HYDROLOGY

F-15/D-4

800 NIKANDA RD.
N.E.

F-15 D-4

1 PLAN

Pre-Design Investigation
(Additions)

DATE _____

ADDRESS 800 Nikanda Rd. ZONE ATLAS # _____

LEGAL DESCRIPTION _____

OWNER _____

ARCHITECT/ENGINEER FRED ARAGON 265-9612

LOT SIZE _____

ZONING _____

PROPOSED DEVELOPMENT _____

	YES	NO	NA	COMMENTS
FLOOD HAZARD AREA				
PART OF AN APPROVED REPORT				
CONSTRUCTION PLANS ON MICRO-FILM				
FIELD INSPECTION				

COMMENTS:

DRAINAGE REQUIREMENTS:

At this time we will allow the proposed addition to be constructed without any changes to the original drainage plan In the future if further development is to take place we will require a new ~~new~~ drainage plan following the drainage ordinance and the DPM drainage checklist.

Adam, Hamlyn, Anderson / consulting engineers inc.

4751 North Fifteenth Street — Phoenix, Arizona 85014 — 602-264-1397
4055 Montgomery Blvd. N.E. — Albuquerque, NM 87109 — 505-881-1808
216 North Chippewa Place — Chandler, Arizona 85224 — 602-889-1345

PRINCIPALS:
CARL H. ADAM, P.E.
RICHARD L. HAMLYN, P.E.
JAMES D. ANDERSON, P.E.
DOYLE L. WISTE, P.E.
JAKE BORDENAVE, P.E.

ASSOCIATE:
FRED E. GOLDMAN, P.E.

March 13, 1981

Mr. Bruno Conegliano
Assistant City Engineer
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Dear Mr. Conegliano:

Submitted herewith are two copies of the drainage report for Espinosa Cartage Company for your review.

Sincerely,

Jean J. Bordenave
Vice President, P.E.

JJB:mkk

RECEIVED
MAR 13 1981
CITY ENGINEER

Reply to: ☐ Phoenix ☐ Chandler ☐ Albuquerque

FOX Consulting Engineers and Geologists

F.M. FOX & ASSOCIATES, INC.
3412 BRYN MAWR DRIVE, N.E.
ALBUQUERQUE, NEW MEXICO 87107
(505) 884-0900 — FMFOX

September 17, 1981

Espinosa Cartage
801 Nikanda Rd. NE
Albuquerque, New Mexico 87107

Job No. 420900

Subject: Density compaction test data for Espinosa Cartage

Gentlemen:

Transmitted herein is the detailed test data for the subject project.

F. M. FOX & ASSOCIATES OF THE SOUTHWEST, INC.

Greg Dower
Engineering Technician

Reviewed by:

CHARLES M. MILLER
NEW MEXICO
6018
REGISTERED PROFESSIONAL ENGINEER

Charles M. Miller, P.E.
Principal Geotechnical Engineer

Copies: Addressee (2)
Terry Higgins Construction Company

Attached: Daily Report No. 1

ms

FOX Consulting Engineers and Geologists

F.M. FOX & ASSOCIATES, INC.
3412 BRYN MAWR DRIVE, N.E.
ALBUQUERQUE, NEW MEXICO 87107
— FMFOX

DENSITY-COMPACTION TEST RESULTS

PROJECT	Espinosa Cartage	PROJECT NO.	420900	DATE	9/16/81
LOCATION		REPORT NO.	1	TIME	
SOURCE		SAMPLE NO.		ENGINEERING TECHNICIAN	Greg Gower

TEST NO.	LOCATION	DEPTH OR ELEVATION	PROCTOR DENSITY PCF	OPTIMUM MOISTURE CONTENT %	DRY DENSITY PCF	MOISTURE CONTENT %	COMPACTION ACT. %	COMPACTION REQ. %	SOIL TYPE
1	Berm around parking area, 30' north of southwest corner, at top of dike	FSG	129.0	8.3	122.5	8.2	95.0	95	SAND, very silty, slightly gravelly, brown (SM)

EQUIPMENT: 1-Compactor, 1-Water Hose

COMMENTS: Material was being compacted while technician was on job site. Test results were given to foreman.

TYPE OF TEST: AG
TEMPERATURE: 65 to 70° F
WIND: 0 to 5 MPH
PRECIPITATION: None

ESPINOSA CARTAGE CO.

