SUPPLEMENTAL

MATERIALS REPORT

SOLDOTNA to KASILOF

PROJECT NUMBER F-021-1(3)

ANCHORAGE DISTRICT

March 1962

Approved

Clayton Rasmussen
District Materials Supervisor

R. V. Hansmann
Chief Geologist

SUPPLEMENTAL MATERIALS REPORT
Soldotna-Kasilof (Station 2445 to 2589)
Project Number F-021-1(3)

INTRODUCTION

This report is to cover an investigation of Materials Site 11-009-62 (P.A. 224-E) Slikok Pit and also a review and investigation of centerline soils from Station 2445 to 2589. A soils profile showing borings on line is also given. The deep cuts were drilled by Anchorage Department of Highways personnel while the shallower areas were covered by Bureau of Public Roads test holes. Equipment used includes a Williams auger, D-4 with auger, 6x6 with auger, backhoe, and hand equipment. Personnel on the project included the entire Anchorage District Materials Section and J. J. Brennan, Geologist; and William Olson, Operator, from the Soldotna Engineering Office.

LOCATION

The Soldotna-Kasilof area lies in the northwest part of the Kenai Peninsula of south central Alaska. The area is bound by the Cook Inlet to the west and north. The beginning of the project is about five miles south of Soldotna and is about three miles in length.

GENERAL SURFICIAL GEOLOGY

During the last period of glaciation the Kenai Lowland was occupied by a large valley glacier which filled most of the Cook Inlet basin. Thick beds of sand and gravel, now broad terraces, were deposited along the two principal streams, the Kenai and Kasilof Rivers and minor terraces along smaller streams such as Slikok Creek and Coal Creek. Hilly moraines, which may be made up of either coarse textured or compact fine grained material, occur in most of the remainder of the area. Strong winds off the retreating glaciers removed silty material from sparsely vegetated land and deposited it as a mantle of loess, varying in thickness from a few inches to several feet, over the entire area. There are areas where the winds have built up sand dunes along larger rivers.

The three mile area of this project lies through typical fine grained glacial till making up hilly moraines. The sand hills are areas of material that were washed clean and deposited while in contact with the glacier. Ground moraine which this area is, is unfavorable for gravel deposits. Those that do lie in it are usually very limited.

REQUIRED THICKNESS OF PAVEMENT AND BASE

The year 1959 (taken as an average year) had a freezing index of 2,090 (degree days). A combined thickness of pavement and base of 62 inches is required to prevent freezing of subgrade is believed to be the best method of preventing failure of the road due to frost heaves and spring break up. This would be the best method of construction over A-4 material with a frost class of F-4 and F-3.

If the subgrade is allowed to freeze in areas underlain by frost susceptible material, a thickness of at least 20 inches of combined pavement and base will be required for wheel loads of 9,000 pounds. It is believed that the present heavy truck traffic on this road would make a design for 15,000 pounds requiring 27 inches more feasible. This would permit the subgrade to freeze and frost heaves to form, but would permit light traffic to operate over the road during break up without causing failures in the pavement and base. If it is at all possible, non frost susceptible material from the cuts should be placed in the top five (5) feet of the embankment thus preventing frost heaves entirely. Sands (A-3) should be overlain by 0.5' of well graded gravel (A-1-a) if the road is to be paved within 2 to 3 years. It should have 0.8' of gravel if more than 3 years is to pass.

STATION TO STATION DESCRIPTION

Station 2445 to 2456

The project begins in a low area between two ridges of silty sands, sands, and silts. The materials are discontinuous throughout the cut. Water was not noted in the cut and it is not believed that back slopes will present water problems from within. The silty soils do erode easily and every effort should be made to cut down erosion on the back slopes.

Recommend:
The grade points at Station 2446+80 and 2455+50 should be excavated at least (5) five feet below grade line and back filled with non frost susceptible material.

Station 2456 to 2473+90

A fill section through this area presents a number of conditions. (1) The natural ground from Station 2462+50 to 2464+80 is near grade. A side hill through the first portion of this cut should not present problems except for erosion of the backslope. The swamp at Station 2467 to °469 was excavated and filled on the last contract and should not call for any further work.

Recommend:
Excavate natural ground five (5) feet below finished grade where within five (5) feet of finished grade. (See general recommendations.) Overlay A-4 material with 27" to 62" of base and pavement.

Station 2473+90 to 2530

A series of sand cuts and firm ground should present little problem. The sands are A-3 with minor A-2-4 present. Past construction has taken care of a small swamp at ± Station 2517 to 2519.

Recommend:
Excavate grade points 5.2 feet and back fill with non frost susceptible material. Place non frost susceptible sand from cuts in this area over the embankments from the silty areas. This will cause extra haul, but will permit the cuts to supply a part of the 5.2 feet of non frost susceptible material to prevent frost heaving. (See typical section.)

Station 2530 to 2590

This area is composed principally of silts. (A-4) They are non plastic, highly frost susceptible, and have only slight compressibility and expansion.

Recommend:
The silt that is within 5.2 feet of proposed finished grade should be placed into dry fills which are plus 5.2 feet deep. The dry fills should then be brought up to 5.2' below finished grade and then capped with sand (A-3) from the cuts at Station 2473+90 to 2530. (See general recommendations.)

GENERAL RECOMMENDATIONS

All backslopes and embankments of A-2-4 and A-4 more than six (6) feet from ditch bottom to top should be seeded or protected with a gravel (A-1-a) layer 0.5' thick. This would insure against erosion and future maintenance.

