23-75

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Keating

NEVADA STATE HIGHWAY DEPARTMENT

FOUNDATION REPORT

GOWAN ROAD GRADE SEPARATION (H-1217)

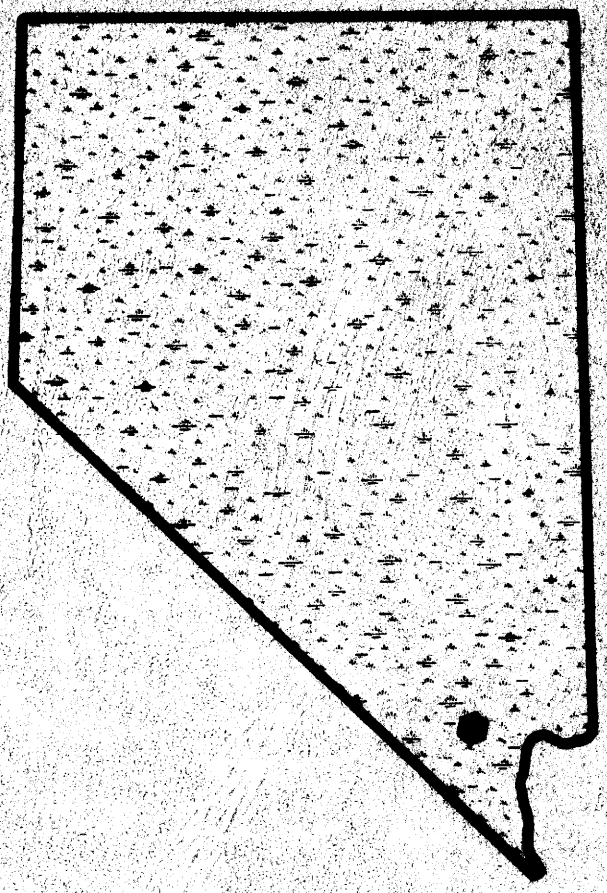
Document 7
CLARK
2

RAINBOW EXPRESSWAY LAS VEGAS, NEVADA

OCTOBER 1975

E.A. NO. 76604

PROJECT NO. F-FF-RF-006-2(5) QF-006-2 (10)



Contract 1638

ENGINEERING GEOLOGY & FOUNDATION SECTION
MATERIALS & TESTING DIVISION

GOWAN ROAD GRADE SEPARATION
FOUNDATION REPORT

SCOPE

This report deals with the foundation considerations involving the design and construction of a grade separation structure at the Gowan Road crossing of the proposed US 95 Expressway in Las Vegas. This structure is to be of a a three span continuous, reinforced concrete design with 17 foot approach fills.

FOUNDATION INVESTIGATION

A foundation investigation was conducted during the latter part of September and the early part of October of 1975 for this structure. A total of two wet rotary and five auger borings were completed. Standard Penetration Test samples were taken at regular intervals in each of these seven borings for field classification and soil strength parameters.

SOILS DESCRIPTION

The soils underlying this site to a depth of at least 90 feet consist primarily of layers of compact silt or clayey silt. Field tests performed on this material tend to classify this material as primarily silt; however this soil reacts more as a clay under laboratory Atterberg limit tests. Small caliche fragments and fine gravel are scattered throughout much of the above material. Randomly distributed, small lenses of caliche are also extant. A well-cemented, four foot thick layer of caliche was encountered at depths of 37.5 and 39.5 feet in borings B3 and B2 respectively.

Ground water was not encountered in any of the seven borings; the deepest of which was 90 feet. According to the drillers log of a nearby

municipal water well located near the intersection of Gowan Road and Torrey Pines Drive, the depth of the highest aquifer is 177 feet. At a depth of 167 feet, a 107 foot thick layer of gravel was encountered in that boring.

FOUNDATION RECOMMENDATIONS

APPROACH FILLS

The construction of these two 17 foot high approach fills should pose no problems. Due to the absence of ground water in the upper foundation material, settlement from the imposed load will occur at a rapid rate, without causing any stability problems. The magnitude of this settlement is estimated to be about 6 inches under the center line of these fills.

PIERS

The piers of this structure may be supported on spread footings at 4000 psf when founded at elevation 2298±. If this allowable pressure is inadequate, then the use of piles is recommended. HP 10 x 57 piles driven into the caliche layer at elevation 2269 should safely support a 60 ton load. Some predrilling may be necessary to drive these piles to the above elevation. Any standard cast-in-place pile would also be suitable, but the use of an H-pile would probably present fewer driving problems in this material.

