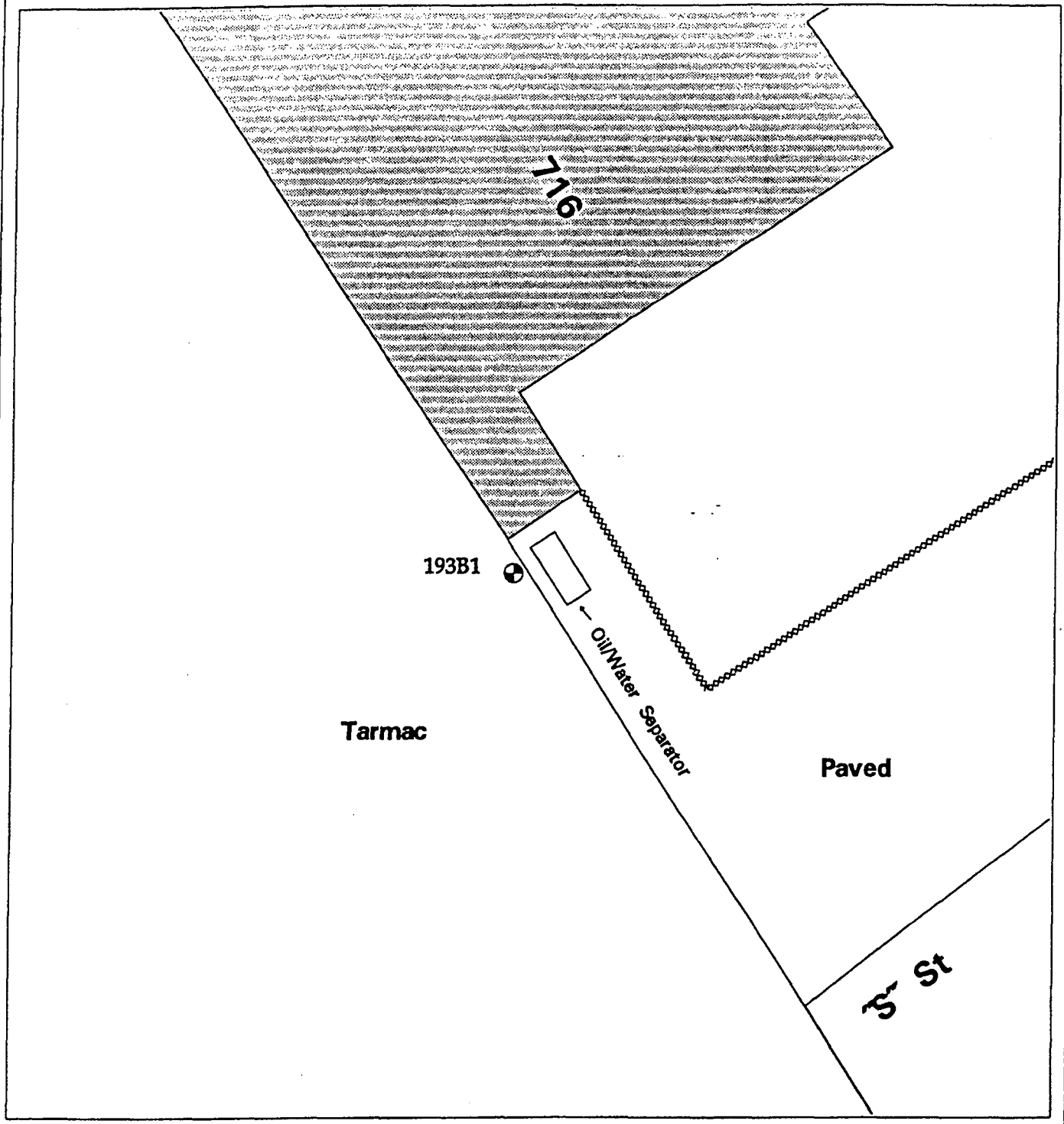

Figure 58 Sample Location Map

SWMU/AOC Number and Type:
193 - Oil/Water Separator

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

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MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
193	Oil/Water Separator (58)	B1	5	ND	NA	NA	Methylene Chloride-16 B * Acetone-15 B *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-14 B * Acetone-16 B *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-14 B * Acetone-11 BJ *	NA	NA	NA		
			20	ND	NA	NA	Methylene Chloride-15 B * Acetone-9 BJ *	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-16 B * Acetone-23 B *	NA	NA	NA		

CRDL - Contract Required Detection Limit

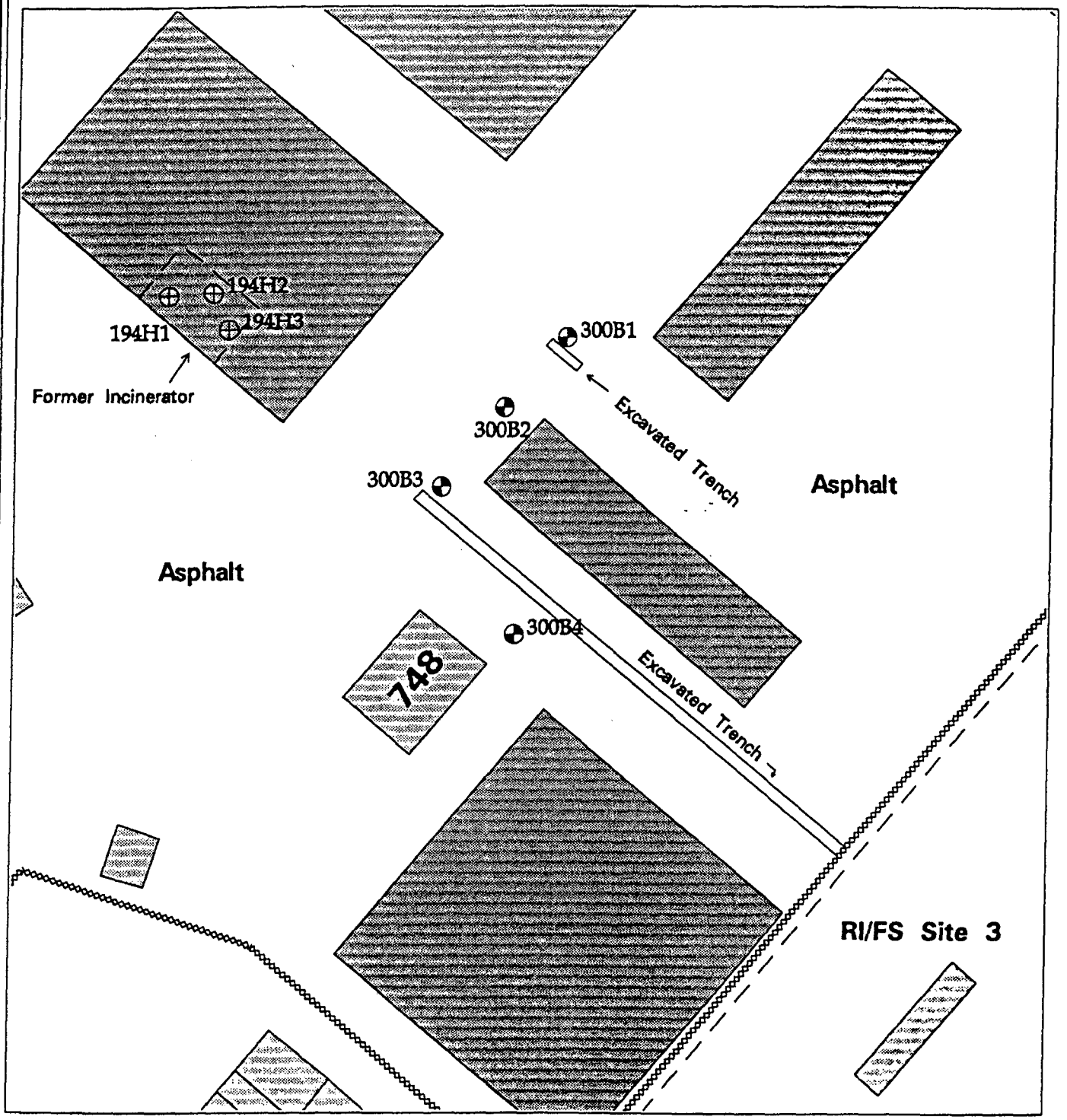

Figure 59 Sample Location Map

Boring Location and Number:

- ⊕ 123H4 5′ Deep Boring
- ◕ 123B4 25′ Deep Boring
- ▲ 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

194 - Former Incinerator Site

300 - Spill Area

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS: TPH (mg/kg)	TFH (mg/kg) Gasoline	TFH (mg/kg) Diesel	VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	RECOMMENDATIONS: Action	RECOMMENDATIONS: Rationale
194	Former Incinerator Site (59)	H1	2	50.7	2 Z	ND	Methylene Chloride-6 BJ * Acetone-62 B * 2-Butanone-10 J PCE-14	Diethylphthalate-26 J Di-n-butylphthalate-38 J Bis(2-Ethylhexyl)phthalate-41 J	ND	Silver-ND Selenium-ND Lead-12.0	Further investigation under the RI/FS program.	Petroleum hydrocarbon contamination, extent unknown. TPH/TFH > 1000 ppm VOCs > ETM & PRG SVOCs < CRDL Pest/PCB < ETM & PRG Metals < ETM & PRG CRDL - Contract Required Detection Limit
			2 (Duplicate)	1650	10 Z	850 ZJ	Methylene Chloride-4 BJ * Acetone-57 B * Xylene-4 J Ethylbenzene-2 J 1,2-Dichloroethene-11 TCE-3 J PCE-130	ND	ND	Silver-1.1 B Selenium-0.7 B Lead-9.4		
			5	779	ND	270 ZJ	Methylene Chloride-6 BJ * Acetone-32 B * Toluene-2 J PCE-9 J	Butylbenzylphthalate-390 J	ND	Silver-0.5 B Selenium- ND Lead-13.3		
		H2	2	421	ND	160 ZJ	Methylene Chloride-7 BJ * Acetone-93 B * PCE-3 J 2-Butanone-11 J	ND	ND	Silver-ND Selenium- ND Lead-19.6		
			5 No sample taken	NA	NA	NA	NA	NA	NA	NA		
		H3	2	1410	ND	440 Z	Methylene Chloride-7 BJ * Acetone-39 B * PCE-4 J	ND	4,4'-DDD-5.2	Silver-0.85 B Selenium-ND Lead-50.6		
			4	2680	4 Z	830 Z	Methylene Chloride-5 BJ * Acetone-59 B * Xylene-3 J PCE-76 TCE-5 J 2-Butanone-9 J	ND	ND	Silver-0.73 B Selenium-0.87 B Lead-18.4		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
300	Spill Area East of SWMU/AOC 194 (59)	B1	5	3140	150 Z	4680 Z	Methylene Chloride-30 BJ * Toluene-16 BJ *	2-Methylnaphthalene-12000	ND	Copper-17.2 Lead-16 Antimony-ND Silver-0.86 B Zinc-62.1 Barium-168	Further investigation under the RI/FS program.	Petroleum hydrocarbon contamination, unknown extent.
			10	13500	1500 Z	8650 Z	Methylene Chloride-20 BJ * Toluene-14 BJ * Acetone-96 * Xylene-8 J	2-Methylnaphthalene-12000 Naphthalene-1300 J	ND	Copper-494 Lead-366 Antimony-ND Silver-2.3 Zinc-332 Barium-224		TPH/TFH > 1000 ppm VOCs < CRDL SVOCs < ETM & PRG Pest/PCB < CRDL Metals < ETM & PRG
			15	277	9 Z	710 Z	Methylene Chloride-5 BJ * Acetone-13 * Toluene-6 J	Di-n-butylphthalate-18 J Bis(2-Ethylhexyl)phthalate-25 BJ * Phenol-29 BJ *	ND	Copper-252 Lead-254 Antimony-2.9 BN Silver-3.1 Zinc-382 Barium-200		CRDL - Contract Required Detection Limit
			20	364	570 Z	370 Z	Methylene Chloride-6 BJ * Acetone-23 * Toluene-2 J	2-Methylnaphthalene-1700 Di-n-butylphthalate-20 J Bis(2-Ethylhexyl)phthalate-100 BJ * Butylbenzylphthalate-36 J	ND	Copper-8.5 Lead-9.3 B Antimony-ND Silver-ND Zinc-23.8 Barium-83.3		
			25	61.9	620 Z	31 Z	Methylene Chloride-6 BJ *	2-Methylnaphthalene-40 J Diethylphthalate-19 J Bis(2-Ethylhexyl)phthalate-41 BJ *	ND	Copper-4.5 B Lead-5.1 Antimony-ND Silver-ND Zinc-16 Barium-84.4		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
300	Spill Area East of SWMU/AOC 194 (59)	B2	5	ND	ND	ND	Methylene Chloride-4 BJ * Acetone-4 J *	Diethylphthalate-31 J	ND	Copper-25.3 Lead-9.3 Antimony-ND Silver-ND Zinc-55.4 Barium-124	Further investigation under the RI/FS program.	Petroleum hydrocarbon contamination, unknown extent.
			5 (Duplicate)	ND	ND	ND	Methylene Chloride-4 BJ * Carbon Disulfide-2 J	Diethylphthalate-44 J Di-n-butylphthalate-25 BJ * Bis(2-Ethylhexyl)phthalate-83 J Butylbenzylphthalate-28 J Benzo(g,h,i)Perylene-31 J Di-n-octylphthalate-55 J	ND	Not Analyzed		TPH/TFH > 1000 ppm VOCs < CRDL SVOCs < ETM & PRG Pest/PCB < CRDL Metals < ETM & PRG
			10	ND	ND	ND	Methylene Chloride-4 BJ *	Diethylphthalate-130 J Bis(2-Ethylhexyl)phthalate-40 J	ND	Copper-238 Lead-918 Antimony-ND Silver-3.0 Zinc-470 Barium-305		CRDL - Contract Required Detection Limit
			15	ND	ND	ND	Methylene Chloride-4 BJ *	Diethylphthalate-61 J Di-n-butylphthalate-20 BJ * Bis(2-Ethylhexyl)phthalate-100 J Butylbenzylphthalate-22 J	ND	Copper-3.2 B Lead-0.66 Antimony-ND Silver-ND Zinc-20.1 Barium-51.5		
			20	ND	ND	ND	Methylene Chloride-4 BJ *	Diethylphthalate-31 J Bis(2-Ethylhexyl)phthalate-140 J Butylbenzylphthalate-66 J	ND	Copper-14.5 Lead-14.4 Antimony-ND Silver-ND Zinc-39.8 Barium-86.2		
			25	ND	ND	ND	Methylene Chloride-4 BJ *	Diethylphthalate-20 J Bis(2-Ethylhexyl)phthalate-65 J	ND	Copper-4.8 B Lead-0.60 B Antimony-ND Silver-ND Zinc-16.2 Barium-88.1		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
300	Spill Area, East of SWMU/AOC 194 (59)	B3	5	ND	ND	ND	Methylene Chloride-7 BJ * Toluene-1 J Chloroform-1 J	NA	ND	Copper-1.9 B Lead-0.43 B Antimony-ND Silver-ND Zinc-12.5 Barium-25.8	Further investigation under the RI/FS program.	Petroleum hydrocarbon contamination, unknown extent.
			5 (Duplicate)	ND	ND	ND	Methylene Chloride-5 BJ * Toluene-2 J	Diethylphthalate-30 J Bis(2-Ethylhexyl)phthalate-18 BJ *	ND	Copper-32.7 Lead-15.8 Antimony-ND Silver-ND Zinc-60.4 Barium-92.5		TPH/TFH > 1000 ppm VOCs < CRDL SVOCs < ETM & PRG Pest/PCB < CRDL Metals < ETM & PRG
			10	ND	ND	ND	Methylene Chloride-5 BJ *	Bis(2-Ethylhexyl)phthalate-46 BJ *	ND	Copper-15.1 Lead-8.6 Antimony-ND Silver-ND Zinc-35.8 Barium-84.3		CRDL - Contract Required Detection Limit
			15	ND	ND	ND	Methylene Chloride-7 BJ *	Diethylphthalate-21 J	ND	Copper-2.3 B Lead-0.69 Antimony-ND Silver-ND Zinc-14.8 Barium-142		
			20	ND	ND	ND	Methylene Chloride-8 BJ *	Diethylphthalate-290 J Bis(2-Ethylhexyl)phthalate-29 BJ *	ND	Copper-4.4 B Lead-0.38 B Antimony-ND Silver-ND Zinc-15.1 Barium-85.6		
			25	ND	1 Z	ND	Methylene Chloride-7 BJ * Acetone-3 J *	Butylbenzylphthalate-36 J Diethylphthalate-36 J Di-n-butylphthalate-17 J Bis(2-Ethylhexyl)phthalate-240 BJ	ND	Copper-7.3 Lead-0.63 Antimony-ND Silver-ND Zinc-24.7 Barium-145		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
300	Spill Area East of SWMU/AOC 194 (59)	B4	5	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-3 J * Bromoform-1 J	Diethylphthalate-25 J Bis(2-Ethylhexyl)phthalate-24 BJ *	ND	Copper-5.1 Lead-0.56 B Antimony-ND Silver-ND Zinc-15.2 Barium-79.5	Further investigation under the RI/FS program.	Petroleum hydrocarbon contamination, unknown extent.
			10	ND	ND	ND	Methylene Chloride-11 B * Acetone-4 J *	Diethylphthalate-20 J	ND	Copper-2.4 B Lead-0.54 B Antimony-ND Silver-ND Zinc-15.2 Barium-53.6		TPH/TFH > 1000 ppm VOCs < CRDL SVOCs < ETM & PRG Pest/PCB < CRDL Metals < ETM & PRG
			15	ND	ND	ND	Methylene Chloride-10 BJ * Toluene-1 J	Diethylphthalate-38 J	ND	Copper-2.1 B Lead-0.43 B Antimony-ND Silver-ND Zinc-13.9 Barium-48.4		CRDL - Contract Required Detection Limit
			20	ND	ND	ND	Methylene Chloride-9 BJ *	Diethylphthalate-28 J Bis(2-Ethylhexyl)phthalate-45 BJ *	ND	Copper-2.4 B Lead-0.58 B Antimony-ND Silver-ND Zinc-15.9 Barium-34.8		
			25	ND	ND	ND	Methylene Chloride-13 B *	Diethylphthalate-41 J Bis(2-Ethylhexyl)phthalate-23 BJ *	ND	Copper-6.1 Lead-0.87 Antimony-ND Silver-ND Zinc-18.3 Barium-85.8		

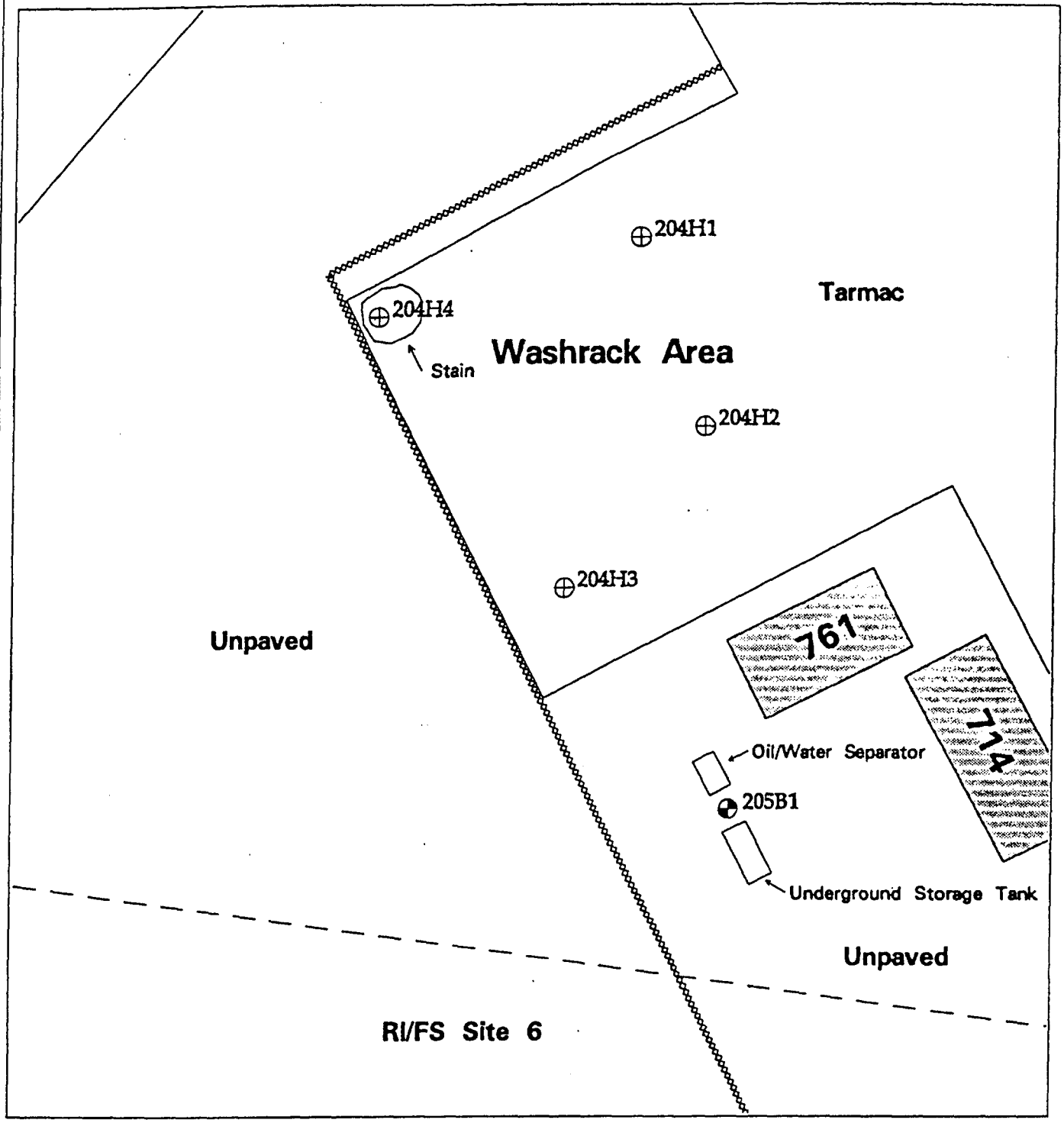

Figure 63 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

204 - Vehicle Washrack

205 - Oil/Water Separator

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
204	Wash Rack (63)	H1	2	ND	NA	NA	Methylene Chloride-7 BJ *	NA	NA	NA	Repair cracks in pavement.	To prevent future migration of petroleum hydrocarbons. TPH/TFH > 1000 ppm VOCs < ETM & PRG
			5	ND	NA	NA	Methylene Chloride-10 BJ * Acetone-14 B *	NA	NA	NA		
		H2	2	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-49 B *	NA	NA	NA		
			2 (Duplicate)	ND	NA	NA	Methylene Chloride-8 BJ * Acetone-190 B *	NA	NA	NA		
			5	ND	NA	NA	Methylene Chloride-9 BJ * Acetone-11 BJ *	NA	NA	NA		
		H3	2	4582	NA	NA	Methylene Chloride-31 BJ * Acetone-200 B * Xylene-500 Ethylbenzene-76	NA	NA	NA		
			5	100	NA	NA	Methylene Chloride-7 BJ *	NA	NA	NA		
		H4	2	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-39 B *	NA	NA	NA		
			5	ND	NA	NA	Methylene Chloride-10 BJ * Acetone-25 B *	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
205	Oil/Water Separator (63)	B1	5	ND	NA	NA	Methylene Chloride-10 BJ * Acetone-21 *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-8 BJ * Acetone-19 *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-12 B * Acetone-23 *	NA	NA	NA		CRDL - Contract Required Detection Limit
			20	ND	NA	NA	Methylene Chloride-15 B * Acetone-39 *	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-17 *	NA	NA	NA		

