HYDROLOGY K22/D18 2 PLANS

K22/D18

2 Plans

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

July 6, 1981

Mr. Christopher L. Weiss, President
Consultants/Terra Sol Inc.
P. O. Box 142
Sandia Park, N.M. 87047

Re: Monarch Townhouses

Dear Mr. Weiss:

We have reviewed your drainage report and the concepts outlined agree with current City procedures, AMAFCA 80-15 and our predesign meeting. It is therefore approved.

In submitting your preliminary and/or final plans for grading and drainage, incorporate the attached checklists, to facilitate review procedures. It is difficult to evaluate one without the other, hence approval of a drainage report does not constitute approval of construction plans.

If you have any questions, feel free to contact me at 766-7467.

Very truly yours,

Charles M. Easterling
Principal Asst. City Engineer/Hydrology

CC/CME/fs

cc: Dep

FEDERAL EMERGENCY MANAGEMENT AGENCY

Washington D.C. 20472

FEB 27 1981

IN REPLY REFER TO:
IFE (218)
FLO-1

23 FEB 1981

Mr. Christopher L. Weiss, P.E.
President
Consultants Terra Sol, Inc.
P.O. Box 142
Sandia Park, NM 87047

Dear Mr. Weiss:

This is in response to your letter of January 27, 1981, requesting that the Federal Insurance Administrator determine whether the proposed Sunset Gardens Townhomes, located on Tract A, being a Redivision of Tract No. 156, Unit No. 6, Town of Atrisco Grant, Albuquerque, New Mexico, as recorded in Volume A-4, Folio 117, in the Office of the Clerk and Recorder, Bernalillo County, New Mexico, are located within the Special Flood Hazard Area.

We have reviewed the Flood Hazard Boundary Map in light of the additional flood data you furnished and have determined that the above mentioned property would be partially inundated by a flood having a one-percent chance of occurrence in any given year (base flood). A final determination as to whether the proposed structures for this property would be located in the Special Flood Hazard Area cannot be made at this time. However, a final determination will be made upon receiving certified "as-built" information showing the locations of the structures, the elevations of the lowest finished grades adjacent to the structures and the elevations of the lowest floor, including basement. If it is determined that the structures are not located within the Special Flood Hazard Area, then flood insurance will not be required. by FEMA

Based on the data supplied by you, the structures would not be located within the Special Flood Hazard Area if construction is completed as proposed on the Grading Drainage Plan for Sunset Gardens Townhomes, prepared by Consultants Terra Sol, Inc., dated January 27, 1981. The final determination will be based on this data unless future additional flood data becomes available indicating otherwise. However, no new information is anticipated to be generated in the near future for the City of Albuquerque, New Mexico.

The above stated results of your request for exemption from the Federal requirement for the purchase of flood insurance are based on minimum criteria established by FIA for flood plain management regulations and are intended only to reflect your status in relation to the Federal requirement for the purchase of insurance. Community officials, based on knowledge of local conditions and in the interest of human safety, may set higher standards for construction in the flood plain

than the minimum criteria established by FIA. If the State of New Mexico or the City of Albuquerque has adopted more restrictive and comprehensive flood plain management criteria, these criteria take precedence over the minimum federal criteria for the purpose of regulating development in the flood plain. This policy is set forth in Section 60.1(d) of the National Flood Insurance Program regulations.

If you have any questions or if we can be of further assistance, please contact the Program Implementation & Engineering Office at (202) 755-6570 or toll free at (800) 424-8872.

Sincerely,

for Robert D Chappell

Richard W. Krimm
Acting Administrator
Federal Insurance Administration

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

October 19, 1979

Mr. John Bettis
Enchantment Engineering
1517 Eubank Blvd., N.E.
Albuquerque, New Mexico 87111

K22-D18

Reference: Monarch Apartments

Dear Mr. Bettis:

Following my letter dated July 24, 1979, a meeting was held on August 7, 1979, to discuss its content.

At that meeting, it was indicated that an amended drainage report was to be submitted furnishing the following information in detail:

1. Definition of the offsite flows which affect the site;

2. Supply a method for the safe conveyance of the offsite flows through the site;

3. Positive drainage of the detention areas into the Juan Tabo Blvd., storm sewer through small diameter outlet pipes;

4. Submission of a revised grading plan with a clear indication that the finished floor elevation of the buildings will be above the anticipated 100 yr. flood level; suitable moisture barrier must be supplied to prevent damage to the foundations.

The information requested has been received, and has been found acceptable by the City Engineer.