ABUTMENTS

The abutments may be placed in compacted granular fill as shown in the preliminary drawing at 3000 psf.

It is proposed to construct a retaining wall for a pedestrian-equestrian path between the south abutment and pier No. 1 at a later date following

completion of this structure. This will necessitate some removal of material on the side slope protecting the south abutment, and this could present foundation problems for the south abutment. For this reason it is stongly recommended that this retaining wall be constructed concurrently with the grade separation structure.

Daniel J. Keating

Daniel J. Keating
Civil Engineer II

TABULAR SUMMARY OF FOUNDATION RECOMMENDATIONS

FOR
GOWAN ROAD GRADE SEPARATION
(H1217)

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
North and South Abuts		Spread Footing	Fill	3000 psf			
Piers 1 & 2		Spread Footing	2298	4000 psf	HP 10 x 57 60 Ton	2269 Design	If piles are used run one load test

MILE POST	SHEET NO.

B-4

C 718+81
42' RT.
2309.9
3.5

29	21	1.4
20	"	
22	38	"
42	70	"

LOOSE LT BR VF SANDY SILT

COMPACT LT BRN SILT W/SCATTERED CALICHE FRAGMENTS

COMPACT LT BRN SILT

LT BRN PARTIALLY CEMENTED VF SANDY SILT W/SCATTERED CALICHE FRAGMENTS

LT BRN SILT W/SCATTERED CALICHE FRAGMENTS & FINE GRAVEL

10-14-75

B-1

C 718+174
16' RT.
2309.3
3.5

11		1.4
29	"	
17	12	"
16	28	"
32	73	"
53	28	"
67	100+	"
100+		"

LOOSE LT BRN VF SANDY SILT

SLIGHTLY COMPACT WHT-BRN DRY PARTIALLY CEMENTED SILT

COMPACT LT BRN SILT W/SCATTERED WHT CEMENTED SILT FRAGMENTS

SLIGHTLY COMPACT LT BRN SILT W/SCATTERED WHT CEMENTED SILT FRAGMENTS

SLIGHTLY COMPACT BRN MOIST SILT

COMPACT BRN MOIST SILT W/SCATTERED CALICHE FRAGMENTS

DENSE LT BRN DAMP SILT W/SCATTERED CALICHE FRAGMENTS & SCATTERED FINE GRAVEL

COMPACT WHT DAMP WEAKLY CEMENTED CALICHE

BRN DAMP SILT W/SCATTERED FRAGMENTED CALICHE

HARD WHITE CALICHE

9-24-75

B-2

C 718+58
13' LT.
2309.3
3.5

5		1.4
25	"	
32	54	"
46		"
26	70	"
39		"
100+		"
27	68	"
11		"
40		"
60		"
35	100+	"
30	100	"

LOOSE LT BRN VF SANDY SILT

LT BRN CLAYEY SILT W/SCATTERED WHT FRAGMENTED CALICHE

COMPACT BRN VF SAND SILT (MOIST) W/SCATTERED CALICHE FRAGMENTS

DENSE BRN VF SANDY SILT (MOIST) W/SCATTERED CALICHE FRAGMENTS & SCATTERED F-M GRAVEL

ALTERNATING SOFT THEN HARD LAYERS OF CALICHE W/SCATTERED CHERT GRAVEL

COMPACT BRN SILT W/SCATTERED CALICHE FRAGMENTS & F-M GRAVEL

DENSE WHT SLIGHTLY CEMENTED CALICHE

WHT CLAYEY SILT & F-M BLK GRAVEL

WHT SILT (DAMP)

HARD WHT WELL-CEMENTED CALICHE

INTERBEDS OF BRN SILT & COMPACT LOOSELY CEMENTED WHT CALICHE

LOOSE TO SLIGHTLY COMPACT LT BRN CLAYEY SILT

COMPACT DK BRN SILT

SOFT DK. BRN. SILTY CLAY W/ SCATTERED GRAVEL

DENSE BROWN SILTY VF SAND

ALTERNATING HARD & SOFT INTERBEDS OF BRN CLAYEY SILT

INTERBEDS OF SOFT CALICHE & BRN CLAYEY SILT W/CALICHE FRAGMENTS

SAME MAT. CONTINUED TO B.T.M. OF BORING (86')

