HYDROLOGY G14/D2 3 PLANS

G 14/D2

3 PLANS

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
David Rusk

April 1, 1981

Mr. Kerry L. Rose
Mitchell/McClure Architects, P.A.
718 Coal Avenue SW
Albuquerque, NM 87102

Re: SOL RIO STORM DRAINAGE REPORT

Dear Mr. Rose:

The referenced drainage report dated January 20, 1981 satisfies all my list of comments dated December 30, 1980; therefore, the drainage report is approved.

Sincerely,

Fred J. Aguirre
Civil Engineer
Engineering Division

FJA:pp

MITCHELL/McCLURE ARCHITECTS P.A.
718 Coal Avenue S.W.
Albuquerque, New Mexico 87102

January 15, 1981

Fred Aguirre
City of Albuquerque
Engineering Division
P.O. Box 1293
Albuquerque, New Mexico 87103

Re: Sol Rio Townhouses

Dear Fred:

The following letter addresses your questions on the Sol Rio Drainage Proposal item by item:

1) On the subdivision approval plat, the drive through the project is designated as the private way and utility easement and the 7' at the east and west ends of the project are designated as public utility easements. The designation of both as utility easements covers all utilities, including drainage and will not be altered by any person(s) who purchase townhouses.

2) On the enclosed drawings I have included notes specifying the installation of an impervious membrane at all ponding areas within 20' of the structures. The perforated pipe is also solid now.

3) Offsite flows were discussed by Dick Burton.

4) Roof drains are located on the drawings.

5) Per our conversation concerning the inlet drains I have added a culvert around the drain for protection. (See enclosed drawing.)

6) Ponds A-E are mainly drainage swales that direct surface water from Sections 1-5 to the sumps and will doubtfully ever contain water but they have been lined with an impervious membrane for those rare occasions. The pond volumes are calculated on Page 2 of Appendix A in the drainage proposal. The rim elevation of ponds A-E is 67.0'

7) Now included in the revised drainage proposal are calculations for the private way. I took the average area of the asphalt road and the 67.0' contour with a depth of 6" to arrive at the proposed value. The pipe invert elevations are 62.0' as detailed on the enclosed drawings. Also please note that the capacity calculations for the sumps use your porosity value of .45.

8) Calculations for Ponds 'F' and 'G' ('H' and 'I') are included in the revised drainage proposal. The inlet detail for these ponds is the same for all the inlets. (See enclosed drawings.)

9) Dick Burton discussed the percolation calculation with you.

10) Construction datum (top of curbs(existing), etc., is provided on drawings.

11) Dick Burton's stamp is shown on drawings.

Fred, I only changed our section of the drainage proposal to reflect our discussions and recommended changes by Dick Burton. His Addendum is the same.

If you have any questions, please call.

Sincerely,

Kerry L. Rose

KLR/im

62.4 X 2.8 =

BURTON, LEYENDECKER & LEYENDECKER, INC.
CONSULTING ENGINEERS
ALBUQUERQUE LAS CRUCES

46% = voids

January 6, 1981

Fred Aguirre
City of Albuquerque
Engineering Division
P. O. Box 1293
Albuqurque, New Mexico 87103

31

RE: Sol Rio Townhouses

Dear Fred,

In accordance with our conversation on the referenced project, we are submitting the following information:

Question 3 - "Discuss offsite flows, if any."

Answer: Offsite flows are not expected to be a problem. The property to the east is developed and slightly lower than the proposed site. The property to the west is undeveloped, except for one house, and it is slightly higher. Minimum care in developing the property to the west will eliminate any possible flooding.

Question 7-B - "Provide the necessary data supporting the 50% porosity value."

Answer: We used the specific gravity of granite and weight-pounds/feet^3 for stone quarried and piled, pages 6-15 of "Steel Construction Manual" AISC, Seventh Edition.

s.g. = 2.8

Wt. Rock - 95 #/ft^3

95 ÷ (2.8) (62.4) = 0.54 use 50% SEE ATTACHED FOR ACTUAL POROSITY VALUE

Admittedly, this is not the best. We looked at soil mechanics texts for a better value, but did not find one. A reduction of this value to

3401 CARLISLE, N.E. • ALBUQUERQUE, NEW MEXICO 87110 • (505) ~~345-0636~~ 884-1330

33 1/3% would change the calculations presented on page BL-3 and BL-4 in the report. The total ponding volume for the sumps will be 4,570 ft^3, and ponding would occur in the parking lot when the rainfall exceeded 0.95 inches. This would reduce the total available ponding area to 15,091 from 16,666. The total required is approximately 11,541.

The only solution we see is to increase the size of the sumps if water in the parking areas on occasion is objectionable.

The architect is making changes concerning items 1, 4, 5, 7, 10 and 12 under separate cover. Please let us know if there are any further questions.

Sincerely,

Richard L. Burton, P. E.

RLB:jw

xc: Mitchell/McClure, Architects

Given: s.g specific gravity = 2.8
Wt Rock : 95 pcf

Weight solid = 95 pcf
sg = 2.8

Volume solid = $\frac{\text{Weight of Rock}}{(S.G)(\gamma_w)}$

$V_s = \frac{95\ pcf}{(2.8)(62.4)} = .5437$

V_v voids $= V_s - V_T$ 1 cu ft

$V_v = 1\ cu.ft - .5437$

$V_v = .4563$

e void ratio $= \frac{V_v}{V_s} = .8392$

porosity $= \frac{V_v}{V} \times 100 =$

porosity $= \frac{.4563}{1} = .4563 \times 10$ 46%

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

INTER-OFFICE CORRESPONDENCE March 19, 1981 REF. NO._____

TO: Fred Aguirre, Engineering

FROM: Barbara Stephenson, Assistant City Attorney

SUBJECT: Sol Rio Townhouses

We have suggested the following language as a substitution for Item 12 on the Restrictive Covenants documents prepared for the Sol Rio Townhouses:

> 12. UTILITY EASEMENTS AND DRAINAGE PLAN. There exist certain easements for public utilities, including sewers, water lines, electrical lines, gas lines and drainage works, as the same have been initially programmed and approved by the undersigned owner and shown on the construction drawings of the Sol Rio Townhouse Project. There also exists the Sol Rio Drainage Report dated December, 1980 and approved by the City of Albuquerque as a condition to the issuance of building permits for this project. No owner of any lot or lots in the Sol Rio Subdivision may interfere with, relocate, or disturb any said utility easements, or any of the physical characteristics of grading as set out in the approved drainage report.

This language will provide assurance that drainage structures which cross property lines are not modified by individual owners.

BS:jdb

cc Kenny Rose

APPROVED FOR DRAINAGE

_____
DATE

_____
SIGNATURE TITLE

ADVISE DRANAGE INSPECTOR
WHEN GRADING EXECUTED

MITCHELL/McCLURE ARCHITECTS P.A.
718 Coal Avenue S.W.
Albuquerue, New Mexico 87102

December 18,1980

Mr. Fred Aguirre
City Engineer's Office
123 Central N.W.
Albuquerque, New Mexico 87102

Dear Fred:

Pertaining to our conversation this afternoon, Mitchell/ McClure Arch. P.A. will agree to revise the Sol Rio Drainage Proposal and Plan in order to satisfy your recommendations to the City Engineer's office.

These revisions will be completed on or before December 29th.

If you have any questions, please call me.

Sincerely,

Kerry L. Rose
KLR/im

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
David P. Rusk

November 5, 1980

Sol Rio

Daz-lin, Inc.
5600 Cometa Place, NE
Albuquerque, NM 87111

REF: SC-80-50

Dear Applicant:

At their meeting of October 30, 1980, the Subdivision Review Board approved your request for subdivision approval subject to the following conditions:

1. Show easements and meter locations on the plat. If within easement meter locations not necessary. JK
2. The 24' face to face private way width (with mountable curb) must be defined on the plat.
3. Recalculate lot sizes exclusive of the private way.
4. A drainage report must be submitted for approval.
5. A performance bond must be submitted prior to approval.

Should you have any questions regarding this matter, please do not hesitate to contact this office at 766-7422.

Sincerly,

Robert J. Casias
County Planner

Reviewed by Vern Hagen, City Planner

cc: Mitchell/McClure, P.A., 718 Coal, SW, 87102

cr

SOL RIO

STORM DRAINAGE REPORT

December 1980

ENGINEERING REPORT

RECEIVED
JAN 19 1981
RECEIVED

Written By:

MITCHELL/MCCLURE ARCHITECTS, P. A.