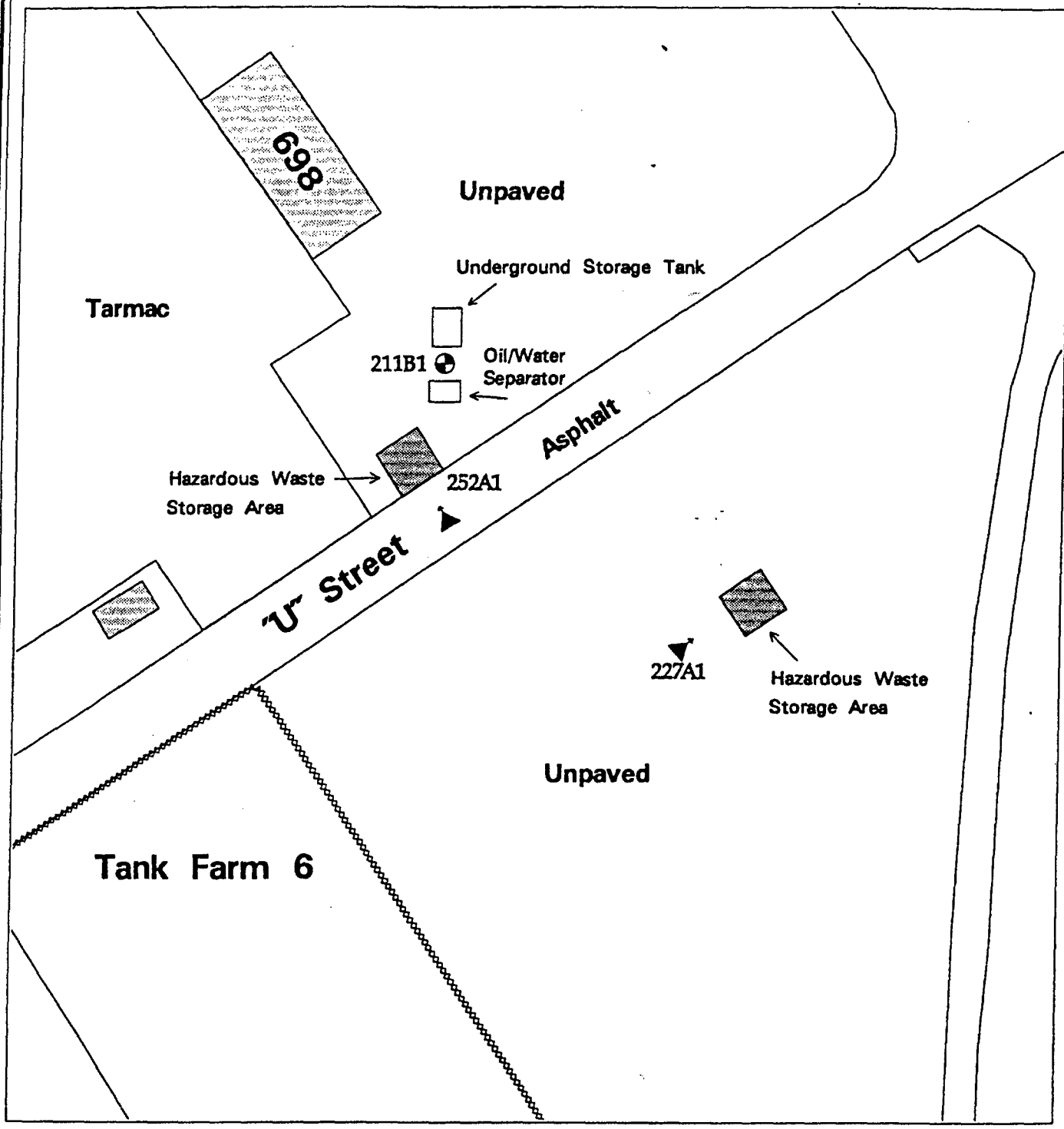

Figure 64 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

211 - Oil/Water Separator

227 - Hazardous Water Storage Area

252 - Hazardous Waste Storage Area

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
211	Oil/Water Separator (64)	B1	5	ND	NA	NA	Methylene Chloride-8 BJ *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-20 *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-9 BJ *	NA	NA	NA		CRDL - Contract Required Detection Limit
			20	ND	NA	NA	Methylene Chloride-7 BJ * Acetone-13 B *	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-10 BJ *	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
227	Hazardous Waste Storage Area (64)	A1	10	79	ND	ND	Methylene Chloride-7 BJ * Acetone-13 B *	ND	ND	Silver-ND Barium-80.5	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < ETM & PRG CRDL - Contract Required Detection Limit
			25	58	ND	ND	Methylene Chloride-6 BJ *	ND	ND	Silver-ND Barium-174		
			30	76	ND	ND	Methylene Chloride-11 BJ * Acetone-10 BJ *	Butylbenzylphthalate-310 J	ND	Silver-0.41 B Barium-134		
			40	ND	ND	ND	Methylene Chloride-14 B * Acetone-17 B *	ND	ND	Silver-0.73 B Barium-329		
			50	39	ND	ND	Methylene Chloride-8 BJ * Acetone-14 B *	ND	ND	Silver-0.59 B Barium-169		
			57	35	ND	ND	Methylene Chloride-7 BJ * Acetone-8 BJ *	ND	ND	Silver-0.48 B Barium-169		

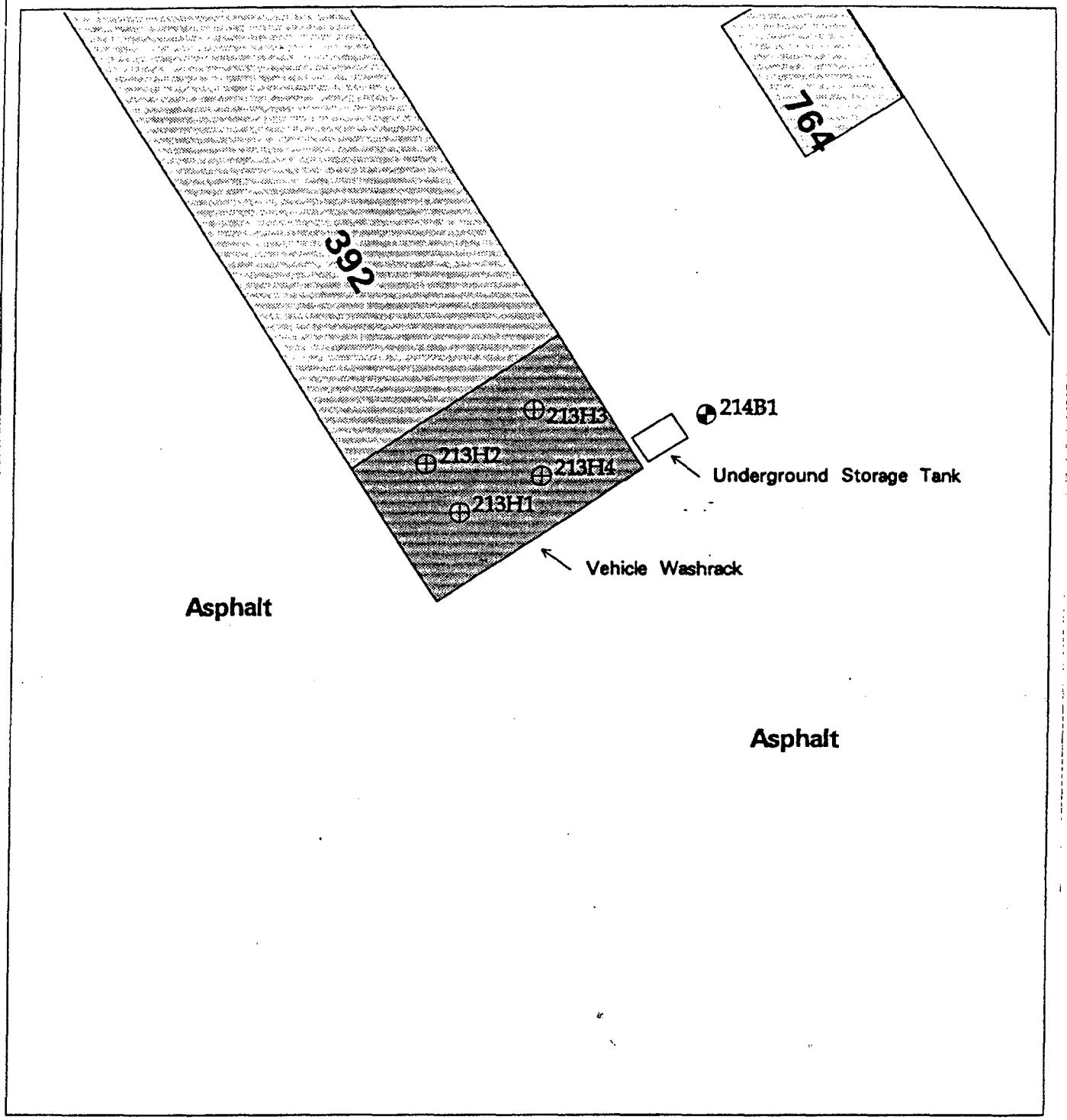

Figure 65 Sample Location Map

Boring Location and Number:

- ⊕ 123H4 5′ Deep Boring
- ◕ 123B4 25′ Deep Boring
- ▲ 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

SWMU/AOC Number and Type:

213 - Vehicle Washrack

214 - Underground Storage Tank

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
213	Vehicle Wash Rack (65)	H1	2	60.6	NA	NA	Methylene Chloride-4 BJ * Acetone-35 B * Toluene-3 J Xylene-7 J PCE-2 J	NA	NA	NA	Repair cracks in pavement.	To prevent future migration of petroleum hydrocarbons. TPH/TFH < 1000 ppm VOCs < CRDL CRDL - Contract Required Detection Limit
			5	170	NA	NA	Methylene Chloride-4 BJ * Acetone-45 B * Toluene-6 J PCE-1 J	NA	NA	NA		
		H2	2	ND	NA	NA	Methylene Chloride-4 BJ * Acetone-12 B * 2-Butanone-3 J	NA	NA	NA		
			2 (Duplicate)	45.9	NA	NA	Methylene Chloride-3 BJ * Acetone-23 B * Xylene-2 J	NA	NA	NA		
			5	733	NA	NA	Methylene Chloride-5 BJ * Acetone-36 B * Toluene-3 J Xylene-9 J PCE-8 J	NA	NA	NA		
		H3	2	39.0	NA	NA	Methylene Chloride-6 BJ * Acetone-13 B * Toluene-3 J	NA	NA	NA		
			5	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-7 BJ *	NA	NA	NA		
		H4	2	34.3	NA	NA	Methylene Chloride-4 BJ * Acetone-46 B * Toluene-2 J PCE-2 J	NA	NA	NA		
			5	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-19 B *	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
214	Underground Storage Tank (65)	B1	5	ND	NA	NA	Methylene Chloride-4 BJ * Acetone-8 BJ *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-6 BJ *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-14 B *	NA	NA	NA		
			20	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-15 B *	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-28 B *	NA	NA	NA		

CRDL - Contract Required Detection Limit

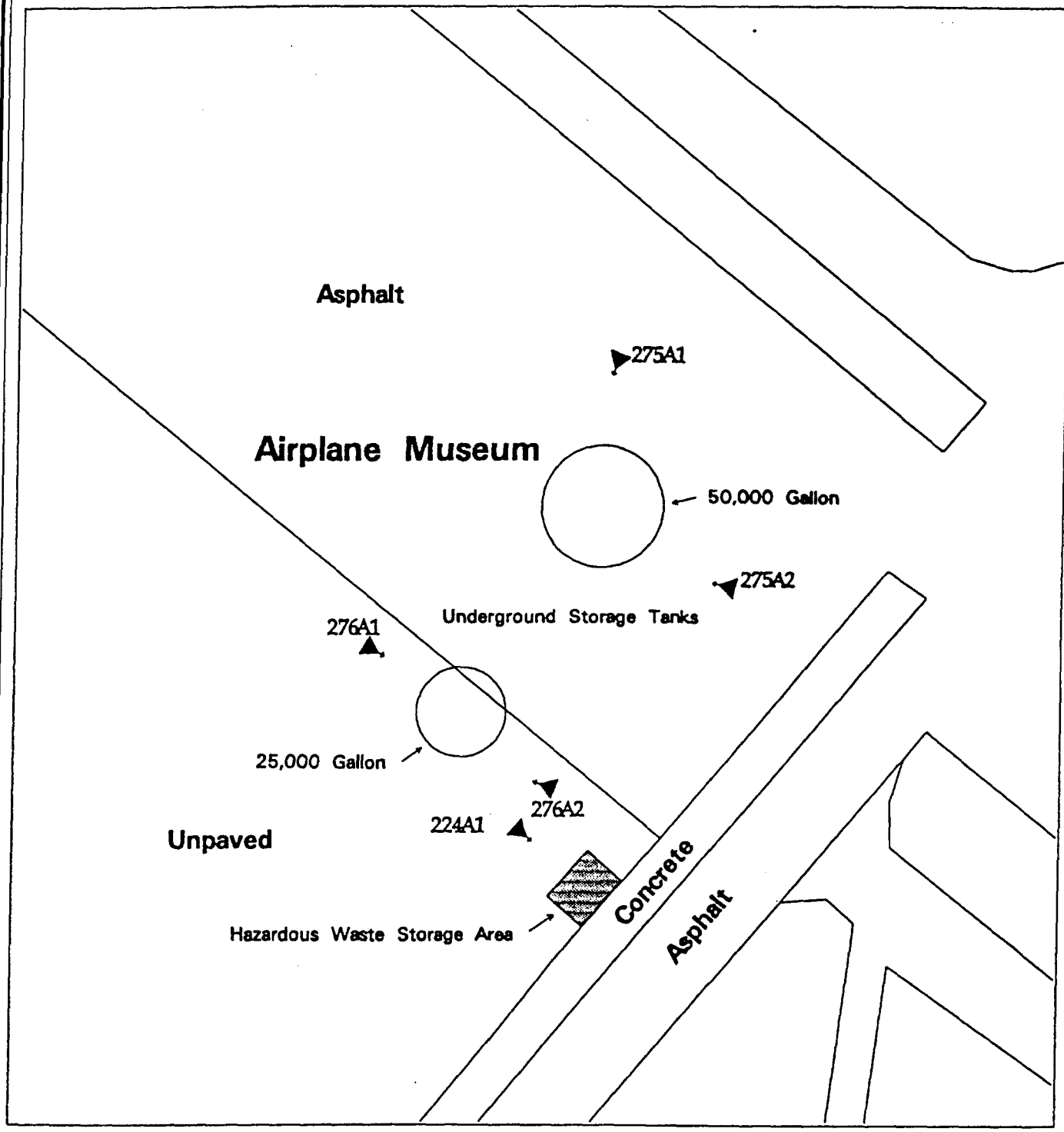

Figure 66 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

224 - Hazardous Waste Storage Area

275 - Underground Storage Tank

276 - Underground Storage Tank

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
224	Hazardous Waste Storage Area (66)	A1	10	ND	ND	ND	Methylene Chloride-5 BJ * Toluene-1 J	Di-n-butylphthalate-29 BJ *	ND	NAB	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < BGT CRDL - Contract Required Detection Limit BGT - Background Threshold Value
			20	ND	ND	ND	Methylene Chloride-6 BJ * Toluene-3 J	Diethylphthalate-39 BJ * Di-n-butylphthalate-46 BJ *	ND	NAB		
			30	ND	ND	ND	Methylene Chloride-4 BJ * Toluene-1 J	Diethylphthalate-39 BJ * Di-n-butylphthalate-35 BJ *	ND	NAB		
			30 (Duplicate)	ND	ND	ND	Methylene Chloride-11 BJ * Toluene-2 J	Di-n-butylphthalate-31 BJ * Bis(2-Ethylhexyl)phthalate-58 J	ND	NAB		
			40	ND	ND	ND	Methylene Chloride-9 BJ * Toluene-2 J	Di-n-butylphthalate-40 BJ *	ND	NAB		
			50	ND	ND	ND	Methylene Chloride-9 BJ * Toluene-2 J	Di-n-butylphthalate-25 BJ *	ND	NAB		
			60	ND	ND	ND	Methylene Chloride-14 B * Toluene-4 J	Diethylphthalate-46 BJ * Di-n-butylphthalate-51 BJ *	ND	NAB		

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
275	Underground Storage Tank (66)	A1	10	ND	ND	ND	Methylene Chloride-8 BJ *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			20	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-13 * Toluene-2 J Xylene-2 J	NA	NA	NA		
			20 (Duplicate)	ND	ND	ND	Methylene Chloride-6 BJ * Toluene-1 J	NA	NA	NA		CRDL - Contract Required Detection Limit
			30	ND	ND	ND	Methylene Chloride-6 BJ *	NA	NA	NA		
			40	ND	ND	ND	Methylene Chloride-7 BJ * Toluene-2 J	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-6 BJ * Toluene-2 J	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-7 BJ * Toluene-2 J	NA	NA	NA		
		A2	10	ND	ND	ND	Methylene Chloride-7 BJ * Toluene-1 J	NA	NA	NA		
			20	ND	ND	ND	Methylene Chloride-6 BJ * Toluene-2 J	NA	NA	NA		
			30	ND	ND	ND	Methylene Chloride-6 BJ * Acetone-7 J * Toluene-2 J	NA	NA	NA		
			40	ND	ND	ND	Methylene Chloride-6 BJ * Toluene-1 J	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-6 BJ * Toluene-2 J	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-5 BJ * Acetone-14 * Toluene-1 J	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
276	Underground Storage Tank (66)	A1	10	ND	ND	ND	Methylene Chloride-5 BJ * Acetone-3 J * Toluene-2 J	NA	NA	NA	NFA	TPH/TFH < 1000 ppm VOCs < CRDL
			10 (Duplicate)	ND	ND	ND	Methylene Chloride-11 BJ * Acetone-8 J * Toluene-2 J	NA	NA	NA		
			20	192	ND	300 Z	Methylene Chloride-12 B * Xylene-7 J	NA	NA	NA		CRDL - Contract Required Detection Limit
			30	ND	ND	ND	Methylene Chloride-5 BJ *	NA	NA	NA		
			40	ND	ND	ND	Methylene Chloride-5 BJ *	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-4 BJ *	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-11 BJ *	NA	NA	NA		
		A2	10	ND	ND	ND	Methylene Chloride-8 BJ * Acetone-7 J * Toluene-2 J	NA	NA	NA		
			10 (Duplicate)	ND	ND	ND	Methylene Chloride-7 BJ * Toluene-2 J	NA	NA	NA		
			20	ND	ND	ND	Methylene Chloride-8 BJ * Toluene-2 J	NA	NA	NA		
			30	ND	ND	ND	Methylene Chloride-6 BJ *	NA	NA	NA		
			40	ND	ND	ND	Methylene Chloride-7 BJ * Toluene-3 J	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-5 BJ *	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-6 BJ *	NA	NA	NA		

