

Bottom of Floyd Hill

Paul Chuvarsky
Materials Division

11 July 1972

DRIVEN PILE DATA

Foundation Investigation - Structure F-15-cm
Supplementary Report to March 3, 1972

Several additional holes were drilled since the original report was written. A closer control was established resulting in the following recommendations:

It is recommended that 12 BF 74 Steel H piles be used at pier 3 and abutment 4 and that they be tipped to facilitate penetration through the dense bouldery material encountered in the area.

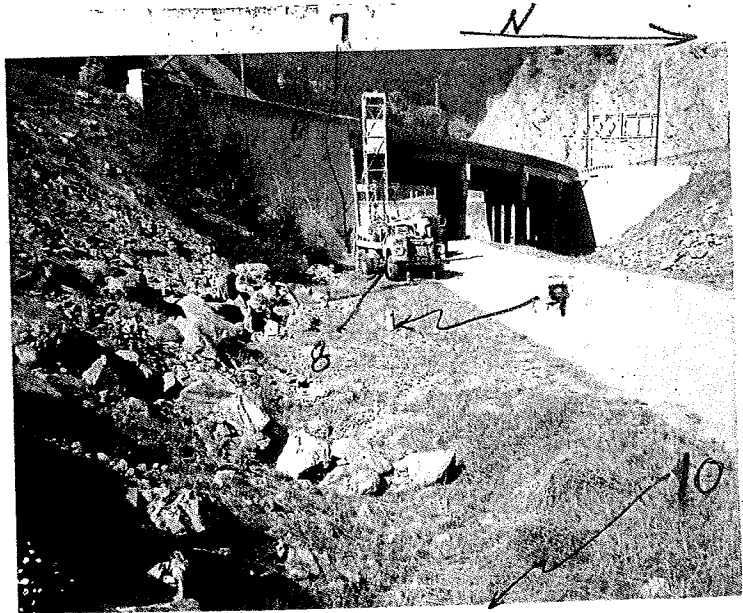
An allowable bearing in excess of 70 tons will be obtained in meta-morphic bedrock at the following pile tip elevations,

Pier 3	7198
Abutment 4 - South End	7230
Abutment 4 - Middle	7220
Abutment 4 - North End	7210

It is also recommended that there be no change in the original recommendations for Pier 2 and Abutment 1. Therefore they should be placed on spread footings excavated three feet into bedrock. Allowable bearings in excess of ten tons per square foot will be obtained in bedrock at or near the following elevations.

Abutment 1	7201
Pier 2	7201

C
O
P
Y



C. R. Lowrie
Staff Materials Engineer

by E. C. Card
E. C. Card
Associate Engineering Geologist

FOUNDATION BORING LOG

Top Hole Elev. 7222.9 Geologist Card Station 291 + 19 33' RE. Boring No. 8

Elev.	Depth	Description of Material	BPF*	Remarks
7222.9	0 - 9.5	Fill Sand, silty, cobbles, micaceous moist, loose, dark gray to brown		5 1/8" Tricone
17.9	5.0-6.5	As above	5	
13.4	9.5-18.0	Sand silty, with small percentage of gravel and cobbles, medium dense to dense, moist, light brown		
13.4	9.5-11.0	As above	45	
08.4	14.5-15.5	As above	60	
04.9	18.0-19.5	Boulder		
03.4	19.5-24.7	Sand gravel, cobbles, boulders, wet brown, dense to very dense		
03.4	19.5-19.9	As above	70/ .4	
7198.4	24.5-24.7	As above	50/ .2	stopped on JB
98.2	24.7-34.5	Schist, Gneiss, (bedrock) gray hard		
7188.4	34.5	SIS		

* Standard Penetration Test (AASHTO T 206)

Water level upon completion 14.5 Elev. 7208.4 Date 5-17-72 Time 11:45
 Water level (24 hrs.) _____ Elev. _____ Date _____ Time _____

FOUNDATION BORING LOG

Top Hole Elev. 7221.9 Geologist Card Station 291 + 68 CL CL Boring No. 9

Elev.	Depth	Description of Material	BPF*	Remarks
7221.9	0-5.1	Fill Sand silty, dry, boulders, light brown, loose to medium dense		5 1/8" Tricone with Air
16.8	5.1-7.0	Sand gravel, dry, loose, tan		
16.6	5.3-6.8	As above	14	
14.9	7.0-9.0	Void		
12.9	9.0-16.7	Sand silty, micaceous, moist gravelly, loose to dense, trace of clay, light brown, few cobbles		
11.4	10.5-12.0	As above	108	
06.5	15.4-16.7	As above	109/.8	stopped on cobble
05.2	16.7-23.7	Same as above, wet		
02.4	19.5-21.0	As above wet	38	
7198.2	23.7-39.7	Schist, micaceous, weathered, dense		
96.9	25.0-27.0	As above		N x P-3 Core Bbl Core #1 Rec=0.5'
92.4	29.5-29.8	As above	68/.3	No Rec
82.4	39.5-39.7	As above	68/.2	No Rec
7182.2	39.7	SIS		