Very truly yours,

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/lc
cc: Richard Leonard, AMAFCA
Richard Heller, City Engineer
Michael L. Norton
Drainage file

RECEIVED
JUN 29 1981
CITY ENGINEER

DRAINAGE REPORT & GRADING PLAN
MONARCH TOWNHOUSES

on

Juan Tabo Blvd. NE

Albuquerque, NM

June, 1981

Consultants terrasol inc.

DRAINAGE REPORT & GRADING PLAN

MONARCH TOWNHOUSES

on

Juan Tabo Blvd. NE

Albuquerque, NM

June, 1981

CHRISTOPHER L. HEBS
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER

Consultants terra Sol inc.
P.O. Box 142 Sandia Park, New Mexico 87047 (505) 281-1991

June 23, 1981

Mr. Chuck Easterling
Principal Assistant City Engineer, Hydrology
City of Albuquerque
400 Marquette NW
Albuquerque, New Mexico 87102

RE: Monarch Townhouses

Dear Mr. Easterling:

We are submitting the attached report, prepared by Consultants/Terra-Sol, Inc., for your review and approval.

Thank you.

Respectfully,

Christopher L. Weiss

Christopher L. Weiss, P.E.
President

CLW/vw

Attachments

DRAINAGE REPORT & GRADING PLAN JUNE 1981

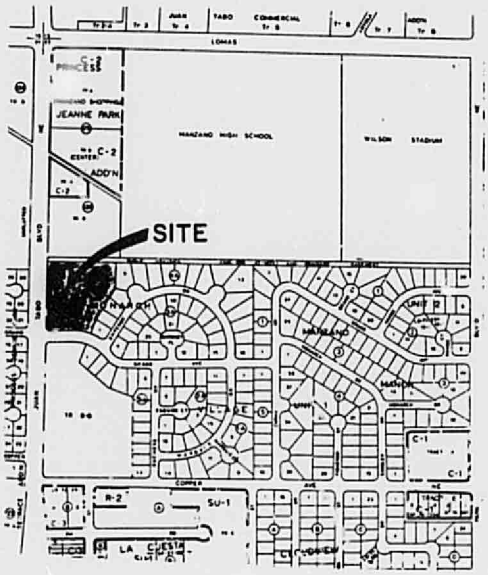
MONARCH TOWNHOUSES

INTRODUCTION

At the request of Mr. Bill Goodin, owner of the proposed townhouse Tract, Consultants/Terra-Sol, Inc., has investigated the storm drainage for the site. This investigation follows the criteria set forth in a pre-design conference with the City Engineers Department.

SITE LOCATION

The proposed site (3.51 Acres) is located in the NE quadrant of the City. It lies east of and adjacent to Juan Tabo Blvd., north of and adjacent to Grand Ave., and is bordered on the north by an apartment complex and an R-1 subdivision on the west.



MONARCH TOWNHOUSES

JUNE 1981

PROPOSED DEVELOPMENT

The proposed development will consist of a combination of duplex, triplex and six-plex townhouses, for a total of 46 units, and related street improvements.

Proposed construction features which are pertinent to drainage are as follows:

1. Each structure's roof will drain to the front yard, There will be no roof ponding.
2. Individual rear yard areas will be self-ponding, with only the yard area contributing runoff. Each yard will be sloped to drain away from the respective structures, with the low point of the yard positioned a minimum of 15' from the foundation of the townhouse.

TOPOGRAPHIC MAP

The topographic map used as a basis for the grading plan is the result of a field survey conducted by Walker Survey Company in March, 1981. This map represents the site topography as it now exists.

SOILS REPORT

The soil-type for the site consists of deposits of principally silty sands (SM,ML) with decomposed granite gravel and some clayey sand seams (SC).

Specific drainage recommendations require positive surface water drainage around and away from all exterior walls. (See soils report in back of this report)

DRAINAGE/GRADING EXHIBIT

The drainage/grading plan located in the back of this report shows the location of the proposed drainage improve-

ments and the proposed final grades for the site.

EXISTING DRAINAGE

Existing conditions indicate that the site is not affected by offsite flows from the residential subdivision to the east. However, surface runoff from Manzano High School passes through the parking lot of the apartment complex located north of the site. These flows presently have the potential of overlapping onto a portion of the site before intercepting Juan Tabo Blvd.

The site is not located in a flood hazard area, as shown on Page 6 of the FHBM, dated December, 1979.