RECEIVED
JAN 20 1981
RECEIVED

Review and Comments By:

BURTON, LEYENDECKER and LEYENDECKER, INC.

REGISTERED PROFESSIONAL ENGINEER
STATE OF NEW MEXICO
NO. 4947
RICHARD L. BURTON

BURTON, LEYENDECKER & LEYENDECKER, INC.

CONSULTING CIVIL ENGINEERS

ALBUQUERQUE LAS CRUCES

Revised

REVISED REPORT DATED 1-20-81

718 COAL AVENUE • s.w.
albuquerque nm
87102 505·243·0878

mitchell/mcclure
architects p.a.

SOL RIO

STORM DRAINAGE REPORT

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BURTON, LEYENDECKER AND LEYENDECKER, INC.

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STORM DRAINAGE STUDY FOR SOL RIO TOWNHOUSES
AT 700 BLOCK CANDELARIA N.W.
FOR DAZ-LIN CORP.

I. Purpose: The purpose of this report is to formulate a comprehensive study of drainage affecting the site development and to show that the development does not restrict drainage in manner or cause damage to adjacent land owners, and provides sufficient drainage facilities to provide safe drainage away from units within the development.

II. Scope: This report is limited to run-off originating within the development. General Engineering proceedures are presented for the calculation of storm run-off and storage.

III. Location: The site is located on the north side of Candelaria, opposite the junction of Seventh Street on the south side of Candelaria. The property is bounded on the north side by Veranda Road, on the west by private land (vacant and 1 home), on the south by Candelaria Road, and on the east by private land (2 homes). The site consists of lot 3, Block 3, of the Monkbridge Addition. The site consists of approximately 82,000 square feet of bare soil.

IV. Existing Drainage: The site lies within the MRGCD and below the major flood protection of the AMAFCA North/South Flood Control Ditch. The site is not within any flood hazard area as designated by the Corps. of Engineer's flood hazard maps prepared for the City of Albuquerque. The existing paved streets with curb and gutter serve as water carrying improvements to handle existing run off. No existing storm drainage system with drop inlets are available adjacent to the site for use as off site drain facilities. The site is relatively flat and has no significant geological or typographical features.

V. Proposed Development: The proposed development will consist of 22 townhouses with parking and private way areas. The coefficient

of run-off "C: has been estimated at 1.00 for impervious conditions and 0.30 for moderately sloped grass areas.

VI. Proposed Drainage Plan: The proposed drainage plan is designed to direct and contain run-off after development into ponds and underground sumps. The sumps will be excavated through the existing clay strata and filled with clean sand and gravel to the specified 10-0 level to allow infiltration of storm water into the sub-soil drainage layers in accordance with recommendations by Albuquerque Testing Laboratory Geotechnical Investigation, ATC Engr. Services No. 8492, of which a copy is attached. The sumps will be lined with 'Mirafi' filter cloth after which a 3'ϕ perforated concrete culvert with a grill will be placed in the sumps as detailed on the enclosed drawing. A 4"ϕ perforated plastic pipe shall be connected to the concrete culvert above the silt line and placed in the sump. All major drainage from roofs and impervious areas are directed to these sumps and will be filtered off site through underground sand levels. Any abnormal storm water which cannot be contained in the sumps will be allowed to pond in the private way to a level of 67.0'. The ponds in sections 1-5 are actually drainage swales which shall pipe water to the sumps by means of a 6" drain with a connecting 4"ϕ pipe which will connect directly to the concrete culvert. (See enclosed drawings and details.)

VII. Conclusions and Recommendations: On the basis of this study, the property under consideration can be adequately developed as proposed, when the proposed ponds, grading and sumps are constructed in accordance with this report. The proposed drainage plan detains and infiltrates 100% of storm waters for a 6 HR duration 100 yr storm. No discharge of storm drainage from

the site is planned on the surface. Based upon the ATTACHED Percolation Tests Lab. No 7831b the sumps will be sufficient to handle the storm water capacity for the project.

APPENDIX A

DESIGN CALCULATIONS

Storm Drainage and Retention Calculations
for Sol Rio Townhouse Project.

Design Calculations

Land Area = 410'x200'		=	82,000 sf
100 yr. 6 HR duration. Intensity		=	2.4 inches
Coeff of run-off	impervious	=	100%
	grass	=	30%
	raw land	=	30%

Development Areas

Area	Sec.1	Sec 2	Sec 3	Sec 4	Sec 5	Sec 6	Total
Roof	-	-	-	-	-	24418	24418
Asphalt	-	-	-	-	-	10920	10920
Concrete	-	-	-	-	-	11960	11960
Grass/ soil	1878	3905	1665	2183	5335	19736	34702
	1878	3905	1665	2183	5335	67034	82000

Volume Calculations

Section 1

Q =(1878)(.3)(2.4/12) = 112.68 cf.
Pond capacity = 97'x 4'x.5' =194 cf
194 cf > 112.68 cf ok

Section 2

Q =(3905)(.3)(2.4/12) = 234.3 cf
Pond capacity =170'x 4'x .5' = 340 cf
340 cf > 234.3 ok

Section 3

Q =(1665)(.3)(2.4/12) = 99.9 cf
Pond capacity = 137'x 4'x .5' =274 cf
274 cf > 99.9 cf ok

Section 4

Q =(2183)(.3)(2.4/12) = 130.98 cf
Pond capacity 120'x 4'x .5' = 240 cf
240 cf > 130.98 cf ok

Section 5

Q =(5335)(.3)(2.4/12) = 320.1 cf
Pond capacity 265'x 4'x .5' = 530 cf
530 cf > 320.1 cf ok

Section 6

Q = [(47298)(1.0) + (19736)(.3)] x (2.4/12) = 10643.76 cf
Pond capacity = 7 sumps + asphalt area in private way up to
67.0' + Pond F + Pond G =
Pond capacity = 7(926.09)+ .5(9600 +8500/2) + 680 + 1700 = 13387.63
13387.63 10643.76 ok

Total Site

Q = [(47298 x 1.0) +(34702 x .3)] x (2.4/12) = 11541.72 cf
Pond capacity = Pond "A" + Pond "B" + Pond "C" + Pond "D" + Pond "E"
+ Pond "F" + Pond "G" + 7(sumps) + Private way
= 194 + 340 + 274 + 240 + 530 + 680 + 1700 + 7(926.09)
+ 4525 = 14965.6 cf
14965.6 cf 11541.72 cf ok

PONDING SCHEDULE

Pond A = 97'x 4' x 6" = 194 cf
B = 170'x 4' x 6" = 340 cf
C = 137'x 4' x 6" = 274 cf
D = 120'x 4' x 6" = 240 cf
E = 265'x 4' x 6" = 530 cf
F = Irregular x 2.0' = 680 cf
G = Irregular x 2.0' = 1700 cf

Sump - DTL 1/c -3
Gravel area =(10x20x10) - $(2.5^2)(3.14)/4$ (10) =1950.9
Pipe area = 49.09 cf
Capacity = (1950.9)(.45) + 49.09 = 926.09 cf
Where 0.45 = porosity value

Private way = .5(9600 +8500/2) = 4525 cf

PERCOLATION CALCULATION FOR SUMPS

Sump capacity = 926.09 cf
Surface area in
Sand layer for
Percolation = (10'+ 10' + 20' + 20')(10) + (10'x 20') = 800
Rate of percolation = .04386 f/minute
Total sump
800 sf x .04386 = 35.088 f/minute
926.09 cf ÷ 35.088 = 26.39 minutes
Sumps at saturated conditions will drain in less than ½ hour.

APPENDIX B

SOIL TEST REPORT

Albuquerque
TESTING LABORATORY
SOIL INVESTIGATION — PHYSICAL TESTING — INSPECTION — RESEARCH
532 JEFFERSON ST., N. E. P. O. BOX 4101 PHONE 255-8916 255-1322
ALBUQUERQUE, NEW MEXICO 87106

Lab No. 7831b

Date November 10, 1980

Report to Mitchell/McClure, Architects

Submitted By Same

Sampled By Nick Korecki, ATL Representative

Project Proposed Sol Rio Townhomes

Source of Material One (1) shallow depth field percolation test

TEST RESULTS

TEST DATA: The percolation test was run in accordance with the procedures set forth in the U.S. Department of Health, Education and Welfare, Public Health Service Publication No. 526, "Manual of Septic Tank Practice". The test was run at a depth of approximately 4 feet beneath the existing ground surface in a 6" ± diameter hole. The hole was allowed to saturate with water prior to running the test.

