7-85

NEVADA
DEPARTMENT OF TRANSPORTATION

FOUNDATION REPORT

B-1262 N&S AND B-1263 N&S

CRADLEBAUGH AND SLOUGH BRIDGES

DOUGLAS COUNTY NEVADA

SEPT. 1985

E.A. NO. 70985

PROJECT NO. F-395-1(3)

GEOTECHNICAL SECTION
MATERIALS AND TESTION DIVISION

NEVADA

DEPARTMENT OF TRANSPORTATION

FOUNDATION REPORT

B-1262 N. & S. AND B-1263 N. & S.

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PROJECT NO. F-395-1(3)

GEOTECHNICAL SECTION

MATERIALS AND TESTING DIVISION

INTRODUCTION

During April and June, 1985, the Geotechnical Section of the Materials and Testing Division performed a field study at the site of the proposed new structures B-1262S and B-1263S and at the site of B-1262N for its proposed widening. This study was performed to determine the scour depth and foundation conditions underlying these structures.

The field study consisted of six rotary borings. Samples were obtained using a Standard Penetration sampler driven by a 140-pound hammer dropping 30 inches.

All field work was performed under the direct supervision of an Engineering Geologist.

GEOLOGY, SCOUR DEPTH, GROUND WATER

These sites are located in the Carson Valley which is bounded by the Carson Range on the west and by the Pine Nut Mountain Range on the east. The Carson River has extensively meandered across the Carson Valley and has a quite extensive flood plain. The river is in extreme old age, therefore, the majority of the valley is flat. The sediment in this flat flood plain area is fine grained and mostly clay, silt and fine sands. The remainder of the valley is a moderately sloping alluvial fan with coarse to fine grained sediments.

The soils encountered in the borings were largely very loose to very dense, clean sands with lesser amounts of silty sand and sandy clay. The relative density of the sands varied throughout the depth of the boring, but are

generally denser with depth.

The depth of geologically recent scour is estimated to be at the following elevations:

BORING	ELEVATION
B-1	4646 ±
B-2	4634 ±
B-3	Not indicated
B-4	4638 ±
B-5	4641 ±
B-6	4633 ±

Ground water was present at the following elevations:

BORING	ELEVATION
B-1	4647.1
B-2	Artesian Flow
B-3	4647.7
B-4	4646.3
B-5	4645.9
B-6	4645.9

FOUNDATION RECOMMENDATIONS

Some difficulty was experienced during the exploratory drilling operations due to caving. This, along with the high water table, indicates that some difficulty could be encountered in constructing forms for footings. Driven piles are, therefore, recommended for support.

Steel 60 or 70 ton, 12-3/4 pipe piles with a 1/4" wall-thickness are recommended. See the "Summary of Foundation Recommendations" for pile tip elevations.

As an alternate, Concrete 60 or 70 ton, 10-inch square, piles may be used.

Boring B-6 shows a very dense sand layer with a blow count of 100 at a depth of 29$^{+}_{-}$ feet. The pipe piles may crumple under this type of driving condition, therefore, predrilling may be required to reach minimum tip, so as not to damage the pile.

A pile load test should be conducted at Pier #2 of B-1262S.

The channel slope as shown on the preliminary plans is a 1-1/2:1 slope at the abutments. Due to the depth of the water table a slope of 2:1 or 3:1 is recommended to prevent the sloughing of the slopes.

P-Y curves for the soil lateral resistance to steel 12-3/4" pipe piles are shown in figures 1-4. The P-Y curves for the 10" concrete piles were not generated at this time, but the lateral soil resistance is estimated to be within 10% of the values shown on the curves.

For ground response characterization of the site, "rock like" material is believed to be greater than 200 feet deep.

Respectfully submitted,

Patricia L. Schoener

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Engineering Geologist III

PLS:jls

NEVADA DEPARTMENT OF TRANSPORTATION
ENGINEERING GEOLOGY AND FOUNDATIONS SECTION

Cradlebaugh & Slough Bridges

SUMMARY OF TEST RESULTS

E.A. 70985

Boring 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.^{3})	Unit Wet Wt. (lb/ft.^{3})	Water Content %	% Minus 200	Atterberg Limits			Other Tests Performed
												PI	LL	PL	
B-1	82.5	"X" 371+90 70' Lt.	A	0.0-2.0	1.4	14/24	SM			8.0	32.7	NP	21		
			B	2.0-4.0	1.4	15/20	SM/CL			22.1	57.0	11	30		
			C	4.0-6.0	1.4	4/9	SM			26.0	28.4	NP	24		
			D	6.0-8.0	1.4	10	SM			24.9	15.5	NP	22		
B-4	7.53	"X" 368+40 70' Lt.	F	33.8-35.8	1.4	16	CL			41.9	79.0	15	45		

NOTATION

QU = Unconfined Compression
S = Direct Shear
C = Consolidation
T = Triaxial Compression
δ = Angle of Side Friction
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit

NEVADA DEPARTMENT OF TRANSPORTATION

ENGINEERING GEOLOGY & FOUNDATIONS SECTION

SUMMARY OF FOUNDATION RECOMMENDATIONS

CRADLEBAUGH BRIDGES B-1262 N & S
E.A. 70985

Support	Support Station	Recommended Support Type	Base of Footing or Pile Tip Elevation	Safe Allowable Design Load	Alternate Support Type and Safe Allowable Design Load	Alternate Support Base of Footing or Pile Tip Elevation	Special Considerations
Abutment 1	"N" 365+41.89 "S" 365+41.89	12 3/4" Pipe Pile	Min. 4609 des. 4604	60 Tons	10" square concrete pile 60 & 70 Tons	Min. 4609 des. 4604	Pipe piles shall have a ¼" wall thickness
			Min. 4609 des. 4604	70 Tons		Min. 4609 des. 4604	
Pier 1	"N" 365+86.89 "S" 365+86.89	12 3/4" pipe pile	Min. 4607 des. 4599	60 Tons	10" square concrete pile 60 & 70 Tons	Min. 4607 des. 4603	
			Min. 4607 des. 4590	70 Tons		Min. 4607 des. 4599	
Pier 2	"N" 366+31.89 "S" 366+31.89	12 3/4" Pipe Pile	Min. 4607 des. 4599	60 Tons	10" square concrete pile 60 & 70 Tons	Min. 4607 des. 4603	
			Min. 4607 des. 4590	70 Tons		Min. 4607 des. 4599	
Pier 3	"N" 366+76.87 "S" 366+76.89	12 3/4" Pipe Pile	Min. 4607 des. 4599	60 Tons	10" square concrete pile 60 & 70 Tons	Min. 4607 des. 4603	
			Min. 4607 des. 4590	70 Tons		Min. 4607 des. 4599	