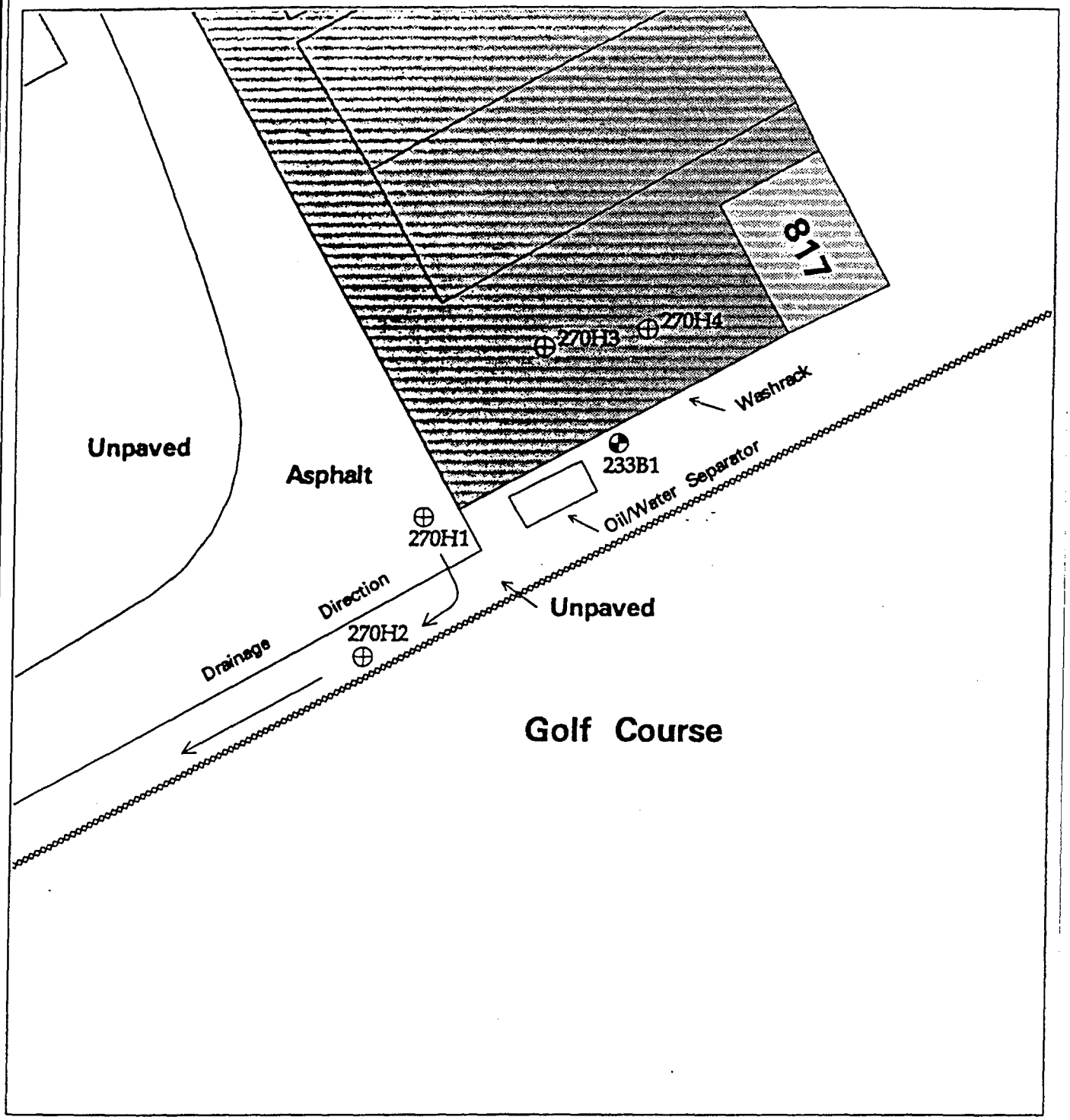

Figure 70 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

SWMU/AOC Number and Type:

233 - Oil/Water Separator

270 - Washrack

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
233	Oil/Water Separator (70)	B1	5	ND	NA	NA	Methylene Chloride-13 B * Acetone-14 B *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-29 B * Acetone-23 B*	NA	NA	NA		
			10 (Duplicate)	ND	NA	NA	Methylene Chloride-17 B * Acetone-12 B *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-24 B * Acetone-15 B *	NA	NA	NA		
			20	ND	NA	NA	Methylene Chloride-16 B * Acetone-7 BJ *	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-27 B * Acetone-13 B *	NA	NA	NA		

CRDL - Contract Required Detection Limit

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
270	Wash Rack (70)	H1	2	ND	NA	NA	Methylene Chloride-12 B *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			5	ND	NA	NA	Methylene Chloride-18 B * Toluene-2 J	NA	NA	NA		
		H2	2	ND	NA	NA	Methylene Chloride-13 B * Acetone-7 BJ *	NA	NA	NA		CRDL - Contract Required Detection Limit
			5	ND	NA	NA	Methylene Chloride-12 B *	NA	NA	NA		
		H3	2	ND	NA	NA	Methylene Chloride-21 B *	NA	NA	NA		
			5	ND	NA	NA	Methylene Chloride-16 B *	NA	NA	NA		
		H4	2	31	NA	NA	Methylene Chloride-18 B * Acetone-11 BJ *	NA	NA	NA		
			5	ND	NA	NA	Methylene Chloride-13 B * Toluene-1 J	NA	NA	NA		

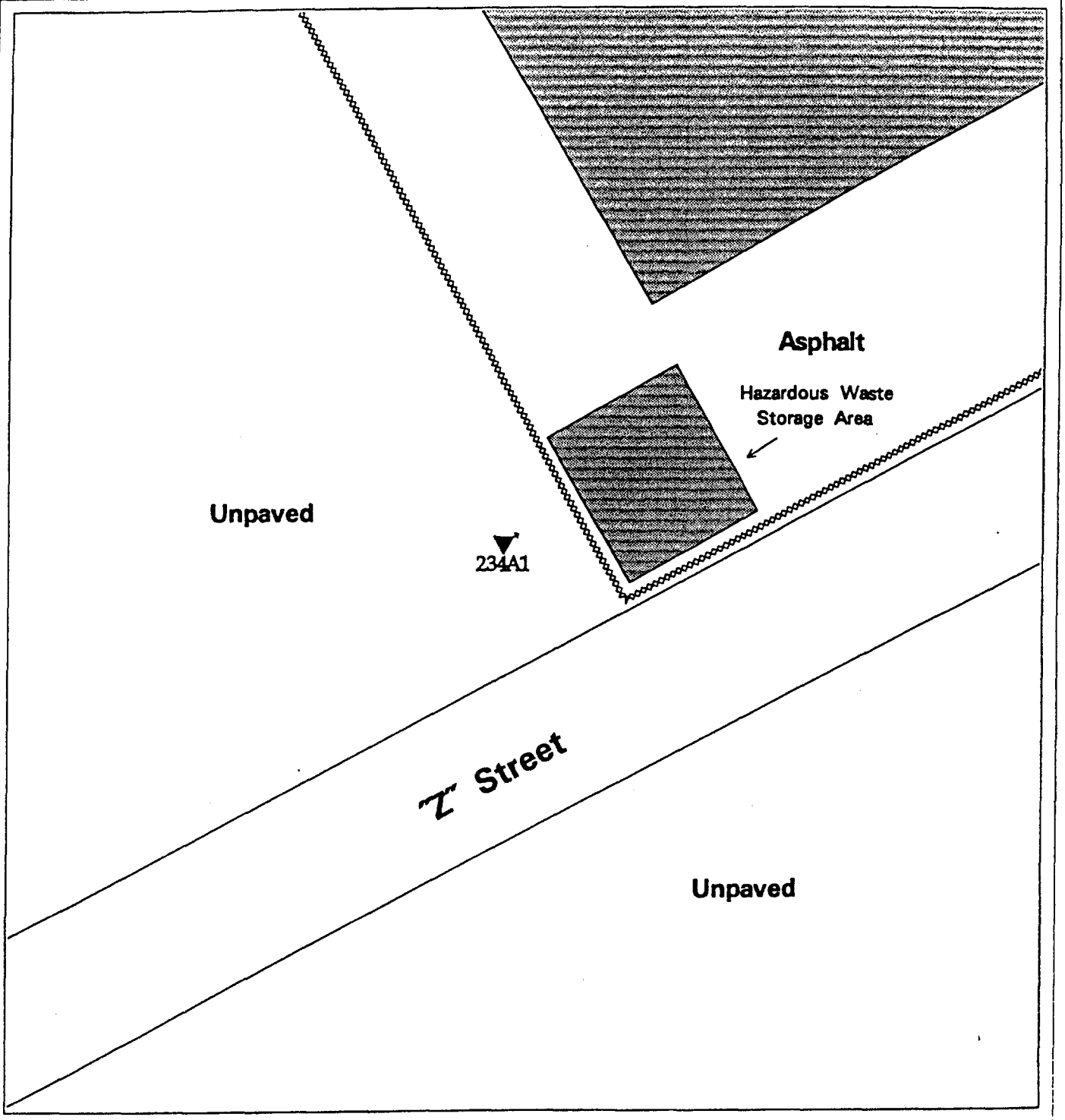

Figure 71 Sample Location Map

SWMU/AOC Number and Type:
234 - Hazardous Waste Storage Area

Boring Location and Number:

- 123H4 5' Deep Boring
- 123B4 25' Deep Boring
- 123A4 60' Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
234	Hazardous Waste Storage Area (71)	A1	10	ND	ND	ND	Methylene Chloride-15 B * Acetone-40 *	ND	ND	Thallium-ND	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < ETM & PRG CRDL - Contract Required Detection Limit
			20	ND	ND	ND	Methylene Chloride-10 BJ * Acetone-21 *	ND	ND	Thallium-0.70 B		
			30	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-24 *	ND	ND	Thallium-ND		
			40	ND	0.057	ND	Methylene Chloride-9 BJ * Acetone-24 *	ND	ND	Thallium-ND		
			50	ND	ND	ND	Methylene Chloride-4 BJ * Acetone-8 J *	ND	ND	Thallium-ND		
			50 (Duplicate)	ND	ND	ND	Methylene Chloride-5 BJ *	ND	ND	Thallium-ND		
			60	ND	ND	ND	Methylene Chloride-4 BJ *	ND	ND	Thallium-ND		

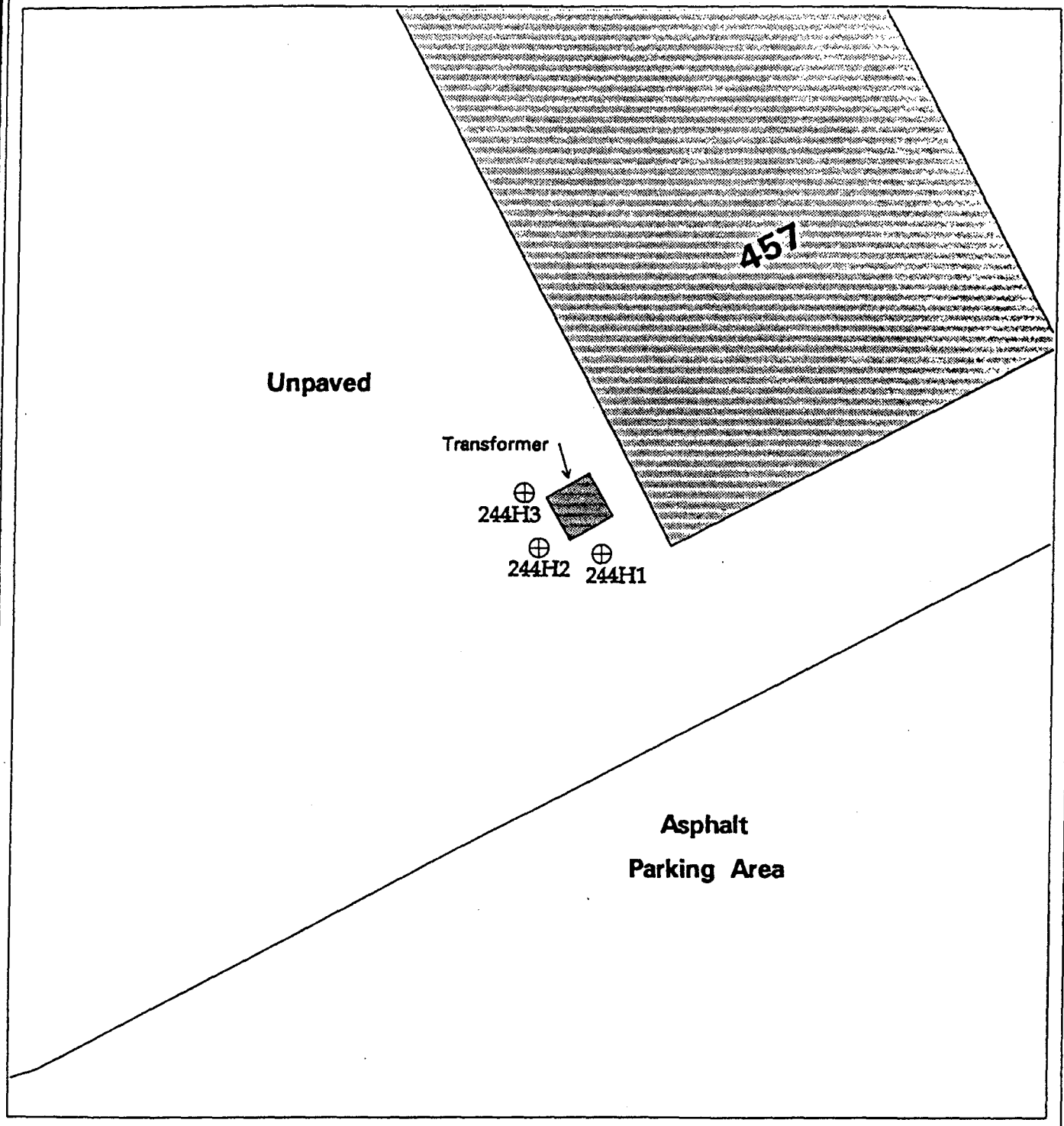

Figure 73 Sample Location Map

SWMU/AOC Number and Type:
244 - PCB Spill Area

Boring Location and Number:

- 123H4 5' Deep Boring
- 123B4 25' Deep Boring
- 123A4 60' Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
244	PCB Spill Area (73)	H1	2	ND	NA	NA	Methylene Chloride-4 J * Acetone-12 B * Toluene-1 J 2-Butanone-3 J *	NA	ND	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL Pest/PCB: See Section 6.3.3. CRDL - Contract Required Detection Limit
			5	ND	NA	NA	Methylene Chloride-2 BJ * Acetone-9 BJ *	NA	ND	NA		
		H2	2	ND	NA	NA	Methylene Chloride-2 BJ * Acetone-5 BJ * Toluene-1 J	NA	ND	NA		
			5	ND	NA	NA	Methylene Chloride-2 BJ *	NA	ND	NA		
		H3	2	ND	NA	NA	Methylene Chloride-3 J * Acetone-7 BJ *	NA	Aroclor(1260)-540	NA		
			5	ND	NA	NA	Acetone-5 BJ *	NA	ND	NA		
			5 (Duplicate)	ND	NA	NA	Methylene Chloride-4 J *	NA	ND	NA		

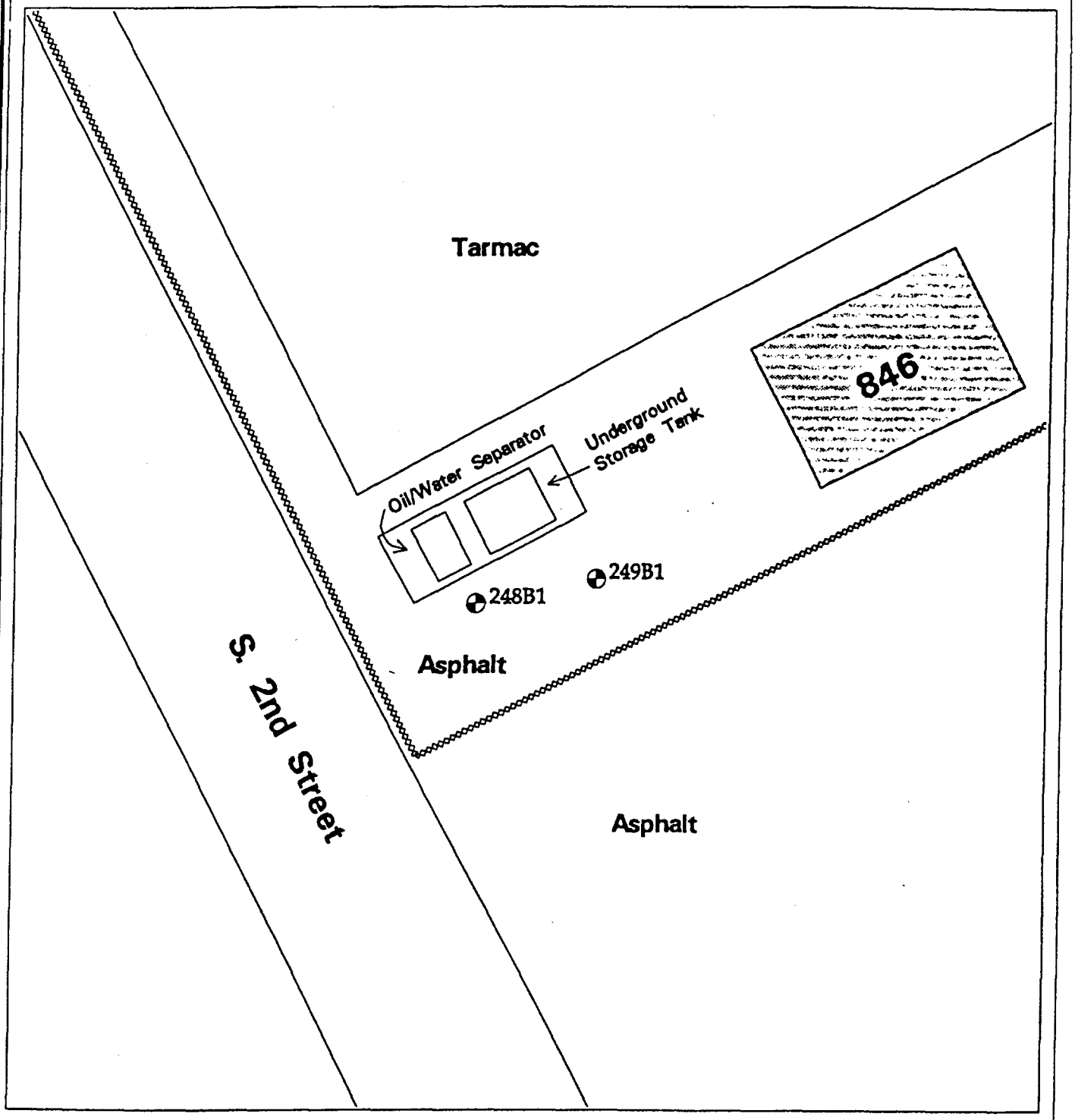

Figure 74 Sample Location Map

Boring Location and Number:

- 123H4 5' Deep Boring
- 123B4 25' Deep Boring
- 123A4 60' Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

SWMU/AOC Number and Type:

248 - Oil/Water Separator

249 - Underground Storage Tank

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RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
248	Oil/Water Separator (74)	B1	5	520	NA	NA	Methylene Chloride-6 BJ * Acetone-25 * Toluene-3 J	NA	NA	NA	NFA	TPH/TFH < 1000 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-5 BJ * Toluene-1 J	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-6 BJ *	NA	NA	NA		
			20	ND	NA	NA	Methylene Chloride-5 BJ *	NA	NA	NA		
			20 (Duplicate)	ND	NA	NA	Methylene Chloride-6 BJ *	NA	NA	NA		
			25	37.4	NA	NA	Methylene Chloride-10 BJ *	NA	NA	NA		

CRDL - Contract Required Detection Limit

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
249	Underground Storage Tank (74)	B1	5	ND	NA	NA	Methylene Chloride-5 BJ *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			10	ND	NA	NA	Methylene Chloride-6 BJ *	NA	NA	NA		
			15	ND	NA	NA	Methylene Chloride-6 BJ *	NA	NA	NA		CRDL - Contract Required Detection Limit
			20	ND	NA	NA	Methylene Chloride-7 BJ * Acetone-9 J *	NA	NA	NA		
			25	ND	NA	NA	Methylene Chloride-6 BJ * Acetone-12 *	NA	NA	NA		

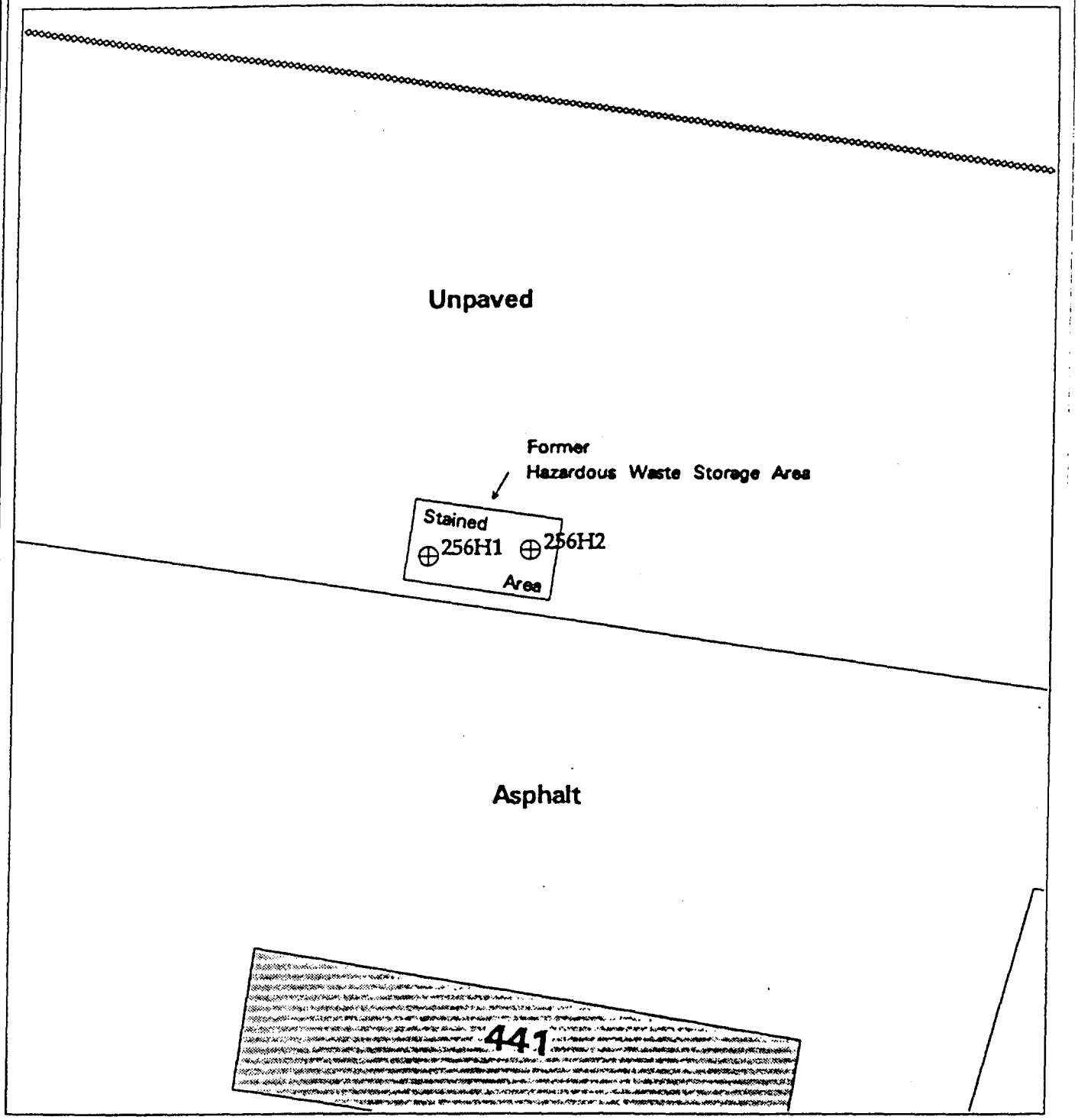

Figure 76 Sample Location Map

SWMU/AOC Number and Type:
256 - Hazardous Waste Storage Area

Boring Location and Number:

- 123H4 5' Deep Boring
- 123B4 25' Deep Boring
- 123A4 60' Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

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MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
256	Hazardous Waste Storage Area (76)	H1	2	40.4	ND	ND	Methylene Chloride-3 BJ *	Di-n-butylphthalate-24 BJ * Bis(2-Ethylhexyl)phthalate-23 J	4,4-DDE-3.4 J 4,4-DDT-2.0 JP	Antimony-7.8 BN Lead-53.3	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < ETM & PRG Metals < ETM & PRG
			5	ND	ND	ND	Methylene Chloride-3 BJ *	Diethylphthalate-21 BJ * Di-n-butylphthalate-28 BJ *	ND	Antimony-ND Lead-6 2		
		H2	2	ND	ND	ND	Methylene Chloride-2 BJ *	Diethylphthalate-20 BJ * Di-n-butylphthalate-29 BJ * Bis(2-Ethylhexyl)phthalate-72 J	4,4-DDT-5 0 P	Antimony-ND Lead-4 9		CRDL - Contract Required Detection Limit
			5	32.5	ND	ND	Methylene Chloride-37 B * Toluene-4 J	Di-n-butylphthalate-29 BJ * Bis(2-Ethylhexyl)phthalate-57 J	ND	Antimony-ND Lead-32 9		

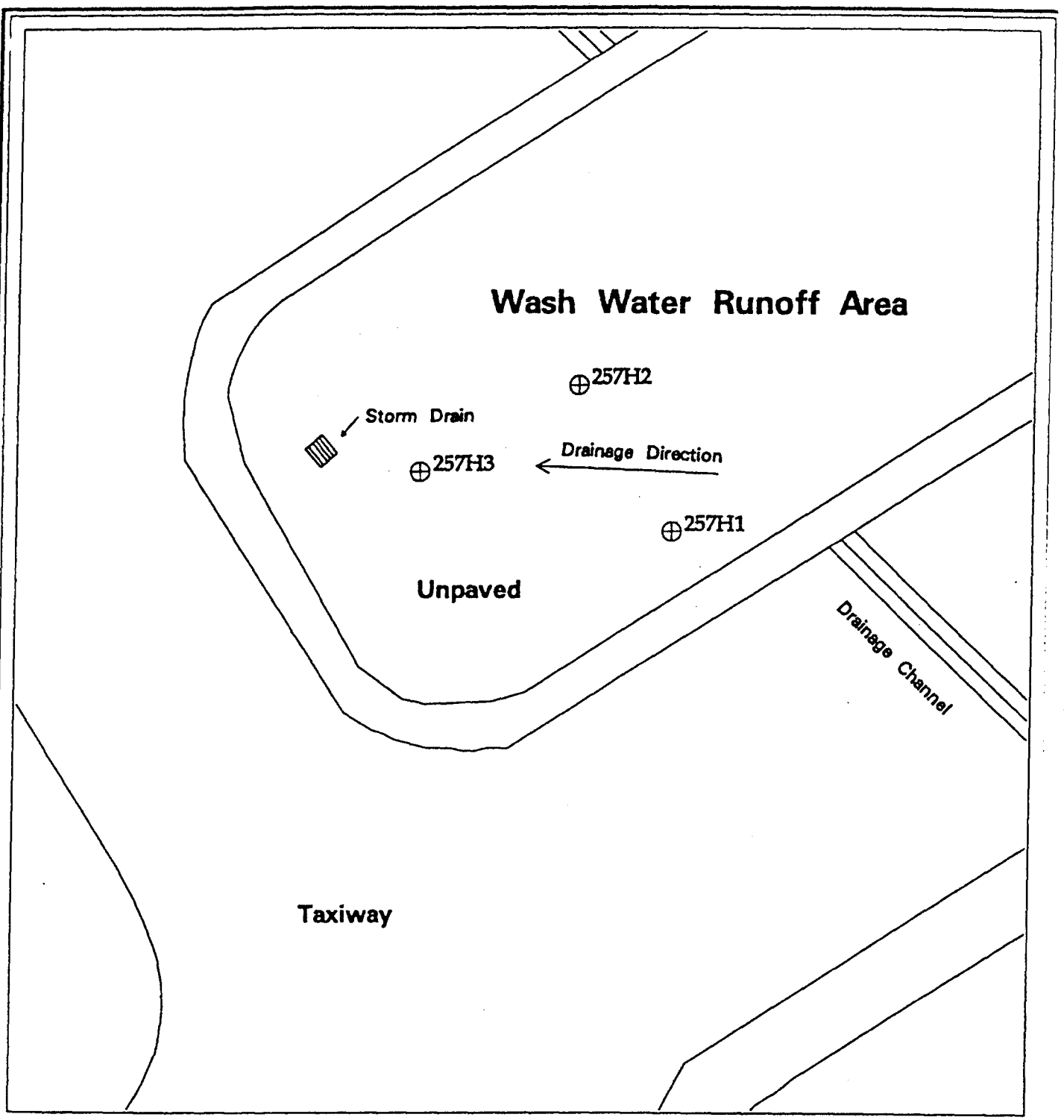

Figure 77 Sample Location Map

SWMU/AOC Number and Type:
257 - Wash Water Runoff Site

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS												
SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
257	Wash Water Runoff (77)	H1	2	NA	ND	ND	ND	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			5	NA	ND	ND	Methylene Chloride-1 BJ * Acetone-8 BJ * 2-Butanone-3 J	NA	NA	NA		
		H2	2	NA	ND	ND	Methylene Chloride-1 BJ * Acetone-13 BJ * 2-Butanone-7 J	NA	NA	NA		CRDL - Contract Required Detection Limit
			5	NA	ND	ND	Methylene Chloride-4 BJ * Acetone-7 BJ * Toluene-1 J	NA	NA	NA		
		H3	2	NA	ND	ND	Methylene Chloride-4 BJ *	NA	NA	NA		
			5	NA	ND	ND	Methylene Chloride-4 BJ * Acetone-12 B * 2-Butanone-2 J	NA	NA	NA		

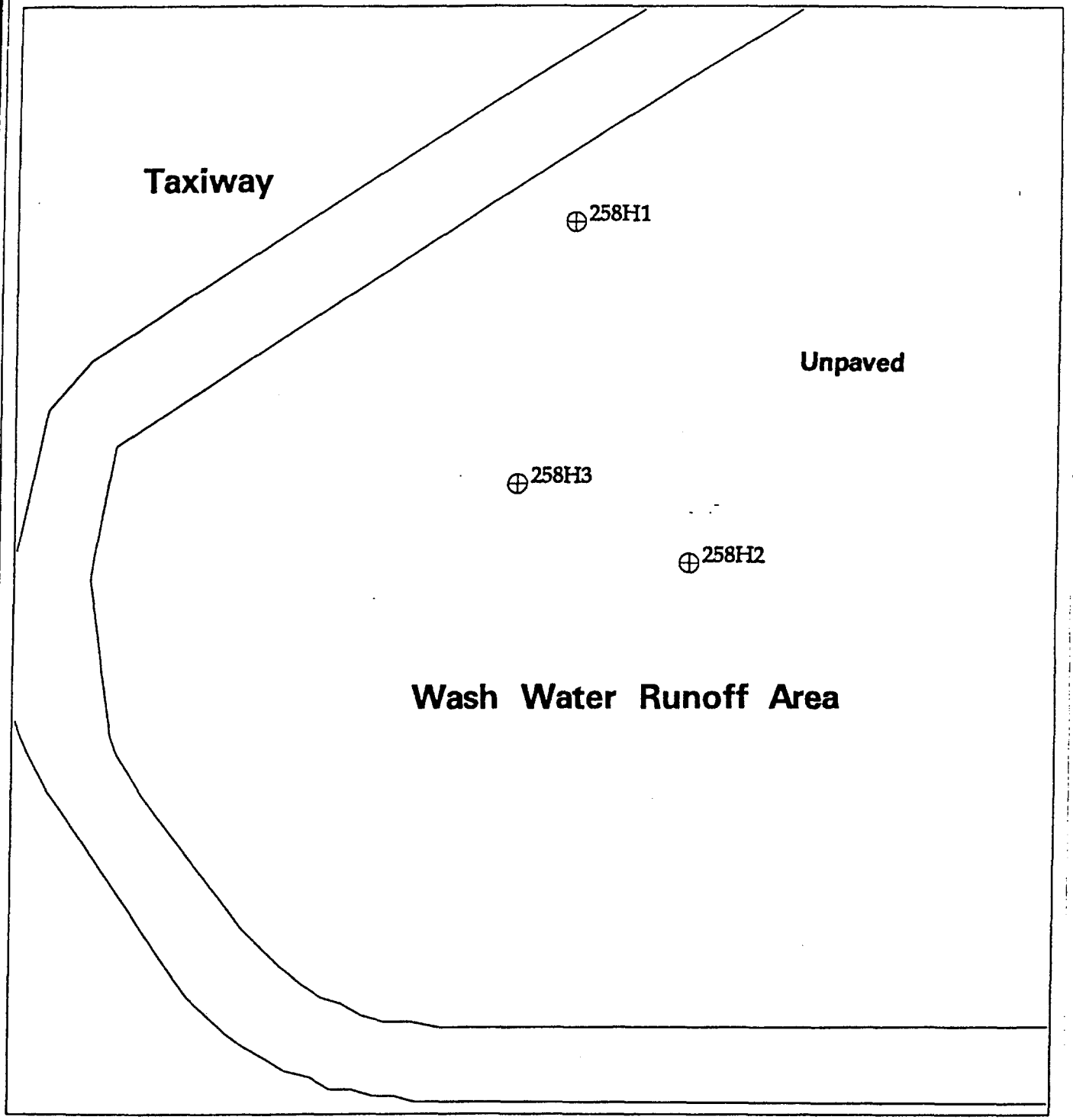

Figure 78 Sample Location Map

SWMU/AOC Number and Type:
258 - Wash Water Runoff Site

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

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RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
258	Wash Water Runoff (78)	H1	2	NA	ND	ND	Methylene Chloride-3 BJ *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			5	NA	ND	ND	Methylene Chloride-4 BJ *	NA	NA	NA		
		H2	2	NA	ND	ND	Methylene Chloride-3 BJ *	NA	NA	NA		CRDL - Contract Required Detection Limit
			5	NA	ND	ND	Methylene Chloride-5 BJ * Toluene-2 J	NA	NA	NA		
		H3	2	NA	ND	ND	Methylene Chloride-3 BJ * Xylene-2 J	NA	NA	NA		
			5	NA	ND	ND	Methylene Chloride-4 BJ *	NA	NA	NA		
			5 (Duplicate)	NA	ND	ND	Methylene Chloride-3 BJ *	NA	NA	NA		

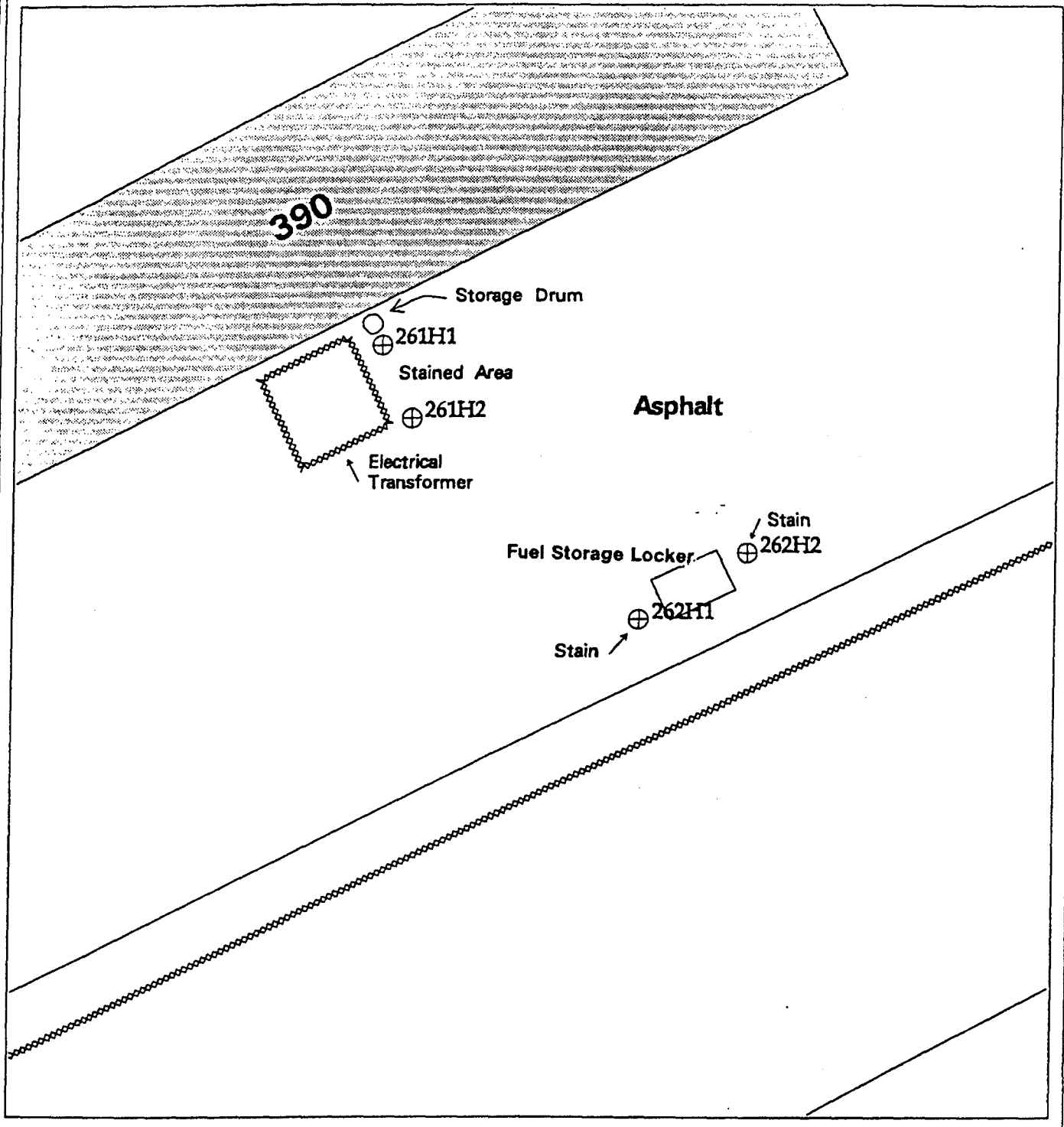

Figure 79 Sample Location Map

Boring Location and Number:

- 123H4 5' Deep Boring
- 123B4 25' Deep Boring
- 123A4 60' Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

SWMU/AOC Number and Type:

261 - Drum Storage Area

262 - Fuel Storage Area

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MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
261	Drum Storage Area (79)	H1	2	ND	ND	ND	Methylene Chloride-2 BJ * Toluene-2 J	Di-n-butylphthalate-27 BJ * Bis(2-Ethylhexyl)phthalate-55 J	ND	Silver-0.89 B Selenium-0.66 W	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < ETM & PRG
			5	ND	ND	ND	Methylene Chloride-2 BJ *	Diethylphthalate-66 BJ * Di-n-butylphthalate-22 BJ	ND	Silver-ND Selenium-ND		
		H2	2	ND	ND	ND	Methylene Chloride-3 BJ * Toluene-7 J	Diethylphthalate-47 BJ * Di-n-butylphthalate-22 BJ *	ND	Silver-0.74 B Selenium-ND		CRDL - Contract Required Detection Limit
			5	ND	ND	ND	Methylene Chloride-2 BJ *	Diethylphthalate-22 BJ * Di-n-butylphthalate-22 BJ *	ND	Silver-0.67 B Selenium-ND		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
262	Fuel Storage Area (79)	H1	2	NA	ND	ND	Methylene Chloride-11 BJ * Acetone-32 B *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			5	NA	ND	ND	Methylene Chloride-11 BJ * Acetone-29 B *	NA	NA	NA		
		H2	2	NA	ND	ND	Methylene Chloride-10 BJ * Acetone-41 B *	NA	NA	NA		CRDL - Contract Required Detection Limit
			5.5	NA	0.119	ND	Methylene Chloride-8 BJ *	NA	NA	NA		