TEST RESULTS:

Time Interval (minutes)	Drop in Water Level (inches)
0-10	16-3/4
10-20	12
20-30	7-1/2
30-40	5-1/4

* Percolation Rate 1.90

*Time in minutes required for water level to drop one inch, the drop occurring during the final 10 minute period being used to calculate the percolation rate.

GRADATION TEST: (Cumulative % Passing)

G	CS	MS	FS	S/C
0	0	2	68	30

UNIFIED SOILS CLASSIFICATION:

Tan Silty Fine Sand (SM)

Respectfully Submitted,
ALBUQUERQUE TESTING LAB.
Original Signed By
J. Patrick Callahan
Registered Professional Engineer

NK/dpr

ALBUQUERQUE TESTING LABORATORY

GEOTECHNICAL INVESTIGATION FOR THE PROPOSED

SOL RIO TOWNHOUSES, ALBUQUERQUE, N.M.

ATL ENGINEERING SERVICES NO. 8492

April 22, 1980

ATL ENGINEERING SERVICES

April 22, 1980

Mitchell/McClure, Architects
205 4th St. S.W., Suite 405
Albuquerque, New Mexico 87102

Attention: Mr. Ron McClure

Re: ATL Engineering Services No. 8492. Geotechnical Investigation for the Proposed Sol Rio Townhouses, Albuquerque, New Mexico.

Gentlemen:

Transmitted herewith is our Geotechnical Investigation for the referenced project. The report includes the procedures utilized, "Boring Log Graphs" depicting subsurface soils encountered, results of standard field penetration tests, laboratory tests, and our conclusions and recommendations for foundation design.

We appreciate the opportunity of working with you on this project. If any questions should arise concerning the report or if we can be of further assistance to you, please contact our office.

Very truly yours,

ATL ENGINEERING SERVICES

James H. Clary, Geologist

Robert K. Lloyd, P.E.

PROPOSED RIO SOL TOWNHOUSES

INTRODUCTION

The purposes of the investigation were to define and evaluate the surface and subsurface soil conditions at the site through field exploration (field reconnaissance and test borings); securing representative soil samples to determine through laboratory testing their engineering properties; and the engineering analysis of both field and laboratory test results to set forth conclusions and recommendations relative to foundation design for the proposed townhouses.

SUBSURFACE EXPLORATION

The test borings were drilled on April 15 and 16, 1980 using a Mobile B-56 rotary drill mounted on a 1969 Dodge truck, the drill itself being powered by a Ford Industrial Engine. The test borings were advanced "dry" using 6-3/4" O.D. by 3-1/4" I.D., continuous flight, 5-foot sectional hollow stem augers. Standard penetration tests were made at 2½ to 5 foot vertical intervals in the holes and through the hollow stems of the augers at the time of drilling. The purpose of the standard penetration test is to obtain a measure of the relative density, consistency, or firmness of the subsurface soils and to obtain samples of the soils for visual inspection and laboratory testing.

LABORATORY TESTING

Soil samples obtained during field exploration were sealed at the site in watertight containers to maintain field moisture and transported to the laboratory where they were visually inspected and classified according to the Unified Soils Classification System (A.S.T.M. Standard D-2487) by either a Geologist or a Geotechnical Engineer. Selected, respresentative samples were tested to further aid in classification and evaluation of engineering properties required for analyses. Results of these tests are tabulated on

the "Boring Log Graphs" and/or Appendix.

SURFACE AND SUBSURFACE CONDITIONS

Surface and subsurface soil conditions existing at the test locations are shown on the "Boring Log Graphs" in the Appendix.

The ground surface at the site is relatively level and even, and the area is sparsely vegetated with grasses and weeds. There is surface evidence of man-made fill and rubbish over the majority of the site, and there appears to have been at least one house located on the southern part of the property at some time in the past. There is the possibility that former house sites could include loosely placed filled-in basement and other areas where probable ash deposits were encountered at depths of approximately 6 through 10 ft. depths at several test locations. These materials may be coal ashes that have been chemically altered into clays and silts designated as CH-ML-OH materials below. On-site soils consist of man-made fill and/or disturbed soils with rubbish which extend to variable depths of from 2 feet to at least 4 feet. As mentioned above, the depths of man-made fill and/or rubbish could extend to greater depths and in areas not covered by the test borings. Beneath the fill and/or disturbed soils are river deposits consisting of silty, clayey to clean fine sands (SM-SC-SP); brown to black floodplain silts, clays and organic clays (CL,CH,ML,OH); and clean, gravelly, river channel sands (SW-SP). The sands are generally in a loose to medium dense state of relative density. The clays generally occur as relatively thin deposits (up to 4" thick) below a depth of approximately 4½ feet and "pinch out" laterally. Standard penetration tests indicate the clays to be in a variably soft to hard state of relative firmness; consolidation tests indicate the clays to be relatively incompressible unless subjected to increased moisture.

Lab No. 8492

No water table or water bearing strata was encountered at any of the test locations.

PROPOSED CONSTRUCTION

It is our understanding that the proposed townhouses will be relatively lightly loaded two story structures of concrete block construction on the first floor and frame construction on the second story; having continuous, reinforced concrete foundations; on-grade reinforced concrete floor slabs; and without basements. Foundations have tentatively been designed for 2000 lbs. per square foot.

CONCLUSIONS AND RECOMMENDATIONS

Considering the loose fill soils found at several test locations and the likelihood that these fill soils exist to significant depths below intended and economical shallow foundation depths, it is recommended that each individual townhouse structure be based on controlled, compacted fill soils as follows:

1. Prior to construction all building areas should be completely stripped of vegetation, fill soils and rubbish, and these materials wasted. The entire site area should then be proof rolled with a 10 ton roller to locate any loose soil zones.

2. Foundations on Engineered, Compacted Fill. Excavations for footings should be made such that the depth of engineered, compacted fill soils beneath footings and the lateral distance of compacted fill soils extending from footing edges is equal and should be not less than two (2) feet. "On-site" sandy soils removed from excavations and approved by the Soils Engineer may be used as engineered, compacted fill for support of foundations. These soils should be thoroughly mixed with optimum moisture outside of excavations. Prior to placement of select fill soils, the exposed subgrade should be scarified to a depth of 8 inches, moistened with optimum moisture, and compacted to a minimum of 90 percent of Modified Proctor Density (A.S.T.M. D-1557). Fill soils should then be placed in thin, horizontal lifts (maximum loose depth not to

exceed 8 inches), compacted to a minimum of 95 percent of Modified Proctor Density, and brought up to the desired grade beneath footings.

3. For all foundations based entirely on engineered, compacted fill soils, and not less than 1½ feet below the lowest, adjacent finished grade, an allowable soil bearing pressure of 2000 lbs. per square foot may be used. Full dead loads plus the maximum reasonable live loads that can act on the footings at any one time should be used. Minimum width of continuous footings should be 1'-4; minimum "spot" footing width should be 2'-0".

4. "On-Grade" Floor Slabs. All "on-grade" reinforced concrete floor slabs should be based on a minimum 6 inch compacted thickness of imported, select fill soil consisting of a pit-run sand and gravel or similar material having a Plasticity Index not exceeding 6. In areas where fill and/or rubbish has been removed, the depth of select, compacted fill beneath floor slabs may be greater than the recommended 4 to 6 inches. Prior to placement of slab fill soils, the previously stripped subgrade should be scarified to a depth of 8 inches, moistened with optimum moisture, and compacted to a minimum of 90 percent of Modified Proctor Density. Slab fill soils should then be placed in thin, horizontal lifts (8 inches maximum loose depth), compacted to a minimum of 90 percent of Modified Proctor Density, and brought up to the desired grade beneath floor slabs.

5. Pavements

Support for asphaltic concrete pavement may be provided by a minimum of 4 inches and preferably 6 inch thickness of a well graded, crushed gravel and fines base course fill, placed as described in Paragraphs 3 and 4 above.