NEVADA DEPARTMENT OF TRANSPORTATION

ENGINEERING GEOLOGY & FOUNDATIONS SECTION

SUMMARY OF FOUNDATION RECOMMENDATIONS

CRADLEBAUGH BRIDGES B-1262 N & S
E.A. 70985

Support	Support Station	Recommended Support Type	Base of Footing or Pile Tip Elevation	Safe Allowable Design Load	Alternate Support Type and Safe Allowable Design Load	Alternate Support Base of Footing or Pile Tip Elevation	Special Considerations
Pier 4	"N" 367+21.89 "S" 367+21.89	12 3/4" Pipe Pile	Min. 4607 des. 4599 Min. 4607 des. 4590	60 Tons 70 Tons	10" square concrete piles 60 & 70 Tons	Min. 4607 des. 4603 Min. 4607 des. 4599	Pipe piles shall have a ¼" wall thickness
Pier 5	"N" 367+66.89 "S" 367+66.89	12 3/4" Pipe Pile	Min. 4607 des. 4599 Min. 4607 des. 4590	60 Tons 70 Tons	10" square concrete piles 60 & 70 Tons	Min. 4607 des. 4603 Min. 4607 des. 4599	
Abutment 2	"N" 368+11.89 "S" 368+11.89	12 3/4" Pipe piles	Min. 4610 des. 4600 Min. 4610 des. 4591	60 Tons 70 Tons	10" square concrete piles 60 & 70 Tons	Min. 4610 des. 4680 Min. 4610 des. 4604	

NEVADA DEPARTMENT OF TRANSPORTATION

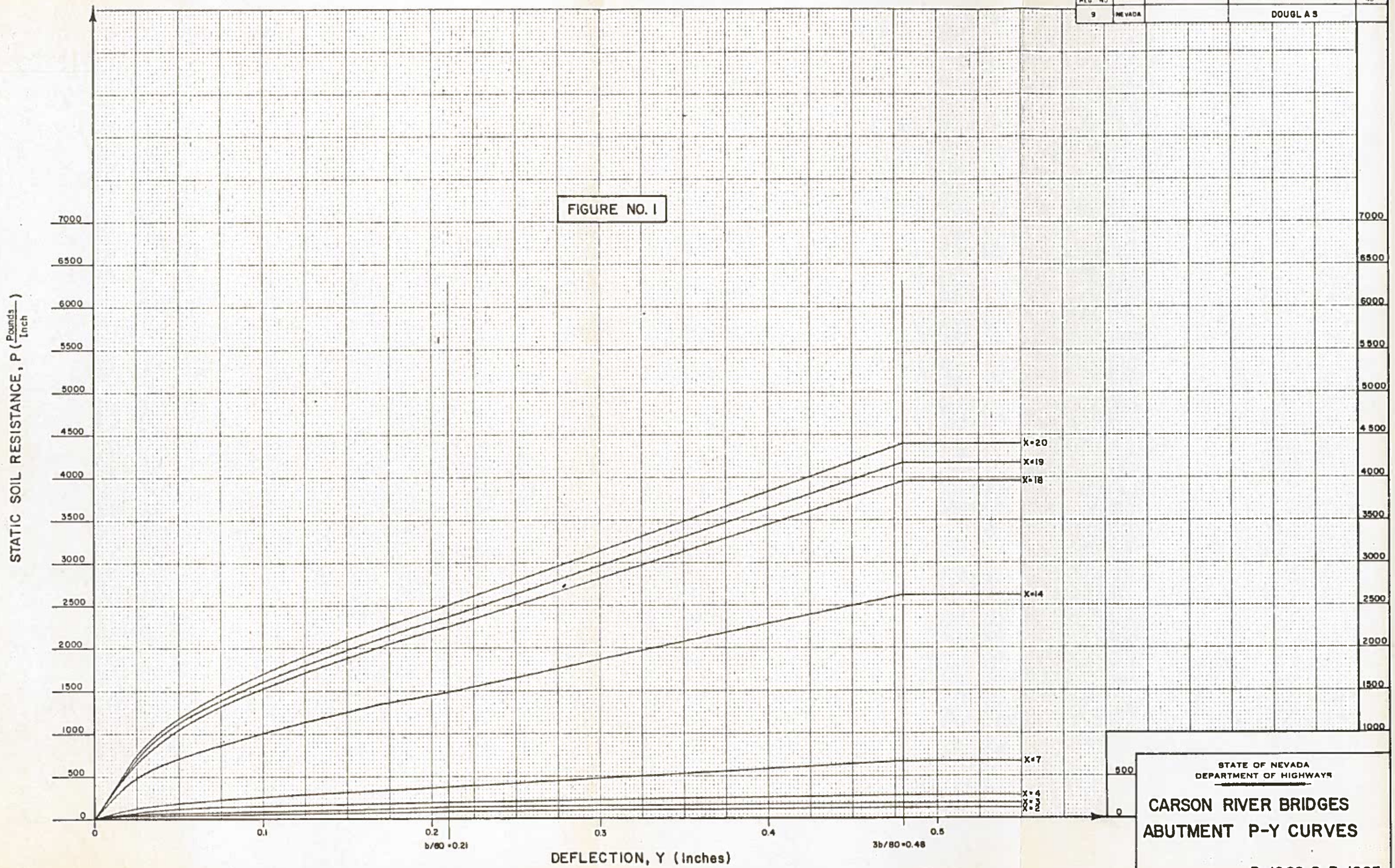
ENGINEERING GEOLOGY & FOUNDATIONS SECTION

