

Memorandum

UTAH DEPARTMENT OF TRANSPORTATION

: Those Listed Below

DATE: February 1, 1983

FOUNDATIONS

M : Heber Vlam, P.E., Engineer of Materials & Research

SUBJECT: I-84-5(7)29 - West Tremonton to Blue Creek Summit,
Foundation Report for "Q" Line Over I-84 at Station 3081+00

SITE CONDITIONS

A two-span prestressed concrete beam structure approximately 246 feet long by 34 feet wide is proposed to carry "Q" Line over I-84. The crossing will be at right angles. The I-84 northbound and southbound grades will be very close to that of existing US-30, while "Q" Line will have 2 to 6 feet of cut at the approach to abutment No. 1 and 25 feet of fill at abutment No. 3.

SUBSURFACE EXPLORATION

Four test holes were drilled at the site of the proposed structure to depths of 35 to 60 feet. Correlation between drill holes is fair.

In general, the subsoils profile is as follows: from the ground surface to the maximum depth of exploration in drill holes No. 1 and 4 - alternate layers of highly fractured, thin-bedded limestone, sandstone and shale; from the ground surface to 22 feet in drill hole No. 3 and to 26 feet in drill hole No. 2 - layers of silty clay with some sand, silty sand and clay; from these depths to the maximum depth of exploration - alternate layers of highly fractured, thin-bedded limestone, sandstone and shale.

For a more detailed description of the subsurface materials and test hole locations, refer to Fig. 1, Log of Borings.

A ground water table was not found in any of the test holes.

FOUNDATION RECOMMENDATIONS

Spread footings are recommended for support of abutment No. 1 and bent #2 on this structure. Five foot wide rectangular footings at abutment No. 1 may be loaded to an allowable soil bearing pressure of 12.0 t.s.f. An eight foot wide footing at the bent may be loaded to an allowable bearing pressure of 10 t.s.f. See Figure 2 for the bearing capacity of footings with other widths. The recommended footing base elevations are 4887 feet for abutment No. 1, and 4864 feet for bent No. 2. The maximum expected footing settlement is one inch.

All loose material at the bottom of the footing excavations should either be removed or recompacted to its in situ density.

