Overview of Environmental and Hydrogeologic Conditions near Kodiak, Alaska

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U.S. GEOLOGICAL SURVEY

Open-File Report 95-406

Prepared in cooperation with the

FEDERAL AVIATION ADMINISTRATION

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By Eppie V. Hogan *and* Allan S. Nakanishi

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Anchorage, Alaska
1995

U.S. DEPARTMENT OF THE INTERIOR
BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY
Gordon P. Eaton, Director

For additional information write to:

District Chief
U.S. Geological Survey
4230 University Drive, Suite 201
Anchorage, AK 99508-4664

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CONVERSION FACTORS

Multiply	By	To obtain
millimeter (mm)	0.03937	inch
centimeter	0.3937	inch
meter (m)	3.281	foot
kilometer (km)	0.6214	mile
square kilometer (km^2)	0.3861	square mile
liter (L)	0.2642	gallon
cubic meter per second (m^3/s)	35.31	cubic foot per second
square meter per day (m^2/d)	10.76	square foot per day
cubic meter per second per square kilometer $(m^3/s)/km^2$	91.4	cubic foot per second per square mile

In this report, temperature is reported in degrees Celsius (°C), which can be converted to degrees Fahrenheit (°F) by the following equation:

$$°F=1.8 \times °C + 32$$

ABBREVIATED WATER-QUALITY UNITS

Chemical concentration and water temperature are given only in metric units. Chemical concentration in water is given in milligrams per liter (mg/L) or micrograms per liter (µg/L). Milligrams per liter is a unit expressing the solute mass per unit volume (liter) of water. One thousand micrograms per liter is equivalent to 1 milligram per liter. Specific conductance is given in microsiemens per centimeter (µS/cm) at 25 °C.

VERTICAL DATUM

Sea level: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929—A geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

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ABSTRACT

The Federal Aviation Administration operates airway-support facilities on Kodiak, Woody, and Shuyak Islands in southern Alaska. They wish to consider environmental and hydrogeologic conditions when evaluating options for environmental compliance at these facilities. Kodiak, Woody, and Shuyak Islands have a maritime climate which is characterized by small temperature variations, high humidity, heavy precipitation, high cloud and fog frequencies, and strong surface winds. High brush vegetation is found near the Kodiak FAA facility and coastal hemlock-spruce forest dominates on Woody and Shuyak Islands. Surficial deposits on these islands consist of till; alluvial sand, silt, and gravel; and volcanic ash. Bedrock consists of volcanic and sedimentary rocks. Ground water at the Kodiak FAA facility is available from alluvium and fractured bedrock. Ground water may be found in surficial deposits and bedrock at the Woody Island and Shuyak Island FAA facilities; however, few data exist to support this. Drinking water for the Kodiak and Woody Island FAA facilities presently is obtained from nearby surface-water sources. Drinking water at the Shuyak Island FAA facility was obtained from a well drilled into alluvium.

INTRODUCTION

The Federal Aviation Administration (FAA) owns and (or) operates airway-support and navigational facilities throughout Alaska. Fuels and other potentially hazardous materials such as solvents, polychlorinated biphenyls, and pesticides may have been used and (or) disposed of at many of these facilities. The FAA is conducting environmental studies mandated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA) to determine if environmentally hazardous materials have been spilled or disposed of. To complete these more comprehensive environmental studies, the FAA requires hydrologic and geologic information about the areas surrounding the facilities. This report is a review and summary of existing hydrologic and geologic data for the Kodiak, Woody Island, and Shuyak Island FAA facilities (fig. 1) by the U.S. Geological Survey (USGS) in cooperation with the FAA. In 1988-89, the USGS conducted hydrologic investigations for the Kodiak Coast Guard Support Center (fig. 1). The data from the investigation are referenced in this report as unpublished data.

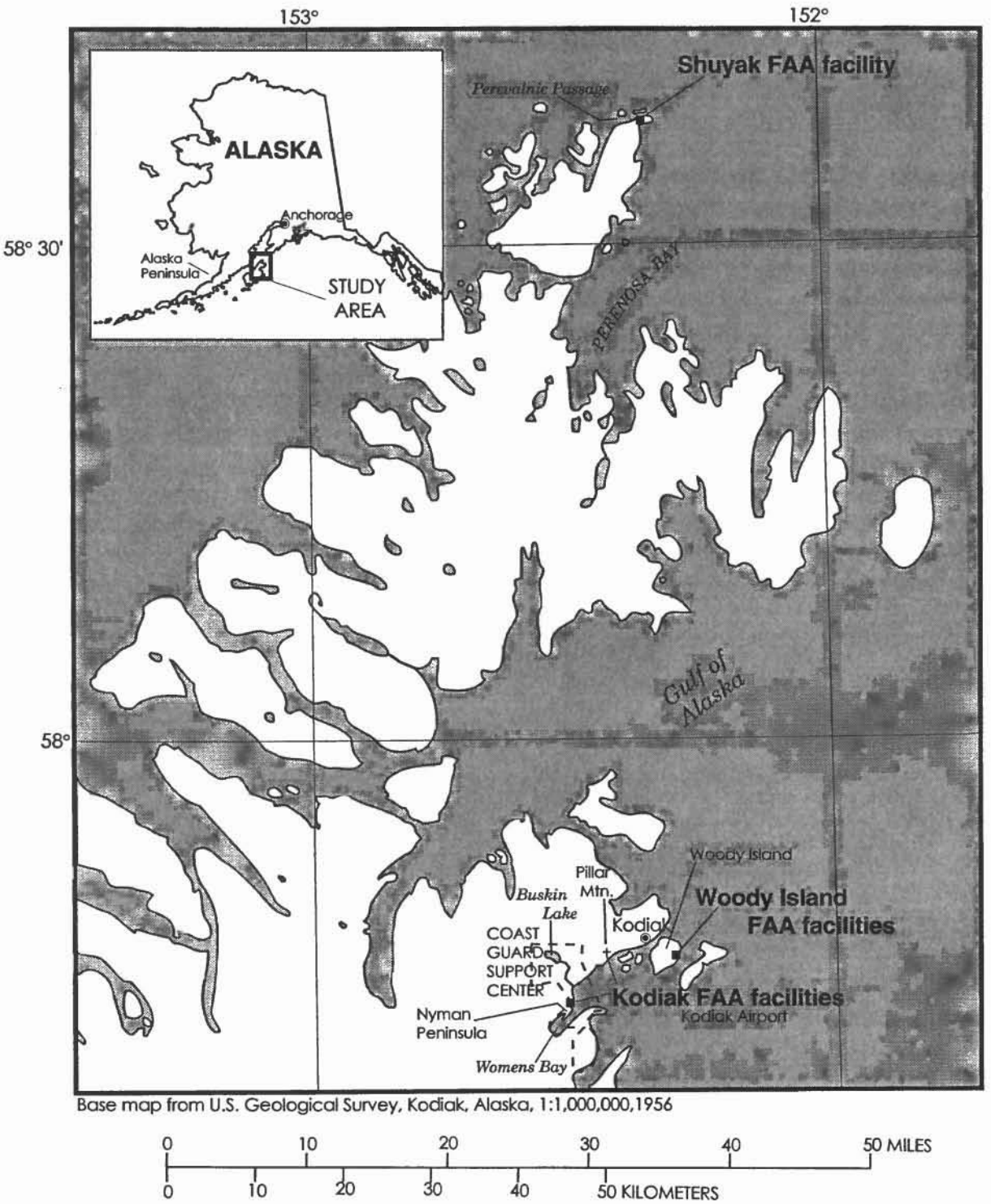


Figure 1. Location of Federal Aviation Administration facilities near Kodiak, Alaska.

KODIAK FAA FACILITIES

Physical Setting

Kodiak Island is about 400 km south of Anchorage in the Gulf of Alaska. The city of Kodiak is near the eastern tip of the island (fig. 1). Most of the FAA airway and navigational-support facilities are at the Kodiak Airport (fig. 1) and operated by the State of Alaska at approximate lat 57°45' N. and long 152°30' W. The Pillar Mountain FAA facility is at lat 57°47' N. and long 152°26' W., about 1.5 km west of the city and about 5 km northeast of the Kodiak Airport (fig. 1). This facility is visited only for maintenance. A detailed description of the Kodiak FAA facilities and an investigation of potential sources of contamination are included in an environmental compliance investigation report by Ecology and Environment, Inc. (1994).

Kodiak Island lies within the maritime climate zone (Hartman and Johnson, 1984). The zone is characterized by small temperature variations, high humidity, heavy precipitation, high cloud and fog frequencies, and strong surface winds. Part of the island is bordered by the Gulf of Alaska and is affected by the warmer ocean currents, which moderate local temperatures. The mean annual temperature at the Kodiak Airport is 4.7 °C. Temperatures range from an August mean maximum of 15.6 °C to a January mean minimum of -3.7 °C. Mean annual precipitation at Kodiak is about 1,480 mm, and mean annual snowfall is about 1,840 mm (Leslie, 1989). Mean monthly and annual temperature, precipitation, and snowfall for the Kodiak Airport for the period 1942-72 are summarized in table 1.

Table 1. Mean monthly and annual temperature, precipitation, and snowfall, 1942-72, Kodiak Airport, Alaska.

[Modified from Leslie (1989); °C, degree Celsius]

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
						Temperature (°C)							
Mean maximum[1]	1.0	2.1	2.6	5.2	8.8	12.4	15.0	15.6	12.6	7.5	3.8	1.2	7.3
Mean minimum[2]	-3.7	-2.9	-2.9	-0.2	3.5	6.9	9.4	9.7	7.1	2.1	-0.9	-3.7	2.0
Mean	-1.3	-0.5	-0.2	2.5	6.1	9.7	12.2	12.7	9.9	4.7	1.4	-1.3	4.7
						Precipitation (millimeters of moisture)							Total
	125	131	94	121	110	110	94	113	156	160	139	126	1,479
						Snowfall (millimeters)							
	386	371	414	173	15	0.0	0.0	0.0	3	53	119	305	1,839

[1]Record maximum, 30.0 °C, June 1953.
[2]Record minimum, -24.4 °C, February 1971.

The vegetation near the Kodiak FAA facility is a high-brush system consisting of coastal alder thickets, willow, blueberry, raspberry, lingonberry, Devil's club, grasses, ferns, lichens, and mosses (Selkregg, 1976). Slopes are heavily vegetated at lower elevations and covered with grasses and tundra vegetation at higher elevations.

Geologic mapping of the Kodiak area has been done by Moore (1967, 1969) and Nilsen and Moore (1979). McGee (1973), Moore (1975), Kienle and Turner (1976), Moore and Bolm (1977), and Lyle and others (1978) discuss the sedimentation and tectonic histories of Kodiak Island and adjacent areas. Soils have been mapped at a regional scale for Kodiak Island (Rieger and others, 1979) and in more detail on the northeast part of the island (Rieger and Wunderlich, 1960). Within the boundaries of the Coast Guard Support Center, soils were mapped by Cox and Young, (1980).

The topography near the Kodiak Airport is characterized by glacially scoured and ice-moulded bedrock hills that are about 100 m above sea level (Combellick, 1989). The bedrock generally is homogeneous in terms of both rock type and structure and consists primarily of compacted and metamorphosed dark-gray to black mudstone, siltstone, sandstone, and conglomerate (Solie and Reifenstuhl, 1989). Limestone and tuff layers are present, but in minor amounts. Bedding typically is 1 to 4 cm thick and consistent throughout the area. A prominent fracture system is oriented approximately perpendicular to bedding (Solie and Reifenstuhl, 1989).

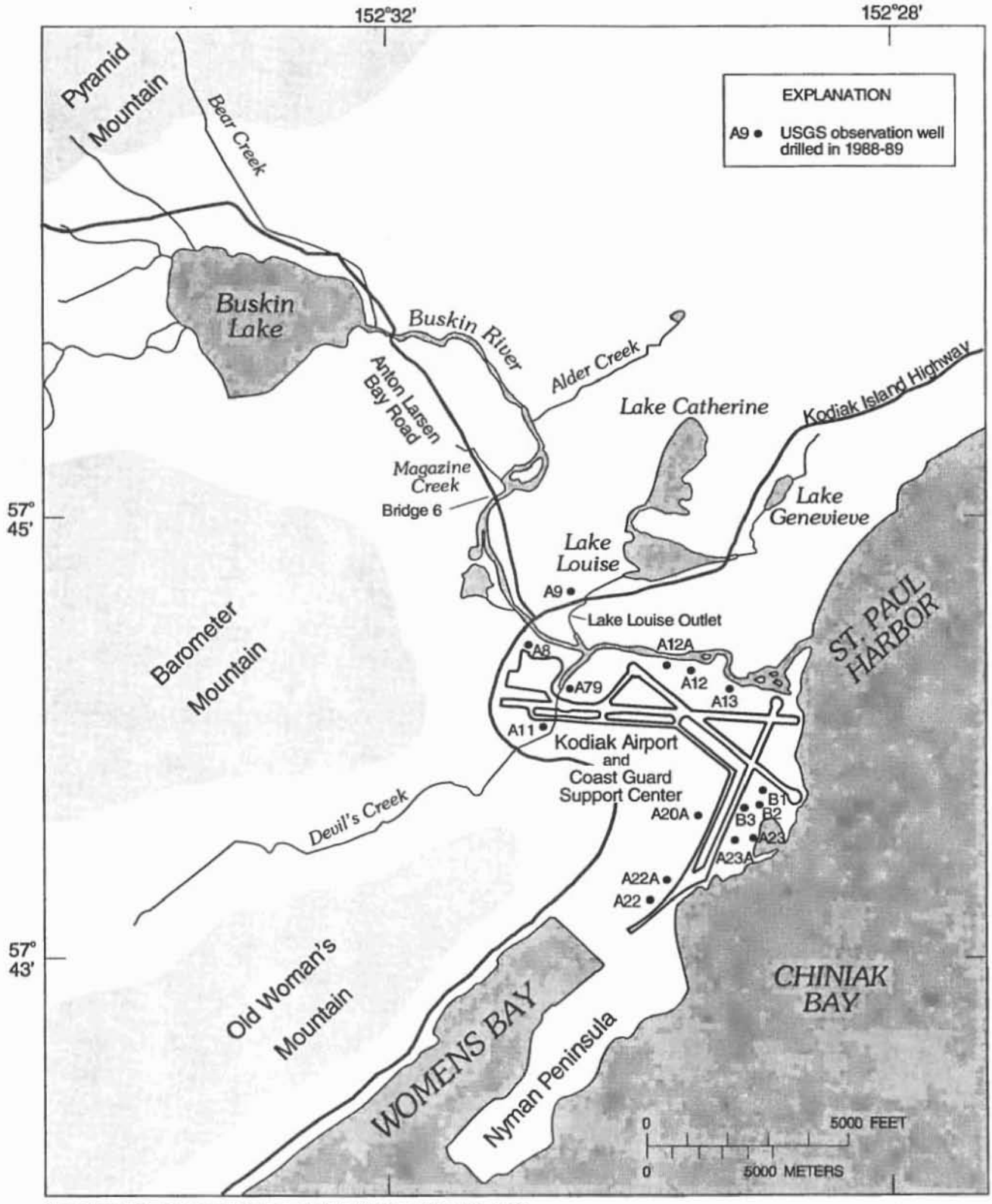
The most widespread surficial deposit in the lowland areas near the Kodiak Airport is a thin, nearly continuous layer of gray, cobbly till (Combellick, 1989). Typically, organic-rich silt overlies the till, or overlies the bedrock where the till is absent. A layer of brown, fine- to medium-grained volcanic ash from the 1912 eruption of Mount Katmai on the nearby Alaska Peninsula covers the entire sequence and is the parent material for the modern soil. Alluvial sand and gravel are common along the Buskin River. Information about sediments encountered in wells drilled at the Kodiak Airport are given in appendix 1. The locations of these wells are given in figure 2.

Hydrology and Drinking Water

Surface Water

Most of the Kodiak FAA facility lies within the Buskin River drainage basin. The river originates in the mountains about 10 km west of Kodiak and supplies water to the Coast Guard Support Center and the FAA facility. Bear Creek drains an area north of Buskin Lake and enters the Buskin River just below the lake. From Buskin Lake, the river flows in a southeasterly direction for about 6 km and empties into St. Paul Harbor, which is part of Chiniak Bay (fig. 2). Several streams flow into the lower reach of Buskin River including Alder Creek, Lake Louise Outlet, Magazine Creek, and Devils Creek (fig. 2).

Peak discharge from streams on Kodiak Island can occur during any month due to rainfall. Streamflow may also increase during periods of intense snowmelt in late spring and early summer. Discharge measurements for the Buskin River and selected tributaries were collected by the USGS and are summarized in table 2 (G.L. Solin, U.S. Geological Survey, unpublished data, 1990). The area surrounding the Kodiak FAA facility is extensively developed, and drainage is directed by ditches, culverts, and storm-sewer lines into the Buskin River to the north and into St. Paul Harbor and Womens Bay to the east. No hydrologic data are available for the Pillar Mountain facility (fig. 1). In general, drainage from this facility is toward St. Paul Harbor.



Base from U.S. Geological Survey, Kodiak, Alaska, 1:250,000, 1952

Figure 2. Location of wells near the Kodiak Airport.

Table 2. Miscellaneous streamflow measurements near Kodiak Airport

[m^3/s, cubic meters per second]

Stream name	Date	Discharge (m^3/s)	Stream name	Date	Discharge (m^3/s)
Buskin River below lake	7-17-59	1.2	Lake Louise Outlet	7-30-87	0.03
	7-28-87	1.4		8-19-87	0.01
	8-19-87	0.6		5-10-88	0.2
	5-10-88	5.4		7-24-88	0.1
	7-24-88	2.5		2-24-89	0.09
	2-24-90	0.5			
			Devils Creek above runway	7-27-87	0.3
Bear Creek near mouth	2-24-89	0.07		5-10-88	1.4
				7-24-88	0.5
Unnamed tributary to Buskin River	7-28-87	0.001		7-24-89	0.09
	8-19-87	0.0			
	2-24-89	0.0	Buskin River near Kodiak	7-31-68	5.9
				2-18-69	0.3
Alder Creek at G Road	5-10-88	0.6		3-18-71	0.8
	7-24-88	0.1			
	8-16-88	0.0	Devils Creek below runway	3-26-68	0.2
	2-24-89	0.0		5-10-68	0.5
				6-19-68	0.5
Buskin River 2.1 km below lake	7-28-87	1.4		7-31-68	0.9
	8-19-87	0.5		7-27-87	0.2
	5-10-88	7.9		8-19-87	0.07
	7-24-88	3.0		5-10-88	1.6
	2-24-89	0.5		7-24-88	0.5
Magazine Creek at 1.4 km Anton Larson Road	7-24-88	0.07	Devils Creek near Kodiak	6-25-70	1.1
	2-24-89	0.03		8-04-70	0.3
				10-13-70	0.4
Buskin River at Bridge 6	2-25-72	0.3			
	2-22-72	0.8			
	3-23-73	0.6			
	2-24-89	0.7			
Buskin River at Kodiak Island Hwy	3-18-70	0.8			
	5-12-88	14.3			
	8-16-88	1.6			
	2-24-89	0.6			

Like other streams on Kodiak Island, peak discharge in the Buskin River can occur during any month of the year due to heavy rainfall. The Buskin River drains about 65 km^2 and average daily discharge is about 3.4 m^3/s (Parks and Madison, 1985).

On October 31, 1991, Kodiak Island received a record 24-hour rainfall of about 190 mm (B.B. Bigelow, U.S. Geological Survey, written commun., 1995). The previous 24-hour rainfall record was about 115 mm on February 25, 1947 (B.B. Bigelow, U.S. Geological Survey, written commun., 1995). The heavy precipitation resulted in saturated and unstable soils with consequent slumping and landslides in the city of Kodiak. Mudslides destroyed at least two homes and damaged several others. Flooding on the Buskin River and its tributaries caused washouts that closed the highway between the city of Kodiak and Kodiak Airport. The peak discharge of the Buskin River at Bridge 6 during the flood was 100 m^3/s. The peak discharge of Devils Creek was 24 m^3/s (B.B. Bigelow, U.S. Geological Survey, written commun., 1995). Damage to city streets; power, sewer and water lines; and other public facilities was estimated to be $5 million. Damage to private property was not estimated.

The Kodiak Airport is vulnerable to partial inundation by earthquake-induced tsunami waves such as the one generated by the 1964 Alaska earthquake (U.S. Army Corps of Engineers, 1993). Tsunami waves are capable of traveling great distances across water and striking shore areas with destructive force. The airport also is susceptible to storm-driven waves. Storm surges at high tide may cause beach erosion and flooding of low-lying areas. Brower and others (1977) describe return periods for maximum significant and extreme wave heights for Kodiak Island (table 3).

Table 3. Annual maximum waves for selected return periods near Kodiak, Alaska
[m, meter]

Return period, in years	Maximum significant wave (m)
5	13.0
10	15.0
25	17.5
50	20.0
100	22.5

Water samples were collected by the U.S. Geological Survey from the Buskin River and most of its tributaries below Buskin Lake (appendix 2). Most of the samples were collected during the hydrologic investigation of the Coast Guard Support Center in 1988-89. Components that were analyzed included total petroleum hydrocarbons, purgeable halocarbons, purgeable aromatics, dissolved metals, EDB (1,2-dibromoethane), semivolatiles, pesticides and PCB's, major ions, and water properties such as color, temperature, and pH (Brunett and Carr, unpublished data, 1990; appendix 2). No fuel-related or other organic compounds were detected in concentrations above the maximum contaminant level (MCL) for that compound.

Ground Water

During 1988 and 1989, the U.S. Geological Survey drilled observation wells near the Kodiak Airport (fig. 2; appendix 1). Some were drilled into alluvium along the Buskin River; the rest were bedrock wells or shallow wells drilled into till or fill. Wells B1, A20A, A22, and A22A are upgradient from the airport. Wells A8, A12, A12A, A13, and A79 are downgradient between the airport and the Buskin River. Well A9 is north of the Buskin River and well A11 is downgradient from the airport terminal area. Wells A23, A23A, B2, and B3 are downgradient between the airport and Womens Bay. The lithology of sediments, water levels, and water-quality data recorded for these wells are included in appendixes 1 and 3.

No single geologic unit can be defined as an unconfined aquifer. Instead, many types of surficial materials may yield water locally to wells. These surficial materials include fill, till, sand, gravel, and volcanic ash (P.J. Still, U.S. Geological Survey, unpublished data, 1990). The stratigraphy and areal distribution of these deposits are complex; however, the available data show that the thickest unconsolidated deposits—estuarine, lake, and stream sediments—are near Buskin Lake and along the Buskin River valley. The unconsolidated deposits near the Kodiak Airport range in thickness from zero where bedrock is exposed to about 14 m (Combellick, 1989). The primary aquifers consist of sand and gravel. Locally, till and bedrock act as barriers that restrict the flow of ground water vertically and horizontally.

Near the Kodiak Airport, bedrock is mantled by till that averages about 1 m thick. Where till is absent, bedrock either is exposed or is overlain by organic-rich soil and volcanic ash (Combellick, 1989). The USGS conducted tests on many of the wells during the fall of 1988 and the summer of 1989. Values of transmissivity and hydraulic conductivity were partly evaluated and are available in USGS files in Anchorage. The highest values of hydraulic conductivity were found in wells developed in alluvium such as those along the Buskin River (H.H. Schumann and G.L. Solin, U.S. Geological Survey, unpublished data, 1990). Values of hydraulic conductivity for some wells near the airport were orders of magnitude lower.

The volcanic and sedimentary rocks that underlie most of Kodiak Island are nearly impermeable and yield little water; however, near the Kodiak Coast Guard Support Center, secondary porosity and permeability may occur in bedrock as a result of fracturing (Brown, 1989). The fractured bedrock is capable of providing water to some homes in the Kodiak area (Jones and others, 1978). Hydraulic testing of bedrock wells indicated that apparent transmissivities of bedrock ranged from almost zero to 100 m^2/d (H.H. Schumann and G.L. Solin, U.S. Geological Survey, unpublished data, 1990).

Water levels in wells during 1988-89 ranged in elevation from 0.08 to 0.6 m below land surface during periods of aquifer recharge and heavy rainfall. Most water levels declined to 1.5-12.2 m below land surface during extensive periods of no precipitation (P.J. Still, U.S. Geological Survey, unpublished data, 1990). Water levels generally are higher in the spring and fall when precipitation is highest. In general, ground-water flow is towards the Buskin River on the north side of the Kodiak Airport and towards Womens Bay on the east side (P.J. Still, U.S. Geological Survey, unpublished data, 1990).

During 1988-89, the USGS collected water samples for analyses from wells near the Kodiak Airport. Total petroleum hydrocarbons, purgeable aromatics, dissolved metals, 1,2-dibromoethane, common anions, and water properties were analyzed (J.O. Brunett and M.R. Carr, U.S. Geo-

logical Survey, unpublished data, 1990; appendix 3, this report). A water sample from well A79 contained a lead concentration of 0.019 mg/L, which exceeds the U.S. Environmental Protection Agency MCL of 0.005 mg/L (U.S. Environmental Protection Agency, 1995). No fuel-related compounds or other organic contaminants were detected in ground water downgradient from the airport except for 6.5 mg/L of toluene in well B1. The MCL for toluene is 1 mg/L.

The position of the freshwater/saltwater interface has not been determined near the Kodiak Airport. Its position may be approximated, however, by the Ghyben-Herzberg relationship that states that for every meter of freshwater above mean sea level, the thickness of the freshwater lens is about 40 m (DeWiest, 1965). Near the Kodiak Airport, as much as 180 m of freshwater may overlie the interface (J.O. Brunett and M.R. Carr, U.S. Geological Survey, unpublished data, 1990). Most of this freshwater is in bedrock of low hydraulic conductivity.

