

5-72

# FOUNDATION AND SOILS REPORT

BELLEVUE INTERCHANGE RAMPS  
 $R_1-R_2-R_3-R_4$

MARCH 14, 1972

PROJECT NO.

F-003-2(13)

E. A. NO.

70561

GENERAL

A foundation study was conducted by the Foundation and Engineering Geology Section of the Materials and Testing Division for the ramps at the site of the Bellevue

**FOUNDATION AND SOILS REPORT I-1261.** The field study was conducted during the period of February 29 through March 2, 1972, and consisted of three borings using wet rotary sample methods, a 1.4-inch (35.5 mm) split spoon sampler and three hand auger borings.

**BELLEVUE INTERCHANGE RAMPS**

**R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub>**

**GEOLOGY AND SOILS**

The site lies on the east edge of an alluvial fan extending eastward from Biggove Canyon in the Carson Range.

**March 14, 1972**

Rock units in the Carson Range consist of principally Quartzmonzonite Granodiorite with some Andesite, Dacite and Rhyolite. These rock units have decomposed in place, eroded and the material deposited by streams in their present location.

For the most part, the coarse grains are siliceous and therefore, unable to a degree from further disintegration. No rocks or pebbles were found in the borings taken and undoubtedly some washing and sorting of the material has occurred from wave action of Washoe Lake. Some of the samples taken contained a high percentage of Mica (10% to 15%).

Boring one contained 1.6 feet of soft sandy clay **Project No. F-003-2(13)** to 5025.1.

**E. A. No. 70561**

Ground water was encountered in all borings and will approximate the water level of Washoe Lake.

## GENERAL

A foundation study was conducted by the Foundation and Engineering Geology Section of the Materials and Testing Division for the ramps at the site of the Bellevue Interchange, Structure No. I-1261. The field study was conducted during the period of February 29 through March 2, 1972, and consisted of three borings using wet rotary sample methods, a 1.4-inch (ID) split spoon sampler and three hand auger borings.

### GEOLOGY AND SOILS

The site lies on the east edge of an alluvial fan extending eastward from Musgrove Canyon in the Carson Range.

Rock units in the Carson Range consist of principally Quartzmonzonite, Granodiorite with some Andesite, Dacite and Rhyolite. These rock units have decomposed in place, eroded and the material deposited by streams in their present location.

For the most part, the coarse grains are silicious and therefore, stable to a degree from further disintegration. No rocks or pebbles were found in the borings taken and undoubtedly some washing and sorting of the material has occurred from wave action of Washoe Lake. Some of the samples taken contained a high percentage of Mica (10% to 15%).

Boring one contained 1.6 feet of soft sandy clay from elevation 5026.7 to 5025.1.

Ground water was encountered in all borings and will approximate the water level of Washoe Lake.

David G. Cochran  
Engineering Geologist II

## FOUNDATION RECOMMENDATIONS

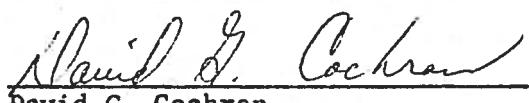
Foundation conditions encountered at the site indicate that the sub-base for ramps R<sub>1</sub> and R<sub>4</sub> may be constructed of granular select material (Nevada Stnd. Spec. 203.03.09). Ramps R<sub>2</sub> and R<sub>3</sub> may be constructed by placing a blanket of select borrow material from "OG" to one foot above high water elevation. The select borrow material shall have the following specifications:

Native materials passing a 2-inch screen shall be wasted. Native material retained on a 2-inch screen up to that material that will pass a 20-inch grizzly shall be crushed to a size that will pass an 8-inch grizzly and said crushed material shall be incorporated into the finished product. Prior to crushing, not less than 50 percent of the remaining material that has passed over the 2-inch screen shall be material that is larger than will pass an 8-inch grizzly.

The material placed above the select borrow shall consist of embankment material (Nevada Stnd. Spec. 203.03.15) and ramp R<sub>2</sub> shall have a 2-foot surcharge. All ramps should have a 30-day time delay to allow for compaction of material below the fills.

It is recommended that slope protection be provided for ramp R<sub>2</sub>.

Submitted by,

  
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David G. Cochran  
Engineering Geologist II

## NEVADA HIGHWAY DEPARTMENT

SUMMARY OF TEST RESULTS  
FOUNDATIONS AND ENGINEERING GEOLOGY SECTION

## BELLEVUE INTERCHANGE RAMPS

HITING NO.	TOTAL DEPTH (FT.)	STATION OR LOCATION	SAMPLE NO.	SAMPLE DEPTH (FT.)	SAMPLE SIZE (IN.)	N BLOWS /FOOT	SOIL GROUP	UNIT DRY WT. (lb/ft <sup>3</sup> )	UNIT WET WT. (lb/ft <sup>3</sup> )	% WATER CONTENT MINUS 200	ATTERBERG LIMITS			OTHER TESTS PERFORMED	
											P I	L L	P L	Q u = 1.01 Tons/ft <sup>2</sup>	Q u = 1.07 Tons/ft <sup>2</sup>
2 972)	20 "R <sub>2</sub> " 1+32 (7' Rt. ft)		A	0.5-1	1.4	6	SM	119	13	15.5	NP	18			
			B	2-3	1.4	6	SM	126	17	27.7	10	28			
			C	5.5-6.5	1.4	11	SW		21	11.5	NP	28			
			D	10.5-11.5	1.4	25	SW		120	12	12.8	NP	30		
			E	15.5-16.5	1.4	32	SM		18.4	12.5	NP	29			
2 972)	15 "R <sub>3</sub> " 0+77 (4' Rt. ft)		A	0.5-1.5	1.4	15	SM	130	12	20.1	5	26			
			B	2-3	1.4	8	SM		10	17.7	4	25			
			C	3.5-4.5	1.4	14	SW								
			D	5.5-6.5	1.4	21	SW								
			E	10.5-11.5	1.4	29	SW								
6 972)	16.5 "R <sub>1</sub> " 16+22 (ft)		1	0.5-1.5	1.4	3	SM								
			2	2.0-3.0	1.4	8	SM								
			3A	3.5-4.5	1.4	11	SW								
			4	10.5-11.5	1.4	27	SM								
			5	15.5-16.5	1.4	30	SM								
1 967)	64 "P" 11+70 (ft)		A	1-2	1.4	14	CL	95							
			D	8.5-9.5	1.4	33	SM	105							
			E	14-15	1.4	23	SW	97							
			F	18.5-19.5	1.4	40	SW	107							
			G	28.5-29.5	1.4	45	SW								
			H	39-40	1.4	40	SW								
			I	52.5-53.5	1.4	54	SW								
			J	61.5-62.5	1.4	>60	SW								

## NOTATION

Q u = UNCONFINED COMPRESSION,  
 $\delta$  = ANGLE OF SIDE FRICTION  
 S = DIRECT SHEAR,  
 C = CONSOLIDATION,

P I = PLASTICITY INDEX  
 P L = PLASTIC LIMIT  
 L L = LIQUID LIMIT

T = TRIAXIAL COMPRESSION  
 P L = PLASTIC LIMIT

## EVADA HIGHWAY DEPARTMENT

SUMMARY OF TEST RESULTS  
FOUNDATIONS AND ENGINEERING GEOLOGY SECTION

## BELLEVUE INTERCHANGE RAMPS

DRING NO.	TOTAL DEPTH (FT.)	STATION OR LOCATION	SAMPLE NO.	SAMPLE DEPTH (FT.)	SAMPLE SIZE (IN.)	N BLOWS FOOT)	SOIL GROUP	UNIT DRY WT. (lb./ft. <sup>3</sup> )	UNIT WET WT. (lb./ft. <sup>3</sup> )	WATER CONTENT MINUS 200 %	ATTERBERG LIMITS			OTHER TESTS PERFORMED	
											P I	L L	P L	P L	
2 1967)	36	"P" 10+54 (6')	A	1-2	1.4	16	(Fill)	94		8	13	NP	17		
			B	5-6	1.4	8	SM	105		14					
			C	10-11	1.4	31	SW	106		14					
			D	15-16	1.4	36	SW								
			E	20-21	1.4	32	SW								
			F	25-26	1.4	26	SM								
3 1967)	31	"P" 9+40 (6' Rt. £)	G	35.5-36.5	1.4	51	SM								
			A	3.5-4.5	1.4	11	SM								
			B	6-7	1.4	19	SM								
			C	9-10	1.4	26	SW								
			D	13-14	1.4	32	SW								
			E	19-20	1.4	27	SW								
BELLEVUE INTERCHANGE RAMPS LINCOLN COUNTY, NEVADA															