DEVELOPED DRAINAGE

Offsite Flows

The offsite flows crossing the apartment parking lot adjacent to, and north of, the site have the potential to spread out beyond the limits of its drainage easement. As part of the preliminary approval of this townhouse concept in regard to these offsite flows, the developer agreed to construct a concrete retaining wall along the common boundary of the two sites. The wall's footing will be placed entirely on the townhouse side of the property line.

Onsite Flows

In a pre-design meeting with Mr. Easterling, Principal Assistant City Engineer, Hydrology, different approaches for handling the on-site drainage were discussed. After Mr. Easterling investigated the times to peak for the storm drainage system within Juan Tabo Blvd., it was determined that the storm drainage system had between 75 and 100 cfs capacity available for the reach adjacent to the site.

The approach to handle on-site runoff recommended by the City, and agreed upon by the developer, is to release

all on-site flows, with the exception of individual rear yard areas, into the internal streets. Flows from Gable Lane and Lombard Lane will be picked up by storm drainage inlets which will be constructed by the developer. Flows from Metro Lane will split, with a portion turning down Lombard Lane. The remaining flows on Metro will be intercepted by Grand Ave. for secondary routing to the storm drain system in Juan Tabo Blvd.

All rear yards, with the exception of Lot 13, will be self-ponding. The location of the lowest point of each yard will be held a minimum of 15' from the townhouse foundation.

The following table refers to onsite flows from three subbasins:

On-Site Drainage Basins - Developed Condition

Sub Area	Area	C	Intensity	Q	Outlet Pt.
1	1.3	0.66	5.4	4.6	Juan Tabo
2	0.79	0.67	5.4	2.9	Juan Tabo
3	0.61	0.67	5.4	2.2	Grand

The following information for sizing the inlets and storm drains is based on the accompanying graphs. Because the City has not developed inlet capacity curves, these graphs do not represent exact conditions. However, the final results were adjusted to account for the base differences between the graphs and the City's single "C" inlet.

The inlet grate graph is the result of actual hydraulic tests. The inlet design chosen closely approximates the grate design used by the City for overall dimensions and clear space openings.

In determining the inlet grate capacity for a specific grate, the value of "K" was chosen from the graph using the proper longitudinal and transverse slope to fit the design case. The "K" selected was then used in the equation $Q = KD\ 5/3$, where "D" is the depth upstream of the grate

in feet. "D" was obtained from the nomogram for flow in triangular channels.

Because the area on each side of the respective street is approximately equal, and because the curbs on both sides of the street are level, the design assumption was made that the individual inlet capacities should be based on one-half of the sub-basin's total Q.

Grate Inlets

Sub-Basin	Inlet Location	n	z	z/n	Runoff Q	D	S_L	S_T	K	Inlet Q
		-	-	-	cfs	ft.	%	%	-	cfs
1	Gable	0.016	50	3125	2.3	0.17	2.5	2.0	30	1.6
2	Lombard	0.016	50	3125	1.5	0.13	3.5	2.0	34	1.1

Curb Opening Inlets

Sub-Basin	Inlet Location	z	d	T	So	Sx	Q_1/Q	Graph Adj. Factor	Q_1
		-	-	ft.					cfs
1	Gable	50	0.17	8.5	0.025	0.020	0.4	0.7	0.6
2	Lombard	50	0.13	6.5	0.035	0.020	0.5	0.7	0.5

Summary of Inlet Capacities

Sub-Basin	Inlet Location	Grate Cap.	Curb Cap.	Total Inlet Cap. / 1/2 Street Flow
1	Gable	1.6	0.6	$2.2 \leq 2.3$
2	Lombard	1.1	0.5	$1.6 \geq 1.5$

The net result is that 2-single "C" combination inlets located at each intersection of Gable and Lombard with Juan Tabo will have the capacity to accept the 100 yr. onsite flows for the respective streets.

The minimum pipe size to convey these flows to the Juan Tabo storm drain will consist of 18" RCP's set at minimum 1% grades or greater. See diagram for Kutter's formula.

Storm Drain	n	Dia.	Min. S.	Cap. Max. Q		Act. Q
Gable	0.016	18"	1%	7.8	>	4.5
Lombard	0.016	18"	1%	7.8	>	2.9

R E C O M M E N D A T I O N S

1. Grade each rear yard as shown in the grading plan to provide a positive slope away from each respective structure. Hold low point of yard a minimum of 15' from the townhouse foundation.

2. Grade side yards, front yards to drain to respective street.

3. All roof scuppers to either drain directly to front of lot, or to discharge onto side yard grading to drain to front of lot.