Present Drinking-Water Supplies

Buskin Lake is the principal source of water for the Coast Guard Support Center, which supplies the FAA facility. The water from the lake is filtered, chlorinated, and delivered to the facilities by a pipeline (J.O. Brunett and M.R. Carr, U.S. Geological Survey, unpublished data, 1990). The U.S. Coast Guard maintains water-quality records for the Buskin Lake water-treatment facility. A 10-meter-deep well at the FAA facility at Pillar Mountain supplied water to this site. The current status of this well is unknown.

WOODY ISLAND FAA FACILITIES

Physical Setting

Woody Island is about 12 km^2 in size and is about 2.5 km east of the city of Kodiak. The FAA navigational facilities on the island are at lat 57°47' N., long 152°19' W. (fig. 1). A detailed description of the Woody Island FAA facilities and an investigation of potential sources of contamination are included in an environmental compliance investigation report by Ecology and Environment, Inc. (1992). The facility is maintained by personnel from the Kodiak facility.

The mean annual temperature on Woody Island is 5.5 °C. Temperatures range from an August mean maximum of 16.7 °C to a February mean minimum of -2.9 °C. Mean annual precipitation at Woody Island is about 1,280 mm and about 890 mm of snow falls annually (Leslie, 1989). Mean monthly and annual temperature, precipitation, and snowfall for the period 1922-87 at the weather station on Woody Island are summarized in table 4.

Table 4. Mean monthly and annual temperature, precipitation, and snowfall, 1922-87, Woody Island, Alaska.

[Modified from Leslie (1989); °C, degree Celsius]

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
						Temperature (°C))							
Mean maximum[1]	3.4	2.7	3.6	6.3	9.2	13.8	16.2	16.7	14.5	9.8	5.5	3.3	8.7
Mean minimum[2]	-1.7	-2.9	-2.7	-0.4	3.2	6.3	8.8	9.3	7.3	3.2	-0.6	-2.3	2.3
Mean	0.9	-0.1	0.4	2.9	6.2	10.1	12.5	12.9	10.9	6.5	2.5	0.5	5.5
						Precipitation (millimeters of moisture)							Total
	106	77	111	79	152	100	55	74	92	166	152	115	1,279
						Snowfall (millimeters)							
	86	183	292	76	0.0	0.0	0.0	0.0	0.0	10	114	126	889

[1]Record maximum, 27.8 °C, July 1929.
[2]Record minimum, -17.8 °C, February 1925.

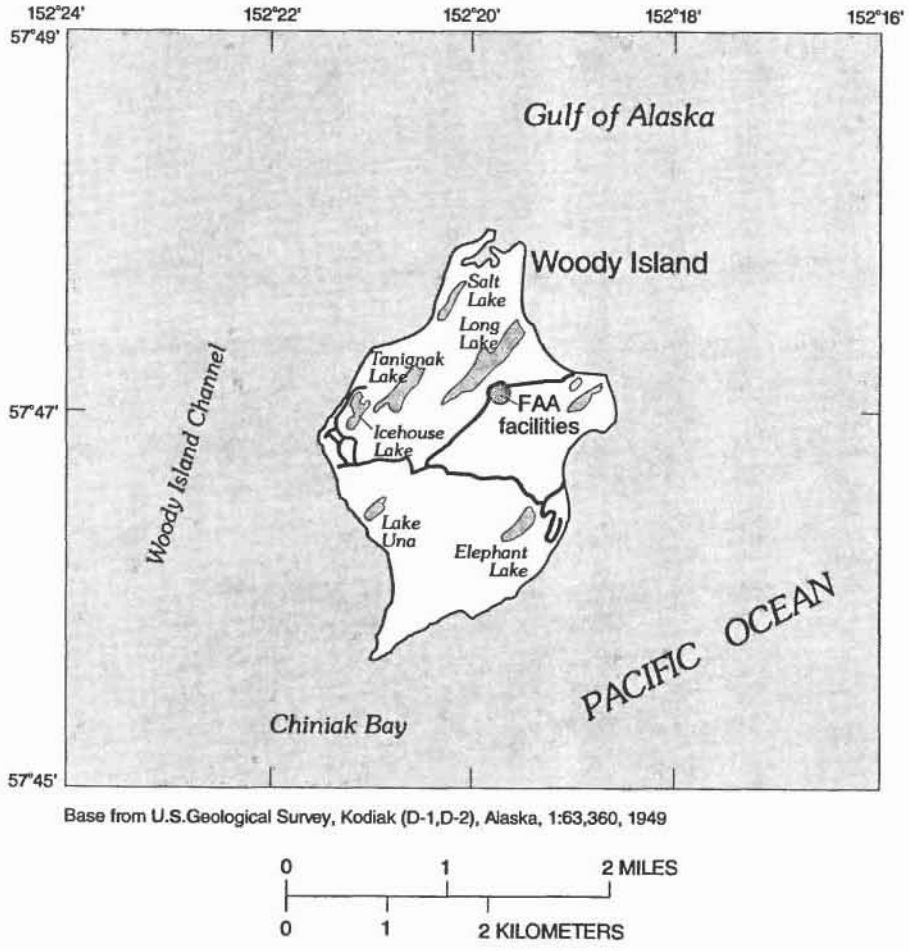


Figure 3. Location of Woody Island, Alaska and the Federal Aviation Administration facilities.

Vegetation on Woody Island consists of coastal hemlock-spruce forest including Sitka spruce, western hemlock, poplar, cottonwood, alder and willow (Viereck and Little, 1972). Forest undergrowth includes ferns, lichens, mosses, and mushrooms.

Geologic data for Woody Island are sparse. The bedrock is expected to be similar to that on Kodiak Island which consists of siltstone, sandstone, mudstone, and conglomerate. Surficial deposits include compacted till, organic-rich silt, and volcanic ash. The depth to bedrock was determined to be 1 to 2 m on the island (Ecology and Environment, Inc. 1992).

Hydrology and Drinking Water

Several freshwater lakes are present on Woody Island—including Salt, Tanignak, Long, Una, Elephant, and one small unnamed lake (fig. 3). These lakes trend in a general northeast-southwest direction. Data concerning the presence, quality, and quantity of perennially flowing streams on Woody Island are not available.

Ground water may exist within unconsolidated deposits or fractured bedrock, but little information is available. According to Ecology and Environment, Inc. (1992), ground water was reached at the FAA facility at a depth of 0.5 m below land surface. The water reportedly was of acceptable drinking-water quality. Currently, Tanignak Lake is used as a drinking-water source at the FAA facility.

SHUYAK ISLAND FAA FACILITY

Physical Setting

Shuyak Island is in the Gulf of Alaska about 60 km north of Kodiak Island and about 340 km south of Anchorage (fig. 1). The FAA navigational and support facilities are on the northeastern end of the island at lat 58°38' N. and long 152°21' W. (fig. 4). Although the facility was closed in 1968, the structures and navigational-support equipment remain on the island. A detailed description of the FAA facility and an investigation of potential sources of contamination are included in an environmental compliance investigation report by Ecology and Environment, Inc. (1993).

Shuyak Island has a maritime climate that is characterized by small temperature variations, high humidity, heavy precipitation, high cloud and fog frequencies, and strong surface winds (Hartman and Johnson, 1984). Climatic data are not available for Shuyak Island or the Shuyak Island FAA facility. On the basis of the close proximity and similar conditions, the climate near Shuyak Island probably reflects that of Kodiak and Woody Island. Local vegetation consists of coastal western hemlock and Sitka spruce forest (Viereck and Little, 1972).

Surficial deposits on Shuyak Island consist of till, alluvium, and volcanic ash (Connelly and Moore, 1979). A thin layer of organic-rich soil overlies most of the surficial deposits. Bedrock consists of volcanic rocks of Triassic to early Jurassic age and marine sedimentary rocks such as graywacke, slate, limestone, shale, chert, and greenstone (Connelly and Moore, 1979). The rock strata dip to the northwest and are extensively fractured and faulted. Bedrock is exposed near the FAA facility.

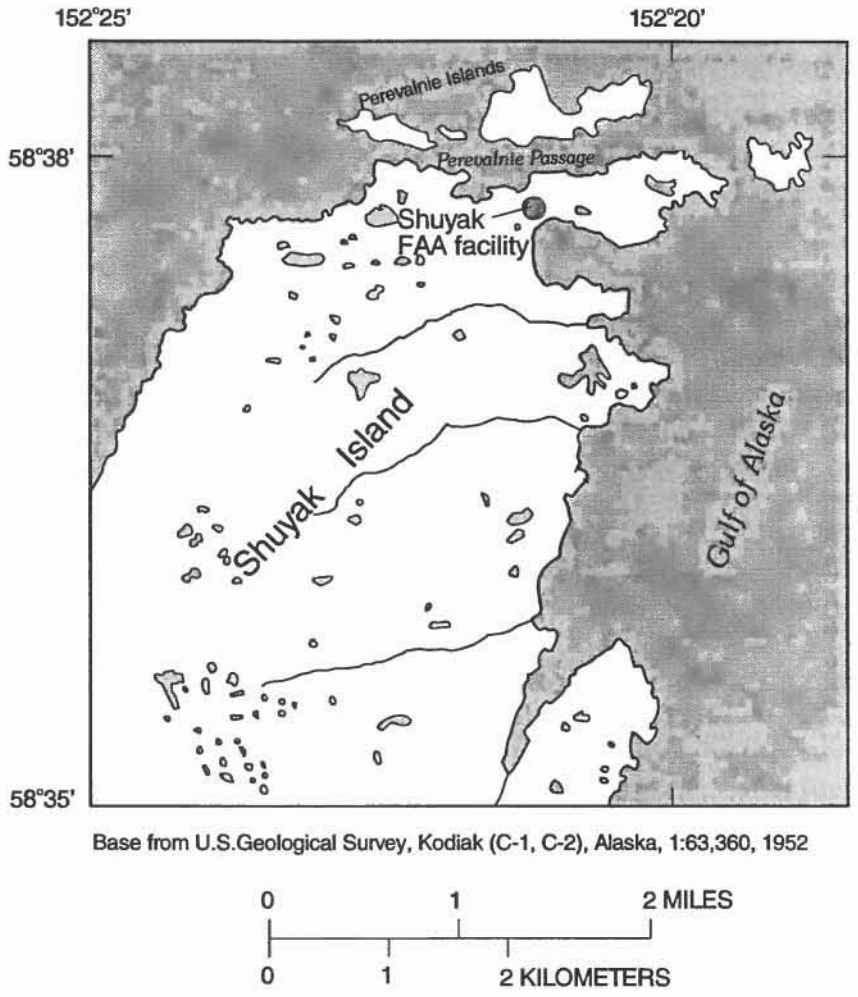


Figure 4. Location of Shuyak Island, Alaska and the Federal Aviation Administration facility.

Hydrology and Drinking Water

Shuyak Island has many small lakes, ponds, streams, and wetland areas; however, no data are available for these water bodies. According to Ecology and Environment, Inc. (1993), runoff from the Shuyak Island FAA facility discharges into adjacent wetlands and ponds. Runoff from the south side of the facility may enter a small 0.3-meter-deep pond about 40 m southwest of the facility. During periods of high runoff, surface water may flow from the pond into Perevalnie Passage. Runoff from the north side of the facility discharges into wetland areas. All surface-water runoff from the Shuyak Island FAA facility ultimately flows to the Gulf of Alaska. Mean annual runoff on Shuyak Island is about 0.04 $(m^3/s)/km^2$ (Selkregg, 1976).

Ground water on Shuyak Island has not been investigated. Ecology and Environment, Inc. (1993) suggest that the water table generally is shallow, on the basis of the large number of small ponds and marshy areas that were observed during their site investigation. Ground water also may be present within fractured bedrock. The Shuyak Island FAA facility was served by at least one well (Ecology and Environment, Inc., 1993). Well-construction details are not available, and additional wells have not been identified near the facility.

ALTERNATIVE DRINKING-WATER SOURCES

Surface-water sources such as lakes, ponds, and streams, and collection of rainwater from roofs may be alternative drinking-water sources for all three FAA facilities. The city of Kodiak's public-water system, which utilizes surface-water reservoirs, could supply the Kodiak FAA facility.

Ground water may be a viable drinking-water source; however, this cannot be quantified without further drilling and data collection. Shallow unconfined aquifer(s) are vulnerable to contamination from surface spills and disposal of hazardous wastes. The amount of self-supplied water that would be needed for commercial and domestic activities at the FAA facilities is estimated to be 540 L/d (Solley and Pierce, 1993; G.L. Solin, U.S. Geological Survey, written commun., 1995). For commercial activities alone, about 390 L/d are needed.

SUMMARY

Most of the Kodiak FAA facilities are at the Kodiak Airport, about 5 km southwest of the city of Kodiak. The Pillar Mountain facility is about 1.5 km west of the city, the Woody Island facility is about 2.5 km east, and the Shuyak Island facility is about 60 km north. Bedrock consists of volcanic and sedimentary rocks. Surficial deposits consist of till; alluvial sand, silt, and gravel; and volcanic ash. Ground water near the Kodiak Airport is available from surficial deposits and bedrock. Ground water probably is available at the Woody Island and Shuyak Island FAA facilities; however, data are scarce for these facilities. Drinking water at the Kodiak and Woody Island FAA facilities is obtained presently from nearby surface-water sources. Drinking water at the Shuyak Island FAA facility reportedly was from a well drilled into unconsolidated alluvium. Alternative sources of drinking water may be available from local lakes and streams or uncontaminated ground water; however, data are inadequate to characterize the current quantity and quality of these sources near the FAA facilities.

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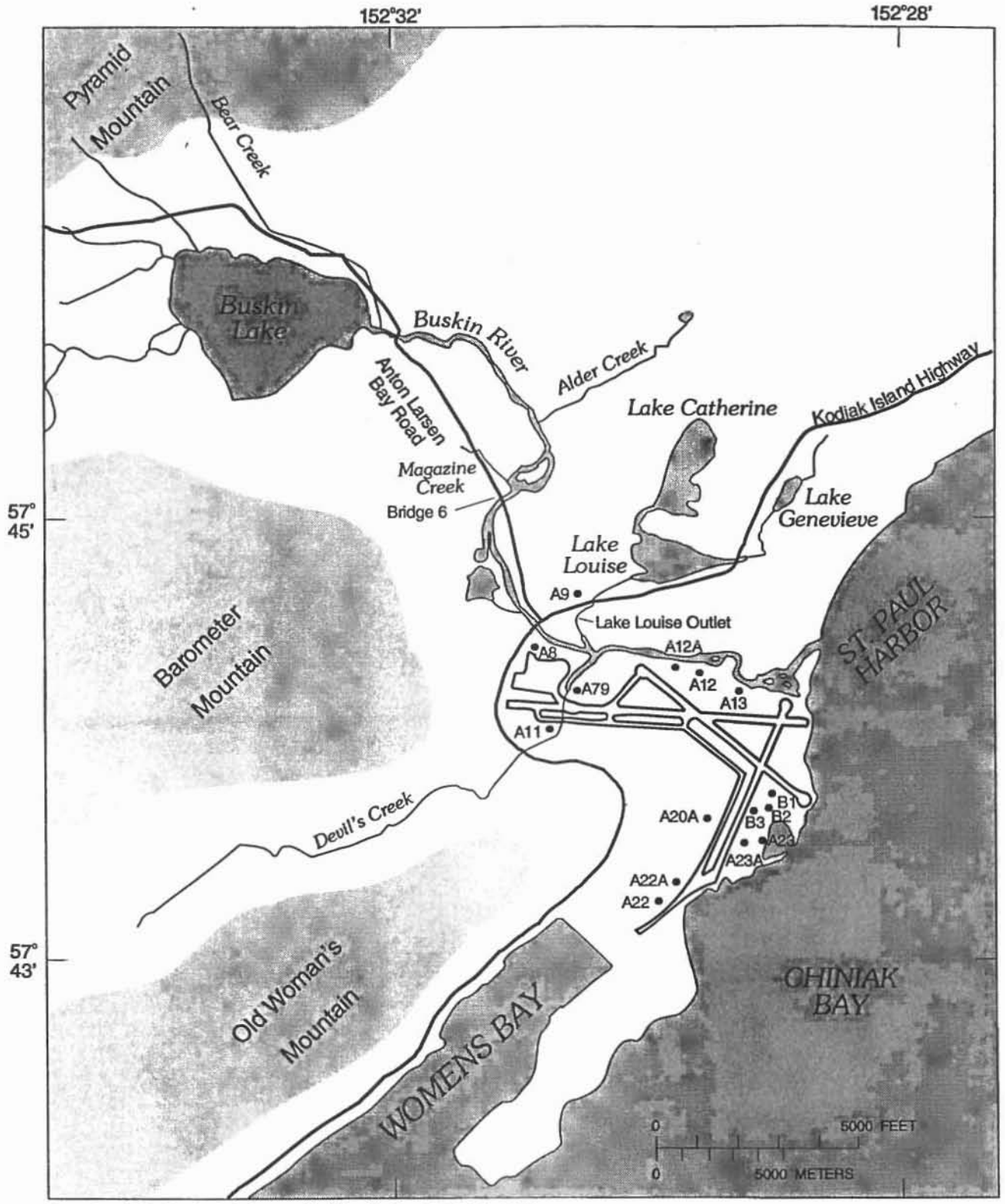
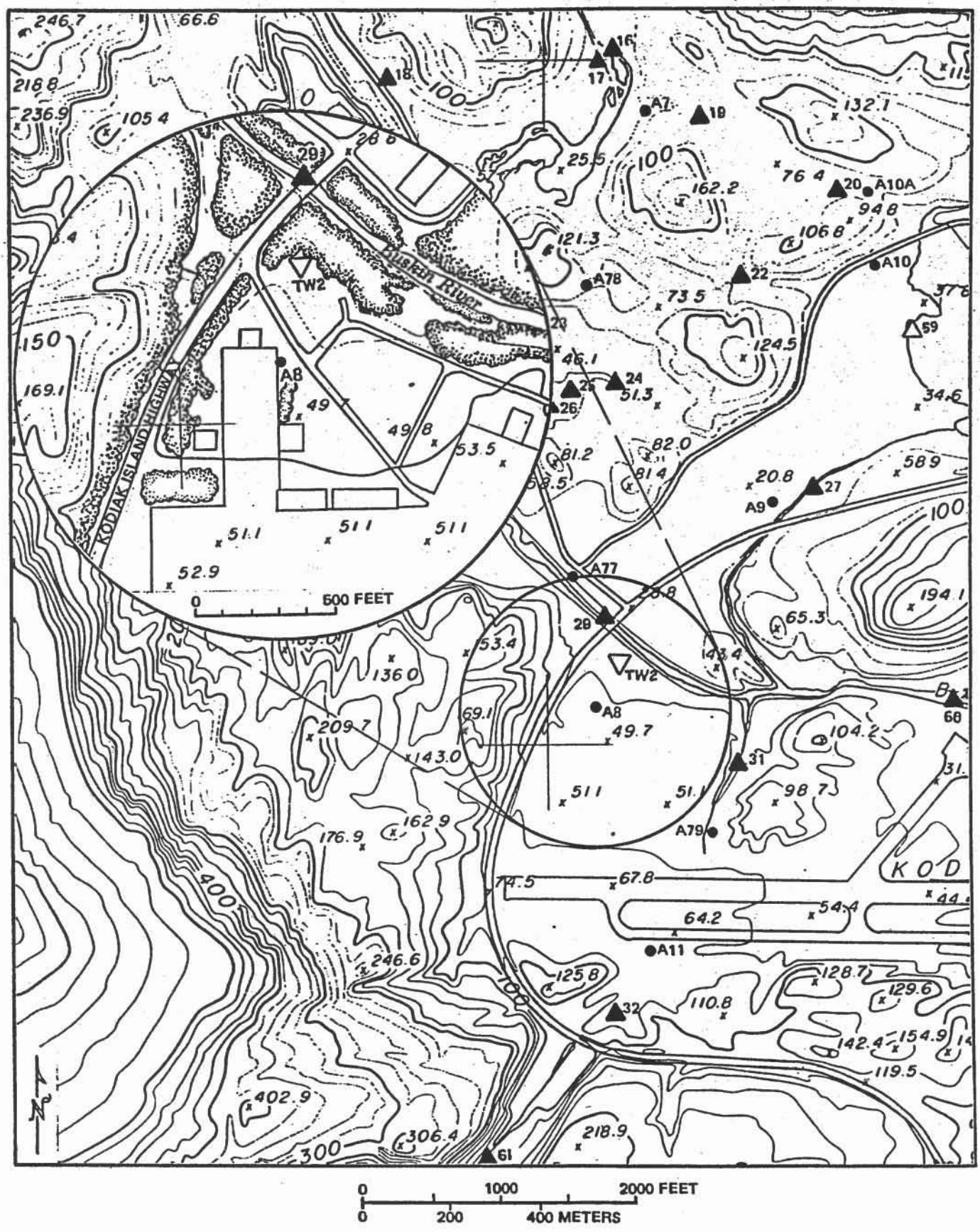
APPENDIX 1

Locations and logs for wells near the Kodiak FAA facility

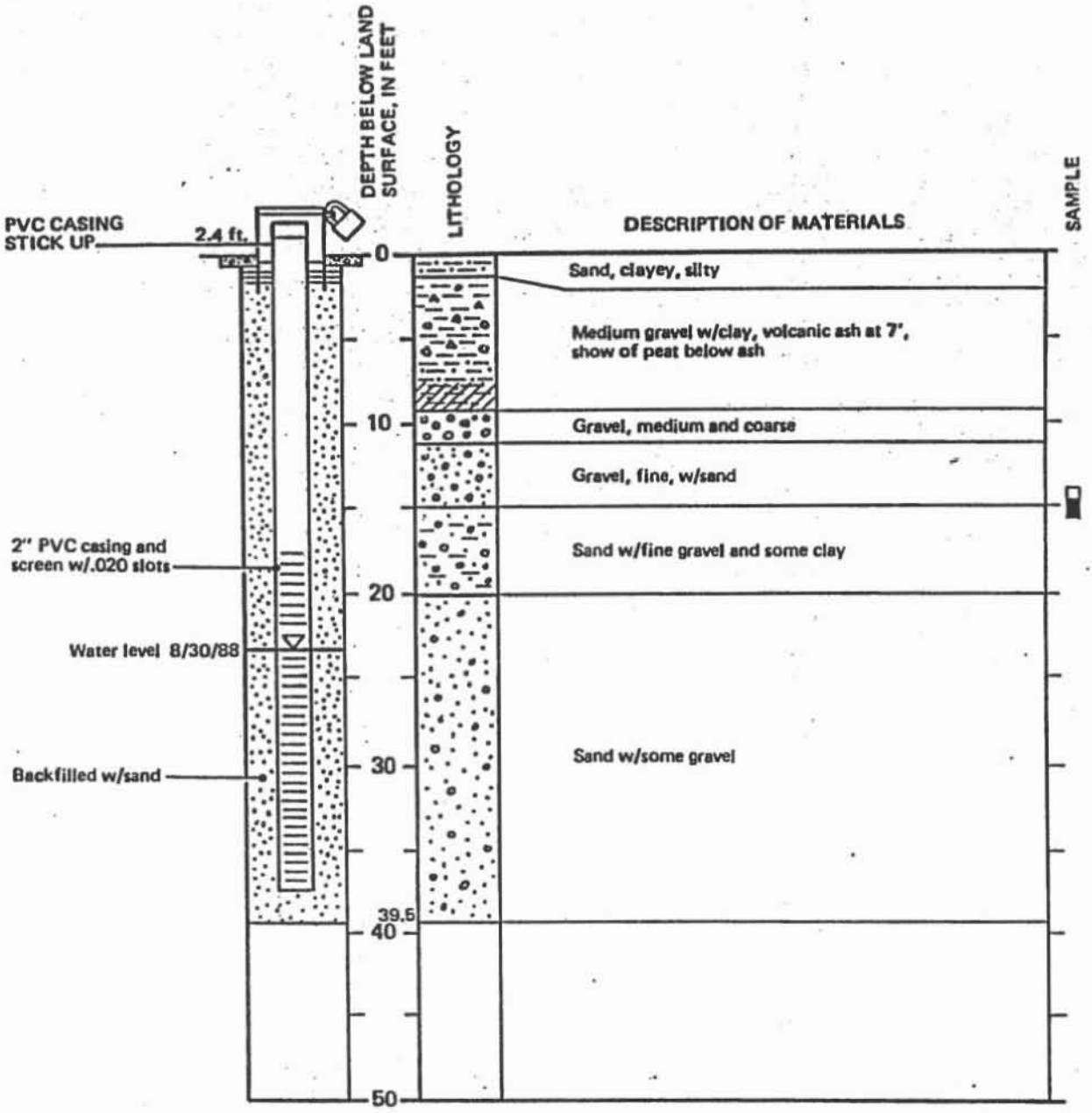


Base from U.S. Geological Survey, Kodiak, Alaska, 1:250,000, 1952

Location of wells near the Kodiak Airport



Location of well A-8.