All grade points in A-4 material should be excavated +5.2 feet below finished

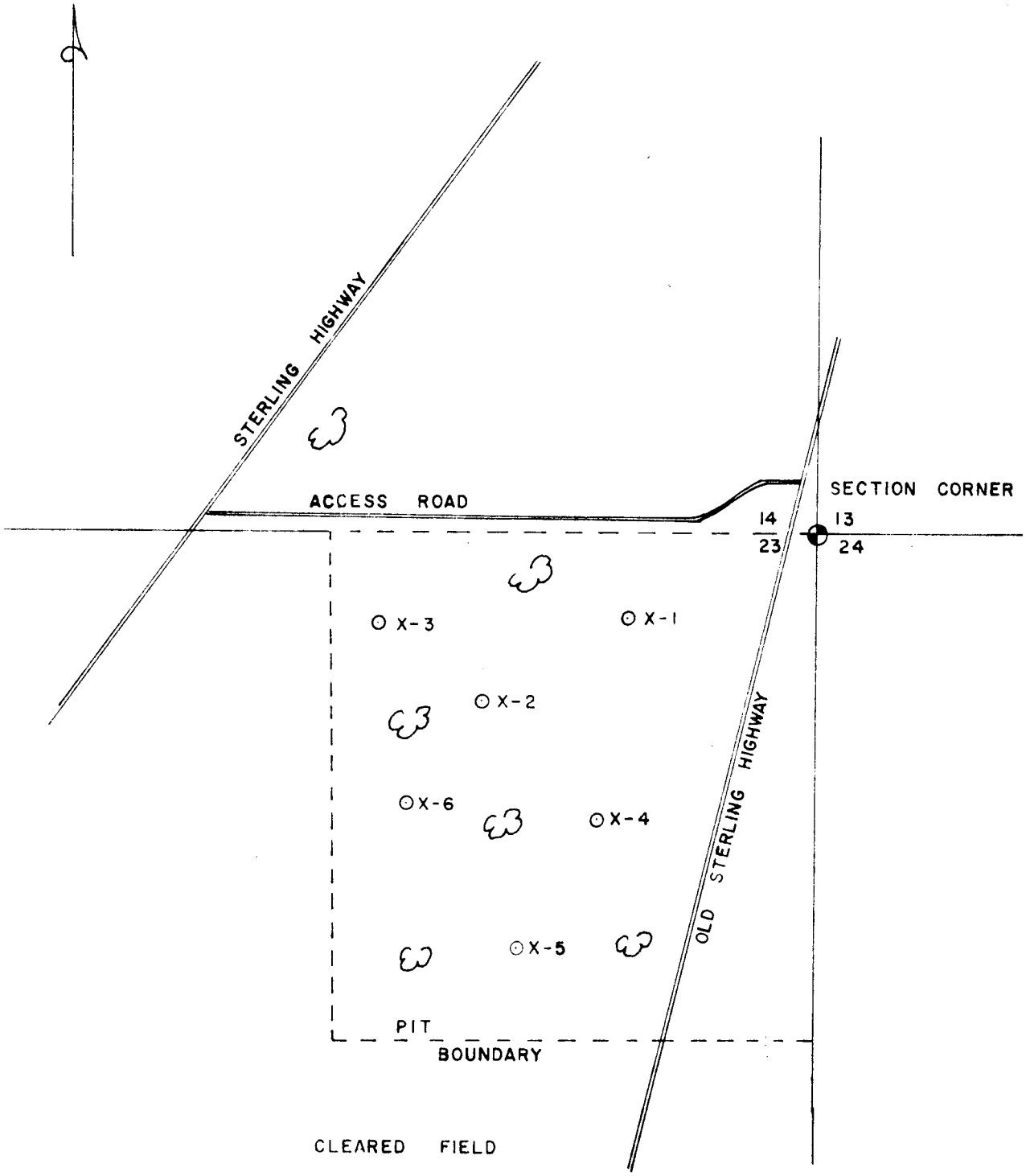
grade. This would insure an even transition from fill to cut and remove frost susceptible material from the frost zone. A-4 material should be overlain by 27" to 62" of base and surfacing. Frost susceptible A-2-4, and A-1-b should be overlain by 20" to 27" of base and surfacing.

MATERIALS SITES

Site 11-009-62, the Slikok Pit, has been prospected and is recommended for use. It is limited, however, in A-1-a material as it is composed mostly of A-3. The Coal Creek Pit (P.A. 291) which lies to the south about 2.1 miles is the next reasonably close source. A detailed materials investigation was made of this source in 1961 and a report made of the area at that time. It has since been stripped and worked, but is not exhausted. It is believed that the present contract on Soldotna-Kasilof will call for more material to be taken from it. A new examination to determine the type of remaining material can not be made until use of it has stopped on the present contract. This department had proven 200,000 c.y. above the water table and 65,000 c.y. below the water table as of January 19, 1961. Construction has presently taken about 66,000 c.y. of A-1-a material and will take more before it is finished. The material proven was about 50% A-1-a, 30% A-1-b, and 20% A-3. Except for minor boulders, 6 inch was the maximum size of material. See previous reports on borrow of Soldotna to Kasilof (F-021-1(9) for more information.

The Soldotna Airport Pit, P.A. 295, had a proven quantity of about 250,000 c.y. of A-1-a material. Construction has taken less than 75,000 c.y. of material from this source. There will be enough A-1-a material available in this source to take care of up to 100,000 c.y. of construction if it is needed on this three mile project. (See vicinity map.)

Mark K. Weaver
District Geologist



PROJECT:

SOLDOTNA TO KASILOF
F-021-1(3)
SLIKOK PIT (Portion of)

STATE OF ALASKA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
MATERIALS SECTION

MAT. SITE NO. 11-009-62	PA. NO. 224 E
SCALE. 1" = 200'	DATE. 2-27-62
DRAWN. KL	DATUM. BRENNAN

FORM NO. 37-A

OUTLINE OF MATERIALS SITE REPORT

MATERIALS SITE NO.: 11-009-62

P.A. NO.: 224-E

Location: that portion of the NE^4 NE^4 NE^4 Sec. 23, T 4 N, R 11 W, S.M. east of the old Sterling Highway

Area: Proven ± 6 acres
Total ± 6 acres

Thickness of Deposit: 9.0' average

Quantities: Proven 14,000 c.y. gravel; 60,000 c.y. sand
Estimated 120,000 c.y. of sand gravel

Field description and geology of deposit: a gravel bench deposited by Slikok Creek during past glaciation retreat

Stripping thickness: 4.2' average

Clearing: spruce cover up to 12" in diameter

Water table: 16' to 17' below surface

Drainage: Surface fair to good
Subsurface good to 15'

Access to highway or project: adjacent to both the old and new highway

Remarks: large boulders may be expected - ± 5' diameter. The gravel is deposited in a layer ± 1.5' thick between the overburden and the sand. It will be difficult to work with out contamination by the sand. This pit is not a recommendation crusher site. Only Type I is recommended.