801 NIKANDA ROAD N.E.
~~[illegible]~~
ALBUQUERQUE, NEW MEXICO 87109
~~505 [illegible] 3375~~
345-6633

OCTOBER 19, 1981

TO WHOM IT MAY CONCERN:

I CERTIFY THAT THE BERM LOCATED AT ESPINOSA CARTAGE CO 801 NIKANDA ROAD N.E., ALBUQUERQUE, NM HAS A DENSITY COMPACTION OF 95.0%. ESPINOSA CARTAGE CO. AGREES TO HOLD THE CITY OF ALBUQUERQUE HARMLESS IN THE EVENT BERM DOES NOT RETAIN WATER AS DESIGNED.

ESPINOSA CARTAGE COMPANY

Lloyd Espi

DRAINAGE REPORT

FOR

ESPINOSA CARTAGE CO.

ALBUQUERQUE, NEW MEXICO

Prepared by:

Adam, Hamlyn, Anderson
Consulting Engineers, Inc.
4055 Montgomery Blvd. N.E.
Albuquerque, New Mexico 87109

Prepared for:

Joseph B. Burwinkle, Jr. & Assoc.
3209 Silver Avenue S.E.
Albuquerque, New Mexico 87106

REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR
NO 5110
NEW MEXICO
JEAN J. BORDENAVE

Jean Jake Bordenave, N.M.P.E. & L.S. #81505

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DRAINAGE REPORT

FOR

ESPINOSA CARTAGE CO.

ALBUQUERQUE, NEW MEXICO

PURPOSE

The purpose of this report is to provide a method of construction which will comply with AMAFCA drainage requirements and the City Drainage Policy, dated November, 1979.

LOCATION AND TERRAIN

The tract is located in the northeast quadrant of the City of Albuquerque and is situated on the north side of Nikanda Road, N.E. which runs east off of Edith boulevard, N.E. See Plate I for exact location.

The site slopes to the northwest at approximately 1.5 to 2.0 percent. The site has been graded previously and is void of vegetation. For soil data see Appendix C.

UPLAND DRAINAGE

The site is bordered to the north and east by undeveloped land, and to the west and south by warehouse-industrial complexes. The only off-site drainage which traverses the site is 2.9 cfs from approximately 1.2 acres due east of the site. See Plate III.

INTERNAL DRAINAGE

Accumulated drainage from the building and ajacent concrete aprons flow directly into the pond; other accumulated runoff will enter the pond via designed swales. The pond will more than adequately contain developed on-site runoff; and an eight inch pipe, installed in the pond bank at the southwest corner of the site, will allow for an outflow at or below a one-year natural runoff rate. The additional runoff introduced from the 1.2 acres to the east will be accumulated into the overflow portion of the pond. A broad crested wier will be constructed to discharge flows which would accumulate above the overflow. The combined discharge rate from both the eight-inch pipe and the wier will be, at its peak, 2.8 cfs. In addition, an assumed infiltration rate has been applied in the runoff calculations. The rates applied are: 1 inch per hour for the first half hour and 1/2 inch per hour for the remaining time period.

CONCLUSION

Development of the site will reduce present runoff rates from the tract. Peak outflow after development for the 100-year storm will be approximately 95 percent of the peak outflow from the 1-year storm prior to development. The 2.9 cfs accumulated from the 1.2 acres to the east, which is to be routed through the overflow section of the pond, will be reduced to 1.1 cfs, approximately 40 percent of the original runoff.

APPENDIX A

COMPUTATIONS

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	Espinosa Cartage Co. On-Site	JOB NO. DATE: BY: F.P.K.	SHT. NO. 1 OF

EXISTING COND - 1YR STORM

Time of Concentration

300' @ S=0.02 (Nearly Bare Soil)

From Appendix A Fig 2-3 V=1.5 fps

$t_c = 300/(1.5)(60) = 3.3$ min. Use 5 min

Peak Runoff Rate

From Appendix A Rainfall Chart - 1 year

$i = 2.0$ in/hr

$Q = 0.45(2.0)(87{,}930/43{,}560) = 1.8$ cfs

DEVELOPED CONDITION - 50 Year Storm

Source	Area	C	Eff. Area
Asph, Conc, Roof	26,460	.95	25,137 ft²
Pervious Area	61,470	.65	39,955 ft²
	87,930		65,092 ft²

POND VOL REQ'D = $(2.3/12)\,65{,}092 = 11{,}934$ ft³

VOLUME PROVIDED

Area Sq.ft.			Volume ft³	
5,850	(.5/2)	=	1,463	
12,420+5850	(.5/2)	=	4,567	13,950 ft³
19,260+12,420	(.5/2)	=	7,920	

Note: Assume infiltration rate 1"/hr for first half hour and ½"/hr for the remainder of time. Set Drain .5' above bottom of pond.