## NOTATION

QU=UNCONFINED COMPRESSION

S=DIRECT SHEAR

C=CONSOLIDATION

 $\phi$ =ANGLE OF SIDE FRICTION

T=TRIAXIAL COMPRESSION

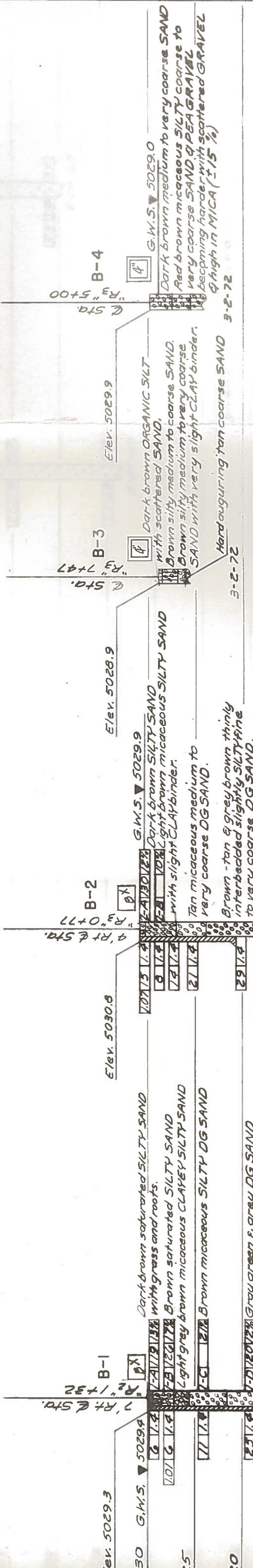
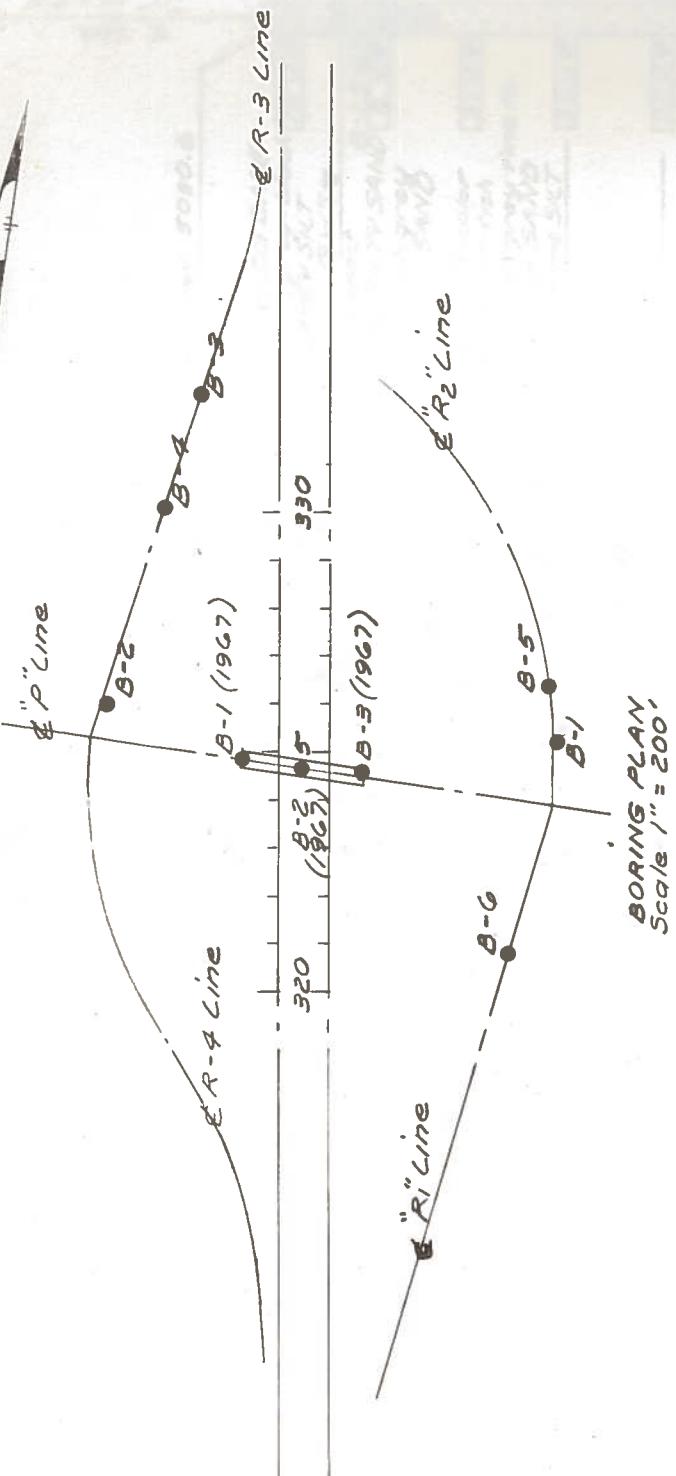
PI=PLASTICITY INDEX

LL=LIQUID LIMIT

PL=PLASTIC LIMIT

**NOTE:**  
Foundation Report Available for Contractors  
Study in District Office & Materials & Testing Div.

STATE	PRODUCT NO.	MAIL PORT	SHIP NO.
NEVADA			



ROCK CLASSIFICATION		SOIL CONSISTENCY CLASSIFICATION	
NAME	SYMBOL	CONSISTENCY	NAME
IGNEOUS ROCK		GRANULAR	CLAY
Metamorphic Rock		Very Loose	FINE
Sedimentary Rock		Loose	Loose
Metamorphic Rock		Slightly	STIFF
Sedimentary Rock		Compact	Very Stiff
Metamorphic Rock		Dense	Hard
Sedimentary Rock		Very Dense	Very Hard

**TEST PITS:**

Bit sizes: (O.D.): "X"=1-13/16", "X"=2-9/32", "X"=2-7/8", "X"=3-1/2".  
Casing sizes: (O.D.): "X"=2-7/8", "X"=3-1/2".  
Blows per ft: (140 lb. Hammer, 30" Free Fall) using a 2" I.D. Sampler.

**NOTES:**

Classification of earth material shown on this sheet is based upon field inspection unless noted otherwise.

**LOG OF TEST BORINGS**

**NEVADA HIGHWAY DEPARTMENT**

**MATERIALS AND TESTING DIVISION**

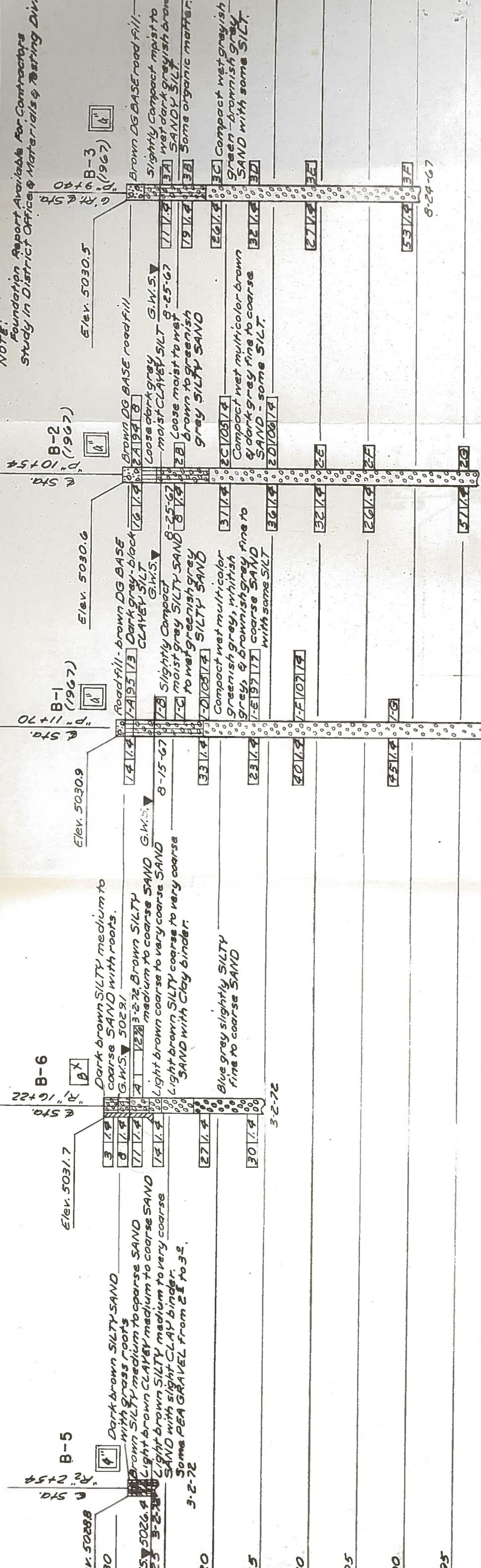
**FOUNDATIONS AND ENGINEERING GEOLOGY SECTION**