Sample Summary:

Field No.	Lab. No.	AASHO Class	Unified Class	Frost Class	Required Subgrade	% Passing #4	200	.02m
1300	A-131	A-3	SP	NFS	none	94	2	--
1301	132	A-1-a	GW	NFS	none	47	3	--
1302	133	A-1-a	GW	NFS	none	50	3	--
1303	134	A-1-b	SP	NFS	none	96	1	--
1304	135	A-1-a	SW	NFS	none	53	4	--
1305	136	A-3	SP	NFS	none	100	1	--
1306	137	A-1-b	SP	NFS	none	88	3	--
1307	138	A-3	SP-SM	--	none	95	6	--

FORM AN-18

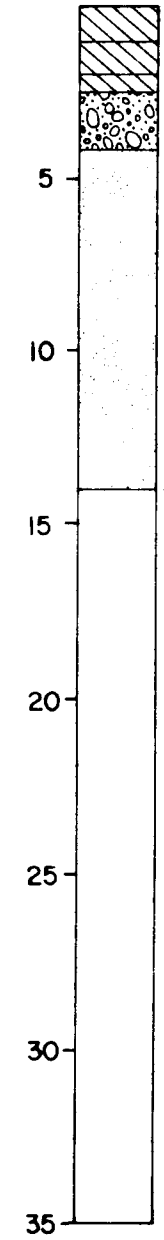
STATE OF ALASKA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

MATERIALS SECTION

FIELD BORING LOG

Code 11-009-62

PROJECT No. F-021-1(3) PROJECT Soldotna - Kasilof PREFIX A DATE 2-26-62
PURPOSE borrow T.H. No X-1 STATION PIT PA 224-E
SUBMITTED BY M. K. Weaver LOGGED BY J. J. Brennan EQUIPMENT Backhoe



LOG CORE	DESCRIPTION	SAMPLE No.	SAMPLE No.	SAMPLE DEPTH
ELEVATION				
1'	Dark Organic Mat'l			
2'	Brown Silt & Roots			
2.5'	Grayish Pebbly Silt			
4'	Sandy Gravel - 3 1/2" max. dia.			
				5'
			1300	
	Pebbly Sand			9'
14'				
	No Water			

BLOWS PER FOOT

SYMBOLS:

WATER TABLE

NO RECOVERY

RECOVERY

> CORE

SIGNED Mark K. Weaver
DISTRICT GEOLOGIST

FORM AN-18

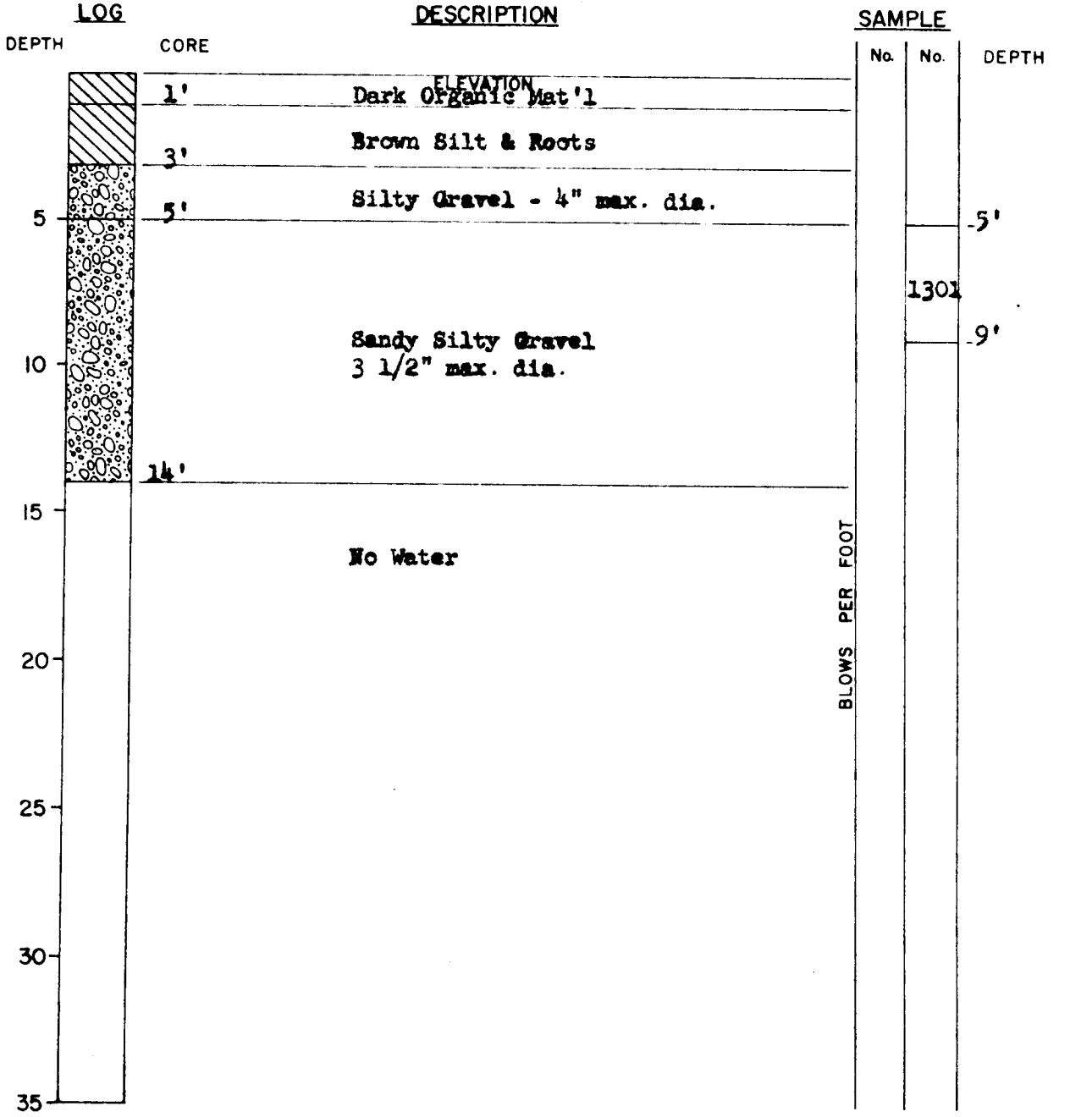
STATE OF ALASKA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