INCREMENTAL INFLOW = (65,092)(Rainfall/12) = 5,424 (Rain)

INCREMENTAL OUTFLOW = $(0.6A\sqrt{2gd})d$ Use 8" pipe

TIME MIN	RAINFALL INCHES	RUNOFF VOLUME FT^3	STORAGE DEPTH FT	INCRE. ORIF. OUTFLOW FT^3	AVERAGE POND SURF. FT^2	INCRE. INFILTR. FT^3	ACCUM. OUT + INFIL. FT^3	Storage
5	0.52	2820	.84 .42	0	4,922	34	34	2786
10	0.81	4393	.94 .89	417	10,974	76	527	3866
15	1.03	5587	.99 .97	495	12,025	83	1126	4461
20	1.17	6346	1.30 1.14	536	14,335	99	1761	4585
25	1.32	7160	1.33 1.32	578	16,798	116	2455	4705
30	1.43	7756	1.32 1.33	580	16,934	117	3152	$\boxed{4604}$
40	1.55	8407	1.28 1.30	1146	16,524	114	4412	3995

Surface Area:

@depth 0'-0.5' $A = 0 + \left(\frac{0+5850}{0.5}\right)d_1$

@depth 0.5'-1.0' $A = 5850 + \left(\frac{12420-5850}{0.5}\right)(d-0.5)$

@depth 1.0'-1.5' $A = 12420 + \left(\frac{19260-12420}{0.5}\right)(d-1.0')$

Volume:

$d = \frac{-1 \pm \sqrt{1+0.05350V_{01}}}{16.72}$

$d = \frac{-1 \pm \sqrt{1+0.00076V_{01}}}{2.24616}$

$d = \frac{-1 \pm \sqrt{1+0.00018V_{01}}}{1.10144}$

TIME	5	10	15	20	25	30	40
DETAINED	0	1.4	1.5	1.6	1.7	*1.7/2.0	*1.7/2.8

Allowable Runoff = 1.8 cfs

On-Site Outflow → * 1.7/2.0 ← On-Site & Off-Site Flow

ADAM, HAMLYN, ANDERSON
CONSULTING ENGINEERS, INC.

Espinosa Cartage Co
On-Site

JOB NO.
DATE:
BY: F.P.K.
SHT. NO. 2 OF

TIME	RAINFALL	RUNOFF VOLUME	STORAGE DEPTH		INCRE. ORIF. OUTFLOW	AVERAGE POND SURF	INCRE. INFILTR.	ACCUM OUT + INFIL	STORAGE
MIN.	INCHES	FT^3	FT		FT^3	FT^2	FT^3	FT^3	
5	0.59	5717	1.05	.53	366	12830	89	455	5262
10	0.92	8915	1.23	1.14	537	14335	54	1046	7869
15	1.17	11338	1.34	1.29	571	16387	113	1730	9608
20	1.32	12792	1.38	1.36	586	17481	121	2437	10355
25	1.49	14439	1.43	1.41	597	18028	124	3158	11281
30	1.62	15699	1.46	1.45	605	18576	128	3891	11808
40	1.84	17831	1.73	1.60	1272	20628	142	5305	12526
50	1.99	19285	1.73	1.73	1322	22406	154	6781	12504

For Surface & Volume Equations See Sheet

Incremental Inflow (116292)(Rainfall/12) = 9691

Use Broad Crested Weir @ Width = 4.5'

ADAM, HAMLYN, ANDERSON
CONSULTING ENGINEERS, INC.

Espinosa Cartage Co.
Off-Site Calcs.

JOB NO.
DATE:
BY: F.P.K.
SHT. NO. 3
OF

ACM 2

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.		JOB NO. DATE: BY:	SHT. NO. 4 OF

OFF-SITE

EXIST. COND. - 1 YR STORM

460' @ S = 0.0130 (Nearly Bare Soil)

From Appendix A Fig 2-3 V = 1.3 fps

t_c = 460/(1.3)(60) = 5.9 min Use 6 min.

