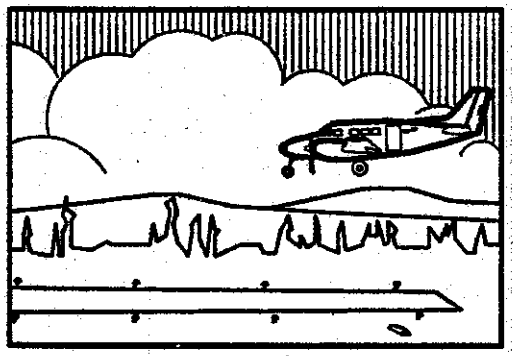
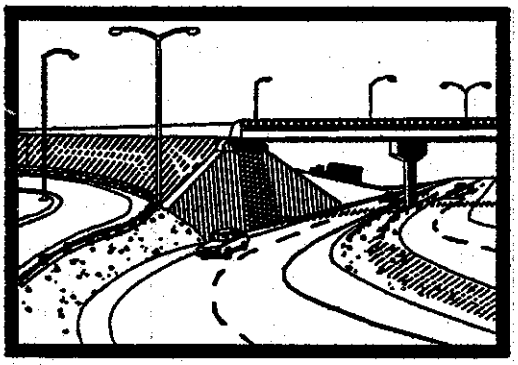
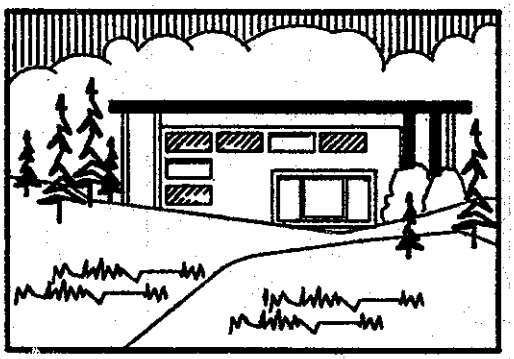
GEOTECHNICAL REPORT

PARKS HIGHWAY
MILE 216 NORTH REHABILITATION

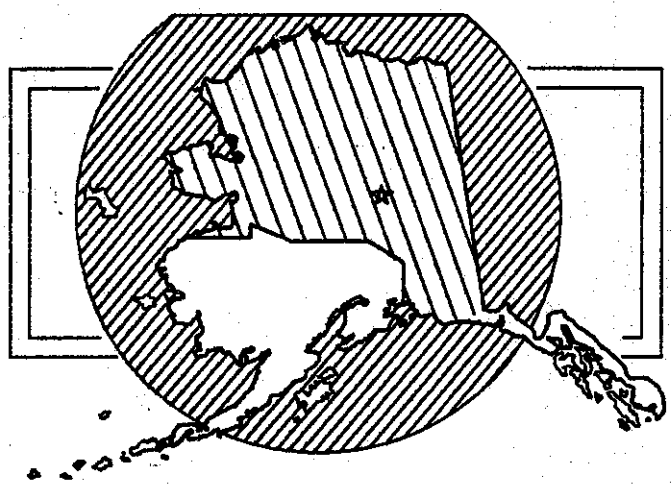
FEDERAL PROJECT NO. I-0A4-3(07)
STATE PROJECT NO. 64924







STATE OF ALASKA
Department of Transportation
and Public Facilities



Prepared By
NORTHERN REGION

ENGINEERING SERVICES
GEOLOGY

JANUARY 1991

GEOTECHNICAL REPORT
PARKS HIGHWAY - MILE 216 NORTH REHABILITATION
FEDERAL PROJECT NO. I-0A4-3(07)
STATE PROJECT NO. 64924
NORTHERN REGION
AUGUST 1991

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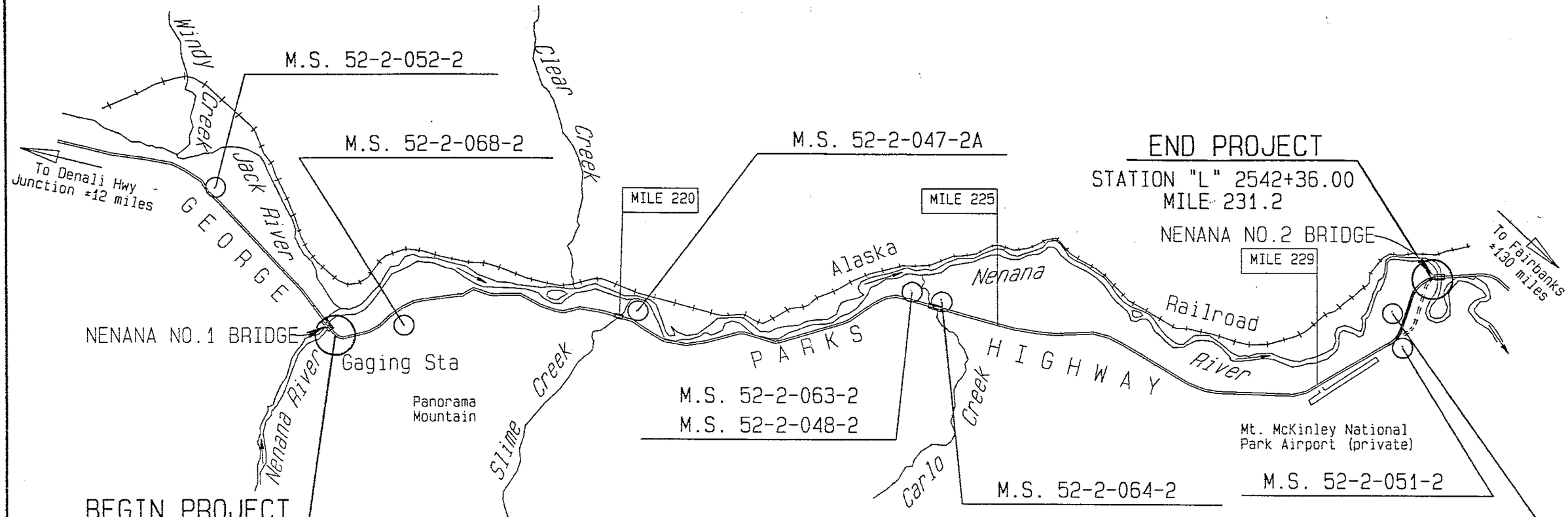
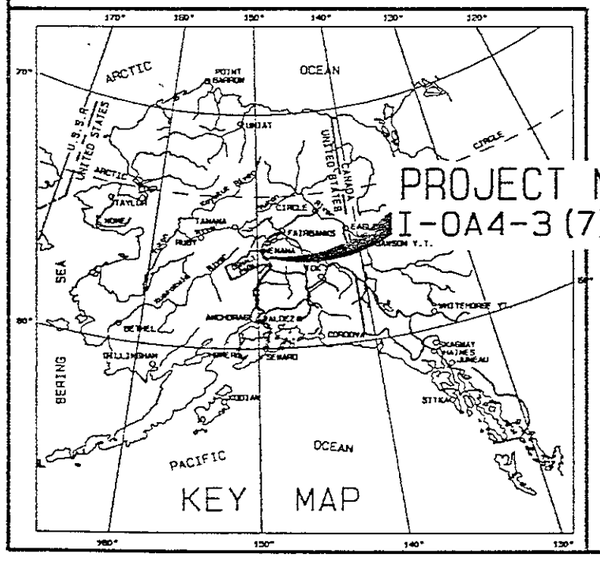




PROJECT No.
I-0A4-3(7)/64924

-1-

STATE OF ALASKA *DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES* *ENGINEERING GEOLOGY UNIT*			
DATA:	G.M.B.	PARKS HIGHWAY MILE 216 NORTH REHABILITATION LOCATION SKETCH	
DRAWN:	G.S.P.		
APPROVED:	H.R.L.	PROJECT NO.:	I-0A4-3(7) 64924
DATE:	07/1991	SCALE:	NOT TO SCALE

GEOTECHNICAL REPORT
PARKS HIGHWAY, MILE 216 NORTH REHABILITATION
FEDERAL PROJECT NO. I-0A4-3(07)
STATE PROJECT NO. 64924
NORTHERN REGION

INTRODUCTION

The Alaska Department of Transportation and Public Facilities (DOT/PF) intends to rehabilitate and resurface the George Parks Highway between Nenana Bridges No. 1 and No. 2. (Mile 215.4 and 231.2).

At the request of D. Sterley, Project Manager, existing geotechnical information on the project was reviewed. It was determined that a modest amount of new field work would be needed on the centerline and in one material site.

This report presents the information obtained from this and several past geotechnical field investigations and makes recommendations for use by the Design Section in the rehabilitation of the highway.

Geotechnical field work, to assure adequate borrow, was done prior to resurfacing project. This work included work in May of 1982 for the McKinley to 4th of July Creek Paving Project, in September and October 1984 for the Nenana South Paving Project and in June 1988 for the Parks Highway Erosion Control Project. Additional work was accomplished in June of 1990 for the current project to investigate locally failed areas and to assure adequate supplies of paving aggregate.

The field work was under the direction of G.Brazo, Engineering Geologist, who located, logged and sampled the test holes and test trenches. A track-mounted Central Mine Equipment (CME) 45B drill and a cat D-5 dozer equipped with a blade and backhoe were used in 1982 and 1984. The D-5 with backhoe was used again in 1988 for trench work. A truck-mounted Mobile B-38 drill was used in 1990. A. Isaacson, T. Johnson, and J. Manthey, Drillers, operated the equipment in 1982 and 1984. J. Nelson assisted Isaacson in 1988 and Manthey assisted in 1990.

The drills were equipped with 6-inch diameter, continuous flight, solid-stem auger. Samples were taken directly from the auger flight, the backhoe bucket or with hand tools and were visually identified by the geologist. In all, 30 centerline samples and 20 material site samples were transported to the Northern Region Materials Laboratory for further analysis and testing.

All of the laboratory test results and the test hole and test trench logs are presented in this report.

LOCATION

The beginning of project (BOP) is south of the Nenana River Bridge No. 1, Mile Post 215.4 miles north of the Denali Highway junction. The end of project (EOP) is at the north end of the Nenana River Bridge No. 2, Mile Post 231. Fairbanks is about 130 road miles north of Nenana Bridge No. 2.

GEOLOGY AND TOPOGRAPHY

The project is situated in the Alaska-Aleutian physiographic province of Alaska and geographically is in the central part of the Alaska Range. Mountains rise to over 5500 feet in elevation in the project area and are commonly composed of highly fractured schist, conglomerate, and basalt. Panorama Mountain, in the project vicinity, is 5778 feet above sea level. The Nenana River (helped in the past by glaciers) has cut through the mountains, flows northerly, and has formed a valley in which the George Parks Highway has been constructed.

The rehabilitation project is generally located on the alluvial flood plain of the Nenana River and is generally underlain by organic material, silt, and sandy gravel. The water table is high and fluctuates with the water level of the river on the south third of the project.

Permafrost is common in the project area.

CLIMATOLOGY

The project is located in the Continental Climatic Zone of Alaska. This zone is characterized by large diurnal and annual temperature variations, by little cloudiness, low humidity, and low precipitation.

The following data from the Environmental Atlas of Alaska, are considered applicable to the project:

Mean Annual Precipitation, inches.....	22
Mean Annual Snowfall, inches.....	75
Mean Annual Temperature, °F.....	24
Thawing Index, degree days.....	2750
Freezing Index, degree days.....	4250
Design Freezing Index (1 yr. in 10), degree days	5800

Weather Bureau records from the McKinley Park recording station for the period 1960-1987 indicate the following average monthly rainfall.

Month	May	June	July	August	September
Inches	0.80	2.47	3.32	2.34	1.39

GENERAL MATERIAL SITES INFORMATION

Seven material sites (MS) were investigated by trenching, drilling and sampling for possible use. All 7 are discussed in this report.

The materials sites on this project in some cases have materials that will not meet the standard specification for degradation.

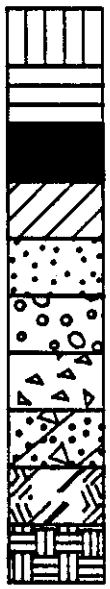
It is recommended that this project allow a specific degradation of 30, for base course to permit the use of on-site borrow materials.

Further, because these materials are degradable, P-200 (% particles passing the No 200 sieve) will be produced in base course materials as a result of handling and manipulation. It is recommended that the crushed aggregate contain a maximum of 4 percent P-200 on the belt and the base course be covered by pavement within 48 hours of placement on the grade.

The material site field investigations performed by DOT&PF personnel were general in nature and sufficient only to determine the overall character of the materials present in each site and to determine whether materials suitable for use on this project are present in the sites.

LOG EXPLANATION

BASIC MATERIAL SYMBOLS



ORGANICS (Org)

CLAY (Cl)

ICE

SILT (Si)

SAND (Sa)

GRAVEL (Gr)

ANGULAR FRAGMENTS (Ang Frags)

COLLUVIUM (Coll) **

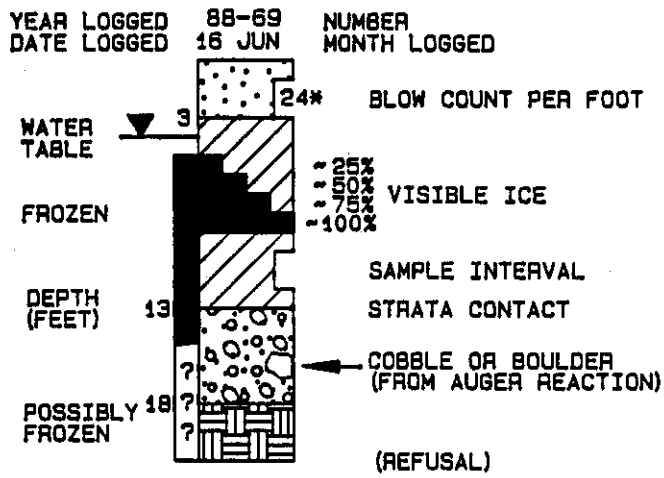
BEDROCK (Bx), soft (type)

BEDROCK (Bx), hard (type)

** MIXTURE OF ROCK FRAGMENTS IN SILT AND SAND MATRIX.

NOTE: SIGNIFICANT MIXTURES ARE SHOWN BY COMBINING SYMBOLS.

TYPICAL LOG



* BLOW COUNT INDICATES SAMPLE TAKEN WITH STANDARD PENETRATION TEST (1.4"I.D., 2.0"O.D. SAMPLER DRIVEN WITH 140 LB. HAMMER, 30" FREE FALL)

SIZE DEFINITIONS

BOULDERS	+10"
COBBLES	3" TO 10"
GRAVEL	#10 TO 3" (ROUNDED)
ANG.FRAGS.	#10 TO 3" (ANGULAR)
SAND	#200 TO #10
SILT	MINUS #200 (P.I.10 OR LESS)
CLAY	MINUS #200 (P.I.>10)

TEST RESULTS

__%-200	= % PASSING #200 SIEVE
N.M._%	= NATURAL MOISTURE
ORG._%	= ORGANIC CONTENT
L.A._	= LOS ANGELES ABRASION
DEG._	= DEGRADATION
P.I._	= PLASTIC INDEX

MISC.

Tr.	= TRACE (0-6%)
sl.	= SLIGHTLY (7-12%)
w/_	= WITH UNSPECIFIED AMOUNT
X'tls	= CRYSTALS

PLAN VIEW SYMBOLS

- POWER AUGER TEST HOLE (T.H.)
- HAND AUGER TEST HOLE (T.H.)
- EXPOSED MATERIAL
- PROBE
- HAND DUG TEST PIT (T.P.)
- BLASTED TEST PIT (T.P.)
- DOZER/BACKHOE TEST TRENCH (T.T.)
- XXXXX WASTE BERM
- BANK
- SWAMP
- TREELINE

COLOR

Bk = BLACK	Or = ORANGE
Bl = BLUE	Rd = RED
Bn = BROWN	Tn = TAN
Gn = GREEN	Wh = WHITE
Gy = GRAY	

MOISTURE

Dry	= < OPTIMUM*
Damp	~ OPTIMUM*
WET	= > OPTIMUM*

* OPTIMUM MOISTURE FOR MAXIMUM DENSITY

FIGURE 2

Table E-1. Classification of Soils and Soil-Aggregate Mixtures (AASHTO, 1986)

General Classification	Granular Materials (35% or less passing 0.075 mm)							Silt-Clay Materials (more than 35% passing 0.075 mm)			
	A-1			*A-2*							*A-7*
Group Classification	*A-1-a*	*A-1-b*	*A-3*	*A-2-4*	*A-2-5*	*A-2-6*	*A-2-7*	*A-4*	*A-5*	*A-6*	*A-7-5, A-7-6*
Sieve analysis: percent passing:											
2.00 mm (No. 10)	50 max.	—	—	—	—	—	—	—	—	—	—
0.425 mm (No. 40)	30 max.	50 max.	51 min.	—	—	—	—	—	—	—	—
0.075 mm (No. 200)	15 max.	25 max.	10 max.	35 max.	35 max.	35 max.	35 max.	36 min.	36 min.	36 min.	36 min.
Characteristics of fraction passing 0.425 mm (No. 40)											
Liquid limit	—		—	40 max.	41 min.	40 max.	41 min.	40 max.	41 min.	40 max.	41 min.
Plasticity index	6 max.		N.P.	10 max.	10 max.	11 min.	11 min.	10 max.	10 max.	11 min.	11 min.[1]
Usual types of significant constituent materials	Stone fragments, gravel, and sand		Fine sand	Silty or clayey gravel and sand				Silty soils		Clayey soils	
General rating as subgrade	Excellent to good							Fair to poor			

[1] Plasticity index of A-7-5 subgroup is equal to or less than LL minus 30. Plasticity index of A-7-6 subgroup is greater than LL minus 30.