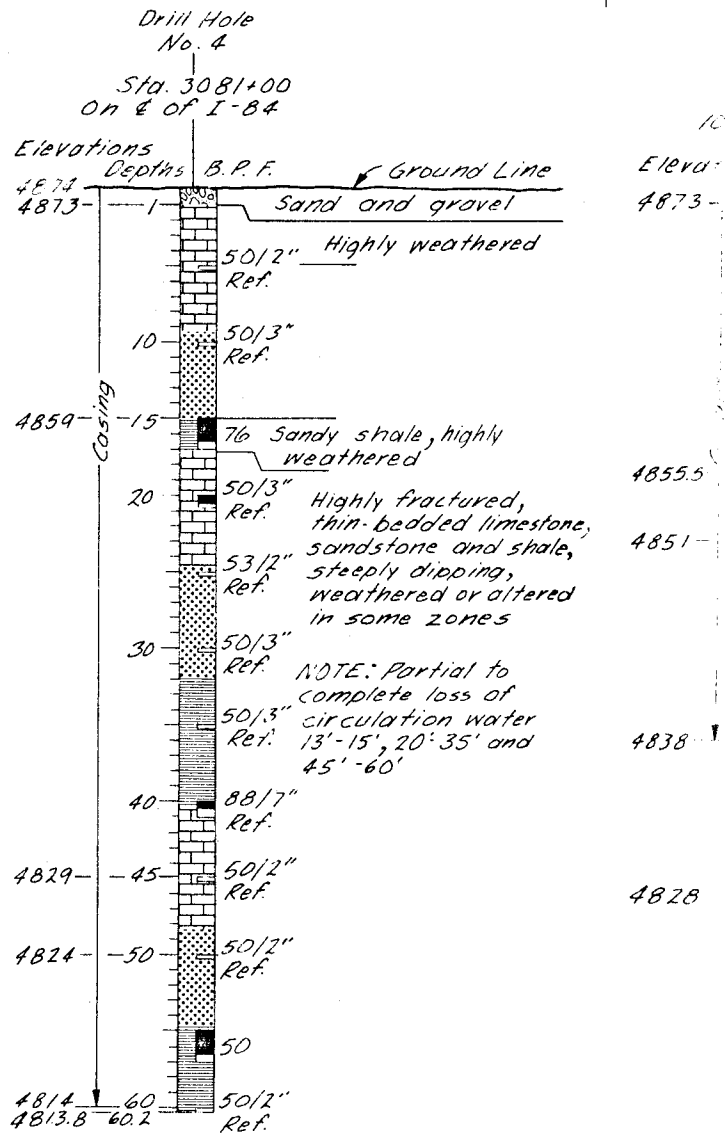
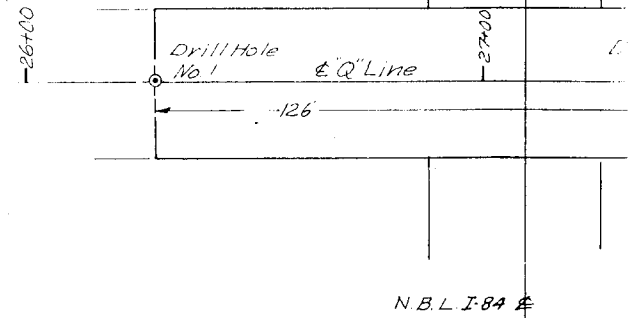
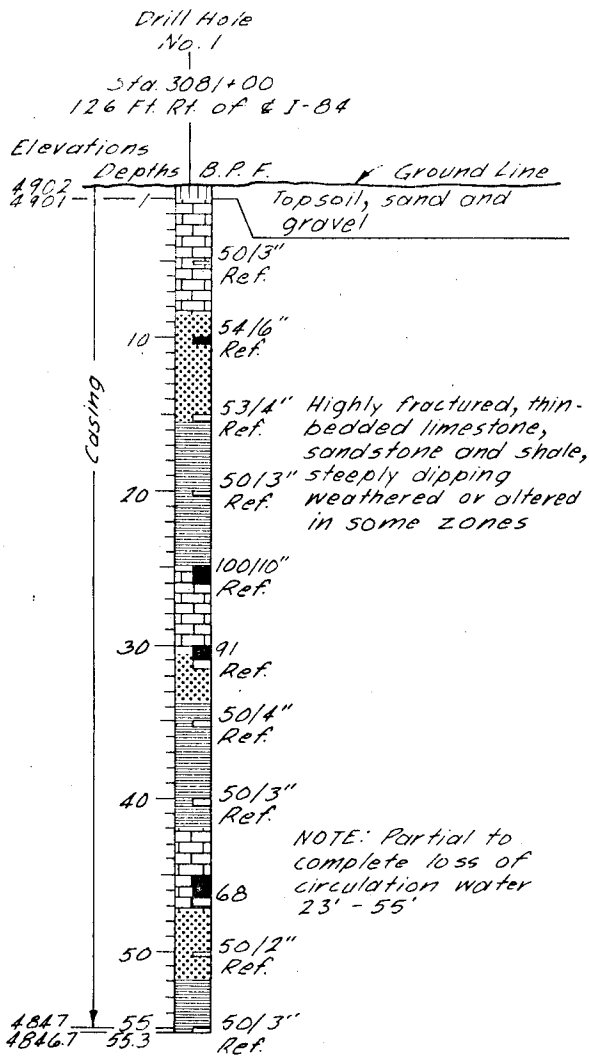
Project No. 1-114-5(7)29
 Project Name West Tremonton to Blue Creek Summit