USGS SITE ID No. 574522152304801

DATE WELL DRILLED 1/21/88 WELL DEEPENED 4/19/88

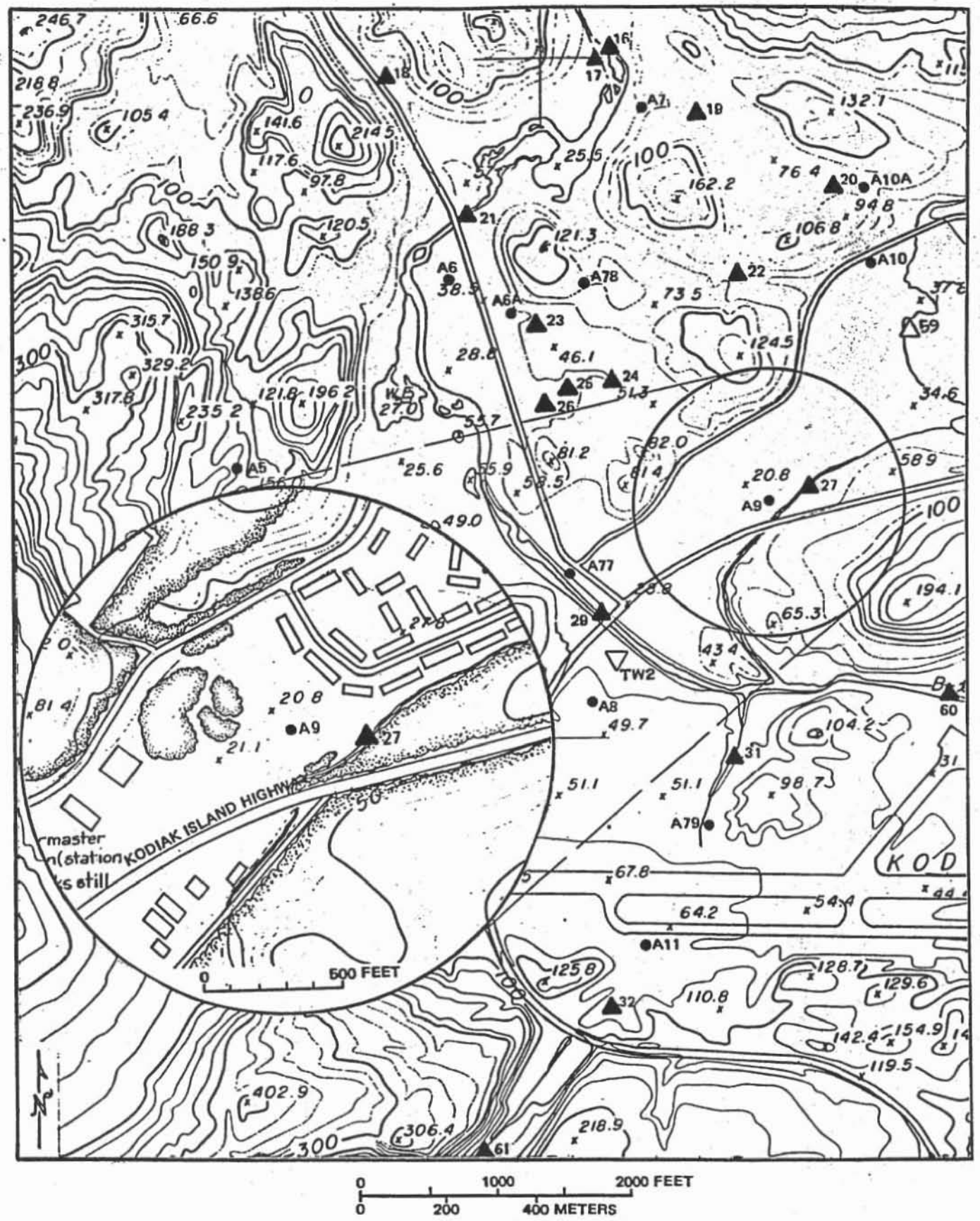
LATITUDE 57° 45' 22" LONGITUDE 152° 30' 48"

ELEVATION OF TOP OF WELL CASING 47.0 ft.

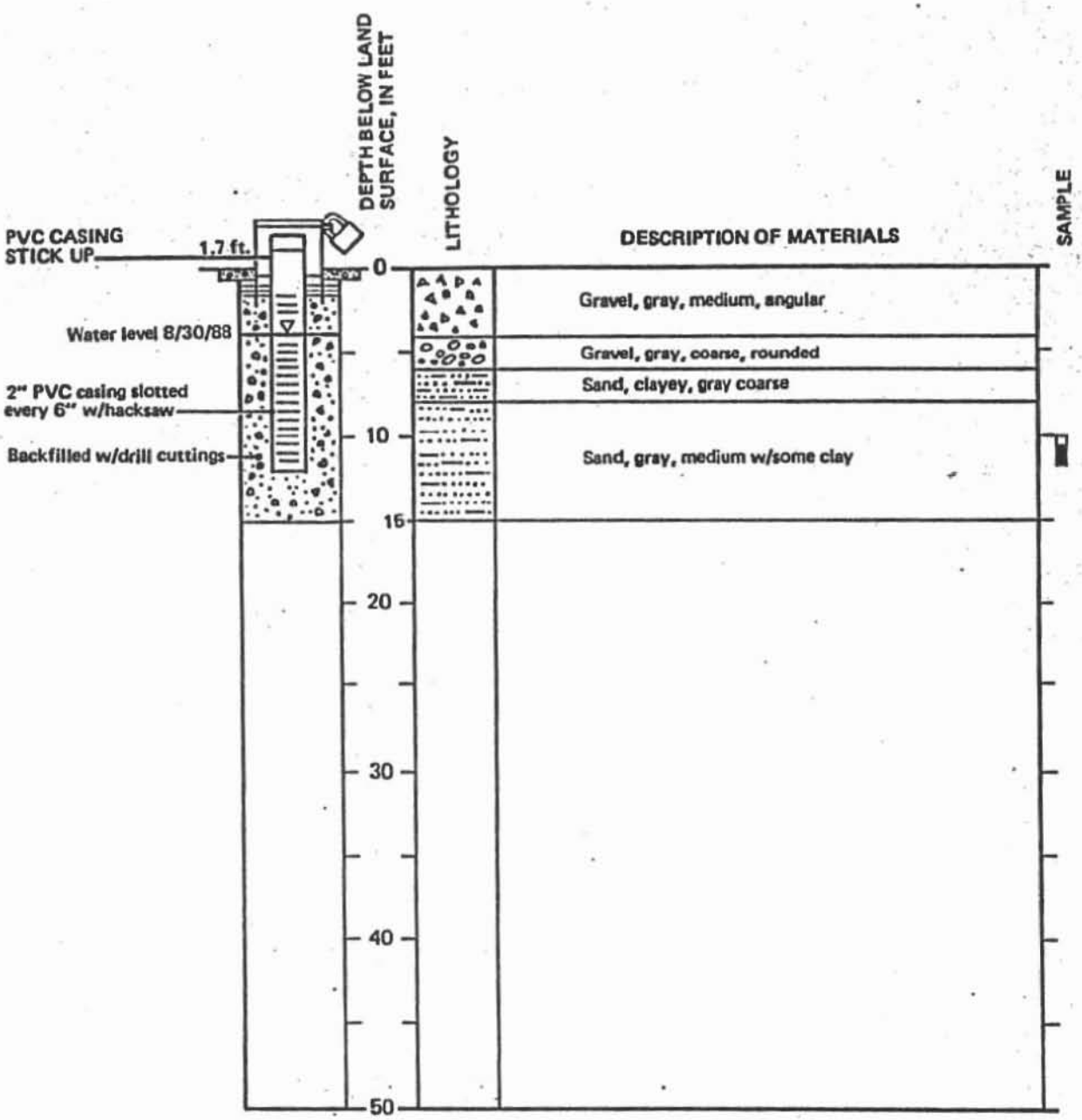
GROUND SURFACE ELEVATION 44.6 ft.

DATUM IS MEAN SEA LEVEL

Log and construction details of well A-8.



Location of well A-9.



USGS SITE ID No. 574536152302301

DATE WELL DRILLED 01/21/88

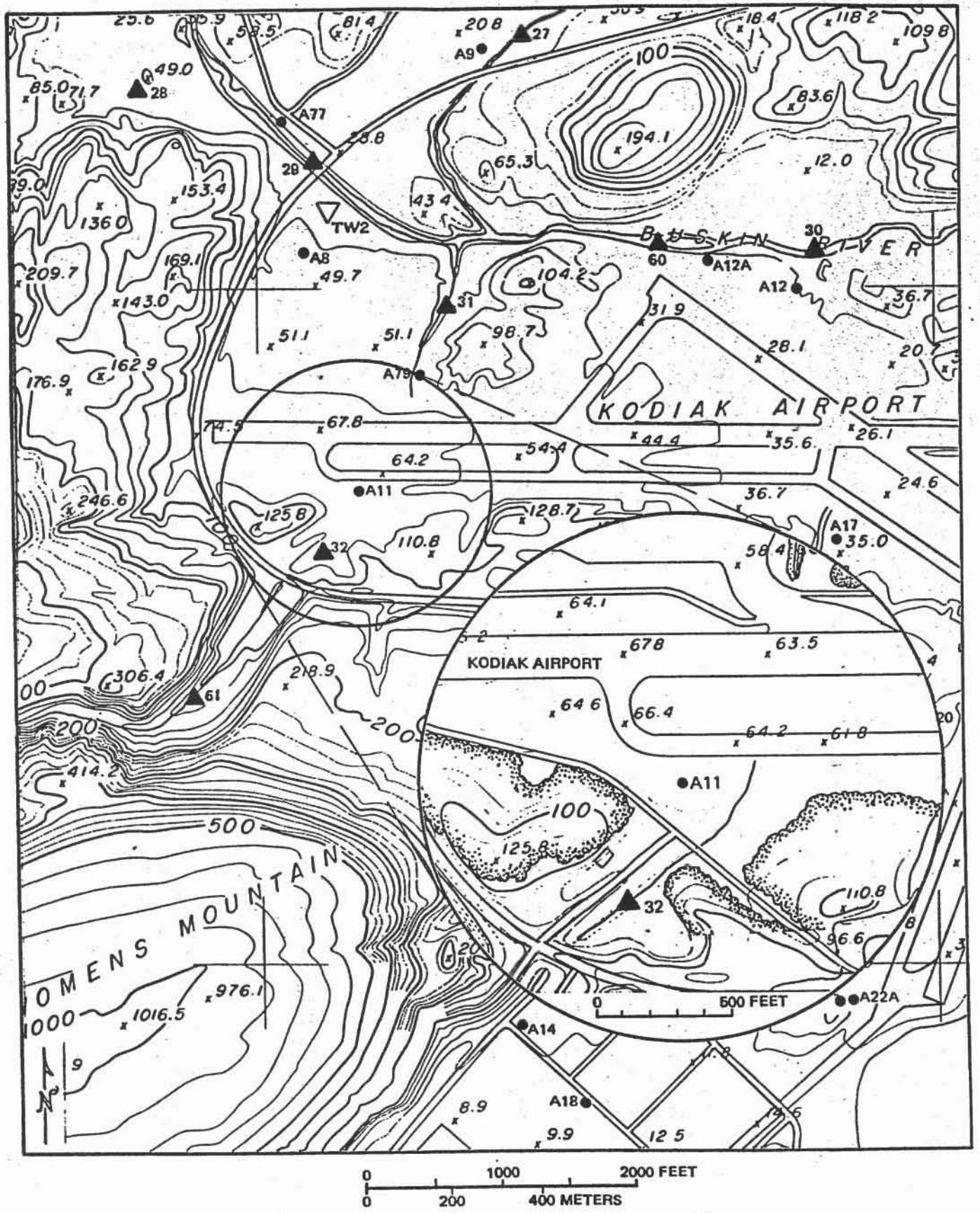
LATITUDE 57° 45' 36" LONGITUDE 152° 30' 23"

ELEVATION OF TOP OF WELL CASING 26.1 ft.

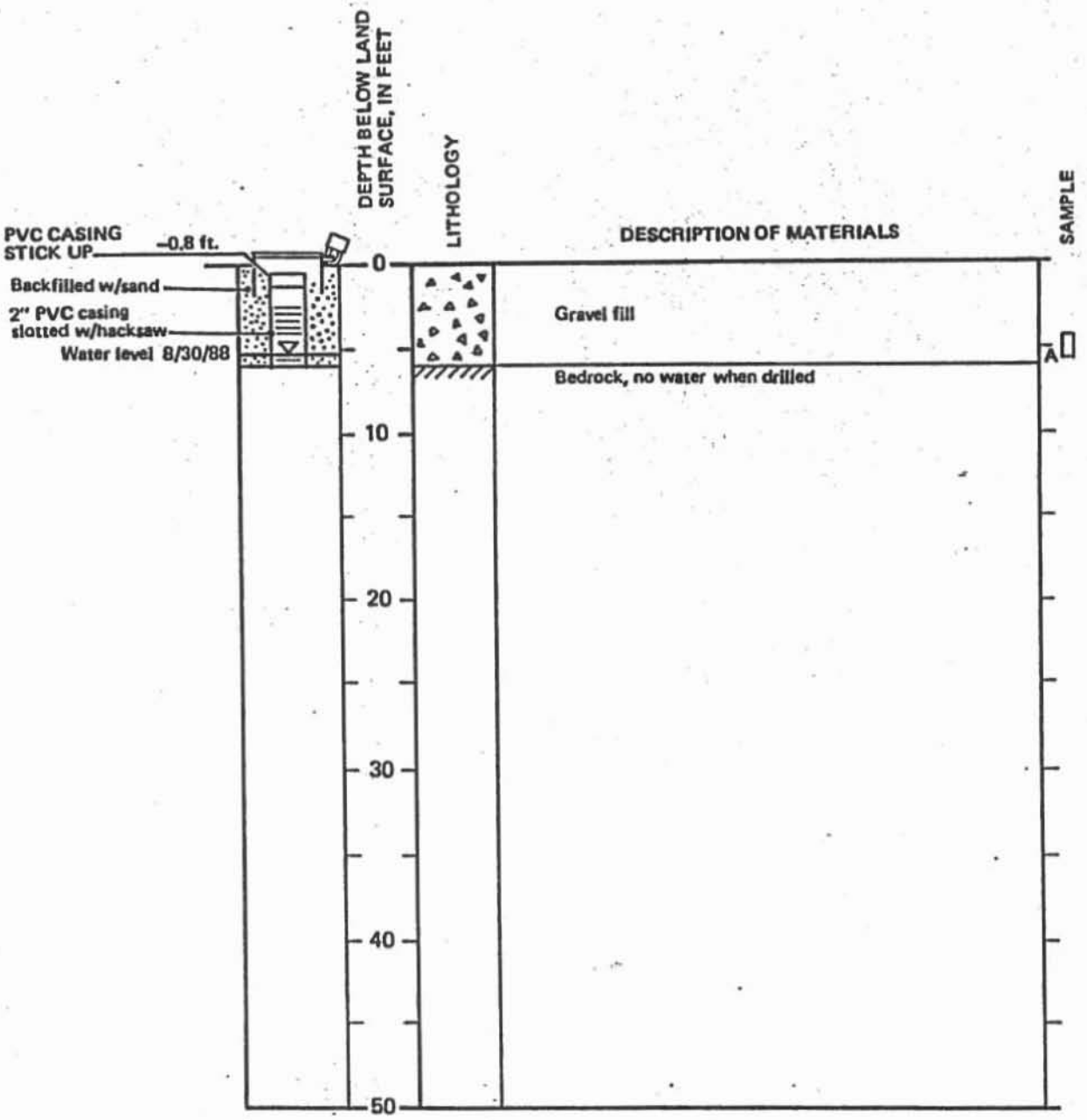
GROUND SURFACE ELEVATION 24.4 ft.

DATUM IS MEAN SEA LEVEL

Log and construction details of well A-9.



Location of well A-11.



USGS SITE ID No. 574504152304201

DATE WELL DRILLED 2/18/88

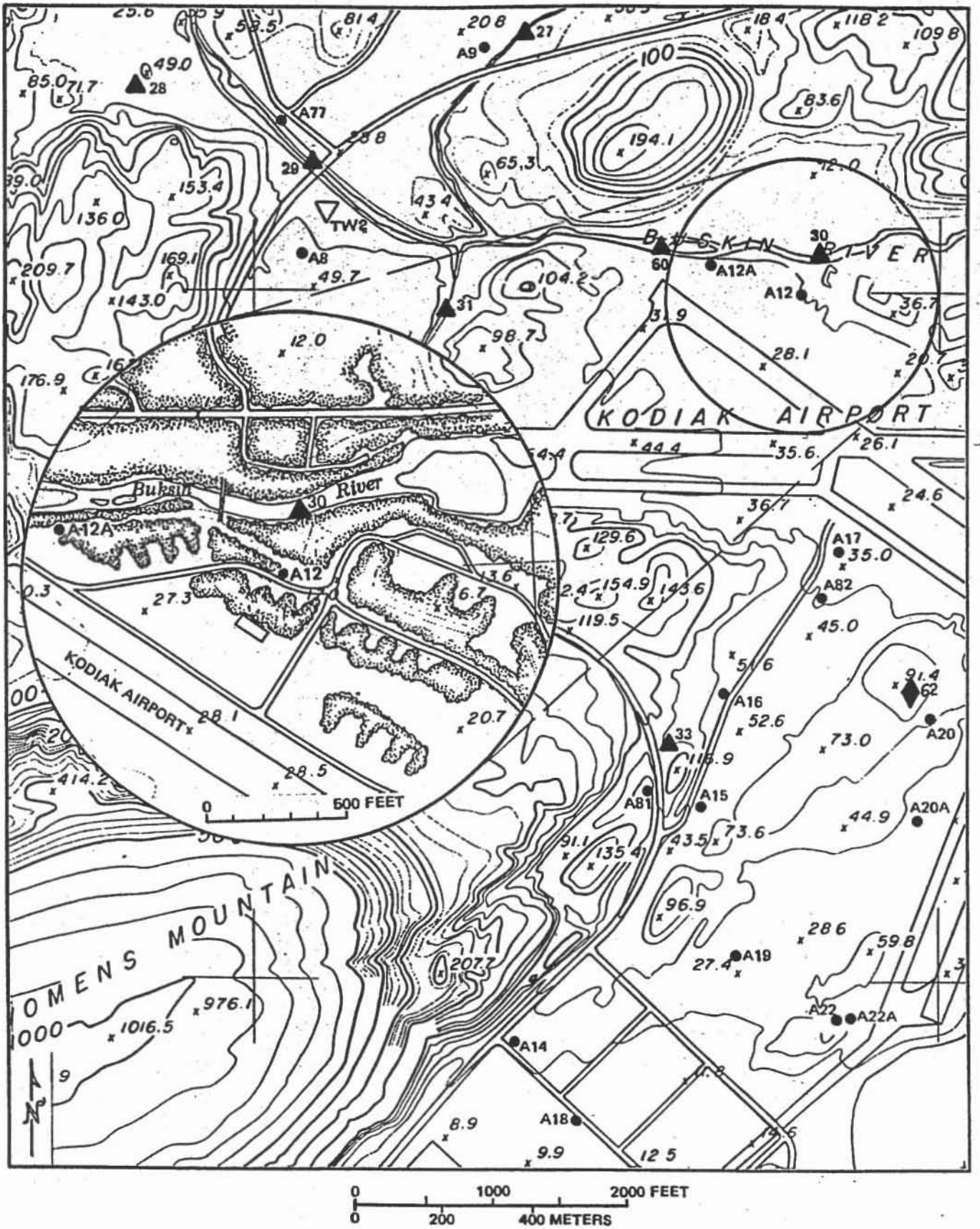
LATITUDE 57° 45' 04" LONGITUDE 152° 30' 42"

ELEVATION OF TOP OF WELL CASING 65.4 ft.

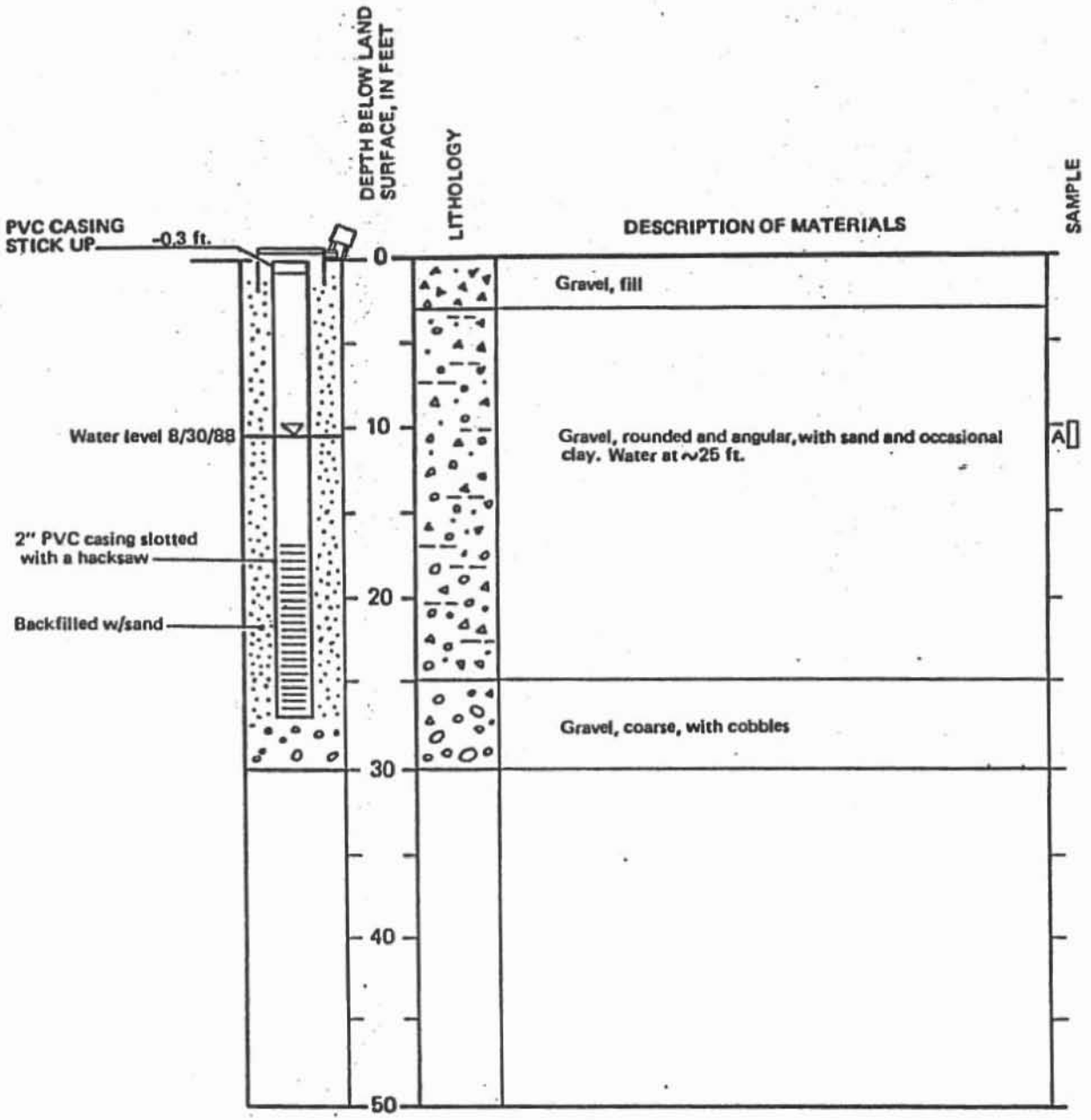
GROUND SURFACE ELEVATION 66.2 ft.

DATUM IS MEAN SEA LEVEL

Log and construction details of well A-11.



Location of wells A-12 and A-12A



USGS SITE ID No. 574519152293901

DATE WELL DRILLED 2/17/88

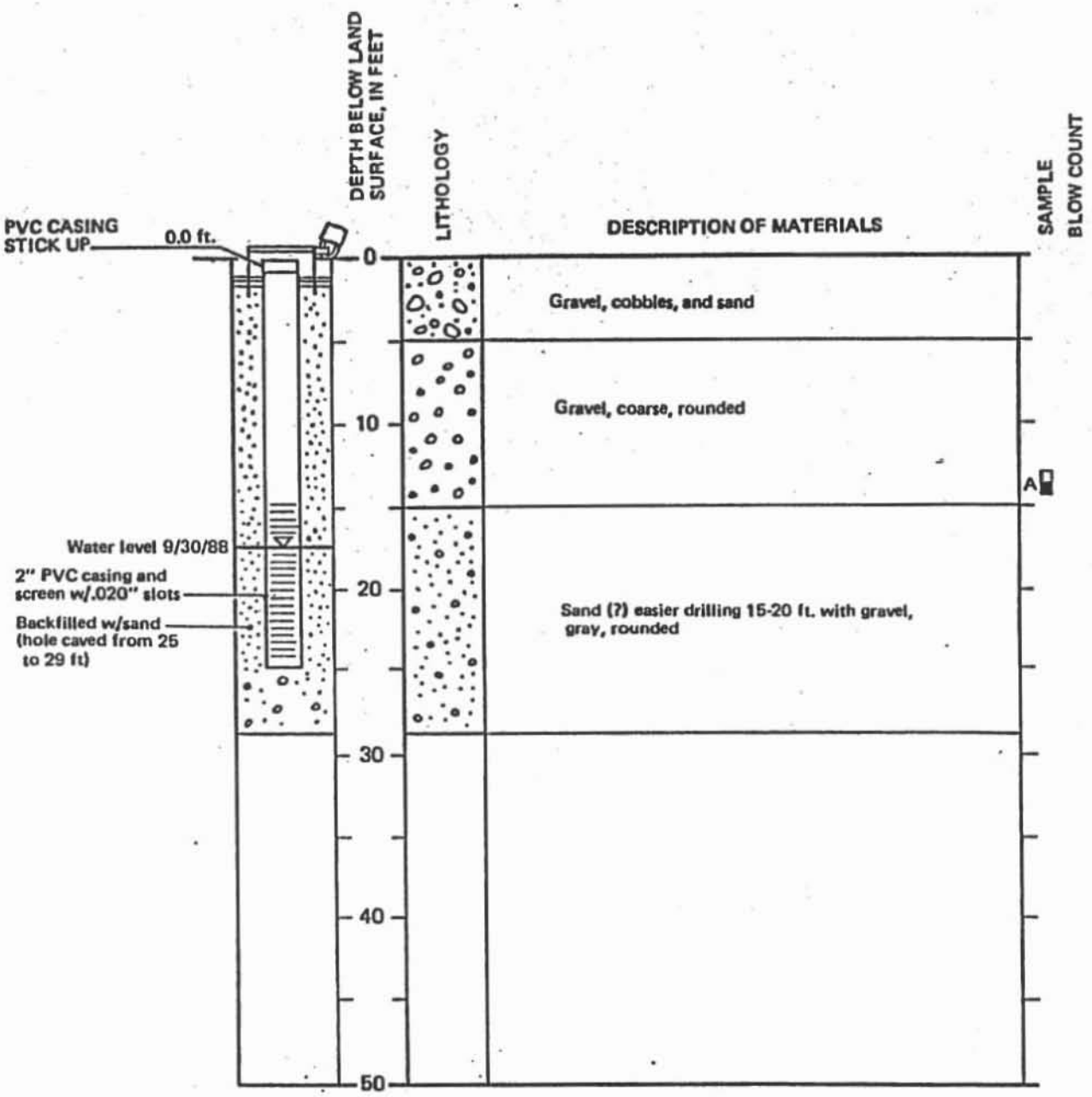
LATITUDE 57°45' 19" LONGITUDE 152°29' 39"

ELEVATION OF TOP OF WELL CASING 16.2 ft.