**BELLEVUE INTERCHANGE RAMPS**

**WASHOE COUNTY R1.R2.R3.R4.**

**MAIL POST**

**NOTE:** Foundation Report Available for Contractors  
Study in District Office & Materials & Testing Div.



5417.2

ROTARY BORING		PENETRATION BORING		THE UNIFIED SOIL CLASSIFICATION SYSTEM		ROCK CLASSIFICATION		SOIL CONSISTENCY CLASSIFICATION										
B- NO.	Size	Top Hole Elev.	Pushed	Sample Number	Unit Weight Wet (lb/ft <sup>3</sup> )	G.H.S. (Water) □ Elev.	Date Measured	No Count Recorded	Name	HAJ. DIV. LETTER SYMBOL	LATER. SYMBOL	STHNU	NAME	HAJ. DIV. LETTER SYMBOL	LATER. SYMBOL	STHNU	NAME	
1	1/2"	Driven _____	Pushed _____	0	0.00	0	0	0	PLAN OF ANY BORING	AUGER BORING (DRY)			IGNEOUS ROCK	1	1/2"	Pushed	SL1	IGNEOUS ROCK
2	1 1/2"	Sampled (Inches) _____	Pushed	0	0.00	0	0	0	PENETROMETER (FLUSH-COUPLED)	JET BORING			SEDIMENTARY ROCK	2	1 1/2"	Pushed	CL	SEDIMENTARY ROCK
3	2 1/2"	Pushed	Pushed	0	0.00	0	0	0	2" CONE PENETROMETER	DIAMOND CORE BORING.			METAMORPHIC ROCK	3	2 1/2"	Pushed	OL	METAMORPHIC ROCK
4	3 1/2"	Pushed	Pushed	0	0.00	0	0	0	SAMPLER BORING (DRY)	TEST PIT.				4	3 1/2"	Pushed	MH	
5	4 1/2"	Pushed	Pushed	0	0.00	0	0	0	ROTARY BORING (WAT)					5	4 1/2"	Pushed	CH	
6	5 1/2"	Pushed	Pushed	0	0.00	0	0	0	BIT SIZES: (O.D.): "AX"-1 1/16", "BX"-2 9/32", "CX"-2 15/32", "DX"-3 1/8", "EX"-3 1/2".					6	5 1/2"	Pushed	SP	
7	6 1/2"	Pushed	Pushed	0	0.00	0	0	0	CASTING SIZES: (O.D.): "EX"-2 9/32", "FX"-2 15/32", "GX"-3 1/8", "HX"-3 1/2".					7	6 1/2"	Pushed	SN	
8	7 1/2"	Pushed	Pushed	0	0.00	0	0	0	CHNK. D.G.C.					8	7 1/2"	Pushed	OH	
9	8 1/2"	Pushed	Pushed	0	0.00	0	0	0	DATE: 3-12-72					9	8 1/2"	Pushed	PT	
10	9 1/2"	Pushed	Pushed	0	0.00	0	0	0	DATE: NO					10	9 1/2"	Pushed	ML	
11	10 1/2"	Pushed	Pushed	0	0.00	0	0	0						11	10 1/2"	Pushed	SL1	
12	11 1/2"	Pushed	Pushed	0	0.00	0	0	0						12	11 1/2"	Pushed	SL1	
13	12 1/2"	Pushed	Pushed	0	0.00	0	0	0						13	12 1/2"	Pushed	SL1	
14	13 1/2"	Pushed	Pushed	0	0.00	0	0	0						14	13 1/2"	Pushed	SL1	
15	14 1/2"	Pushed	Pushed	0	0.00	0	0	0						15	14 1/2"	Pushed	SL1	
16	15 1/2"	Pushed	Pushed	0	0.00	0	0	0						16	15 1/2"	Pushed	SL1	
17	16 1/2"	Pushed	Pushed	0	0.00	0	0	0						17	16 1/2"	Pushed	SL1	
18	17 1/2"	Pushed	Pushed	0	0.00	0	0	0						18	17 1/2"	Pushed	SL1	
19	18 1/2"	Pushed	Pushed	0	0.00	0	0	0						19	18 1/2"	Pushed	SL1	
20	19 1/2"	Pushed	Pushed	0	0.00	0	0	0						20	19 1/2"	Pushed	SL1	
21	20 1/2"	Pushed	Pushed	0	0.00	0	0	0						21	20 1/2"	Pushed	SL1	
22	21 1/2"	Pushed	Pushed	0	0.00	0	0	0						22	21 1/2"	Pushed	SL1	
23	22 1/2"	Pushed	Pushed	0	0.00	0	0	0						23	22 1/2"	Pushed	SL1	
24	23 1/2"	Pushed	Pushed	0	0.00	0	0	0						24	23 1/2"	Pushed	SL1	
25	24 1/2"	Pushed	Pushed	0	0.00	0	0	0						25	24 1/2"	Pushed	SL1	
26	25 1/2"	Pushed	Pushed	0	0.00	0	0	0						26	25 1/2"	Pushed	SL1	
27	26 1/2"	Pushed	Pushed	0	0.00	0	0	0						27	26 1/2"	Pushed	SL1	
28	27 1/2"	Pushed	Pushed	0	0.00	0	0	0						28	27 1/2"	Pushed	SL1	
29	28 1/2"	Pushed	Pushed	0	0.00	0	0	0						29	28 1/2"	Pushed	SL1	
30	29 1/2"	Pushed	Pushed	0	0.00	0	0	0						30	29 1/2"	Pushed	SL1	
31	30 1/2"	Pushed	Pushed	0	0.00	0	0	0						31	30 1/2"	Pushed	SL1	
32	31 1/2"	Pushed	Pushed	0	0.00	0	0	0						32	31 1/2"	Pushed	SL1	
33	32 1/2"	Pushed	Pushed	0	0.00	0	0	0						33	32 1/2"	Pushed	SL1	
34	33 1/2"	Pushed	Pushed	0	0.00	0	0	0						34	33 1/2"	Pushed	SL1	
35	34 1/2"	Pushed	Pushed	0	0.00	0	0	0						35	34 1/2"	Pushed	SL1	
36	35 1/2"	Pushed	Pushed	0	0.00	0	0	0						36	35 1/2"	Pushed	SL1	
37	36 1/2"	Pushed	Pushed	0	0.00	0	0	0						37	36 1/2"	Pushed	SL1	
38	37 1/2"	Pushed	Pushed	0	0.00	0	0	0						38	37 1/2"	Pushed	SL1	
39	38 1/2"	Pushed	Pushed	0	0.00	0	0	0						39	38 1/2"	Pushed	SL1	
40	39 1/2"	Pushed	Pushed	0	0.00	0	0	0						40	39 1/2"	Pushed	SL1	
41	40 1/2"	Pushed	Pushed	0	0.00	0	0	0						41	40 1/2"	Pushed	SL1	
42	41 1/2"	Pushed	Pushed	0	0.00	0	0	0						42	41 1/2"	Pushed	SL1	
43	42 1/2"	Pushed	Pushed	0	0.00	0	0	0						43	42 1/2"	Pushed	SL1	
44	43 1/2"	Pushed	Pushed	0	0.00	0	0	0						44	43 1/2"	Pushed	SL1	
45	44 1/2"	Pushed	Pushed	0	0.00	0	0	0						45	44 1/2"	Pushed	SL1	
46	45 1/2"	Pushed	Pushed	0	0.00	0	0	0						46	45 1/2"	Pushed	SL1	
47	46 1/2"	Pushed	Pushed	0	0.00	0	0	0						47	46 1/2"	Pushed	SL1	
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50	49 1/2"	Pushed	Pushed	0	0.00	0	0	0						50	49 1/2"	Pushed	SL1	
51	50 1/2"	Pushed	Pushed	0	0.00	0	0	0						51	50 1/2"	Pushed	SL1	
52	51 1/2"	Pushed	Pushed	0	0.00	0	0	0						52	51 1/2"	Pushed	SL1	
53	52 1/2"	Pushed	Pushed	0	0.00	0	0	0						53	52 1/2"	Pushed	SL1	
54	53 1/2"	Pushed	Pushed	0	0.00	0	0	0						54	53 1/2"	Pushed	SL1	
55	54 1/2"	Pushed	Pushed	0	0.00	0	0	0						55	54 1/2"	Pushed	SL1	
56	55 1/2"	Pushed	Pushed	0	0.00	0	0	0						56	55 1/2"	Pushed	SL1	
57	56 1/2"	Pushed	Pushed	0	0.00	0	0	0						57	56 1/2"	Pushed	SL1	
58	57 1/2"	Pushed	Pushed	0	0.00	0	0	0						58	57 1/2"	Pushed	SL1	
59	58 1/2"	Pushed	Pushed	0	0.00	0	0	0						59	58 1/2"	Pushed	SL1	
60	59 1/2"	Pushed	Pushed	0	0.00	0	0	0						60	59 1/2"	Pushed	SL1	
61	60 1/2"	Pushed	Pushed	0	0.00	0	0	0						61	60 1/2"	Pushed	SL1	
62	61 1/2"	Pushed	Pushed	0	0.00	0	0	0						62	61 1/2"	Pushed	SL1	
63	62 1/2"	Pushed	Pushed	0	0.00	0	0	0						63	62 1/2"	Pushed	SL1	
64	63 1/2"	Pushed	Pushed	0	0.00	0	0	0						64	63 1/2"	Pushed	SL1	
65	64 1/2"	Pushed	Pushed	0	0.00	0	0	0						65	64 1/2"	Pushed	SL1	
66	65 1/2"	Pushed	Pushed	0	0.00	0	0	0						66	65 1/2"	Pushed	SL1	
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68	67 1/2"	Pushed	Pushed	0	0.00	0	0	0						68	67 1/2"	Pushed	SL1	
69	68 1/2"	Pushed	Pushed	0	0.00	0	0	0						69	68 1/2"	Pushed	SL1	
70	69 1/2"	Pushed	Pushed	0	0.00	0	0	0						70	69 1/2"	Pushed	SL1	
71	70 1/2"	Pushed	Pushed	0	0.00	0	0	0						71	70 1/2"	Pushed	SL1	
72	71 1/2"	Pushed	Pushed	0	0.00	0	0	0						72	71 1/2"	Pushed	SL1	
73	72 1/2"	Pushed	Pushed	0	0.00	0	0	0						73	72 1/2"	Pushed	SL1	
74	73 1/2"	Pushed	Pushed	0	0.00	0	0	0						74	73 1/2"	Pushed	SL1	
75	74 1/2"	Pushed	Pushed	0	0.00	0	0	0						75	74 1/2"	Pushed	SL1	
76	75 1/2"	Pushed	Pushed	0	0.00	0	0	0						76	75 1/2"	Pushed	SL1	
77	76 1/2"	Pushed	Pushed	0	0.00	0	0	0						77	76 1/2"	Pushed	SL1	
78	77 1/2"	Pushed	Pushed	0	0.00	0	0	0						78	77 1/2"	Pushed	SL1	
79	78 1/2"	Pushed	Pushed	0	0.00	0	0	0						79	78 1/2"	Pushed	SL1	
80	79 1/2"	Pushed	Pushed	0	0.00	0	0	0						80	79 1/2"	Pushed	SL1	
81	80 1/2"	Pushed	Pushed	0	0.00	0	0	0						81	80 1/2"	Pushed	SL1	
82	81 1/2"	Pushed	Pushed	0	0.00	0	0	0						82	81 1/2"	Pushed	SL1	
83	82 1/2"	Pushed	Pushed	0	0.00	0	0	0						83	82 1/2"	Pushed	SL1	
84	83 1/2"	Pushed	Pushed	0	0.00	0	0	0						84	83 1/2"	Pushed	SL1	
85	84 1/2"	Pushed	Pushed	0	0.00	0	0	0						85	84 1/2"	Pushed	SL1	
86	85 1/2"	Pushed	Pushed	0	0.00	0	0	0						86	85 1/2"	Pushed	SL1	
87	86 1/2"	Pushed	Pushed	0	0.00	0	0	0						87	86 1/2"	Pushed	SL1	
88	87 1/2"	Pushed	Pushed	0	0.00	0	0	0						88	87 1/2"	Pushed	SL1	
89	88 1/2"	Pushed	Pushed	0	0.00	0	0	0						89	88 1/2"	Pushed	SL1	
90	89 1/2"	Pushed	Pushed	0	0.00	0	0	0						90	89 1/2"	Pushed	SL1	
91	90 1/2"	Pushed	Pushed	0	0.00	0	0	0						91	90 1/2"	Pushed	SL1	
92	91 1/2"	Pushed	Pushed	0	0.00	0	0	0						92	91 1/2"	Pushed	SL1	
93	92 1/2"	Pushed	Pushed	0	0.00	0	0	0						93	92 1/2"	Pushed	SL1	
94	93 1/2"	Pushed	Pushed	0	0.00	0	0	0						94	93 1/2"	Pushed	SL1	
95	94 1/2"	Pushed	Pushed	0	0.00	0	0	0										