The following minimum pavement sections are suggested for varying traffic conditions:

Traffic Conditions	Minimum Total Pavement Thickness (inches)
Light (passenger cars, general parking areas)	3
Medium (medium to heavy trucks, driveway and ramp areas)	4

Specifications for asphaltic concrete and select gravel base course may be taken from the "New Mexico Standard Specifications for Public Works Construction", 1979 edition, Sections 115 and 302 respectively. All subgrade soils should be compacted to a minimum of 90 percent of Modified Proctor Density; select aggregate base course should be compacted to a minimum of 95% of Modified Proctor Density. The minimum acceptable density of in-place asphaltic concrete paving should be 96% of the recorded laboratory specimen density.

DRAINAGE AND PROTECTION OF FOUNDATION SOILS

It will be very important at this site to keep the soils at and below foundation depths protected from moisture intrusions. Saturation or wetting to various degrees of the foundation soils could cause them to consolidate to some degree, with resulting settlement which, if sufficient and differential in nature, could cause structural distress. Depending on imposed structural loads, some of the clay-type soils could also swell to some extent should they be subjected to increased moisture conditions. To help prevent saturation or wetting to various degrees of the foundation soils, we advise that the following precautions be taken:

1. Provide and maintain positive surface water drainage around and away from all foundations and exterior walls.
2. Keep opened footing excavations dry, with concreting operations to follow as soon as is practical.
3. Properly compact all backfill soils in utility trenches and around

foundations to a minimum of 90 percent of Modified Proctor Density.

4. Discourage the planting of vegetation adjacent to foundations unless subsurface drains are placed beneath planted areas to lead irrigation waters away from foundations.

5. Ponding areas, if required, should be a minimum distance of 20 feet from all structures. Preliminary plans are to construct small ponding areas along the east and west boundaries of the property and to construct larger ponding areas in the central portion of the property to collect the majority of runoff. We recommend that for a more satisfactory performance, the larger ponding areas be excavated entirely through the underlying black clay deposit,(or clay-ash materials) and these soils replaced with a clean sand and gravel up to the bottom elevation of the ponding area.

The recommendations given in this report are based on the actual subsurface soils existing at the test locations, visual reconnaissance of the area, and our understanding of the proposed construction.

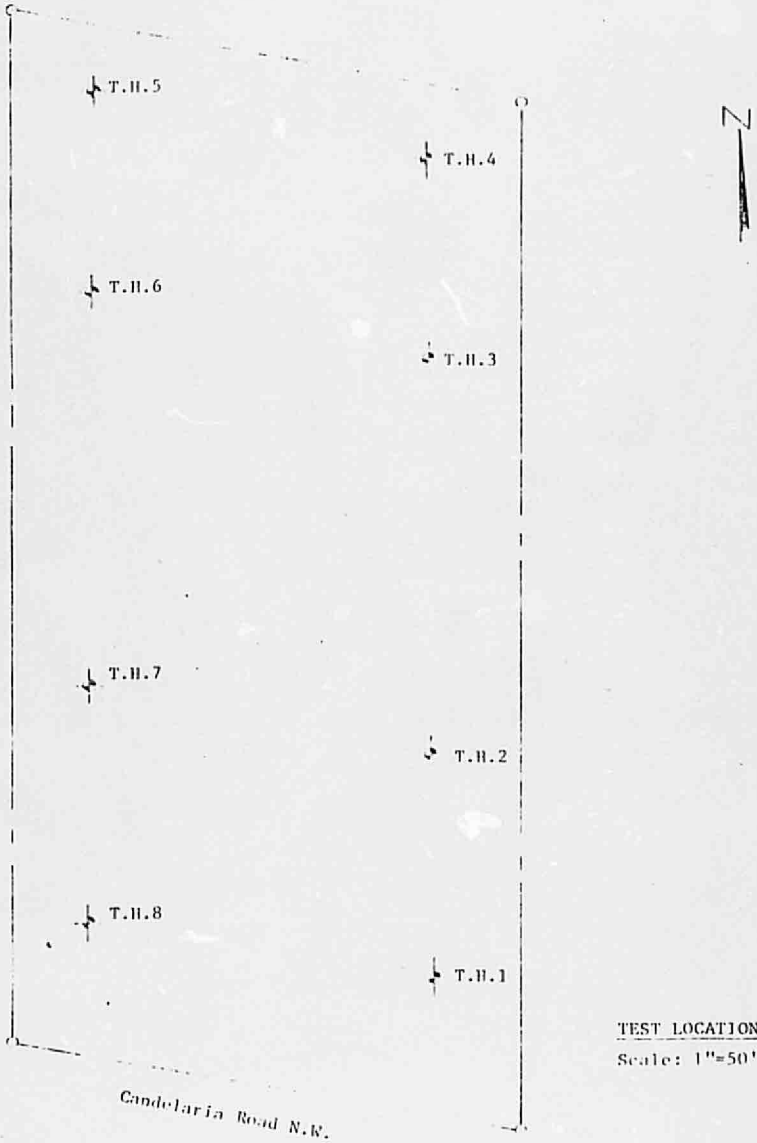
Any changes or deviations from the recommendations given in this report, in structure loads, foundation depths or any other factors which could affect or alter the recommendations covered herein, should be brought to our attention before finalization of plans and prior to construction.

Your attention is directed to the fact that only very small, fractional parts of the proposed site area were "opened" and the subsurface soils exposed and tested from the test borings depict soils and soil conditions <u>only</u> at these locations. Subsurface soils and their in-situ properties which can materially affect design considerations may change in areas not covered by test borings. Therefore, if during construction and when excavations for footings are opened, soil foundation conditions differ from those encountered by the test borings of this report, our laboratory should be notified immediately for possible

revision to our recommendations.

Professional opinions and recommendations presented in this report are based on our evaluations of the subsurface soil conditions at the site, our understanding of the proposed construction and our experience in the geotechnical field. Our only guarantee concerning the project is that our engineering and geological work and judgments given herein meet the standards of our profession at this time.

APPENDIX B-1



TEST LOCATIONS

Scale: 1"=50'

PROJECT: Proposed Sol Rio Townhouses

Lab No. 8492

Date: April 22, 1980

BORING LOG GRAPH - TEST HOLE NO. 1 & 2

Depth - Ft.	VISUAL DESCRIPTION	PENETRATION RESISTANCE Per Foot N	Per 6" or as Noted	Per Foot C	SAMPLER TYPE	MOISTURE CONTENT % M	DRY DENSITY P.C.F. D	PARTICLE SIZE DISTRIBUTION % GRAVEL	SAND	SILT & CLAY	ATTERBERG LIMITS % LIQUID LIMIT	PLASTIC LIMIT	P.I.
	Test Hole No. 1												
	Fill, brown silty, gravelly sand (SM). Loose. 2'	8	3 3 5		S	5.0		12	69	19			
	Tan, clean fine sand (SP).	24	8 18 6		C*	5.0		0	93	7			
5	Medium dense. 7'	14	4 7 7		S	3.0		0	98	2			
	Brown to black silty clay (CH-OH) with snail shells & organics. Soft to moderately 11' firm.	12	4 6 6		S	38.[illegible]		0	23	77	72	34	38
10		6	3 3 3		S	28.6		0	29	71			
	Gray, silty to clean sand (SM-SP), slightly gravelly. Medium dense.	19	6 9 10		S	3.1		3	84	13			
15	*Soil not retained in sampler.												
	Test Hole No. 2												
0	Brown, silty, clayey sand (SC). Soft. 2'	5	3 2 3		S	10.3							
	Tan, silty to clean fine sand (SM-SP) with some thin interbedded clay (CL); contains "pinsize" holes. Medium dense or moderately firm. 8'	20	3 8 12		C	2.3 4.7 2.6	--- --- 95						
5		14	6 7 7		S	6.4							
	Brown to black, silty sandy clay (CH-OH) with snail shells. Moderately 10½' firm.	10	5 6 4 4		S	20.7							
10		9	4 5		S	11.4							
	Gray clean fine to medium sand (SP). Loose to medium dense.	12	5 7 5		S	2.8							
15													