GROUND SURFACE ELEVATION 16.5 ft.

DATUM IS MEAN SEA LEVEL

Log and construction details of well A-12.



USGS SITE ID No. 574520152295301

DATE WELL DRILLED 4/18/88

LATITUDE 57°45' 20" LONGITUDE 152°29' 53"

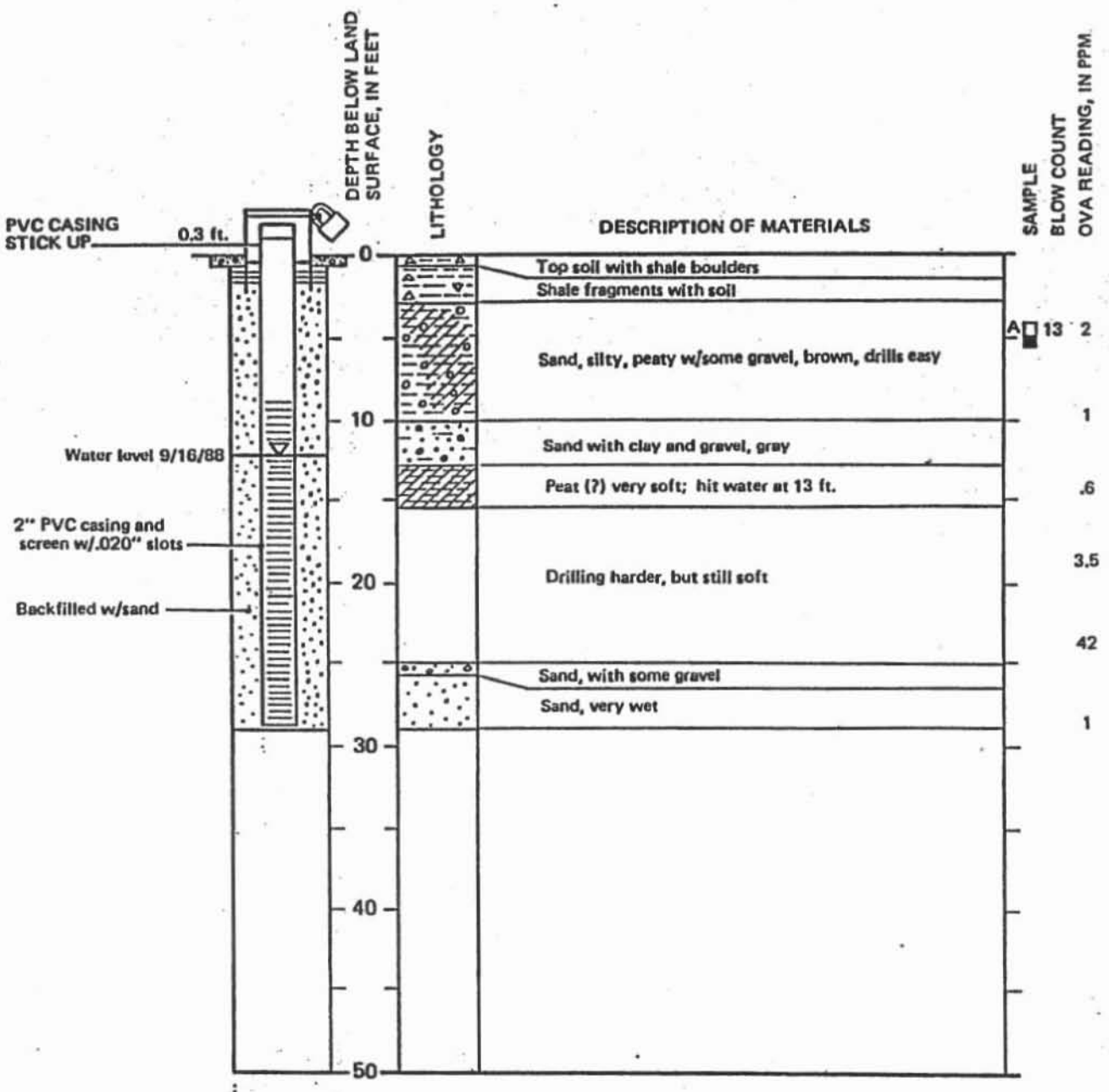
ELEVATION OF TOP OF WELL CASING 24.0 ft.

GROUND SURFACE ELEVATION 24.0 ft.

DATUM IS MEAN SEA LEVEL

Log and construction details of well A-12-A.

Location of well A-20-A.



USGS SITE ID No. 574442152292801

DATE WELL DRILLED 4/17/88

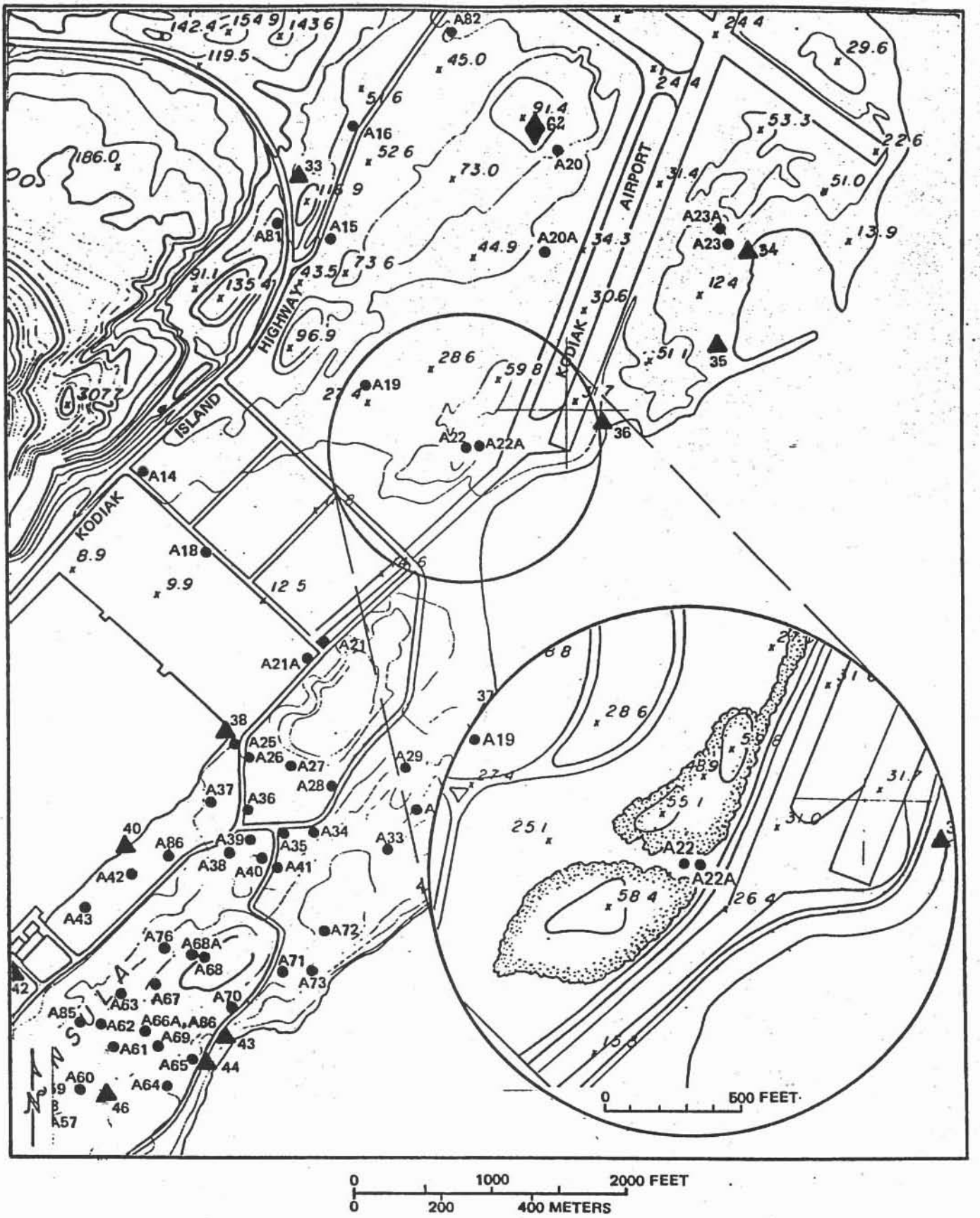
LATITUDE 57°44' 42" LONGITUDE 152°29' 28"

ELEVATION OF TOP OF WELL CASING 31.5 ft.

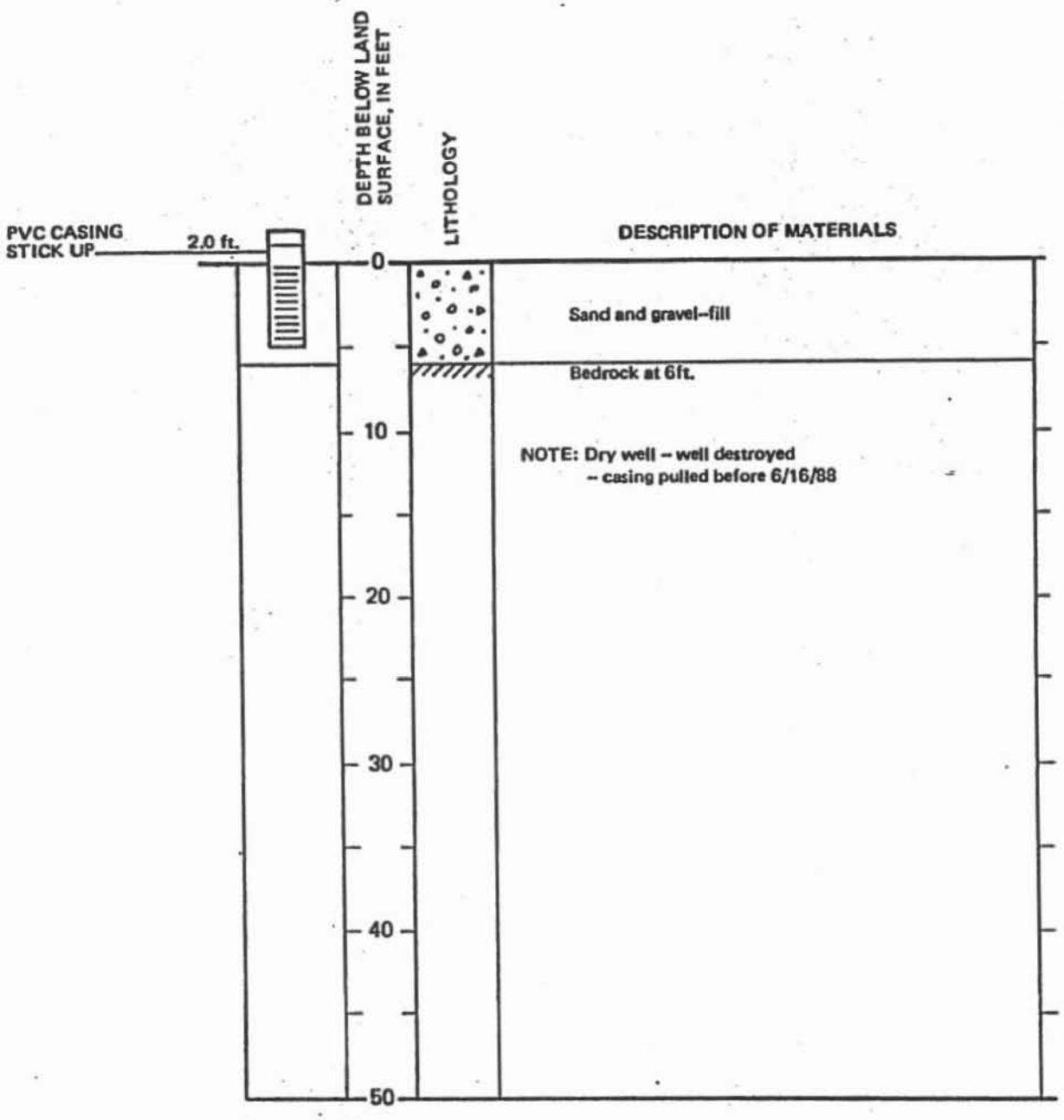
GROUND SURFACE ELEVATION 31.2 ft.

DATUM IS MEAN SEA LEVEL

Log and construction details of well A-20-A.



Location of wells A-22 and A-22A



USGS SITE ID No. 574427152293901

DATE WELL DRILLED 1/27/88

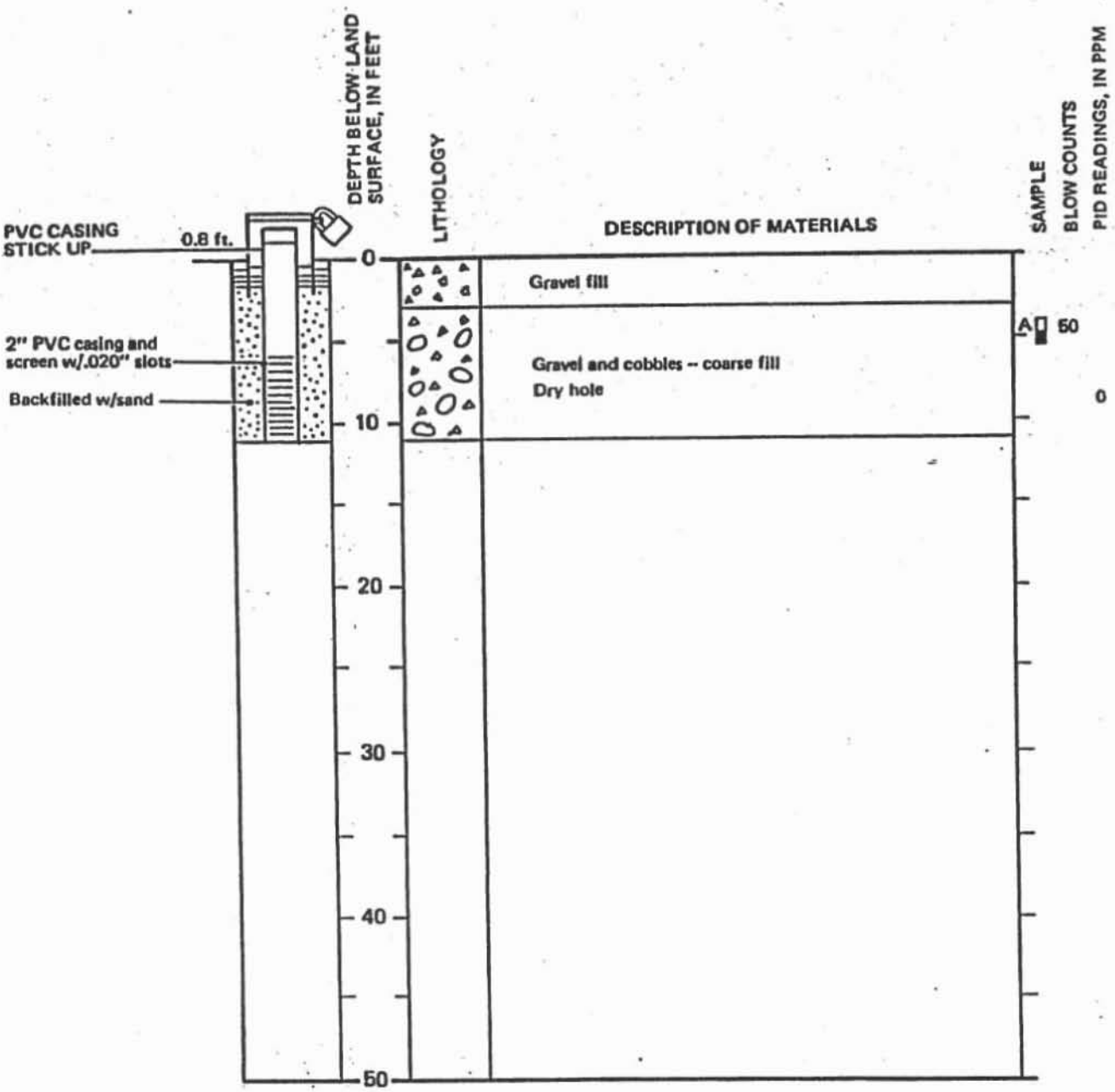
LATITUDE 57° 44' 27" LONGITUDE 152° 29' 39"

ELEVATION OF TOP OF WELL CASING 29.1 ft.

GROUND SURFACE ELEVATION 27.1 ft.

DATUM IS MEAN SEA LEVEL

Log and construction details of well A-22.



USGS SITE ID No. 574427152293401

DATE WELL DRILLED 4/17/88

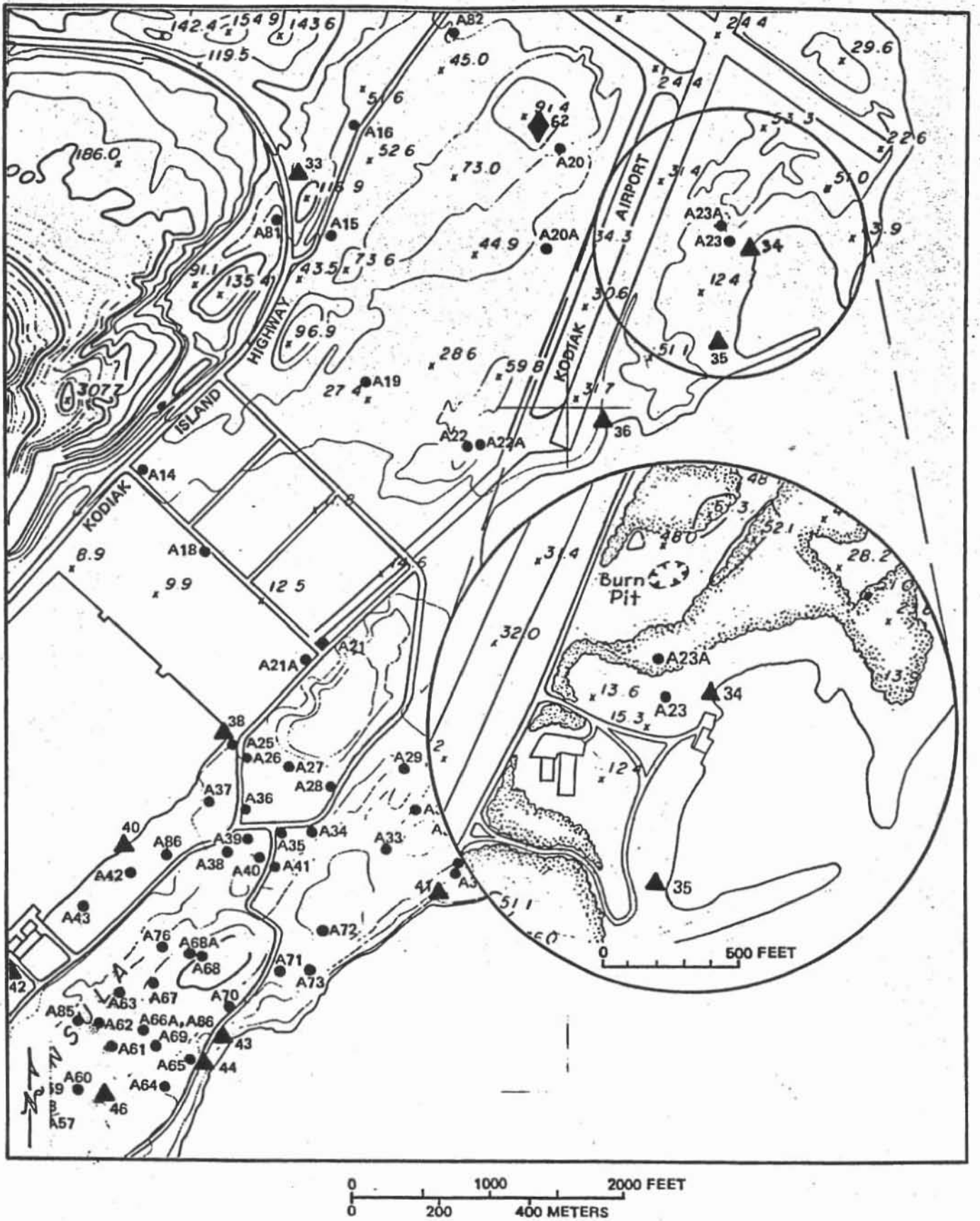
LATITUDE 57° 44' 27" LONGITUDE 152° 29' 34"

ELEVATION OF TOP OF WELL CASING 27.3 ft.

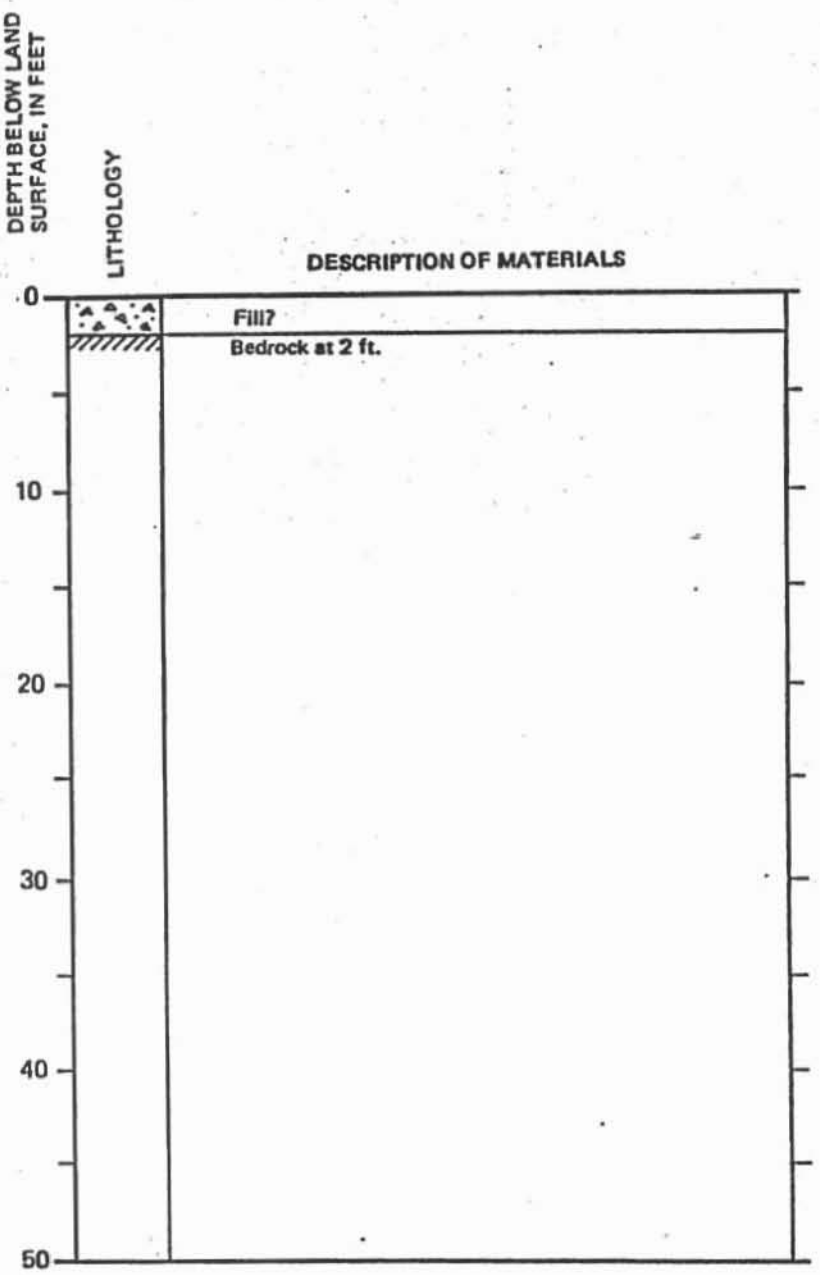
GROUND SURFACE ELEVATION 26.5 ft.

DATUM IS MEAN SEA LEVEL

Log and construction details of well A-22-A.