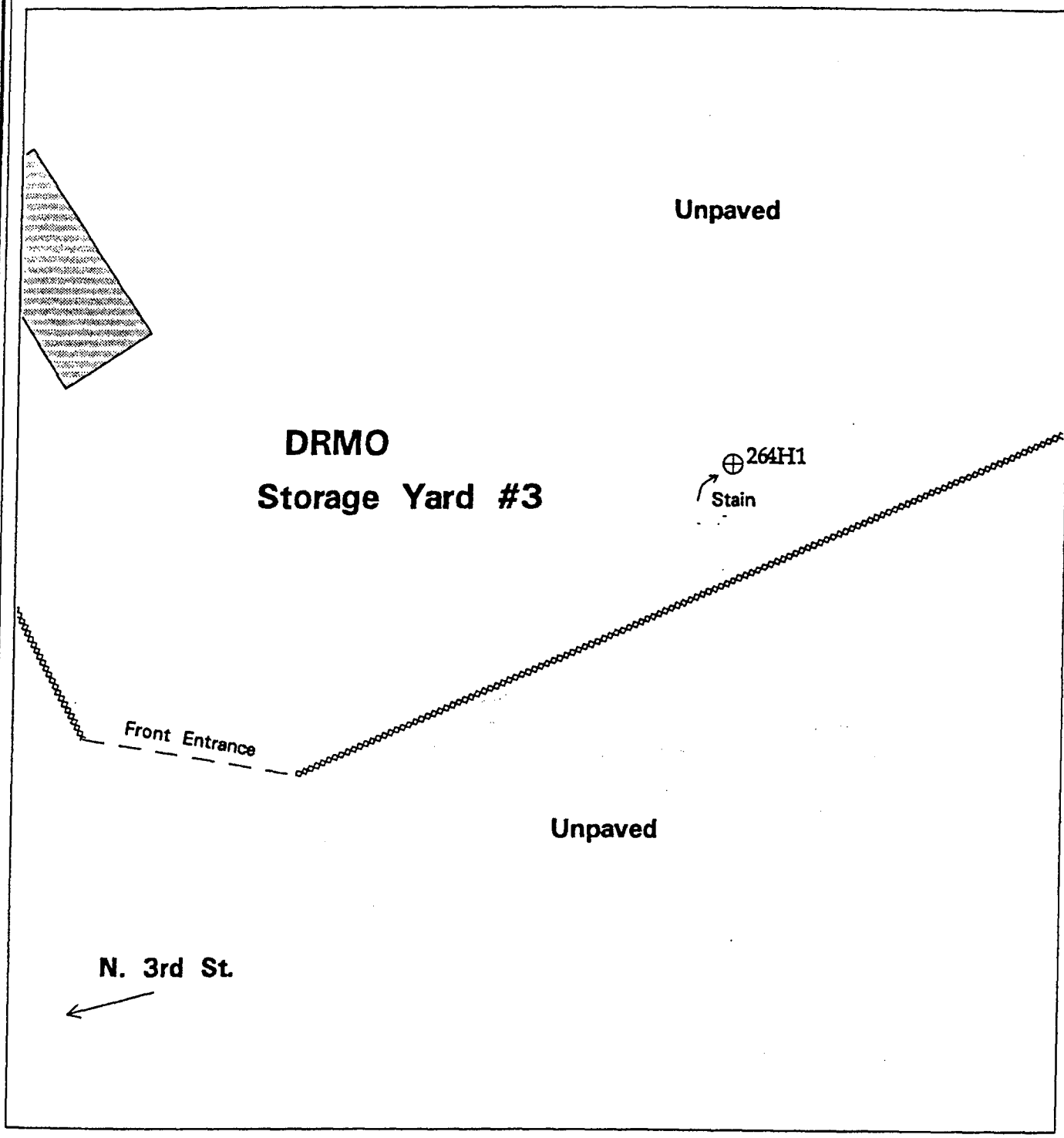

Figure 80 Sample Location Map

SWMU/AOC Number and Type:
264 - Equipment Storage Area

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 10 20 40 Feet

MCAS El Toro
RCRA Facility Assessment

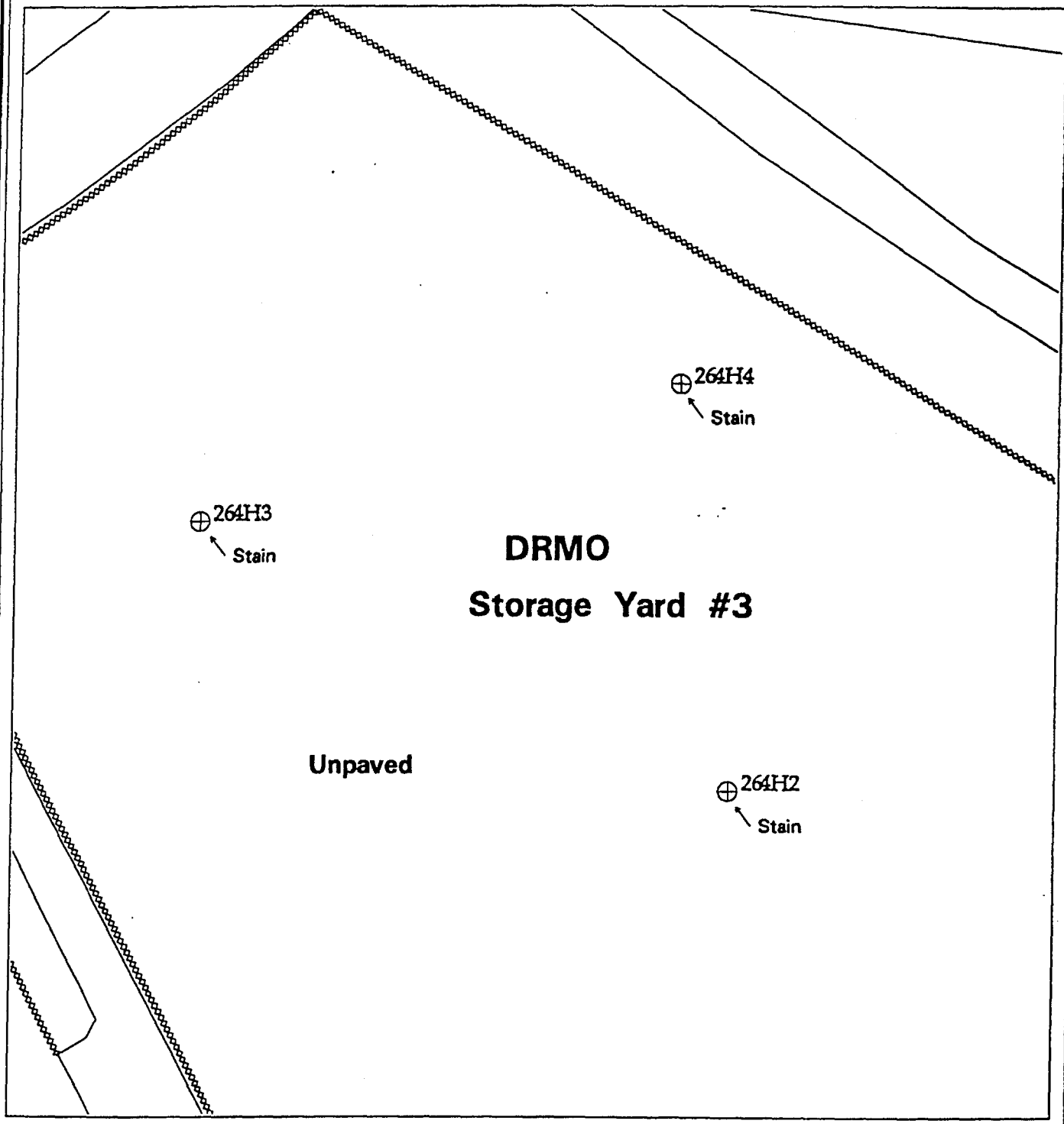

Figure 81 Sample Location Map

SWMU/AOC Number and Type:
264 - Equipment Storage Area

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
264	Equipment Storage Area (80, 81)	H1	2	33	NA	NA	Toluene-1 J	NA	NA	NA	NFA	TPH/TFH < 1000 ppm VOCs < CRDL
			5	47	NA	NA	PCE-1 J Xylene-2 J	NA	NA	NA		
		H2	2	65	NA	NA	ND	NA	NA	NA		CRDL - Contract Required Detection Limit
			5	ND	NA	NA	ND	NA	NA	NA		
		H3	2	34	NA	NA	Methylene Chloride-5 BJ * Acetone-9 BJ * Toluene-1 J	NA	NA	NA		
			2 (Duplicate)	490	NA	NA	Methylene Chloride-5 BJ * Acetone-13 B *	NA	NA	NA		
			5	290	NA	NA	Acetone-10 BJ * Toluene-1 J	NA	NA	NA		
		H4	2	ND	NA	NA	Methylene Chloride-4 BJ * Acetone-5 BJ *	NA	NA	NA		
			5	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-8 BJ * 2-Butanone-3 J	NA	NA	NA		

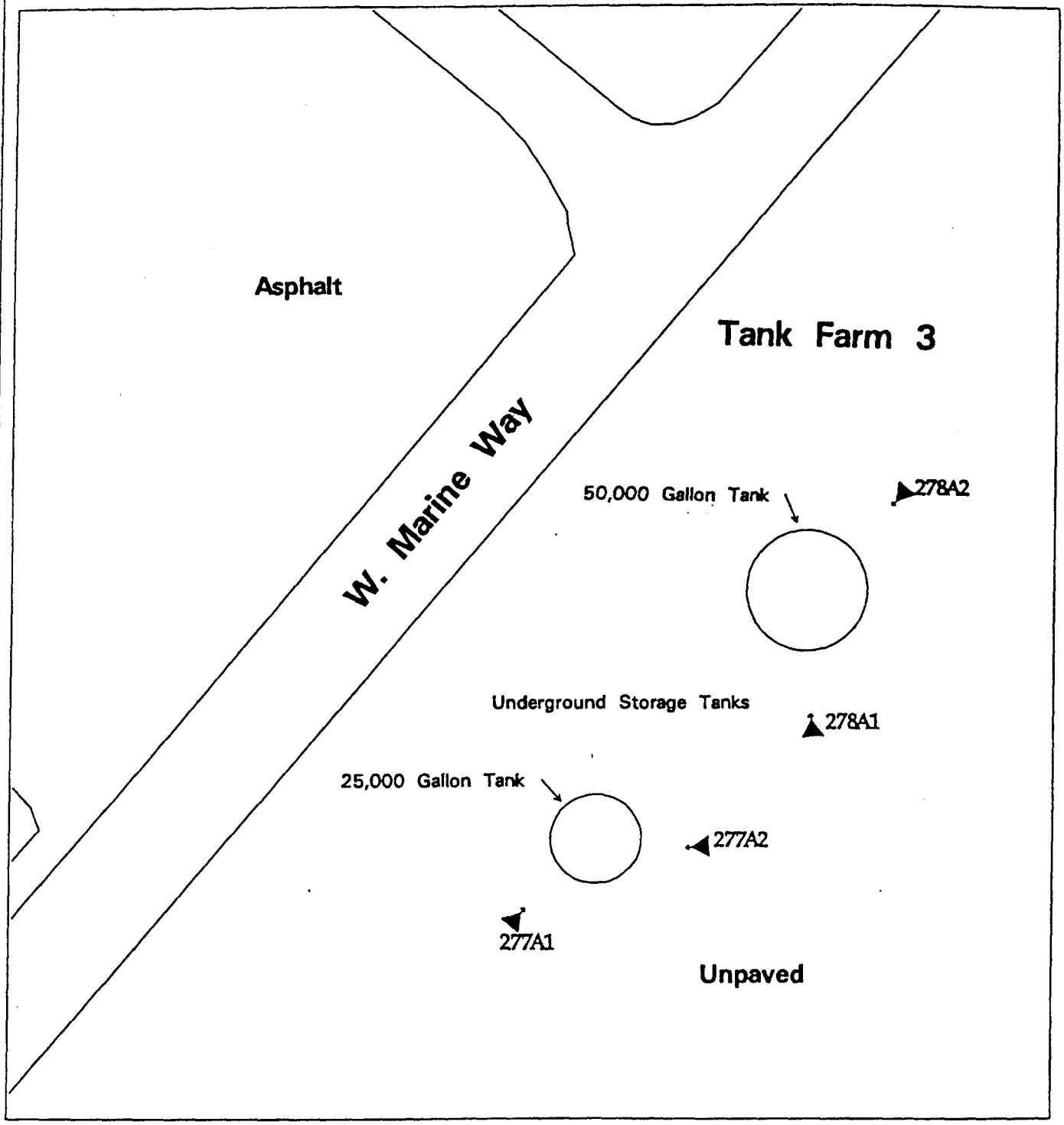

Figure 89 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

277 - Underground Storage Tank

278 - Underground Storage Tank

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
277	Underground Storage Tank (89)	A1	10	124	ND	46	Methylene Chloride-9 BJ * Toluene-4 J Xylene-4 J	NA	NA	NA	NFA	TPH/TFH > 1000 ppm in top sample only. For all other samples TPH/TFH < CRDLs. See Section 6.3.1. VOCs < ETM & PRG CRDL - Contract Required Detection Limit
			10 (Duplicate)	1050	ND	1010	Methylene Chloride-7 BJ * Ethylbenzene-2 J Xylene-43	NA	NA	NA		
			20	ND	ND	ND	Methylene Chloride-5 BJ *	NA	NA	NA		
			30	ND	ND	ND	Methylene Chloride-4 BJ *	NA	NA	NA		
			40	ND	ND	ND	Methylene Chloride-6 BJ * Acetone-7 J * Toluene-3 J	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-4 BJ *	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-4 BJ *	NA	NA	NA		
		A2	10	ND	ND	ND	Methylene Chloride-9 BJ * Xylene-4 J	NA	NA	NA		
			20	ND	ND	ND	Methylene Chloride-8 BJ * Toluene-1 J Xylene-4 J	NA	NA	NA		
			30	ND	ND	ND	Methylene Chloride-8 BJ * Toluene-2 J Xylene-2 J	NA	NA	NA		
			40	ND	ND	ND	Methylene Chloride-5 BJ *	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-5 BJ *	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-5 BJ *	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
278	Underground Storage Tank (89)	A1	10	ND	ND	ND	Methylene Chloride-5 BJ * Toluene-2 J	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			20	ND	ND	ND	Methylene Chloride-5 BJ * Toluene-2 J	NA	NA	NA		
			30	ND	ND	ND	Methylene Chloride-14 B * Toluene-3 BJ *	NA	NA	NA		CRDL - Contract Required Detection Limit
			40	ND	ND	ND	Methylene Chloride-5 BJ * Toluene-1 J	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-4 BJ * Toluene-1 J	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-5 BJ * Toluene-1 J	NA	NA	NA		
		A2	10	ND	ND	ND	Methylene Chloride-4 BJ *	NA	NA	NA		
			20	ND	ND	ND	Methylene Chloride-4 BJ *	NA	NA	NA		
			30	ND	ND	ND	Methylene Chloride-4 BJ *	NA	NA	NA		
			40	ND	ND	ND	Methylene Chloride-4 BJ * Toluene-1 J	NA	NA	NA		
			40 (Duplicate)	ND	ND	ND	Methylene Chloride-4 BJ *	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-4 BJ *	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-5 BJ * Toluene-2 J	NA	NA	NA		

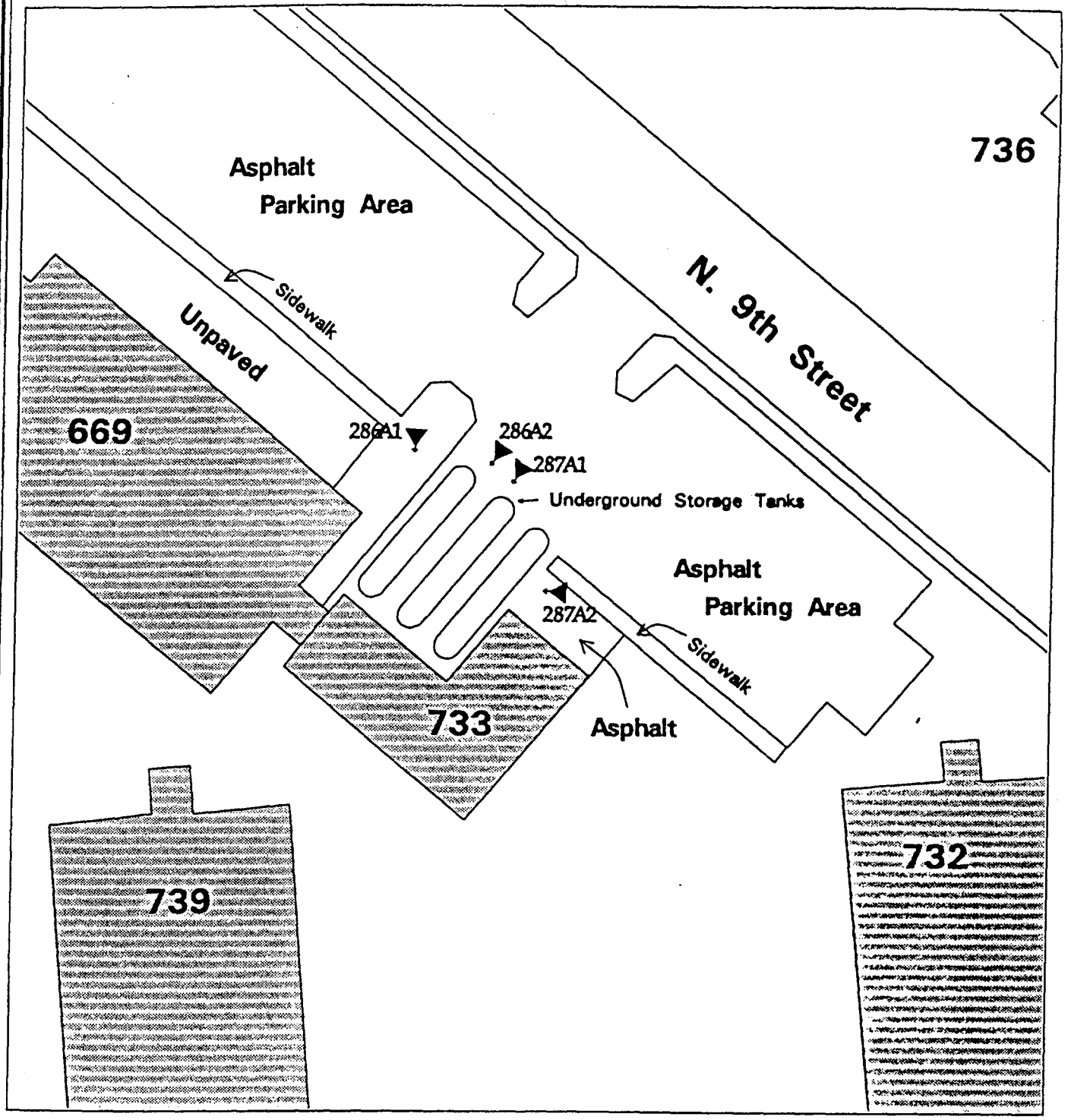

Figure 91 Sample Location Map

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

SWMU/AOC Number and Type:

286 - Underground Storage Tank

287 - Underground Storage Tank

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
286	Underground Storage Tank (91)	A1	10	ND	ND	ND	Methylene Chloride-7 BJ * Toluene-2J	NA	NA	NA	NFA	TPH/TFH < 1000 ppm VOCs < CRDL
			20	ND	ND	ND	Methylene Chloride-5 BJ *	NA	NA	NA		
			30	31.5	ND	ND	Methylene Chloride-8 BJ *	NA	NA	NA		CRDL - Contract Required Detection Limit
			40	ND	ND	ND	Methylene Chloride-7 BJ * Toluene-2 J	NA	NA	NA		
			40 (Duplicate)	ND	ND	ND	Methylene Chloride-7 BJ *	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-7 BJ * Toluene-2 J	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-8 BJ *	NA	NA	NA		
		A2	10	ND	ND	ND	Methylene Chloride-7 BJ *	NA	NA	NA		
			20	ND	ND	ND	Methylene Chloride-7 BJ *	NA	NA	NA		
			30	43	ND	ND	Methylene Chloride-6 BJ *	NA	NA	NA		
			40	124	ND	ND	Methylene Chloride-8 BJ *	NA	NA	NA		
			50	31	ND	ND	Methylene Chloride-7 BJ *	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-6 BJ *	NA	NA	NA		

MCAS EL TORO RCRA FACILITY ASSESSMENT – SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
287	Underground Storage Tank (91)	A1	10	ND	ND	ND	Methylene Chloride-16 B * Acetone-22 B *	NA	NA	NA	NFA	TPH/TFH < 100 ppm VOCs < CRDL
			20	ND	ND	ND	Methylene Chloride-15 B * Acetone-19 B *	NA	NA	NA		
			30	ND	ND	ND	Methylene Chloride-16 B * Acetone-17 B * Toluene-2 J	NA	NA	NA		CRDL - Contract Required Detection Limit
			40	ND	ND	ND	Methylene Chloride-11 BJ * Acetone-11 BJ * Toluene-2 J	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-8 BJ * Acetone-6 BJ *	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-8 BJ * Acetone-5 BJ *	NA	NA	NA		
		A2	10	30.2	ND	ND	Methylene Chloride-22 B * Toluene-1 J Bromoform-1 J	NA	NA	NA		
			20	31.4	ND	ND	Methylene Chloride-20 B * Acetone-19 * Toluene-1 J	NA	NA	NA		
			30	ND	ND	ND	Methylene Chloride-10 BJ *	NA	NA	NA		
			30 (Duplicate)	ND	ND	ND	Methylene Chloride-7 BJ * Toluene-1 J	NA	NA	NA		
			40	ND	ND	ND	Methylene Chloride-10 BJ *	NA	NA	NA		
			50	ND	ND	ND	Methylene Chloride-10 BJ * Toluene-2 J	NA	NA	NA		
			60	ND	ND	ND	Methylene Chloride-7 BJ * Acetone-11 J *	NA	NA	NA		

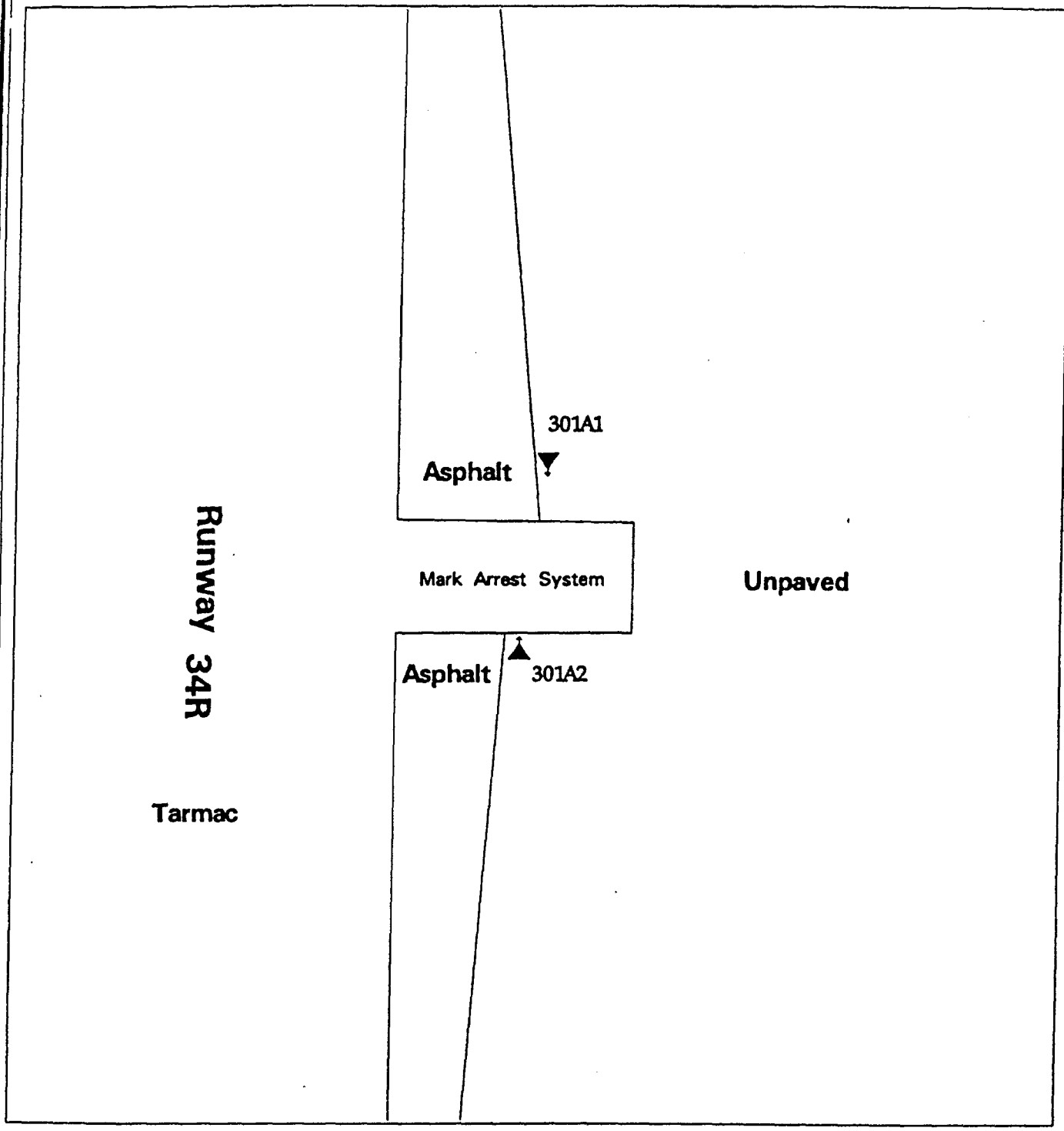

Figure 92 Sample Location Map

SWMU/AOC Number and Type:
301 - Mark Arrest System

Boring Location and Number:

- 123H4 5′ Deep Boring
- 123B4 25′ Deep Boring
- 123A4 60′ Long, Angle Boring

Features:

- Building
- Concrete
- Fence
- Railroad

Scale

0 20 40 80 Feet

MCAS El Toro
RCRA Facility Assessment

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	ANALYTICAL TEST RESULTS							RECOMMENDATIONS	
				TPH (mg/kg)	TFH (mg/kg)		VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	Action	Rationale
					Gasoline	Diesel						
301	Mark Arrest System (92)	A1	10	ND	NA	NA	Methylene Chloride-6 BJ *	NA	NA	NA	NFA	TPH/TFH < 1000 ppm VOCs < CRDL
			20	ND	NA	NA	Methylene Chloride-7 BJ * Toluene-2 J	NA	NA	NA		
			30	ND	NA	NA	Methylene Chloride-4 BJ * Acetone-11 *	NA	NA	NA		CRDL - Contract Required Detection Limit
			40	ND	NA	NA	Methylene Chloride-5 BJ * Acetone-18 * Toluene-2 J	NA	NA	NA		
			50	ND	NA	NA	Methylene Chloride-4 BJ *	NA	NA	NA		
			60	ND	NA	NA	Methylene Chloride-4 BJ * Acetone-7 J *	NA	NA	NA		
		A2	10	ND	NA	NA	Methylene Chloride-7 BJ *	NA	NA	NA		
			20	45.3	NA	NA	Methylene Chloride-6 BJ * Acetone-18 * Toluene-2 J Xylene-3 J	NA	NA	NA		
			30	ND	NA	NA	Methylene Chloride-7 BJ * Toluene-1 J	NA	NA	NA		
			40	197	NA	NA	Methylene Chloride-7 BJ *	NA	NA	NA		
			40 (Duplicate)	ND	NA	NA	Methylene Chloride-6 BJ * Toluene-2 J	NA	NA	NA		
			50	ND	NA	NA	Methylene Chloride-7 BJ *	NA	NA	NA		
			60	ND	NA	NA	Methylene Chloride-7 BJ * Toluene-2 J	NA	NA	NA		

APPENDIX AA

FINAL REPORT TO ORANGE COUNTY WATER DISTRICT TRICHLOROETHYLENE INVESTIGATION NEAR THE El TORO MARINE AIR STATION

FINAL REPORT
TO
ORANGE COUNTY WATER DISTRICT

TRICHLOROETHYLENE INVESTIGATION
NEAR THE EL TORO MARINE AIR STATION

BY

WILLIAM R. MILLS & ASSOCIATES

NOVEMBER, 1985

4

William R. Mills & Associates
Water Resources Management Consultants
895 E. Yorba Linda Blvd., Suite J, Placentia, CA 92670
Telephone: (714) 579-1455

November 7, 1985

Mr. Nereus L. Richardson
Assistant Manager and District Engineer
Orange County Water District
P.O. Box 8300
Fountain Valley, CA 92728

Dear Nick:

I am pleased to submit our final report, Trichloroethylene Investigation Near the El Toro Marine Station. The report presents the results of first phase of the study, using soil vapor contaminant sensing devices.