MATERIALS SECTION

FIELD BORING LOG

Code 11-009-62

PROJECT No. F-021-1(3) PROJECT Soldotna - Kasilof PREFIX A DATE 2-26-62
PURPOSE borrow TH No. X-2 STATION PIT PA 224-E
SUBMITTED BY M. K. Weaver LOGGED BY J. J. Brennan EQUIPMENT Backhoe



SYMBOLS:

WATER TABLE

NO RECOVERY

RECOVERY

> CORE

SIGNED Monte K. Weaver
DISTRICT GEOLOGIST

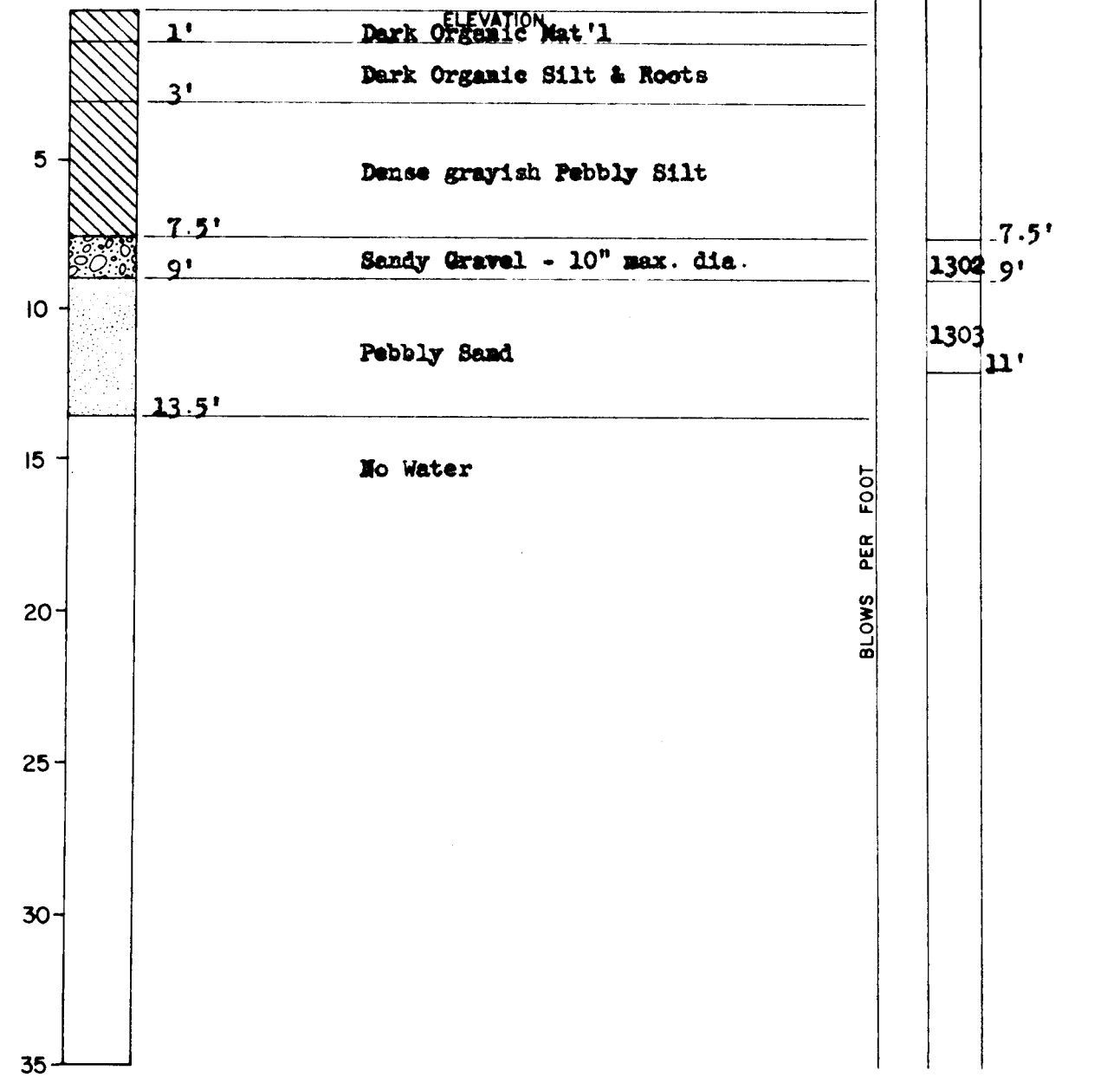
FORM AN-18

STATE OF ALASKA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
MATERIALS SECTION

FIELD BORING LOG

Code 11-009-62

PROJECT No. F-021-1(3) PROJECT Soldotna - Kasilof PREFIX A DATE 2-26-62
PURPOSE borrow T.H. No. X-3 STATION PIT PA 224-E
SUBMITTED BY M. K. Weaver LOGGED BY J. J. Brennan EQUIPMENT Backhoe