10-2-75

B-5

C 718+61
42' RT.
2309.5
3.5

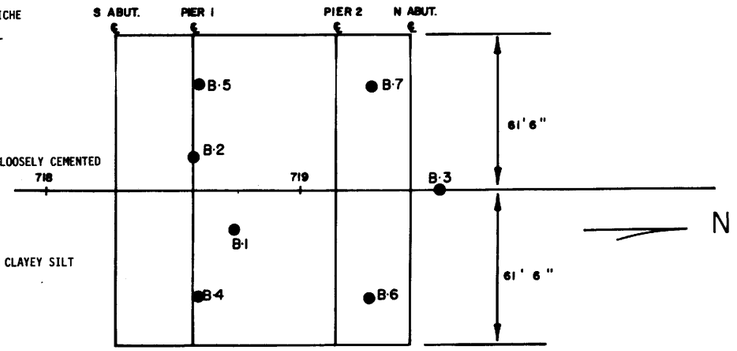
24		1.4
20	44	"
47	84	"
47		"

LOOSE LT BRN VF SAND SILT

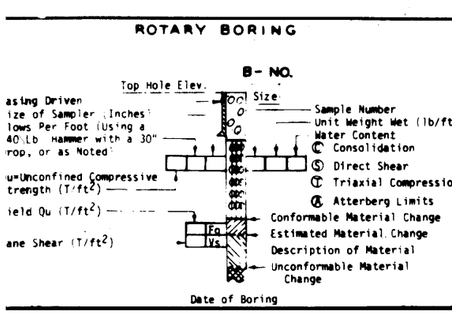
COMPACT LT BRN SILT W/SCATTERED CALICHE FRAGMENTS

DK BRN PARTIALLY CEMENTED SILT W /SCATTERED CALICHE FRAGMENTS

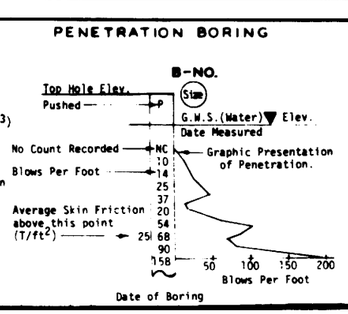
10-14-75



ROTARY BORING



PENETRATION BORING



- PLAN OF ANY BORING
- PENETROMETER (FLUSH-COUPLED)
- 2 " CONE PENETROMETER
- SAMPLER BORING (DRY) — Size
- ROTARY BORING (WET) — Size
- AUGER BORING (DRY) — Size
- JET BORING — Size
- DIAMOND CORE BORING. — Size
- TEST PIT.

BIT SIZES: (O.D.): "AX"=1-13/16", "BX"=2-9/32", "NX"=2-29/32".

CASING SIZES: (O.D.): "BX"=2-7/8", "NX"=3-1/2"

THE UNIFIED SOIL CLASSIFICATION SYSTEM

MAJ. DIV.		LETTER	SYMBOL	NAME
Coarse Grained Material	Gravel and Gravelly Soil	GW		Well-graded gravel or gravel-sand Mixtures, Little or no Fines.
		GP		Poorly-graded Gravel or Gravel-Sand Mixtures, Little or no Fines.
		GM		Silty Gravel, Gravel-Sand-Silt Mixtures.
		GC		Clayey Gravel, Gravel-Sand-Clay Mixtures.
	Sand and Sandy Soil	SW		Well-Graded Sand or Gravelly Sand, Little or no Fines.
		SP		Poorly-Graded Sand or Gravelly Sand, Little or no Fines.
		SM		Silty Sand, Sand-Silt Mixtures.
		SC		Clayey Sand, Sand-Clay Mixtures

MAJ. DIV.	LETTER	SYMBOL	NAME
Fine Grained Soil — Silts and Clays LL≤50	ML		Inorganic Silt and Very Fine Sand, Rock Flour, Silty or Clayey Fine Sand or Clayey Silt with Slight Plasticity.
	CL		Inorganic Clay or Low to Medium Plasticity, Gravelly Clay, Sandy Clay, Silty Clay, Lean Clay.
	OL		Organic Silt and Organic Silt-Clay of Low Plasticity
Silts and Clays LL>50	MH		Inorganic Silt, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silt
	CH		Inorganic Clay or High Plasticity, Fat Clay.
	OH		Organic Clay of Medium to High Plasticity, Organic Silt.
Highly Organic Soils	PT		Peat and other Highly Organic Soils

ROCK CLASSIFICATION

SYMBOL	NAME
	IGNEOUS ROCK
	SEDIMENTARY ROCK
	METAMORPHIC ROCK

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

SOIL CONSISTENCY CLASSIFICATION

CONSISTENCY		*BLOWS PER FT.
GRANULAR	COHESIVE	
Very Loose	Very Soft	0 to 5
Loose	Soft	5 to 10
Slightly Compact	Stiff	10 to 20
Compact	Very Stiff	20 to 35
Dense	Hard	35 to 70
Very Dense	Very Hard	70

*(Standard Penetration Test) Blows Per Ft. (140 LB. Hammer, 30" Free-Fall Blow using a 2" O.D. x 1-3/8" I.D. Sampler).