SUMMARY OF FOUNDATION RECOMMENDATIONS

SLOUGH BRIDGE B-1263 S
E.A. 70985

Support	Support Station	Recommended Support Type	Base of Footing or Pile Tip Elevation	Safe Allowable Design Load	Alternate Support Type and Safe Allowable Design Load	Alternate Support Base of Footing or Pile Tip Elevation	Special Considerations
Abutment 1	"S" 370+87.89	12 3/4" Pipe pile	Min. 4611 des. 4598	60 Tons	10" square concrete pile 60 & 70 Tons	Min. 4611 des. 4606	Pipe piles shall have a ¼" wall thickness
			Min. 4611 des. 4589	70 Tons		Min. 4611 des. 4602	
Pier 1	"S" 371+32.89	12 3/4" Pipe pile	Min. 4610 des. 4585	60 Tons	10" square concrete pile 60 & 70 Tons	Min. 4610 des. 4595	
			Min. 4610 des. 4580	70 Tons		Min. 4610 des. 4591	
Abutment 2	"S" 371+77.89	12 3/4" Pipe pile	Min. 4610 des. 4572	60 Tons	10" square concrete pile 60 & 70 Tons	Min. 4610 des. 4584	
			Min. 4610 des. 4571	70 Tons		Min. 4610 des. 4580	