SYMBOLS:
WATER TABLE
NO RECOVERY
RECOVERY
> CORE

SIGNED Maurice K. Weaver
DISTRICT GEOLOGIST

FORM AN-18

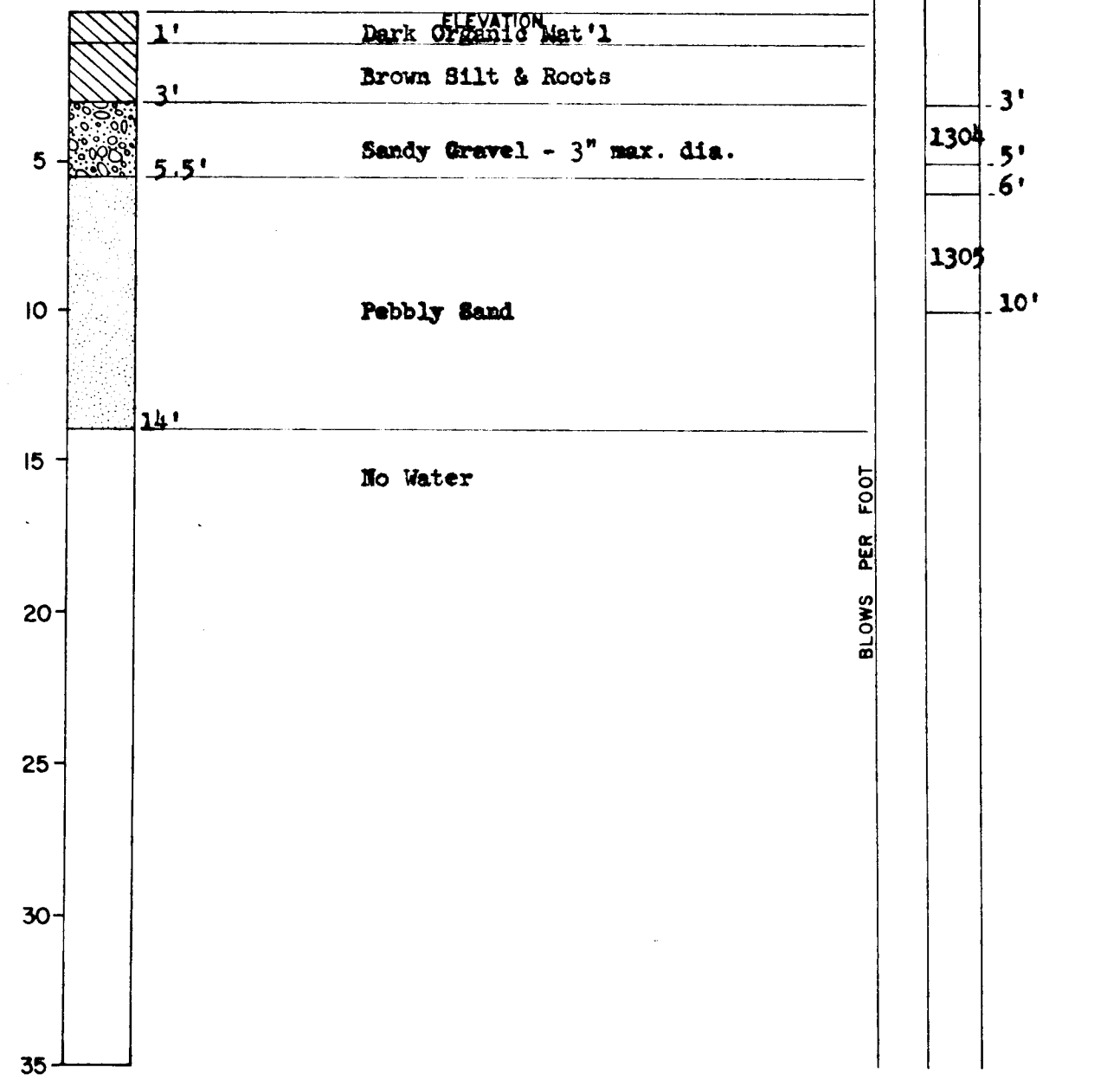
STATE OF ALASKA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

MATERIALS SECTION

FIELD BORING LOG

Code 11-009-62

PROJECT No. F-021-1(3) PROJECT Soldotna - Kasilof PREFIX A DATE 2-27-62
PURPOSE borrow T.H. No. X-4 STATION PIT PA 224-E
SUBMITTED BY M. K. Weaver LOGGED BY J. J. Brennan EQUIPMENT Backhoe



SYMBOLS:

WATER TABLE

NO RECOVERY

RECOVERY

> CORE

SIGNED Monte K. Weaver
DISTRICT GEOLOGIST

FORM AN-18

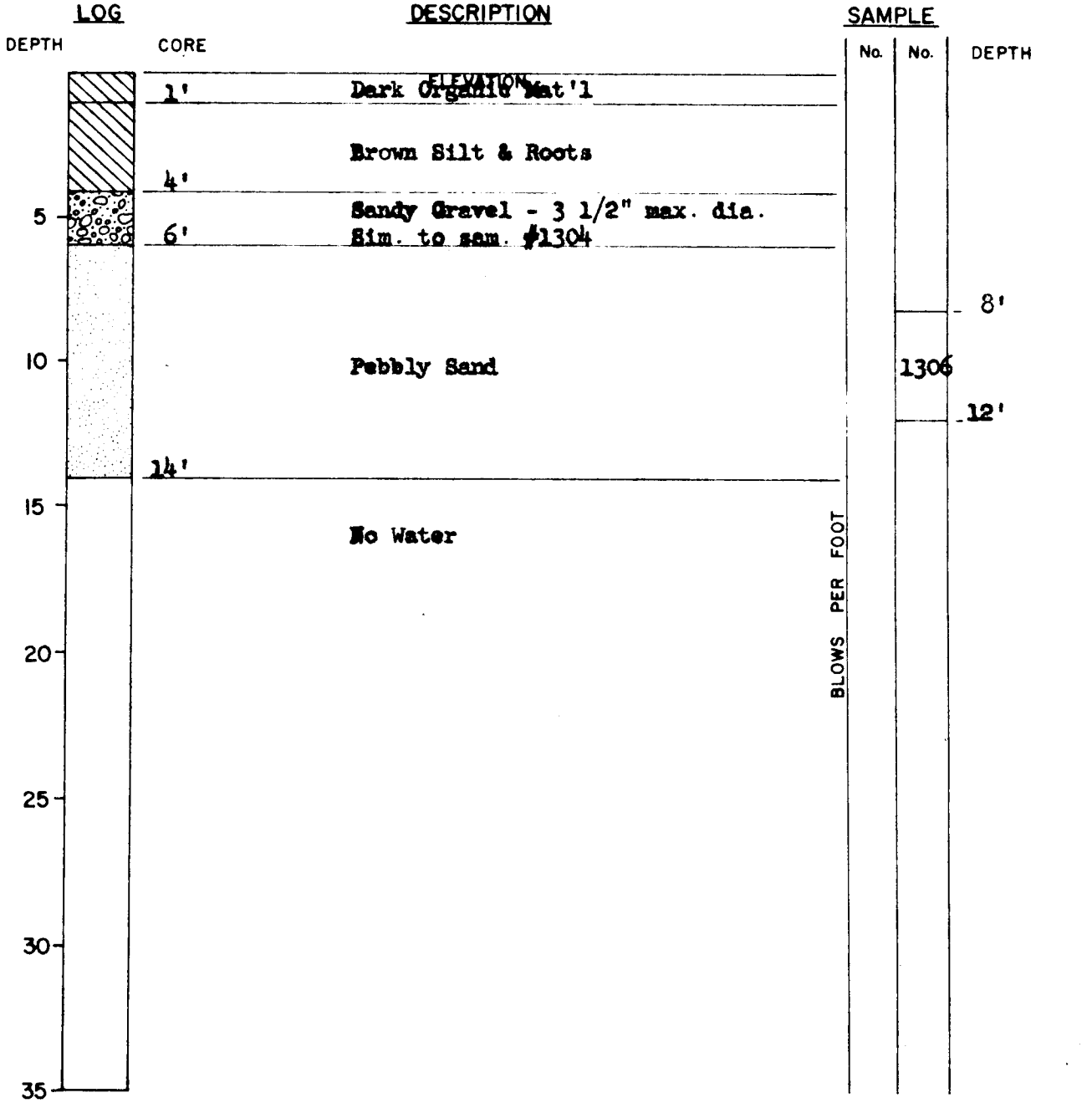
STATE OF ALASKA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

MATERIALS SECTION

FIELD BORING LOG

Code 11-009-62

PROJECT No. F-021-1(3) PROJECT Soldotna - Kasilof PREFIX A DATE 2-27-62
PURPOSE borrow T.H. No X-5 STATION PIT PA 224-E
SUBMITTED BY M. K. Weaver LOGGED BY J. J. Brennan EQUIPMENT Backhoe