FIGURE 3

ALASKA DEPARTMENT OF TRANSPORTATION TEXTURAL SOIL DESCRIPTIONS

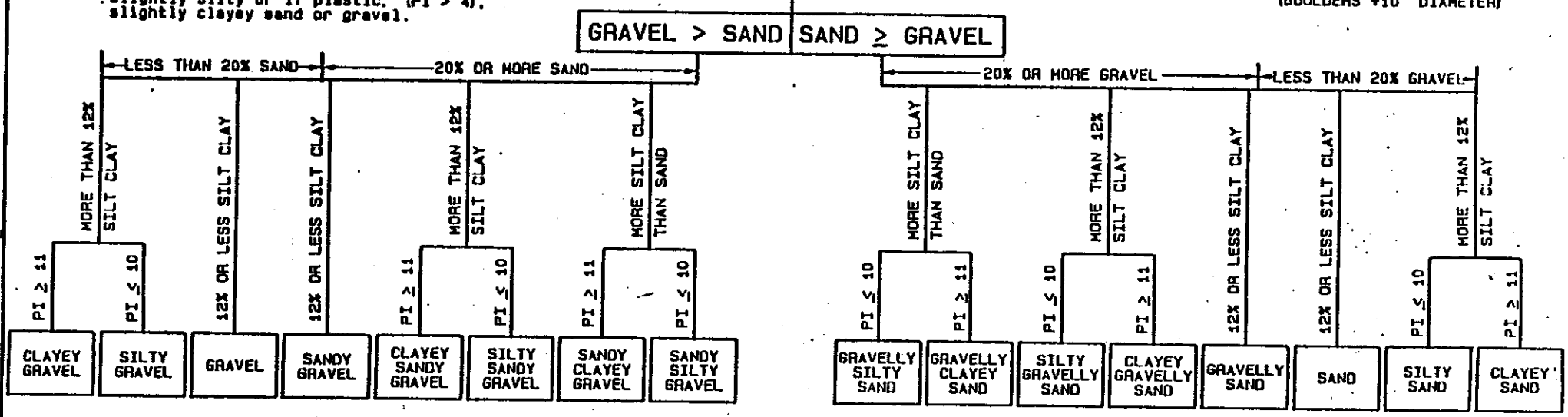
Rev. October 21, 1988

NOTES: 1) All silts with a plastic index > 4 shall be termed "clayey".

2) Sands and gravels with 7% thru 12% silt and/or clay (#200) shall be termed slightly silty or if plastic. (PI > 4), slightly clayey sand or gravel.

(CLAYS < .002 mm)
(SILTS < #200)
(SAND #200 TO #10)
(GRAVEL #10 TO 3" DIAMETER)
(COBBLES 3" TO 10" DIAMETER)
(BOULDERS +10" DIAMETER)

COARSE-GRAINED SOILS
35% OR LESS SILT/CLAY



FINE-GRAINED SOILS
36% OR MORE SILT/CLAY

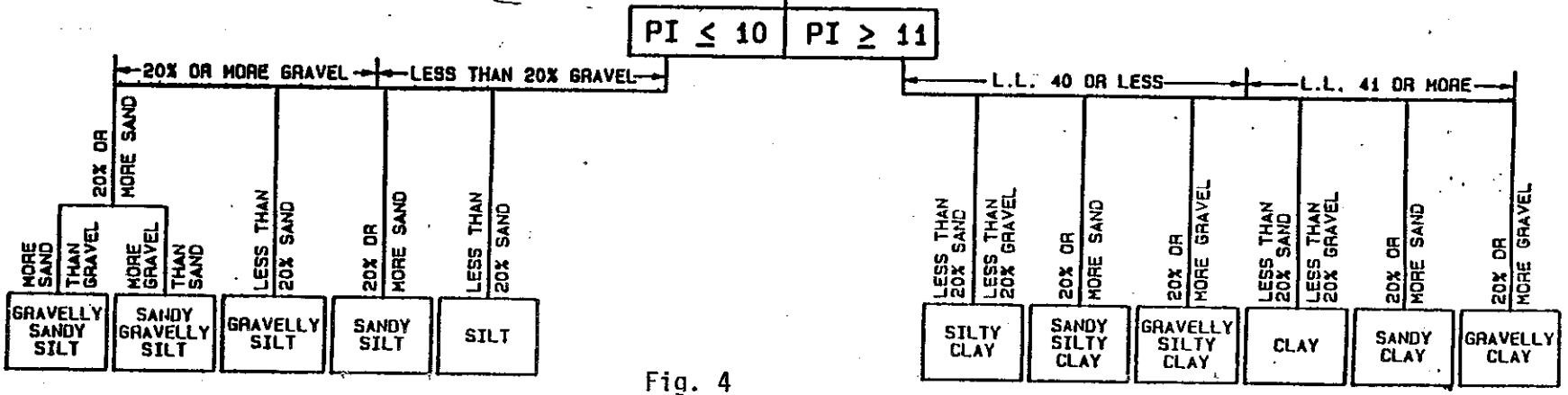


Fig. 4

GENERAL COMMENTS AND RECOMMENDATIONS

COMMENTS

The embankment for this project was built between 1972 and 1974 during the Cantwell to McKinley Park Grading, Drainage and Bridges Project, ALF-037-2(19). Pavement was added in 1974 and 1975 during the Cantwell to Mckinley Park Paving Project, F-037-2(25).

The pavement in this interval has failed prematurely but has given fair performance. The pavement is alligatored and shows rutting in many locations. The alligatoring was observed as early as 1978 north of the Nenana Bridge No. 1. however nearly all of the pavement has remained in place.

Base course and subbase course samples were taken at approximate one mile intervals on this section. See sample results 84-2900 through 84-2929. The P-200 in the base course ranges from 7 to 11 percent while the P-200 in the subbase ranges from 5 to 20 percent. The P-200 in the majority (13 out of 15) of the base course samples was 10 percent or less.The subbase samples with P-200 greater than 15 percent are associated with badly failed pavement areas. These areas were probably adulterated during construction from the underlying silt and require subexcavation to prevent failure of the new pavement.

The alligator cracking has been examined from several aspects and preponderance of opinion is that the asphalt used was too brittle for adequate performance under local climatic conditions.

RECOMMENDATIONS

The majority of the project should be reconditioned.

Areas that require additional work are discussed below.

SELECTED STATION TO STATION DESCRIPTION, COMMENTS AND RECOMMENDATIONS

STATIONS 485+00 TO 491+00

DESCRIPTION

This short interval has noticeable ruts and was patched near Station 488+00. Testholes (TH) showed 2.5 feet of silt beneath the base course. See TH's 84-32 through 84-36.

RECOMMENDED REPAIR

Remove the silt to 3 feet in depth and replace it with Selected Material, Type A or B. The subexcavated material should be used to form screening berms in the borrow sources.

STATIONS 524+00 TO 529+50

DESCRIPTION:

This interval has deep rutting and patching. Test holes showed pavement and base course over 0.6 to 3 feet of sandy embankment gravel over 9 to 13 feet of saturated silt and organic silt and organic silty sandy gravel. The organic materials rest on sandy gravel or rubble. A water table was noted at 2.5 to 5 feet beneath the pavement surface. See TH's 84-37 through 84-42.

RECOMMENDED REPAIR

Excavate the saturated organic materials to at least 13 feet or to coarse granular or rubble material. Dewatering may be necessary. Waste the excavated materials. Fill the excavation with Selected Material, Type A. The sandy gravel in the present embankment could be used for Selected Material, Type B.

As an alternative, raise the grade to provide a minimum of 4 feet of embankment over the saturated silt. Place 2 inches of board insulation 3 feet beneath the surface to reduce seasonal frost heaving.

STATIONS 2106+00 TO 2108+00

DESCRIPTION

This short section is badly rutted and patched. Test holes showed a pavement and base course over 2 feet of sandy gravel embankment over 8 feet of organic silt. The organic material was saturated to 7.5 feet below the asphalt and was frozen from 7.5 to 10 feet in depth where frozen sandy gravel was found. See TH's 84-45 through 84-47.

RECOMMENDED REPAIR

Excavate both the saturated and frozen organic silt to at least 10 feet in depth or to coarse granular material. Dewatering may be necessary. Fill the excavation with Selected Material, Type A or B. The sandy gravel in the present embankment meets the requirements of Selected Material, Type B.

As an alternative, raise the grade to provide at least 4 feet of embankment over the silt. Place 2 inches of board insulation 3 feet beneath the surface to reduce seasonal frost heaving.

STATION 2340+80

DESCRIPTION

A seasonal frost heave occurs every winter in this short (less than 50 feet long) interval. Test holes showed a total of 2 feet of pavement, base course and sandy gravel fill resting on 1 foot of silt overlying over sandy gravel. The silt and underlying sandy gravel were frozen. The silt layer did not extend more than 30 feet either way from the center of the bump and patch. Apparently there is sufficient moisture in the silt to cause seasonal frost heaving of the entire embankment. See TH's 90-4 and 90-7 at Station 2340+00..

RECOMMENDED REPAIR

Subexcavate to 4 feet or to the underlying sand and gravel from 2340+55 to 2341+05. Fill the excavation with Selected Material, Type A or B.

STATION 2385+00

DESCRIPTION

A seasonal frost heave occurs here, too. Fifty to sixty linear feet of patch and chips have been placed on the highway surface. A test hole showed about 4 inches of asphalt and 5 inches of base over about 2 feet of silty sandy gravel fill. This fill rests on sandy gravel at about 3 feet beneath the road surface. Frozen soils began 2 feet beneath the surface. The silty sandy gravel apparently contains sufficient silt and moisture to cause seasonal frost heaving of the entire embankment. See TH 90-5.

RECOMMENDED REPAIR

Excavate the silty sandy gravel between Station 2384+70 and Station 2385+30 about 3 feet to the underlying sandy gravel. Replace those soils with Selected Material, Type A or B. Use the excavated material to construct screening berms in the borrow sources.

STATION 2426+00

DESCRIPTION

This very short (ten foot long) section is another seasonal frost heave. A test hole showed a total of 1 foot of asphalt, base and sandy gravel fill over about 1.5 feet of sandy silt resting on frozen sandy gravel. Again the silty soil beneath the cleaner embankment materials seems to be the culprit causing the seasonal frost heave. See TH 90-6.

RECOMMENDED REPAIR

Excavate the sandy silt to sandy gravel at approximately 2.5 feet beneath the road surface between Stations 2425+90 and 2426+10. Replace the sandy silt with Selected Material, Type A or B.

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SOILS TESTING REPORT

PROJECT NAME:		PARKS HIGHWAY, 216 NORTH REHABILITATION						
PROJECT NUMBER:		I-OA4-3(07)/64924						
SOURCE:		Centerline						
SAMPLED BY:		G.Brazo						
TEST HOLE NO.		84-28	84-30	84-30	84-31	84-31	84-32	
DEPTH (FEET)		0-0.5	0-0.5	0.5-2	0-0.5	0.5-2	0-0.5	
STATION (LOCATION)		340+00	381+75	381+75	435+00	435+00	488+00	
OFFSET (FEET)		Rt.6	Lt.8	Lt.8	Rt.6	Rt.6	Rt.9	
LAB NO.		84-2900	84-2901	84-2902	84-2903	84-2904	84-2905	
DATE SAMPLED		9-27-84	9-27-84	9-27-84	9-27-84	9-27-84	9-27-84	
OVERSIZE	+3"							
PERCENT PASSING	3"							
	2"			100		100		
	1"	100	100	98	100	98	100	
Gravel	3/4"	99	98	96	97	95	99	
	1/2"	92	89	89	85	89	91	
	3/8"	82	81	82	76	79	83	
	#4	60	63	62	58	53	63	
	#10	45	49	46	42	34	47	
Sand	#40	19	23	24	21	19	25	
	#50							
	#100	11	13	17	12	13	16	
Silt - Clay	#200	7	9	12	8	10	11	
Clay Size	02mm							
	.005mm							
LIQUID LIMIT		NV	NV	NV	NV	NV	NV	
PLASTIC INDEX		NP	NP	NP	NP	NP	NP	
CLASSIFICATION		A-1-a	A-1-a	A-1-a	A-1-a	A-1-a	A-1-a	
SOIL DESCRIPTION		Base	Base	Subbase	Base	Subbase	Base	
NATURAL MOISTURE		2.4	3.7	3.9	3.4	2.6	3.2	
SP.GR. (FINE)								
SP.GR. (COARSE)								
MAX DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRADATION FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)					-			
ORGANICS								
PAVEMENT CONDITION:		Patched Rutted	Patched Rutted	Patched Rutted	Alligatored Patched	Alligatored Patched	Patched Rutted	

REMARKS: 01P216

* - Gradation is based on material passing the 3 inch sieve, according to Alaska Test Method T-7.

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SOILS TESTING REPORT

PROJECT NAME:	PARKS HIGHWAY, 216 NORTH REHABILITATION							
PROJECT NUMBER:	I-OA4-3(07)/64924							
SOURCE:	Centerline							
SAMPLED BY:	G.Brazo							
TEST HOLE NO.		84-32	84-34	84-37	84-37	84-43	84-43	
DEPTH (FEET)		0.5-2	2-3.5	0-0.5	2-3	0-.5	0.5-2	
STATION (LOCATION)		488+00	486+00	527+90	527+90	2005+00	2005+00	
OFFSET (FEET)		Rt.9	Rt.6	Rt.6	Rt.6	Rt.6	Rt.6	
LAB NO.		84-2906	84-2907	84-2908	84-2909	84-2910	84-2911	
DATE SAMPLED		9-27-84	9-27-84	9-27-84	9-27-84	9-28-84	9-28-84	
OVERSIZE	+3"							
PERCENT PASSING	3"							
	2"		100		100		100	
	1"	100	89	100	80	100	92	
Gravel	3/4"	98	76	99	75	98	84	
	1/2"	97	54	91	67	86	68	
	3/8"	94	38	83	64	75	57	
	#4	89	24	63	57	56	41	
	#10	84	20	47	48	41	30	
Sand	#40	76	16	21	39	21	18	
	#50							
	#100	68	13	11	31	13	11	
Silt - Clay	#200	59	10	8	25	10	8	
Clay Size	02mm							
	.005mm							
LIQUID LIMIT		NV	NV	NV	NV	NV	NV	
PLASTIC INDEX		NP	NP	NP	NP	NP	NP	
CLASSIFICATION		A-4(0)	A-1-a	A-1-a	A-1-b	A-1-a	A-1-a	
SOIL DESCRIPTION		Subbase	Colluv.	Base	Colluv.	Base	Subbase	
NATURAL MOISTURE		30.0	6.6	2.7	19.0	3.3	3.3	
SP.GR. (FINE)								
SP.GR. (COARSE)								
MAX DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRADATION FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
ORGANICS			7.5		9.8			
PAVEMENT CONDITION		Patched Rutted	Sagged Alligatored	Patched Rutted	Patched Rutted	Alligatored	Alligatored	

REMARKS:

* - Gradation is based on material passing the 3 inch sieve, according to Alaska Test Method T-7.