STATE OF NEVADA  
Department of Highways  
Materials and Testing Division

E.A. or Cont. No. 70561  
Con.Sec. or M.P. WA

Lab No. 10-25-72  
Date 4-13-72

REPORT OF CONSOLIDATION AND SHEAR TESTS ON COHESIVE SOILS

Samplers No. 1-A  
Location Bellvue Interchange  
Depth 0-15

Condition of Sample \_\_\_\_\_  
\_\_\_\_\_

Sieve Analysis	100	Hydrometer Analysis	Liquid Limit
Sieve Size	% Pass.	smaller than	18
No. 4	<u>78.1</u>	.02mm	<u>NP</u>
No. 10	<u>93.1</u>	.002mm	<u>2.64 @ 20°C</u>
No. 40	<u>53.4</u>	.001mm	Description of Soil
No. 200	<u>15.5</u>		<u>COARSE SAND</u>

Consolidation

Load tons/sq.ft.	Void Ratio e	Permeability, K ft/day	Amount of Settlement, feet/foot at 50% consol.	C <sub>v</sub> , sq ft/day at 50% consol.	Primary Compression ratio, r
Initial					
1/4					
1/2					
1					
2					
4					
8					
Unload					
2					
1/2					
1/16					

Moisture Content	Initial	Final	Remarks
Degree of Saturation			

Direct Shear\* or Triaxial Compression\*\*

Normal Stress, or Chamber pressure

0	1	2	3	4

Shear Maximum, S<sub>m</sub>, psf

Displacement at s<sub>m</sub>

Shear Ultimate, S<sub>u</sub>, psf

Displacement at s<sub>u</sub>

Moisture Content: Initial/Final

Degree of Saturation: Initial/Final

Void Ratio: Initial unit weight  
Final

Angle of Internal Friction, φ<sub>a</sub>

Cohesion, C

13.2 %      13.1 %      18.0 %      22.8

117 pcf      120 pcf      104 pcf      -

Remarks:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

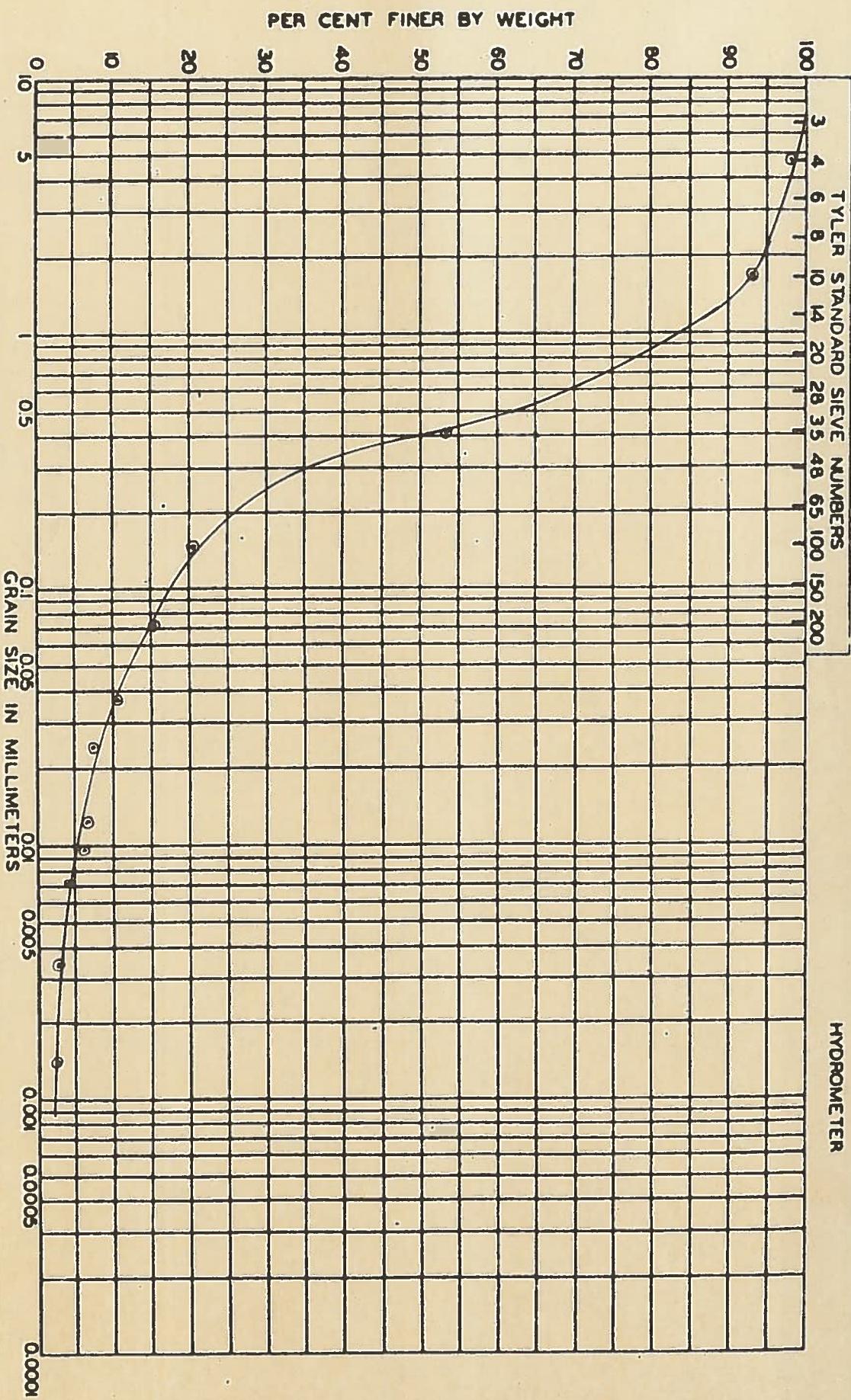
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GRAIN SIZE DISTRIBUTION DIAGRAM

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Lab No. F0-24-72  
Date 4-13-72

REPORT OF CONSOLIDATION AND SHEAR TESTS ON COHESIVE SOILS

Samplers No. 3-A  
Location Bellvue Interchange  
Depth

Condition of Sample undisturbed

Sieve Analysis	100
Sieve Size	% Pass.
No. 4	77.8
No. 10	87.6
No. 40	45.9
No. 200	20.1

Hydrometer Analysis	
smaller than	%
.02mm	13.8
.002mm	6.2
.001mm	5.9

Liquid Limit 26  
Plasticity Index 5  
Specific Gravity 2.64 @ 20°C  
Description of Soil medium sand

Consolidation

Load tons/sq.ft.	Void Ratio e	Permeability, K ft/day
Initial		
1/4		
1/2		
1		
2		
4		
8		
Unload		
2		
1/2		
1/16		

Amount of Settlement, feet/foot at 50% consol.	C <sub>v</sub> , sq ft/day at 50% consol.	Primary Compression ratio, r
Initial		
Final	Remarks	

Moisture Content  
Degree of Saturation

Initial

Normal Stress, or Chamber pressure

Shear Maximum, S<sub>m</sub>, psf TOTAL LOAD

Displacement at S<sub>m</sub>

Shear Ultimate, S<sub>u</sub>, psf

Displacement at S<sub>u</sub>

Moisture Content: Initial/Final

Degree of Saturation: Initial/Final

Void Ratio: Initial UNIT WT.  
Final

Angle of Internal Friction, φ<sub>a</sub>

Cohesion, C

UNCONFINED COMPRESSION	(1)	(2)	(3)	(4)
292.3 psf	1570 psf	1930 psf	1148 psf	
13.2	9.5%	13.5	10.1%	
126.0 pcf	129.0 pcf	136.0 pcf	134.7 pcf	

Remarks: By J.M.