* Standard Penetration Test (AASHTO T 206)

Water level upon completion 15.3 Elev. 7206.6 Date 5-18-72 Time _____
 Water level (24 hrs.) _____ Elev. _____ Date _____ Time _____

FOUNDATION BORING LOG

Top Hole Elev. 7220.2 Geologist Card Station 292 + 16 34' Lt. Boring No. 10

Elev.	Depth	Description of Material	BPF*	Remarks
7220.2	0-7.0	Fill Sand silty, cobbles, loose to medium dense, few large boulders on surface		5 1/8" Tricone bit with air
15.2	5.0-6.5	As above	38	
13.2	7.0-11.2	Sand gravel, cobbles, loose to medium dense, moist, tan		
10.5	9.7-11.2	As above	12	
09.0	11.2-19.7	Sand gravel, silty, wet, dark brown, loose to medium dense		
05.2	15.0-16.5	As above	5	
00.5	19.7-35.0	Schist sandy, micaceous, highly weathered, (bedrock)		
00.5	19.7-20.4	As above	50/ .2	0.2* Recovery
7195.7	25.0-25.1	As above	50/ .1	No Recovery
7185.2	35.0	SIS		

* Standard Penetration Test (AASHTO T 206)

Water level upon completion 11.0 Elev. 7209.2 Date 5-18-72 Time 5:00 PM
 Water level (24 hrs.) _____ Elev. _____ Date _____ Time _____

ss: 6-13-72

FOUNDATION BORING LOG

Top Hole Elev. 7250.2 Geologist Card Station 292+41 20' RE. Boring No. 11

Elev.	Depth	Description of Material	BPF*	Remarks
7250.2	0-2.2	Fill Sand gravel, cobbles, dry loose, tan		5 1/8" Tricone bit
48.0	2.2-4.7	Granite boulder		with Air
45.3	4.7-6.5	Sand gravel, medium dense, dry, tan		
45.2	5.0-6.5	As above 11A A-1-b(0)	69	
41.7	6.5-21.2	Sand gravel, cobbles, silty dry micaceous, gray, medium dense		
40.2	10.0-11.5	As above	16	
35.2	15.0-15.2	As above	50/.2	stopped on cobble
30.5	19.7-21.2	As above	67	3 5/8" Tricone with A1
29.0	21.2-30.5	Sand silty, micaceous, dry, cobbles gray to brown		natural ground
25.2	25.0-26.5	As above	30	
20.5	29.7-29.8	As above	50/.1	stopped on rock
19.7	30.5-44.7	Schist, Gneiss with local zone of pegmatite, hard, dry		
7205.2	44.7	SIS		

* Standard Penetration Test (AASHTO T 206)

Water level upon completion None Elev. _____ Date _____ Time _____
 Water level (24 hrs.) _____ Elev. _____ Date _____ Time _____

Paul Chuvarsky

March 3, 1972

Materials Division

Foundation Investigation - Structure F-15-CN

The proposed bridge will carry I 70 over Clear Creek at the junction of present US 6 and 40 east of Idaho Springs. Test borings were completed under the supervision of Ed Card, Associate Engineering Geologist, with the Mayhew drill on January 24, 1972. Subsurface conditions and foundation design were discussed with Mr. Jirsa of the Bridge Design Section on February 24.

Geology:

The structure will be located in a steep-sided canyon cut by Clear Creek into hard metamorphic bedrock, and topography at the structure site is irregular. Subsurface material at Pier 3 and Abutment 4 consists of from 14 to 24 feet of roadway embankment overlying stream terrace material which consists of sand, gravel and boulders and ranges from 2.5 to 25 feet in thickness. The terrace gravels rest on hard gneiss and schist bedrock. Material at the locations of Abutment 1 and Pier 2 consists of three to eight feet of stream bed alluvium similar to the terrace material, overlying hard bedrock. A seven foot void which appears to be an abandoned mine tunnel was encountered in test hole 2 between elevations 7212.7 and 7205.7, and may also be encountered during pile driving operations.