DRN. R.R.R.
CHK. RJA
DATE. 10-24-75

NEVADA HIGHWAY DEPARTMENT — MATERIALS AND TESTING DIVISION

FOUNDATIONS AND ENGINEERING GEOLOGY SECTION

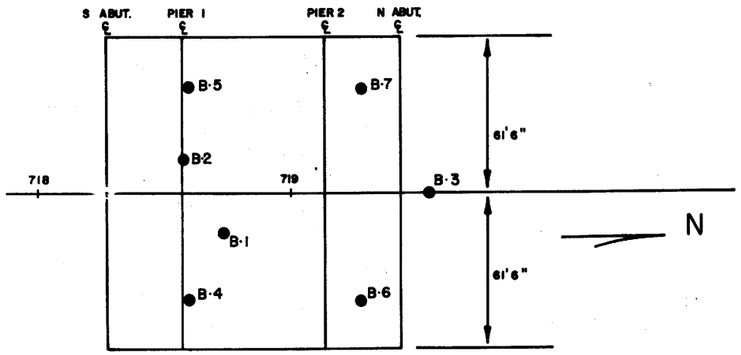
E.A NO. 70640 PROJECT NO. _____ COUNTY CLARK

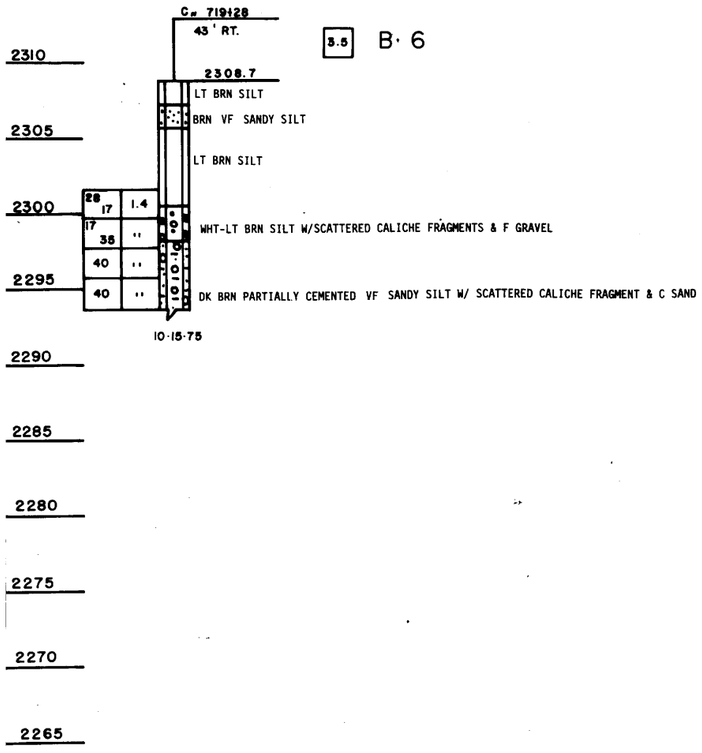
GOWAN ROAD GRADE SEPERATION (H-1217)