PEAK RUNOFF RATE

From Appendix A Rainfall Chart - 100 Year

i = 2.4 in/hr.

Q = 0.45(2.4)(116,292/43,560) = 2.9 cfs

INCREMENTAL INFLOW = (116,292)(Rainfall/12) = 9691 (Rainfall)

APPENDIX B

RAINFALL CHARTS

PRECIPITATION DATA

ALBUQUERQUE, SAN PEDRO BLVD WEST

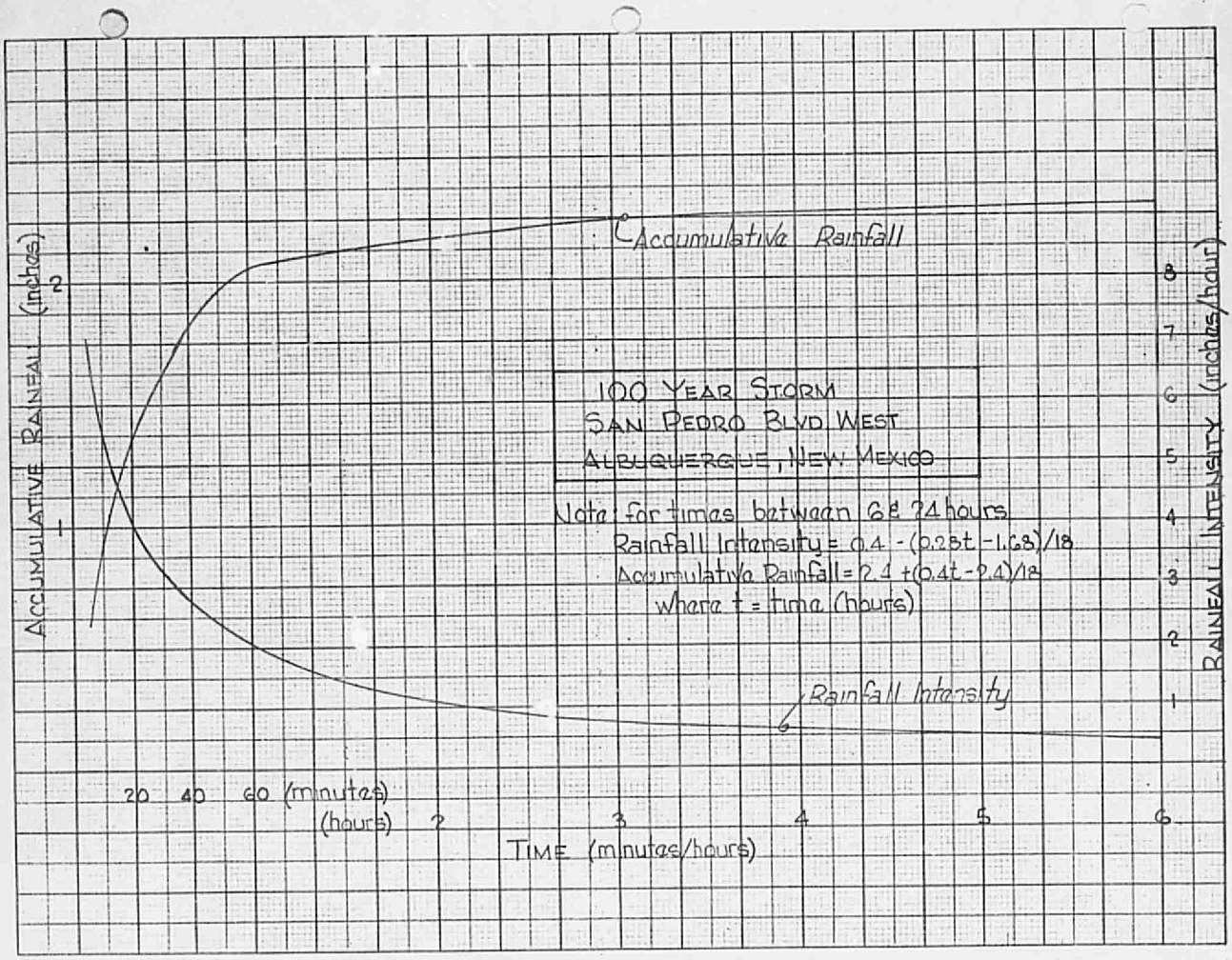
from NOAA Atlas 2, Volume IV, New Mexico