SYMBOLS:
WATER TABLE
NO RECOVERY
RECOVERY
> CORE

SIGNED Monte K. Weaver
DISTRICT GEOLOGIST

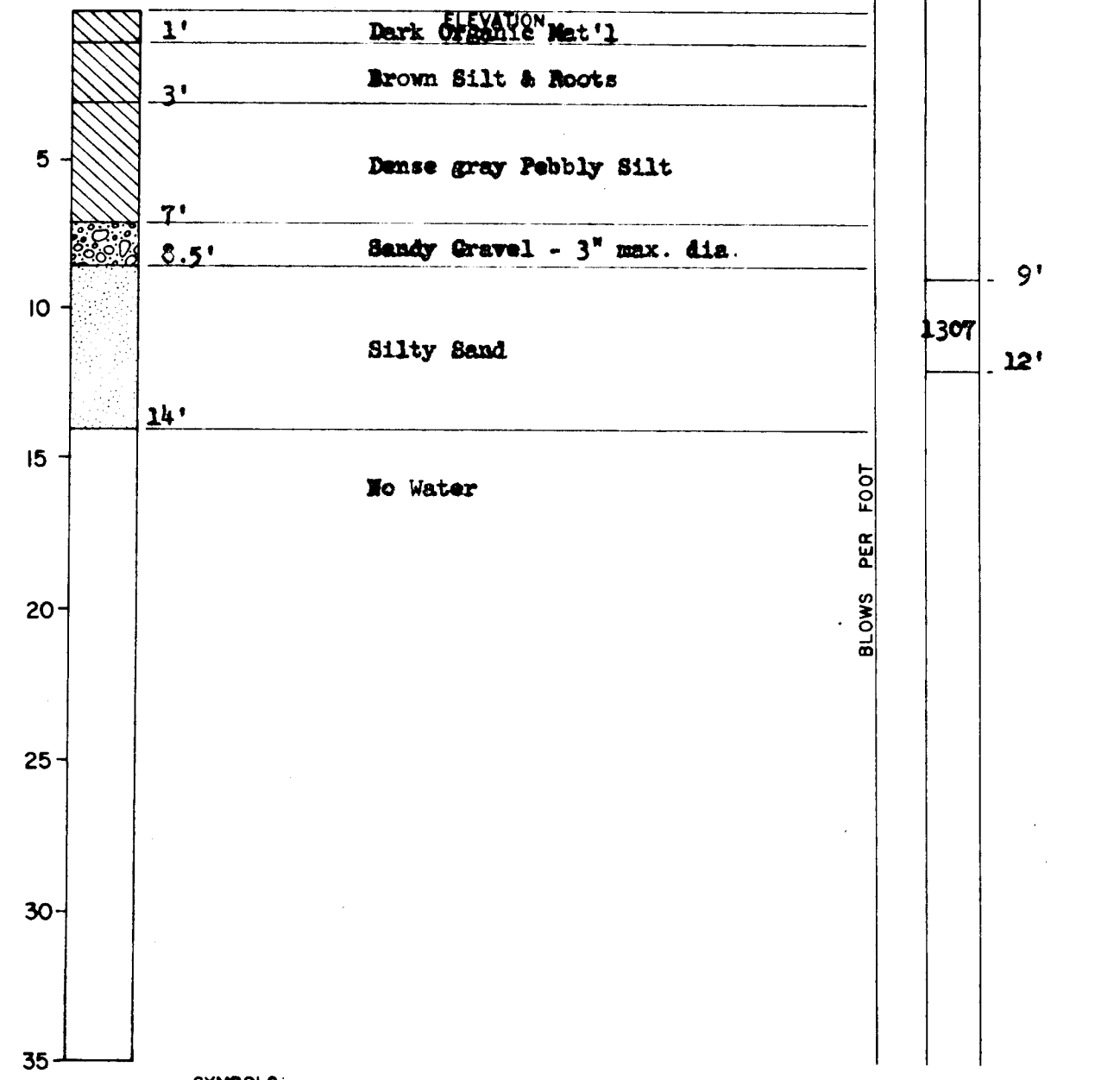
FORM AN-18

STATE OF ALASKA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
MATERIALS SECTION

FIELD BORING LOG

Code 11-009-62

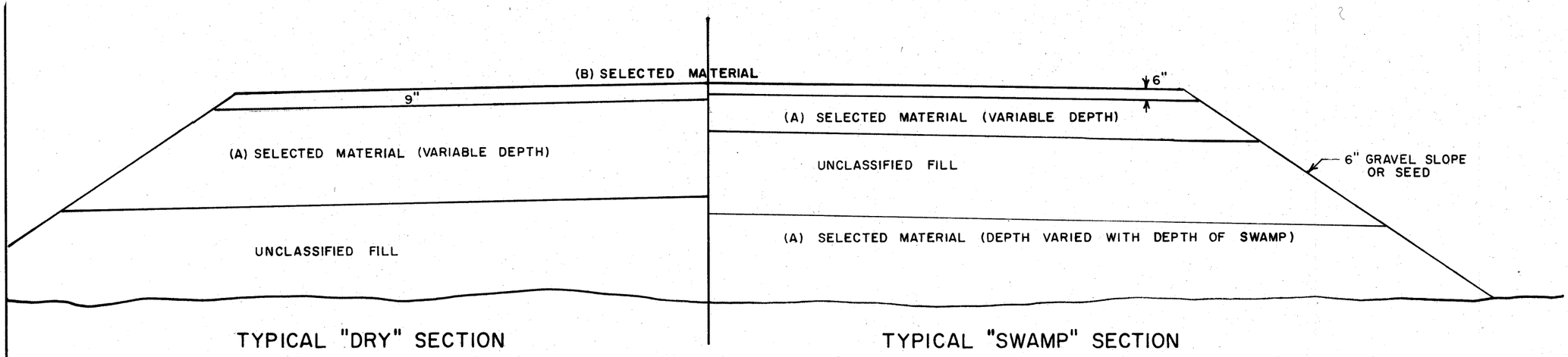
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PURPOSE borrow T.H. No. X-6 STATION PIT PA 224-E
SUBMITTED BY M K. Weaver LOGGED BY J. J. Brennan EQUIPMENT Backhoe



SYMBOLS:
WATER TABLE
NO RECOVERY
RECOVERY
> CORE

SIGNED Wm K. Weaver
DISTRICT GEOLOGIST

RECOMMENDED TYPICAL SECTIONS



TYPICAL "DRY" SECTION

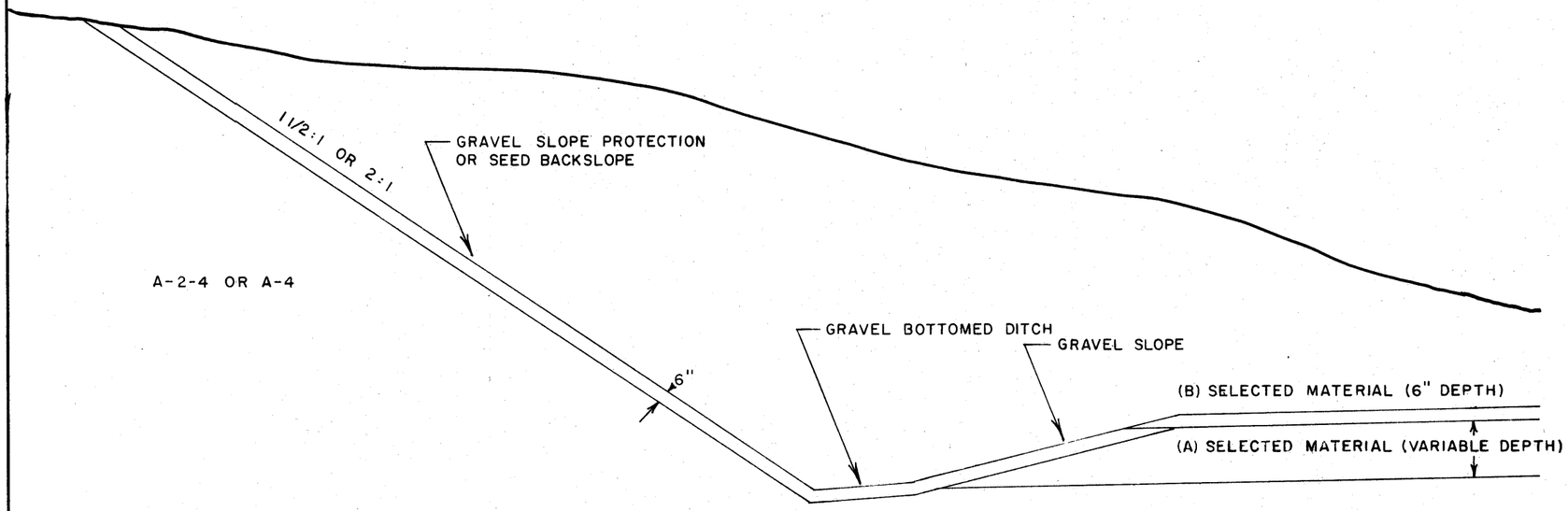
TYPICAL "SWAMP" SECTION

VARIABLE THICKNESS FOR (A) SELECTED MATERIAL

1. 14" A-3 OVER A-2-4
2. 21" A-3 OVER A-4 (WILL HEAVE)
3. 56" A-3 OVER A-4 (WILL NOT HEAVE)