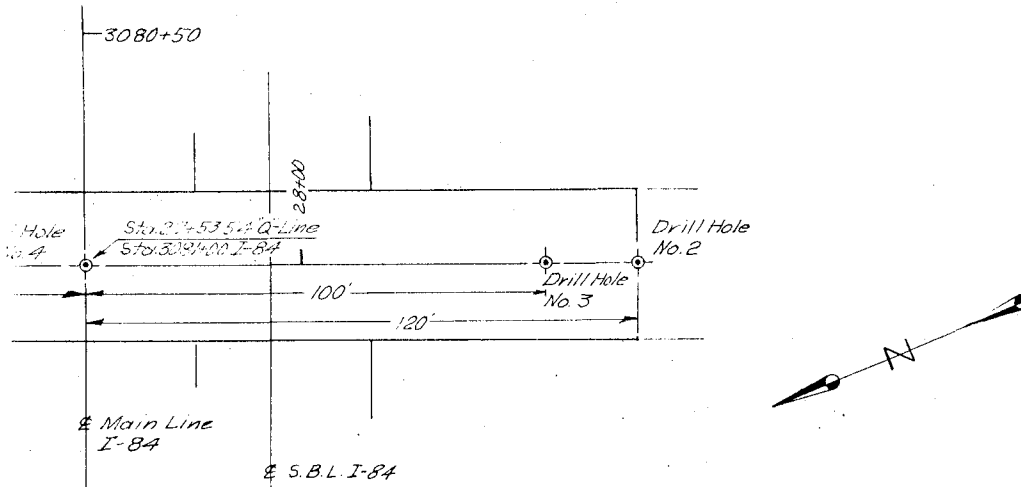
Summary Test Data

Sheet 1 of 1
 Structure "Q" Line over I-84

boring No.	Depth	Grading Analysis				Group Classification	Atterberg Limits		Water Cont. ω %	Wet Unit Weight γ P.C.F.	Dry Unit Weight γ_s P.C.F.	Specific Gravity Gs	Permeability k 10^{-4} cm/sec.		Unconfined Strength q_u T.S.F.	Shear Strength				Type Of Test
		Percent					Liquid Limit L.L.	Plastic Index P.I.					Total Stress			Effective Stress				
		Gravel	Coarse Sand	Fine Sand	Silt and Clay								ϕ^o	C T.S.F.		ϕ^o	C' T.S.F.			
2	17	0	0	9	91	A-6(8)	31	11	26	117	92	2.77			.64					
2	22	0	0	19	81	A-4(8)	27	9	24	125	101	2.71			1.09					
3	12	8	0	4	88	A-6(9)	29	13				2.72								
3	17	0	0	8	92	A-6(9)	31	13	31	113	86	2.72			.29					
3	22	0	2	17	81	A-4(8)	28	8	26	112	89	2.73			.38					

S - Shelby Sample P - Penetration Sample T - Triaxial Shear Test C - Consolidation DIR - Direct Shear Test UU - Unconsolidated, Undrained
 CU - Consolidated, Undrained CD - Consolidated, Drained

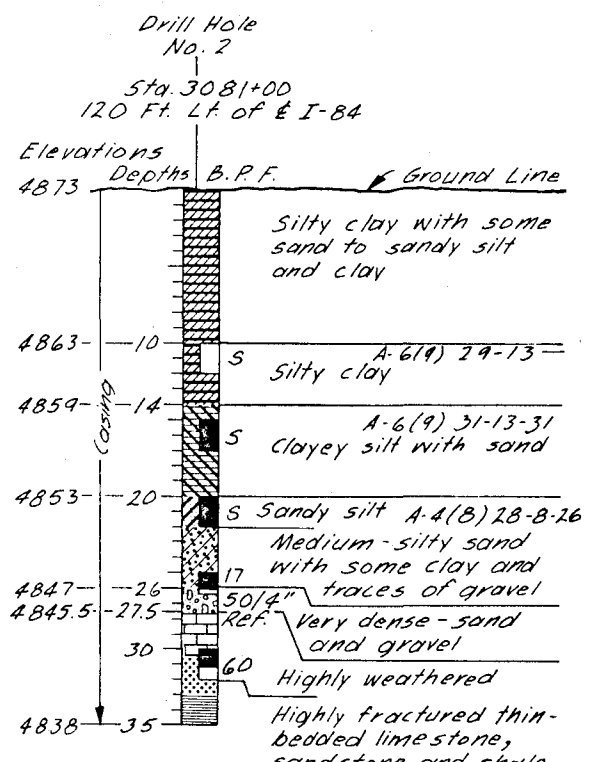
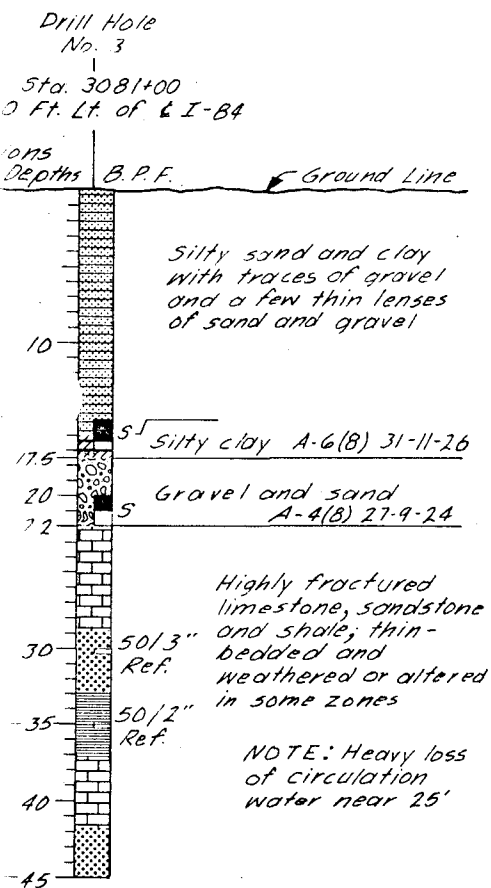
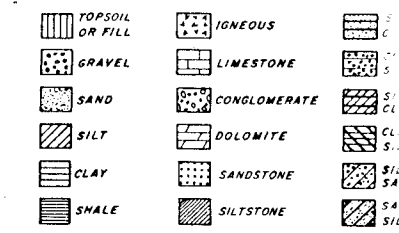