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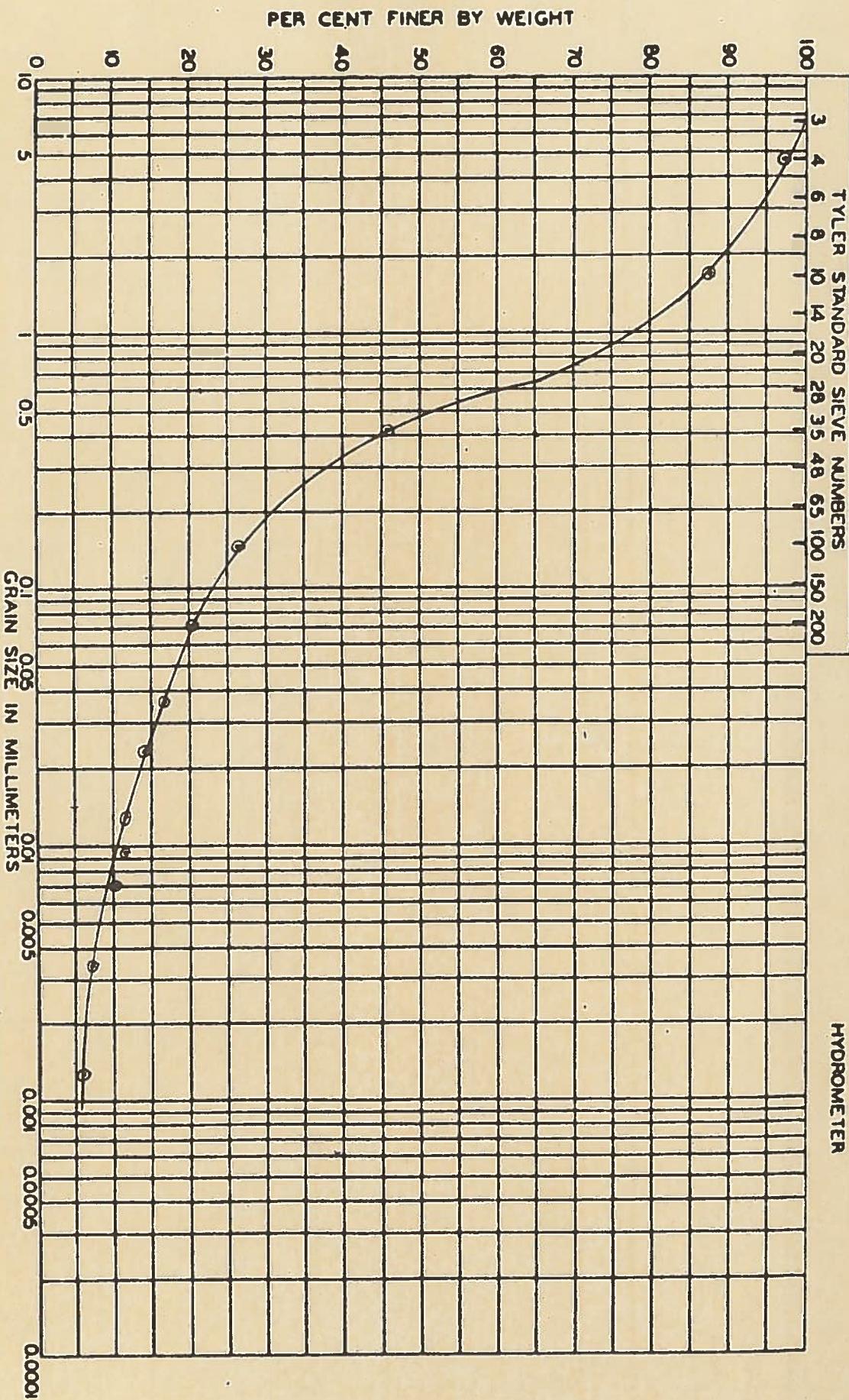
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HYDROMETER



MEDIUM GRAVEL	FINE GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY
U.S. BUREAU OF SOILS CLASSIFICATION							

PROJECT Bellvue Interchange      BORING NO. 2      SAMPLE NO. 29  
 DEPTH \_\_\_\_\_ ELEVATION \_\_\_\_\_ REMARKS \_\_\_\_\_

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Lab No. F0-31-72

Date 4-13-72

REPORT OF CONSOLIDATION AND SHEAR TESTS ON COHESIVE SOILS

Samplers No. 6-A

Location Bellvue Interchange

Depth \_\_\_\_\_

Condition of Sample \_\_\_\_\_

Sieve Analysis

Sieve Size	% Pass.
No. 4	<u>98.5</u>
No. 10	<u>89.6</u>
No. 40	<u>53.5</u>
No. 200	<u>16.5</u>

Hydrometer Analysis

smaller than	%
.02mm	<u>7.8</u>
.002mm	<u>2.1</u>
.001mm	<u>0.9</u>

% moist.

12.7

Liquid Limit 19

Plasticity Index NP

Specific Gravity 2.64 @ 20°C

Description of Soil \_\_\_\_\_

COARSE SAND

Consolidation

Load tons/sq.ft.	Void Ratio e	Permeability, K ft/day	Amount of Settlement, feet/foot at 50% consol.	$C_v$ , sq ft/day at 50% consol.	Primary Compression ratio, r
Initial					
1/4					
1/2					
1					
2					
4					
8					
Unload					
2					
1/2					
1/16					

Initial

Final

Remarks \_\_\_\_\_

Moisture Content

Degree of Saturation \_\_\_\_\_

Direct Shear\* or Triaxial Compression\*\*

Normal Stress, or Chamber pressure \_\_\_\_\_

Shear Maximum,  $S_m$ , psf \_\_\_\_\_

Displacement at  $S_m$  \_\_\_\_\_

Shear Ultimate,  $S_u$ , psf \_\_\_\_\_

Displacement at  $S_u$  \_\_\_\_\_

Moisture Content: Initial/Final \_\_\_\_\_

Degree of Saturation: Initial/Final \_\_\_\_\_

Void Ratio: Initial \_\_\_\_\_

Final \_\_\_\_\_

Angle of Internal Friction,  $\phi_a$  \_\_\_\_\_

Cohesion, C \_\_\_\_\_

Remarks: \_\_\_\_\_

By J.M.

J. M. DESMOND, Chief Materials & Testing Eng'r.

By

Sparks

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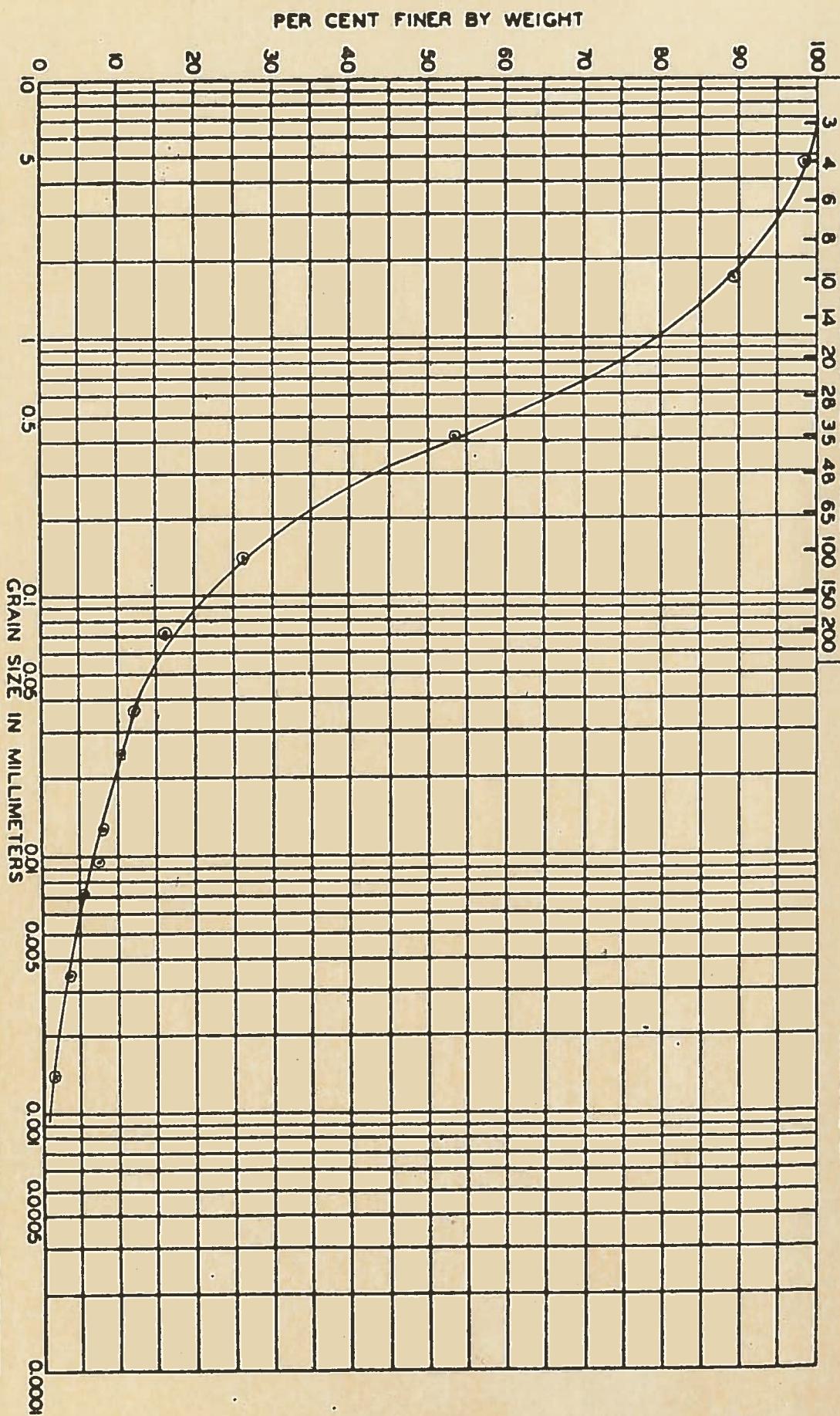
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TYLER STANDARD SIEVE NUMBERS  
3 4 6 8 10 14 20 28 35 48 65 100 150 200