FED RD REG NO	STATE	PROJECT NO	COUNTY	SHEET NO
9	NEVADA		DOUGLAS	

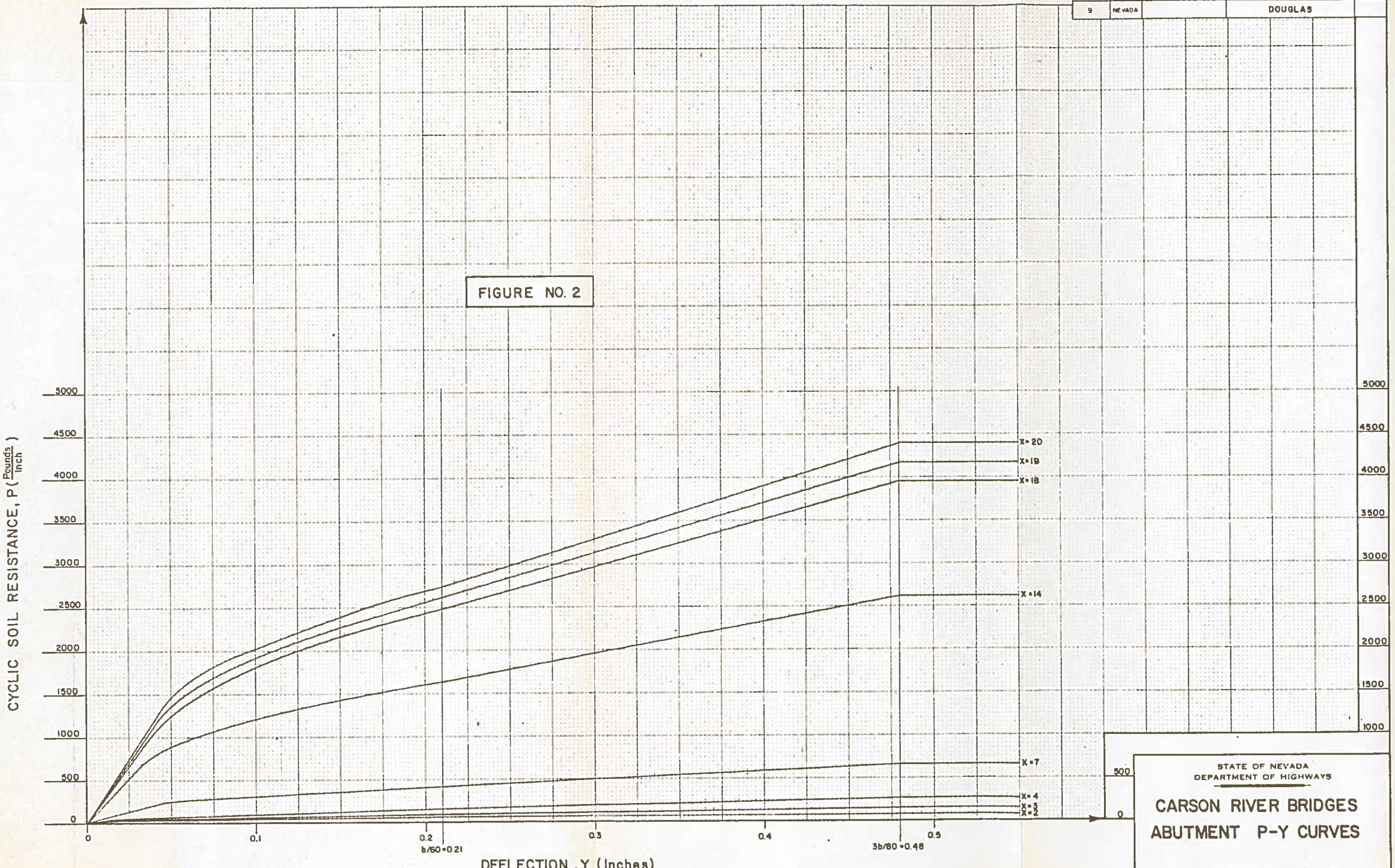


STATE OF NEVADA
DEPARTMENT OF HIGHWAYS

CARSON RIVER BRIDGES
ABUTMENT P-Y CURVES

B-1262 & B-1263

FED RD REG NO	STATE	PROJECT NO	COUNTY	SHEET NO
9	NEVADA		DOUGLAS	



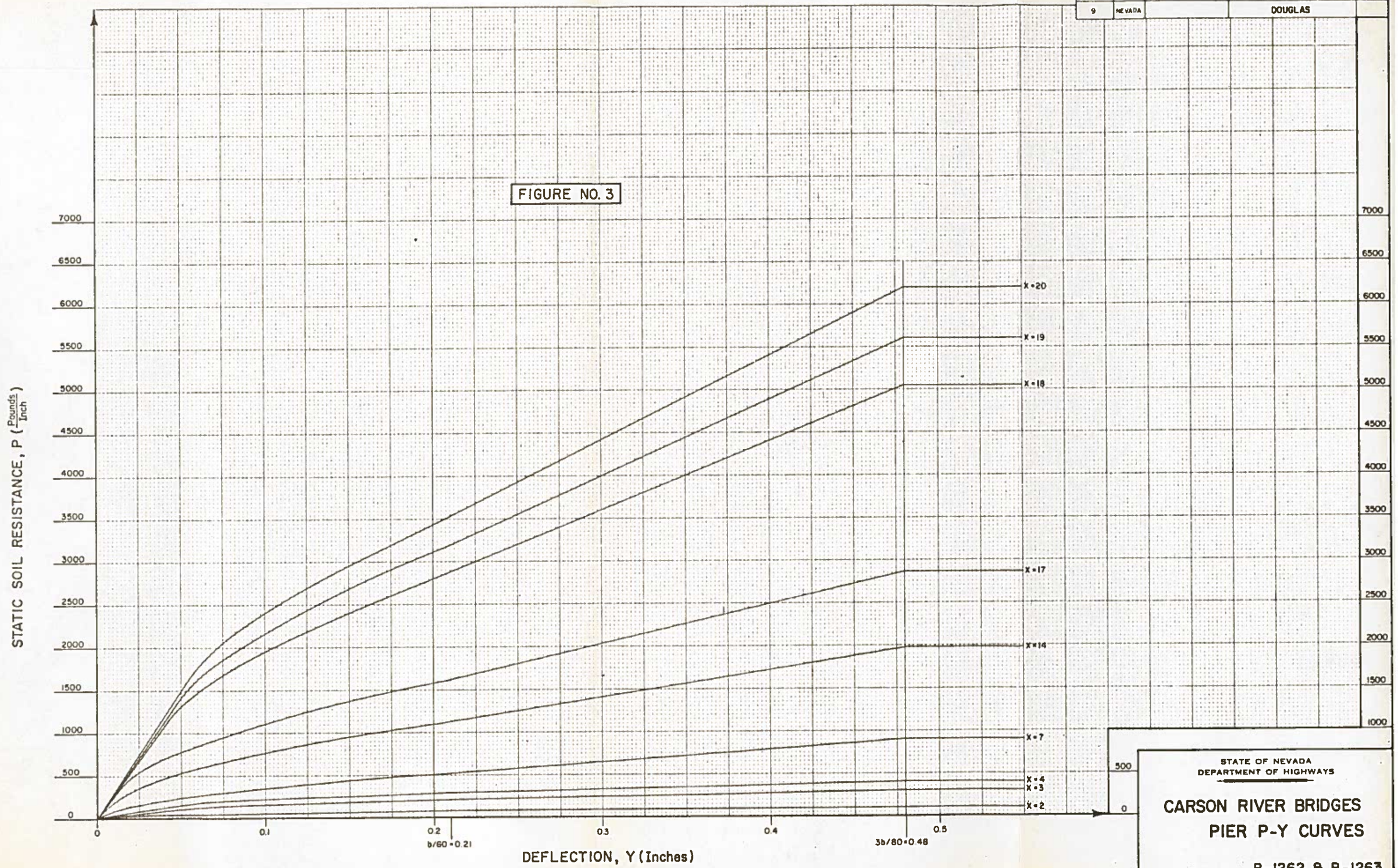
STATE OF NEVADA
DEPARTMENT OF HIGHWAYS

CARSON RIVER BRIDGES
ABUTMENT P-Y CURVES

B-1262 & B-1263