02P216

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SOILS TESTING REPORT

PROJECT NAME:		PARKS HIGHWAY, 216 NORTH REHABILITATION						
PROJECT NUMBER:		I-OA4-3(07)/64924						
SOURCE:		Centerline						
SAMPLED BY:		G.Brazo						
TEST HOLE NO.		84-44	84-44	84-45	84-45	84-48	84-48	
DEPTH (FEET)		0-0.5	0.5-2	0-0.5	0.5-2	0-0.5	0.5-2	
STATION (LOCATION)		2058+00	2058+00	2067+75	2067+75	2156+00	2156+00	
OFFSET (FEET)		Rt.9	Rt.9	Rt.7	Rt.7	Rt.8	Rt.8	
LAB NO.		84-2912	84-2913	84-2914	84-2915	84-2916	84-2917	
DATE SAMPLED		9-28-84	9-28-84	9-28-84	9-28-84	9-28-84	9-28-84	
OVERSIZE	+3"							
PERCENT PASSING	3"							
	2"		100		100		100	
	1"	100	92	100	97	100	93	
Gravel	3/4"	98	86	99	93	99	88	
	1/2"	85	73	91	82	92	79	
	3/8"	75	65	82	71	84	72	
	#4	56	47	64	51	65	58	
	#10	40	32	42	38	48	41	
Sand	#40	19	16	24	24	24	21	
	#50							
	#100	11	9	14	17	14	14	
Silt - Clay	#200	8	7	10	14	10	11	
Clay Size	02mm							
	.005mm							
LIQUID LIMIT		NV	NV	NV	18	NV	NV	
PLASTIC INDEX		NP	NP	NP	2	NP	NP	
CLASSIFICATION		A-1-a	A-1-a	A-1-a	A-1-b	A-1-a	A-1-a	
SOIL DESCRIPTION		Base	Subbase	Base	Subbase	Base	Subbase	
NATURAL MOISTURE		2.5	2.1	3.7	3.5	2.7	5.0	
SP.GR. (FINE)								
SP.GR. (COARSE)								
MAX DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRADATION FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
ORGANICS								
PAVEMENT CONDITION		Alligatored Rutted	Alligatored Rutted	Patched Rutted	Patched Rutted	Alligatored Rutted	Alligatored Rutted	

REMARKS:

03P216

* - Gradation is based on material passing the 3 inch sieve, according to Alaska Test Method T-7.

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SOILS TESTING REPORT

PROJECT NAME:		PARKS HIGHWAY, 216 NORTH REHABILITATION						
PROJECT NUMBER:		I-OA4-3(07)/64924						
SOURCE:		Centerline						
SAMPLED BY:		G.Brazo						
TEST HOLE NO.		84-49	84-49	84-50	84-50	84-51	84-51	
DEPTH (FEET)		0-0.5	0.5-2	0-0.5	0.5-2	0-0.5	0.5-2	
STATION (LOCATION)		2208+00	2208+00	2261+00	2261+00	2315+00	2315+00	
OFFSET (FEET)		Rt.6	Rt.6	Rt.6	Rt.6	Rt.9	Rt.9	
LAB NO.		84-2918	84-2919	84-2920	84-2921	84-2922	84-2923	
DATE SAMPLED		10-1-84	10-1-84	10-1-84	10-1-84	10-1-84	10-1-84	
OVERSIZE	+3"							
PERCENT PASSING	3"		100					
	2"		93		100		100	
	1"	100	73	100	96		99	
Gravel	3/4"	98	65	99	91	100	97	
	1/2"	90	51	91	83	93	91	
	3/8"	80	42	78	74	84	83	
	#4	60	26	56	54	63	69	
	#10	44	17	39	45	46	57	
Sand	#40	20	9	20	23	23	39	
	#50							
	#100	12	5	12	16	14	27	
Silt - Clay	#200	9	4	9	12	11	21	
Clay Size	02mm							
	.005mm							
LIQUID LIMIT		NV	NV	NV	NV	NV	NV	
PLASTIC INDEX		NP	NP	NP	NP	NP	NP	
CLASSIFICATION		A-1-a	A-1-a	A-1-a	A-1-a	A-1-a	A-1-b	
SOIL DESCRIPTION		Base	Subbase	Base	Subbase	Base	Subbase	
NATURAL MOISTURE		2.4	2.1	3.2	4.1	2.7	4.0	
SP.GR. (FINE)								
SP.GR. (COARSE)								
MAX DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRADATION FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
ORGANICS								
PAVEMENT CONDITION		Alligatored Rutted	Alligatored Rutted	Alligatored Rutted	Alligatored Rutted	Alligatored Rutted	Alligatored Rutted	

REMARKS:

04P216

* - Gradation is based on material passing the 3 inch sieve, according to Alaska Test Method T-7.

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SOILS TESTING REPORT

PROJECT NAME:	PARKS HIGHWAY, 216 NORTH REHABILITATION							
PROJECT NUMBER:	I-OA4-3(07)/64924							
SOURCE:	Centerline							
SAMPLED BY:	G.Brazo							
TEST HOLE NO.		84-52	84-52	84-53	84-53	84-54		
DEPTH (FEET)		0-0.5	0.5-2	0-0.5	0.5-2	0-0.5		
STATION (LOCATION)		2368+00	2368+00	2421+00	2421+00	2521+00		
OFFSET (FEET)		Rt.9	Rt.9	Rt.8	Rt.8	Rt.8		
LAB NO.		84-2924	84-2925	84-2926	84-2927	84-2928		
DATE SAMPLED		10-1-84	10-1-84	10-1-84	10-1-84	10-1-84		
OVERSIZE	+3"							
PERCENT PASSING	3"				100			
	2"		100		98			
	1"	100	91	100	78	100		
Gravel	3/4"	98	86	99	72	98		
	1/2"	89	77	89	61	88		
	3/8"	78	69	77	53	78		
	#4	57	57	54	41	57		
	#10	39	46	38	30	42		
Sand	#40	18	32	19	16	20		
	#50							
	#100	11	25	11	10	11		
Silt - Clay	#200	8	22	9	7	9		
Clay Size	02mm							
	.005mm							
LIQUID LIMIT		NV	NV	NV	NV	NV		
PLASTIC INDEX		NP	NP	NP	NP	NP		
CLASSIFICATION		A-1-a	A-1-b	A-1-a	A-1-b	A-1-a		
SOIL DESCRIPTION		Base	SiSaGr	Base	sl.SiSaGr	Base		
NATURAL MOISTURE		2.6	8.2	2.5	3.8	2.2		
SP.GR. (FINE)								
SP.GR. (COARSE)								
MAX DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRADATION FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
ORGANICS								
PAVEMENT CONDITION		Alligatored Rutted	Alligatored Rutted	Alligatored Rutted	Alligatored Rutted	Alligatored Rutted		

REMARKS: 05P216

* - Gradation is based on material passing the 3 inch sieve, according to Alaska Test Method T-7.

STA. 340+00
Right 6
84-28
27 SEP

Depth marks: 5.5-, 8-

84-28

0.0 - 0.8	5" ASPHALT over base SAMPLE 84-2900 N.M. 2.4%
0.8 - 5.5	Broken BASALT (fill), damp
5.5 - 8.0	Gy Gr Si SAND, wet

STA. 356+00
Right 8
84-29
27 SEP

Depth marks: 0.7-, 12-, 16-, 19-, 22-, 23-

84-28

0.0 - 0.7	4" ASPHALT over base
0.7 -16.0	Broken BASALT (fill)
16.0 -19.0	Gy Gr Si SAND Organics 16.0-16.5
19.0 -22.0	Bn Sa GRAVEL, wet
22.0 -23.0	Gy Si Sa GRAVEL, wet

STA. 381+75
Left 8
84-30
27 SEP

Depth marks: 4-3-, 9-, 13-

84-30

0.0 - 0.5	2" ASPHALT over base SAMPLE 84-2901 (0.0-0.5) A-1-a, 9%-200 N.M. 3.7%
0.5 - 3.0	Bn Broken BASALT (fill), damp SAMPLE 84-2902 (0.5-2.0) A-1-a, 12%-200 N.M. 3.9%
3.0 - 4.0	Bn SILT, wet w/roots to 3.5
4.0 - 9.0	Bn Org COLLUVIUM, WET
9.0 -13.0	RUBBLE or TALUS, wet

STA. 435+00
Right 6
84-31
27 SEP

Depth marks: 2.5-

84-31

0.0 - 0.5	1-1/2" ASPHALT over base SAMPLE 84-2903 (0.0-0.5) A-1-a, 8%-200
0.5 - 2.5	Bn Broken BASALT (fill) SAMPLE 84-2904 (0.5-2.0) A-1-a, 10%-200 N.M. 2.6%

STA. 488+00
Right 9
84-32
28 SEP

Depth marks: 2.0-, 3.5-, 5.5-, 8.0-

84-32

0.0 - 0.5	1-1/2" ASPHALT over base SAMPLE 84-2905 (0.0-0.5) A-1-a, 11%-200 N.M. 3.2%
0.5 - 2.0	Bn Sa SILT (fill) SAMPLE 84-2906 (0.5-2.0) A-4(0), 59%-200 N.M. 30.0%
2.0 - 3.5	Bn Sa Gr SILT (fill), wet
3.5 - 5.5	Bn Sa SILT, wet
5.5 - 8.0	Bn COLLUVIUM, wet

STA. 487+00
Right 6
84-33
28 SEP

Depth marks: 1.5-, 3.0-, 5.0-, 7.5-

84-33

0.0 - 0.5	1-1/2" ASPHALT over base
0.5 - 1.5	Bn SILT (fill), damp Tr. Gr
1.5 - 3.0	Bn Sa SILT (fill), wet
3.0 - 5.0	Bn COLLUVIUM, wet
5.0 - 7.5	Bn Si Sa GRAVEL, wet

STA. 485+00
Right 6
84-34
28 SEP

Depth marks: 1.5-, 3.5-, 5.0-

84-34

0.0 - 0.5	1-1/2" ASPHALT over base
0.5 - 1.0	Bn Sa GRAVEL (fill), damp
1.0 - 1.5	Bn SILT, damp
1.5 - 3.5	Bn COLLUVIUM, wet SAMPLE 84-2907 (2.0-3.5) A-1-a, 10%-200 N.M. 6.6%
3.5 - 5.0	Bn RUBBLE or TALUS

STA. 489+00
Right 6
84-35
28 SEP

Depth marks: 1.0-, 4.5-, 8.0-

84-35

0.0 - 0.5	1-1/2" ASPHALT over base
0.5 - 1.0	Bn Sa GRAVEL, damp
1.0 - 2.5	Bn SILT, damp
2.5 - 4.5	Bn Sa SILT, damp Tr. Gr
4.5 - 8.0	Bn COLLUVIUM, wet

STA. 490+00
Right 6
84-36
28 SEP

Depth marks: 2.0-, 4.0-, 5.0-, 8.0-

84-36

0.0 - 0.5	1-1/2" ASPHALT over base
0.5 - 2.0	Bn Sa GRAVEL (fill), damp
2.0 - 3.5	Bn Gr Sa SILT (fill), wet
3.5 - 4.0	Bn COLLUVIUM, wet
4.0 - 5.0	Bn SILT, wet
5.0 - 8.0	Bn COLLUVIUM

STA. 527+90
Right 6
84-37
28 SEP

Depth marks: 1.5-, 5.0-, 10.5-, 14.0-

84-37

0.0 - 0.9	6" ASPHALT over base SAMPLE 84-2908 (0.0-0.5) A-1-a, 8%-200 N.M. 2.7%
0.9 - 1.5	Bn Sa GRAVEL (fill), damp
1.5 -10.5	Gy Org COLLUVIUM, wet SAMPLE 84-2909 (2.0-3.0) A-1-b, 25%-200 N.M. 19.0%
10.5 -14.0	Bn Org Si RUBBLE, wet

STA. 526+90
Right 6
84-38
28 SEP

Depth marks: 2.5-, 4.0-, 9.0-, 11.0-

84-38

0.0 - 0.5	1-1/2" ASPHALT over base
0.5 - 4.0	Bn Sa GRAVEL (fill), damp to 1.5 wet 1.5 to 2.5
4.0 - 4.1	Org Mat
4.1 - 9.0	Gy Org SILT, wet
9.0 -11.0	Bn RUBBLE, wet

STA. 525+90
Right 6
84-39
28 SEP

Depth marks: 0.5-, 3.0-, 12.5-

84-39

0.0 - 0.5	1-1/2" ASPHALT over base
0.5 - 3.5	Bn Sa GRAVEL (fill), damp
3.5 -12.5	Gy Org SILT, wet
12.5 -13.0	Bn RUBBLE, wet

STA. 524+40
Right 6
84-40
28 SEP

Depth marks: 1.5-, 5.0-, 8.0-, 12.0-

84-40

0.0 - 0.5	1-1/2" ASPHALT over base
0.5 - 1.5	Bn Sa GRAVEL (fill), damp
1.5 - 2.0	Bn SAND (fill), damp
2.0 - 2.5	Bn SILT (fill), wet
2.5 - 3.0	Bn Sa GRAVEL (fill), wet
3.0 - 8.0	Bn SILT, wet
8.0 -11.0	Bn Si SAND, wet
11.0 -12.0	Bn Sa GRAVEL

STA. 528+90
Right 6
84-41
28 SEP

Depth marks: 3.0-, 5.0-, 9.0-, 13.0-

84-41

0.0 - 0.5	1-1/2" ASPHALT over base
0.5 - 3.0	Bn Sa GRAVEL (fill), damp
3.0 - 9.0	Gy Org SILT, wet Tr. Gr 6.0-7.0
9.0 -13.0	Bn Si Gr SAND, wet

STA. 529+90
Right 6
84-42
28 SEP

Depth marks: 0.5-, 5.5-, 8.0-

84-42

0.0 - 0.5	1-1/2" ASPHALT over base
0.5 - 5.5	Bn Sa GRAVEL (fill), damp
5.5 - 7.5	Bn SILT, wet
7.5 - 8.0	Bn Si Gr SAND, wet

STA. 2005+00
Right 6
84-43
28 SEP

Depth marks: 0.5-, 5.0-

84-43

0.0 - 0.5	1-1/2" ASPHALT over base SAMPLE 84-2910 (0.0-0.5) A-1-a, 10%-200 N.M. 3.3%
0.5 - 5.0	Bn sl. Si Sa GRAVEL (fill), damp SAMPLE 84-2911 (0.5-2.0) A-1-a, 6%-200 N.M. 3.3%

STA. 2058+00
Right 9
84-44
28 SEP

Depth marks: 0.5-, 5.0-

84-44

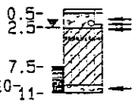
0.0 - 0.5	1-1/2" ASPHALT over base SAMPLE 84-2912 (0.0-0.5) A-1-a, 9%-200 N.M. 2.5%
0.5 - 5.0	Bn sl. Si Sa GRAVEL (fill), damp SAMPLE 84-2913 (0.5-2.0) A-1-a, 7%-200 N.M. 2.1%

Vert 0-10 feet; Horiz. 0-100 feet

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: S.M.B.	PARKS HIGHWAY, 216 NORTH RE-HABILITATION STA. 340+ TO 2058+
DRAWN: G.S.P.	
APPROVED: H.R.L.	PROJECT NO.: I-0A4-3(7)/64924
DATE: JULY 1991	SCALE: AS SHOWN

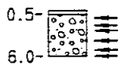
STA. 2106+75
Right 7
84-45
01 OCT



84-45

0.0 - 0.5	2" ASPHALT over base SAMPLE 84-2914 (0.0-0.5) A-1-b, 10%-200 N.M. 3.7%
0.5 - 2.5	Bn Si Sa GRAVEL (fill), damp SAMPLE 84-2915 (0.5-2.0) A-1-b, 14%-200 N.M. 3.5%
2.5 -10.0	Gy Org SILT, wet w/Bn PEAT 3.7-4.0
10.0 -11.0	Bn Sa GRAVEL

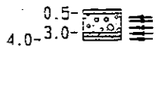
STA. 2103+70
Right 8
84-46
01 OCT



84-46

0.0 - 0.5	1-1/2" ASPHALT over base
0.5 - 6.0	Bn Sa GRAVEL (fill), damp Cobble or Boulder at 6.0

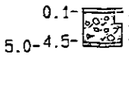
STA. 2109+00
Right 8
84-47
01 OCT



84-47

0.0 - 0.5	1-1/2" ASPHALT over base
0.5 - 3.0	Bn Sa GRAVEL (fill), damp
3.0 - 3.5	Bn Org SILT, damp
3.5 - 4.0	Bn Sa GRAVEL, damp Cobble or Boulder at 4.0

STA. 2156+00
Right 8
84-48
01 OCT

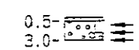


84-48

0.0 - 0.5	1-1/2" ASPHALT over base SAMPLE 84-2916 A-1-a, 10%-200 N.M. 2.7%
0.5 - 4.5	Bn sl. Si Sa GRAVEL (fill), damp SAMPLE 84-2917 (0.5-2.0) A-1-a, 11%-200 N.M. 5.0%
4.5 - 5.0	Bn SILT w/twigs & roots

1984 TESTHOLES

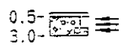
STA. 2208+00
Right 6
84-49
01 OCT



84-49

0.0 - 0.5	1-1/2" ASPHALT over base SAMPLE 84-2918 (0.0-0.5) A-1-a, 9%-200 N.M. 2.4%
0.5 - 3.0	Bn GRAVEL (fill), damp SAMPLE 84-2919 (0.5-2.0) A-1-a, 4%-200 N.M. 2.1%

STA. 2261+00
Right 6
84-50
01 OCT



84-50

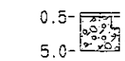
0.0 - 0.5	1-1/2" ASPHALT over base SAMPLE 84-2920 (0.0-0.5) A-1-a, 9%-200 N.M. 3.2%
0.5 - 3.0	Bn sl. Si Sa GRAVEL (fill), damp SAMPLE 84-2921 (0.5-2.0) A-1-a, 12%-200 N.M. 4.1%