ALBUQUERQUE TESTING LABORATORY

PROJECT: Proposed Sol Rio Townhouses

Lab No. 8492

Date: April 22, 1980

BORING LOG GRAPH - TEST HOLE NO. 3 & 4

Depth - Ft.	VISUAL DESCRIPTION	PENETRATION RESISTANCE Per Foot N	Per 6" or as Noted	Per Foot C	SAMPLER TYPE	MOISTURE CONTENT % M	DRY DENSITY P.C.F. D	PARTICLE SIZE DISTRIBUTION % GRAVEL	SAND	SILT & CLAY	ATTERBERG LIMITS % LIQUID LIMIT	PLASTIC LIMIT	P.I.
	Test Hole No. 3												
	Brown, silty, clayey sand(SC). Very sof	4	2 2 2		S	13.4							
	2' Tan, silty to clean fine sand(SM-SP). Medium dense.	15	4 7 8		C*	2.3							
5	4½' Light gray silty, fine sandy clay(CL). Firm.	18	5 6 12		S	7.7							
	7' Tan, silty to clean fine sand (SM-SP). Loose.	7	3 3 4		S	3.0							
0		8	4 4 4		S	4.3							
	13' Gray, clean gravelly sand (SP-SW). Loose.	9	3 5 4		S	1.3							
	*Soil not retained in sampler.												
	Test Hole No. 4												
	Man-made fill soils consist of brown, silty, clayey, to clean sand(SM-SC-SP) with various rubbish. Loose. 4'	10	2 5 5		S	5.1							
		7	4 3 4		C*	6.1							
	Tan, clean fine sand (SP).	14	4 7 7		S	2.8							
	Medium dense.	18	4 9 9		S	3.4							
		14	5 7 7		S	3.1							
	*Soil not retained in sampler.	13	6 6 7		S	3.4							

ALBUQUERQUE TESTING LABORATORY

PROJECT: Proposed Sol Rio Townhouses

Lab No. 8492

Date: April 22, 1980

BORING LOG GRAPH - TEST HOLE NO. 5 & 6

Depth - Ft.	VISUAL DESCRIPTION	PENETRATION RESISTANCE Per Foot N	Per 6" or as Noted	Per Foot C	SAMPLER TYPE	MOISTURE CONTENT % M	DRY DENSITY P.C.F. D	PARTICLE SIZE DISTRIBUTION % GRAVEL	SAND	SILT & CLAY	ATTERBERG LIMITS % LIQUID LIMIT	PLASTIC LIMIT	P.I.
	Test Hole No. 5												
	Fill, brown, silty, clayey sand (SM-SC) Loose. 4'	4	2 2 2		S	11.0		1	59	40			
		10	3 4 6		C	5.0		0	74	26			
5	Tan, clean fine to medium sand (SP).	15	3 7 8		S	1.9		0	94	6			
		19	6 9 10		S	1.7		0	93	5			
10	Medium dense.	12	5 6 6		S	1.9		1	93	6			
15		13	6 6 7		S	1.8		0	92	7			
	Test Hole No. 6												
	Fill, brown, silty sand (SM) with rubbish. Loose. 2'	6	3 3 3		S	6.8							
	Brown, silty, clayey sand (SM-SC) with some thin brown to black clay layers (CL-CH). Moderately firm. 7'	11	4 5 6		C	8.1							
		15	5 7 8		S	7.9							
	Gray, silty to clean sand (SM-SP). Loose to medium dense, some iron staining.	7	2 2 5		S	1.9							
		13	3 5 8		S	2.6							
15		12	4 5 7		S	3.5							

ALBUQUERQUE TESTING LABORATORY

PROJECT: Proposed Sol Rio Townhouses

Lab No. 8492

Date: April 22, 1980

BORING LOG GRAPH - TEST HOLE NO. 7 & 8

Depth - Ft.	VISUAL DESCRIPTION	PENETRATION RESISTANCE Per Foot N	Per 6" or as Noted	Per Foot C	SAMPLER TYPE	MOISTURE CONTENT% M	DRY DENSITY P.C.F. D	PARTICLE SIZE DISTRIBUTION % GRAVEL	SAND	SILT & CLAY	ATTERBERG LIMITS % LIQUID LIMIT	PLASTIC LIMIT	P.I.
	Test Hole No. 7												
	Brown, silty fine sand (SM) with thin clay layers (CL). Loose.	5	2 2 3		S	6.7							
		9	3 4 5		S	4.7							
	4½'		7			8.9	93				32	25	7
5	Light brown, silty, fine sandy clay (CL-ML) contains "pinsize" holes. 7' Hard.	50+	7 50-5½"		C	11.3 12.0	85 Auger	Cuttings 7'-7'					
	Black, silty clay (CH-OH). Soft. 8½'	4	6 2 2		S	7.1							
10	Gray, clean, fine to medium sand (SP). Loose.	6	2 3 3		S	3.1							
15		10	3 5 5		S	2.6							
	Test Hole No. 8												
0	Fill, brown silty sand (SM) with rubbish. Very loose to loose	4	3 2 2		S	5.5							
		6	2 3 3		S	3.6							
	4½'		5										
5	Light brown, silty, fine sandy clay (CL-ML) contains "pinsize" holes. Mod. 7' firm.	13	7 6		C	9.3 9.7	87				32	28	3
	Black, silty clay (CH-OH). Soft.	8	4 4		S	22.8							
	9'		3										
10	Gray, clean, fine to coarse sand (SW-SP) with some small gravels. Loose.	6	2 4		S	5.6							
15		8	4 4 4		S	7.7							

TES AND DEFINITIONS

1. **Penetration Resistance** – Blows per foot using "A" rod, 140 lb. hammer with 30-inch guided free fall unless otherwise noted.
   - N – Standard Penetration Resistance (ASTM: D-1586), 2" O.D. split barrel sampler
   - C – Continuous Penetration Resistance, 2½" O.D., conical, steel drive point
   - R – Penetration Resistance, 3" O.D. Modified Dames & Moore Split Ring Sampler

2. **Sample Type**
   - S – Standard Split Barrel; 2" O.D. x 1-3/8" I.D.
   - C – California Sampler; 2-3/8" O.D. equipped with 2" I.D. x 4" high brass liners
   - R – Modified Dames & Moore Sampler; 3" O.D. equipped with 2.42" I.D. x 1" high brass liners
   - T – Shelby Tube

3. **Soil Index Properties**
   - M – Moisture Content, % of dry soil weight
   - D – Density, lbs per cubic foot computed either by volumetric or displacement methods. Soils Classifications are visual unless accompanied by grain size analysis and Atterberg Limits.

4. **Water Table** – If encountered is noted on Log Graphs as ⏚.

UNIFIED SOIL CLASSIFICATION SYSTEM
ASTM: D2487

COARSE-GRAINED SOIL

MORE THAN 50% LARGER THAN 200 SIEVE SIZE

Symbol	Letter	Description	Major Divisions
	GW	Well graded gravels or gravel sand mixtures, less than 5% - 200 fines	GRAVELS More than half of coarse fraction is larger than No. 4 sieve size
	GP	Poorly graded gravels or gravel sand mixtures, less than 5% - 200 fines	
	GM	Silty gravels, gravel sand silt mixtures, more than 12% - 200 fines	
	GC	Clayey gravels, gravel sand clay mixtures, more than 12% - 200 fines	
	SW	Well graded sands or gravelly sands, less than 5% - 200 fines	SANDS More than half of coarse fraction is smaller than No. 4 sieve size
	SP	Poorly graded sands or gravelly sands, less than 5% - 200 fines	
	SM	Silty sands, sand silt mixtures, more than 12% - 200 fines	
	SC	Clayey sands, sand clay mixtures, more than 12% - 200 fines	

NOTE – Soils with 5 to 12 percent minus 200 fines should be classified with dual symbols

FINE-GRAINED SOIL

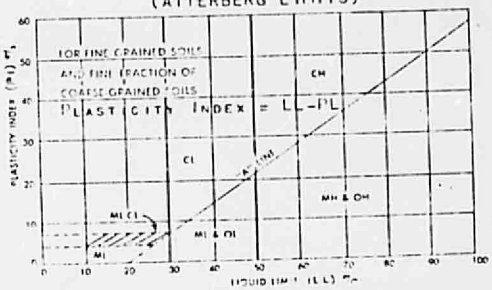
MORE THAN 50% SMALLER THAN 200 SIEVE SIZE

Symbol	Letter	Description	Major Divisions
	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity	SILTS AND CLAYS Liquid limit less than 50
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
	OL	Organic silts and organic silt clays of low plasticity	
	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	SILTS AND CLAYS Liquid limit greater than 50
	CH	Inorganic clays of high plasticity, fat clays	
	OH	Organic clays of medium to high plasticity, organic silts	
	Pt	Peat and other highly organic soils	