The study concludes that the TCE contamination plume could not be defined by soil vapor analysis but that PCE soil and/or groundwater contamination is present in several areas. The report lists suspected sources for the TCE/PCE contamination and outlines several investigative techniques to confirm the suspected sources.

I have enjoyed working with you and your staff on this interesting study.

Very truly yours,

Bill

WILLIAM R. MILLS, JR. P.E.

WRM:slr
Enclosure

6

PHYSICAL/CHEMICAL PROPERTIES

PCE and TCE, have unusual physical/chemical properties. They are volatile to semivolatile. Further, they are slightly to poorly soluable in water. The maximum soluability TCE in water is about 1100 mg/l and for PCE about 150-200 mg/l. Finally, each of the compounds are about 62% heavier than water.

These compounds are environmentally mobile and persistent in groundwater. They do volatilize, sorb on soil and biodegrade. Recent studies have demonstrated that PCE is reducesively chlorinated to TCE, dichloroethylene (DCE) and vinyl chloride[11]. More recently, it has been shown that TCE also undergoes biodegradation, forming DCE and vinyl chloride (chloroethylene)[8]. These studies show that soil microbes, under anaerobic conditions, dehydrochlorinate this family of compounds. Thus, a PCE spill at the surface can be converted to TCE and/or DCE prior to reaching the water table. The microbal transformation of the family of compounds prompted one researcher to state[8]:

> "Thus, researchers may be required to search for the source of a contaminant different than the one found in the water, and concurrently prepare to remove a third, which groundwater microbiota may make in the future from the existing contaminant".

SOIL VAPOR SURVEY

The investigation of groundwater pollution in a large area can be costly and time consuming using conventional methods of soil

borings and monitoring wells. In recent years, a new technology has been developed that can reduce investigative cost. This technology was employed in this study, as a reconnaissance tool to survey a large area. The following is a description of the technique and of the survey.

STATIC SOIL VAPOR SENSING COLLECTOR TECHNIQUE

Volatile organics present in groundwater or soil vaporize and permeate, in trace quantities, the air space between soil particles in the vadose zone (unstaturated zone) above the water table. The presence of volatile organics in the soil atmosphere (vadose zone) can be a positive indication of pollution in the soil or groundwater. Thus, the sampling of soil vapor can be an aid in defining the type and areal extent of pollution. It is also an aid in cost effectively designing subsequent investigations using conventional techniques.

A static soil vapor sensing collector technique was utilized for this study. The technique consists of placing a ferro-magnetic wire coated with activated carbon enclosed in a glass container, in the surface soil at a depth of about 12 inches. (See figure 6.) The collector remains in the soil for several days or weeks depending on concentration of volatile organics in the soil atmosphere. While in the soil atmosphere, the carbon sorbs organics that may be present. After exposure, the collector is retrieved and sent to the laboratory for analysis, where the sorbed molecules are identified and quantified.

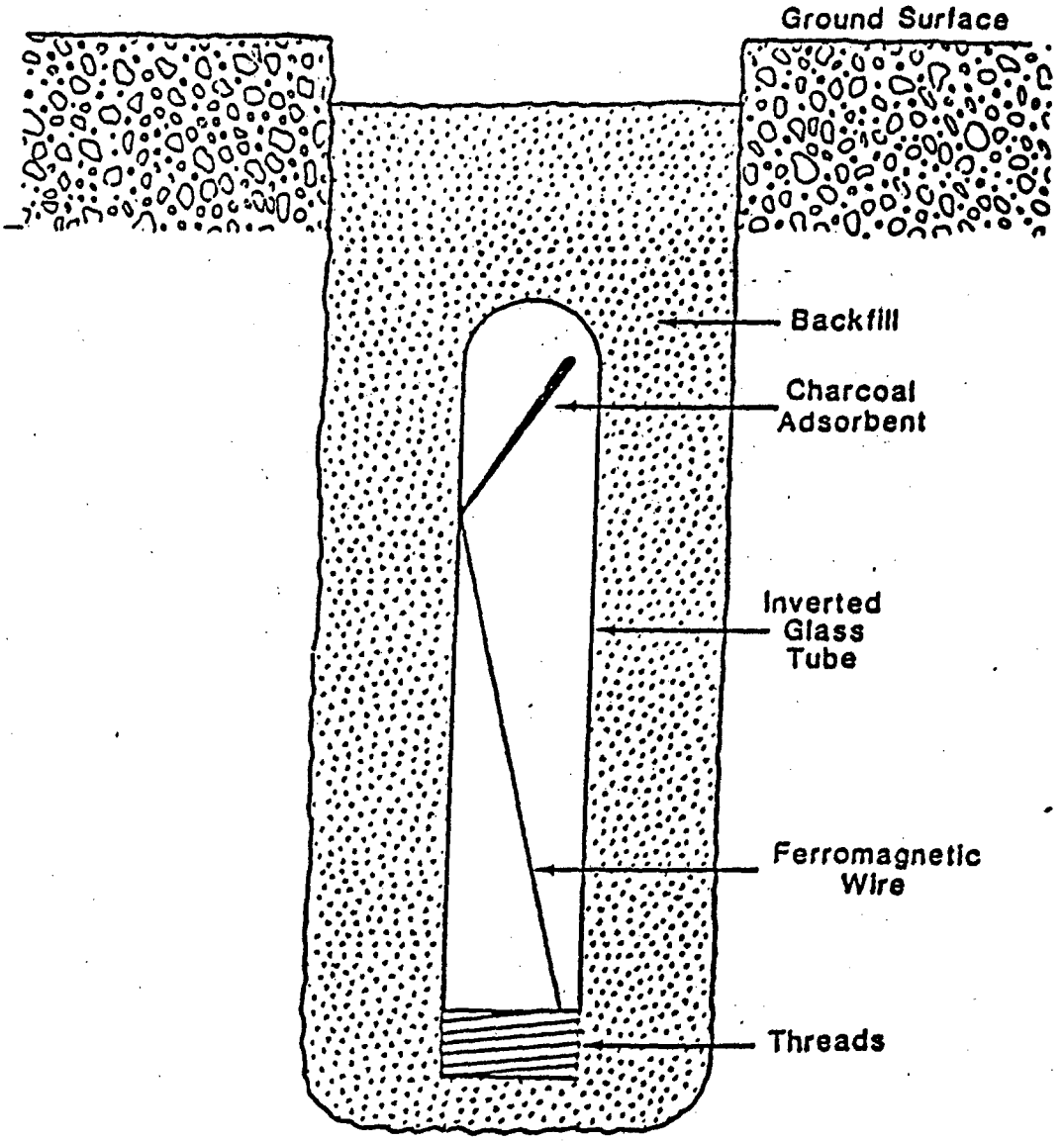

FIGURE 6

STATIC SURFACE
SOIL VAPOR COLLECTOR

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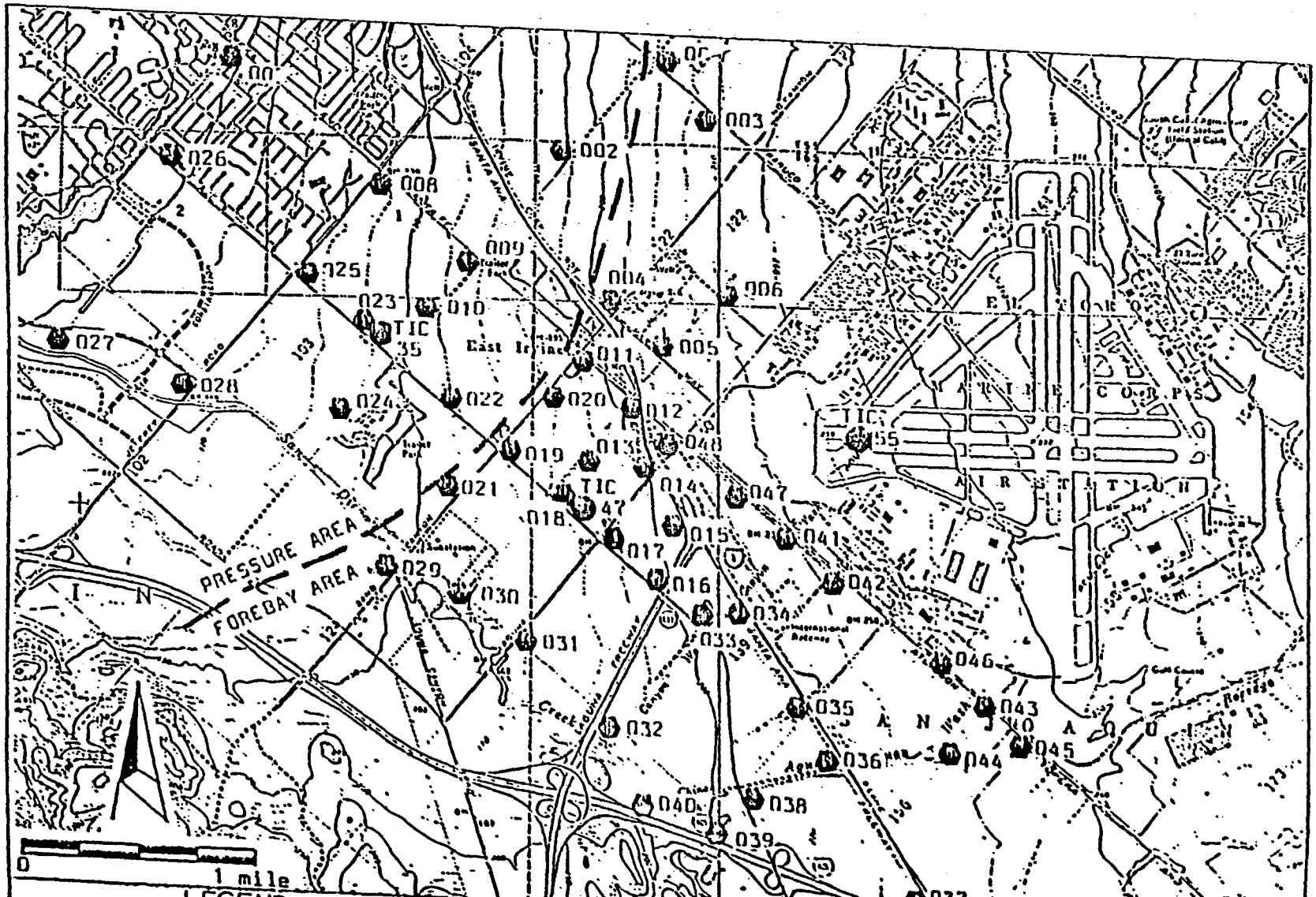
An advantage of the static soil vapor collector is its long-term residence time in the soil. This serves to integrate environmental effects due to changes in barometric pressure, temperature and moisture, all of which effect the concentration of gases in the soil. Thus, the results from static collectors reflect the average conditions that occurred during the sampling period. A detailed description of this technique is included in Appendix A of this report.

DESCRIPTION OF SURVEY

The static soil vapor collectors were placed at 55 locations within the study area. Spacing between the collectors varied along each sampling traverse alignment from 750 to 3500 feet. The average distance between collectors was approximately 1800 feet. The location of the collectors are shown on figure 7. The sampling network was developed on the basis of the TCE detected in TIC wells 35 and 47 and with knowledge of the groundwater movement direction (east to west). Further considerations in the design of the sampling network were the discharge locations from the El Toro Marine Air Station and the presence of an abandoned motor speedway.

The collectors were implanted over a three day period between August 19 and 21, 1985. Three collectors were placed adjacent to



LEGEND

- Collector Location
- Well where TCE was detected

FIGURE 7
SURFACE SOIL
VAPOR COLLECTOR
SURVEY NETWORK

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TIC well 47 to allow analysis after a predetermined time interval. The purpose of these collectors was to determine the appropriate exposure time for all collectors. These collectors were retrieved after 10, 17 and 35 days. Originally, a 21 days exposure period was anticipated. However, the first two collectors, retrieved after 10 and 17 days, did not detect TCE. As a result, it was decided extend to exposure period by an additional 2 to 3 weeks. When the third exposure collector, which was retrieved after 36 days, failed to detect TCE, it was decided to retrieve the entire collector network as soon as practical.

The collectors were removed September 30 and October 2. Four collectors could not be retrieved because of construction activity, farming or vandalism. Unfortunately, all four collectors were adjacent to collectors that detected contamination.

The Agricultural Division of TIC recorded for the survey period irrigation schedules and amounts applied to lands within the study area. TIC also provided listings of herbicide chemical applications. The herbicide manufactures were contacted and it was determined that chlorinated solvents were not used in their chemical formulation[9].

SURVEY RESULTS

The 48 collectors were analyzed for PCE, TCE and DCE. None of the

collectors detected TCE or DCE. PCE was detected in about 1/3 of the collectors (14 of the 48). The following table shows the number of PCE molecules identified in each collector.

TABLE NO. 3

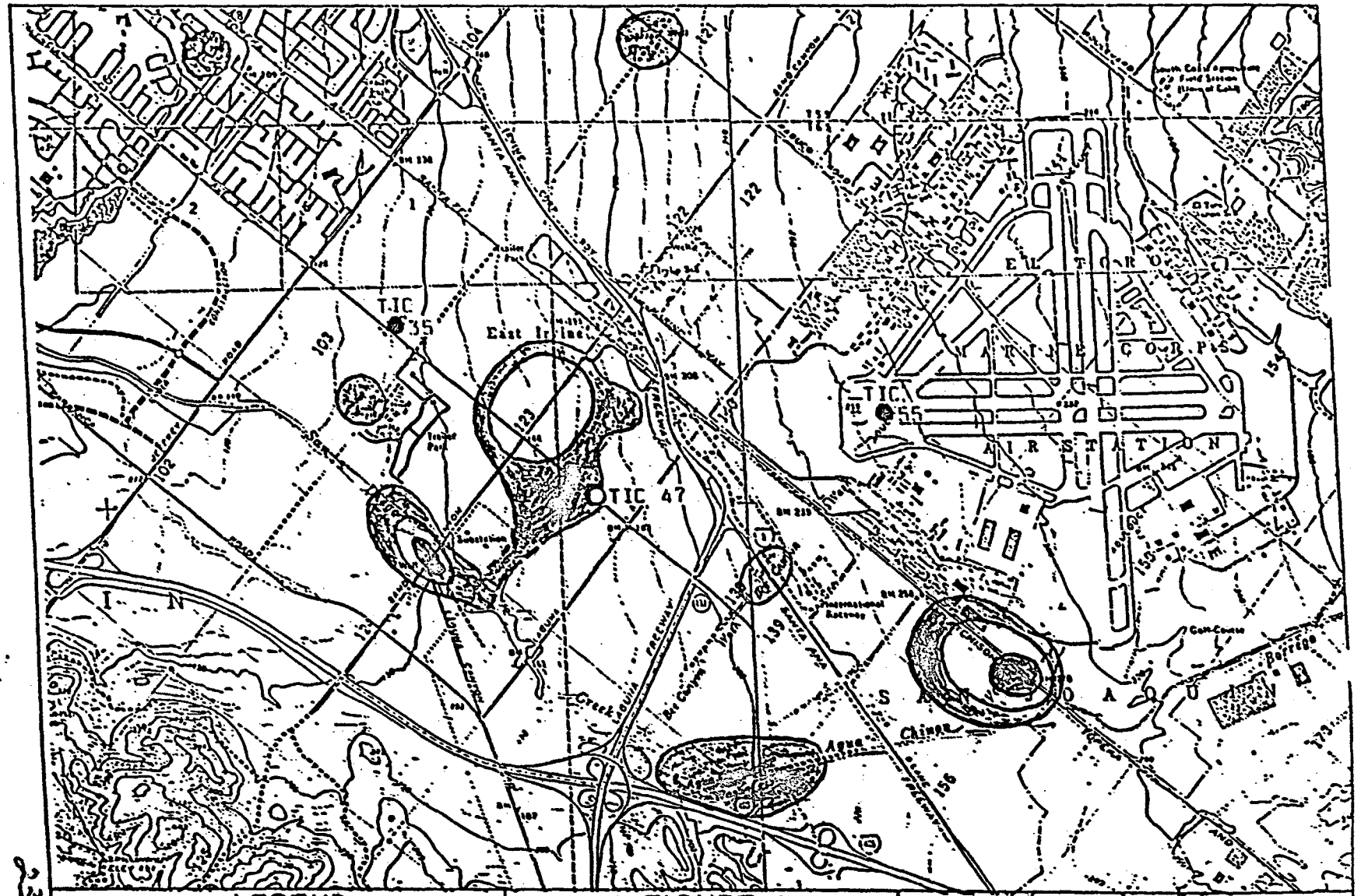
PCE COUNT IN COLLECTORS

Collector #	PCE Molecule count
1	226
7	265
12	231
18	220*
19	1,873
20	4,055
24	599
29	12,171
34	698
38	286
39	262
40	542
43	13,568
46	1,764

* average of the three "time exposure" collectors

PCE molecule counts in the collectors ranged from 200+ to about 14,000. (The detection limit of the mass apectrograph is 200 molecule counts.) The average count in the collectors was about 2600. Those collectors with PCE molecule counts greater than one standard deviation (7000) are particularily significant. These collectors are located on Agua Chinon Wash near the Marine Base (Collector No. 43), and on San Diego Creek near Sand Canyon Road (Collector No. 29.)

The collectors detecting PCE appear to be associated with drainage courses in the study area. Only two or possibly three of the



LEGEND

PCE CONCENTRATIONS (No. of molecules)

- 200-999
- 1000-9999
- >10,000

FIGURE 8

PCE FLUX MAP

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fourteen PCE detecting collectors are not located near drainage facilities (Collectors 1, 9 and 24).

A PCE molecule-count (flux) map (figure 8) shows two or three areas of PCE soil and possibly groundwater contamination. These are discussed in the following:

AGUA CHINON WASH

Immediately adjacent to the Marine Air Station is a large flux; two adjacent collectors trapped PCE for counts of about 4,000 and 14,000. (The 14,000 count was the largest detected in the survey.) Further down-stream in this Wash, another but much smaller, PCE presence was detected in three adjacent collectors. This implies possible PCE contaminants traveling along and percolating within this unlined channel. The question arises as to whether a more closely spaced collector network aligned along the Agua Chinon and along San Diego Creek to Sand Canyon Road would have consistently detected PCE.

BEE CANYON WASH

Only one collector detected PCE along this wash. This detection suggests that the number and spacing of the collectors in this area may have been insufficient.

RIFLE RANGE DITCH

Four collectors in the immediate vicinity of this drainage channel detected PCE counts ranging from about 200 to 4,000, suggesting

a PCE contaminated area of about 150-200 acres.

Groundwater beneath this suspected area of contamination has been confirmed to contain TCE at the 8-10 ppb level. Small amounts of PCE and DCE have also been detected in the water from TIC well 47. However, these PCE and DCE concentration levels were below or close to the limit of detection of the analyzer and therefore are suspect.

SAN DIEGO CREEK AT SAND CANYON ROAD

Only one collector in this area detected PCE, however, the count was the second largest detected (12,000). Also, collector spacing in this area was very large at 1/2 to 1 mile. Further, an adjacent downstream collector was destroyed by tractor work.

As seen on the flux map, this contamination area was connected to the contamination area along Rifle Ranch Ditch on the assumption that the contamination at San Diego Creek traveled along Rifle Range Ditch. (A collector at the intersection of San Diego Creek and Rifle Range Ditch did not detect PCE. It was located near a deep erosional channel and consequently, PCE vapors at this location may have "gassed out" the side of the channel.)