Recur. Inter.	Duration	min / hour	5	10	15	30	1	2	3	6	12	24
2 Year	Rainfall	inches	0.23	0.36	0.45	0.62	0.79	0.88	0.94	1.05	1.18	1.3
	Intensity	inches/hour	2.76	2.16	1.80	1.24	0.79	0.44	0.31	0.18	0.10	0.05
5 Year	Rainfall	inches	0.32	0.49	0.62	0.86	1.09	1.18	1.24	1.35	1.50	1.65
	Intensity	inches/hour	3.84	2.94	2.48	1.72	1.09	0.55	0.41	0.23	0.13	0.07
10 Year	Rainfall	inches	0.37	0.58	0.73	1.02	1.29	1.40	1.47	1.6	1.75	1.9
	Intensity	inches/hour	4.44	3.48	2.92	2.04	1.29	0.70	0.49	0.27	0.15	0.08
25 Year	Rainfall	inches	0.46	0.71	0.89	1.24	1.57	1.68	1.76	1.9	2.13	2.35
	Intensity	inches/hour	5.52	4.26	3.56	2.48	1.57	0.84	0.59	0.32	0.18	0.10
50 Year	Rainfall	inches	0.52	0.81	1.03	1.43	1.81	1.94	2.03	2.2	2.40	2.6
	Intensity	inches/hour	6.24	4.86	4.12	2.86	1.81	0.97	0.68	0.37	0.20	0.11
100 Year	Rainfall	inches	0.59	0.92	1.17	1.62	2.05	2.17	2.25	2.4	2.60	2.8
	Intensity	inches/hour	7.08	5.52	4.68	3.24	2.05	1.09	0.75	0.4	0.22	0.12

2 year 1 hour = $-0.011 + 0.942(1.05^2/1.3) = 0.79$ in.

100 year 1 hour = $0.494 + 0.755(2.4^2/2.8) = 2.05$ in.

3 hour = 0.569 (6 hour) + 0.431 (1 hour)
2 hour = 0.341 (6 hour) + 0.659 (1 hour)
30 min = 0.79 (1 hour)
15 min = 0.57 (1 hour)
10 min = 0.45 (1 hour)
5 min = 0.29 (1 hour)



KEUFFEL & ESSER CO. N. Y.

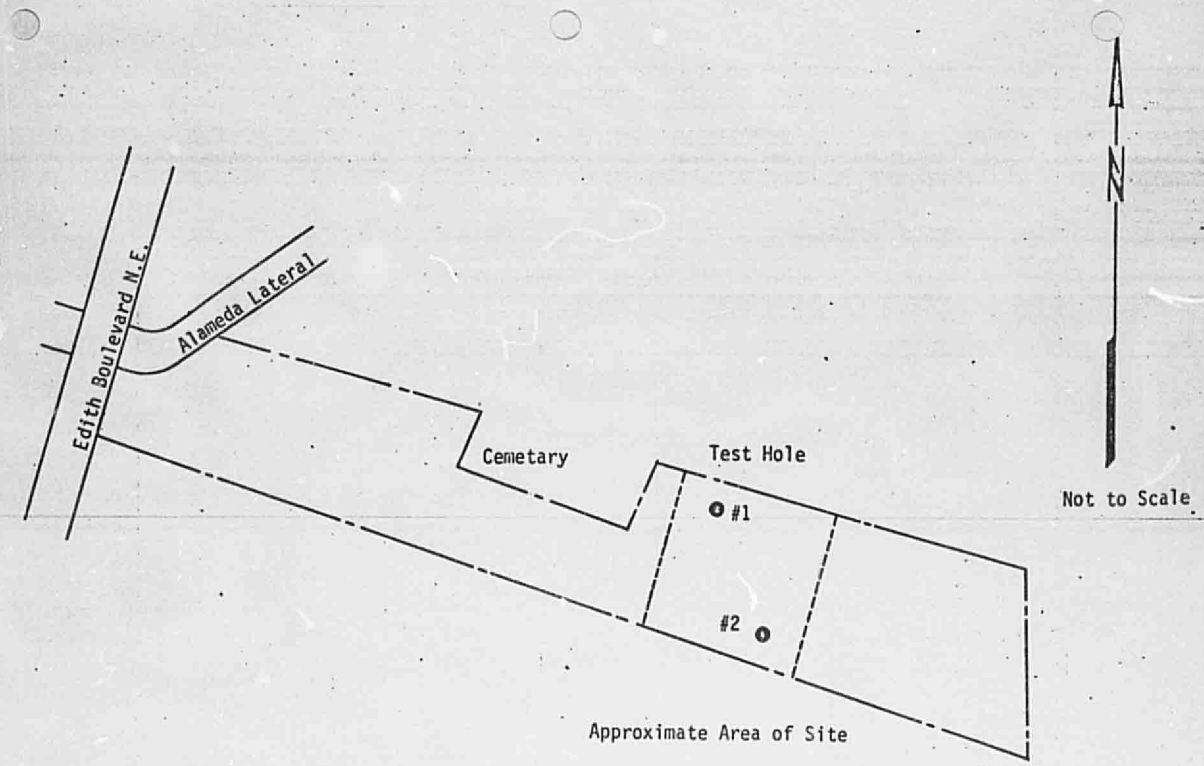
ESTIMATED RETURN PERIODS FOR SHORT-DURATION PRECIPITATION (Inches)