SOIL FRACTIONS

Component			Size Range
Boulders			Above 12 in.
Cobbles			3 in. to 12 in.
Gravel			3 in. to No. 4 sieve
Coarse Gravel	G		3 in. to ¾ in.
Fine gravel			¾ in. to No. 4 sieve
Sand			No. 4 to No. 200
Coarse	CS	TS	No. 4 to No. 10
Medium	MS	TS	No. 10 to No. 40
Fine	FS	TS	No. 40 to No. 200
Fines (silt or clay)	S/C		Below No. 200 sieve

PLASTICITY CHART (ATTERBERG LIMITS)



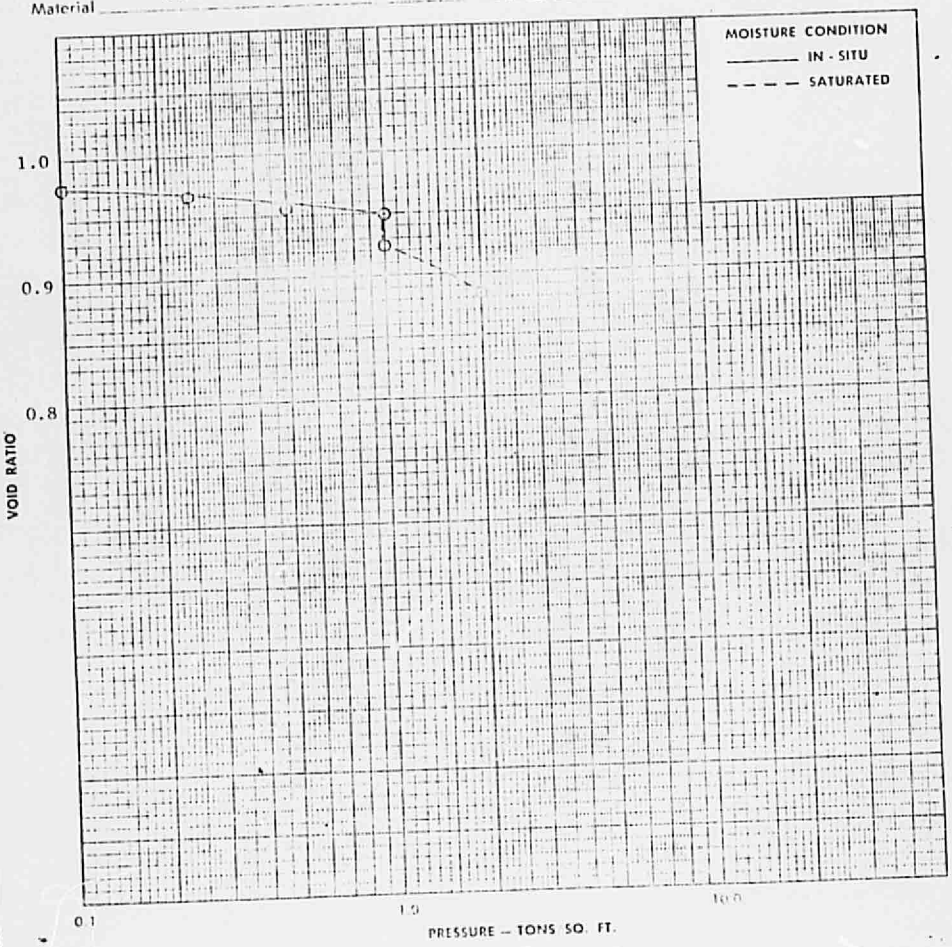
CONSOLIDATION TEST DATA

Lab. No. 8492

Project Sol Rio Townhouses Location Albuquerque, N.M.

Source of Sample Test Hole 8 Depth 5 ft.

Material Fine silt



ALBUQUERQUE TESTING LAB., INC.

ALBUQUERQUE TESTING LABORATORY, INC.

CONSOLIDATION TEST DATA SHEET

LAB No. 8492

PROJECT Sol Rio Townhouses LOCATION Albuquerque, N.M.

SAMPLE SOURCE Test Hole 8 DEPTH 5'

MATERIAL Fine silt UNDISTURBED X "C" REMOLDED

COMMENTS Saturate at 1 tsf - load to 2 tsf.

DATE	TIME	LOAD TONS/S.F.	ELAPSED TIME, MIN.	DIAL READING	DATE	TIME	LOAD TONS/S.F.	ELAPSED TIME, MIN.	DIAL READ
1/80	11:01	1/4	0	0.0000				2	0.011
			1/4	0.0029				4	0.012
			1/2	0.0029		10:23			0.012
			1	0.0030		12:04			0.012
			2	0.0030		1:09	Saturate	0	0.013
			4	0.0030				1/4	0.014
	12:19			0.0039				1/2	0.015
	1:30			0.0043				1	0.016
	3:19	1/2	0	0.0048				2	0.019
			1/4	0.0069				4	0.022
			1/2	0.0070		2:57			0.024
			1	0.0070		4:38			0.025
			2	0.0071	4/19/80	7:43AM	2	0	0.025
			4	0.0072				1/4	0.036
	4:25			0.0079				1/2	0.037
18/80	8:09			0.0098				1	0.038
	9:13	1	0	0.0098				2	0.039
			1/4	0.0116				3	0.039
			1/2	0.0117				4	0.040
			1	0.0118		8:48			0.0434
					4/21/80	8:00		End	0.0476

CONSOLIDATION RINGS:

1.8900" H = 1.00"A = 2.8323 in.^{2}
0.00164 cu.ft.

WET WT., SOIL+RING = 101.9 GM MOIST. CONTENT 6.2
RING = 35.7 GM DRY DENSITY 83.7
WET SOIL = 66.2 GM
DRY SOIL = 62.3 GM
SPECIFIC GRAVITY =

$V_s = \frac{\text{DRY DENSITY}}{62.4 \times \text{SP.GR.}} = 0.5062$

e_o = INITIAL VOID RATIO = $\frac{V_v}{V_s} = 0.9755$

$V_v = 1 - V_s = 0.4938$

$e = \frac{\Delta}{V_s} - V_s$

LOAD TS/S.F.	DIAL (1)	CORRECTION (2)	FINAL DIAL (1) - (2)	1- FINAL DIAL (Δ)	e	REMARKS (% Consolidation)
0	0.0000	0		1.0000	0.9755	0
/8	---	0.0008		---	---	---
/4	0.0048	0.0010		0.9952	0.9660	0.48
/2	0.0098	0.0015		0.9902	0.9561	0.98
/4	---	0.0014		---	---	---
1	0.0130	0.0016		0.9870	0.9498	1.30
2 1*	0.0257	0.0020		0.9743	0.9247	2.57
8 2	0.0476	0.0025		0.9524	0.8815	4.76
		0.0034				
2		0.0041				
		0.0045				

Saturated

PRESSURE-SWELL TEST (WITH OVERBURDEN)

Sample Identification: Test Hole No. 1 at 7½ ft. depth

Remolded _____ Undisturbed Standard spoon

Test Data:

Ring: Diam. 1.37 inches; Area: 1.4741 in.^{2}, 0.0102 ft.^{2}

Height 1.0 inches; Volume: 0.000853 ft.^{3}

Weight 147.1 gms.

Soil Sample:

Initial Wt. Soil + Ring 188.1 gms. Moisture Prior to Test = 37.1 %

Soil + Ring After Test --- gms. After Test --- %

Soil Dry Wt. 29.9 gms. Dry Density = 77.3 p.c.

Overburden Pressure

(1) Avg. Unit in-place Soil wt. = 98.8 p.c.f.

(2) Overburden Soil Height = 7½ ft.

(3) P_o = (1) x (2) 741 p.s.f.

Surcharge Wt. Required

(4) 56.69 x (3) x Sample Area (ft.^{2}) = 430.2 gms. 430.2 gms. (Total)

less sample container = 61.5 gms.

Net wt. to be added = 368.7 gms.

Actual Wt. added to prevent swelling (5) = 652.9 gms.

250+61.5+710.1 = 1021.6, 1021.6 - 368.7

Swelling Pressure = $\frac{(5) \times 8}{\text{Sample Area}}$ = 1125 p.s.f.