Recommendations:

It is recommended that 12BP53 steel H piles be used at Pier 3 and Abutment 4. Allowable bearings in excess of 70 tons will be obtained in bedrock at the following elevations. The bedrock surface beneath the proposed location of Abutment 4 drops sharply from south to north and bearing will be obtained at elevations ranging between the limits indicated. All piles should be driven as end bearing piles.

Pier 3	7198
Abutment 4 - South end	7230
Abutment 4 - North end	7206

It is recommended that Abutment 1 and Pier 2 be placed on spread footings excavated three feet into bedrock. Allowable bearings in excess of ten tons per square foot will be obtained in bedrock at or near the elevations shown

Abutment 1	7201
Pier 2	7201


John B. Gilmore
Senior Engineering Geologist

JBG:as
cc: Stemple-Stuka
Linke (2)
FNWA-Via Bridge Design
Gilmore

DIVISION OF HIGHWAYS
 STATE OF COLORADO
 DOH Form No. 267
 Revised: May 1970

Project I 70-3 (39)
 Location Floyd Hill-Beaverbrook
 Structure 6 & 40 Clear Creek
 Route 170 County Clear Creek
 Date Drilled 1-18-72

FOUNDATION BORING LOG

Top Hole Elev. 7223.7 Geologist Card Station 190 + 60 40' ht. Boring No. 1

Elev.	Depth	Description of Material	BPF*	Remarks
7223.7	0 - 0.5	Oil mat		5 1/8" Tricone Bit
	0.5-1.5	Fill (sand gravel cobbles boulders)		
	5.0-6.5	As above	39	
11.2	12.5-20.7	Sand, gravel, cobbles, boulders, wet, dense		
08.7	15.0-15.7	As above	50/ *2	
03.7	20.0-21.5	As above medium dense to dense	39	
03.0	20.7-23.0	Sand silty, micaceous, gravelly, wet		
		medium dense, iron stained, brown		
		to dark gray		
7200.7	23.0-37.0	Schist, gneiss, micaceous with local zones of		
		pegmatite		Ran 23' casing OK Core Sbl Recovery = 0.7'
7193.7	30.0-30.9	As above diagonally fractured		
7186.7	37.0	SIS		

* Standard Penetration Test (AASHTO T 206)

Water level upon completion 12.6 Elev. 7211.1 Date 1-18-72 Time 4:30 PM
 Water level (24 hrs.) 12.5 Elev. 7211.2 Date 1-19-72 Time 10:00 AM

est 3-3-72

FOUNDATION BORING LOG

Top Hole Elev. 7241.0 Geologist Card Station 289+71 31 Lt. Boring No. 4

Elev.	Depth	Description of Material	BPF*	Remarks
7240.0	0-20.0	Fill Sand silty, gravel, cobbles boulders, dry, gray dense		5 1/8" Tricone bit with Air
20.0	20.0-25.5	Sand gravel, cobbles, boulders, loose to medium dense, dry, gray to brown		San 20" of casing
20.0	20.0-21.5	As above	19	
14.5	25.5-29.5	Schist boulder, very hard, gray, in sand, silt gravel		
10.5	29.5-34.0	Sand silty, gravel, cobbles, boulders wet, gray to brown		
10.5	29.5-30.4	As above	50/ .4	stopped on Rock
06.0	34.0-55.0	Metamorphic bedrock, schist gneiss, very hard micaceous with local zones of pegmatite, hard		
7185.0	55.0	SIS		

* Standard Penetration Test (AASHTO T 206)

Water level upon completion caved Elev. _____ Date _____ Time _____
 Water level (24 hrs.) _____ Elev. _____ Date _____ Time _____

DIVISION OF HIGHWAYS
 STATE OF COLORADO
 DOH Form No. 267
 Revised: May 1970

Project I 70-3 (29)
 Location Floyd Hill-Beaverbrook
 Structure 6 & 40 Clear Creek Bridge
 Route 170 County Clear Creek
 Date Drilled 2-2-72