Location of boreholes A-23 and A-23A



USGS SITE ID No. 574442152290201

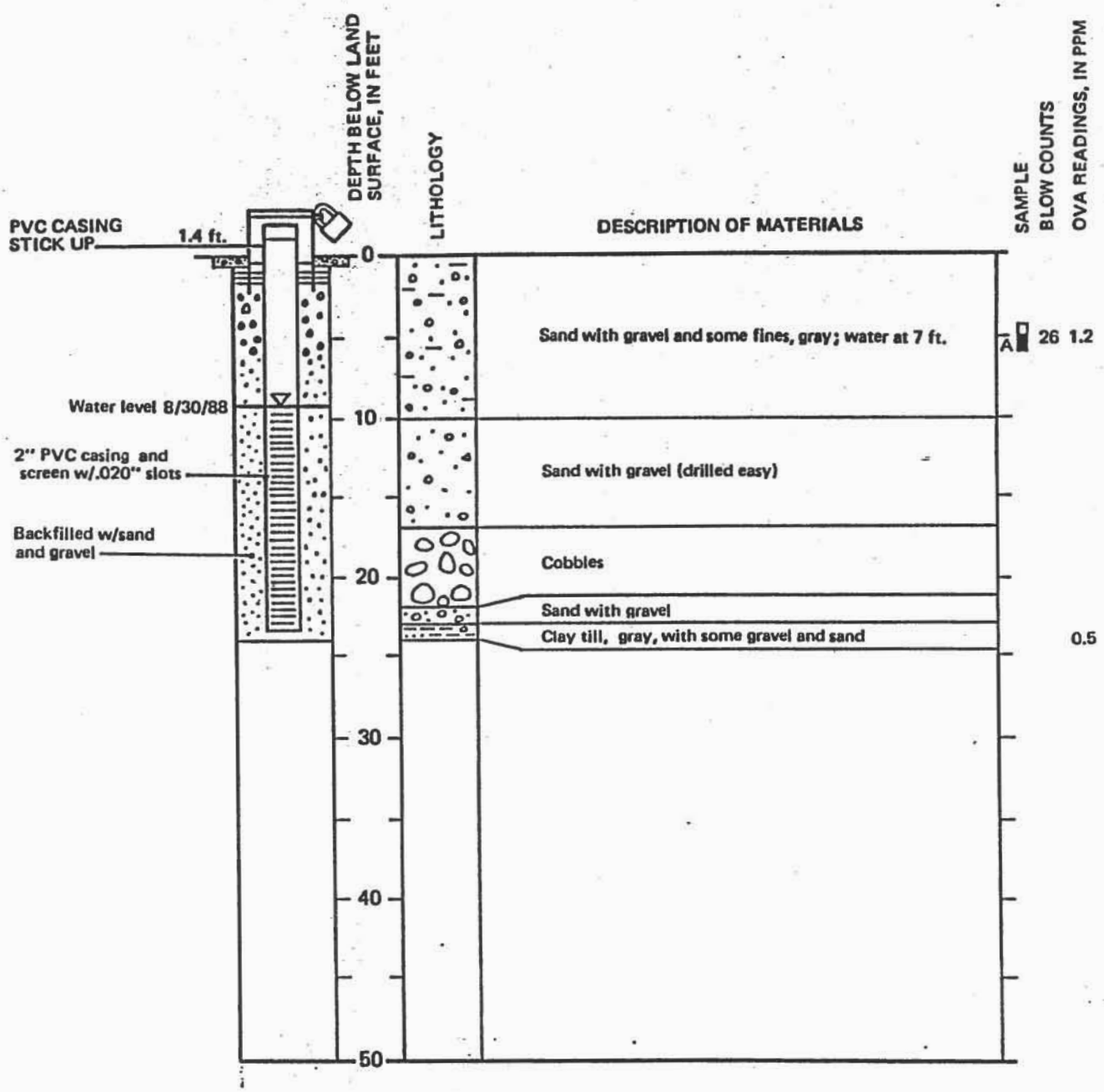
DATE WELL DRILLED 1/27/88

LATITUDE 57° 44' 44" LONGITUDE 152° 29' 03"

GROUND SURFACE ELEVATION (ESTIMATED) 12 ft.

DATUM IS MEAN SEA LEVEL

Log of borehole A-23.



USGS SITE ID No. 574444152290301

DATE WELL DRILLED 4/17/88

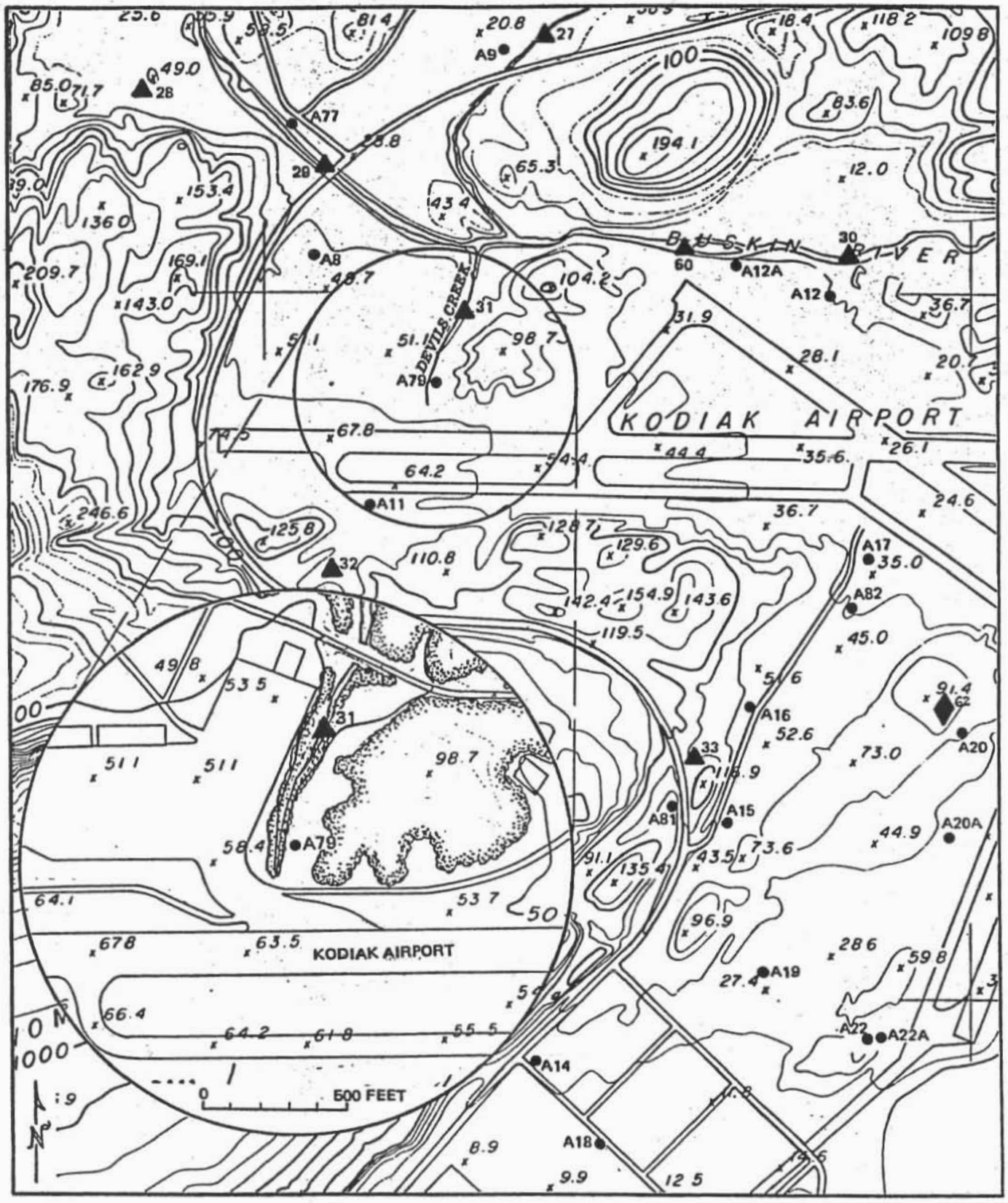
LATITUDE 57°44' 44" LONGITUDE 152°29' 03"

ELEVATIDN OF TOP OF WELL CASING 11.7 ft.

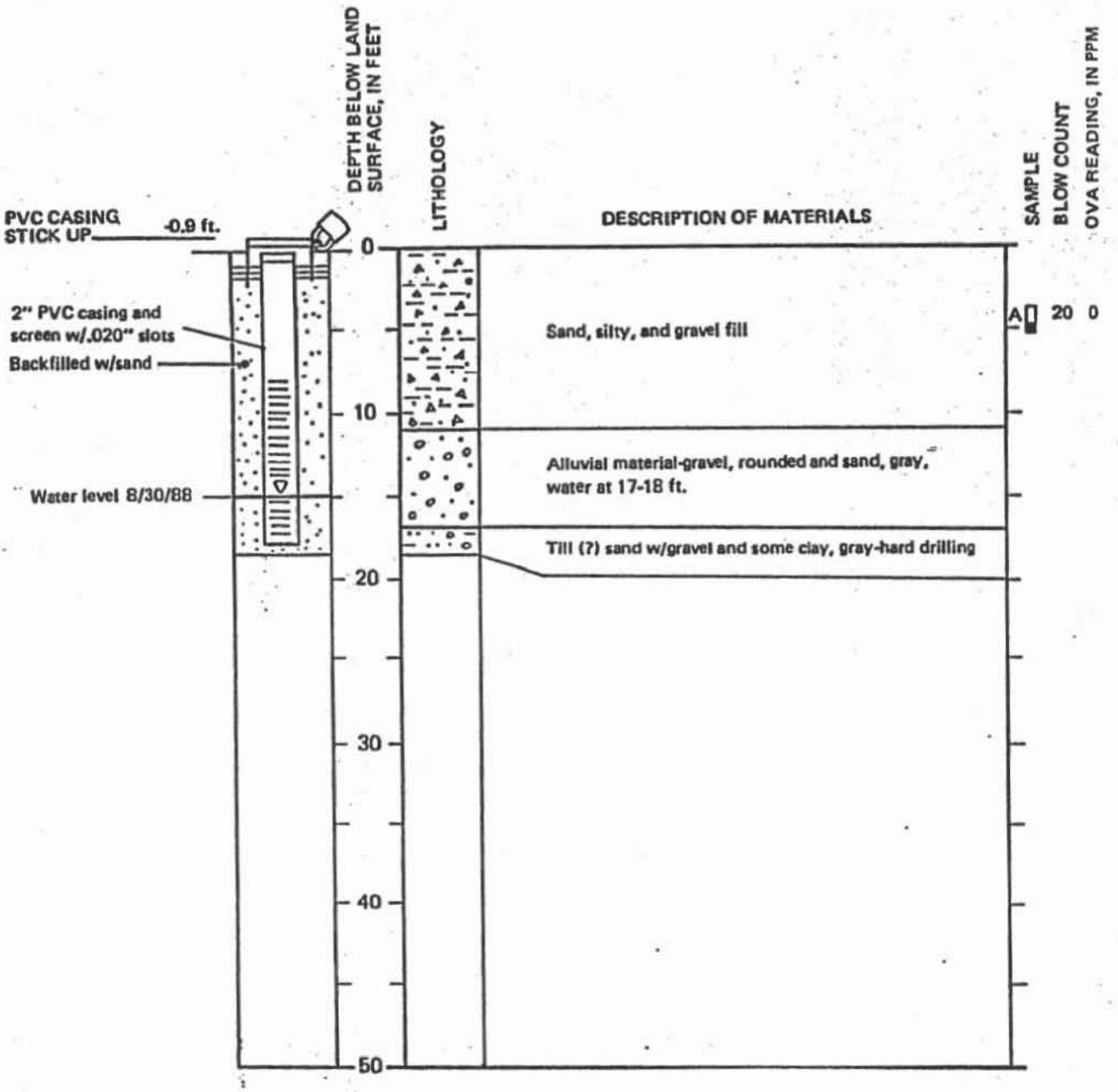
GROUND SURFACE ELEVATION 10.3 ft.

DATUM IS MEAN SEA LEVEL

Log and construction details of well A-23-A.



Location of well A-79.



USGS SITE ID No. 574513152303101

DATE WELL DRILLED 4/18/88

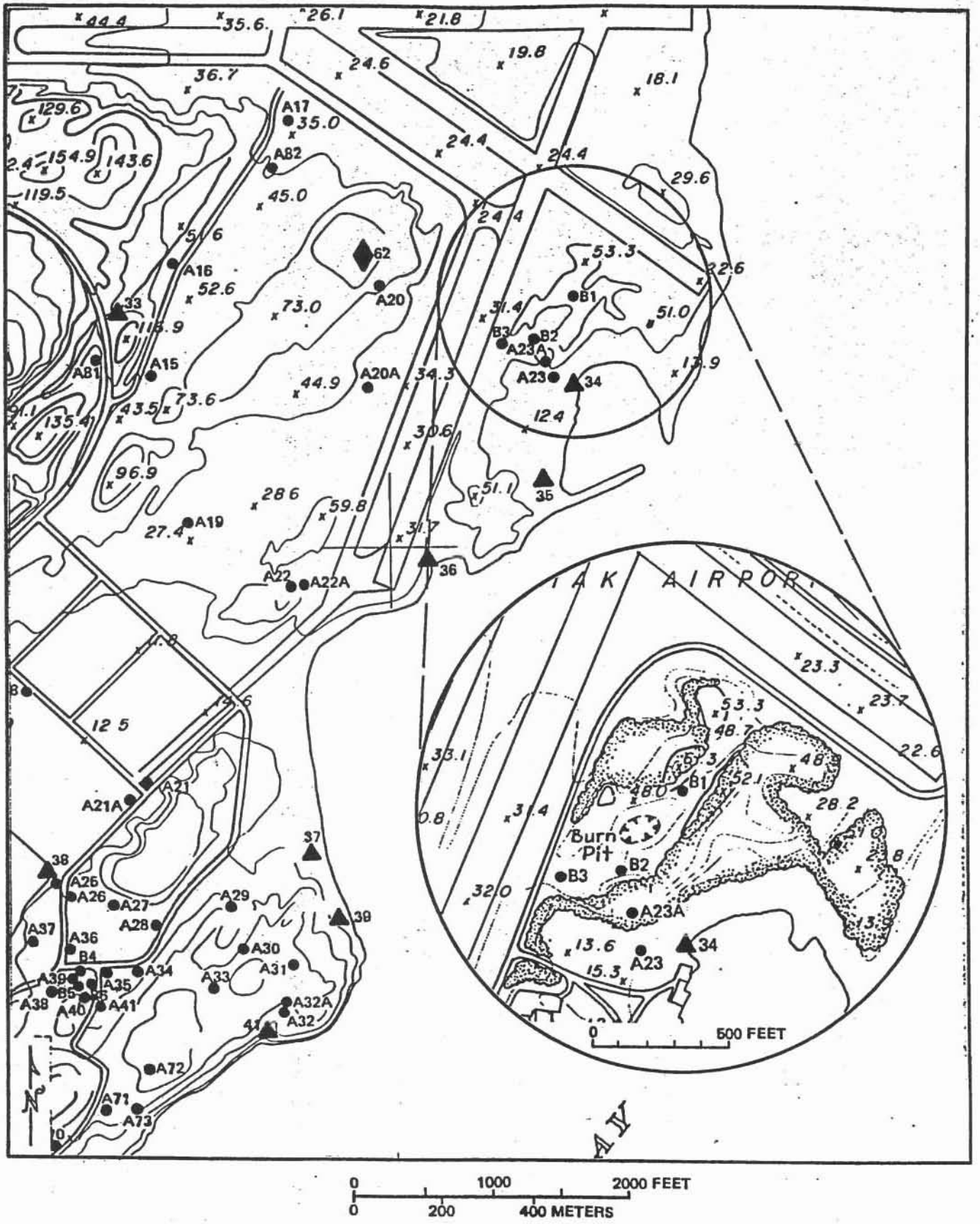
LATITUDE 57°45' 13" LONGITUDE 152°30' 31"

ELEVATION OF TOP OF WELL CASING 55.7 ft.

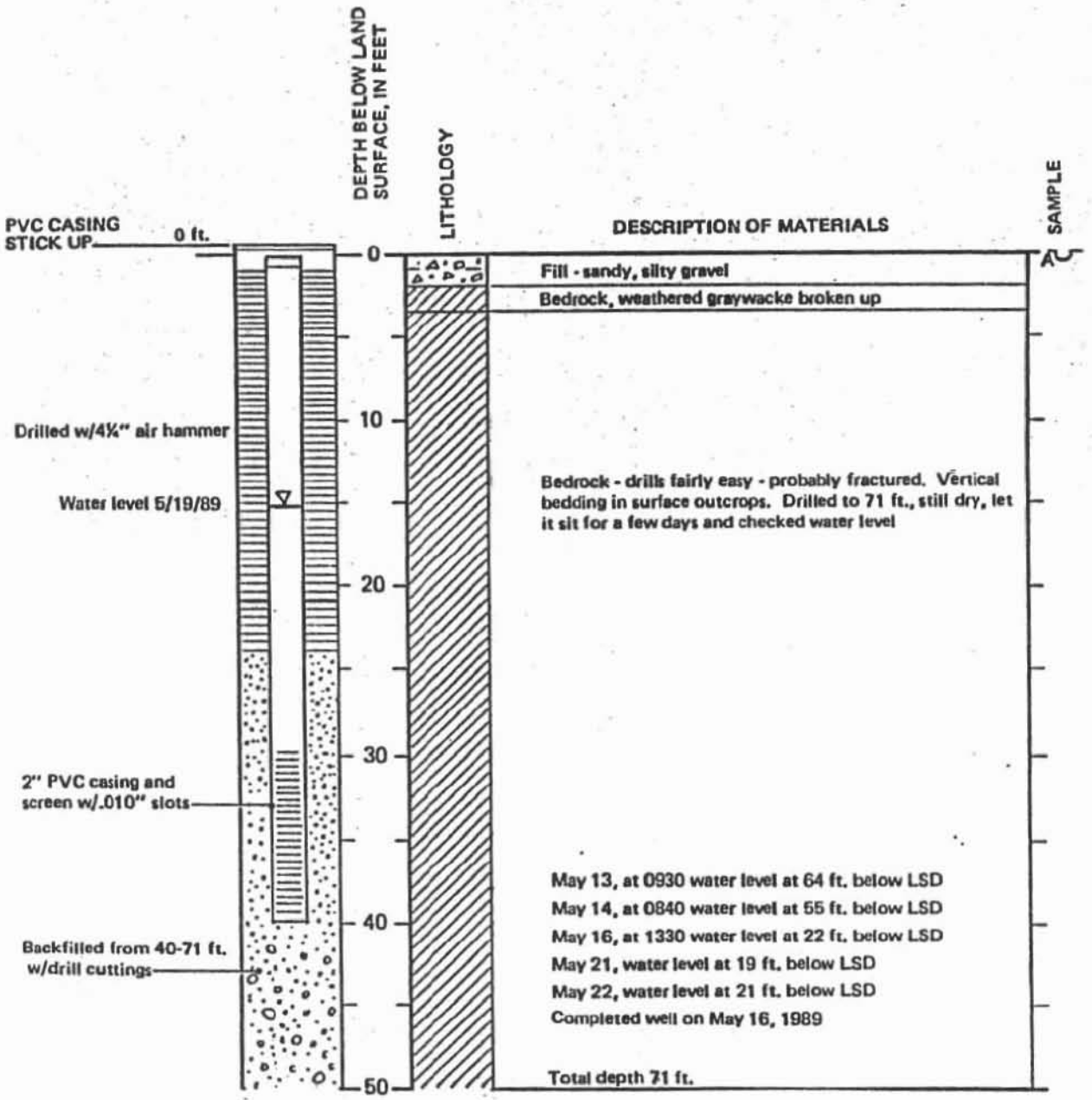
GROUND SURFACE ELEVATION 56.6 ft.

DATUM IS MEAN SEA LEVEL

Log and construction details of well A-79.



Location of wells B-1, B-2, and B-3



USGS SITE ID No. 574447152285901

DATE WELL DRILLED 5/12/89

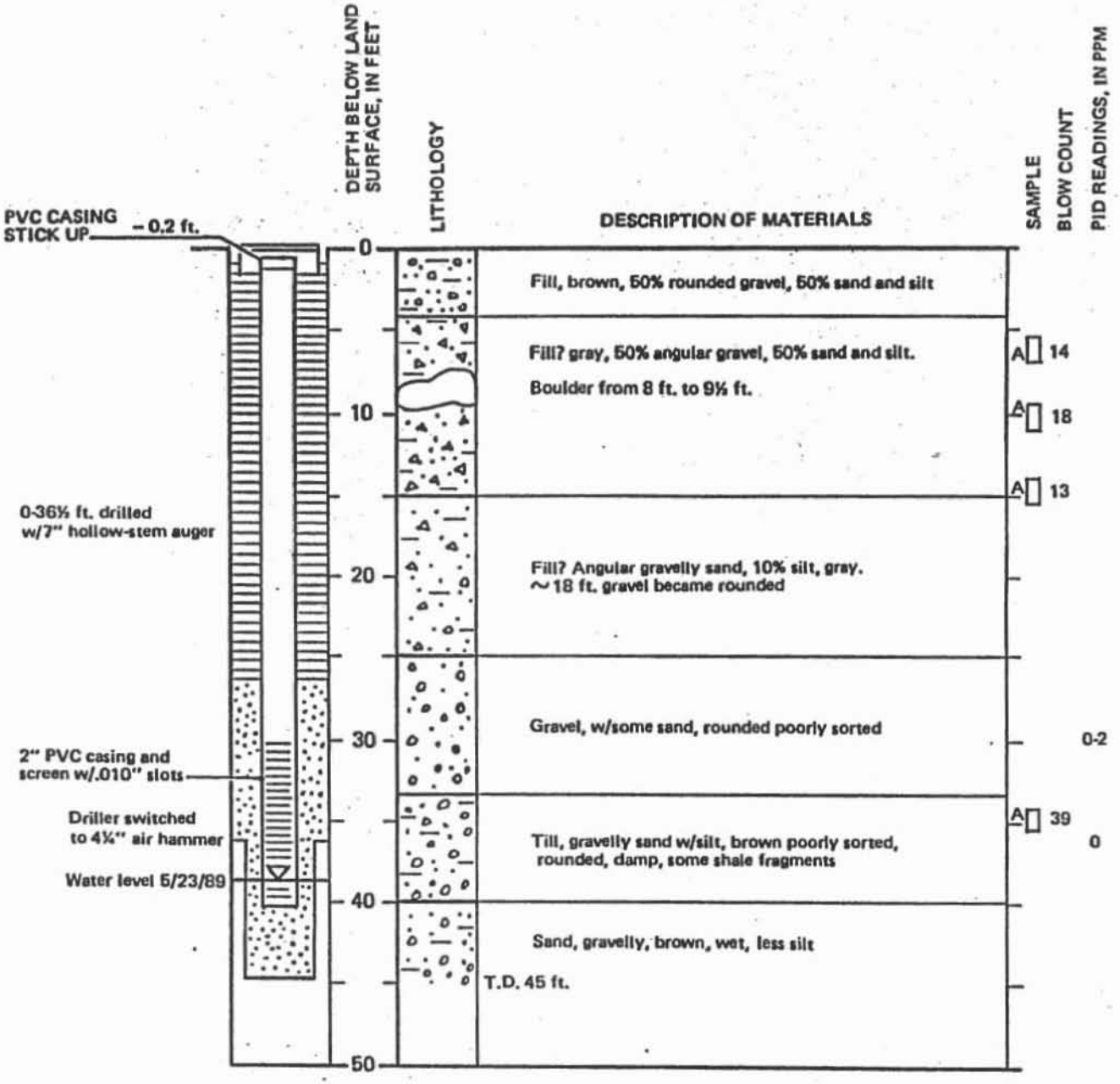
LATITUDE 57° 44' 47" LONGITUDE 152° 28' 59"

ELEVATION OF TOP OF WELL CASING 37.7 ft.

GROUND SURFACE ELEVATION 37.7 ft.

DATUM IS MEAN SEA LEVEL

Log and construction details of well B-1.



USGS SITE ID No. 574444152290301

DATE WELL DRILLED 5/13/89

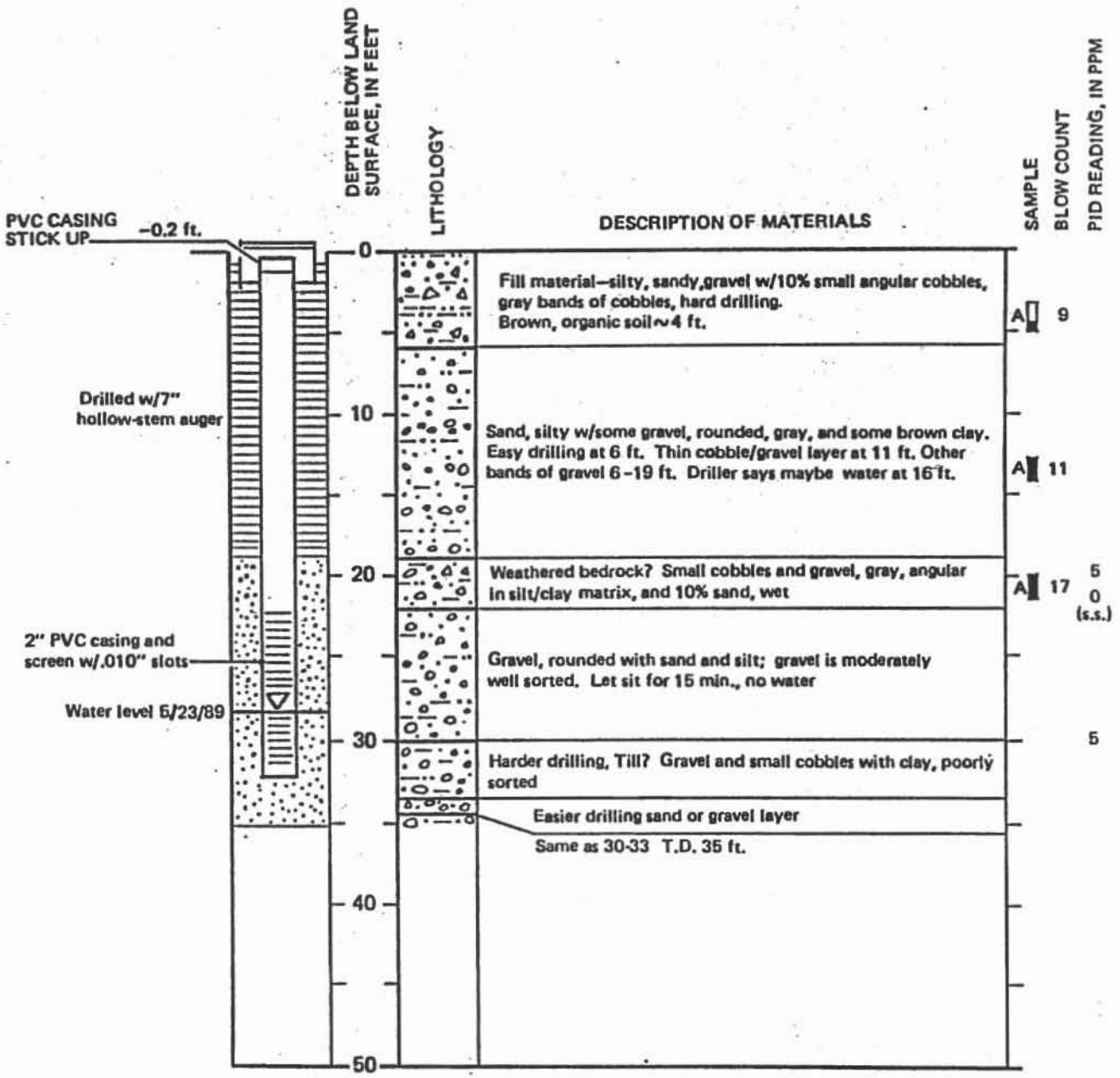
LATITUDE 57°44' 44" LONGITUDE 152°29' 03"

ELEVATION OF TOP OF WELL CASING 38.2 ft.