Station: ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO (CITY).
Latitude, 35° 05' N.; Longitude, 106° 39' W.; Elevation 4960 ft.

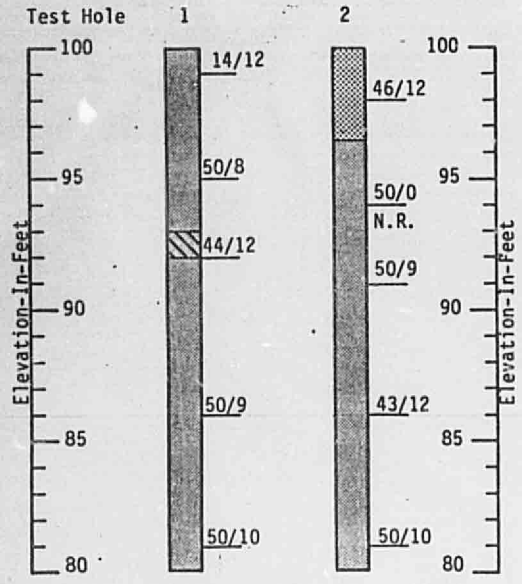
DURATION	RETURN PERIOD (YEARS) 1	2	5	10	25	50	100
5 min.	0.18	0.23	0.30	0.35	0.44	0.49	0.55
10 min.	0.27	0.35	0.47	0.55	0.63	0.77	0.86
15 min.	0.35	0.44	0.59	0.70	0.86	0.97	1.03
30 min.	0.48	0.62	0.82	0.96	1.19	1.34	1.50
1 hr.	0.61	0.78	1.04	1.22	1.50	1.70	1.90
2 hr.	0.63	0.81	1.09	1.28	1.57	1.78	1.99
3 hr.	0.64	0.83	1.13	1.33	1.63	1.86	2.03
6 hr.	0.68	0.90	1.25	1.47	1.80	2.05	2.30
12 hr.	0.71	0.96	1.35	1.59	1.95	2.22	2.50
24 hr.	0.75	1.02	1.46	1.72	2.10	2.40	2.70

APPENDIX C

SOILS REPORT



TEST HOLE LOCATION PLAN	Job No: 31218066400
FOX Consulting Engineers and Geologists	Date: October 14, 1980
	Figure 1



LEGEND

SAND, medium to fine-grained, slightly silty, medium dense to dense, slightly moist, light brown (SP-SM)

SAND, medium to fine-grained, clayey, dense, slightly moist, brown (SC)

SAND, coarse to fine-grained, clean to slightly silty, dense, slightly moist, light brown (SP)

N.R. indicates no sample recovery

NOTES

1. Test holes were drilled on October 3, 1980, with a 6-inch diameter hollowstem continuous flight power auger.
2. (14/12) location of Standard Penetration Test; indicates that 14 blows with a 140-pound hammer, falling 30 inches, were required to drive a 2-inch diameter sampler 12 inches
3. Elevations taken with a hand level and are approximate.