Pollution at this site might also be explained by a PCE release from the Edison substation.

OTHER "HOT SPOTS"

The PCE contamination detected near a Trailer Park located about 1/2 mile northwesterly of the substation may be associated with the contamination detected on San Diego Creek.

PCE was also detected at two locations in the northwest portion of the study area. These appear to be isolated occurrances, possibly due to local PCE spill.

CONCLUSIONS

It was expected that the collectors would find TCE in the soil atmosphere at the two TIC wells since TCE had been detected in groundwater extracted from these wells. However, the collectors did not detect TCE in the vicinity of the two TIC wells, nor at any other location. A probable explanation is that the TCE detected in the groundwater is contained in "deep" water bearing lenses that are present well below the water table surface; which is between 50 and 100 feet below ground surface.

Both TIC wells' perforations begin at 260 feet below ground-surface. Also, the sediments between ground surface and the beginning of the perforation interval are composed of alternating units of clay, silt and sand. These alternating lenses of fine grained sediments may impede or trap (by adsorption) upward migrating TCE vapors, thus prohibiting their detection by near

surface soil vapor techniques. This "deep contamination aquifer" theory may also explain the absence of TCE (assuming TCE is present in groundwater over a large area, as suggested by its presence in both TIC wells) in all of the collectors within the four square mile study area.

As a possible support to this theory is that TCE has not been used for about 10 years. As a result, an "old" spill of TCE, which occurred more than 10 years ago, may have migrated downward due to its greater density and frequent irrigation water applications into deeper portions of the groundwater reservoir.

The surface soil vapor collectors identified PCE presence in several locations, one of which was at TIC well 47. As indicated in a previous section of this report, PCE can be biotransformed to TCE and DCE. This may have occurred and the PCE identified by the collectors may be the parent compound and source of the TCE in TIC well 47. However, this seems unlikely since PCE was not detected in significant concentrations in the water from either TIC well. If PCE were biotransformed, it is doubtful that a 100% conversion of PCE would take place. It is more likely that a portion of the PCE would not be transformed and would be present in the groundwater.

Therefore, these data seem to indicate separate pollution events, i.e. the TCE pollution, occurred more than 10 years ago and the

PCE detected represents more recent contamination which has not yet reached the water table, at least in the vicinity of TIC well 47; it may be present in groundwaters elsewhere. Thus, the PCE and TCE occurances may be unrelated.

SUSPECTED CONTAMINATION SOURCES

If the previously presented "deep aquifer" theory correctly depicts the TCE occurance, then the extent and source of this contamination cannot be inferred from the survey results. Only the historic groundwater gradient and past land uses can be helpful in identifing possible sources. Based on these factors, it appears that the TCE source was probably the Marine Air Station.

The PCE contamination, which appears to be unrelated to the TCE contamination, was frequently identified by the soil vapor survey technique. The possible PCE contamination sources are listed in the following table.

RECEIVED

AUG 27 1993

Department of
Toxic Substances Control
Region 4 Long Beach

APPENDIX AB

EXTRACT
PLAN ACTION
PERIMETER INVESTIGATION
VERIFICATION STEP CONFIRMATION STUDY

surface, with the potential for subsequent subsurface percolation and contamination of the groundwater.

In addition to the specific sources listed in Table 2-1 and Table 2-2, TCE and/or PCE may have been used or stored at other locations on the station. For example, underground storage tanks on the station that may have been used for waste solvent storage are potential sources. In the event that the station's underground tank program identifies any such sources (i.e., leaking tanks used to store significant quantities of waste solvents), the sources will be incorporated into this assessment.

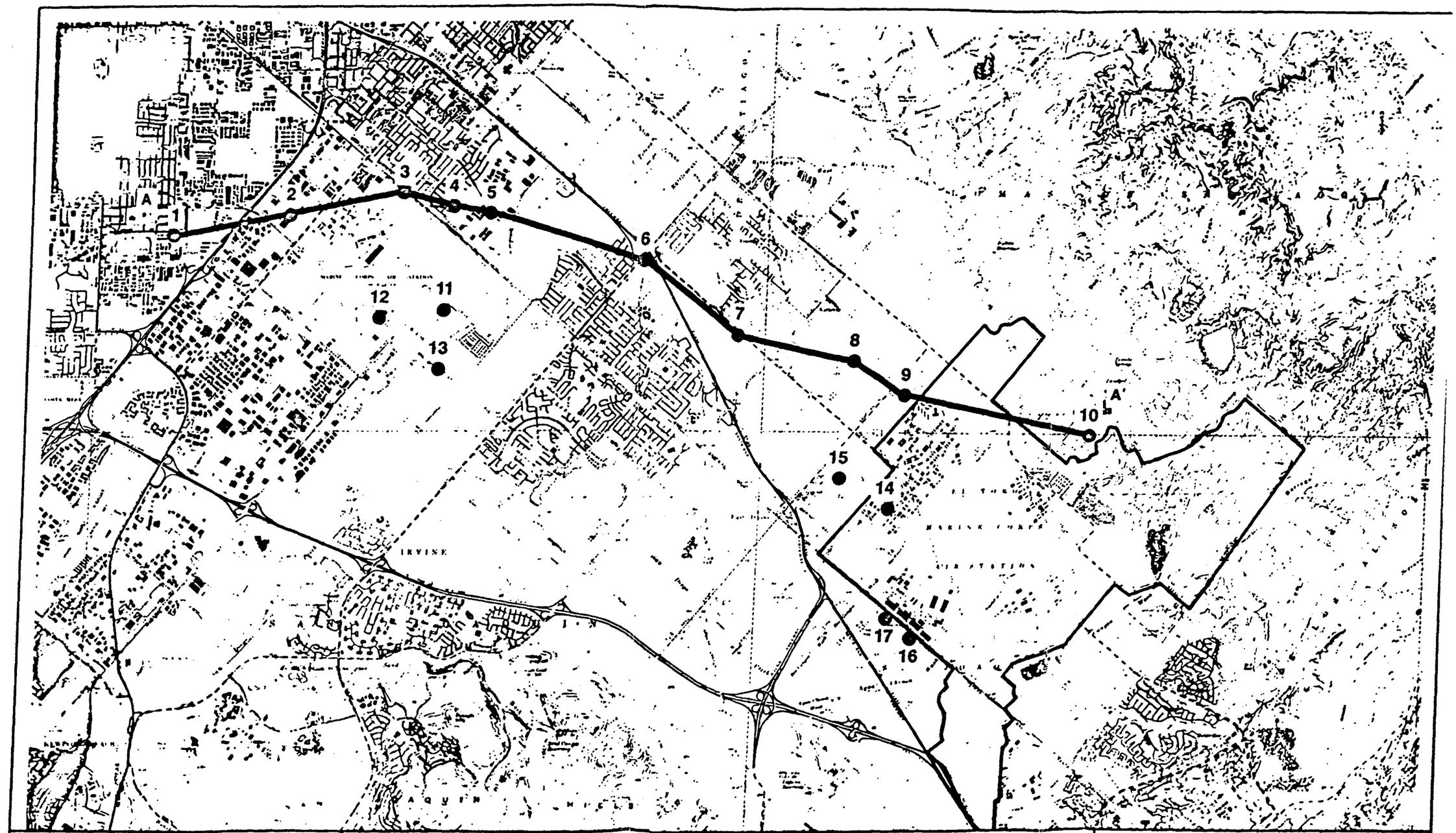
Off-station sources have not been researched.

2.1.1.2 Non-localized Sources. The major non-localized sources that may have caused TCE or PCE contamination, include sanitary sewage systems, the associated oil/water separators, and the major drainages that run through and outside of MCAS El Toro.

TCE or PCE may have been discharged with washwaters to oil/water separators or may have been disposed directly to the oil/water separators. The TCE or PCE may have been dissolved in the processed water from the separators or may have infiltrated into the subsurface environment through cracks that may have existed in the separators.

TCE or PCE could have been transported into the sanitary sewer in solution from washdown operations, discharge from oil/water separators, or disposal down drains. Exfiltration of TCE or PCE contaminated wastewater while in the sewer lines could have caused contamination to groundwater at any point downstream in the system. Ponding in the wet well of the old sewage treatment plant may have been a source of contamination to groundwater if any leakage from the wet well occurred.

TCE or PCE could have existed in spills or washdown operations that may have discharged into the major drainages or the storm sewers leading to the major drainages. Discharges during dry periods, which would have carried less diluted levels of contaminants, would have been expected to percolate into the sediments of the drainages at a relatively short distance from the discharge



PERIMETER INVESTIGATION
MCAS EL TORO, CA

MCAS EL TORO BOUNDARY

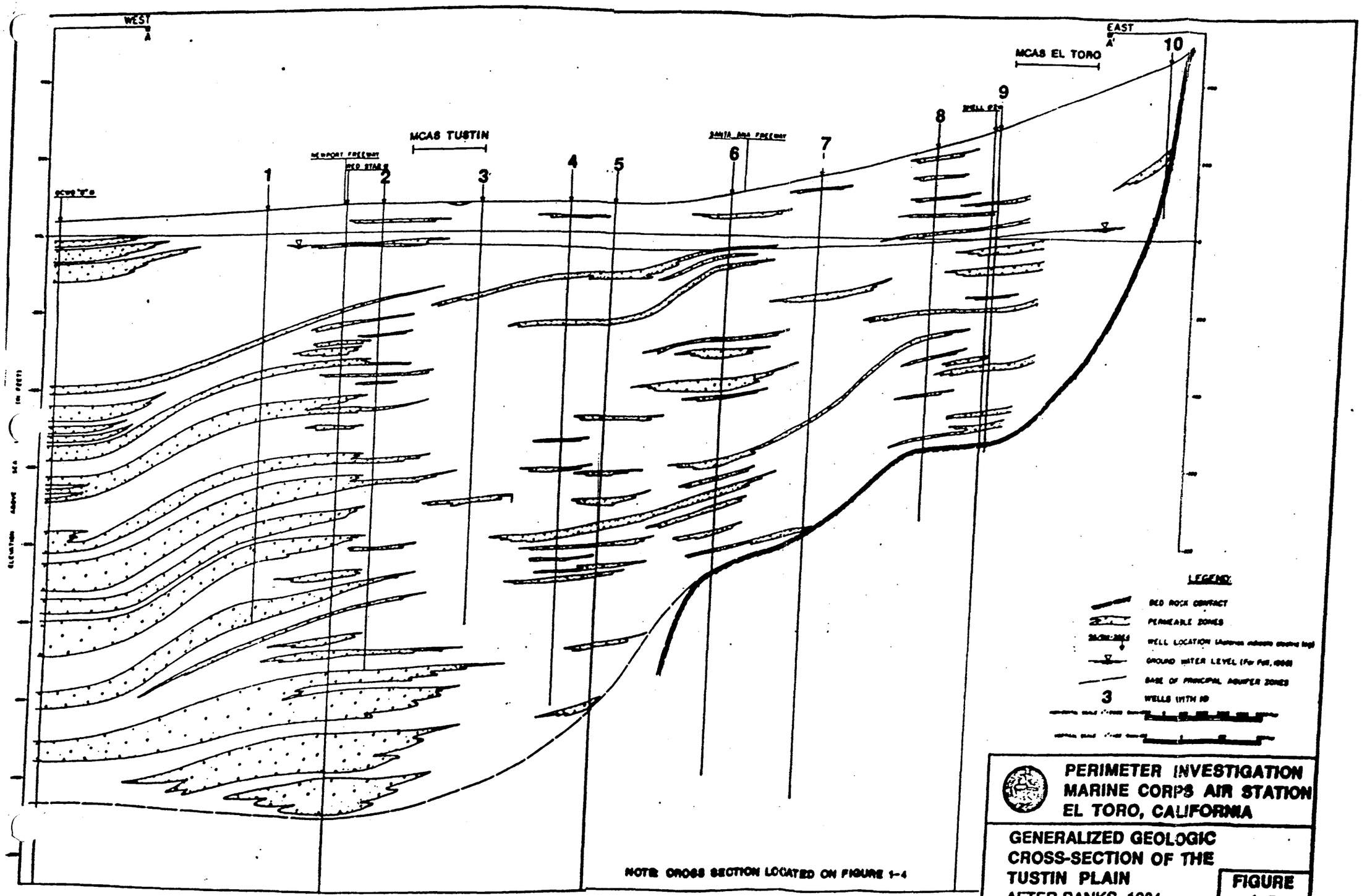
WELLS 1–10 ON CROSS SECTION
LOGS FOR 11–17 IN APPENDIX A

A—A' LOCATION OF CROSS SECTION GIVEN IN FIGURE 1–5

SCALE IN FEET
0 4000 8000

N

FIGURE 1–4
LOCATION OF SELECTED WELLS AND GEOLOGIC CROSS SECTION OF THE TUSTIN PLAIN



PERIMETER INVESTIGATION
MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

GENERALIZED GEOLOGIC CROSS-SECTION OF THE TUSTIN PLAIN
AFTER BANKS, 1984

FIGURE 1-5

TABLE 2-2

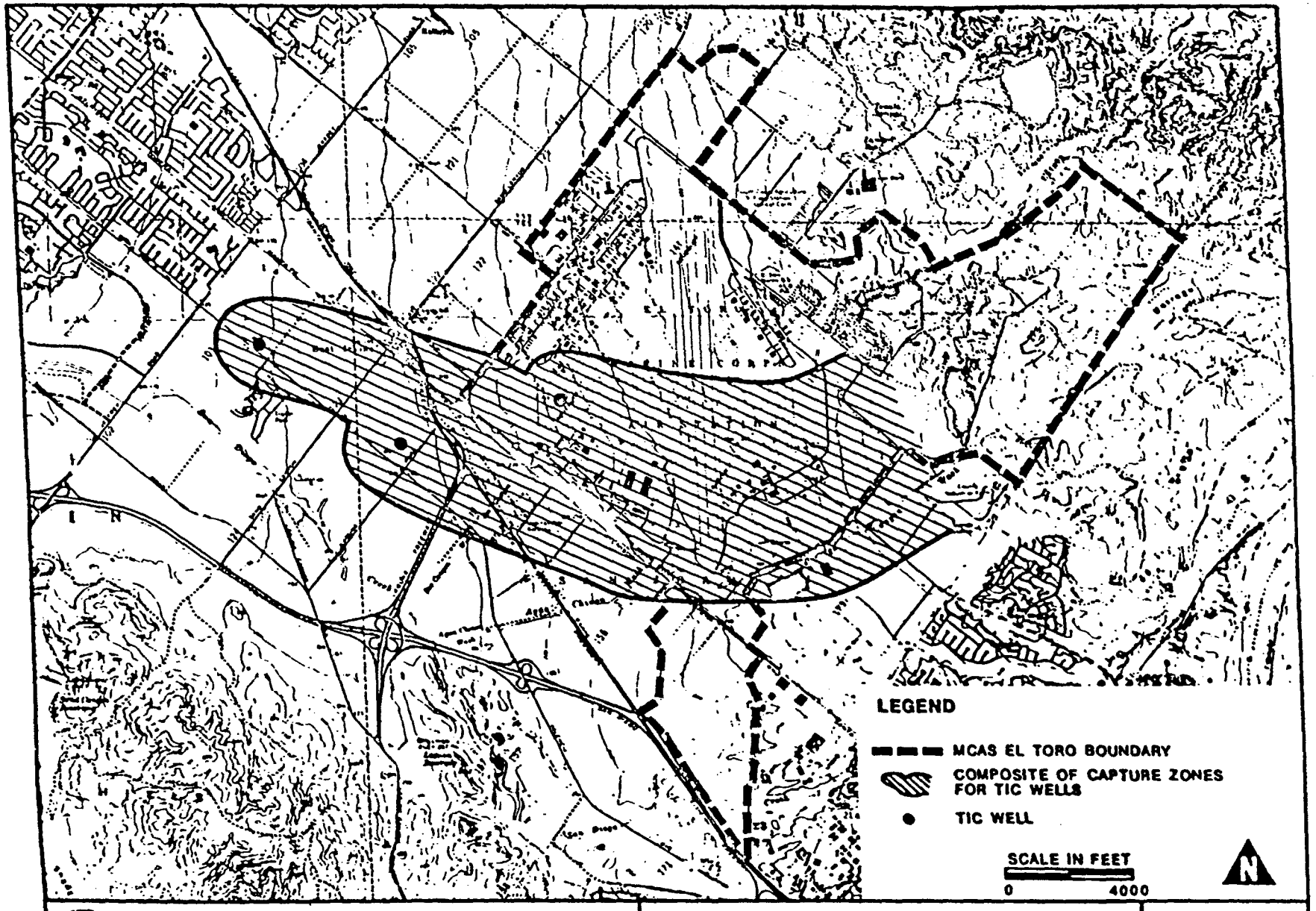
Summary of Solvent Use Areas - Initial Assessment Study Solvent Use Areas, Perimeter Study at MCAS El Toro, California

Building Number(s)	Operations Name	Map Identi-fication	Period of Practice	Types of Materials Used	Comments
288,289	Station Operations and Maintenance - Aircraft Maintenance Dept.	A	1943 to present	POL, PD-680, other solvents	50 gallons per year stored in drums and bowsers,(till mid-1970s) 450 gallons per year (1970s to present). Disposal by Facility Maintenance.
138	- Station Electronics and Maintenance Div.	B	? up to 1980	Carbon Tetrachloride TCE, Trichloroethane (TCA)	Two to Three 55 gallon Barrels used per year. Most solvents volatilized, residual solvents drummed and stored near Bldg. 730
626	- Auto Hobby Shop	C	1967 to present	Solvents	Operations include three 50 gallon solvent parts tanks. Yearly usage unknown. Mud/solvent sludge to separators. Very dirty solvent to two drums per year disposed by Facilities Management.
347 past	- Exchange Gasoline Station	D	? to 1971	Solvents	110 gallons per month to wash parts. Solvent had also been used to wash the decks. Quantity unknown.
360	- Defense Property Disposal Office	E	1940s to 1980	Solvents	Surplus solvent materials held prior to resale/reuse. Undocumented spills may have occurred.
370	- Facilities Management Dept. (FMD) - Pipe Shop	F	1940s? to present	metal cleaners/ degreasers	Portion of up to 24 gals./year. Disposed in shop trash sent to then current sanitary landfill.
370	- FMD - Machine Shop	G	1940s? to present	metal cleaners/ degreasers	Portion of up to 24 gals./year. Disposed in shop trash sent to

TABLE 2-2 - (Continued)

Summary of Solvent Use Areas - Initial Assessment Study Solvent Use Areas, Perimeter Study at MCAS El Toro, California

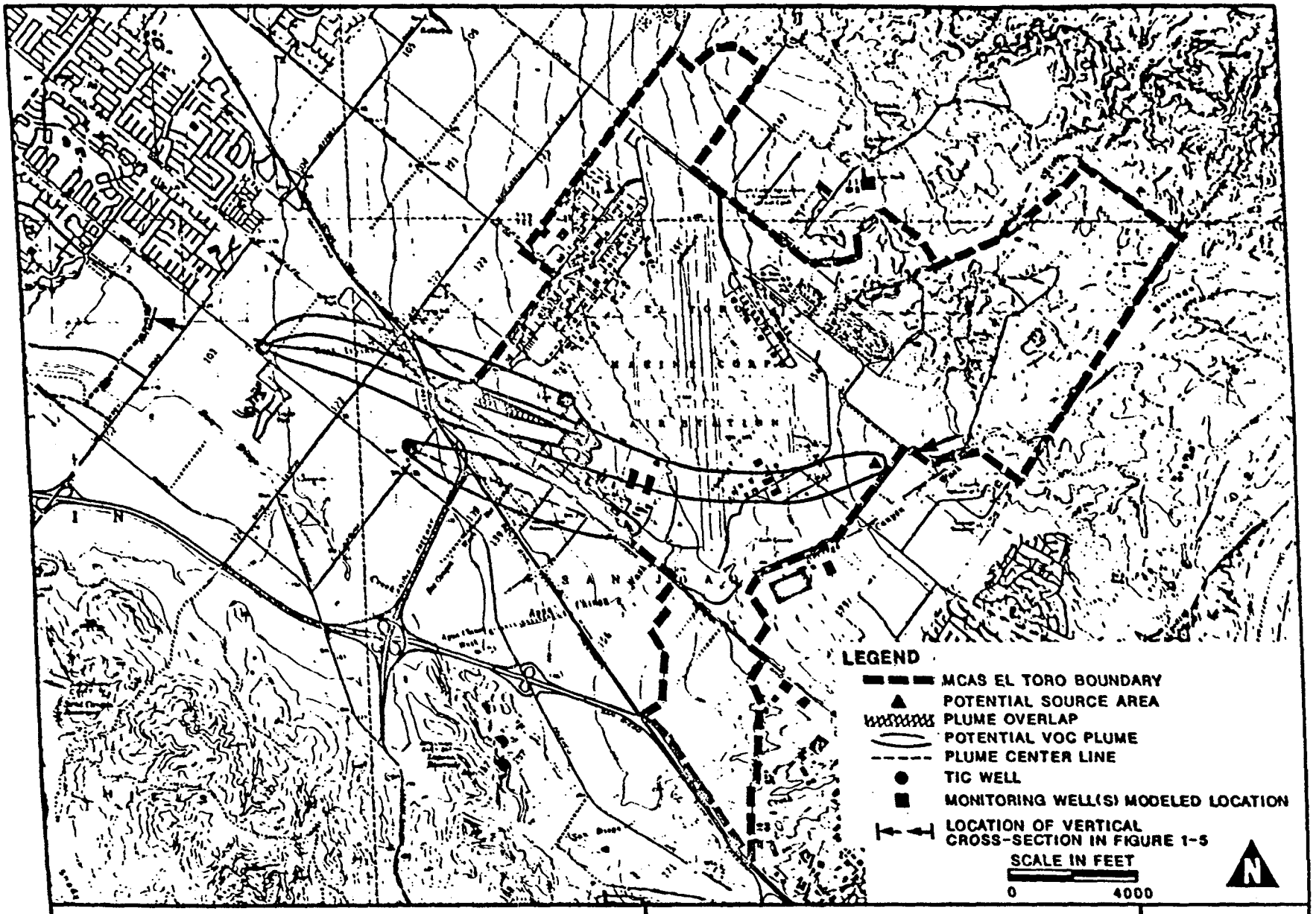
Building Number(s)	Operations Name	Map Identification	Period of Practice	Types of Materials Used	Comments
1589	- FMD - Motor Transport Div. (MTD) - Heavy Duty Maintenance Shop	H	prior to 1952 to mid 1960's	dry cleaning solvents	Use in parts dip tank about 75 gallons per year. This solvent used to wash decks once per week (144 gallons/year) and lube racks daily (240 gallons/year). Solvents in waste oil disposed to Oil Disposal Area (Site 10).
298	- FMD - MTD - Light Duty Maintenance Shop	I	up through mid 1960s	solvent	Solvent dip tank, thirty gallon capacity, changed once every six weeks (used to present). Solvent used to clean the cement decks (720 gallons per year).
388	The Third Marine Air Wing (3d MAW) - Third Force Field Support Group Detachment B	J	? to present	Solvents, predominantly methylene chloride	Three 55-gallon drums of solvent used for parts cleaning each year. Waste solvents stored in drums.
634	- Marine Air Group 11 (MAG-11) - Headquarters and Maintenance Squadron 11 (H&MS-11)	K	late 1960s present	Solvents/paint strippers	2-1/2 gallons per month generated during paint stripping. Waste is drummed for storage, hauled off site for disposal by private contractor.
605 current	- MAG-11 - VFMA-314	L	1952 to present (unit operation)	POL and solvents	Currently disposed off site by private contractor. Otherwise past waste disposal unknown.
115 current	- MAG-11 - VFMA-323	M	1946 to present (unit operation)	POL and solvents	Spills on Tarmac, otherwise disposal off site by private contractor