KEY TO DRILLING LOG

RELATIVE DENSITY (NON-PLASTIC SANDS)
 VERY LOOSE - LESS THAN 4 BLOWS PER FOOT.
 LOOSE - 4 TO 10 BLOWS PER FOOT.
 MEDIUM - 10 TO 30 BLOWS PER FOOT.
 DENSE - 30 TO 50 BLOWS PER FOOT.
 VERY DENSE - MORE THAN 50 BLOWS PER FOOT.

CONSISTENCY (PLASTIC SILT & CLAY)
 VERY SOFT - LESS THAN 2 BLOWS PER FOOT.
 SOFT - 2 TO 4 BLOWS PER FOOT.
 MEDIUM - 4 TO 8 BLOWS PER FOOT.
 STIFF - 8 TO 15 BLOWS PER FOOT.
 VERY STIFF - 15 TO 30 BLOWS PER FOOT.
 HARD - MORE THAN 30 BLOWS PER FOOT.



DRILL HOLE NO. 3

STATION	0+00 E OR LT OR RT. IN FT. OF	ELEVATIONS	B.P.F.	DEPTHS	GROUND LINE
GROUND ELEVATION					EXAMPLE: Soft-silt, clay, 30m fine sand
				2	AASHTO LL-PI-W A-6(9) 37-14-30
				5	
GROUND WATER TABLE		4552		5	DATE
				5	THIN WALL SAMPLE TUBE, UNDISTURBED SAMPLER USED
STRATA CHANGE		4546		10	
				16	
LOCATION OF SAMPLE				20	R - SPLIT BARREL UNDISTURBED SAMPLER WITH RINGS OR CALIBER TYPE SAMPLER
				14	
				25	
SAMPLE NOT RECOVERED				25	REASON NOT RECOVERED
BOTTOM OF HOLE		4531		30	

NO. OF BLOWS OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO DRIVE A STD. 1 3/8" ID, 2" O.D. SAMPLE TUBE 1 FT.

ABBREVIATIONS

L.L. - LIQUID LIMIT IN %
 P.I. - PLASTIC INDEX
 W. - NATURAL MOISTURE CONTENT
 Ref. - REFUSAL ≥ 50 BLOWS PER FOOT
 PEN. - PENETRATION
 G.W.T. - GROUND WATER TABLE
 B.P.F. - BLOWS PER FOOT
 N.P. - NON PLASTIC
 AASHTO - SOIL CLASSIFICATION SYSTEM

NOTE: A water table was not observed in any of the test holes.

Date Drilled: May, June & Sept. 1982

NO.	BY	DATE

REVISIONS

UTAH STATE DEPARTMENT OF TRANSPORTATION
 SALT LAKE CITY, UTAH

MATERIALS and RESEARCH SECTION

WEST TREMONTON TO BLUE CREEK SUMMIT
 "Q" LINE OVER I-84

Drawn By Kistler Checked By Verry Ryan I-84-5(7)
 Checked By B. Sizemore Checked By _____ Proj. _____
 Checked By Di. Salkha Checked By _____ 3081+
 Approval Recommended By Loren H. Rausher Station _____
 Received _____ Date _____ Chief Structural Engr. BOX # _____
 Foundations File No. _____ Dwg No. _____

FIGURE 1