STA. 2315+00
Right 9
84-51
01 OCT

84-51

0.0 - 0.6	2-1/2" ASPHALT over base SAMPLE 84-2922 (0.0-0.5) A-1-a, 11%-200 N.M. 2.7%
0.6 - 5.0	Bn Si Sa GRAVEL (fill), damp SAMPLE 84-2923 (0.5-2.0) A-1-b, 21%-200 N.M. 40%

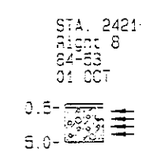
STA. 2368+00
Right 9
84-52
01 OCT



84-52

0.0 - 0.5	1-1/2" ASPHALT over base SAMPLE 84-2924 (0.0-0.5) A-1-a, 8%-200 N.M. 2.6%
0.5 - 5.0	Bn Si Sa GRAVEL, wet SAMPLE 84-2925 (0.5-2.0) A-1-a, 22%-200 N.M. 8.2%

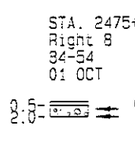
STA. 2421+00
Right 8
84-53
01 OCT



84-53

0.0 - 0.5	1-1/2" ASPHALT over base SAMPLE 84-2926 (0.0-0.5) A-1-a, 9%-200 N.M. 2.5%
0.5 - 5.0	Bn sl. Si Sa GRAVEL (fill), damp SAMPLE 84-2927 (0.5-2.0) A-1-a, 7%-200 N.M. 3.8%

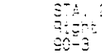
STA. 2475+00
Right 8
84-54
01 OCT



84-54

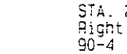
0.0 - 0.5	1-1/2" ASPHALT over base SAMPLE 84-54 (0.0-0.5) A-1-a, 9%-200 N.M. 2.1%
0.5 - 2.0	Bn Sa GRAVEL (fill), damp

STA. 2117+00
Right 6
90-3
5 JUN



0.0 - 0.6	2" ASPHALT over base
0.6 - 4.5	Bn Sa GRAVEL, damp to 2.0, (fill), damp
4.5 - 5.5	Gy Si Sa GRAVEL

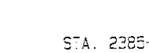
STA. 2340+00
Right 6
90-4
5 JUN



0.0 - 0.8	4" ASPHALT over base
0.8 - 3.0	Bn Sa GRAVEL, damp to 2.0, (fill)
3.0 - 8.5	Bn Sa GRAVEL

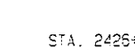
1990 TESTHOLES

STA. 2385+00
Right 7
90-5
5 JUN



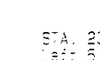
0.0 - 0.8	4" ASPHALT over base
0.8 - 3.0	Bn Si Sa GRAVEL, damp to 2.0 (fill)
3.0 - 9.5	Bn Sa GRAVEL

STA. 2426+00
Right 7
90-6
5 JUN



0.0 - 0.6	1.5" ASPHALT over base
0.6 - 1.0	Bn Sa GRAVEL, damp, (fill)
1.0 - 2.8	Bn Sa SILT, damp, Trc. Gr
2.8 - 5.0	Bn Sa GRAVEL

STA. 2340+00
Left 6
90-7
5 JUN



0.0 - 3.0	3" ASPHALT over base
3.0 - 5.0	Bn Sa GRAVEL, damp, (fill)
5.0 - 8.0	Bn SILT
8.0 - 9.0	Bn Sa GRAVEL

Vert 10- feet 0-
Horiz. 0 feet 100

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: G.M.S.	PARKS HIGHWAY, 216 NORTH REHABILITATION
DRAWN: G.S.P.	STA. 2106+75 TO 2475+00
APPROVED: H.R.L.	PROJECT NO.: F-0AA-3(7)/64924
DATE: JULY 1991	SCALE: AS SHOWN

STATIONS 2525+00 TO 2530+00

DESCRIPTION

This section is the fill just south of Nenana Bridge No. 2 near M.P. 231. A portion of the fill (Station 2527+50) has settled and moved towards the right (north). The right guard rail has settled about 5 feet and has shifted to the right at least 3 feet. The guard rail on the left has settled about 2 feet. A test hole in the failure showed 7.5 feet of wet, sandy gravel fill over 7 feet of wet, silty sandy gravel fill, all resting on frozen organic silt. The stabilizing berm on the right had 9 feet of sandy gravel fill, wet at a depth of 5 feet beneath the surface. The stabilizing berm rests 5 feet of wet organic silt that was frozen at 14 feet beneath the surface.

This sliding or slumping failure is further complicated by a drain in each ditch of the through cut just east (back) of the fill. The drains are designed to carry water away from the contact between outwash gravels and underlying glacial till exposed in the cut. Test holes attempted in the left drain met refusal in the drain rocks. The drains are supposed to carry the water along both sides of the fill and the right drain appears to be doing so. However, considering the wet condition of the fill and stabilizing berm, some of the water must be entering the fill from the left and from the contact source. See Page 24.

RECOMMENDED REPAIRS

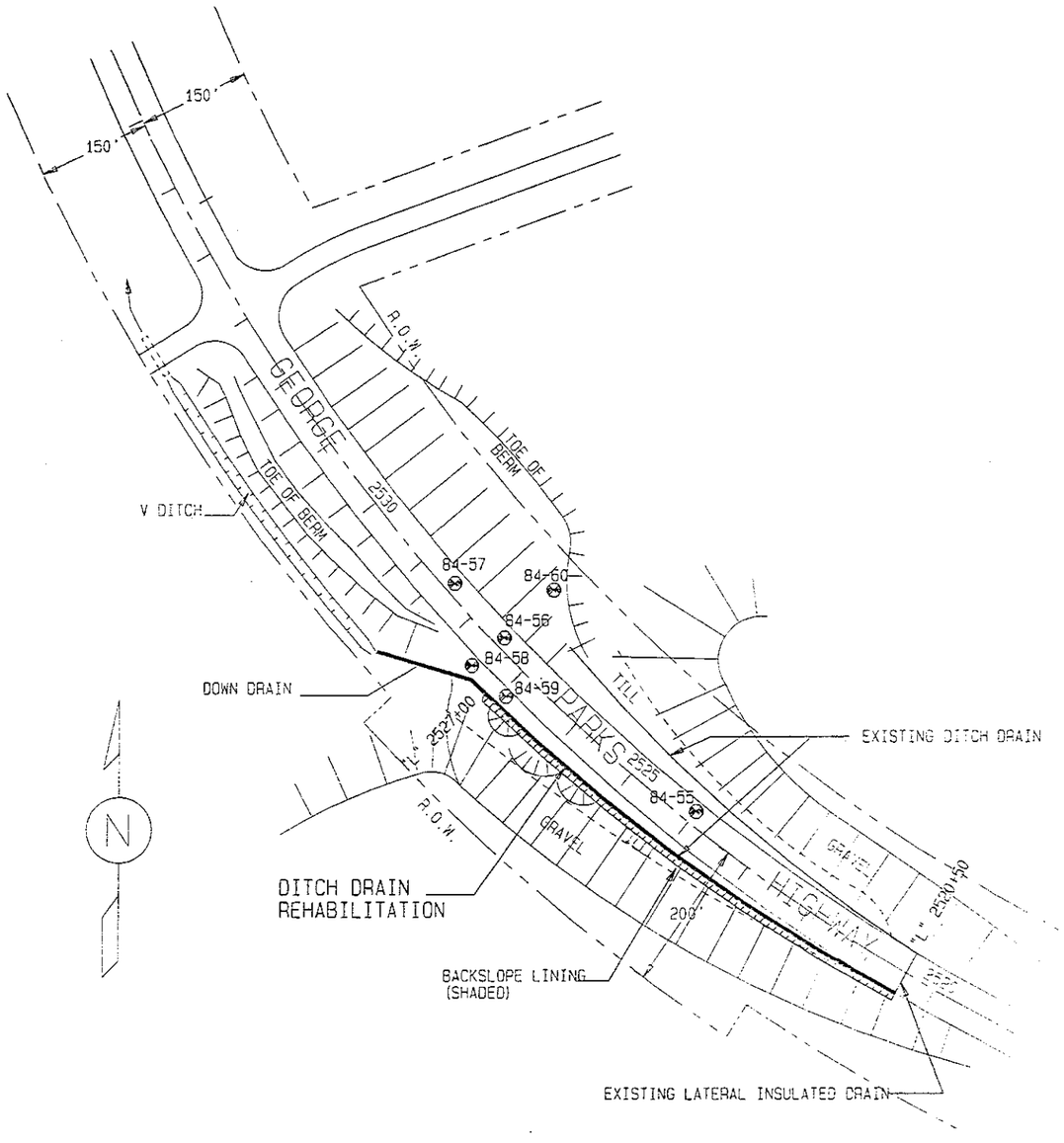
Because the embankment and stabilizing berm are wet there is little chance to perennially freeze these soils. Rehabilitating the left drain will help. This work should include removing the existing drain materials, lining the drain ditch with a filter fabric and placing new drain material. See Page 25 for ditch drain details.

A geosynthetic to help stabilize the embankment is recommended. A single layer of geosynthetic was installed in this fill between Stations 2526+50 and 2530+00 in 1987. The fabric was placed 3 feet beneath the pavement surface and was wrapped on each side. It does not extend the full width of the fill; the guardrails were not removed for the fabric installation. The embankment showed some cracking outside of the geosynthetic in 1990.

Remove the 1987 geosynthetic. Excavate the embankment full width, to 42 inches beneath the final grade between Stations 2525+00 and 2530+00. Replace the excavated soils with Selected Material, Type A or B. In addition, place a high strength, high modulus geosynthetic 1 foot beneath the final grade. This work will require replacing the guardrails.

Additional earth work in this interval should include flattening the right fill slope to 2:1 and increasing the stabilizing berm height to 2/3's of the embankment height. Both will increase the stability of the fill.

PLAN VIEW



84-55
1 OCT

1.5	0.0 - 0.5	ASPHALT over base, damp
4.5	0.5 - 1.5	Bn Sa GRAVEL, damp (fill)
	1.5 - 4.5	Bn Si Sa GRAVEL, damp
		REFUSAL

84-56
1 OCT

	0.0 - 7.5	Bn Sa GRAVEL, damp to 1.0, wet 1.0-7.5 (fill)
7.5	7.5 -15.0	Bn Si Sa GRAVEL, wet (fill)
15	15.0 -15.5	Bn Org SILT

84-57
2 OCT

3	0.0 - 3.0	Bn Sa GRAVEL, damp (fill)
10	3.0 -18.0	Gy Si Sa GRAVEL, damp (fill)
14		
18		

84-58
2 OCT

2	0.0 - 0.5	Gy Si Sa GRAVEL, wet
	0.5 - 2.0	Bn Sa GRAVEL, wet w/cobbles
		Drain Material
		REFUSAL

84-59
2 OCT

1	0.0 - 1.0	Gy Gr SILT, wet
3	1.0 - 3.0	Bn Sa GRAVEL, wet w/cobbles
		Drain Material
		REFUSAL

84-60
2 OCT

1.5	0.0 - 0.1	ORG MAT
5	0.1 - 1.5	Bn Sa GRAVEL, wet
9	1.5 - 9.0	Gy Si Sa GRAVEL, wet
14	9.0 -16.0	Bn Org SILT, wet to 14.0
16		

Vert 10 feet 0 — Horiz. 0 feet 100

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

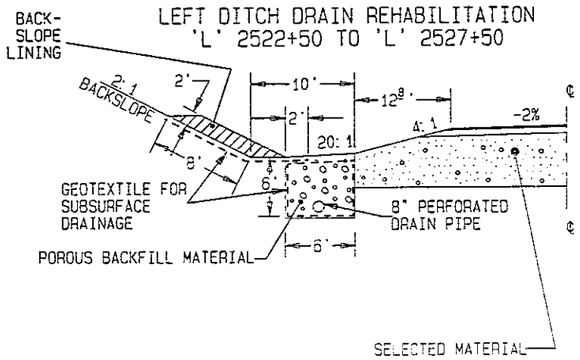
DATA:	G.M.B./H.R.L.	PARKS HIGHWAY, 216 NORTH DRAIN REHABILITATION TEST HOLES	
DRAWN:	G.S.P.		
APPROVED:	H.R.L.	PROJECT NO.:	1-0A4-3(7) /64924
DATE:	07/1991	SCALE:	AS SHOWN

/64924P16

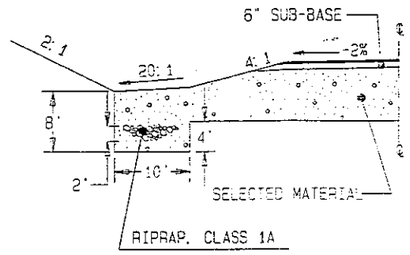
McKINLEY VILLAGE HILL DITCH DRAIN REHABILITATION

DITCH DRAIN

LEFT DITCH DRAIN REHABILITATION
'L' 2522+50 TO 'L' 2527+50



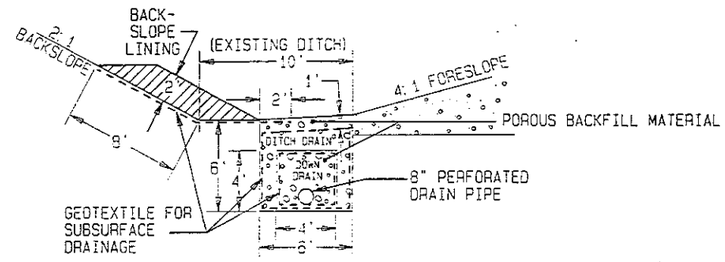
EXISTING LEFT DITCH DRAIN



(ELEVATIONS NOT KNOWN)

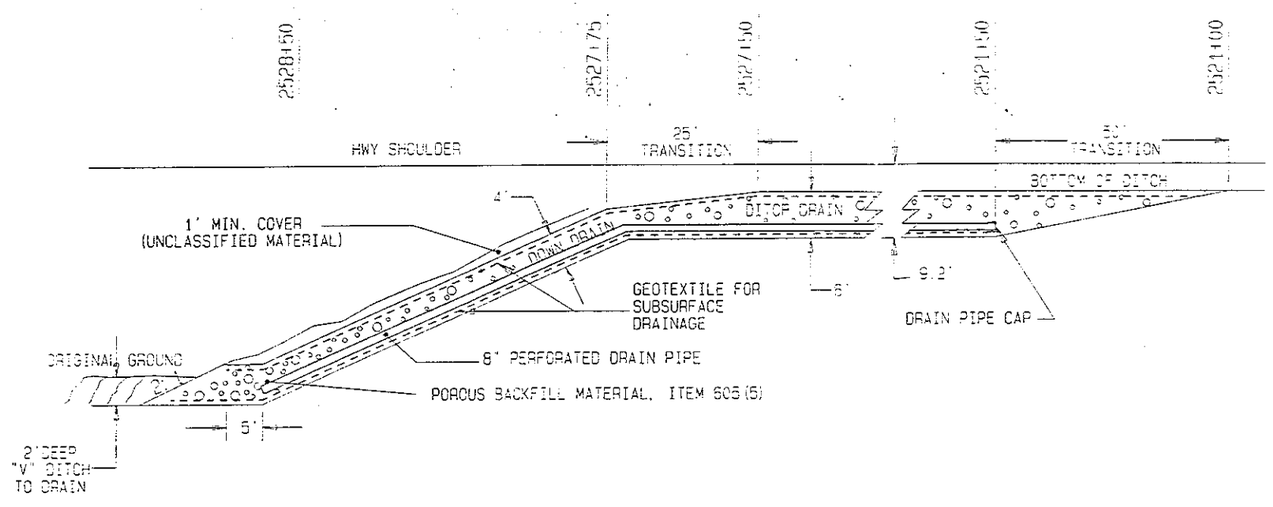
LEFT DITCH DRAIN & DOWN DRAIN DETAIL

LOOKING AHEAD FROM 2527+50



DITCH TO DOWN DRAIN TRANSITIONS

SIDE VIEW



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: G.M.S./H.R.L.	PARKS HIGHWAY, 216 NORTH REHABILITATION DRAINAGE DETAILS
DRAWN: G.S.P.	
APPROVED: H.R.L.	PROJECT NO.: I-0A4-5(7)/64924
DATE: 07/1991	SCALE: NOT TO SCALE

/64924P13

MS 52-2-052-2

LOCATION AND ACCESS

This site is located west of the highway between Stations 165+00 and 173+00 near MP 213 and approximately 3 miles south of the Nenana Bridge No. 1. Access to the site is directly from the highway Right of Way (ROW) on haul roads near Station 166+40 and Station 172+60. The existing excavation is screened by trees in the highway ROW. The site is situated on the floodplain of the Jack River. The river is about a quarter of a mile to the west.