GROUND SURFACE ELEVATION 38.4 ft.

DATUM IS MEAN SEA LEVEL

Log and construction details of well B-2.



USGS SITE ID No. 574444152290701

DATE WELL DRILLED 5/16/89

LATITUDE 57°44' 44" LONGITUDE 152°29' 07"

ELEVATION OF TOP OF WELL CASING 28.2 ft.

GROUND SURFACE ELEVATION 28.4 ft.

DATUM IS MEAN SEA LEVEL

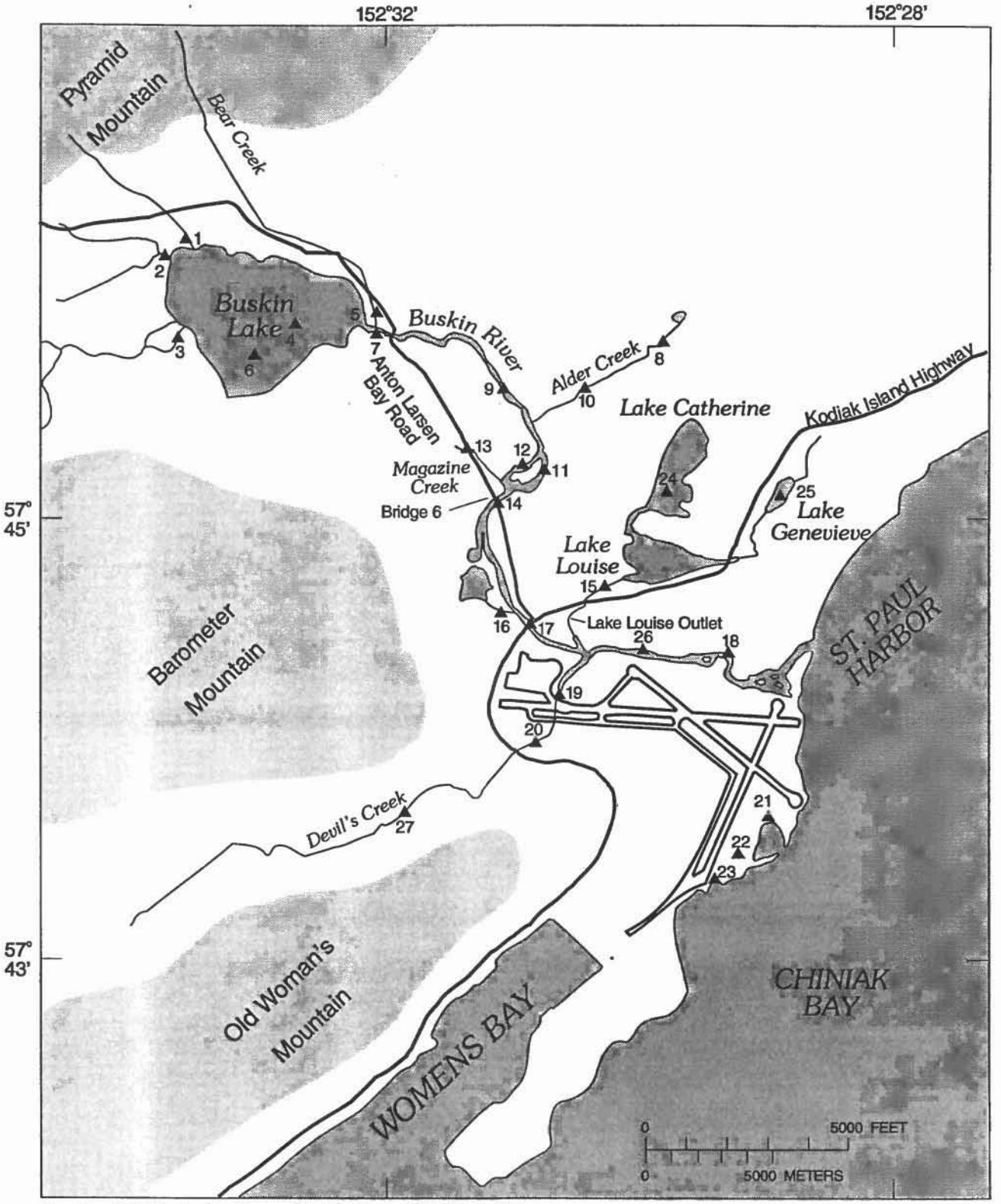
Log and construction details of well B-3.

APPENDIX 2

Surface-water data near the Kodiak FAA facility

Location and description of surface-water data-collection sites near the Kodiak Airport

Site	Station number
01 Buskin Lake tributary (north-northwest)	574658152332600
02 Buskin Lake tributary (northwest)	574654152333600
03 Buskin Lake tributary (west)	574646152333700
04 Buskin Lake (station 1)	574640152324600
05 Bear Creek at mouth	574640152312300
06 Buskin Lake (station 2)	574638152331000
07 Buskin River below Buskin Lake	574636152314200
08 Alder Creek at BB Road	574635152300500
09 Buskin River (1.4 km below Buskin Lake)	574628152310400
10 Alder Creek at G Road	574624152303200
11 Unnamed tributary-1 to Buskin River	574612152304500
12 Buskin River (2.1 km below Buskin Lake)	574612152304300
13 Magazine Creek at 1.4 km Anton Larson	574610152311700
14 Buskin River at Bridge 6	574559152310400
15 Lake Louise Outlet	574538152301000
16 Unnamed tributary-2 to Buskin River	574536152310900
17 Buskin River at Kodiak Island Highway	574530152304600
18 Buskin River near mouth	574522152294000
19 Devils Creek below runway near mouth	574522152303800
20 Devils Creek above runway below highway	574505152304200
21 Kodiak Airport drainage site-3	574446152285300
22 Kodiak Airport drainage site-1	574436152290800
23 Kodiak Airport drainage site-A	574429152292000
24 Catherine (Margaret) Lake	574600152295200
25 Genevieve Lake	574600152290000
26 Buskin River	15297440
27 Devils Creek	15297439



Base from U.S. Geological Survey, Kodiak, Alaska, 1:250,000, 1952

Location of surface -water data-collection sites.

Physical and chemical characteristics of surface water

[Unit: mg/L, milligram per liter; µg/L, microgram per liter]

Chemical Abstract Service number	Chemical	Sample location	Date	Concentration or value	Reporting level	Unit
10	Water temperature	BUSKIN LK TRIB (NORTHWEST)	870728	8.0	-	DEGREE C
10	Water temperature	BUSKIN LK TRIB (WEST)	870728	8.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	12.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	12.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	12.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	12.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	11.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	11.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	11.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	11.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	10.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	10.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	10.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	10.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	9.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	9.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	8.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	8.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	8.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	8.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 1	880725	8.0	-	DEGREE C
10	Water temperature	BEAR CR AT MOUTH	890224	0.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	13.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	13.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	13.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	13.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	12.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	12.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	11.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	11.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	10.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	10.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	10.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	10.5	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	10.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	10.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	9.0	-	DEGREE C
10	Water temperature	BUSKIN LK, STA 2	880725	8.5	-	DEGREE C
10	Water temperature	BUSKIN R BL LK	870728	15.0	-	DEGREE C
10	Water temperature	BUSKIN R BL LK	870728	15.0	-	DEGREE C
10	Water temperature	BUSKIN R BL LK	870728	15.0	-	DEGREE C
10	Water temperature	BUSKIN R BL LK	870728	15.0	-	DEGREE C
10	Water temperature	BUSKIN R BL LK	870728	15.0	-	DEGREE C
10	Water temperature	BUSKIN R BL LK	880510	5.5	-	DEGREE C
10	Water temperature	BUSKIN R BL LK	880724	12.5	-	DEGREE C
10	Water temperature	BUSKIN R BL LK	890224	1.5	-	DEGREE C
10	Water temperature	ALDER CR AT BB ROAD	890224	1.0	-	DEGREE C
10	Water temperature	BUSKIN R 0.9 MI BL BUSKIN LK	890224	2.5	-	DEGREE C
10	Water temperature	ALDER C AT G ROAD	880510	3.5	-	DEGREE C
10	Water temperature	ALDER C AT G ROAD	880724	9.5	-	DEGREE C
10	Water temperature	UNNAMED TRIB 1 TO BUSKIN R	870728	9.5	-	DEGREE C
10	Water temperature	MAGAZINE C AT .9 MI ANTON LARSEN	880724	9.0	-	DEGREE C
10	Water temperature	MAGAZINE C AT .9 MI ANTON LARSEN	890224	2.5	-	DEGREE C
10	Water temperature	LK LOUISE OUTLET	870730	18.0	-	DEGREE C
10	Water temperature	LK LOUISE OUTLET	880510	9.5	-	DEGREE C
10	Water temperature	LK LOUISE OUTLET	880724	17.0	-	DEGREE C
10	Water temperature	LK LOUISE OUTLET	890224	1.5	-	DEGREE C
10	Water temperature	DEVILS C AB RUNWAY BL HWY	870727	15.5	-	DEGREE C
10	Water temperature	DEVILS C AB RUNWAY BL HWY	880510	4.5	-	DEGREE C
10	Water temperature	DEVILS C AB RUNWAY BL HWY	880724	9.5	-	DEGREE C
10	Water temperature	DEVILS C AB RUNWAY BL HWY	890224	0.5	-	DEGREE C
10	Water temperature	CATHERINE (MARGARET) LK	750529	6.0	-	DEGREE C
10	Water temperature	GENIVIEVE (GENEVIEVE) LK	750529	6.0	-	DEGREE C
80	Color	BUSKIN R BL LK	690522	5	-	PL-CO
80	Color	UNNAMED C N OF BUSKIN LK	560801	5	-	PL-CO
80	Color	CATHERINE (MARGARET) LK	750529	4	-	PL-CO
80	Color	GENIVIEVE (GENEVIEVE) LK	750529	8	-	PL-CO
80	Color	DEVILS C	681005	10	-	PL-CO

Chemical Abstract Service number	Chemical	Sample location	Date	Concentration or value		Reporting level	Unit
95	Specific conductance	BUSKIN LK TRIB (NORTHWEST)	870728	34	-		µS/cm
95	Specific conductance	BUSKIN LK TRIB (WEST)	870728	34	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	43	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	43	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	42	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	42	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	42	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	41	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	40	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	40	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	39	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	38	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	39	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	38	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	39	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	39	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	39	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	38	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	38	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 1	880725	38	-		µS/cm
95	Specific conductance	BEAR CR AT MOUTH	890224	50	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	43	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	43	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	43	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	43	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	42	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	41	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	41	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	40	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	39	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	39	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	39	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	38	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	38	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	38	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	39	-		µS/cm
95	Specific conductance	BUSKIN LK, STA 2	880725	39	-		µS/cm
95	Specific conductance	BUSKIN R BL LK	690522	54	-		µS/cm
95	Specific conductance	BUSKIN R BL LK	870728	34	-		µS/cm
95	Specific conductance	BUSKIN R BL LK	870728	34	-		µS/cm
95	Specific conductance	BUSKIN R BL LK	870728	34	-		µS/cm
95	Specific conductance	BUSKIN R BL LK	870728	35	-		µS/cm
95	Specific conductance	BUSKIN R BL LK	870728	34	-		µS/cm
95	Specific conductance	BUSKIN R BL LK	880510	52	-		µS/cm
95	Specific conductance	BUSKIN R BL LK	880724	54	-		µS/cm
95	Specific conductance	BUSKIN R BL LK	890224	48	-		µS/cm
95	Specific conductance	ALDER CR AT BB ROAD	890224	54	-		µS/cm
95	Specific conductance	BUSKIN R 0.9 MI BL BUSKIN LK	890224	40	-		µS/cm
95	Specific conductance	ALDER C AT G ROAD	880510	44	-		µS/cm
95	Specific conductance	ALDER C AT G ROAD	880724	35	-		µS/cm
95	Specific conductance	UNNAMED TRIB 1 TO BUSKIN R	870728	34	-		µS/cm
95	Specific conductance	MAGAZINE C AT .9 MI ANTON LARSEN	880724	72	-		µS/cm
95	Specific conductance	MAGAZINE C AT .9 MI ANTON LARSEN	890224	61	-		µS/cm
95	Specific conductance	LK LOUISE OUTLET	870730	66	-		µS/cm
95	Specific conductance	LK LOUISE OUTLET	880510	79	-		µS/cm
95	Specific conductance	LK LOUISE OUTLET	880724	82	-		µS/cm
95	Specific conductance	LK LOUISE OUTLET	890224	85	-		µS/cm
95	Specific conductance	UNNAMED TRIB 2 TO BUSKIN R	890224	56	-		µS/cm
95	Specific conductance	DEVILS C AB RUNWAY BL HWY	870727	66	-		µS/cm
95	Specific conductance	DEVILS C AB RUNWAY BL HWY	880510	69	-		µS/cm
95	Specific conductance	DEVILS C AB RUNWAY BL HWY	880724	70	-		µS/cm
95	Specific conductance	DEVILS C AB RUNWAY BL HWY	890224	76	-		µS/cm
95	Specific conductance	UNNAMED C N OF BUSKIN LK	560801	57	-		µS/cm
95	Specific conductance	GENIVIEVE (GENEVIEVE) LK	591102	64	-		µS/cm
95	Specific conductance	DEVILS C	681005	71	-		µS/cm

Chemical Abstract Service number	Chemical	Sample location	Date	Concentration or value	Reporting level	Unit
300	Oxygen dissolved	BUSKIN LK TRIB (NORTHWEST)	870728	10.8	-	mg/L
300	Oxygen dissolved	BUSKIN LK TRIB (WEST)	870728	10.5	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	11.4	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	11.3	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	11.4	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	11.5	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	11.5	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	11.6	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	11.7	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	11.7	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	11.9	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	11.9	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	11.8	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	11.7	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	11.4	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	11.2	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	10.9	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	10.9	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	10.8	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	10.6	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 1	880725	10.1	-	mg/L
300	Oxygen dissolved	BEAR CR AT MOUTH	890224	13.3	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.2	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.1	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.1	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.2	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.2	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.3	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.7	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.3	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.4	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.4	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.5	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.6	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.9	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.6	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.6	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	11.2	-	mg/L
300	Oxygen dissolved	BUSKIN LK, STA 2	880725	10.8	-	mg/L
300	Oxygen dissolved	BUSKIN R BL LK	870728	10.2	-	mg/L
300	Oxygen dissolved	BUSKIN R BL LK	870728	10.1	-	mg/L
300	Oxygen dissolved	BUSKIN R BL LK	870728	10.3	-	mg/L
300	Oxygen dissolved	BUSKIN R BL LK	870728	10.4	-	mg/L
300	Oxygen dissolved	BUSKIN R BL LK	870728	10.2	-	mg/L
300	Oxygen dissolved	BUSKIN R BL LK	890224	8.6	-	mg/L
300	Oxygen dissolved	ALDER CR AT BB ROAD	890224	13.8	-	mg/L
300	Oxygen dissolved	BUSKIN R 0.9 MI BL BUSKIN LK	890224	12.8	-	mg/L
300	Oxygen dissolved	ALDER C AT G ROAD	880724	10.4	-	mg/L
300	Oxygen dissolved	UNNAMED TRIB 1 TO BUSKIN R	870728	10.5	-	mg/L
300	Oxygen dissolved	MAGAZINE C AT .9 MI ANTON LARSEN	890224	9.6	-	mg/L
300	Oxygen dissolved	LK LOUISE OUTLET	870730	8.6	-	mg/L
300	Oxygen dissolved	LK LOUISE OUTLET	890224	9.0	-	mg/L
300	Oxygen dissolved	UNNAMED TRIB 2 TO BUSKIN R	890224	13.6	-	mg/L
300	Oxygen dissolved	DEVILS C AB RUNWAY BL HWY	870727	10.1	-	mg/L
300	Oxygen dissolved	DEVILS C AB RUNWAY BL HWY	890224	13.9	-	mg/L

Chemical Abstract Service number	Chemical	Sample location	Date	Concentration or value	Reporting level	Unit
400	pH	BUSKIN LK, STA 1	880725	7.28	-	UNITS
400	pH	BUSKIN LK, STA 1	880725	7.28	-	UNITS
400	pH	BEAR CR AT MOUTH	890224	7.20	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.24	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.24	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.24	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.22	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.22	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.22	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.20	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.19	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.17	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.16	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.14	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.14	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.16	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.15	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.14	-	UNITS
400	pH	BUSKIN LK, STA 2	880725	7.12	-	UNITS
400	pH	BUSKIN R BL LK	690522	7.40	-	UNITS
400	pH	BUSKIN R BL LK	870728	7.70	-	UNITS
400	pH	BUSKIN R BL LK	870728	7.70	-	UNITS
400	pH	BUSKIN R BL LK	870728	7.70	-	UNITS
400	pH	BUSKIN R BL LK	870728	7.80	-	UNITS
400	pH	BUSKIN R BL LK	870728	7.70	-	UNITS
400	pH	BUSKIN R BL LK	880510	7.20	-	UNITS
400	pH	BUSKIN R BL LK	880724	7.40	-	UNITS
400	pH	BUSKIN R BL LK	890224	6.70	-	UNITS
400	pH	ALDER CR AT BB ROAD	890224	7.00	-	UNITS
400	pH	BUSKIN R 0.9 MI BL BUSKIN LK	890224	6.70	-	UNITS
400	pH	ALDER C AT G ROAD	880510	7.20	-	UNITS
400	pH	ALDER C AT G ROAD	880724	7.40	-	UNITS
400	pH	UNNAMED TRIB 1 TO BUSKIN R	870728	7.40	-	UNITS
400	pH	MAGAZINE C AT .9 MI ANTON LARSEN	880724	6.70	-	UNITS
400	pH	MAGAZINE C AT .9 MI ANTON LARSEN	890224	6.60	-	UNITS
400	pH	LK LOUISE OUTLET	870730	7.20	-	UNITS
400	pH	LK LOUISE OUTLET	880510	6.80	-	UNITS
400	pH	LK LOUISE OUTLET	880724	7.50	-	UNITS
400	pH	LK LOUISE OUTLET	890224	7.00	-	UNITS
400	pH	UNNAMED TRIB 2 TO BUSKIN R	890224	7.10	-	UNITS
400	pH	DEVILS C AB RUNWAY BL HWY	870727	7.60	-	UNITS
400	pH	DEVILS C AB RUNWAY BL HWY	880510	7.20	-	UNITS
400	pH	DEVILS C AB RUNWAY BL HWY	880724	7.40	-	UNITS
400	pH	DEVILS C AB RUNWAY BL HWY	890224	7.10	-	UNITS
400	pH	UNNAMED C N OF BUSKIN LK	560801	6.70	-	UNITS
400	pH	GENIVIEVE (GENEVIEVE) LK	591102	7.00	-	UNITS
400	pH	DEVILS C	681005	7.50	-	UNITS
400	pH	BUSKIN LK TRIB (NORTHWEST)	870728	6.70	-	UNITS
400	pH	BUSKIN LK TRIB (WEST)	870728	6.70	-	UNITS
400	pH	BUSKIN LK, STA 1	880725	7.33	-	UNITS
400	pH	BUSKIN LK, STA 1	880725	7.30	-	UNITS
400	pH	BUSKIN LK, STA 1	880725	7.29	-	UNITS
400	pH	BUSKIN LK, STA 1	880725	7.28	-	UNITS
400	pH	BUSKIN LK, STA 1	880725	7.29	-	UNITS
400	pH	BUSKIN LK, STA 1	880725	7.29	-	UNITS
400	pH	BUSKIN LK, STA 1	880725	7.29	-	UNITS
400	pH	BUSKIN LK, STA 1	880725	7.28	-	UNITS
400	pH	BUSKIN LK, STA 1	880725	7.29	-	UNITS
400	pH	BUSKIN LK, STA 1	880725	7.28	-	UNITS

Chemical Abstract Service number	Chemical	Sample location	Date	Concentration or value		Reporting level	Unit
410	Alkalinity, water, whole, fixed endpoint	BUSKIN R BL LK	690522	8	-		mg/L
410	Alkalinity, water, whole, fixed endpoint	UNNAMED C N OF BUSKIN LK	560801	18	-		mg/L
410	Alkalinity, water, whole, fixed endpoint	CATHERINE (MARGARET) LK	750529	10	-		mg/L
410	Alkalinity, water, whole, fixed endpoint	GENIVIEVE (GENEVIEVE) LK	591102	13	-		mg/L
410	Alkalinity, water, whole, fixed endpoint	GENIVIEVE (GENEVIEVE) LK	750529	17	-		mg/L
410	Alkalinity, water, whole, fixed endpoint	DEVILS C	681005	21	-		mg/L
605	Nitrogen organic	CATHERINE (MARGARET) LK	750529	0.19	-		mg/L AS N
610	Nitrogen ammonia	CATHERINE (MARGARET) LK	750529	0.01	-		mg/L AS N
610	Nitrogen ammonia	GENIVIEVE (GENEVIEVE) LK	750529	0.01	-		mg/L AS N
625	Nitrogen ammonia plus organic	CATHERINE (MARGARET) LK	750529	0.2	-		mg/L AS N
625	Nitrogen ammonia plus organic	GENIVIEVE (GENEVIEVE) LK	750529	0.01	-		mg/L AS N
630	Nitrogen nitrite plus nitrate	CATHERINE (MARGARET) LK	750529	0.23	-		mg/L AS N
630	Nitrogen nitrite plus nitrate	GENIVIEVE (GENEVIEVE) LK	750529	0.06	-		mg/L AS N
631	Nitrogen nitrite plus nitrate dissolved	CATHERINE (MARGARET) LK	750529	0.23	-		mg/L AS N
631	Nitrogen nitrite plus nitrate dissolved	GENIVIEVE (GENEVIEVE) LK	750529	0.06	-		mg/L AS N
902	Noncarbonate hardness water whole, field	BUSKIN R BL LK	690522	4	-		mg/L
902	Noncarbonate hardness water whole, field	UNNAMED C N OF BUSKIN LK	560801	2	-		mg/L
902	Noncarbonate hardness water whole, field	CATHERINE (MARGARET) LK	750529	6	-		mg/L
902	Noncarbonate hardness water whole, field	GENIVIEVE (GENEVIEVE) LK	591102	5	-		mg/L
902	Noncarbonate hardness water whole, field	GENIVIEVE (GENEVIEVE) LK	750529	10	-		mg/L
902	Noncarbonate hardness water whole, field	DEVILS C	681005	7	-		mg/L
1003	Chloride dissolved	BUSKIN LK TRIB (NORTHWEST)	870728	4.3	-		mg/L
1003	Chloride dissolved	BUSKIN LK TRIB (WEST)	870728	4.4	-		mg/L
1003	Chloride dissolved	BUSKIN R BL LK	690522	5.3	-		mg/L
1003	Chloride dissolved	UNNAMED TRIB 1 TO BUSKIN R	870728	5.2	-		mg/L
1003	Chloride dissolved	LK LOUISE OUTLET	870730	9.2	-		mg/L
1003	Chloride dissolved	DEVILS C AB RUNWAY BL HWY	870727	4.8	-		mg/L
1003	Chloride dissolved	UNNAMED C N OF BUSKIN LK	560801	2.5	-		mg/L
1003	Chloride dissolved	CATHERINE (MARGARET) LK	750529	7.6	-		mg/L
1003	Chloride dissolved	GENIVIEVE (GENEVIEVE) LK	591102	10	-		mg/L
1003	Chloride dissolved	GENIVIEVE (GENEVIEVE) LK	750529	12	-		mg/L
1003	Chloride dissolved	DEVILS C	681005	4.1	-		mg/L
1010	Solids, sum of constituents, dissolved	BUSKIN R BL LK	690522	26	-		mg/L
1010	Solids, sum of constituents, dissolved	UNNAMED C N OF BUSKIN LK	560801	31	-		mg/L
1010	Solids, sum of constituents, dissolved	CATHERINE (MARGARET) LK	750529	33	-		mg/L
1010	Solids, sum of constituents, dissolved	GENIVIEVE (GENEVIEVE) LK	591102	47	-		mg/L
1010	Solids, sum of constituents, dissolved	GENIVIEVE (GENEVIEVE) LK	750529	49	-		mg/L
1010	Solids, sum of constituents, dissolved	DEVILS C	681005	46	-		mg/L
3035	Sulfate dissolved	BUSKIN R BL LK	690522	2.9	-		mg/L
3035	Sulfate dissolved	UNNAMED C N OF BUSKIN LK	560801	3.0	-		mg/L
3035	Sulfate dissolved	CATHERINE (MARGARET) LK	750529	2.2	-		mg/L
3035	Sulfate dissolved	GENIVIEVE (GENEVIEVE) LK	591102	4.0	-		mg/L
3035	Sulfate dissolved	GENIVIEVE (GENEVIEVE) LK	750529	2.8	-		mg/L
3035	Sulfate dissolved	DEVILS C	681005	8.3	-		mg/L
25900	Nitrogen nitrate dissolved	BUSKIN R BL LK	690522	0.09	-		mg/L AS N
25900	Nitrogen nitrate dissolved	UNNAMED C N OF BUSKIN LK	560801	0.02	-		mg/L AS N
25900	Nitrogen nitrate dissolved	GENIVIEVE (GENEVIEVE) LK	591102	0.05	-		mg/L AS N
25900	Nitrogen nitrate dissolved	DEVILS C	681005	0.18	-		mg/L AS N
66300	Fluoride dissolved	BUSKIN R BL LK	690522	0.2		.1	mg/L
71523	Bicarbonate, water, whole, fixed endpoin	BUSKIN R BL LK	690522	10	-		mg/L
71523	Bicarbonate, water, whole, fixed endpoin	UNNAMED C N OF BUSKIN LK	560801	22	-		mg/L
71523	Bicarbonate, water, whole, fixed endpoin	CATHERINE (MARGARET) LK	750529	12	-		mg/L
71523	Bicarbonate, water, whole, fixed endpoin	GENIVIEVE (GENEVIEVE) LK	591102	16	-		mg/L
71523	Bicarbonate, water, whole, fixed endpoin	GENIVIEVE (GENEVIEVE) LK	750529	21	-		mg/L
71523	Bicarbonate, water, whole, fixed endpoin	DEVILS C	681005	26	-		mg/L
117817	bis(2-Etylhexyl)phthalate	BUSKIN R BL LK	870728	7.0		5	µg/L
117817	bis(2-Ethylhexyl)phthalate	BUSKIN R BL LK	880510	270.		10	µg/L
117817	bis(2-Ethylhexyl)phthalate	ALDER C AT G ROAD	880510	14.		10	µg/L
117817	bis(2-Ethylhexyl)phthalate	DEVILS C AB RUNWAY BL HWY	880510	84.		10	µg/L
124389	Carbon dioxide dissolved	BUSKIN R BL LK	690522	0.6	-		mg/L
124389	Carbon dioxide dissolved	UNNAMED C N OF BUSKIN LK	560801	7.0	-		mg/L
124389	Carbon dioxide dissolved	GENIVIEVE (GENEVIEVE) LK	591102	2.5	-		mg/L
124389	Carbon dioxide dissolved	DEVILS C	681005	1.3	-		mg/L
471341	Hardness	BUSKIN R BL LK	690522	12	-		mg/L
471341	Hardness	UNNAMED C N OF BUSKIN LK	560801	20	-		mg/L
471341	Hardness	CATHERINE (MARGARET) LK	750529	16	-		mg/L
471341	Hardness	GENIVIEVE (GENEVIEVE) LK	591102	18	-		mg/L
471341	Hardness	GENIVIEVE (GENEVIEVE) LK	750529	27	-		mg/L
471341	Hardness	DEVILS C	681005	28	-		mg/L