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA		DOUGLAS	

FIGURE NO. 3



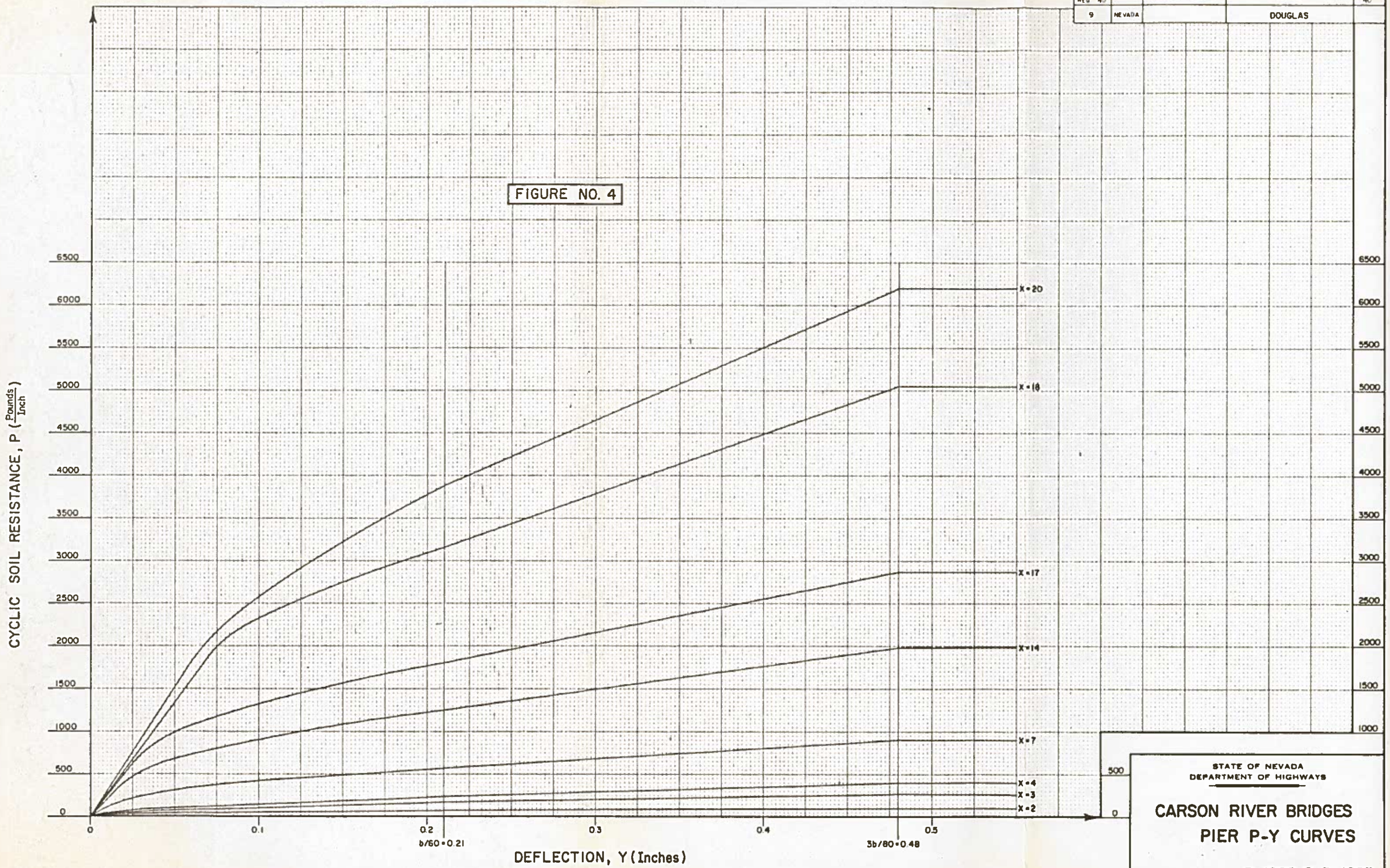
STATE OF NEVADA
DEPARTMENT OF HIGHWAYS

CARSON RIVER BRIDGES
PIER P-Y CURVES

B-1262 & B-1263

FED RD REG NO	STATE	PROJECT NO	COUNTY	NO
9	NEVADA		DOUGLAS	

FIGURE NO. 4



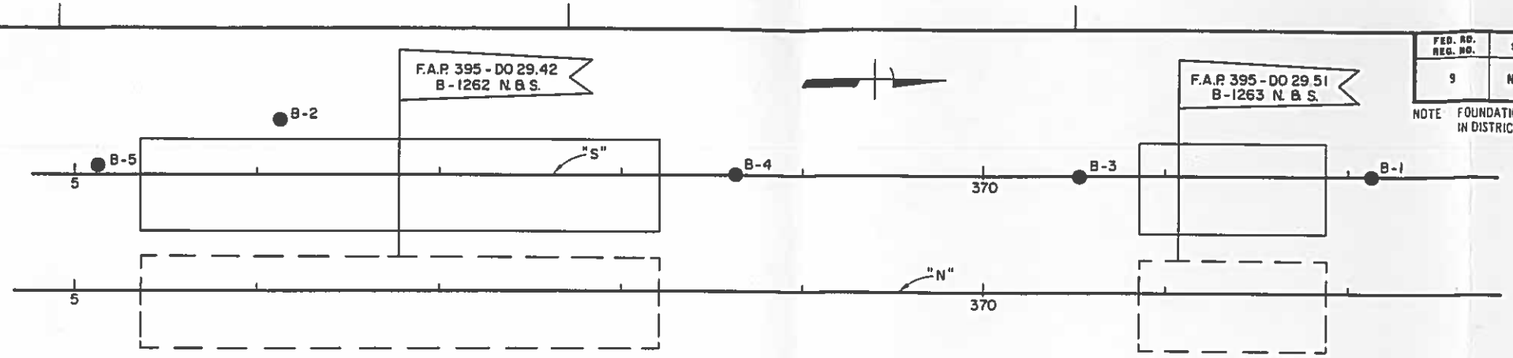
STATE OF NEVADA
DEPARTMENT OF HIGHWAYS

CARSON RIVER BRIDGES
PIER P-Y CURVES

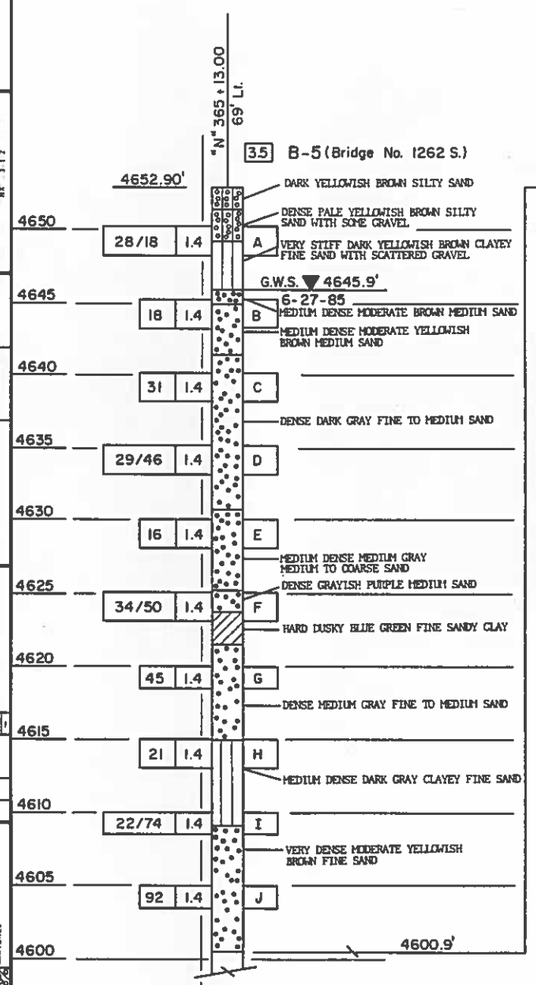