DESCRIPTION OF MATERIALS

The sand and gravel in this site contain cobbles and boulders and are alluvium laid down by the Jack River. Layers of silt sandwiched in the sand and gravel were located in Test Hole (TH)82-2. This site was used for "embankment" material (no further definition in the records) and Subbase Grading C on the Cantwell to McKinley Park Grading, Drainage and Bridges Project, Number ALF-037-2(19), 1972 thru 1974.

CLEARING AND STRIPPING

The site has been cleared and stripped.

DRAINAGE AND WATER TABLE

Surficial drainage is generally towards the northeast. A dike is located across the south end of this site. The excavated area is about 5 feet deep and collects water, particularly during breakup, and may be subject to flooding by the Jack River. A water table was located in all of the test holes at or within 1 foot of the ground surface.

FROZEN CONDITIONS

Frozen soils were found from 2.5 to 7.5 feet beneath the surface in May, 1982. (See test hole logs).

LAND STATUS

This site is on land owned by AHTNA, Incorporated, a native regional corporation. The United States Bureau of Land Management issued the State of Alaska a non-expiring Right-Of-Way Grant, No. F-033441, in December 1964 for use of the site as a source of materials for highway construction and maintenance. The Grant is currently administered by AHTNA, Inc.

QUALITY OF MATERIALS

Laboratory test results on samples taken from the site indicate the gravel and sandy gravel present in the site meet the requirements for use as Selected Material, Type A and B. They also indicate the material is suitable for use in the production of crushed asphalt aggregate. This material can be used for base course if the degradation test value is changed to a minimum of 30. Cobbles and boulders are present in the site. Due to the limits of the auger, gravel larger

than 2 inches in diameter and larger rocks were generally not recovered in the samples.

MINING PLAN GUIDELINES

Portions of the existing excavations could be deepened but will require dewatering. Backslopes should be left no steeper than 1 1/2:1 for stability. The site should be left in a neat and orderly condition with the working area sloped to drain and with access suitable for future use. If the site is dewatered or material is baled, the depth should be to at least 35 feet below the water surface elevation.

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SOILS TESTING REPORT

PROJECT NAME:		PARKS HIGHWAY, 216 NORTH REHABILITATION						
PROJECT NUMBER:		I-OA4-3(07)/64924						
SOURCE:		M.S.52-2-052-2						
SAMPLED BY:		G.Brazo						
TEST HOLE NO.		82-1	82-3					
DEPTH (FEET)		3-8	0-6					
STATION (LOCATION)								
OFFSET (FEET)								
LAB NO.		82-2534	82-2535					
DATE SAMPLED		5-24-82	5-24-82					
OVERSIZE	+3"							
PERCENT PASSING	3"		100					
	2"	100	96					
	1"	83	79					
Gravel	3/4"	71	70					
	1/2"	57	58					
	3/8"	47	51					
	#4	30	37					
	#10	21	26					
Sand	#40	12	9					
	#50	9	7					
	#100	7	5					
Silt - Clay	#200	6	4					
Clay Size	02mm	4	2					
	.005mm	2	1					
LIQUID LIMIT		17	NV					
PLASTIC INDEX		1	NP					
CLASSIFICATION		A-1-a	A-1-a					
SOIL DESCRIPTION		Gr	Gr					
NATURAL MOISTURE								
SP.GR. (FINE)		2.70	2.69					
SP.GR. (COARSE)								
MAX DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION		21	21					
DEGRADATION FACTOR		32	73					
SODIUM SULF. (CRSE)		1.8						
SODIUM SULF. (FINE)		2.0						
ORGANICS								

REMARKS:

06P216

* - Gradation is based on material passing the 3 inch sieve, according to Alaska Test Method T-7.

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
REGIONAL MATERIALS LAB

AGGREGATE TEST REPORT

PROJECT: PARKS HIGHWAY, 216 NORTH REHABILITATION
PROJECT #: I-OA4-3(07)/64924

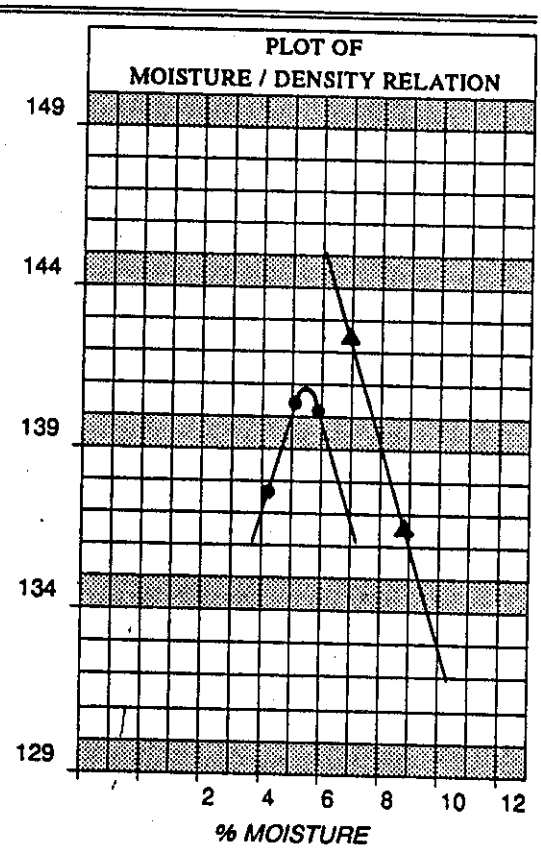
LAB #: 90-1032
DATE SAMPLED 6-5-90

TEST HOLE #: Grab
SOURCE: M.S.52-2-052-2
SAMPLED BY: G.Brazo

DEPTH: 0-1
STATION:
OFFSET:

SIEVE SIZE	% PASS
3"	100
2"	95
1 1/2"	90
1"	82
3/4"	77
1/2"	66
3/8"	59
#4	42
#8	32
#10	30
#16	26
#20	
#30	20
#40	
#50	14
#60	
#80	11
#100	10
#200	7

TEST	%	
OVERSIZE:		
DELETERIOUS:		
LL		
PI		
SP GR (APP)		
FINE AGG:	2.69	
COARSE AGG	2.73	
LA:	18	
DEG:	35	
		DEPTH
NATURAL MOISTURE:		
% ORGANICS:		



HYDRO	
.002mm	3
.005mm	1

	COARSE	FINE
Na2SO4		
SOUNDNESS:	3.59	4.92

T-180D* TEST RESULT	REG. LAB
MAX DENSITY	140.8
OPT MOIST	5.5
ZAV SP GR	2.71

* +3/4" MATERIAL REMOVED

ZAV POINT	136.4 @ 8.8 %
ZAV POINT	142.4 @ 6.9 %

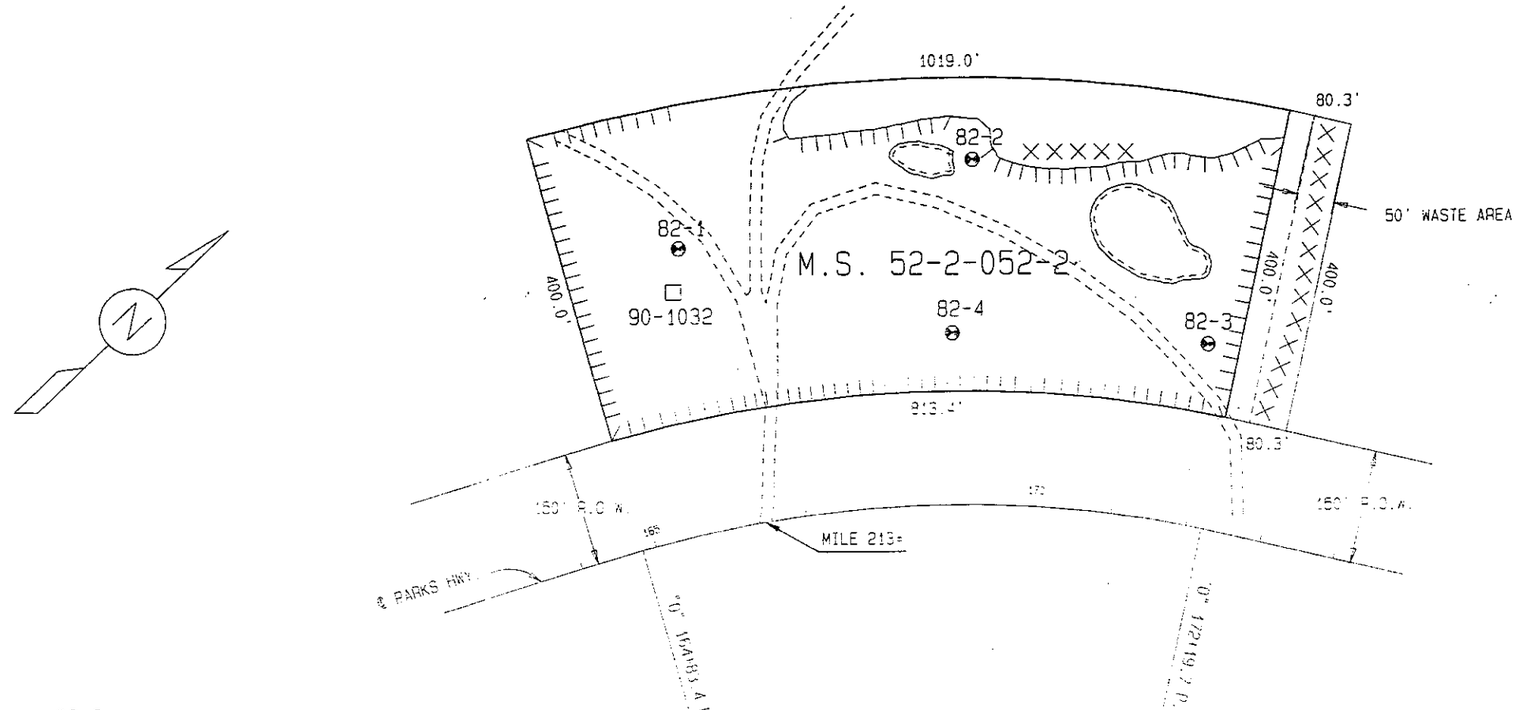
MOLD NO.	1	2	3	4	5
DRY UNIT WT	137.7	140.3	140.1		
% MOISTURE	4.2	5.1	5.9		
FREE MOIST					

REMARKS:

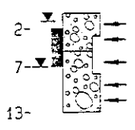
AASHTO CLASS:	A-1-a
TEXTURAL CLASS:	sl.SiSaGr
UNIFIED CLASS:	

SIGNATURE: T. C. Harwood

TED C. HARWOOD
REGIONAL LAB SUPERVISOR

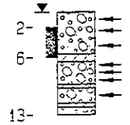


82-1
25 MAY



0.0 - 5.0 Bn Sa GRAVEL. wet to 2.0
5.0 -13.0 Bn GRAVEL
SAMPLE 82-2534
(3.0-8.0)
A-1-a, 6%-200
L.A.: 21, Deg.: 32

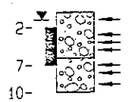
82-2
25 MAY



0.0 - 5.5 Bn Sa GRAVEL.
5.5 - 6.0 SILT
6.0 -13.0 Bn GRAVEL. w/layers of Silt

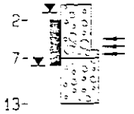
SAMPLE 90-1032
(0.0-1.0)
A-1-a, 7%-200
L.A.: 18, Deg.: 35

82-4
25 MAY



0.0 - 6.0 Bn Sa GRAVEL. wet to 2.0
6.0 -10.5 Bn GRAVEL

82-3
25 MAY



0.0 - 7.0 Bn Sa GRAVEL. wet to 2.0
SAMPLE 82-2535
(0.0-8.0)
A-1-a, 4%-200
L.A.: 21, Deg.: 73
7.0 -13.0 Bn GRAVEL

Vert 10 feet 0
Horiz. 0 100 feet

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: G.M.B.	PARKS HIGHWAY, 216 NORTH REHABILITATION M.S. CODE NO. 52-2-052-2
DRAWN: G.S.P.	
APPROVED: H.R.L.	PROJECT NO.: I-0A4-3(7) /64924
DATE: 07/1991	SCALE: AS SHOWN

MS 52-2-068-2

LOCATION AND ACCESS

M.S. 52-2-068-2 lies 30 to 40 feet east of the highway R.O.W. on the east side of the George Parks Highway at Mile 217.1. Existing access is south of the site and crosses privately-owned land. The Fairbanks-Anchorage Electrical Intertie transmission lines cross the east half of the site with a support tower located in the central part of the site. The site is partially screened from the highway by a road cut backslope.

DESCRIPTION OF MATERIALS

Material in this site generally consists of basalt fragments ranging in size from less than 1 inch to more than 6 feet in diameter. The material is a combination talus cone and rock glacier at the foot of Panorama Mountain. The larger sizes were observed to be generally concentrated on the surface of the ground and at the toe of the slopes.

Class II riprap was obtained from this site for use in the reconstruction of the George Parks Highway in the early 1970's. Selective excavation was necessary to obtain the specified material.

CLEARING AND STRIPPING

Most of the talus cone and rock glacier and some of the excavated areas are unvegetated. A large excavated area in the east corner of the site has a growth of 6-foot high alders between unvegetated dozer cuts. Grass grows in the areas between debris piles. A large draw in the northwest end of the site has 4 to 12-inch diameter spruce trees spaced 10 to 50 feet apart. Dense alders to 6 feet high grow between the spruce trees. No silt overburden was noted in the test trenches.

WATER TABLE

The water table was not found in any of the test trenches, the deepest of which reached 9 feet below the ground surface.

FROZEN CONDITIONS

In early June 1988, frozen material was found in 2 of the 4 test trenches dug in this site. It was noted at depths of 4 feet and 8 feet below the ground surface in test trenches 88-4 and 88-3, respectively. The frozen zone of test trench 88-4, which bottomed at a depth of 8 feet in frozen material, was difficult to dig with the backhoe. Rock fragments in the unfrozen zones were loosely-arranged and the test trench walls tended to collapse.

LAND STATUS

This site is located on land owned by AHTNA, Incorporated. The United States Bureau of Land Management issued the State of Alaska a Right-Of-Way grant, F-026067, on July 9, 1962 permitting use of the site as a material source for highway construction and maintenance. The Grant is currently administered by AHTNA, Inc.

QUANTITY AND MATERIALS

Results of laboratory testing of samples taken from this site indicate that the material meets the requirements for riprap. Screening will be required to meet the size requirements. The average specific gravity (coarse) of 4 rock samples taken from this site was found to be 3.00, or 187.3 pounds per cubic foot. Accordingly, the following relationships between rock sizes and weights were calculated:

Weight (Pounds)	Approx. Size * (inches)
400	15.5
200	12.3
25	6.1

*Size is determined by averaging the nominal length, width, and thickness of an angular or blocky rock fragment.

Visual estimate of the rock sizes found in the test trenches are shown on the Plan View with Test Trench Logs.

MINING PLAN GUIDELINES

Clearing debris should be placed on the periphery of the site to maximize the area available for excavation. Backslopes should be left no steeper than 1 1/2:1 for stability.

A 100 foot round island of undisturbed ground should be maintained around the base of the transmission line tower. Guidelines for the configuration of the island can be found in the Alaska DOT&PF Utilities Manual.

The site should be left in a neat and orderly condition, sloped to drain, with suitable access for future use.