Chemical Abstract Service number	Chemical	Sample location	Date	Concentration or value		Reporting level	Unit
7404200	Silica as SiO2	BUSKIN LK, STA 1	880725	3.4		0.1	mg/L
7404200	Silica as SiO2	BUSKIN LK, STA 2	880725	3.8		0.1	mg/L
7404200	Silica dissolved	BUSKIN R BL LK	690522	4.0	-		mg/L
7404200	Silica as SiO2	BUSKIN R BL LK	880724	3.5		0.1	mg/L
7404200	Silica as SiO2	ALDER C AT G ROAD	880724	4.2		0.1	mg/L
7404200	Silica as SiO2	MAGAZINE C AT .9 MI ANTON LARSEN	880724	6.9		0.1	mg/L
7404200	Silica as SiO2	LK LOUISE OUTLET	880724	3.9		0.1	mg/L
7404200	Silica as SiO2	DEVILS C AB RUNWAY BL HWY	880724	5.1		0.1	mg/L
7404200	Silica dissolved	UNNAMED C N OF BUSKIN LK	560801	3.8	-		mg/L
7404200	Silica dissolved	CATHERINE (MARGARET) LK	750529	5.1	-		mg/L
7404200	Silica dissolved	GENIVIEVE (GENEVIEVE) LK	591102	6.0	-		mg/L
7404200	Silica dissolved	GENIVIEVE (GENEVIEVE) LK	750529	5.3	-		mg/L
7404200	Silica dissolved	DEVILS C	681005	5.8	-		mg/L
7439896	Iron	LK LOUISE OUTLET	880510	0.05		0.05	mg/L
7439896	Iron dissolved	CATHERINE (MARGARET) LK	750529	.08	-		mg/L
7439896	Iron dissolved	GENIVIEVE (GENEVIEVE) LK	750529	.13	-		mg/L
7439921	Lead dissolved	BUSKIN R BL LK	690522	.02	-		mg/L
7439954	Magnesium	BUSKIN LK, STA 1	880725	0.5		0.1	mg/L
7439954	Magnesium	BUSKIN LK, STA 2	880725	0.5		0.1	mg/L
7439954	Magnesium dissolved	BUSKIN R BL LK	690522	0.8	-		mg/L
7439954	Magnesium	BUSKIN R BL LK	880510	0.6		0.1	mg/L
7439954	Magnesium	BUSKIN R BL LK	880724	0.5		0.1	mg/L
7439954	Magnesium	ALDER C AT G ROAD	880510	0.7		0.1	mg/L
7439954	Magnesium	ALDER C AT G ROAD	880724	0.6		0.1	mg/L
7439954	Magnesium	MAGAZINE C AT .9 MI ANTON LARSEN	880724	0.9		0.1	mg/L
7439954	Magnesium	LK LOUISE OUTLET	880510	1.2		0.1	mg/L
7439954	Magnesium	LK LOUISE OUTLET	880724	1.2		0.1	mg/L
7439954	Magnesium	DEVILS C AB RUNWAY BL HWY	880510	0.9		0.1	mg/L
7439954	Magnesium	DEVILS C AB RUNWAY BL HWY	880724	0.8		0.1	mg/L
7439954	Magnesium dissolved	UNNAMED C N OF BUSKIN LK	560801	0.3	-		mg/L
7439954	Magnesium dissolved	CATHERINE (MARGARET) LK	750529	1.2	-		mg/L
7439954	Magnesium dissolved	GENIVIEVE (GENEVIEVE) LK	591102	1.4	-		mg/L
7439954	Magnesium dissolved	GENIVIEVE (GENEVIEVE) LK	750529	1.3	-		mg/L
7439954	Magnesium dissolved	DEVILS C	681005	1.1	-		mg/L
7439965	Manganese	BUSKIN LK, STA 1	880725	0.006		0.005	mg/L
7439965	Manganese	BUSKIN R BL LK	880724	0.006		0.005	mg/L
7439965	Manganese	MAGAZINE C AT .9 MI ANTON LARSEN	880724	0.025		0.005	mg/L
7439965	Manganese	LK LOUISE OUTLET	880510	0.052		0.005	mg/L
7439965	Manganese	LK LOUISE OUTLET	880724	0.023		0.005	mg/L
7439965	Manganese dissolved	CATHERINE (MARGARET) LK	750529	.07	-		mg/L
7439965	Manganese dissolved	GENIVIEVE (GENEVIEVE) LK	750529	.41	-		mg/L
7439976	Mercury	LK LOUISE OUTLET	880510	0.0001		0.0001	mg/L
7440020	Nickel	BUSKIN R BL LK	870728	.004		.001	mg/L
7440097	Potassium dissolved	BUSKIN R BL LK	690522	0.4	-		mg/L
7440097	Potassium dissolved	UNNAMED C N OF BUSKIN LK	560801	0.4	-		mg/L
7440097	Potassium dissolved	CATHERINE (MARGARET) LK	750529	0.6	-		mg/L
7440097	Potassium dissolved	GENIVIEVE (GENEVIEVE) LK	591102	7.0	-		mg/L
7440097	Potassium dissolved	GENIVIEVE (GENEVIEVE) LK	750529	0.5	-		mg/L
7440097	Potassium dissolved	DEVILS C	681005	0.2	-		mg/L
7440235	Sodium	BUSKIN LK, STA 1	880725	3.0		0.05	mg/L
7440235	Sodium	BUSKIN LK, STA 2	880725	3.0		0.05	mg/L
7440235	Sodium dissolved	BUSKIN R BL LK	690522	3.5	-		mg/L
7440235	Sodium	BUSKIN R BL LK	880510	3.9		0.05	mg/L
7440235	Sodium	BUSKIN R BL LK	880724	3.1		0.05	mg/L
7440235	Sodium	ALDER C AT G ROAD	880510	5.0		0.05	mg/L
7440235	Sodium	ALDER C AT G ROAD	880724	3.2		0.05	mg/L
7440235	Sodium	MAGAZINE C AT .9 MI ANTON LARSEN	880724	4.9		0.05	mg/L
7440235	Sodium	LK LOUISE OUTLET	880510	7.1		0.05	mg/L
7440235	Sodium	LK LOUISE OUTLET	880724	7.0		0.05	mg/L
7440235	Sodium	DEVILS C AB RUNWAY BL HWY	880510	4.9		0.05	mg/L
7440235	Sodium	DEVILS C AB RUNWAY BL HWY	880724	3.6		0.05	mg/L
7440235	Sodium dissolved	UNNAMED C N OF BUSKIN LK	560801	2.8	-		mg/L
7440235	Sodium dissolved	CATHERINE (MARGARET) LK	750529	4.9	-		mg/L
7440235	Sodium dissolved	GENIVIEVE (GENEVIEVE) LK	591102	5.7	-		mg/L
7440235	Sodium dissolved	GENIVIEVE (GENEVIEVE) LK	750529	7.3	-		mg/L
7440235	Sodium dissolved	DEVILS C	681005	3.6	-		mg/L
7440428	Boron	LK LOUISE OUTLET	880724	0.01		0.01	mg/L
7440428	Boron	DEVILS C AB RUNWAY BL HWY	880724	0.02		0.01	mg/L
7440428	Boron	CATHERINE (MARGARET) LK	750529	.06	-		mg/L
7440428	Boron	GENIVIEVE (GENEVIEVE) LK	750529	.05	-		mg/L
7440440	Carbon organic	BUSKIN LK TRIB (NORTHWEST)	870728	0.4	-		mg/L AS C
7440440	Carbon organic	BUSKIN LK TRIB (WEST)	870728	0.4	-		mg/L AS C
7440440	Carbon organic	UNNAMED TRIB 1 TO BUSKIN R	870728	0.8	-		mg/L AS C
7440440	Carbon organic	LK LOUISE OUTLET	870730	1.8	-		mg/L AS C
7440440	Carbon organic	DEVILS C AB RUNWAY BL HWY	870727	1.1	-		mg/L AS C
7440440	Carbon organic	CATHERINE (MARGARET) LK	750529	1.8	-		mg/L AS C
7440440	Carbon organic	GENIVIEVE (GENEVIEVE) LK	750529	1.5	-		mg/L AS C
7440660	Zinc	BUSKIN LK, STA 1	880725	0.02		0.01	mg/L
7440660	Zinc	MAGAZINE C AT .9 MI ANTON LARSEN	880724	0.01		0.01	mg/L

Chemical Abstract Service number	Chemical	Sample location	Date	Concentration or value		Reporting level	Unit
10	Water temperature	BUSKIN R NR MOUTH BL BRIDGE 2	870727	18.5	-		DEGREE C
10	Water temperature	BUSKIN R NR MOUTH BL BRIDGE 2	870727	18.5	-		DEGREE C
10	Water temperature	BUSKIN R NR MOUTH BL BRIDGE 2	870727	18.5	-		DEGREE C
10	Water temperature	BUSKIN R NR MOUTH BL BRIDGE 2	870727	18.5	-		DEGREE C
10	Water temperature	BUSKIN R NR MOUTH BL BRIDGE 2	880510	5.0	-		DEGREE C
10	Water temperature	BUSKIN R NR MOUTH BL BRIDGE 2	880724	11.0	-		DEGREE C
10	Water temperature	BUSKIN R NR MOUTH BL BRIDGE 2	890224	1.0	-		DEGREE C
10	Water temperature	DEVILS C BL RUNWAY NR MOUTH	680326	0.0	-		DEGREE C
10	Water temperature	DEVILS C BL RUNWAY NR MOUTH	680731	10.0	-		DEGREE C
10	Water temperature	DEVILS C BL RUNWAY NR MOUTH	870727	14.0	-		DEGREE C
10	Water temperature	DEVILS C BL RUNWAY NR MOUTH	880510	4.5	-		DEGREE C
10	Water temperature	DEVILS C BL RUNWAY NR MOUTH	880724	10.0	-		DEGREE C
10	Water temperature	KODIAK AIRPORT DRAINAGE SITE 3	870811	12.0	-		DEGREE C
10	Water temperature	KODIAK AIRPORT DRAINAGE SITE 3	890224	2.5	-		DEGREE C
10	Water temperature	KODIAK AIRPORT DRAINAGE SITE 1	870731	11.5	-		DEGREE C
10	Water temperature	KODIAK AIRPORT DRAINAGE SITE 1	870810	15.0	-		DEGREE C
10	Water temperature	KODIAK AIRPORT DRAINAGE SITE 1	890223	2.0	-		DEGREE C
10	Water temperature	KODIAK AIRPORT DRAINAGE SITE A	880511	7.0	-		DEGREE C
10	Water temperature	KODIAK AIRPORT DRAINAGE SITE A	890223	0.0	-		DEGREE C
10	Water temperature	BUSKIN R	680326	0.5	-		DEGREE C
10	Water temperature	BUSKIN R	680731	12.0	-		DEGREE C
61	Discharge, instantaneous	BUSKIN R NR MOUTH BL BRIDGE 2	870727	71	-		FT3/S
61	Discharge, instantaneous	BUSKIN R NR MOUTH BL BRIDGE 2	880510	367	-		FT3/S
61	Discharge, instantaneous	BUSKIN R NR MOUTH BL BRIDGE 2	880724	131	-		FT3/S
61	Discharge, instantaneous	BUSKIN R NR MOUTH BL BRIDGE 2	890224	28	-		FT3/S
61	Discharge, instantaneous	DEVILS C BL RUNWAY NR MOUTH	680326	7.9	-		FT3/S
61	Discharge, instantaneous	DEVILS C BL RUNWAY NR MOUTH	680731	31	-		FT3/S
61	Discharge, instantaneous	DEVILS C BL RUNWAY NR MOUTH	870727	8.2	-		FT3/S
61	Discharge, instantaneous	DEVILS C BL RUNWAY NR MOUTH	880510	58	-		FT3/S
61	Discharge, instantaneous	KODIAK AIRPORT DRAINAGE SITE 3	890224	E0.03	-		FT3/S
61	Discharge, instantaneous	KODIAK AIRPORT DRAINAGE SITE 1	890223	E0.4	-		FT3/S
61	Discharge, instantaneous	KODIAK AIRPORT DRAINAGE SITE A	880511	<0.01		0.01	FT3/S
61	Discharge, instantaneous	KODIAK AIRPORT DRAINAGE SITE A	890223	0.02	-		FT3/S
61	Discharge, instantaneous	BUSKIN R	680326	56	-		FT3/S
61	Discharge, instantaneous	BUSKIN R	680731	210	-		FT3/S
80	Color	DEVILS C BL RUNWAY NR MOUTH	680731	5	-		PL-CO
80	Color	BUSKIN R	680731	5	-		PL-CO
95	Specific conductance	BUSKIN R NR MOUTH BL BRIDGE 2	870727	38	-		µS/cm
95	Specific conductance	BUSKIN R NR MOUTH BL BRIDGE 2	870727	38	-		µS/cm
95	Specific conductance	BUSKIN R NR MOUTH BL BRIDGE 2	870727	38	-		µS/cm
95	Specific conductance	BUSKIN R NR MOUTH BL BRIDGE 2	870727	38	-		µS/cm
95	Specific conductance	BUSKIN R NR MOUTH BL BRIDGE 2	880510	46	-		µS/cm
95	Specific conductance	BUSKIN R NR MOUTH BL BRIDGE 2	880724	39	-		µS/cm
95	Specific conductance	BUSKIN R NR MOUTH BL BRIDGE 2	890224	52	-		µS/cm
95	Specific conductance	DEVILS C BL RUNWAY NR MOUTH	680326	83	-		µS/cm
95	Specific conductance	DEVILS C BL RUNWAY NR MOUTH	680731	69	-		µS/cm
95	Specific conductance	DEVILS C BL RUNWAY NR MOUTH	870727	64	-		µS/cm
95	Specific conductance	DEVILS C BL RUNWAY NR MOUTH	880510	77	-		µS/cm
95	Specific conductance	DEVILS C BL RUNWAY NR MOUTH	880724	69	-		µS/cm
95	Specific conductance	KODIAK AIRPORT DRAINAGE SITE 3	870811	>4000	-		µS/cm
95	Specific conductance	KODIAK AIRPORT DRAINAGE SITE 3	890224	19900	-		µS/cm
95	Specific conductance	KODIAK AIRPORT DRAINAGE SITE 1	870731	130	-		µS/cm
95	Specific conductance	KODIAK AIRPORT DRAINAGE SITE 1	870810	4000	-		µS/cm
95	Specific conductance	KODIAK AIRPORT DRAINAGE SITE 1	890223	102	-		µS/cm
95	Specific conductance	KODIAK AIRPORT DRAINAGE SITE A	880511	56	-		µS/cm
95	Specific conductance	KODIAK AIRPORT DRAINAGE SITE A	890223	148	-		µS/cm
95	Specific conductance	BUSKIN R	680326	61	-		µS/cm
95	Specific conductance	BUSKIN R	680731	53	-		µS/cm
300	Oxygen dissolved	BUSKIN R NR MOUTH BL BRIDGE 2	870727	9.7	-		mg/L
300	Oxygen dissolved	BUSKIN R NR MOUTH BL BRIDGE 2	870727	9.8	-		mg/L
300	Oxygen dissolved	BUSKIN R NR MOUTH BL BRIDGE 2	870727	9.7	-		mg/L
300	Oxygen dissolved	BUSKIN R NR MOUTH BL BRIDGE 2	870727	9.7	-		mg/L
300	Oxygen dissolved	BUSKIN R NR MOUTH BL BRIDGE 2	880724	10.4	-		mg/L
300	Oxygen dissolved	BUSKIN R NR MOUTH BL BRIDGE 2	890224	13.4	-		mg/L
300	Oxygen dissolved	DEVILS C BL RUNWAY NR MOUTH	870727	10.1	-		mg/L
300	Oxygen dissolved	KODIAK AIRPORT DRAINAGE SITE 3	890224	9.3	-		mg/L
300	Oxygen dissolved	KODIAK AIRPORT DRAINAGE SITE 1	890223	10.8	-		mg/L

Chemical Abstract Service number	Chemical	Sample location	Date	Concentration or value		Reporting level	Unit
400	pH	BUSKIN R NR MOUTH BL BRIDGE 2	870727	7.70	-		UNITS
400	pH	BUSKIN R NR MOUTH BL BRIDGE 2	870727	7.60	-		UNITS
400	pH	BUSKIN R NR MOUTH BL BRIDGE 2	870727	7.60	-		UNITS
400	pH	BUSKIN R NR MOUTH BL BRIDGE 2	880510	7.10	-		UNITS
400	pH	BUSKIN R NR MOUTH BL BRIDGE 2	880724	7.30	-		UNITS
400	pH	BUSKIN R NR MOUTH BL BRIDGE 2	890224	7.20	-		UNITS
400	pH	DEVILS C BL RUNWAY NR MOUTH	680326	7.40	-		UNITS
400	pH	DEVILS C BL RUNWAY NR MOUTH	680731	7.50	-		UNITS
400	pH	DEVILS C BL RUNWAY NR MOUTH	870727	7.70	-		UNITS
400	pH	DEVILS C BL RUNWAY NR MOUTH	880510	7.20	-		UNITS
400	pH	DEVILS C BL RUNWAY NR MOUTH	880724	7.40	-		UNITS
400	pH	KODIAK AIRPORT DRAINAGE SITE 3	870811	7.00	-		UNITS
400	pH	KODIAK AIRPORT DRAINAGE SITE 3	890224	6.60	-		UNITS
400	pH	KODIAK AIRPORT DRAINAGE SITE 1	870731	6.90	-		UNITS
400	pH	KODIAK AIRPORT DRAINAGE SITE 1	890223	7.60	-		UNITS
400	pH	KODIAK AIRPORT DRAINAGE SITE A	890223	7.60	-		UNITS
400	pH	BUSKIN R	680326	7.10	-		UNITS
400	pH	BUSKIN R	680731	7.20	-		UNITS
403	pH laboratory	KODIAK AIRPORT DRAINAGE SITE 3	870811	8.90	-		UNITS
410	Alkalinity, water, whole, fixed endpoint	DEVILS C BL RUNWAY NR MOUTH	680326	21	-		mg/L
410	Alkalinity, water, whole, fixed endpoint	DEVILS C BL RUNWAY NR MOUTH	680731	23	-		mg/L
410	Alkalinity, water, whole, fixed endpoint	BUSKIN R	680326	14	-		mg/L
410	Alkalinity, water, whole, fixed endpoint	BUSKIN R	680731	15	-		mg/L
902	Noncarbonate hardness water whole, field	DEVILS C BL RUNWAY NR MOUTH	680326	11	-		mg/L
902	Noncarbonate hardness water whole, field	DEVILS C BL RUNWAY NR MOUTH	680731	2	-		mg/L
902	Noncarbonate hardness water whole, field	BUSKIN R	680326	6	-		mg/L
902	Noncarbonate hardness water whole, field	BUSKIN R	680731	2	-		mg/L
1003	Chloride dissolved	DEVILS C BL RUNWAY NR MOUTH	680326	6.0	-		mg/L
1003	Chloride dissolved	DEVILS C BL RUNWAY NR MOUTH	680731	3.6	-		mg/L
1003	Chloride dissolved	DEVILS C BL RUNWAY NR MOUTH	870727	4.8	-		mg/L
1003	Chloride dissolved	BUSKIN R	680326	6.0	-		mg/L
1003	Chloride dissolved	BUSKIN R	680731	3.8	-		mg/L
1010	Solids, sum of constituents, dissolved	DEVILS C BL RUNWAY NR MOUTH	680326	46	-		mg/L
1010	Solids, sum of constituents, dissolved	DEVILS C BL RUNWAY NR MOUTH	680731	41	-		mg/L
1010	Solids, sum of constituents, dissolved	BUSKIN R	680326	35	-		mg/L
1010	Solids, sum of constituents, dissolved	BUSKIN R	680731	30	-		mg/L
3035	Sulfate dissolved	DEVILS C BL RUNWAY NR MOUTH	680326	2.6	-		mg/L
3035	Sulfate dissolved	DEVILS C BL RUNWAY NR MOUTH	680731	4.8	-		mg/L
3035	Sulfate dissolved	BUSKIN R	680326	2.6	-		mg/L
3035	Sulfate dissolved	BUSKIN R	680731	3.1	-		mg/L
25900	Nitrogen nitrate dissolved	DEVILS C BL RUNWAY NR MOUTH	680326	0.32	-		mg/L AS N
25900	Nitrogen nitrate dissolved	DEVILS C BL RUNWAY NR MOUTH	680731	0.05	-		mg/L AS N
25900	Nitrogen nitrate dissolved	BUSKIN R	680326	0.25	-		mg/L AS N
25900	Nitrogen nitrate dissolved	BUSKIN R	680731	0.07	-		mg/L AS N
66300	Fluoride dissolved	DEVILS C BL RUNWAY NR MOUTH	680326	0.3		.1	mg/L
66300	Fluoride dissolved	DEVILS C BL RUNWAY NR MOUTH	680731	0.1		.1	mg/L
66300	Fluoride dissolved	BUSKIN R	680326	0.1		.1	mg/L
71523	Bicarbonate	DEVILS C BL RUNWAY NR MOUTH	680326	26	-		mg/L
71523	Bicarbonate	DEVILS C BL RUNWAY NR MOUTH	680731	28	-		mg/L
71523	Bicarbonate	BUSKIN R	680326	17	-		mg/L
71523	Bicarbonate	BUSKIN R	680731	18	-		mg/L
75694	Trichlorofluoromethane	KODIAK AIRPORT DRAINAGE SITE 3	870811	0.2		.2	µg/L
107062	1,2-Dichloroethane	KODIAK AIRPORT DRAINAGE SITE 3	890224	0.50		0.50	µg/L
107062	1,2-Dichloroethane	KODIAK AIRPORT DRAINAGE SITE 1	890223	1.0		0.50	µg/L
117817	bis(2-Ethylhexyl)phthalate	DEVILS C BL RUNWAY NR MOUTH	880510	41.		10	µg/L
124389	Carbon dioxide dissolved	DEVILS C BL RUNWAY NR MOUTH	680326	1.6	-		mg/L
124389	Carbon dioxide dissolved	DEVILS C BL RUNWAY NR MOUTH	680731	1.4	-		mg/L
124389	Carbon dioxide dissolved	BUSKIN R	680326	2.1	-		mg/L
124389	Carbon dioxide dissolved	BUSKIN R	680731	1.8	-		mg/L
471341	Hardness	DEVILS C BL RUNWAY NR MOUTH	680326	32	-		mg/L
471341	Hardness	DEVILS C BL RUNWAY NR MOUTH	680731	25	-		mg/L
471341	Hardness	BUSKIN R	680326	20	-		mg/L
471341	Hardness	BUSKIN R	680731	17	-		mg/L