B-1262 & B-1263

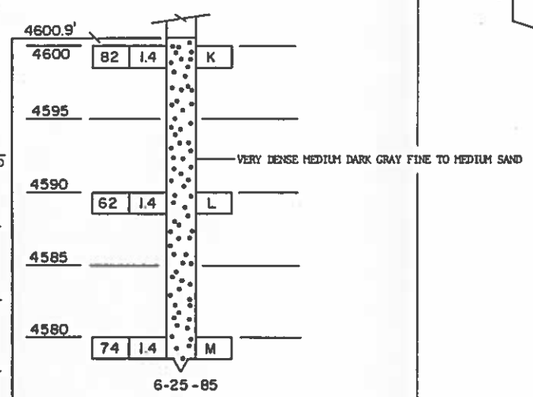
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA		DOUGLAS	

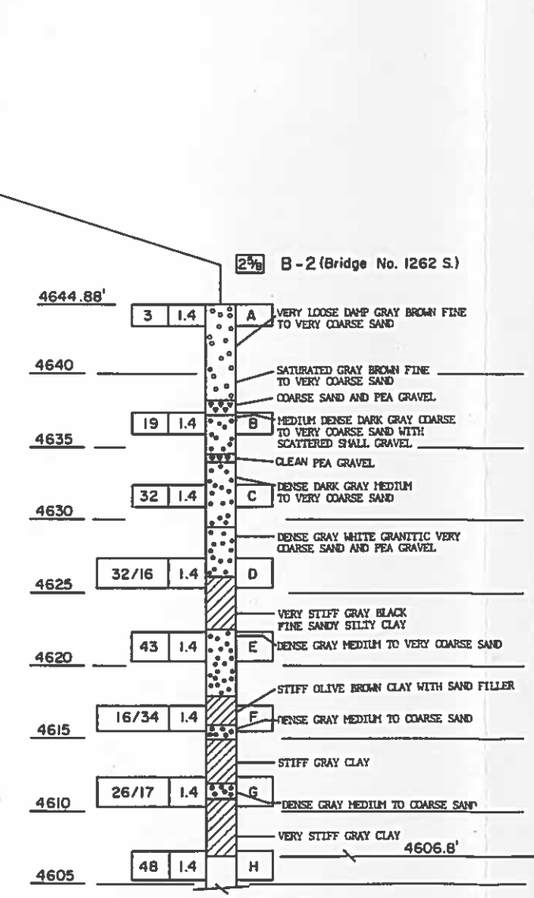
NOTE FOUNDATION REPORT AVAILABLE FOR CONTRACTORS STUDY IN DISTRICT OFFICE AND MATERIALS & TESTING DIVISION



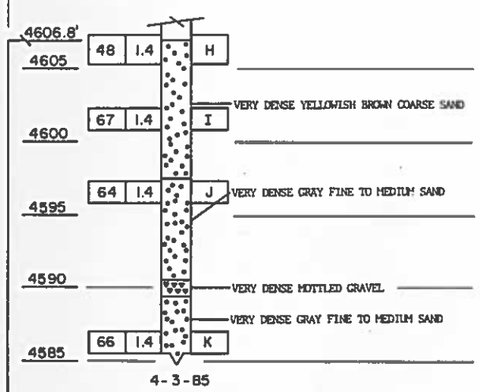
BORING PLAN

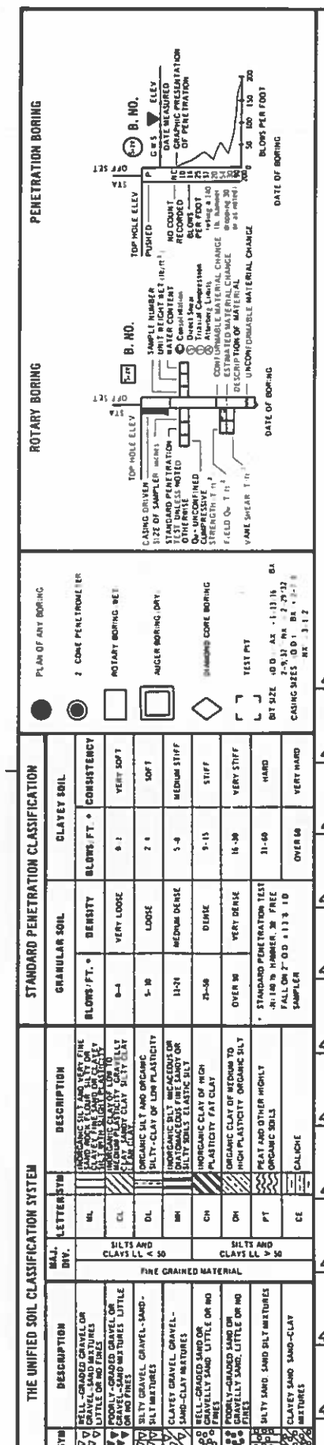






ARTESIAN WATER – Water Table Could Not Be Established.