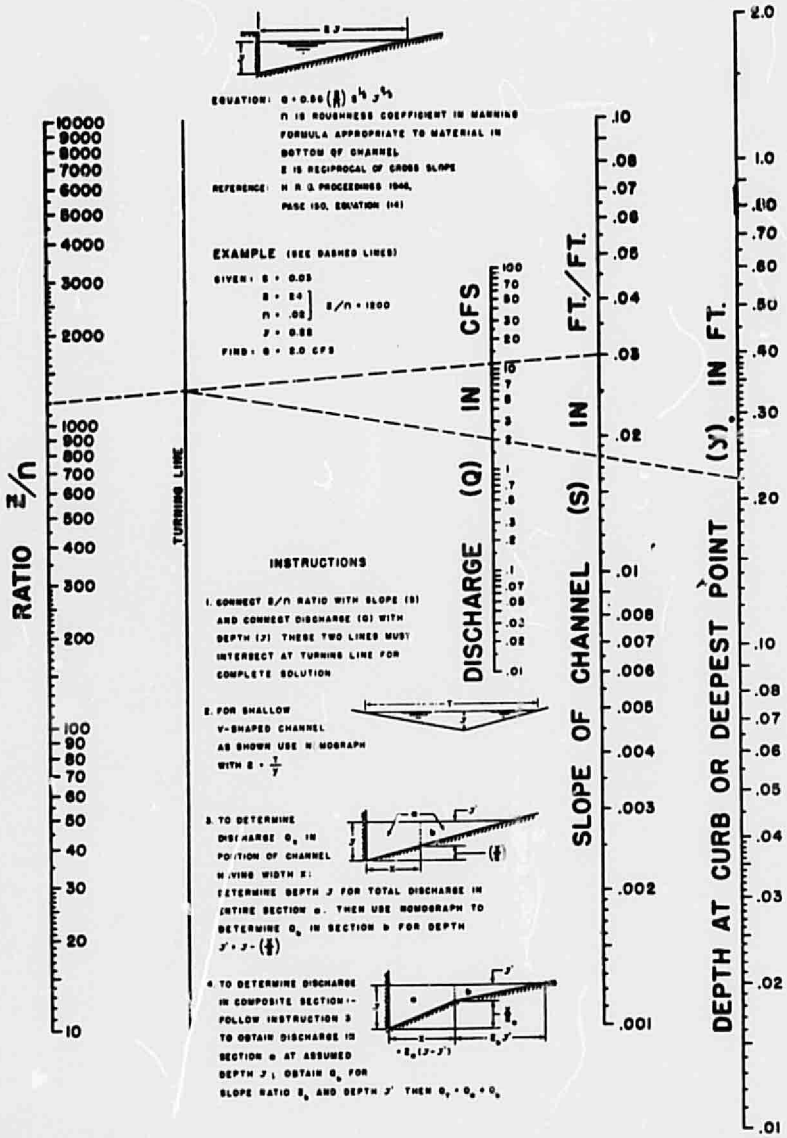
4. Construct 2-single "C" combination inlets at each street intersection of Gable and Lombard Lane with Juan Tabo. Connect each storm drain system to the existing 54" RCP Storm Drain located in Juan Tabo Blvd.

5. An existing storm inlet on Juan Tabo Blvd. conflicts with the proposed location of Lombard Lane with Juan Tabo. Remove existing inlet and reconstruct a single "D" inlet over existing drain pipe at the street entrance.

C O N C L U S I O N

The proposed drainage plan meets the requirements set forth in the preliminary subdivision approval process and the pre-design meeting in that: 1) a retaining wall between the apartment site and this project will be constructed to maintain the drainage patterns from the east to Juan Tabo across the apartment parking lot; 2) Storm drainage facilities will be constructed to intercept onsite flows directly from Gable and Lombard Lanes; 3) Partial flows from Metro Lane will enter Grand Ave. for secondary collection by the Juan Tabo Storm Sewer.

The following pages contain the design graphs, pre-design criteria, planning department guidelines and approval for preliminary plat procedure, and the Soils Report.