FOUNDATION BORING LOG

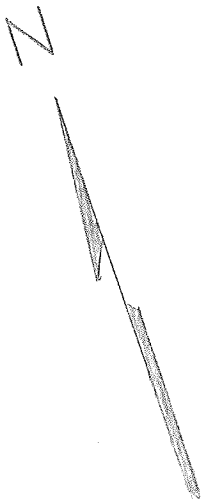
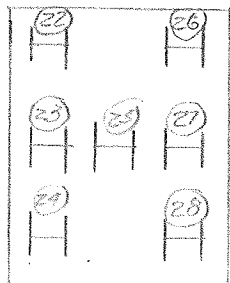
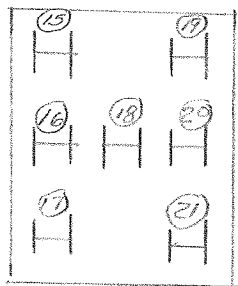
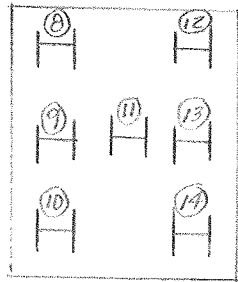
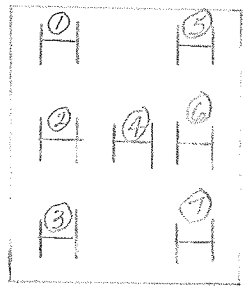
Top Hole Elev. 7244.5 Geologist Card Station 288-57 20' Ac. _____ Boring No. 6

Elev.	Depth	Description of Material	BPF*	Remarks
7244.5	0-0.5	Oil Mat		5 1/8" Tricone w/Air
44.0	0.5-23.8	Fill (mostly boulders w/micaceous sand and gravel, light brown to gray		
20.7	23.8-30.0	Sand, cobbles, boulders, very micaceous, silty, medium to dark gray		Ran 30' casing
14.5	30.0-31.5	14-14-14	28	
13.0	31.5-35.0	As above		
09.5	35.0-36.5	3-4-6	10	
08.0	36.5-37.0	As above	10	
09.5	37.0-40.0	Gravel sand, few cobbles, wet		little free under fru
01.5	40.0-41.5	15-20-8	28	37 to 44
03.0	41.5-44.0	As above		
99.9	44.0-60.0	Bedrock metamorphic, gneiss, schist very dense, gray		
7184.5	60.0	SIS		

* Standard Penetration Test (AASHTO T 206)

Water level upon completion Caved Elev. _____ Date _____ Time _____
 Water level (24 hrs.) _____ Elev. _____ Date _____ Time _____

I-70 3 (76) 253
PIER NO. 3
12 X 74 STEEL PILE



PILE DRIVING RECORD

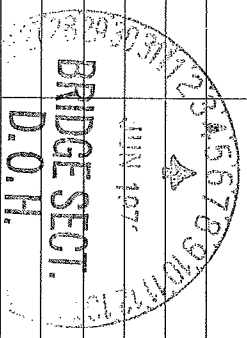
Per #3

241.4 m Place

TYPE OF HAMMER USED Linkbolt RECORDED BY R.P. Fugate PROJECT No. I 70-3 (76)253 SHEET OF
 RATED ENERGY OF HAMMER 18,200 DATE April 18 1973 STRUCTURE No. E-15-CM1

Heat # 42767

1	2	3	4	5	6	7	8	9	10	11	12	13
PILE No.	ORIGINAL LENGTH	CUTOFF	SPLICE LENGTH	DRIVEN LENGTH	CUTOFF ELEVATION	TIP ELEVATION	LENGTH ABOVE GROUND	EMBEDDED LENGTH	TYPE OF PILE	TOTAL PENETRATION FOR BLOWS	AVERAGE PENETRATION PER BLOW	COMPUTED ALLOWABLE PILE LOAD
1	20'	24	↑	17 6/8	7217.00	7199.6	12	16.5	HP 12X74		3/8"	1/4"
2	20'	25	↓	17 3/4	↑	7199.7	12	16.5	↑		1/2"	3/8"
3	20'	27	↓	17 3/4	↓	7199.2	12	16.3			1/2"	3/8"
4	20'	23	↓	17 3/4	↓	7199.5	12	16.3			3/8"	1/2"
5	20'	34	↓	16 1/2	↓	7200.2	12	15.9			1/8"	1/4"
6	20'	39	↓	17 1/2	↓	7199.2	12	16.9			1/2"	3/8"
7	20'	31	↓	16 1/2	7217.00	7200.2	12	15.9			3/4"	3/8"
8	20'	23	↓	17 1/2	7216.00	7199.4	12	16.7			3/8"	1/4"
9	20'	26	↓	17 1/4	↑	7199.7	12	16.4			1/2"	3/8"
10	20'	21	↓	17 1/2	↓	7199.2	12	16.9			3/8"	1/2"
11	20'	23	↓	17 1/2	↓	7199.2	12	16.3			1/2"	3/8"
12	20'	27	↓	17 3/4	↓	7199.8	12	16.3			5/8"	1/2"
13	20'	33	↓	16 3/4	↓	7200.3	12	15.8	↑		5/8"	1/2"
14	20'	35	↓	16 1/4	7216.00	7200.2	12	15.4	HP 12X74		3/4"	3/8"
										14 Tips	welded	



(OVER)