CONSOLIDATION TEST DATA SHEET

Lab No. 8492

Project Sol Rio

Location

Sample Source Test Hole 1

Depth 7'

Material black & gray clay

Undisturbed x Std. Remolded

Comments

Date	Time	Load Tons/S.F.	Elapsed Time, Min.	Dial Reading	Date	Time	Load Tons/S.F.	Elapsed Time, Min.	Dial Reading
17/80	3:40	¼ (250g)	0	0.0000					
			½	0.0006					
			¼	0.0006					
			1	0.0007					
			2	0.0007					
			4	0.0005 Swell					
	4:40			-0.0026					
18/80	8:09	saturate		-0.0064					
	4:30			-0.0061					

Consolidation Rings:

[illegible]

[illegible]

1.37 H= 1 A= 1.4741 V= .000853

Wet Wt., Soil+Ring = 188.1 gm Moist. Content 37.1

Ring = 147.1 gm Dry Density 77.3

Wet Soil = 41.0 gm Ring 1=Dry Soil x 0.7

Dry Soil = 29.9 gm Ring 2=Dry Soil x 0.8

Specific Gravity =

$Vs = \frac{\text{Dry Density}}{62.4 \times \text{Sp.Gr.}} =$

e_o = Initial Void Ratio = $\frac{Vv}{Vs}$ =

$Vv = 1 - Vs =$

$e = \frac{\Delta}{Vs} - Vs$

Loads/S.F.	Dial (1)	Correction (2)	Final Dial (1) - (2)	1- Final Dial (Δ)	e	Remarks
0		0				
1/8		0.0008				
1/4		0.0010				
1/2		0.0013				
3/4		0.0014				
1		0.0016				
2		0.0020				
4		0.0025				
8		0.0034				
12		0.0041				
16		0.0048				

APPENDIX C

REVIEW and COMMENTS BY:

BURTON, LEYENDECKER and LEYENDECKER, INC.

CONSULTING CIVIL ENGINEERS

REVIEW and COMMENTS BY:

BURTON, LEYENDECKER and LEYENDECKER, INC.

CONSULTING CIVIL ENGINEERS

REVIEW:

Introduction

Burton, Leyendecker and Leyendecker, Inc. was asked to review the report written by Mitchell/McClure and to make changes in the report and in the plans as they felt necessary for a workable drainage system. The following is a review of the changes and comments to the Mitchell/McClure report on a section-by-section basis.

III. Location

Add Location Map. Location is shown overlain on City of Albuquerque Zone Atlas Map G-14-Z. (See BLL-1.)

IV. Existing Drainage

Delete: Sentence No. 4, Line 7 and 8; "No existing storm drainage system with drop inlets are available adjacent to the site for use as off-site drain facilities."

Add: "Existing storm sewers on the North side of the project are shown in Figures BLL-2."

The storm sewer on Veranda (Monkbridge) is shown on Plans for Paving District No. 165, Sheet No. 13. A portion of the Plan Sheet is included as Figure BLL-3.

V. Proposed Development

We probably would have used a runoff "C" for grassed areas of 0.50 instead of 0.3. This change would increase the runoff 12%. We looked at the excess ponding capacity which is 44% and decided that it was not a factor in the workability of the overall plan.

Design Calculations

Add: "The property is divided into nine sections which correspond to the areas shown on the Contour and Grading Plan, Sheet C-3 of 36 of the construction drawings.

SUMPS

Calculation of Size Detail $\frac{1}{C-3}$

Gravel Area: $(10 \times \overset{1,666}{20} \times 8.33) - (2.5)^2 (3.14) \div 4)$ $(8.40) = 1,625\ ft^3$

Pipe Area - $41\ ft^3$

Capacity - $(1,625)\ (.50) \div 41 = 853.5\ ft^3$

Where 0.50 = void ratio

The depth shown in the calculations is 8 feet, 4 inches, and the depth in the calculations is 14 feet. We believe there would be some difficulty in excavating 14 feet pits in this soil and recommend the depth in Section 1/C-3 be changed to approximately 10 feet. Excavation should be to the "gray, clean,

fine to medium sand" layer. Therefore, we propose changing the calculations to:

$$(10 \times 20 \times 10) - 2{,}000 \text{ ft}^3$$

$$(2{,}000) - 41)\ (0.50) = 980 \text{ ft}^3$$

and we have used this figure in our calculations.

PONDS A, B, C, D, and E

The ponds are actually drainage ditches which drain directly into the sumps and all begin at contours 67.0. Therefore, these ditches and ponds would actually surcharge the sumps and cause water to seek a level of 67.0 feet in the parking area. Therefore, it seems appropriate to calculate an ultimate ponding capacity which would be the water retained on the property before it went onto Candelaria. This would include the parking lot and the planted areas below the 67.0 contour level and would amount to 7,575 ft^3.

POND I

Pond I can be allowed to fill to contour 67.0, therefore the total ponding according to our calculations would be:

2,946 ponding over Pond I

7,575 ft^3 ponding in parking lot

Sumps: 7 @ 980 = 6,860

Total: 16,666 ft^3

Total without water in parking area: 9,806 ft^3

Using these figures, it would take a rain of 2.03 inches to result in water in the parking area, and a rain of 3.46 inches to result in water flowing onto Candelaria.

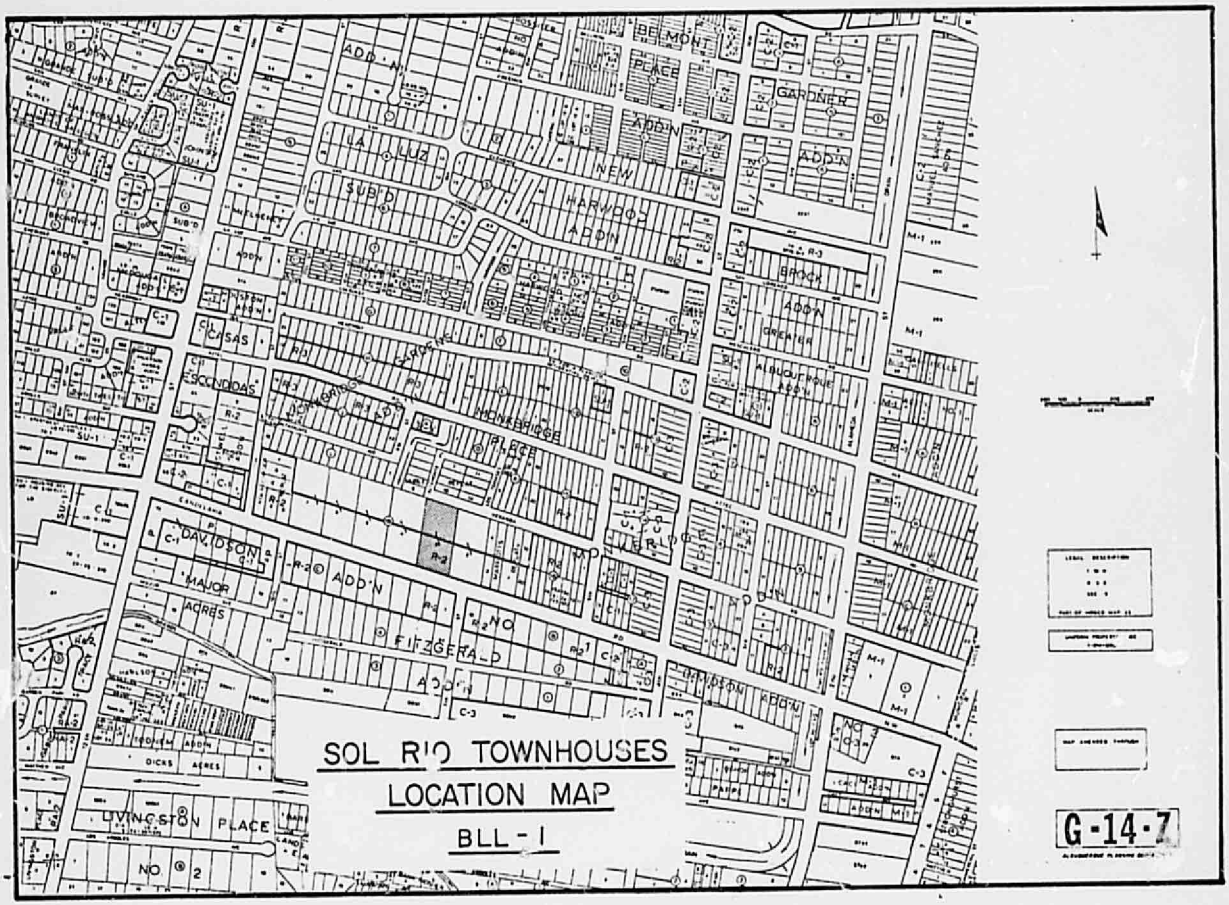
BURTON, LEYENDECKER and LEYENDECKER, INC.-RECOMMENDATIONS