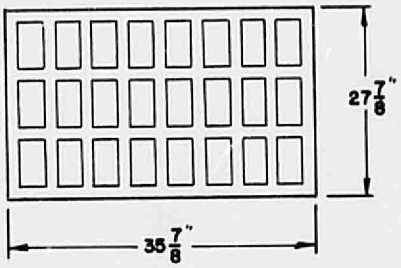


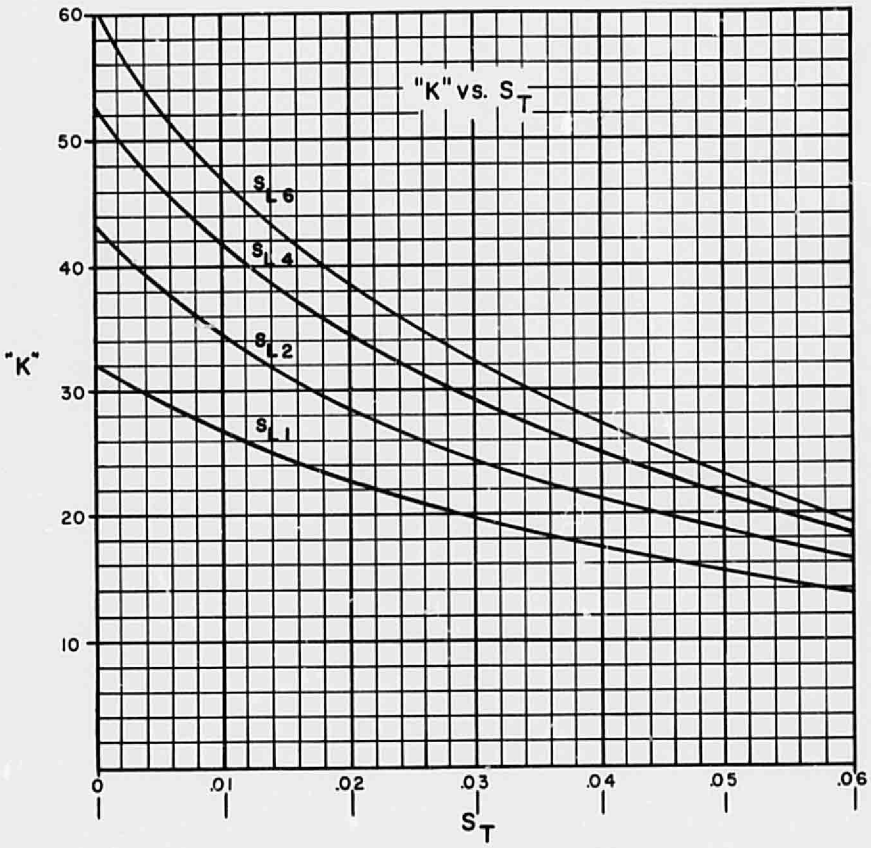
NOMOGRAM FOR FLOW IN TRIANGULAR CHANNELS

Plate 2.6-0682

CAT. NO.- R-3403F
DESCRIPTION- TYPE A
COMP. CODE-3403-0006

FLOW →



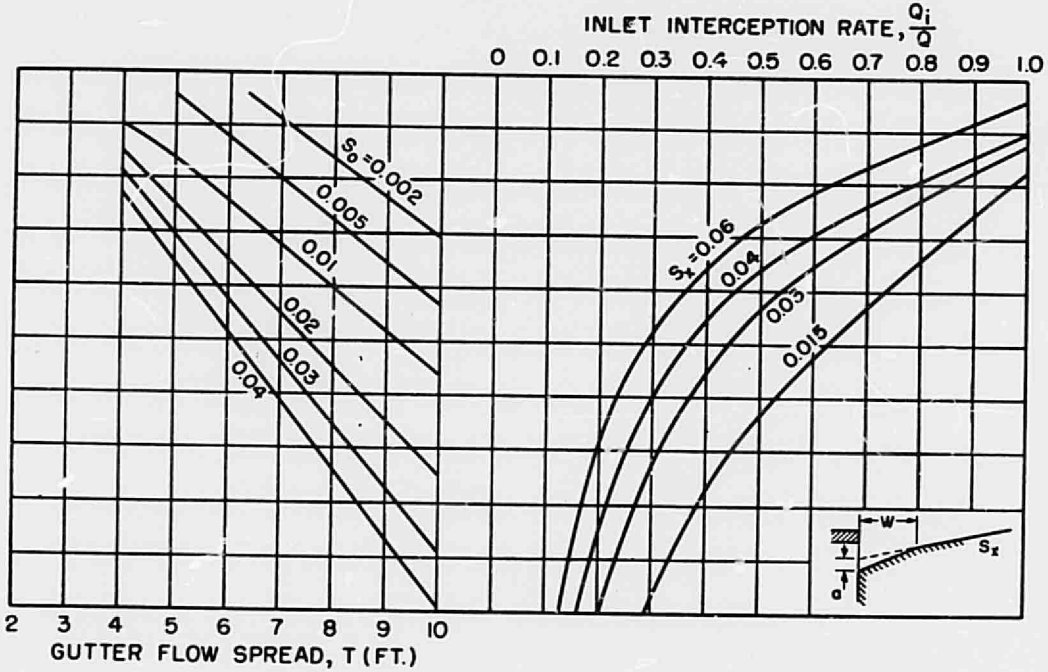


S_T = TRANSVERSE GUTTER SLOPE

S_L = LONGITUDINAL GUTTER SLOPE

K = GRATE INLET COEFFICIENT

© 1976 Neenah Foundry Co.