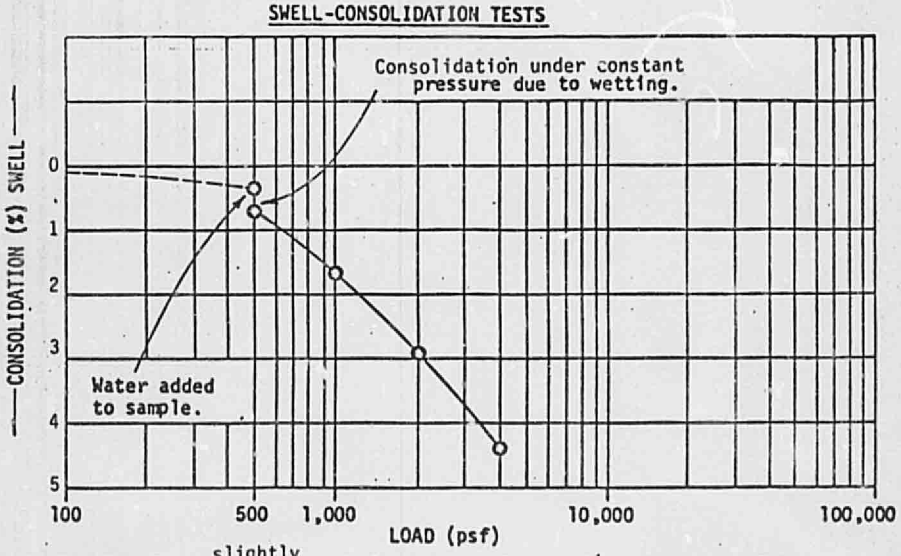
LOGS OF TEST HOLES	Job No: 31218066400
FOX Consulting Engineers and Geologists	Date: October 14, 1980
	Figure 2

SUMMARY OF LABORATORY TEST DATA

Hole No.	Depth of Sample (ft)	Natural Dry Density (pcf)	Natural Moisture Content (%)	Atterberg Limits LL	Atterberg Limits PI	Sieve Analysis % Passing No. 4	Sieve Analysis % Passing No. 10	Sieve Analysis % Passing No. 40	Sieve Analysis % Passing No. 200	Soil Description	Remarks
1	1	109	4.8	NV	NP	99	97	60	6	slightly silty SAND	Figure 3
1	5	-	3.7	NV	NP	97	94	59	9	slightly silty SAND	
2	9	-	4.6	NV	NP	100	98	49	10	slightly silty SAND	

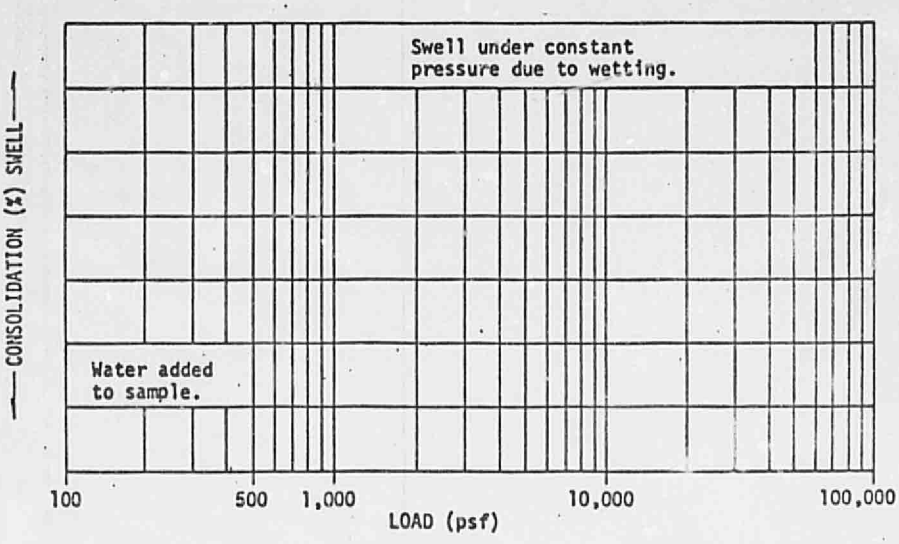
Table 1

SWELL-CONSOLIDATION TESTS



Sample of slightly silty SAND from test hole 1 from depth 1 feet.

Natural Moisture Content 4.8% Natural Dry Density 109 pcf



Sample of _____ from test hole ____ from depth ____ feet.

Natural Moisture Content _____ Natural Dry Density _____

Form 1-109

FIGURE 3

0641