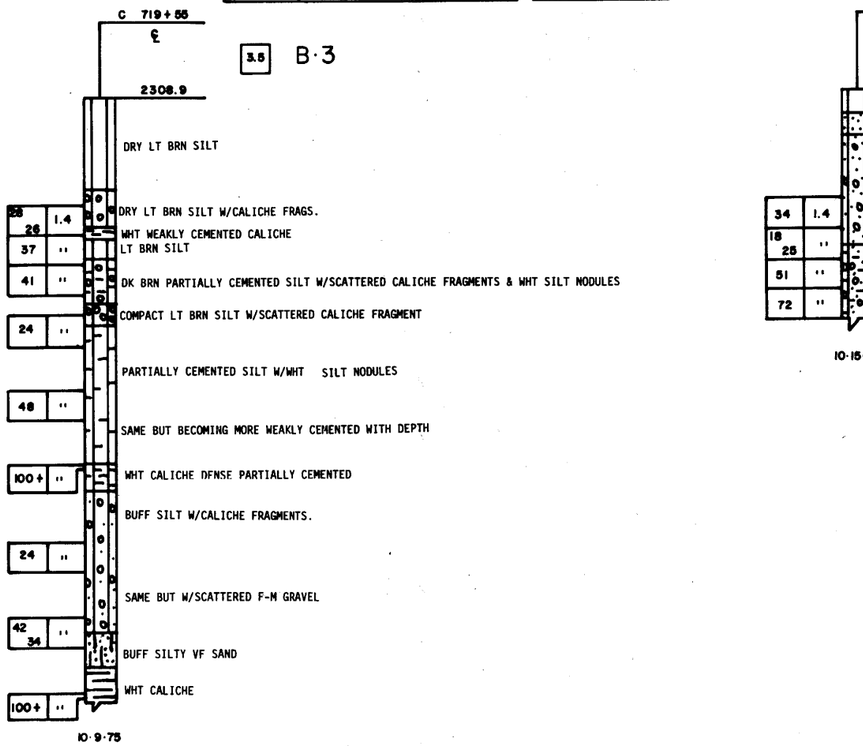
DWG. NO. 1

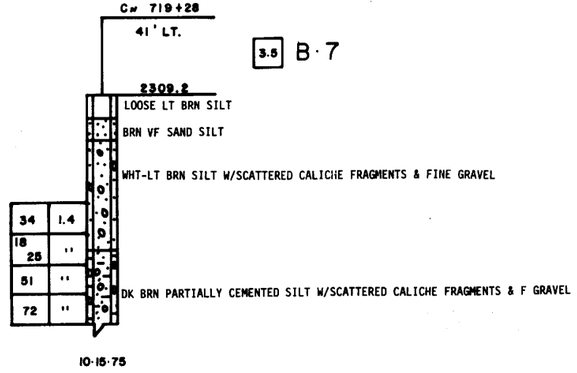
FED. AID PROJ. NO.	STATE	PROJECT NO.	MILE POST	SHEET NO.
9	NEVADA			

NOTE:
Foundation Report Available For Contractors Study In District Office & Materials & Testing Div.









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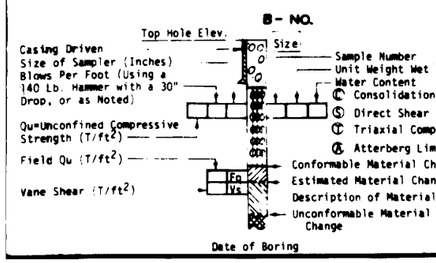

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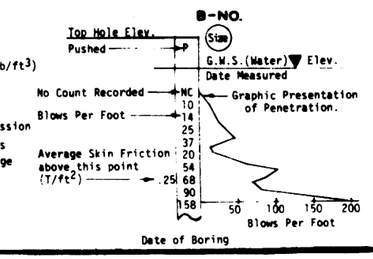

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DWN. R.R.R.
CHK. [illegible]
DATE 10-24-75

NEVADA HIGHWAY DEPARTMENT — MATERIALS AND TESTING DIVISION

FOUNDATIONS AND ENGINEERING GEOLOGY SECTION

EA NO 70640 PROJECT NO _____ COUNTY CLARK DWG NO 2

GOWAN ROAD GRADE SEPERATION (H-1217)

STATE OF NEVADA
DEPARTMENT OF HIGHWAYS

MEMORANDUM

November 17, 19 75

To Rod McGinnis, Principal Bridge Design Engineer

From Dan Keating, Civil Engr. II, M. & T.

Subject: Gowan Road Grade Separation, Pile Supports
US 95 Expressway

As per your request to go entirely to pile supports for each support of this structure, the following is recommended. Any of the three standard cast-in-place concrete piles, as listed in the standard plans or an HP 10 x 57 may be used to support a 60 ton design load when driven to elevation 2268 at all support locations. At this elevation the tips of the piles should be embedded in a well-cemented layer of caliche. Because it is highly desireable for tip embedment in this layer, minimum tip elevation should be set at elevation 2269. Predrilling or spudding will probably be necessary to penetrate a smaller caliche layer at approximately elevation 2285.

At least one load test should be run at a pier location to verify the adequacy of these piles.

If further information is needed for your foundation design please do not hesitate to contact us.

Daniel J. Keating
Civil Engineer II, M & T

DJK:mlf