HYDROMETER



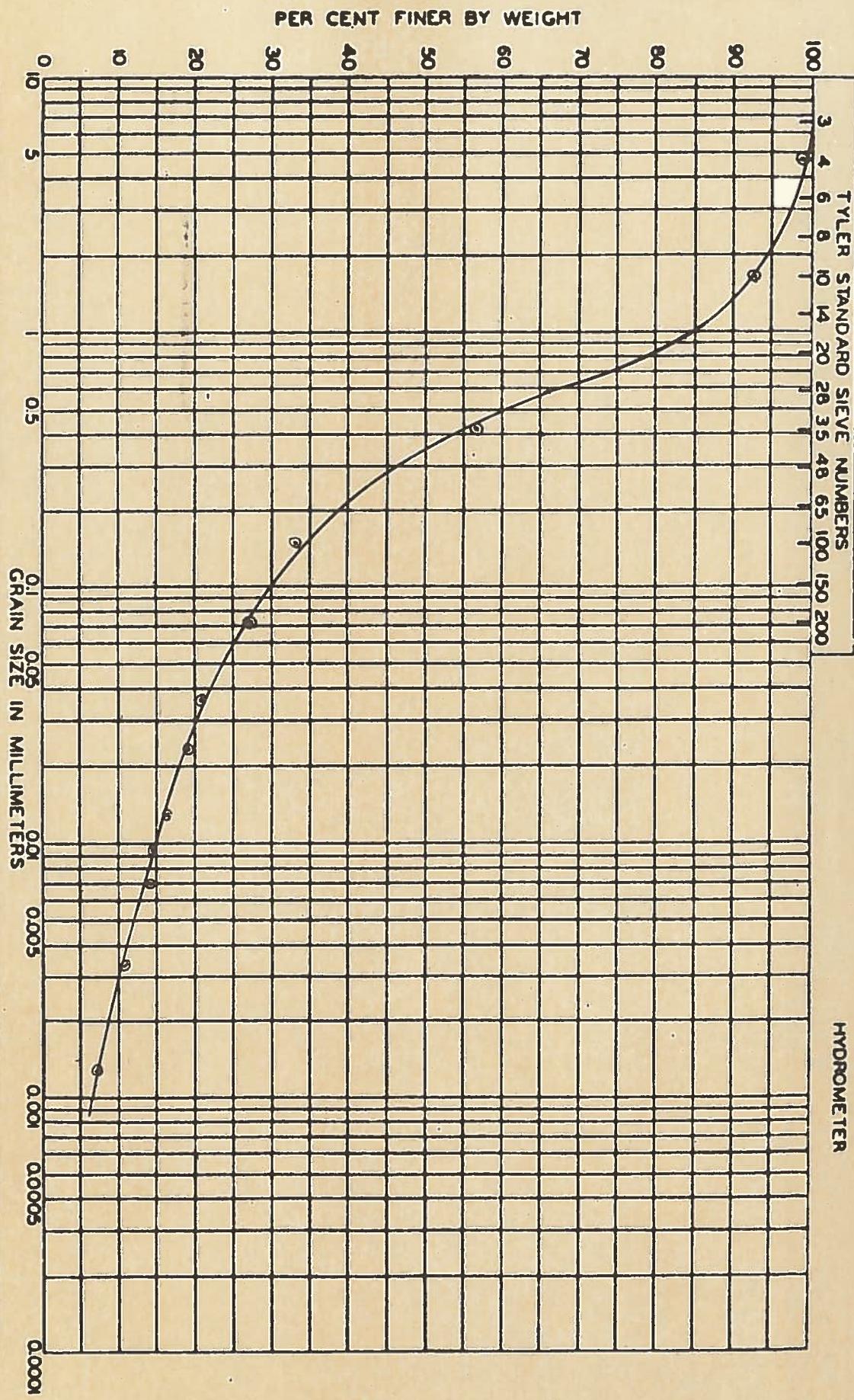
MEDIUM GRAVEL	FINE GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY
U.S. BUREAU OF SOILS CLASSIFICATION							

PROJECT Bellvue Interchange      BORING NO. 6-A      SAMPLE NO. C-A  
 DEPTH \_\_\_\_\_ ELEVATION \_\_\_\_\_ REMARKS \_\_\_\_\_

GRAIN SIZE DISTRIBUTION DIAGRAM



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GRAIN SIZE DISTRIBUTION DIAGRAM

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Lab No. F0-30-72  
Date 4-13-72

REPORT OF CONSOLIDATION AND SHEAR TESTS ON COHESIVE SOILS

2-B

6-2B

Samplers No.

Location Bellvue Interchange

Depth \_\_\_\_\_

Sieve Analysis	<u>1/2</u>	<u>100</u>
Sieve Size	<u>7/8</u>	<u>98.9</u>
No. 4		<u>93.0</u>
No. 10		<u>76.4</u>
No. 40		<u>37.6</u>
No. 200		<u>17.7</u>

Hydrometer Analysis	smaller than	%
	.02mm	<u>12.9</u>
	.002mm	<u>7.5</u>
	.001mm	<u>6.8</u>

% moist.	<u>10.5</u>	<input checked="" type="checkbox"/>
Liquid Limit	<u>25</u>	
Plasticity Index	<u>4</u>	
Specific Gravity	<u>2.66 @ 20°C</u>	
Description of Soil	<u>COARSE SAND</u>	

Consolidation

Load tons/sq.ft.	Void Ratio e	Permeability, K ft/day	Amount of Settlement, feet/foot at 50% consol.	C <sub>v</sub> , sq ft/day at 50% consol.	Primary Compression ratio, r
Initial					
1/4					
1/2					
1					
2					
4					
8					
Unload					
2					
1/2					
1/16					

Initial

Final

Remarks

Moisture Content  
Degree of Saturation

Direct Shear\* or Triaxial Compression\*\*

Normal Stress, or Chamber pressure

Shear Maximum, S<sub>m</sub>, psf

Displacement at S<sub>m</sub>

Shear Ultimate, S<sub>u</sub>, psf

Displacement at S<sub>u</sub>

Moisture Content: Initial/Final

Degree of Saturation: Initial/Final

Void Ratio: Initial

Final

Angle of Internal Friction, Ø<sub>a</sub>

Cohesion, C

Remarks:

*By J.M.*

J. M. DESMOND, Chief Materials & Testing Engr.

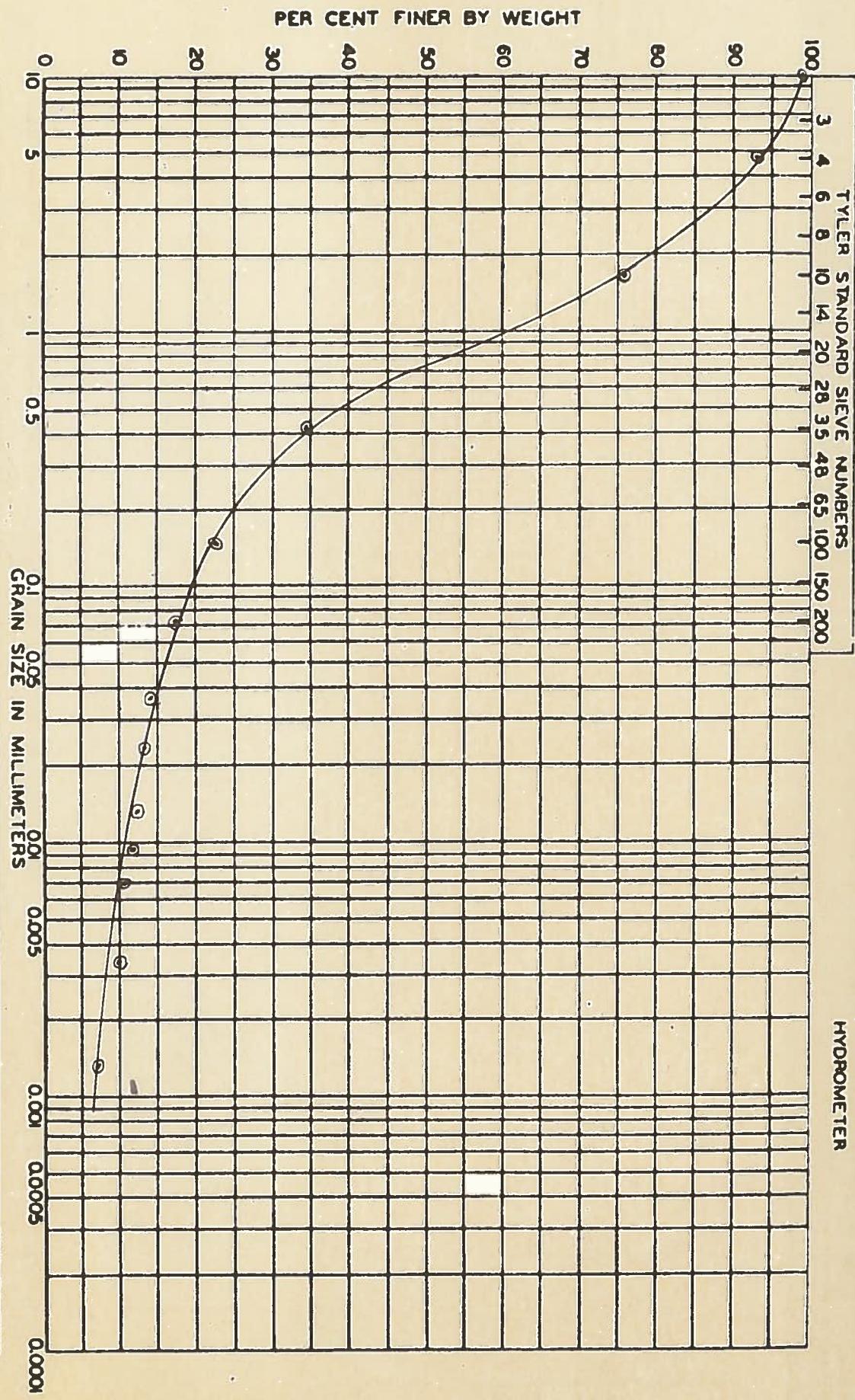
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*Sample*