Chemical Abstract Service number	Chemical	Sample location	Date	Concentration or value		Reporting level	Unit
7404200	Silica as SiO2	BUSKIN R NR MOUTH BL BRIDGE 2	880724	0.2		0.1	mg/L
7404200	Silica dissolved	DEVILS C BL RUNWAY NR MOUTH	680326	5.4	-		mg/L
7404200	Silica dissolved	DEVILS C BL RUNWAY NR MOUTH	680731	5.5	-		mg/L
7404200	Silica as SiO2	DEVILS C BL RUNWAY NR MOUTH	880724	5.0		0.1	mg/L
7404200	Silica dissolved	BUSKIN R	680326	4.7	-		mg/L
7404200	Silica dissolved	BUSKIN R	680731	4.5	-		mg/L
7439954	Magnesium	BUSKIN R NR MOUTH BL BRIDGE 2	880510	0.7		0.1	mg/L
7439954	Magnesium	BUSKIN R NR MOUTH BL BRIDGE 2	880724	0.3		0.1	mg/L
7439954	Magnesium dissolved	DEVILS C BL RUNWAY NR MOUTH	680731	0.8	-		mg/L
7439954	Magnesium	DEVILS C BL RUNWAY NR MOUTH	880510	0.9		0.1	mg/L
7439954	Magnesium	DEVILS C BL RUNWAY NR MOUTH	880724	0.8		0.1	mg/L
7439954	Magnesium dissolved	BUSKIN R	680731	0.6	-		mg/L
7439965	Manganese	BUSKIN R NR MOUTH BL BRIDGE 2	880510	0.006		0.005	mg/L
7439976	Mercury	BUSKIN R NR MOUTH BL BRIDGE 2	880510	0.0003		0.0001	mg/L
7439976	Mercury recoverable	KODIAK AIRPORT DRAINAGE SITE 3	870811	.0001		.00001	mg/L
7440020	Nickel	BUSKIN R NR MOUTH BL BRIDGE 2	870727	.004		.001	mg/L
7440020	Nickel	KODIAK AIRPORT DRAINAGE SITE 3	870811	.003		.001	mg/L
7440020	Nickel	KODIAK AIRPORT DRAINAGE SITE 1	870731	.006		.001	mg/L
7440097	Potassium dissolved	DEVILS C BL RUNWAY NR MOUTH	680326	0.5	-		mg/L
7440097	Potassium dissolved	DEVILS C BL RUNWAY NR MOUTH	680731	0.1	-		mg/L
7440097	Potassium dissolved	BUSKIN R	680326	0.3	-		mg/L
7440097	Potassium dissolved	BUSKIN R	680731	0.2	-		mg/L
7440224	Silver	BUSKIN R NR MOUTH BL BRIDGE 2	880724	0.006		0.005	mg/L
7440235	Sodium	BUSKIN R NR MOUTH BL BRIDGE 2	880510	4.2		0.05	mg/L
7440235	Sodium	BUSKIN R NR MOUTH BL BRIDGE 2	880724	0.67		0.05	mg/L
7440235	Sodium dissolved	DEVILS C BL RUNWAY NR MOUTH	680326	4.0	-		mg/L
7440235	Sodium dissolved	DEVILS C BL RUNWAY NR MOUTH	680731	3.0	-		mg/L
7440235	Sodium	DEVILS C BL RUNWAY NR MOUTH	880510	4.9		0.05	mg/L
7440235	Sodium	DEVILS C BL RUNWAY NR MOUTH	880724	3.6		0.05	mg/L
7440235	Sodium dissolved	BUSKIN R	680326	3.6	-		mg/L
7440235	Sodium dissolved	BUSKIN R	680731	2.7	-		mg/L
7440280	Thallium	KODIAK AIRPORT DRAINAGE SITE 3	870811	.011		.001	mg/L
7440393	Barium	BUSKIN R NR MOUTH BL BRIDGE 2	880724	0.007		0.005	mg/L
7440428	Boron	DEVILS C BL RUNWAY NR MOUTH	880724	0.02		0.01	mg/L
7440440	Carbon organic	DEVILS C BL RUNWAY NR MOUTH	870727	0.5	-		mg/L AS C
7440702	Calcium	BUSKIN R NR MOUTH BL BRIDGE 2	880510	6.3		0.1	mg/L
7440702	Calcium	BUSKIN R NR MOUTH BL BRIDGE 2	880724	0.6		0.1	mg/L
7440702	Calcium dissolved	DEVILS C BL RUNWAY NR MOUTH	680326	13	-		mg/L
7440702	Calcium dissolved	DEVILS C BL RUNWAY NR MOUTH	680731	8.7	-		mg/L
7440702	Calcium	DEVILS C BL RUNWAY NR MOUTH	880510	7.9		0.1	mg/L
7440702	Calcium	DEVILS C BL RUNWAY NR MOUTH	880724	7.5		0.1	mg/L
7440702	Calcium dissolved	BUSKIN R	680326	8.0	-		mg/L
7440702	Calcium dissolved	BUSKIN R	680731	5.7	-		mg/L
7440702	Calcium	BUSKIN R BL LK	880510	6.2		0.1	mg/L
7440702	Calcium	BUSKIN R BL LK	880724	4.9		0.1	mg/L
7440702	Calcium	ALDER C AT G ROAD	880510	5.2		0.1	mg/L
7440702	Calcium	ALDER C AT G ROAD	880724	4.4		0.1	mg/L
7440702	Calcium	MAGAZINE C AT .9 MI ANTON LARSEN	880724	6.1		0.1	mg/L
7440702	Calcium	LK LOUISE OUTLET	880510	6.7		0.1	mg/L
7440702	Calcium	LK LOUISE OUTLET	880724	5.9		0.1	mg/L
7440702	Calcium	DEVILS C AB RUNWAY BL HWY	880510	8.0		0.1	mg/L
7440702	Calcium	DEVILS C AB RUNWAY BL HWY	880724	7.5		0.1	mg/L
7440702	Calcium dissolved	UNNAMED C N OF BUSKIN LK	560801	7.5	-		mg/L
7440702	Calcium dissolved	CATHERINE (MARGARET) LK	750529	4.6	-		mg/L
7440702	Calcium dissolved	GENIVIEVE (GENEVIEVE) LK	591102	4.8	-		mg/L
7440702	Calcium dissolved	GENIVIEVE (GENEVIEVE) LK	750529	8.6	-		mg/L
7440702	Calcium dissolved	DEVILS C	681005	9.4	-		mg/L
7723140	Phosphorous	GENIVIEVE (GENEVIEVE) LK	750529	0.01		.01	mg/L AS P
17778880	Nitrogen	CATHERINE (MARGARET) LK	750529	0.43	-		mg/L
17778880	Nitrogen	GENIVIEVE (GENEVIEVE) LK	750529	0.07	-		mg/L

APPENDIX 3

Water-quality data for ground water near the Kodiak FAA facility

[Unit: mg/L, milligram per liter; µg/L, microgram per liter]

Chemical Abstract Service number	Chemical	Sample location	Date	Concentration or value	Reporting level	Unit
10	Temperature	A008	880502	5.5	-	DEGREE C
10	Temperature	A008	880719	5.0	-	DEGREE C
10	Temperature	A008	881004	5.5	-	DEGREE C
10	Temperature	A008	890307	5.5	-	DEGREE C
10	Temperature	A011	881005	8.0	-	DEGREE C
10	Temperature	A012	880502	5.0	-	DEGREE C
10	Temperature	A012	880719	5.0	-	DEGREE C
10	Temperature	A012	881004	6.0	-	DEGREE C
10	Temperature	A012	890306	4.0	-	DEGREE C
10	Temperature	A012A	880502	5.5	-	DEGREE C
10	Temperature	A012A	880719	11.0	-	DEGREE C
10	Temperature	A012A	881005	9.0	-	DEGREE C
10	Temperature	A012A	890306	0.0	-	DEGREE C
10	Temperature	A013	880502	5.5	-	DEGREE C
10	Temperature	A013	880719	5.5	-	DEGREE C
10	Temperature	A013	881004	5.5	-	DEGREE C
10	Temperature	A013	890306	5.5	-	DEGREE C
10	Temperature	A020A	880720	5.5	-	DEGREE C
10	Temperature	A020A	881005	8.0	-	DEGREE C
10	Temperature	A020A	890308	4.0	-	DEGREE C
10	Temperature	A020A	890522	3	-	DEGREE C
10	Temperature	A023A	880506	3.0	-	DEGREE C
10	Temperature	A023A	880720	5.0	-	DEGREE C
10	Temperature	A023A	881006	7.0	-	DEGREE C
10	Temperature	A023A	890308	2.5	-	DEGREE C
10	Temperature	A079	880505	4.0	-	DEGREE C
10	Temperature	A079	880719	7.0	-	DEGREE C
10	Temperature	A079	881004	7.5	-	DEGREE C
10	Temperature	A079	890306	1.0	-	DEGREE C
10	Temperature	B001	890522	6	-	DEGREE C
10	Temperature	B002	890523	6	-	DEGREE C
10	Temperature	B003	890523	6	-	DEGREE C
95	Specific conductance	A008	880502	122	-	µS/cm
95	Specific conductance	A008	880719	133	-	µS/cm
95	Specific conductance	A008	881004	135	-	µS/cm
95	Specific conductance	A008	890307	117	-	µS/cm
95	Specific conductance	A011	881005	405	-	µS/cm
95	Specific conductance	A012	880502	119	-	µS/cm
95	Specific conductance	A012	880719	115	-	µS/cm
95	Specific conductance	A012	881004	115	-	µS/cm
95	Specific conductance	A012	890306	96	-	µS/cm
95	Specific conductance	A012A	880502	56	-	µS/cm
95	Specific conductance	A012A	880719	55	-	µS/cm
95	Specific conductance	A012A	881005	54	-	µS/cm
95	Specific conductance	A012A	890306	61	-	µS/cm
95	Specific conductance	A013	880502	124	-	µS/cm
95	Specific conductance	A013	880719	156	-	µS/cm
95	Specific conductance	A013	881004	131	-	µS/cm
95	Specific conductance	A013	890306	152	-	µS/cm
95	Specific conductance	A020A	880720	198	-	µS/cm
95	Specific conductance	A020A	881005	115	-	µS/cm
95	Specific conductance	A020A	890308	187	-	µS/cm
95	Specific conductance	A020A	890522	168	-	µS/cm
95	Specific conductance	A023A	880506	133	-	µS/cm
95	Specific conductance	A023A	880720	123	-	µS/cm
95	Specific conductance	A023A	881006	82	-	µS/cm
95	Specific conductance	A023A	890308	97	-	µS/cm
95	Specific conductance	A079	880505	284	-	µS/cm
95	Specific conductance	A079	880719	348	-	µS/cm
95	Specific conductance	A079	881004	402	-	µS/cm
95	Specific conductance	A079	890306	106	-	µS/cm
95	Specific conductance	B001	890522	233	-	µS/cm
95	Specific conductance	B002	890523	150	-	µS/cm
95	Specific conductance	B003	890523	227	-	µS/cm

Chemical Abstract Service number	Chemical	Sample location	Date	Concentration or value		Reporting level	Unit
237	Water level, depth below land surface	A008	880502	24.70	-		FEET
237	Water level, depth below land surface	A008	880719	25.47	-		FEET
237	Water level, depth below land surface	A008	881004	23.35	-		FEET
237	Water level, depth below land surface	A011	881005	4.63	-		FEET
237	Water level, depth below land surface	A012	880502	12.08	-		FEET
237	Water level, depth below land surface	A012	880719	12.66	-		FEET
237	Water level, depth below land surface	A012	881004	10.47	-		FEET
237	Water level, depth below land surface	A012A	880502	18.28	-		FEET
237	Water level, depth below land surface	A012A	881005	16.40	-		FEET
237	Water level, depth below land surface	A013	880502	16.51	-		FEET
237	Water level, depth below land surface	A013	880719	16.43	-		FEET
237	Water level, depth below land surface	A013	881004	14.85	-		FEET
237	Water level, depth below land surface	A020A	880720	19.00	-		FEET
237	Water level, depth below land surface	A020A	881005	11.40	-		FEET
237	Water level, depth below land surface	A020A	890308	17.39	-		FEET
237	Water level, depth below land surface	A023A	880506	10.25	-		FEET
237	Water level, depth below land surface	A023A	880720	11.01	-		FEET
237	Water level, depth below land surface	A023A	881006	9.80	-		FEET
237	Water level, depth below land surface	A023A	890308	10.84	-		FEET
237	Water level, depth below land surface	A079	880505	17.85	-		FEET
237	Water level, depth below land surface	A079	880719	15.73	-		FEET
237	Water level, depth below land surface	A079	881004	14.67	-		FEET
400	pH	A008	880502	5.90	-		UNITS
400	pH	A008	881004	5.70	-		UNITS
400	pH	A008	890307	5.30	-		UNITS
400	pH	A011	881005	7.20	-		UNITS
400	pH	A012	880502	6.60	-		UNITS
400	pH	A012	881004	6.50	-		UNITS
400	pH	A012A	880502	7.00	-		UNITS
400	pH	A012A	880719	6.50	-		UNITS
400	pH	A012A	881005	6.70	-		UNITS
400	pH	A012A	890306	7.30	-		UNITS
400	pH	A013	880502	5.90	-		UNITS
400	pH	A013	881004	5.80	-		UNITS
400	pH	A013	890306	6.00	-		UNITS
400	pH	A020A	880720	6.10	-		UNITS
400	pH	A020A	881005	5.90	-		UNITS
400	pH	A020A	890308	5.90	-		UNITS
400	pH	A020A	890522	6.4	-		UNITS
400	pH	A023A	880506	7.40	-		UNITS
400	pH	A023A	880720	7.20	-		UNITS
400	pH	A023A	881006	6.40	-		UNITS
400	pH	A023A	890308	6.30	-		UNITS
400	pH	A079	880505	6.30	-		UNITS
400	pH	A079	880719	7.10	-		UNITS
400	pH	A079	881004	6.90	-		UNITS
400	pH	A079	890306	7.80	-		UNITS
400	pH	B001	890522	8.2	-		UNITS
400	pH	B002	890523	6.4	-		UNITS
400	pH	B003	890523	7.1	-		UNITS
1003	Chloride	A008	881004	16.		0.5	mg/L
1003	Chloride	A011	881005	4.8		0.5	mg/L
1003	Chloride	A012	881004	12.		0.5	mg/L
1003	Chloride	A012A	881005	8.3		0.5	mg/L
1003	Chloride	A013	881004	18.		0.5	mg/L
1003	Chloride	A020A	880720	14.		0.5	mg/L
1003	Chloride	A020A	881005	21.		0.5	mg/L
1003	Chloride	A020A	890522	16.		0.5	mg/L
1003	Chloride	A023A	881006	11.		0.5	mg/L
1003	Chloride	A079	881005	6.3		0.5	mg/L
1003	Chloride	B001	890523	9.0		0.5	mg/L
1003	Chloride	B002	890523	11.		0.5	mg/L
1003	Chloride	B003	890523	16.		0.5	mg/L
1010	Total Dissolved Solids	A020A	890522	110.		10.	mg/L
1010	Total Dissolved Solids	B001	890523	140.		10.	mg/L
1010	Total Dissolved Solids	B002	890523	100.		10.	mg/L
1010	Total Dissolved Solids	B003	890523	140.		10.	mg/L
3035	Sulfate	A008	881004	3.8		0.5	mg/L
3035	Sulfate	A011	881005	11.		0.5	mg/L
3035	Sulfate	A012	881004	5.0		0.5	mg/L
3035	Sulfate	A012A	881005	2.2		0.5	mg/L
3035	Sulfate	A013	881004	4.5		0.5	mg/L
3035	Sulfate	A020A	880720	1.1		0.5	mg/L
3035	Sulfate	A020A	881005	4.3		0.5	mg/L
3035	Sulfate	A020A	890522	1.9		0.5	mg/L
3035	Sulfate	A023A	881006	2.1		0.5	mg/L
3035	Sulfate	A079	881005	27.		0.5	mg/L
3035	Sulfate	B001	890523	11.		0.5	mg/L
3035	Sulfate	B002	890523	5.0		0.5	mg/L
3035	Sulfate	B003	890523	7.2		0.5	mg/L

Chemical Abstract Service number	Chemical	Sample location	Date	Concentration or value	Reporting level	Unit
25900	Nitrate as N	A008	881004	9.0	0.5	mg/L
25900	Nitrate as N	A012	881004	3.6	0.5	mg/L
25900	Nitrate as N	A012A	881005	0.6	0.5	mg/L
25900	Nitrate as N	A013	881004	2.9	0.5	mg/L
25900	Nitrate as N	A023A	881006	0.5	0.5	mg/L
25900	Nitrate as N	B003	890523	1.0	0.5	mg/L
74873	Chloromethane	B001	890523	3.3	1.1	µg/L
75694	Trichlorofluoromethane	B002	890523	27.	5.0	µg/L
107062	1,2-Dichloroethane	A008	880502	0.78	0.20	µg/L
107062	1,2-Dichloroethane	A008	890307	0.72	0.50	µg/L
107062	1,2-Dichloroethane	A012	880502	0.93	0.20	µg/L
107062	1,2-Dichloroethane	A012	890306	0.91	0.50	µg/L
107062	1,2-Dichloroethane	A012A	880502	0.48	0.20	µg/L
107062	1,2-Dichloroethane	A012A	890306	0.74	0.50	µg/L
107062	1,2-Dichloroethane	A013	880502	0.80	0.20	µg/L
107062	1,2-Dichloroethane	A013	890306	0.88	0.50	µg/L
107062	1,2-Dichloroethane	A020A	890522	0.73	0.50	µg/L
107062	1,2-Dichloroethane	A023A	880506	0.67	0.20	µg/L
107062	1,2-Dichloroethane	A023A	890308	0.71	0.50	µg/L
107062	1,2-Dichloroethane	A079	880507	1.0	0.20	µg/L
107062	1,2-Dichloroethane	A079	890306	0.79	0.50	µg/L
108883	Toluene	B001	890523	6.5	1.0	µg/L
7404200	Silica as SiO2	A008	881004	9.2	0.1	mg/L
7404200	Silica as SiO2	A011	881005	7.8	0.1	mg/L
7404200	Silica as SiO2	A012	881004	6.6	0.1	mg/L
7404200	Silica as SiO2	A012A	881005	5.1	0.1	mg/L
7404200	Silica as SiO2	A013	881004	9.6	0.1	mg/L
7404200	Silica as SiO2	A020A	880720	16.	0.1	mg/L
7404200	Silica as SiO2	A020A	881005	10.	0.1	mg/L
7404200	Silica as SiO2	A023A	881006	6.1	0.1	mg/L
7404200	Silica as SiO2	A079	881005	7.3	0.1	mg/L
7429905	Aluminum	A012A	881005	0.06	0.05	mg/L
7429905	Aluminum	A020A	880720	0.08	0.05	mg/L
7429905	Aluminum	A023A	881006	0.25	0.05	mg/L
7429905	Aluminum	B003	890523	0.2	0.2	mg/L
7439896	Iron	A020A	880720	15.	0.05	mg/L
7439896	Iron	A020A	881005	0.19	0.05	mg/L
7439896	Iron	A020A	890522	12.	0.05	mg/L
7439896	Iron	A023A	881006	0.39	0.05	mg/L
7439896	Iron	B003	890523	0.28	0.05	mg/L
7439921	Lead	A013	880502	0.002	0.002	mg/L
7439921	Lead	A023A	880720	0.002	0.002	mg/L
7439921	Lead	A079	880507	0.019	0.002	mg/L
7439954	Magnesium	A008	881004	2.5	0.1	mg/L
7439954	Magnesium	A011	881005	6.2	0.1	mg/L
7439954	Magnesium	A012	881004	1.7	0.1	mg/L
7439954	Magnesium	A012A	881005	0.8	0.1	mg/L
7439954	Magnesium	A013	881004	2.7	0.1	mg/L
7439954	Magnesium	A020A	880720	3.3	0.1	mg/L
7439954	Magnesium	A020A	881005	1.4	0.1	mg/L
7439954	Magnesium	A020A	890522	1.9	0.2	mg/L
7439954	Magnesium	A023A	881006	1.5	0.1	mg/L
7439954	Magnesium	A079	881005	2.9	0.1	mg/L
7439954	Magnesium	B001	890523	6.4	0.2	mg/L
7439954	Magnesium	B002	890523	3.6	0.2	mg/L
7439954	Magnesium	B003	890523	4.5	0.2	mg/L
7439965	Manganese	A008	881004	0.083	0.005	mg/L
7439965	Manganese	A011	881005	0.006	0.005	mg/L
7439965	Manganese	A013	881004	0.59	0.005	mg/L
7439965	Manganese	A020A	880720	3.5	0.005	mg/L
7439965	Manganese	A020A	881005	0.066	0.005	mg/L
7439965	Manganese	A020A	890522	2.4	0.01	mg/L
7439965	Manganese	A023A	881006	0.010	0.005	mg/L
7439965	Manganese	A079	881005	0.42	0.005	mg/L
7439965	Manganese	B001	890523	0.05	0.01	mg/L
7439965	Manganese	B002	890523	0.13	0.01	mg/L
7439965	Manganese	B003	890523	0.74	0.01	mg/L

Chemical Abstract Service number	Chemical	Sample location	Date	Concentration or value	Reporting level	Unit
7439976	Mercury	A020A	890522	0.0003	0.0001	mg/L
7439976	Mercury	B001	890523	0.0004	0.0001	mg/L
7439976	Mercury	B002	890523	0.0006	0.0001	mg/L
7439976	Mercury	B003	890523	0.0003	0.0001	mg/L
7440097	Potassium	B001	890523	10.	5.	mg/L
7440235	Sodium	A008	881004	10.	0.05	mg/L
7440235	Sodium	A011	881005	13.	0.05	mg/L
7440235	Sodium	A012	881004	5.8	0.05	mg/L
7440235	Sodium	A012A	881005	4.5	0.05	mg/L
7440235	Sodium	A013	881004	8.8	0.05	mg/L
7440235	Sodium	A020A	880720	11.	0.05	mg/L
7440235	Sodium	A020A	881005	11.	0.05	mg/L
7440235	Sodium	A020A	890522	10.	0.9	mg/L
7440235	Sodium	A023A	881006	12.	0.05	mg/L
7440235	Sodium	A079	881005	8.2	0.05	mg/L
7440235	Sodium	B001	890523	11.	0.9	mg/L
7440235	Sodium	B002	890523	8.9	0.9	mg/L
7440235	Sodium	B003	890523	8.0	0.9	mg/L
7440382	Arsenic	B001	890523	0.006	0.003	mg/L
7440393	Barium	A008	881004	0.022	0.005	mg/L
7440393	Barium	A011	881005	0.017	0.005	mg/L
7440393	Barium	A012	881004	0.009	0.005	mg/L
7440393	Barium	A013	881004	0.015	0.005	mg/L
7440393	Barium	A020A	880720	0.14	0.005	mg/L
7440393	Barium	A020A	890522	0.01	0.01	mg/L
7440393	Barium	A079	881005	0.005	0.005	mg/L
7440393	Barium	B001	890523	0.04	0.01	mg/L
7440393	Barium	B003	890523	0.01	0.01	mg/L
7440428	Boron	A011	881005	0.03	0.01	mg/L
7440428	Boron	A020A	880720	0.02	0.01	mg/L
7440428	Boron	A023A	881006	0.01	0.01	mg/L
7440428	Boron	A079	881005	0.02	0.01	mg/L
7440439	Cadmium	A012A	881005	0.006	0.005	mg/L
7440660	Zinc	A008	881004	0.01	0.01	mg/L
7440660	Zinc	A011	881005	0.03	0.01	mg/L
7440660	Zinc	A012	881004	0.02	0.01	mg/L
7440660	Zinc	A012A	881005	0.01	0.01	mg/L
7440660	Zinc	A013	881004	0.01	0.01	mg/L
7440660	Zinc	A020A	880720	0.02	0.01	mg/L
7440660	Zinc	A079	881005	0.02	0.01	mg/L
7440702	Calcium	A008	881004	13.	0.1	mg/L
7440702	Calcium	A011	881005	72.	0.1	mg/L
7440702	Calcium	A012	881004	15.	0.1	mg/L
7440702	Calcium	A012A	881005	6.2	0.1	mg/L
7440702	Calcium	A013	881004	13.	0.1	mg/L
7440702	Calcium	A020A	880720	15.	0.1	mg/L
7440702	Calcium	A020A	881005	8.7	0.1	mg/L
7440702	Calcium	A020A	890522	11.	0.1	mg/L
7440702	Calcium	A023A	881006	3.3	0.1	mg/L
7440702	Calcium	A079	881005	11.	0.1	mg/L
7440702	Calcium	B001	890523	23.	0.1	mg/L
7440702	Calcium	B002	890523	16.	0.1	mg/L
7440702	Calcium	B003	890523	32.	0.1	mg/L
477520600	Alkalinity, water, whole, fixed endpoint titra	A020A	890522	49.	5.	mg/L
477520600	Alkalinity, water, whole, fixed endpoint titra	B001	890523	84.	5.	mg/L
477520600	Alkalinity, water, whole, fixed endpoint titra	B002	890523	46.	5.	mg/L
477520600	Alkalinity, water, whole, fixed endpoint titra	B003	890523	78.	5.	mg/L
477923700	Alkalinity, Bicarb. as CaCO3 at pH 4.5	A020A	890522	49.	5.	mg/L
477923700	Alkalinity, Bicarb. as CaCO3 at pH 4.5	B001	890523	84.	5.	mg/L
477923700	Alkalinity, Bicarb. as CaCO3 at pH 4.5	B002	890523	46.	5.	mg/L
477923700	Alkalinity, Bicarb. as CaCO3 at pH 4.5	B003	890523	78.	5.	mg/L