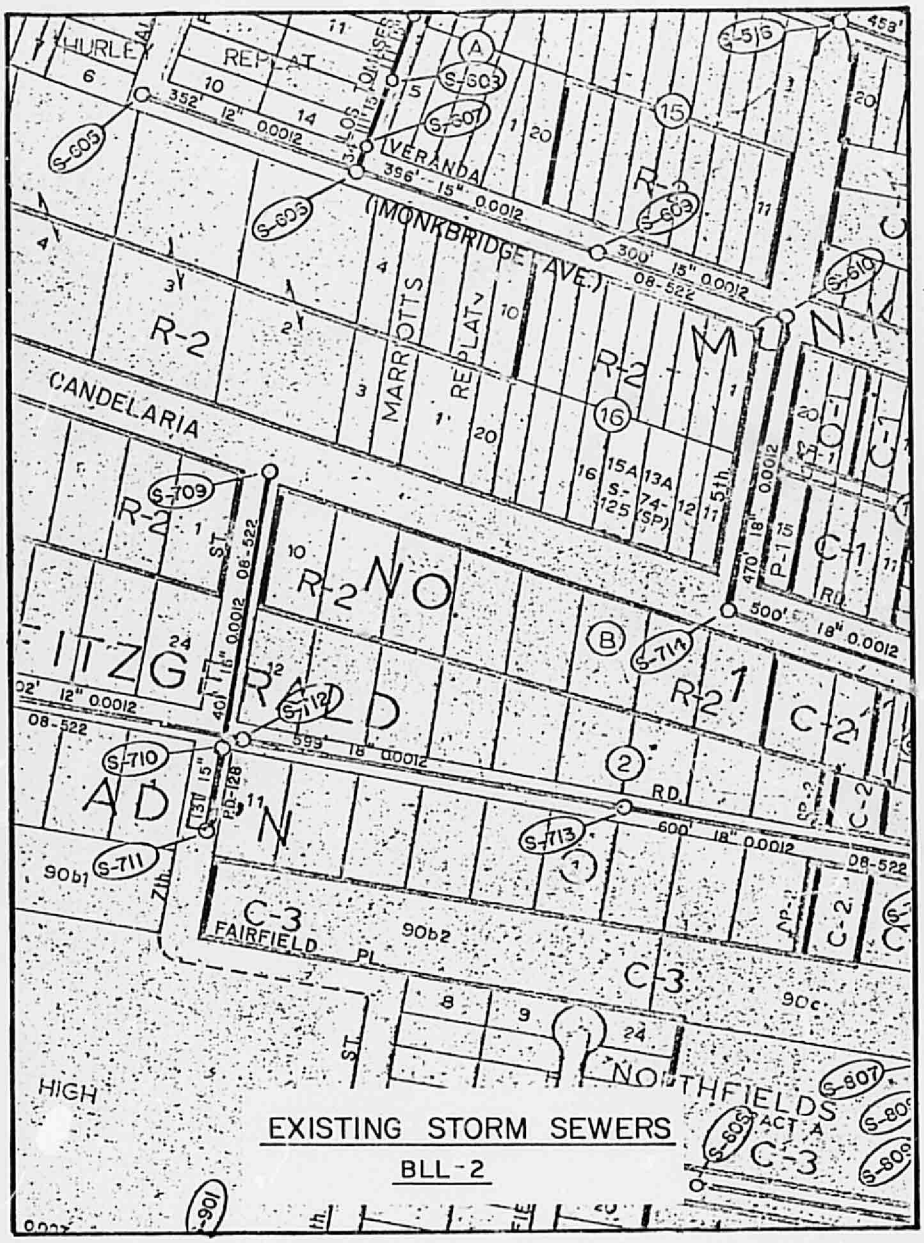
Change Detail 1/C-3. Eliminate the bottom in the concrete pipe. This eliminates useful percolation area for no good purpose.

Change depth to approximately 10 feet. The sump should be dug to a depth necessary to place the bottom in the "gray or tan, clean, fine sand". See drill logs for actual depth which varies from 5 feet (hole 5 and 6) to 10 feet (hole 1, 2, 3, 4, 7 and 8).

Other Solutions

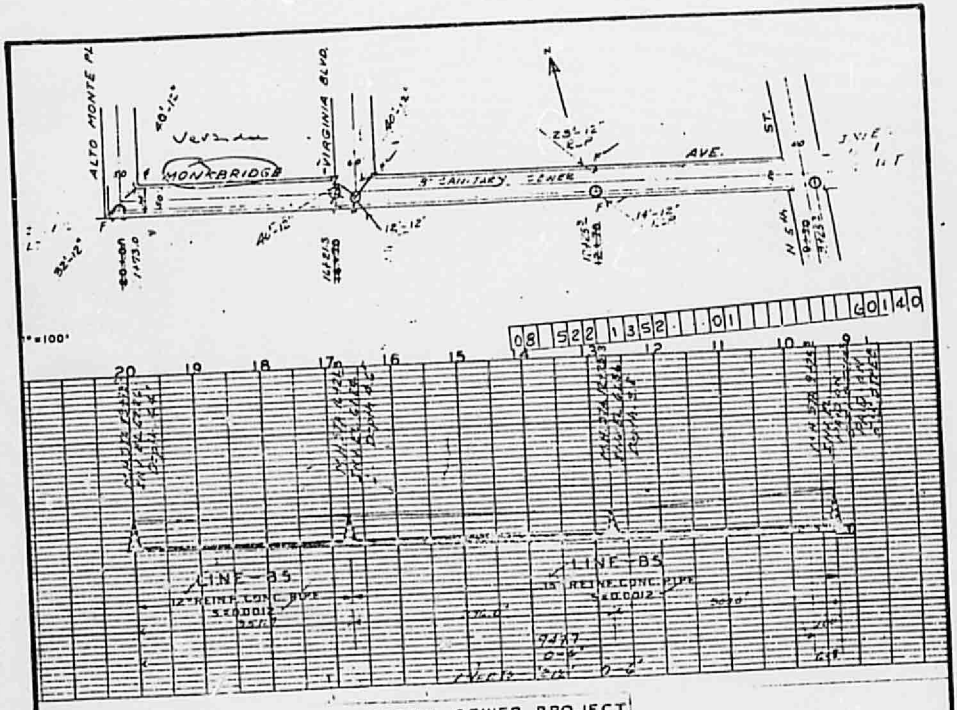
The existing storm sewer in the Veranda area (Monkbridge) has an invert depth of 3.0 feet, an elevation of top of manhole 66.77 feet. If we installed a 15 inch storm sewer at a grade of 0.015 inches, the invert would be 63.6 at 130 (nearest sump), add 1.25, equals 64.85 feet. This would be 6.6 feet above the recommended invert of the sump, with a coverage over the pipe of only 2.15 feet. Therefore, we would not recommend any access to the storm sewer system by pipe, we believe that the excess ponding capacity is the best safeguard.

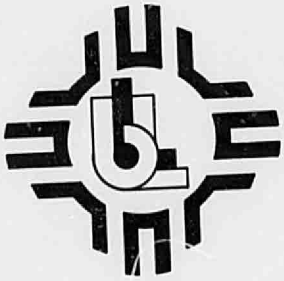

SOL RIO TOWNHOUSES
LOCATION MAP
BLL - I
G-14-7
BELMONT PLACE
GARDNER ADDN
LA LUZ SUBD
NEW HARWOOD ADDN
BROOK ADDN
CASAS ESCONDIDAS
ALBUQUERQUE ACRES
NEUBERGER PLACE
DAVIDSON
MAJOR ACRES
ADD'N
FITZGERALD ADDN
DICKS ACRES
LIVINGSTON PLACE
NO 2



EXISTING STORM SEWERS

BLL-2



STORM SEWER PROJECT
FOR
PAVING DISTRICT NO. 65
SHEET NO. 13

STORM SEWER
MONKBRIDGE AVE.
BLL-3