PERIMETER INVESTIGATION MARINE CORPS AIR STATION EL TORO, CALIFORNIA

COMPOSITE OF HYPOTHETICAL CAPTURE ZONES FOR TIC WELLS

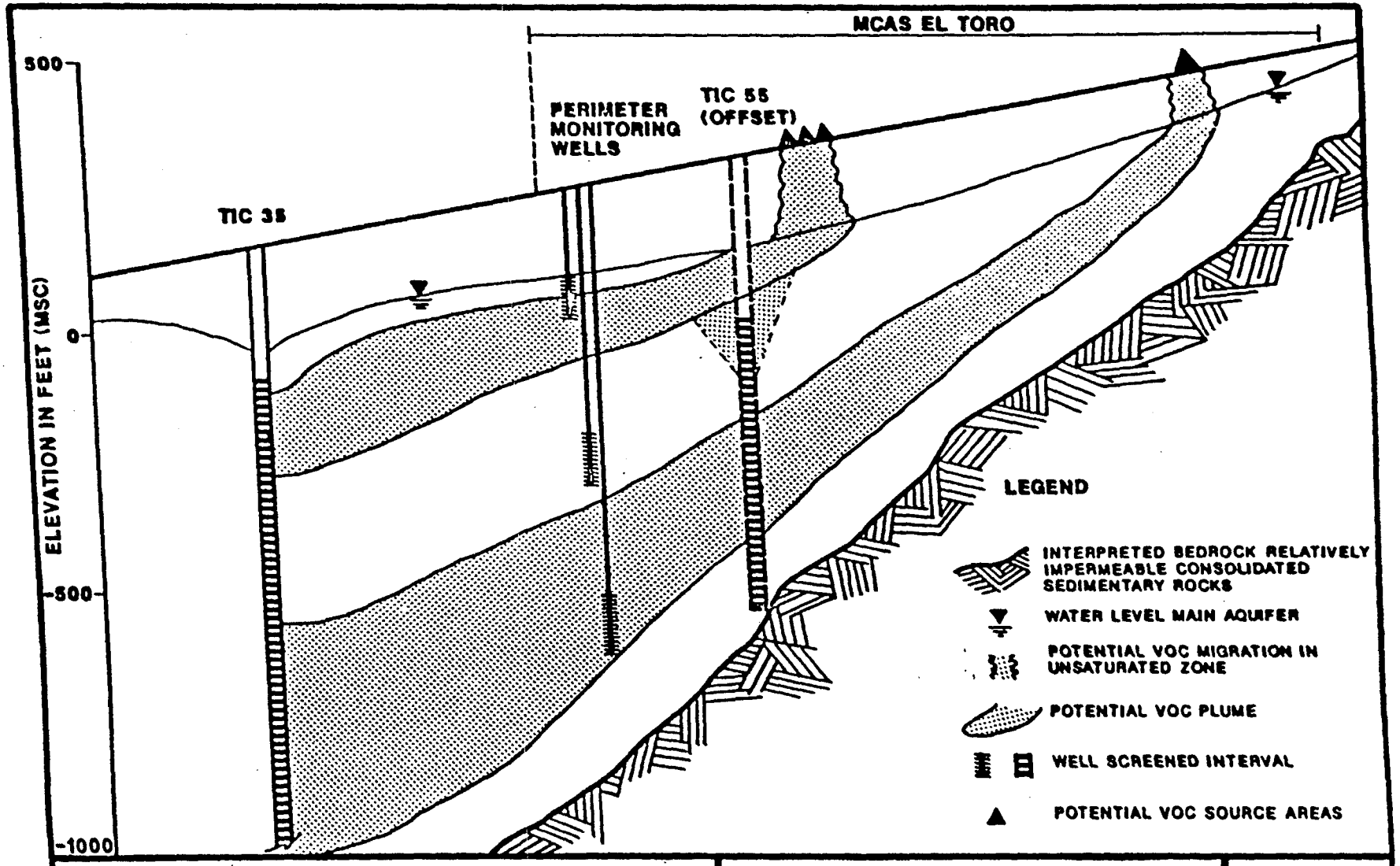
FIGURE 2-4



PERIMETER INVESTIGATION MARINE CORPS AIR STATION EL TORO, CALIFORNIA

HYPOTHETICAL COMPOSITE OF CAPTURE ZONES AND POTENTIAL PLUMES WITH RESULTANT MONITORING WELL LOCATIONS

FIGURE 2-6



PERIMETER INVESTIGATION
MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

HYPOTHETICAL VERTICAL MIGRATION OF POTENTIAL VOC PLUMES

FIGURE 2-7

APPENDIX AC

EXTRACT
OCWD REPORT
INVESTIGATION OF
TRICHLOROETHYLENE CONTAMINATION

1.1 BACKGROUND

In 1985, the District began a program of routine sampling of all active production wells in the Orange County Groundwater Basin for volatile organic compound (VOC) analysis. On June 17, 1985 District staff sampled The Irvine Company (TIC) Well 47 and detected the solvent trichloroethylene (TCE) at a concentration of 10.1 micrograms per liter (ug/l) (See Figure 1). The drinking water standard established by the U.S. Environmental Protection Agency (EPA) and the California Department of Health Services (DHS) for TCE in drinking water is 5.0 ug/l. Subsequent sampling of 13 additional Irvine area wells in 1985 through 1987 revealed the presence of TCE in 3 of the wells, TIC 35, TIC 55, and TIC 74 (formerly misidentified as TIC 17), at concentrations ranging from trace levels to 48.7 ug/l. As shown on Figure 1, well TIC 55 is located on the El Toro MCAS property, while wells TIC 35, TIC 47, and TIC 74 are located west of the base.

The USMC has submitted a Plan of Action (POA) to investigate whether the source of TCE detected in the TIC wells is attributable to historical activities conducted at the El Toro MCAS. The POA is, however, confined to areas within the base boundaries. The District and the RWQCB have taken the position that the POA is inadequate to achieve its objective. Consequently, the RWQCB issued

Cleanup and Abatement Order No. 87-97 requiring the USMC to expand its POA off-base. The USMC has not complied with the Order and has indicated that it does not intend to comply at this time because it believes that data are insufficient to link its activities with off-base contamination and, thus, insufficient justification to warrant an off-base investigation.

Groundwater in the Irvine area is used primarily for irrigation purposes (TIC 35, TIC 47, and TIC 55 are used solely for irrigation). Nonetheless, the presence of TCE is considered a threat to the current and future beneficial use of the Orange County Groundwater Basin. The Irvine area is rapidly becoming urbanized and, in the future, the groundwater in the Irvine area will likely be needed as a domestic supply source. For the year 1987, 9,200 acre-feet were pumped from the area east of Newport Blvd. Groundwater flow in the Irvine area is generally in a westward direction toward the main portion of the Orange County Groundwater Basin and a possible future wellfield to be developed by the Irvine Ranch Water District. West of Newport Blvd., groundwater currently provides a major portion of domestic supply to the cities of Santa Ana, Costa Mesa, Tustin and Irvine.

As shown on Figure 7, TDS concentrations are slightly higher at the top of the Zone 2 hydrochemical facies, indicating that vertical groundwater inflow from the overlying high-TDS facies probably occurs. The change in chemical nature of groundwater from Zone 2 to Zone 3 is much more abrupt, indicating that little or no groundwater intermixing occurs between these zones.

The hydrochemical data collected from the MP monitoring wells support the theory of a single, dominant heterogeneous aquifer system underlain by consolidated sediments which contain relatively immobile connate water.

3.4.2 Volatile Organic Compounds

Areal Extent of TCE

TCE was detected in wells on the El Toro MCAS and as far west as the Woodbridge North Lake well. The area affected covers approximately 2900 acres. In wells MCAS -1, -2, and -7, maximum detected TCE concentrations ranged between 25 and 52 ug/l. TCE was not detected in well MCAS-3, located adjacent to the western base property corner. Of the four wells that the District tried to rehabilitate, TCE was detected in wells TIC 68, TIC 74, and TIC 83. Figure 8 illustrates the maximum detected TCE concentrations in study area wells and the estimated areas

affected. The southern extent of the TCE plume was estimated to be approximately along San Diego Creek and Agua Chinon Wash which are probably groundwater recharge sources at the margin of the basin. As reported by the USMC, TCE concentrations in on-base wells ranged from not detected in wells PS-5 and PS-7 to 90 ug/l in well PS-8 located near the southwest base property line. Although data are lacking in the area south of the El Toro MCAS, the high levels of TCE found on the Marine base coupled with the high recharge potential of this area are indicators that TCE is probably present at depth.

The northern boundary of the TCE plume outside the Marine base appears to be fairly well defined by nondetectable or very low TCE concentrations in wells TIC 110, TIC 117, TIC 74, and MCAS-3 (Figure 8). The westerly (downgradient) extent of TCE contamination appears to be adequately defined between the Woodbridge North Lake well and well TIC 78 on Culver Drive.

Several VOCs other than TCE were detected in water samples from wells both on and off the El Toro MCAS property (see Tables 2 and 4). However, only two of these compounds were detected above the drinking water limit as shown below:

Compound	Drinking Water Limit (ug/L)	Maximum Detected Concentration (ug/l)	
		On-Base	Off-Base
Tetrachloroethylene (PCE)	5.0	81	0.8
Carbon Tetrachloride	5.0	82	ND

The TCE molecule can be broken down into dichloroethylene and vinyl chloride by dehalogenation through natural in-situ biodegradation processes (Kleopfer et al, 1985). The very low or nondetectable concentrations of these chemical byproducts found in water samples in study wells indicate that TCE may not be breaking down in the subsurface and may, therefore, remain in the groundwater for a longer period and travel greater distances.

Vertical Distribution of TCE

The vertical distribution of TCE has been delineated at the cluster wells near well TIC 55 on the El Toro MCAS and at the four MP monitoring wells. The remaining wells containing TCE are screened over either large or very shallow intervals and, therefore, could not provide vertical TCE distribution data. Because of the severe encrustation and large screened intervals of wells TIC 68, TIC 74 and TIC 83, distinct TCE-bearing zones were not defined.

In wells MCAS-1, -2, and -7, TCE-bearing groundwater was found between the depths of 200 and 450 feet bgs, with the highest concentrations present below 300 feet. As shown on Table 4 and Figures 5 and 7, aquifer zones containing TCE exhibited relatively low TDS concentrations. TCE was detected in cluster wells DW-135, -450, and -540 at the El Toro MCAS at depths of 135, 450, and 540 feet, respectively. The perimeter wells installed on the Marine base were each less than 150 feet deep, and, therefore, did not provide water quality data for deeper aquifer zones.

TCE was not detected in the MP monitoring wells at shallow depths above 200 feet, discounting the possibly of surficial TCE sources at these locations. TCE was also absent in the MP monitoring wells below depths of 450 feet, most likely because groundwater below this depth is relatively immobile connate water not influenced by the overlying aquifer.

The volume of TCE-contaminated water for a 200-foot thick aquifer covering 2900 acres with a porosity of 0.25 was calculated to total 150,000 acre-feet.

The known vertical and lateral distribution of TCE both on and off the Marine base are consistent with other

hydrochemical and hydrogeologic data which point to a vertical TCE flowpath downward in recharge areas in the vicinity of the base and then a northwesterly lateral flowpath through the major water-producing aquifer zones.

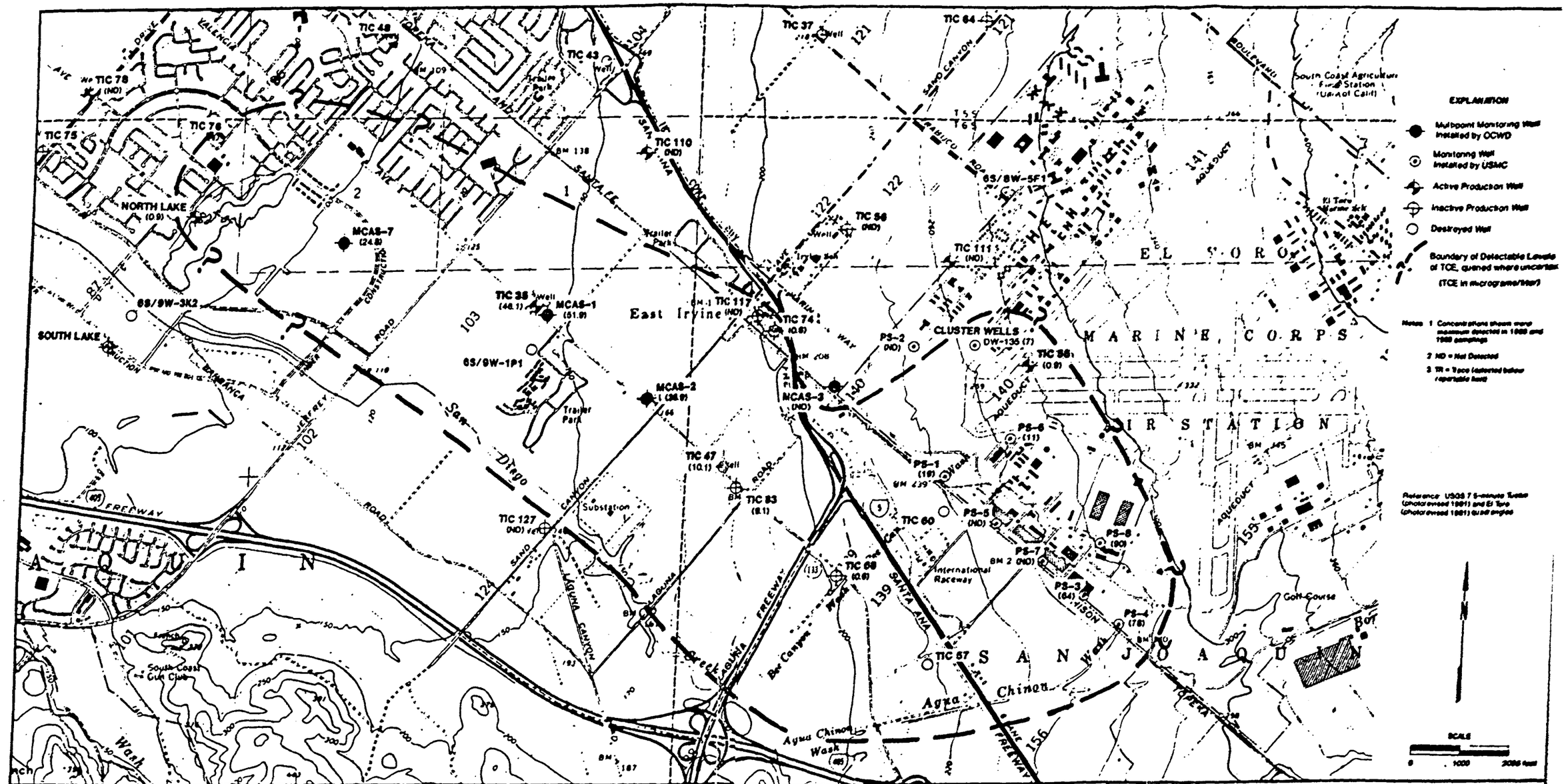


Figure 8. Estimated Areal Extent of TCE

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TELEPHONE (714) 963-5661

4. FINDINGS AND CONCLUSIONS

The District conducted a groundwater investigation to evaluate the nature and extent of TCE contamination in the vicinity of the El Toro MCAS. Four multipoint monitoring wells were constructed and sampled for analysis of VOCS and inorganic compounds. Four inactive production wells were desilted, tested, and sampled. In addition, water from several study-area production wells was sampled and analyzed for VOCs and inorganics. The data collected were compiled and analyzed to develop an understanding of the groundwater system.

The USMC is performing a concurrent investigation, the field data collection phase of which primarily covers the southwestern portion of the El Toro MCAS. Data collected and made available to the District to date have been incorporated into this report. A report prepared by the USMC on their on-base investigation is forthcoming. Based on available data from both investigations, the following findings were made:

1. Industrial solvents, including TCE and PCE, were used and/or disposed of at the El Toro MCAS.

2. Groundwater containing the highest TCE concentrations has been found at shallow depths at the El Toro MCAS. TCE concentrations have also been detected at deeper depths to 540 feet at the El Toro MCAS.

3. The Marine base is located within a primary groundwater recharge area. The number and thickness of clay and silt lenses appear to be lower in the vicinity of the Marine base than at wells MCAS-1 and -7 to the west. The reduced extent of the aquitards near the base provides potential pathways for vertical TCE migration from surficial source areas to the principle aquifer zone.

4. Downward piezometric gradients exist in the study area and probably were steeper historically during increased groundwater production. These gradients, together with the greater density of TCE than water, would provide the driving force for shallow TCE-bearing groundwater to migrate to greater depths.

5. Lithologic, piezometric, and chemical data collected in the study area indicate that shallow aquifer zones containing TCE located on the El Toro MCAS are hydraulicaly connected with deeper TCE-bearing aquifer zones off-base.

6. Groundwater containing TCE above drinking water standards was found in several off-base wells as far as 2.5 miles west of the base and at detectable levels as far as 3 miles off-base. The aquifer zone in which TCE was found is the primary groundwater producing

zone for irrigation wells in this area. This zone occurs between the depths of 200 and 450 feet. Below 450 feet, groundwater is more saline and does not appear to be influenced by or hydraulicaly connected to the overlying main producing zone.

7. The TCE plume covers an area of approximately 2900 acres and impacts a total groundwater volume of 150,000 acre-feet. Groundwater flow velocities were estimated to range between 0.7 and 4 feet/day in the study area.

Based on the findings of this investigation, the following conclusions were drawn:

1. The TCE contamination detected in irrigation and monitoring wells located off-base is continuous with the TCE contamination detected in irrigation and monitoring wells located on the El Toro MCAS.

2. The El Toro MCAS is the source of the TCE in the Irvine area.

5. RECOMMENDATIONS FOR ADDITIONAL WORK

The data collected during the off-base investigation conducted by the District and the perimeter investigation conducted by the USMC have provided a hydrogeologic framework of the study area and design criteria that will be used to develop a strategy for final TCE cleanup. An interim off-base TCE pumpout program utilizing irrigation wells TIC 35 and TIC 47 is currently being developed by the District. The highest TCE concentrations, however, were detected on-base and, as such, pose a serious threat to surrounding groundwaters. The following recommendation is made to address this concern:

- The Marines should immediately initiate interim cleanup of on-base TCE contamination. Such interim cleanup should continue until more information as to the extent is gathered and a final cleanup program is implemented.

To ensure an effective and thorough remediation program, specific areas in which hydrogeologic and hydrochemical data are lacking should be studied. In addition, a regular groundwater sampling program of existing study area wells should be established to monitor the movement of the TCE plume. The following recommendations are made to address these concerns:

1. The Marines should undertake action to identify possible active source areas and the vertical and lateral limits of the TCE plume within the Marine base property. Due to a lack of deep borings and wells, additional clustered or multiscreened monitoring wells should be installed to depths from the water table to at least 450 feet to evaluate the vertical distribution of TCE.

2. The Marines should more precisely define the lateral extent of the TCE plume to the north and south of well MCAS-7 to evaluate the effectiveness of remedial strategies being developed by the District. Because the vertical distribution of TCE is now fairly well defined in this area, two single-screen monitoring wells, targeted at the depths of 250 to 450 feet, would provide the needed water level and water quality data. Preferred locations for these wells would be near the destroyed well TIC 48 and near Barranca Parkway at San Diego Creek.

3. The Marines and the District should implement a groundwater monitoring program, consisting of minimum quarterly water level measurements and water sample collections at all monitoring and active production wells within the area bordered by Trabuco Road and

Culver Drive, including the Marine base. Special attention should be paid to wells TIC 78 and TIC 113 which, as of yet, have not been found to contain TCE but, are located directly downgradient of the plume. In addition, well TIC 111 should be closely monitored, as it is located approximately downgradient from the cluster wells.

4. The Marines should continue development of the groundwater flow model of the Irvine area and continue to refine it as additional hydrogeologic data become available. This model should be used to simulate recovery well capture areas and groundwater flow paths as part of the evaluation of the interim TCE cleanup by the District and to assist in developing a final TCE cleanup program.