(A) SELECTED MATERIAL SHALL HAVE LESS THAN 10% PASSING THE NO. 200 & 10" MAX. PARTICLE SIZE.

(B) SELECTED MATERIAL = A-1-a WITH LESS THAN 8% PASSING THE NO. 200.

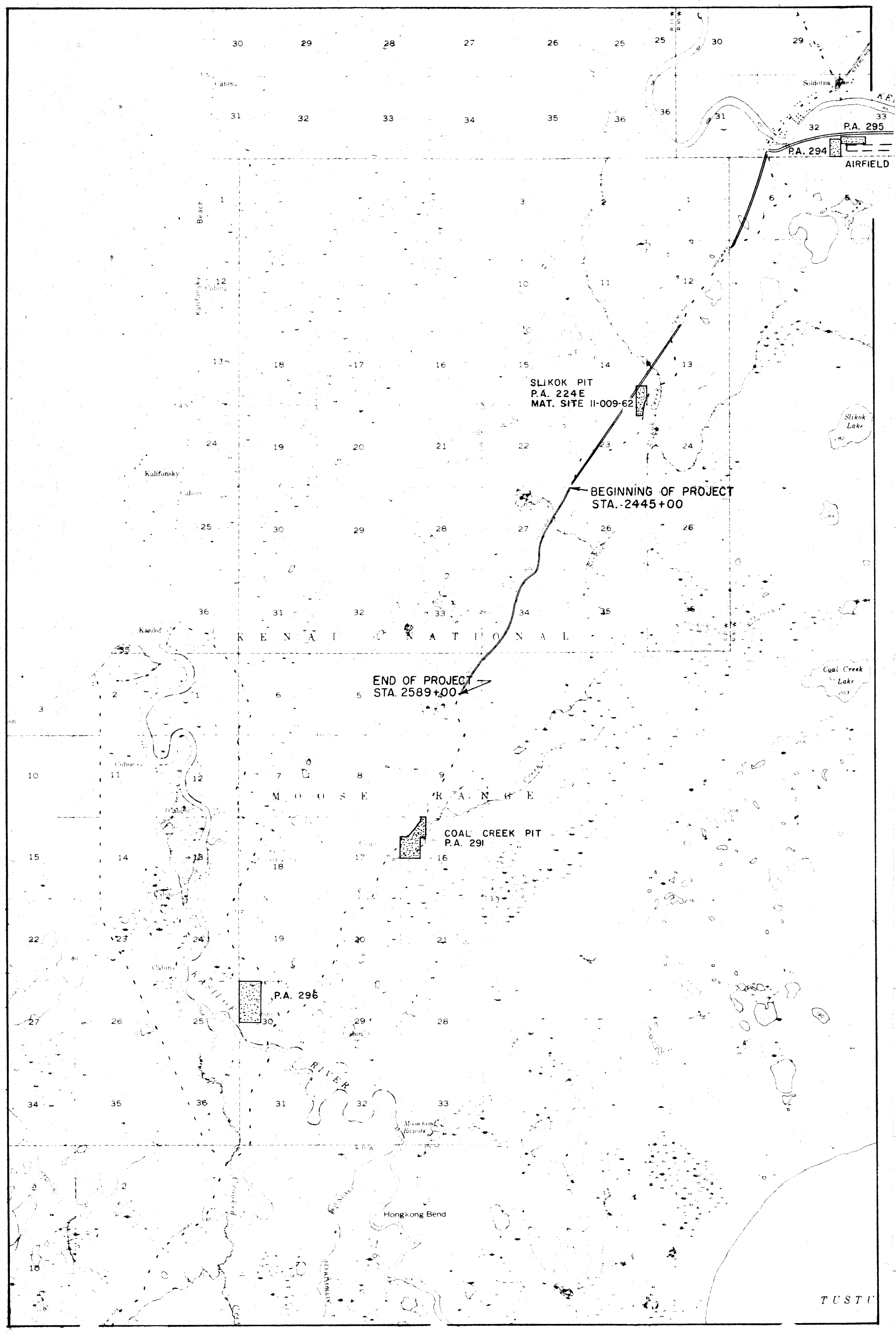


TYPICAL "CUT" SECTION

STATE OF ALASKA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
MATERIALS SECTION

—RECOMMENDED TYPICAL SECTIONS—

PROJECT SOLDOTNA – KASILOF
PROJECT NO. F-021-1(3) DISTRICT A
DATE OF DRAWING 3-28-62
DRAWN KL DATUM MKW
APPROVED MKW SHEET 1 OF 1


P.A. 295
P.A. 294
AIRFIELD
SLIKOK PIT
P.A. 224E
MAT. SITE II-009-62
BEGINNING OF PROJECT
STA. 2445+00
END OF PROJECT
STA. 2589+00
COAL CREEK PIT
P.A. 291
P.A. 296
K E N A I
N A T I O N A L
M O O S E
R A N G E
Soldotna
Kalifonsky
Kasilof
Cohoe
Beach
Slikok Lake
Coal Creek Lake
Hongkong Bend
T U S T U