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Lab No. Fo-27-72

Date 4-13-72

REPORT OF CONSOLIDATION AND SHEAR TESTS ON COHESIVE SOILS

Samplers No. 1-C  
Location Bellvue Interchange  
Depth \_\_\_\_\_

Condition of Sample \_\_\_\_\_

<u>Sieve Analysis</u>	<u>100</u>	<u>Hydrometer Analysis</u>	<u>% moist.</u>	<u>20.7</u>
<u>Sieve Size</u>	<u>% Pass.</u>	<u>smaller than</u>	<u>%</u>	
No. 4	<u>99.2</u>	.02mm	<u>7.2</u>	Liquid Limit <u>28</u>
No. 10	<u>90.8</u>	.002mm	<u>4.3</u>	Plasticity Index <u>NP</u>
No. 40	<u>49.0</u>	.001mm	<u>4.0</u>	Specific Gravity <u>2.66 @ 20°C</u>
No. 200	<u>11.5</u>			Description of Soil <u>COARSE-MEDIUM SAND</u>

Consolidation

<u>Load</u> <u>tons/sq.ft.</u>	<u>Void Ratio</u> <u>e</u>	<u>Permeability, K</u> <u>ft/day</u>	<u>Amount of</u> <u>Settlement,</u> <u>feet/foot at</u> <u>50% consol.</u>	<u>C<sub>v</sub>,</u> <u>sq ft/day at</u> <u>50% consol.</u>	<u>Primary</u> <u>Compression</u> <u>ratio, r</u>
Initial					
1/4					
1/2					
1					
2					
4					
8					
Unload					
2					
1/2					
1/16					
		<u>Initial</u>	<u>Final</u>	<u>Remarks</u>	

Moisture Content  
Degree of Saturation

<u>Direct Shear* or Triaxial Compression**</u>	
Normal Stress, or Chamber pressure	
Shear Maximum, $s_m$ , psf	
Displacement at $s_m$	
Shear Ultimate, $s_u$ , psf	
Displacement at $s_u$	
Moisture Content: Initial/Final	
Degree of Saturation: Initial/Final	
Void Ratio: Initial	
Final	
Angle of Internal Friction, $\phi_a$	
Cohesion, C	

Remarks:

By Jm

J. M. PLUMOND, Chief Materials & Testing Eng'r.

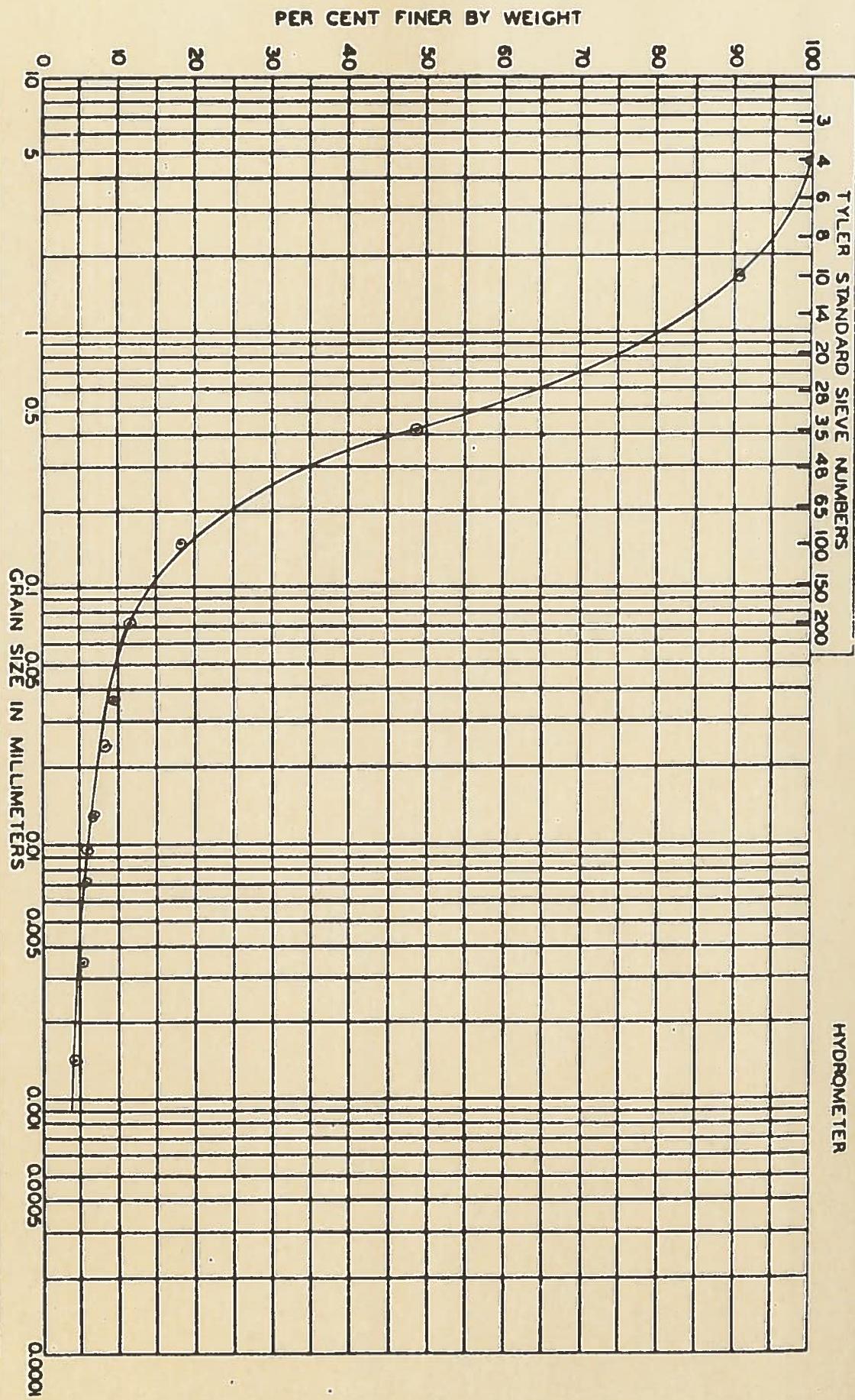
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GRAIN SIZE DISTRIBUTION DIAGRAM

STATE OF NEVADA  
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Lab No. F-28-72  
Date 4-13-72

REPORT OF CONSOLIDATION AND SHEAR TESTS ON COHESIVE SOILS

Samplers No. 4-10

Location Bellvue Interchange

Depth 11"

Condition of Sample \_\_\_\_\_

Sieve Analysis 100  
Sieve Size % Pass.  
No. 4 91.5  
No. 10 70.6  
No. 40 39.8  
No. 200 12.8

Hydrometer Analysis  
smaller than %  
.02mm 7.1  
.002mm 2.3  
.001mm 1.4

% moist. 12.4  
Liquid Limit 30  
Plasticity Index NP  
Specific Gravity 2.67 @ 20°C  
Description of Soil \_\_\_\_\_

Consolidation

Load tons/sq.ft.	Void Ratio e	Permeability, K ft/day	Amount of Settlement, feet/foot at 50% consol.	C <sub>v</sub> , sq ft/day at 50% consol.	Primary Compression ratio, r
Initial					
1/4					
1/2					
1					
2					
4					
8					
Unload					
2					
1/2					
1/16					

Initial

Final

Remarks \_\_\_\_\_

Moisture Content  
Degree of Saturation

Direct Shear\* or Triaxial Compression\*\*

Normal Stress, or Chamber pressure

Shear Maximum, S<sub>m</sub>, psf

Displacement at S<sub>m</sub>

Shear Ultimate, S<sub>u</sub>, psf

Displacement at S<sub>u</sub>

Moisture Content: Initial/Final

Degree of Saturation: Initial/Final

Void Ratio: Initial UNIT wt.  
Final

Angle of Internal Friction, φ<sub>a</sub>  
Cohesion, C

120 psf

121 psf

120 psf

Remarks:

By J.M.