NEVADA DEPARTMENT OF TRANSPORTATION
MATERIALS AND TESTING DIVISION
Geotechnical Section

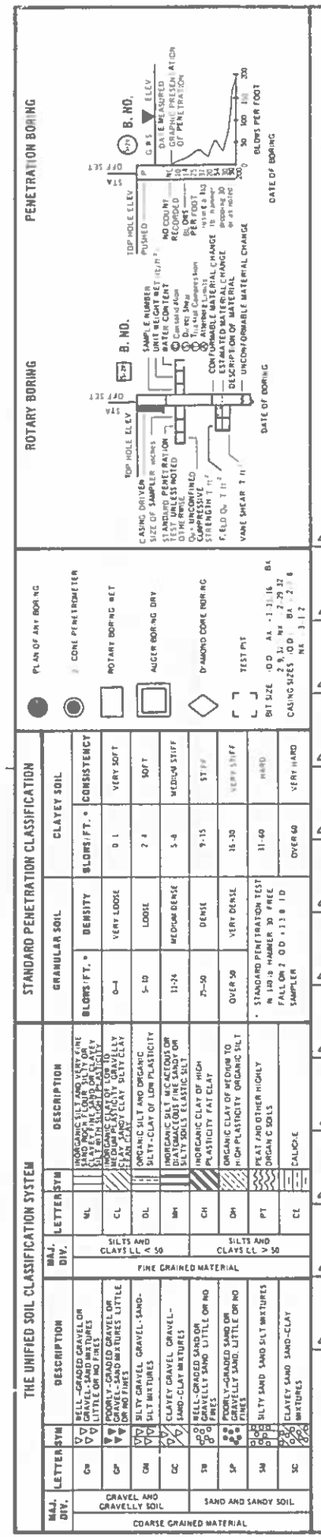
CRADLEBAUGH BRIDGE

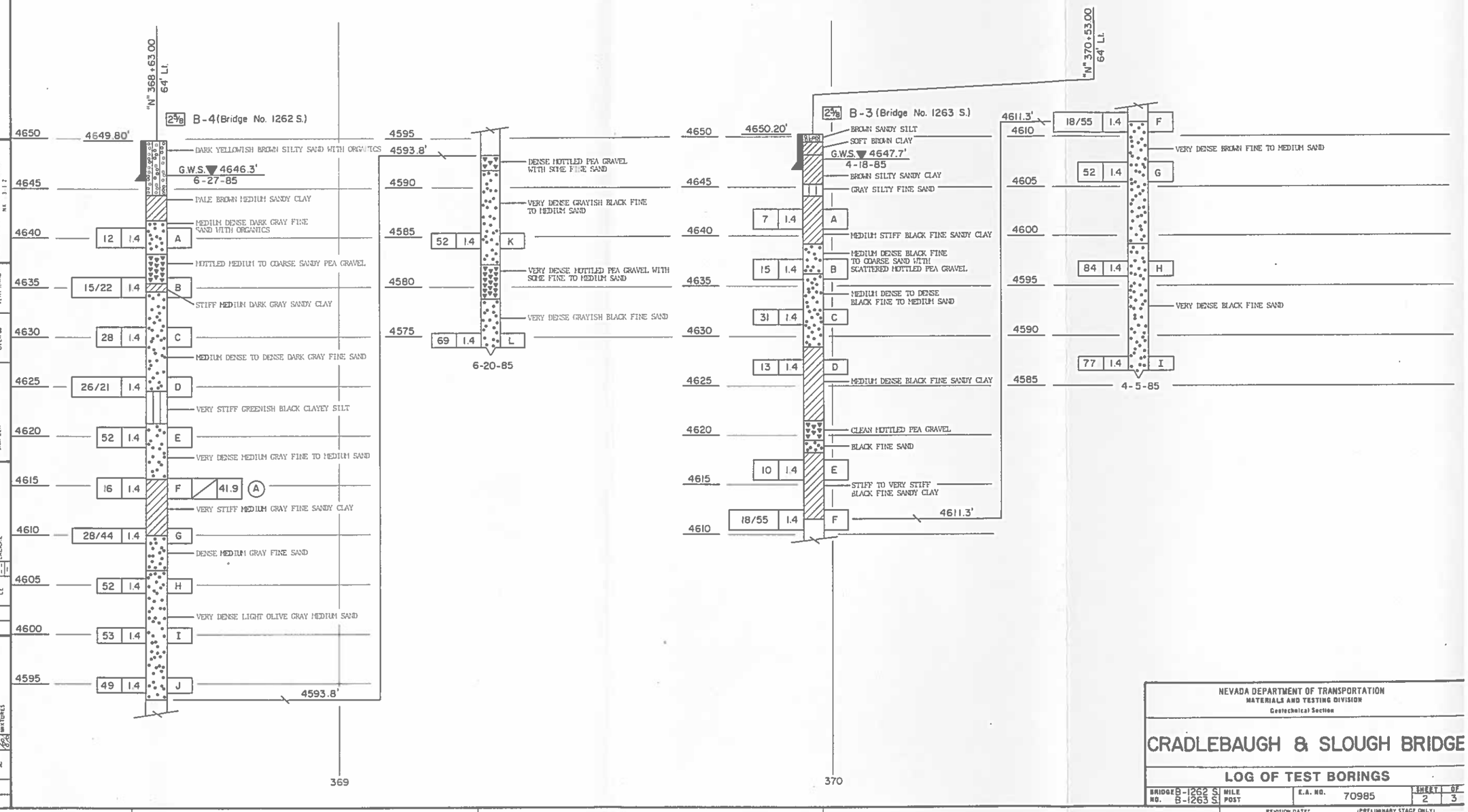
LOG OF TEST BORINGS

BRIDGE NO.	MILE POST	E.A. NO.	SHEET	OF
B-1262 S.		70985	1	3

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA		DOUGLAS	

NOTE: FOUNDATION REPORT AVAILABLE FOR CONTRACTORS STUDY IN DISTRICT OFFICE AND MATERIALS & TESTING DIVISION





NEVADA DEPARTMENT OF TRANSPORTATION
MATERIALS AND TESTING DIVISION
Geotechnical Section