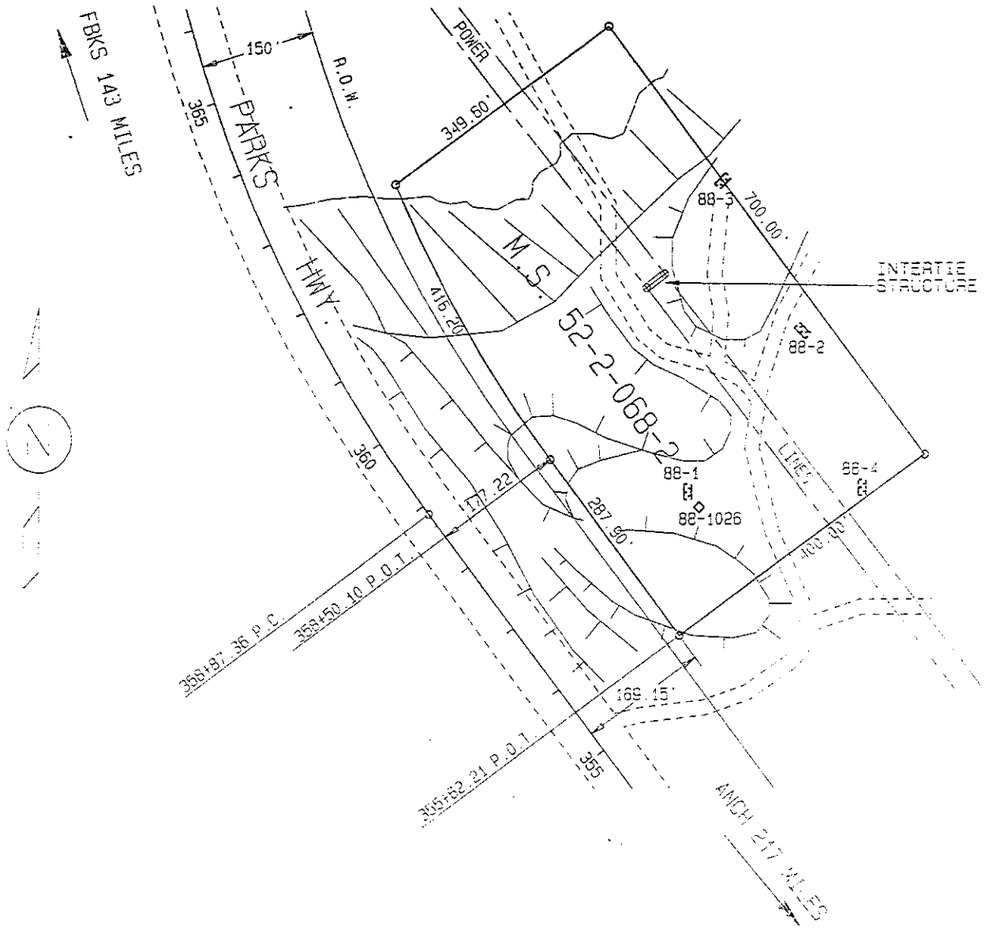
STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SOILS TESTING REPORT

PROJECT NAME:	PARKS HIGHWAY, 216 NORTH REHABILITATION						
PROJECT NUMBER:	I-OA4-3(07)/64924						
SOURCE:	M.S.522-068-2						
SAMPLED BY:	G.Brazo						
TEST HOLE NO.	88-1	Near 88-1	88-3	88-4			
DEPTH (FEET)	2-4	Grab	3-5	1-3			
STATION (LOCATION)							
OFFSET (FEET)							
LAB NO.	88-1025	88-1026	88-1027	88-1028			
DATE SAMPLED	6-9-88	6-10-88	6-10-88	6-10-88			
OVERSIZE	+3"						
PERCENT PASSING	3"						
	2"						
	1"						
Gravel	3/4"						
	1/2"						
	3/8"						
	#4						
	#10						
Sand	#40						
	#50						
	#100						
Silt - Clay	#200						
Clay Size	02mm						
	.005mm						
LIQUID LIMIT							
PLASTIC INDEX							
CLASSIFICATION							
SOIL DESCRIPTION	Basalt Bx	Basalt Bx	Basalt Bx	Basalt Bx			
NATURAL MOISTURE							
SP.GR. (FINE)							
SP.GR. (COARSE)	3.01	3.02	2.98	3.00			
MAX DRY DENSITY							
OPTIMUM MOISTURE							
L.A. ABRASION	9	9	10	10			
DEGRADATION FACTOR	41	81	31	41			
SODIUM SULF. (CRSE)		0.4					
SODIUM SULF. (FINE)							
ORGANICS							
PAVEMENT CONDITION:							

REMARKS:

* - Gradation is based on material passing the 3 inch sieve, according to Alaska Test Method T-7.

11P216



88-1
9 JUN

0.0 - 9.0 Gy BASALT Ang Frag, damp and loose
Size Est.: 100% 1"-6'
40% 1'-2'
20% >4'
SAMPLE 88-1025
(2.0-4.0)
L.A.: 9, DEG: 41

GRAB SAMPLE 88-1026
L.A.: 9, DEG: 81

88-3
9 JUN

0.0 - 8.0 Gy BASALT Ang Frag
damp and loose
Size Est.:
(0.0-5.0)
100% 1"-5'
40% 1'-5'
15% >4'
SAMPLE 88-1027
(3.0-5.0)
L.A.: 10, DEG: 31
Size Est.
(5.0-8.0)
100% <10"

88-2
9 JUN

0.0 - 8.0 Gy BASALT Ang Frag
damp and loose
Size Est.: 100% <10"

88-4
9 JUN

0.0 - 6.0 Gy BASALT Ang Frag
damp and loose
Size Est.:
(0.0-3.0)
100% 1"-2"
25% 1'-2'
SAMPLE 88-1028
(1.0-3.0)
L.A.: 10, DEG: 41
Size Est.: 100% <6"

NOTE: SIZE ESTIMATES ARE VISUAL. SIZE AS DETERMINED BY AVERAGING THE NOMINAL LENGTH, WIDTH, AND THICKNESS OF AN ANGULAR OR BLOCKY ROCK FRAGMENT.

Vert feet 10-0
Horiz. 0 feet 100

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA:	G.M.S.	PARKS HIGHWAY, 21S NORTH REHABILITATION	
DRAWN:	G.S.P.	M.S. CODE NO.: 52-2-068-2	
APPROVED:	H.R.L.	PROJECT NO.: [illegible]	
DATE:	07/1991	SCALE: AS SHOWN	

MS 52-2-047-2A

LOCATION AND ACCESS

This site is west of and adjoins the highway ROW near Mile 220. There is no developed access directly from the ROW to this borrow area. Access was through the unpermitted, MS 52-2-047-2. New access will have to be developed. The site is partially screened from the highway by spruce trees.

DESCRIPTION OF MATERIALS

The sand and gravel in this site are alluvial in origin probably laid down by the Nenana River. There may have been local deposition by Slime Creek which is about 500 feet south of the site.

This site was used for "embankment" material on the Cantwell to McKinley Park Grading, Drainage and Bridges Project, Number ALF-037-2(19), 1972 to 1974. Approximately half of the site area has been excavated to about 12 feet in depth.

CLEARING AND STRIPPING

Vegetation on the uncleared, south half of the site is spruce trees 6 to 10 inches in diameter on 30 to 100-foot centers. Dwarf birch bushes 3 to 4 feet high and moss to half a foot thick are the ground cover.

Overburden consists of the moss ground cover.

DRAINAGE AND WATER TABLE

Surficial drainage is generally to the west. The existing site may collect water particularly during breakup. Water was ponded in the larger excavation, about 600 feet north of this site in late May 1982.

No water table was found to the depth of the test holes in early September 1964.

FROZEN CONDITIONS

No frozen soils were noted in the 1964 test holes. Considering the latitude and altitude of the site, frozen soils should be expected.

LAND STATUS

The land occupied by this site is owned by AHTNA, Incorporated. The United States Bureau of Land Management issued the State of Alaska a non-expiring Right-Of-Way Grant, No. F-033434, on December 1, 1964 for the use of this site as a source of materials. The Grant is currently administered by AHTNA, Inc.

QUALITY OF MATERIALS

One laboratory test result of material taken from this site indicates the sandy gravel meets the requirements for Selected Material Type A, B and C. Considering the sites proximity to the near by mountains, cobbles and boulders may be present. Due to the limits of the auger, gravel larger than 2 inches in diameter

and larger rocks were generally not recovered in the samples.

MINING PLAN GUIDELINES

Build an access road at a convenient location on the east side of the site. Place clearing and stripping debris on the west side of the site area. The existing excavation can be extended south approximately 150 feet. Use 1 1/2:1 sideslopes in the excavation for stability. Slope the pit floor towards the north. The site should be left in a neat and orderly condition with suitable access for future use.

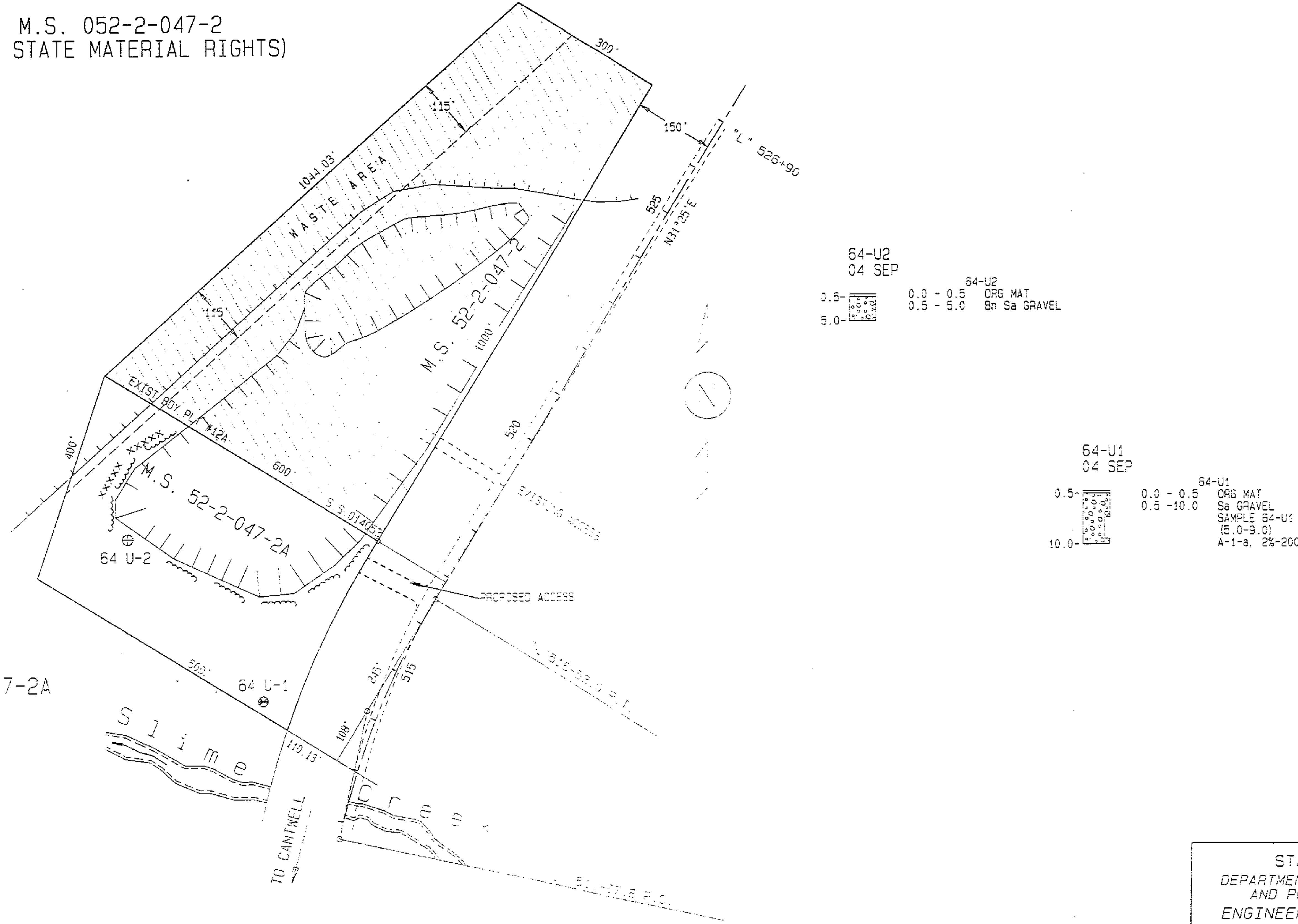
Note: This site was investigated by H.R. Livingston in September 1964.

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SOILS TESTING REPORT

PROJECT NAME:		PARKS HIGHWAY, 216 NORTH REHABILITATION						
PROJECT NUMBER:		I-OA4-3(07)/64924						
SOURCE:		M.S.52-2-047-2A						
SAMPLED BY:		H.Livingston						
TEST HOLE NO.		64-U1						
DEPTH (FEET)		5-8						
STATION (LOCATION)		"L"513+50						
OFFSET (FEET)		Lt.200						
LAB NO.		64-927						
DATE SAMPLED		9-4-64						
OVERSIZE	+3"							
PERCENT PASSING	3"							
	2"	100						
	1"	71						
Gravel	3/4"	64						
	1/2"	54						
	3/8"	47						
	#4	35						
	#10	24						
Sand	#40	9						
	#50							
	#100							
Silt - Clay	#200	2						
Clay Size	02mm							
	.005mm							
LIQUID LIMIT		NV						
PLASTIC INDEX		NP						
CLASSIFICATION		A-1-a						
SOIL DESCRIPTION		SaGr						
NATURAL MOISTURE								
SP.GR. (FINE)								
SP.GR. (COARSE)								
MAX DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRADATION FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)					-			
ORGANICS								
PAVEMENT CONDITION:								

REMARKS: 15P216

* - Gradation is based on material passing the 3 inch sieve, according to Alaska Test Method T-7.



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: G.M.S.	PARKS HIGHWAY, 216 NORTH REHABILITATION
DRAWN: G.S.P.	M.S. CODE NO. 52-2-047-2A
APPROVED: H.R.L.	PROJECT NO.: I-0A4-3(7)/64924
DATE: 07/1991	SCALE: AS SHOWN

MS 522-048/063-2

LOCATION AND ACCESS

This site is located west of the Parks Highway between Stations 2138+00 and 2147+50 near Mile 223.6. Access is directly from the highway ROW via a haul road near Station 2141+00. The existing excavation is screened by trees in the highway ROW. The Nenana River is about one quarter of a mile west of the site.

DESCRIPTION OF MATERIALS

The sand and gravel in this site contain cobbles and boulders and are part of a local alluvial fan. The fan was probably built by Carlo Creek, which is about a quarter of mile north of the site. Layers of silt and gravelly silt that were found in test borings may be the result of flooding by the ancient Nenana River during deglaciation. The Carlo Creek Glaciation reached this vicinity and the deposits may be ice-contact type deposits, at least in part. Several different depositional periods probably occurred.

This site was excavated for "embankment" material (no further definition in the records) on the Cantwell to McKinley Park Grading, Drainage and Bridges Project, Number ALF-037-2(19), 1972 to 1974. Virtually the entire site has been excavated. MS 52-2-063-2 has 4 to 5.5 feet of silt and/or gravelly silt, over silty sandy gravel over sandy gravel. The northern portion of -063- contains silty materials.

The southern half of 52-2-048-2 also contains silty materials. The northern half of -048-, the area around TH 82-1, is about 5 feet higher than the work area floor to the south. This area has been dug to about 5 feet in depth and about a 6-foot layer of sandy gravel may remain. Note the silty sandy gravel in TH 82-1.

CLEARING AND STRIPPING

No clearing or stripping will be necessary on the northern portion of -048-.

DRAINAGE AND WATER TABLE

Surficial drainage within this site is generally towards the west. The site area may collect water in the lower elevations particularly during breakup. A water table was found from 1 to 6 feet beneath the surface in the southern portions of -048- and -063-. It appears there was a perched water table above a frozen layer.

FROZEN CONDITIONS

Some frozen soils were found in all of the test borings in May, 1982 and were noted from 5 to at least 11 feet beneath the surface in TH 82-1.

LAND STATUS

These sites are on land owned by AHTNA, Incorporated. The United States Bureau of Land Management issued the State of Alaska a non-expiring Right-Of-Way Grant, No. F-029731, in July 1962 for use of the site as a source of materials for highway construction and maintenance.

QUALITY OF MATERIALS

One laboratory test result on a sample taken from -048- indicates the slightly silty sandy gravel present meets the requirements for use as Selected Material, Type C. Cobbles and boulders are present in the site. Due to the limits of the auger, gravel larger than 2 inches in diameter and larger rocks were generally not recovered in the samples.

MINING PLAN GUIDELINE

Portions of the existing excavation could be deepened. Backslopes should be left no steeper than 1/2:1 for stability. The site should be left in a neat and orderly condition with the floor sloped to drain and with access suitable for future use.