J. M. DESMOND, Chief Materials & Testing Engr.

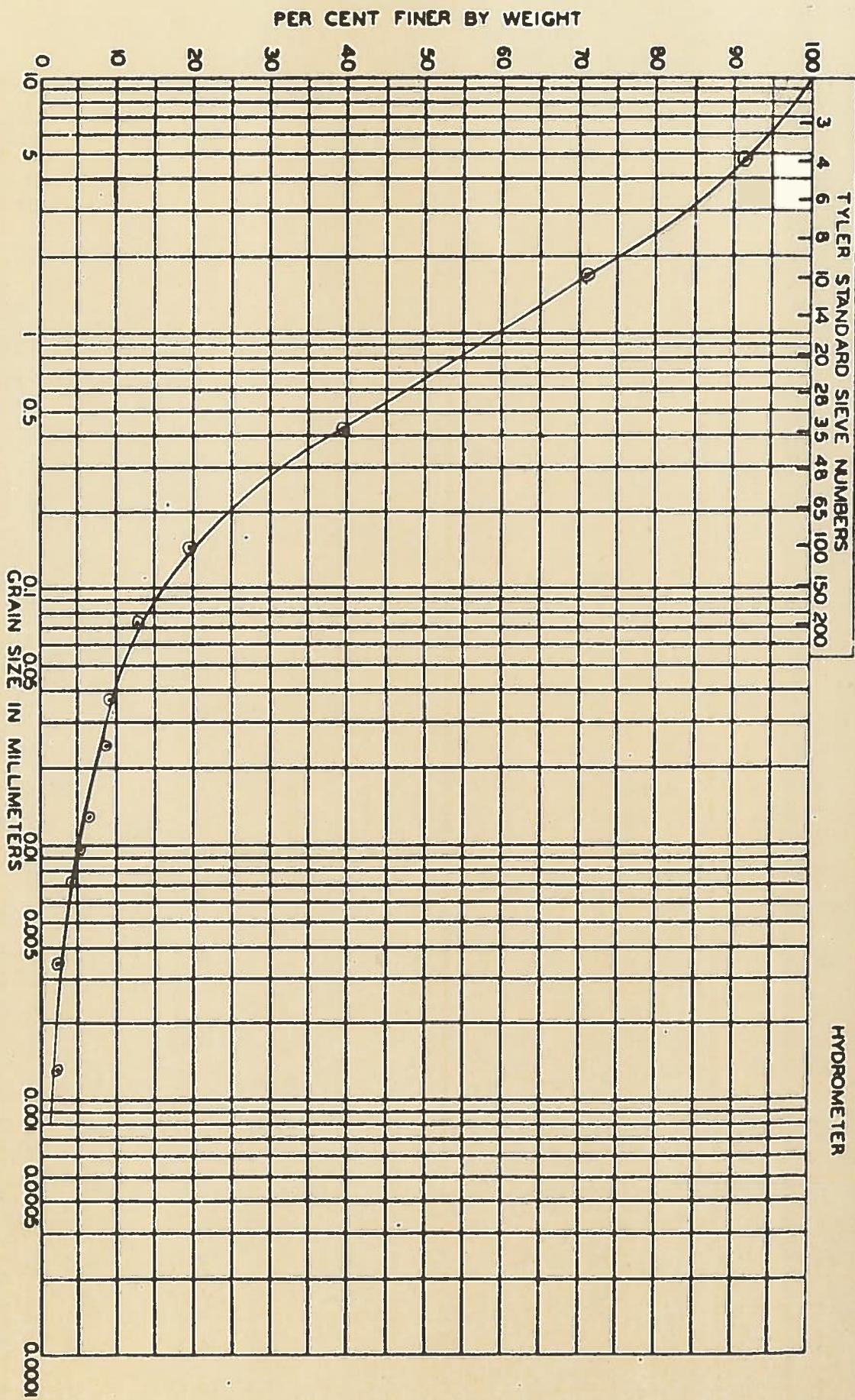
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GRAIN SIZE DISTRIBUTION DIAGRAM

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Date 4-13-72

REPORT OF CONSOLIDATION AND SHEAR TESTS ON COHESIVE SOILS

Samplers No. 1-E

Location Bellvue Interchange

Depth \_\_\_\_\_

Sieve Analysis	$\frac{1}{4}$	<u>100</u>
	$\frac{1}{8}$	<u>98.5</u>
Sieve Size	% Pass.	Hydrometer Analysis
No. 4	<u>76.4</u>	smaller than %
No. 10	<u>87.7</u>	.02mm
No. 40	<u>49.8</u>	.002mm
No. 200	<u>12.5</u>	.001mm

Condition of Sample \_\_\_\_\_

% moist. 18.4

Liquid Limit 29

Plasticity Index NP

Specific Gravity 2.67 @ 20°C

Description of Soil COARSE SAND

Consolidation

Load tons/sq.ft.	Void Ratio e	Permeability, K ft/day	Amount of Settlement, feet/foot at 50% consol.	$C_v$ , sq ft/day at 50% consol.	Primary Compression ratio, r
Initial					
1/4					
1/2					
1					
2					
4					
8					
Unload					
2					
1/2					
1/16					

Initial

Final

Remarks \_\_\_\_\_

Moisture Content  
Degree of Saturation

Direct Shear\* or Triaxial Compression\*\*

Normal Stress, or Chamber pressure

Shear Maximum,  $S_m$ , psf

Displacement at  $s_m$

Shear Ultimate,  $S_u$ , psf

Displacement at  $s_u$

Moisture Content: Initial/Final

Degree of Saturation: Initial/Final

Void Ratio: Initial

Final

Angle of Internal Friction,  $\phi_a$

Cohesion, C

Remarks: \_\_\_\_\_

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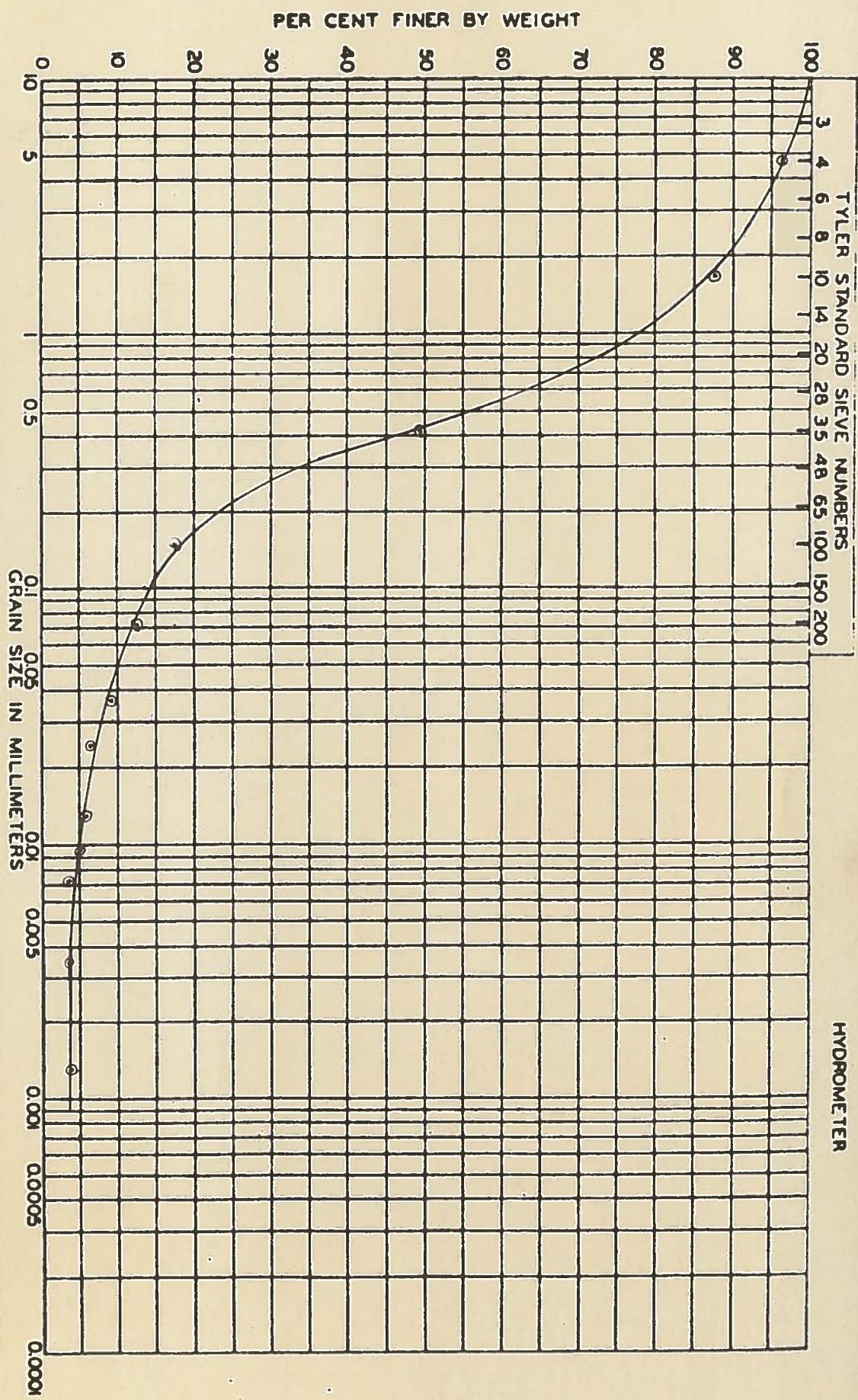
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PROJECT Bellview Interchange  
DEPTH \_\_\_\_\_ ELEVATION \_\_\_\_\_ REMARKS \_\_\_\_\_

**REMARKS.**

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## GRAIN SIZE DISTRIBUTION DIAGRAM