CRADLEBAUGH & SLOUGH BRIDGE

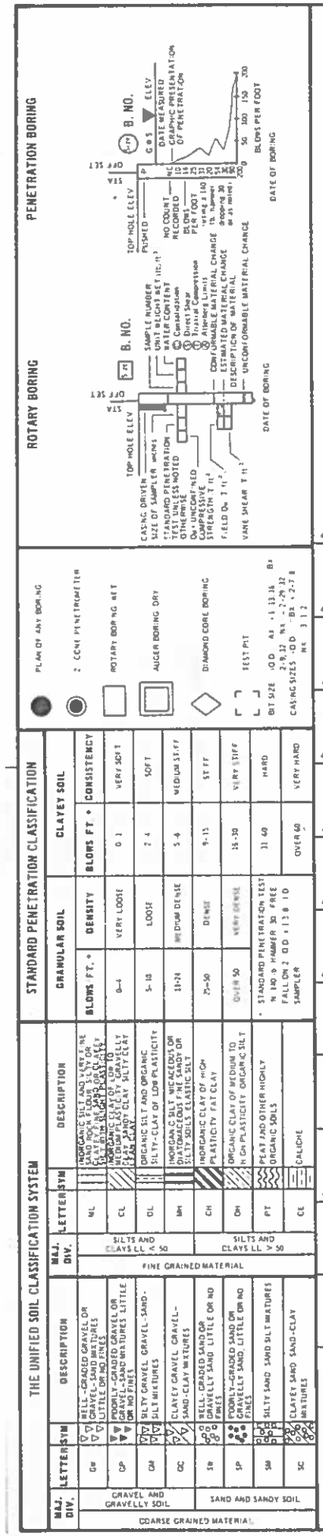
LOG OF TEST BORINGS

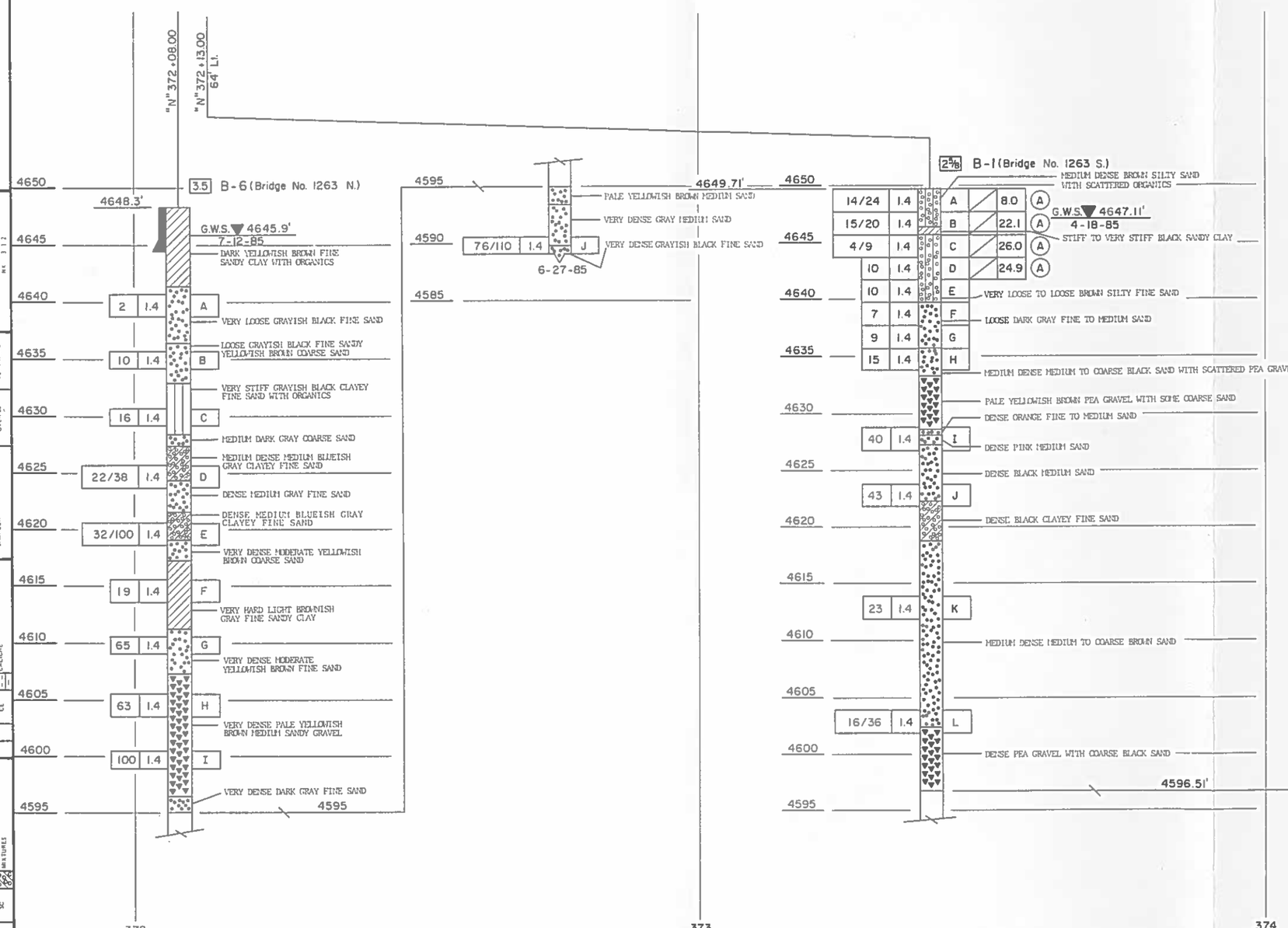
BRIDGE NO.	B-1262 S. B-1263 S.	MILE POST	E.A. NO. 70985	SHEET 2 OF 3

REVISION DATES (PRELIMINARY STAGE ONLY)

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA		DOUGLAS	

NOTE: FOUNDATION REPORT AVAILABLE FOR CONTRACTORS STUDY IN DISTRICT OFFICE AND MATERIALS & TESTING DIVISION





NEVADA DEPARTMENT OF TRANSPORTATION
MATERIALS AND TESTING DIVISION
Geotechnical Section

SLOUGH BRIDGE

LOG OF TEST BORINGS

BRIDGE NO.	B-1263 N / B-1263 S	MILE POST	E.A. NO.	70985	SHEET	OF
					3	3

REVISION DATES (PRELIMINARY STAGE ONLY)