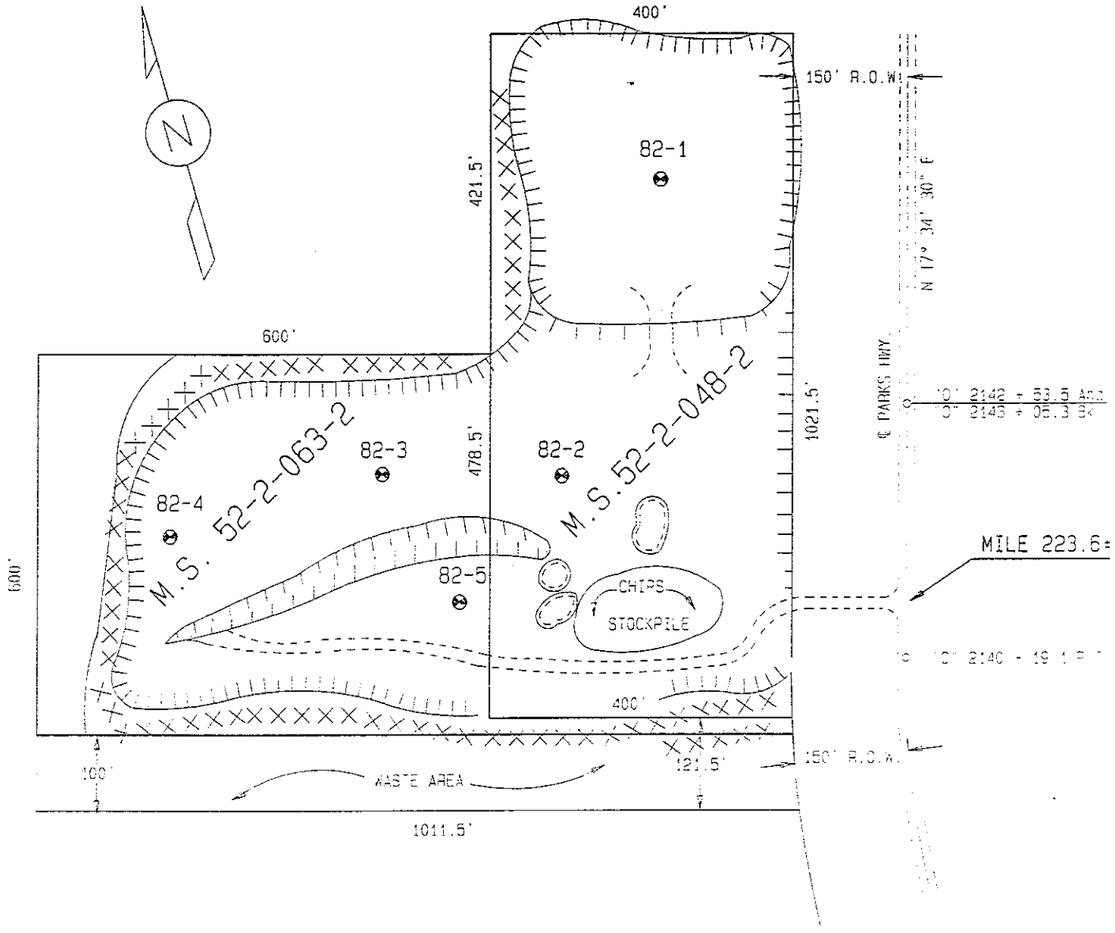
STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SOILS TESTING REPORT

PROJECT NAME:		PARKS HIGHWAY, 216 NORTH REHABILITATION						
PROJECT NUMBER:		I-OA4-3(07)/64924						
SOURCE:		M.S.52-2-048/063-2						
SAMPLED BY:		G.Brazo						
TEST HOLE NO.		82-1						
DEPTH (FEET)		1-9						
STATION (LOCATION)								
OFFSET (FEET)								
LAB NO.		82-2536						
DATE SAMPLED		5-26-82						
OVERSIZE	+3"							
PERCENT PASSING	3"	100						
	2"	92						
	1"	82						
Gravel	3/4"	75						
	1/2"	64						
	3/8"	56						
	#4	41						
	#10	32						
Sand	#40	20						
	#50	17						
	#100	14						
Silt - Clay	#200	11						
Clay Size	02mm	6						
	.005mm	3						
LIQUID LIMIT		18						
PLASTIC INDEX		NP						
CLASSIFICATION		A-1-a						
SOIL DESCRIPTION		slSiSaGr						
NATURAL MOISTURE								
SP.GR. (FINE)		2.67						
SP.GR. (COARSE)								
MAX DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION		17						
DEGRADATION FACTOR		35						
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
ORGANICS								

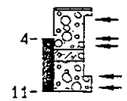
REMARKS:

07P216

* - Gradation is based on material passing the 3 inch sieve, according to Alaska Test Method T-7.

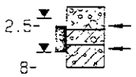


82-1
26 MAY



0.0 - 0.3 D-1
0.3 - 5.5 Bn Sa GRAVEL
5.5 - 6.5 Bn Si Sa GRAVEL
6.5 -11.0 Bn Sa GRAVEL
SAMPLE 82-2536
(1.0-9.0)
A-1-a, 11%-200
L.A.: 17, Deg.: 35

82-3
25 MAY

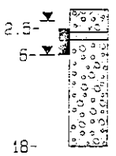


0.0 - 3.0 Bn Si Sa GRAVEL
wet to 2.5
3.0 - 5.0 Bn Gr SILT
5.0 - 8.0 Bn Gr Sa SILT

82-2
26 MAY

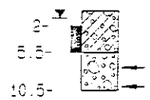
0.0 - 1.0 Bn Si Sa GRAVEL
1.0 - 2.0 Bn SILT
2.0 - 8.0 Bn Si Sa GRAVEL

82-4
26 MAY

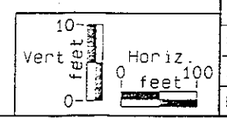


0.0 - 3.0 Bn Si Sa GRAVEL
wet to 2.5
3.0 - 4.0 Bn SILT
4.0 -18.0 Bn Sa GRAVEL.

82-5
26 MAY



0.0 - 5.5 Br Gr SILT,
wet to 2
5.5 -10.5 Br Sa GRAVEL, damp



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: G.M.B.	PARKS HIGHWAY, 215 NORTH REHABILITATION
DRAWN: G.S.P.	M.S. CODE NO. 52-2-048-2 52-2-063-2
APPROVED: H.R.L.	PROJECT NO.: 1-DA4-3(7) 64924
DATE: 07/1991	SCALE: AS SHOWN

MS 522-064-2

LOCATION AND ACCESS

This site is located west of the Parks Highway between Station 2177+00 and 2187+00 near Mile 224.5. Access is directly from the highway ROW on a short haul road near Station 2183+00. The existing excavation is partially screened by trees in the highway ROW. Carlo Creek is about one half mile south of the site.

DESCRIPTION OF MATERIALS

The sand, gravelly sand and sandy gravel in this site contain cobbles and boulders. Gravelly sand is the predominate material. The site is located on an extensive glacial outwash plain deposited by the ancient Nenana River. Wind-blown silt (loess) was later deposited on the surface of the plain. The site occupies an erosional remnant of the old outwash plain. The surface of the plain slopes gently down to the north and contains occasional closed depressions resulting from the melting of buried glacial ice.

This site was used for "embankment" material (no further definition in the records) on the Cantwell to McKinley Park Grading, Drainage and Bridges Project, Number ALF-037-2(19), from 1972 to 1974. The site was also used during the Cantwell to Mckinley Park Paving Project, Number F-037-2(25) in 1974 and 1975 to produce D-1 (base course) and asphalt aggregate.

CLEARING AND STRIPPING

Spruce trees to 14 inches in diameter on 15 to 50-foot centers grow on the undisturbed areas of the site. Up to 6 inches of moss and organic mat mantle at least 3 feet of brown silt overburden. The existing excavation is cleared and stripped.

DRAINAGE AND WATER TABLE

Surficial drainage within the site is generally towards the east in the excavated area and towards the north in the undisturbed areas. No water table was located in the test holes.

FROZEN CONDITIONS

Some frozen soils were located in all of the 1982 test holes. The amount of frozen soils varied from hole to hole. Previous clearing and excavation affects the amount of frozen soils.

LAND STATUS

The site is on land owned by AHTNA, Incorporated. The United States Bureau of Land Management issued the State of Alaska a non-expiring Right-Of-Way grant, No. A-064372, in June 1966 for use of the site as a source of materials for highway maintenance and construction. The Grant is currently administered by AHTNA, Inc.

QUALITY OF MATERIALS

Laboratory test results on samples taken from the site indicate the gravel and sandy gravel present in the site meet the requirements for use as Selected Material, Type A and B. They also indicate the material is suitable for use in the production of base course if the degradation test value is changed to a minimum of 30. The material meets the degradation requirement for asphalt aggregate. Cobbles and boulders are present in the site. Due to the limits of the auger, gravel larger than 2 inches in diameter and larger rocks were generally not recovered in the samples. The high percentage of material smaller than the No. 4 mesh will require processing large amounts of sandy material to produce crushed products.

MINING PLAN GUIDELINES

Renewed excavation in this site should extend the existing excavation into the terrace, i.e., towards the north, west or the south. Clearing and stripping debris should be placed on the worked out area on the east side of the site. Doing so will allow the maximum use of the sand and gravel. The site floor should be left smooth and sloped to drain. Suitable access should remain for future activities.

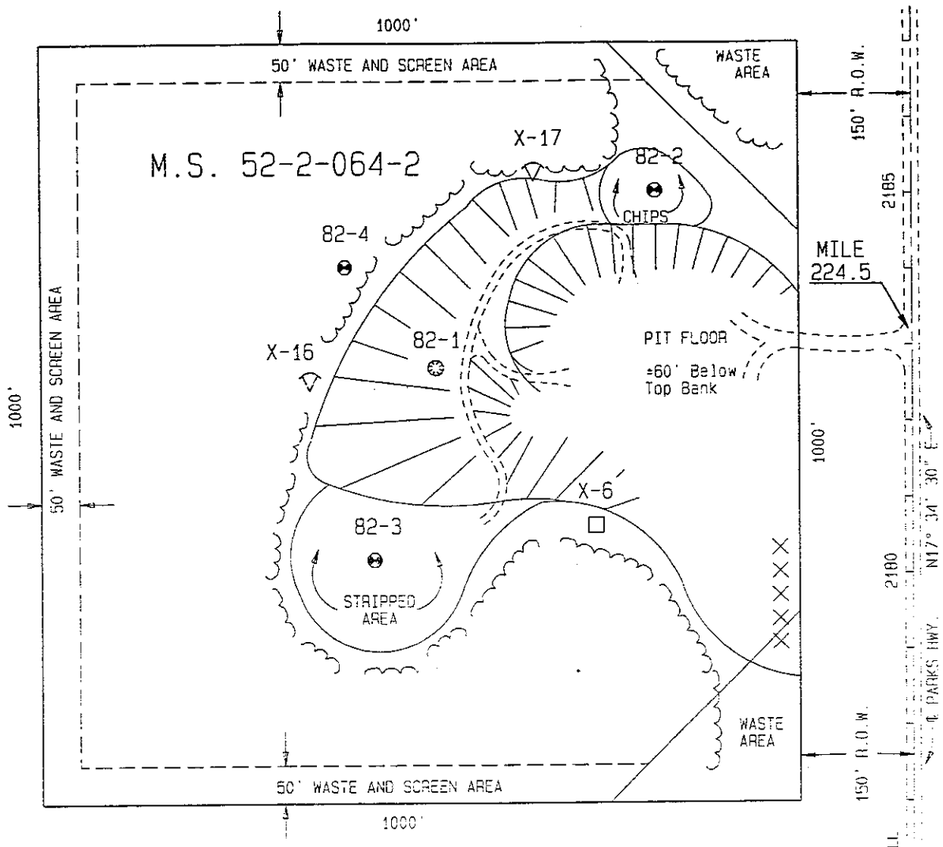
STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SOILS TESTING REPORT

PROJECT NAME:		PARKS HIGHWAY, 216 NORTH REHABILITATION						
PROJECT NUMBER:		I-OA4-3(07)/64924						
SOURCE:		M.S.52-2-064-2						
SAMPLED BY:		G.Brazo						
TEST HOLE NO.		X-17	X-6	82-1	82-3	82-3		
DEPTH (FEET)		5-6	4.5-6	25-30	2-10	30-35		
STATION (LOCATION)		2186+00	2230+00					
OFFSET (FEET)		Lt.500	Lt.400					
LAB NO.		64B-1580	1102	82-2539	82-2537	82-2538		
DATE SAMPLED		1964	1964	5-26-82	5-26-82	5-26-82		
OVERSIZE	+3"							
PERCENT PASSING	3"	100		100	100			
	2"	95	100	96	99	100		
	1"	88	88	87	85	93		
Gravel	3/4"	87	81	83	74	86		
	1/2"	85	76	78	64	77		
	3/8"	83	72	74	58	71		
	#4	78	64	63	45	53		
	#10	73	56	51	35	37		
Sand	#40	21	18	25	12	12		
	#50			13	8	9		
	#100			8	5	5		
Silt - Clay	#200	3	5	5	4	4		
Clay Size	02mm							
	.005mm							
LIQUID LIMIT		NV	NV	NV	NV	NV		
PLASTIC INDEX		NP	NP	NP	NP	NP		
CLASSIFICATION		A-1-b	A-1-b	A-1-a	A-1-a	A-1-a		
SOIL DESCRIPTION		GrSa	GrSa	SaGr	SaGr	SaGr		
NATURAL MOISTURE								
SP.GR. (FINE)		2.72		2.69	2.74	2.69		
SP.GR. (COARSE)		2.76						
MAX DRY DENSITY		119.0						
OPTIMUM MOISTURE		11.0						
L.A. ABRASION				21	19			
DEGRADATION FACTOR				73	35			
SODIUM SULF. (CRSE)				2.1				
SODIUM SULF. (FINE)				3.1				
ORGANICS								

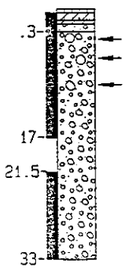
REMARKS:

08P216

* - Gradation is based on material passing the 3 inch sieve, according to Alaska Test Method T-7.

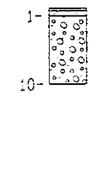


82-4
26 MAY



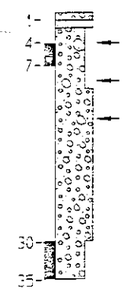
0.0 - 0.5 ORG MAT
0.5 - 1.5 Bn Org SILT
1.5 - 2.0 Bn SILT
2.0 - 3.0 Bn Gr SAND
3.0 -33.0 Bn Sa GRAVEL

X-16
1964



0.0 - 0.3 ORG MAT
0.3 - 1.0 Bn SILT, damp
1.0 -10.0 Bn Sa GRAVEL

82-3
26 MAY



0.0 - 1.0 Bn Sa GRAVEL
1.0 - 2.0 Bn SAND, dry
2.0 -35.0 Bn Sa GRAVEL
damp to 4.0
wet below 7.0
SAMPLE 82-2537
(2.0-10.0)
A-1-a, 4%-200
L.A.: 19, Deg.: 35
SAMPLE 82-2538
(30.0-35.0)
A-1-a, 4%-200

X-17
1964

0.0 - 0.3 ORG MAT
0.3 - 1.5 Bn SILT, damp
1.5 - 8.0 Bn Gr SAND
SAMPLE 898
(5.0-6.0)
A-1-b, 3%-200

82-1
26 MAY

0.0 - 0.3 ORG MAT
0.3 - 3.0 Bn SILT
3.0 -60.0 Bn Sa GRAVEL
SAMPLE 82-2539
(25.0-30.0)
A-1-b, 5%-200
L.A.: 21, Deg.: 73

82-2
26 MAY

0.0 - 0.5 Chips
0.5 - 8.0 Bn Gr SAND

X-6
1964

0.0 - 0.5 ORG MAT
0.5 -10.0 Gr SAND
SAMPLE X-4
(4.5-6.0)
A-1-b, 5%-200

Vert. 10 feet 0
Horiz. 0 feet 100

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: G.M.B./H.R.L.	PARKS HIGHWAY, 216 NORTH REHABILITATION
DRAWN: G.S.P.	M.S. CODE NO. 52-2-064-2
APPROVED: H.R.L.	PROJECT NO.: [illegible] /64924
DATE: 07/1991	SCALE: AS SHOWN

MS 52-2-051-2

LOCATION AND ACCESS

This site is located east of Station 2495+00 on the "old" Denali Highway (east of Mile 230.5 of the Parks Highway). The Parks Highway is about a quarter of a mile to the west (see the location sketch). Access is directly from the old roadway and the site is screened by trees and waste berms. The northwest one-third of the site has been dug 5 to 15 feet in depth. The central third has been excavated to about 30 feet beneath the surface. The south quarter has been cleared and stripped only. The Nenana River is about one quarter of a mile north of the site.

DESCRIPTION OF MATERIALS

The sand and gravel in this site contain cobbles and boulders and are part of a glacial outwash plain deposited by the Nenana River. The river later down-cut into the plain and left the gravel terrace where this site is located. Refusal in the test holes in the floor of the material site may be an indication that the lag gravel-boulder layer resting on underlying glacial till has been reached.

The site was used during the Cantwell to Mckinley Park Paving Project, Number F-037-2(25) in 1974 and 1975 for D-1 (base course). Most recently, in 1987, Borrow, Type A, Subbase Grading "E", crushed aggregate, asphalt aggregate, drain aggregate, winter sand and "E" chips were produced during the Parks Highway, McKinley Village to Dragonfly Creek Rehabilitation and Repaving Project, IR-0A4-3(4). Considerable material has been removed by private parties to construct driveways, subdivision roads, and highways within McKinley Park.

CLEARING AND STRIPPING

No clearing or stripping will be necessary.

DRAINAGE AND WATER TABLE

The permeable nature of the outwash materials permits any water to drain vertically through the sandy gravels. There are few culverts in this vicinity because they are not needed. Local drainage may collect in the existing excavation particularly during spring breakup. No water table was found in the test holes.

FROZEN CONDITIONS

No frozen soils were found in the test holes in 1964 or in 1990. Considering the latitude and elevation of this site, frozen soils should be expected.

LAND STATUS

The DOT&PF holds a Negotiated Material Sale Contract, Number ADL 408733, for this site. The contract was issued by the Alaska Department of Natural Resources and expires on December 31, 1998. This agreement contains stipulations for the use of this site that should be included in the special provisions of the construction contract.

QUALITY OF MATERIALS

Laboratory test results on samples taken from the site indicate the gravel and sandy gravel present in the site meet the requirements for use as Selected Material, Type A, and for the production of crushed aggregate. Cobbles and boulders are present in the site. Due to the limits of the auger, gravel larger than 2 inches in diameter and larger rocks were generally not recovered in the samples.

MINING PLAN GUIDELINES

Renewed mining could extend the existing site to south and west. Note the section line easements on the south and east sides of the site. A 50-foot waste and screen area should be maintained between the work area and the road easements. Backslopes in the sand and gravel should be no steeper than 1/2:1 for stability. The site floor should be left relatively smooth and sloped to drain. The existing gated access from the "old" Denali Highway should remain for future use. Access from the platted subdivision roads is not recommended and waste berms should be placed to prevent such access.

Existing stockpiles in this site are reserved for DOT&PF maintenance use.

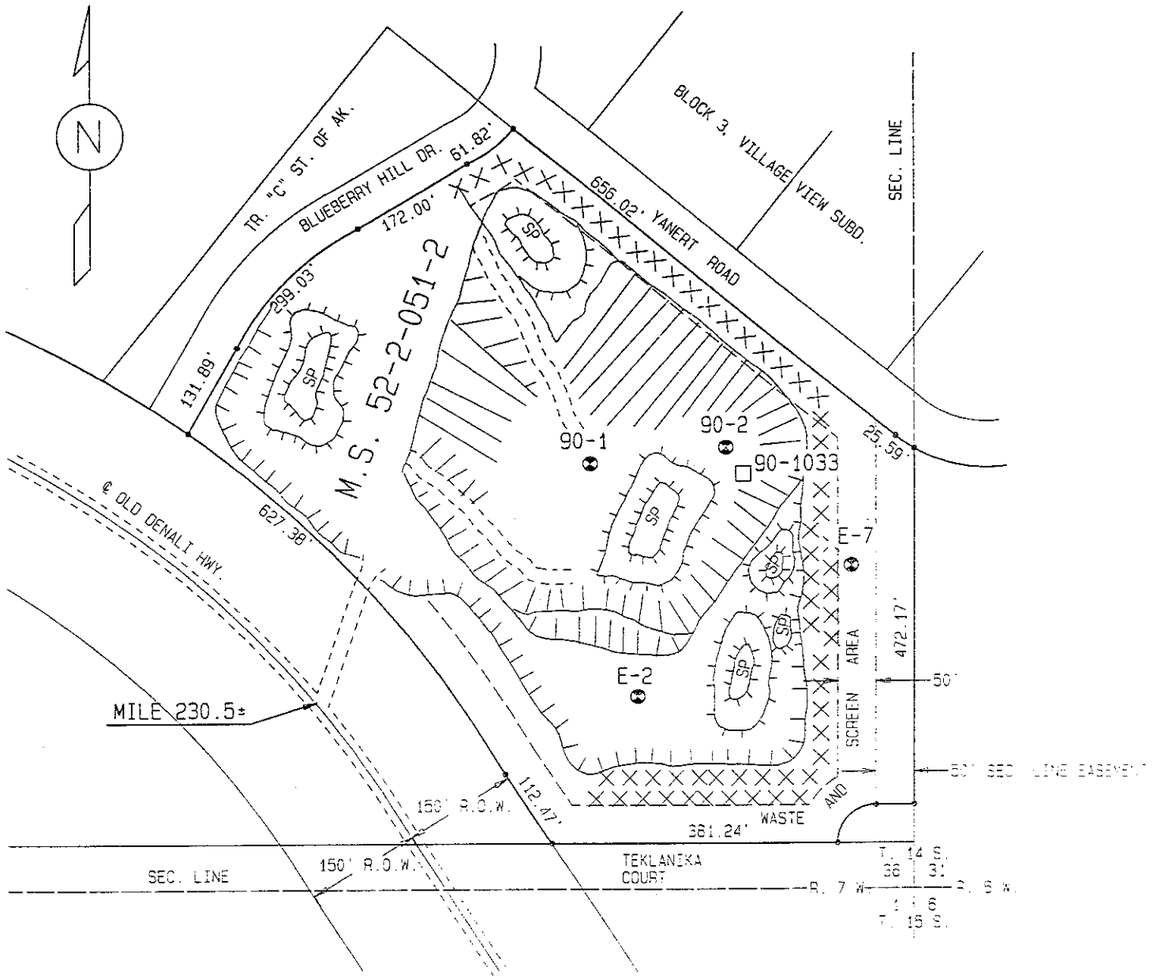
STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SOILS TESTING REPORT

PROJECT NAME:		PARKS HIGHWAY, 216 NORTH REHABILITATION						
PROJECT NUMBER:		I-OA4-3(07)/64924						
SOURCE:		M.S.52-2-051-2						
SAMPLED BY:		G.Brazo						
TEST HOLE NO.		Grab	E-7					
DEPTH (FEET)		0-1	5-7					
STATION (LOCATION)			2497+00					
OFFSET (FEET)			Rt.350					
LAB NO.		90-1033	1174					
DATE SAMPLED		6-5-90	1964					
OVERSIZE	+3"							
PERCENT PASSING	3"	100						
	2"	94	100					
	1"	81	70					
Gravel	3/4"	76	67					
	1/2"	67	58					
	3/8"	61	53					
	#4	48	45					
	#10	34	36					
Sand	#40		21					
	#50	9						
	#100	6						
Silt - Clay	#200	4	9					
Clay Size	02mm							
	.005mm							
LIQUID LIMIT		NV	NV					
PLASTIC INDEX		NP	NP					
CLASSIFICATION		A-1-a	A-1-a					
SOIL DESCRIPTION		SaGr	slSiSaGr					
NATURAL MOISTURE								
SP.GR. (FINE)		2.71						
SP.GR. (COARSE)								
MAX DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION		17						
DEGRADATION FACTOR		61						
SODIUM SULF. (CRSE)		4						
SODIUM SULF. (FINE)		7						
ORGANICS								

REMARKS:

09P216

* - Gradation is based on material passing the 3 inch sieve, according to Alaska Test Method T-7.



SP = STOCK PILE

90-2
5 JUN

1- 0.0 - 0.5 CHIPS
0.5 - 1.0 Bn Sa GRAVEL, damp
(REFUSAL)

90-1
6 JUN

2- 0.0 - 2.0 Bn Sa GRAVEL, damp
(REFUSAL)

SAMPLE 90-1033
(0.0-1.0)
A-1-a, 4%-200
L.A.: 17, Deg.: 61

E-7
1964

10- 0.0 - 0.5 ORG MAT & SILT
0.5 -10.0 si. Si Sa GRAVEL
SAMPLE 1174
(5.0-7.0)
A-1-a, 9%-200

E-2
1964

2- 0.0 - 2.0 EXCAVATED
2.0 -10.0 Sa GRAVEL
10-

Vert. 10- feet 0-
Horiz. 0 feet 100

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA:	G.M.B./H.R.L.	PARKS HIGHWAY, 216 NORTH REHABILITATION	
DRAWN:	G.S.P.	M.S. CODE NO. 52-2-051-2	
APPROVED:	H.R.L.	PROJECT NO.:	F-0A4-3(7)/64924
DATE:	07/1991	SCALE:	AS SHOWN

MS 52-2-087-2

LOCATION AND ACCESS

This proposed material source is located near Mile 231, west of the George Parks Highway, approximately between "L" Stations 2503+00 and 2521+50. The highway is in a full cut section in this interval. Access could be at any convenient location, perhaps on the Sections 36/1 Line and directly from the highway R.O.W.

DESCRIPTION OF MATERIALS

The sandy gravel in this site contains cobbles and boulders and is of alluvial origin. The nearby Nenana River probably deposited these materials during glacial times. The River is now about 100 feet lower in elevation than the terrace where the proposed site is to be situated.

The site is undeveloped. Boulders to 15 feet across were noted on the surface at several locations in the site.

CLEARING AND STRIPPING

Vegetation is a stand of 2 to 8-inch diameter spruce trees on 5 to 25-foot centers. Willow clumps to 6 feet high are scattered among the spruce trees. Labrador tea and moss cover the ground.

Overburden includes about 1 foot of cobbley silt and up to 2 feet of sand in some locations.

DRAINAGE AND WATER TABLE

No water table was found to the depth of the test trenches.

Surficial drainage is towards the west and north. Local drainage could enter any excavation.

FROZEN CONDITIONS

Frozen ground was found in one test trench. The organic mat was frozen in October of 1984, at the time of the exploration.

LAND STATUS

The land this proposed site occupies is State owned. The Department of Transportation and Public Facilities has made application for the use of this site as a source of materials for highway construction and maintenance.

QUALITY OF MATERIALS

Laboratory test results indicate the sandy gravel could be used for Borrow, Type A. Degradation testing indicates P-200 (silt) would be produced in base course materials as the result of handling and manipulation to and on the grade. It is recommended that the asphalt aggregate contain a maximum of 4 percent P-200 on the belt and the crushed base course be covered by pavement within 48 hours of placement on the grade.

MINING PLAN GUIDELINES

The existing highway backslope could be moved back to the south edge of the site to maximize useable material.

Clearing and stripping debris should be placed in the areas labeled "Waste and screen" on the site diagram. Using these peripheral areas for waste would avoid covering useable material. The small amount of waste could be hauled to M.S. 52-2-051-2 and used to rehabilitate that site.

Consideration should be given to permitting wood cutting on the site to clear the trees.

Backslopes should be no steeper than 1 1/2:1 for stability in the sand and gravel. The site floor should be left relatively smooth and sloped to drain. Suitable access should remain for future material use.

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SOILS TESTING REPORT

PROJECT NAME:		PARKS HIGHWAY, 216 NORTH REHABILITATION						
PROJECT NUMBER:		I-OA4-3(07)/64924						
SOURCE:		M.S.522-087-2						
SAMPLED BY:		G.Brazo						
TEST HOLE NO.		84-2	84-4	84-6	84-7			
DEPTH (FEET)		4-7	5-8	6-8	4-7			
STATION (LOCATION)								
OFFSET (FEET)								
LAB NO.		84-2946	84-2947	84-2949	84-2950			
DATE SAMPLED		10-8-84	10-9-84	10-9-84	10-9-84			
OVERSIZE	+3"	4	7					
PERCENT PASSING	3"	100	100	100	100			
	2"	88	89	89	90			
	1"	75	76	71	76			
Gravel	3/4"	69	71	64	71			
	1/2"	62	64	55	63			
	3/8"	57	60	49	58			
	#4	44	49	38	48			
	#10	34	40	30	41			
Sand	#40	17		14	19			
	#50		13					
	#100	7	7	6	5			
Silt - Clay	#200	4	5	3	3			
Clay Size	02mm							
	.005mm							
LIQUID LIMIT		NV	NV	NV	NV			
PLASTIC INDEX		NP	NP	NP	NP			
CLASSIFICATION		A-1-a	A-1-a	A-1-a	A-1-a			
SOIL DESCRIPTION		SaGr	SaGr	SaGr	SaGr			
NATURAL MOISTURE					3.9			
SP.GR. (FINE)								
SP.GR. (COARSE)								
MAX DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION			19					
DEGRADATION FACTOR			31	27				
SODIUM SULF. (CRSE)			3.6					
SODIUM SULF. (FINE)			5.4					
ORGANICS								
PAVEMENT CONDITION:								

REMARKS:

10P216

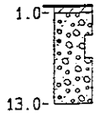
* - Gradation is based on material passing the 3 inch sieve, according to Alaska Test Method T-7.

84-8
09 OCT

84-8

0.0 - 0.3	MOSS & ORG MAT
0.3 - 0.8	Bn SILT, damp
0.8 - 1.5	Bn SAND, damp
1.5 - 4.0	Bn Sa GRAVEL, damp w/Cobbles
4.0 -10.0	Bn Si Sa GRAVEL, damp w/Cobbles & Boulders

84-7
09 OCT

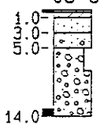


84-7

0.0 - 0.2	ORG MAT
0.2 - 1.0	Bn SILT, damp w/Cobbles
1.0 -13.0	Bn Sa GRAVEL, damp and loose w/Cobbles & Boulders

SAMPLE 84-2950
(4.0-7.0)
A-1-a, 3%-200
N.M. 3.9%

84-4
08 OCT

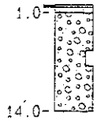


84-4

0.0 - 0.3	MOSS & ORG MAT
0.3 - 1.0	Bn SILT, damp
1.0 - 3.0	Bn SAND, damp
3.0 - 5.0	Bn Gr SAND, damp
5.0 -14.0	Bn Sa GRAVEL, damp w/Cobbles & Boulders

SAMPLE 84-2497
(5.0-8.0)
A-1-a, 5%-200
DEG: 31, L.A. 19

84-6
09 OCT

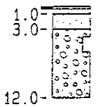


84-5

0.0 - 0.3	MOSS & ORG MAT
0.3 - 1.0	Bn SILT, damp w/Cobbles
1.0 -14.0	Bn Sa GRAVEL, damp w/Cobbles & Boulders

SAMPLE 84-2949
(6.0-8.0)
A-1-a, 3%-200
DEG: 27

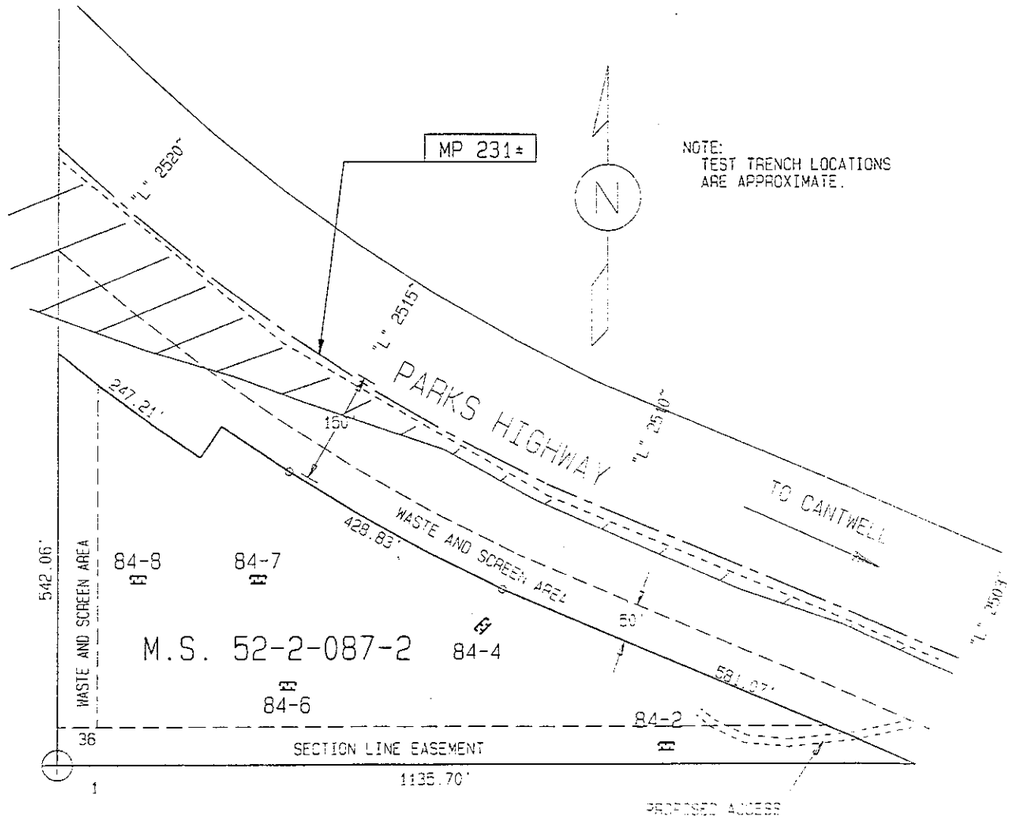
84-2
08 OCT



84-2

0.0 - 0.3	MOSS & ORG MAT
0.3 - 1.0	Bn Sa SILT, damp
1.0 - 3.0	Bn SAND, damp
3.0 -12.0	Bn Sa GRAVEL, damp and loose w/Cobbles & Boulders

SAMPLE 84-2946
(4.0-6.0)
A-1-a, 4%-200
L.A. 19



NOTE:
TEST TRENCH LOCATIONS
ARE APPROXIMATE.

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: G.M.B.	PARKS HIGHWAY, 215 NORTH REHABILITATION
DRAWN: G.S.P.	M.S. CODE NO. 52-2-087-2
APPROVED: H.R.L.	PROJECT NO.: 1-0A4-3(7) /64924
DATE: 07/1991	SCALE: AS SHOWN

10- Vert feet 0-
Horiz. 0 feet 100

/64924P14

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