General condition
W = 2' a ≧ 2"
n = 0.016
Length of opening, L_i = 5'
Minimum height of curb opening, $h_m = T\,S_x$

Chart 7

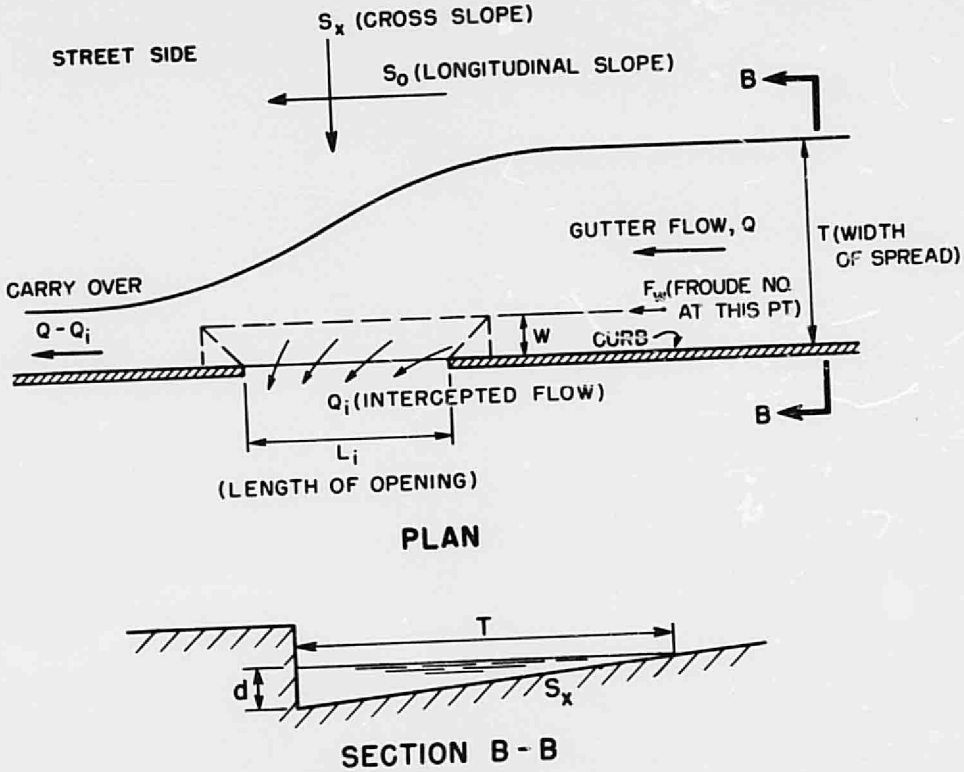


Figure 30 - Graphical definition of symbols

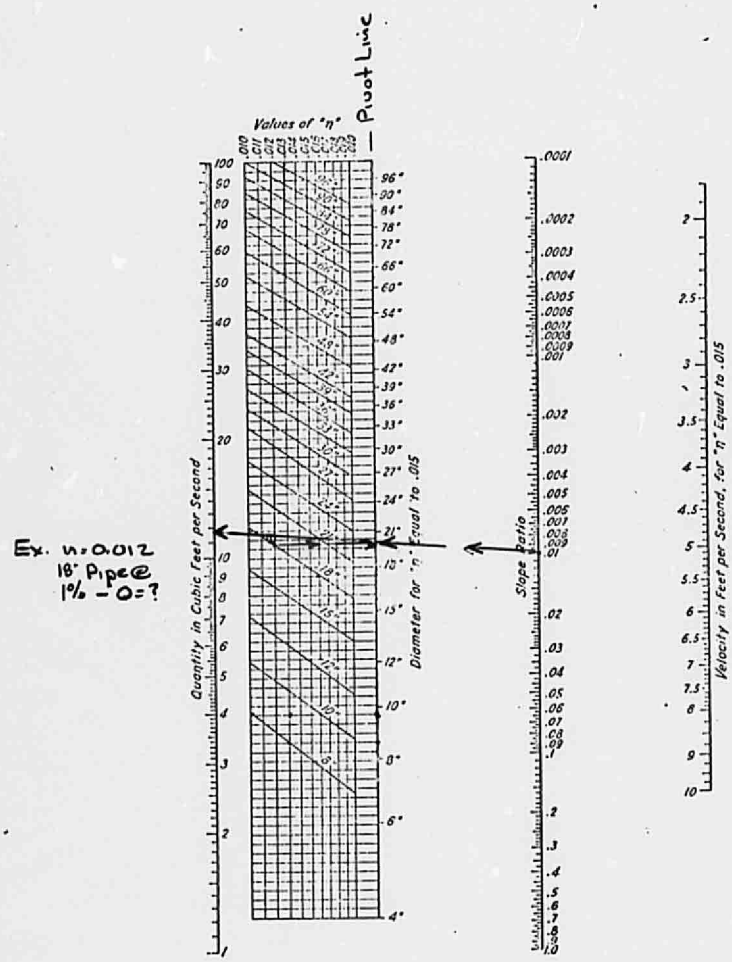
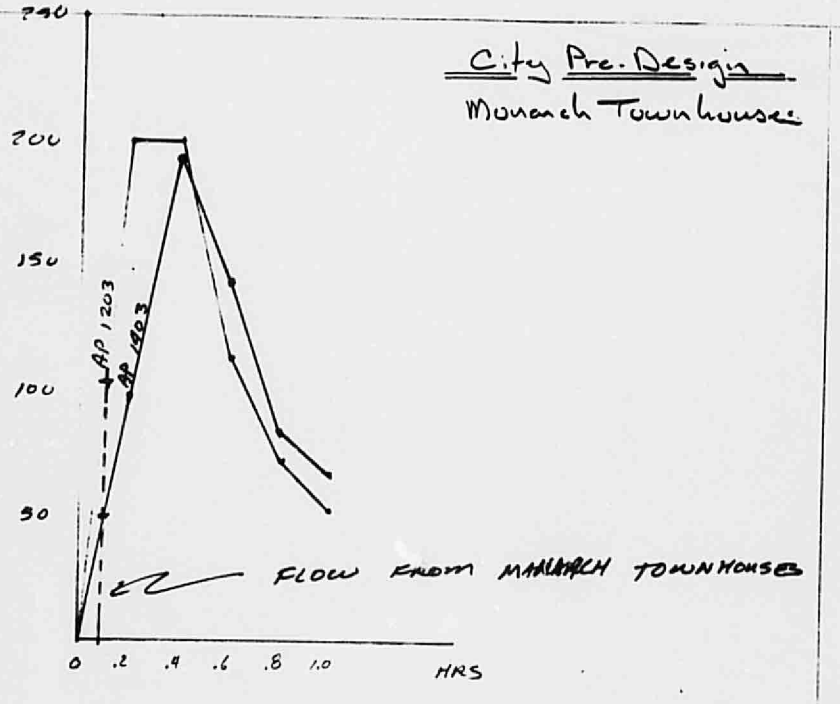


Fig. 4-3. Diagram for the solution of Kutter's formula for circular pipes flowing full; 1.0 to 100 cfs.



100 YR Q's ON JUAN TABO

75% Q ALLOWED < 100 cfs
TO DISCHARGE TO JUAN
TABO STORM SEWER

Robert W Easterday. 6/17/81

AGENDA ITEM NO. 3
SUBDIVISION REVIEW BOARD
May 29, 1991
S-91-19

S-91-19 Consultants, Inc., Engineering, agents for William A. Goodin, request Subdivision approval for Tract C, Monarch Park Subdivision, described as Tract C of the amended replat of Tracts 3 & 5, Monarch Park, located at the northeast corner of the intersection of Juan Tabo Boulevard and Grand Avenue, NE, containing 3.5102 acres. (X-22)

COMMENTS FROM OTHER DEPARTMENTS TO THE SRB 5/29/91:

City Engineer:	"a. A drainage study is required for approval prior to approval of plat. Included in the study shall be a grading plan. b. All double frontage lots shall have curb & gutter and sidewalks constructed on each side of the lot which abuts a street."
Real Estate Officer:	"No adverse comment."
Zoning Enforcement:	"No adverse comment."
Traffic:	"The applicant should be advised that the median opening on Juan Tabo between Lombard and Sable Lanes will be closed at a future date. Direct residential access (driveways) to Grand Avenue should be avoided in view of the areas to the south and east which are accessed via Grand."
City Engineer:	"Recommend no further consideration until grading and drainage information submitted as per subdivision requirements."
AMAFCA:	"Defer to City Engineer's comments."
APD:	"No adverse comments; we are assuming that unit address numbers will be clearly visible fromm the street."
Gas Company:	"Approves the plat."
Public Service:	"No adverse comments. PNM desires the continuation of any existing rights within the subject property."
Mountain Bell:	"No comment."
Fire Department:	"Must comply with Fire Code Ordinance 50-1975, provide required fire flow and fire hydrant distribution, provide sufficient access for fire fighting equipment."

PLANNING DIVISION COMMENTS TO THE SRB 5/28/91:

Requested is subdivision approval for a 48 unit townhouse development on a 3.5 acre parcel of land located at the northeast corner of the intersection of Juan Tabo Boulevard and Grand Avenue, NE.

The proposal, as submitted, contains certain areas of concern which must be addressed:

1. The most westerly structures are located too close to Juan Tabo Boulevard and must be relocated further east.
2. A buffer is needed between Juan Tabo Boulevard and the site.
3. A detailed drainage report and site grading plan are required.
4. A soils analysis for the site is required.

Since the site is located along a major thoroughfare, the firt two factors above are vital to help ensure some degree of residential integrity and shielding from traffic. These concerns were voiced to the applicant at a pre-meeting with members of the SRB. Therefore, the applicant is aware of the situation. A twenty-foot landscaped buffer along Juan Tabo was also advised. Since the meeting; however, no new information has been submitted to the Planning Division.

FINDINGS
1. The most westerly proposed structure sites must be setback an additional 20 feet minimum.
2. A landscaped buffer is required along Juan Tabo Boulevard.
3. A detailed drainage report and street grading plan is required.
4. A soils analysis for the site is required.

RECOMMENDATION: Indefinite deferral of S-81-19 is recommended, based upon the Findings.

Robert J. Casias, Planner

RJC:edj

cc: William A. Goodin, 1526 Loiring, San Diego, Ca. 92109
Consultants, Inc. Engineering, P.O. Box 142, Sandia Park, N.M. 87047

IT IS REQUESTED THAT THE APPLICANT/AGENT BE PRESENT AT THE MEETING

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

MAYOR
David P. Rusk

May 30, 1981

Mr. Christopher Weiss
Consultants, Inc.
P.O. Box 142
Sandia Park, N.M. 87047

RE: S-81-19

Dear Mr. Weiss:

At the meeting of the Subdivision Review Board on May 28, 1981 the following decision was made:

CONDITIONS:

1. The plans shall be amended to show 20' landscapped sound buffer and bermed area.
2. The sidewalks on Grand and Juan Tabo are to be moved back to the property line.
3. Amend the handicapped ramps per the discussion.
4. Provision of a detailed grading and drainage report.
5. Show the retainer wall along north boundary line and define its purpose on the plat.

BE IT RESOLVED THAT S-81-19 be given preliminary approval, subject to the Conditions.

The appeal date for this decision is June 12, 1981. Appeal may be made at the offices of the Planning Division, Room 601, City Hall, 400 Marquette, NW, Albuquerque, N.M, 87103. No permits or other such action may be taken until this date has passed.

If you have any questions concerning these decisions, do not hesitate to contact me at 766-7422.

Sincerely,

Robert J. Casias, Chairman
Subdivision Review Board

cc: William A. Goodin

GEOTECHNICAL INVESTIGATION FOR THE PROPOSED
DEVELOPMENT OF TRACT C OF MONARCH PARK
ALBUQUERQUE, NEW MEXICO
ATL ENGINEERING SERVICES LAB. NO. 2789
APRIL 24, 1981

ATL ENGINEERING SERVICES

April 24, 1981

Consultants/Terra Sol, Inc.
P.O. Box 142
Sandia Park, New Mexico 87147

Attention: Mr. Chris Weiss

Re: ATL Engineering Services No. 2789. Geotechnical Investigation for the Proposed Development of Tract C of Monarch Park in Albuquerque, New Mexico.

Gentlemen:

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

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

Nicholas T. Korecki

Nicholas T. Korecki, E.I.T.

Reviewed by:

Robert K. Lloyd

Robert K. Lloyd, P.E.

Albuquerque Testing Laboratory • 532 Jefferson, N.E. • Albuquerque, New Mexico 87108 • Telephone (505) 268-4537

GEOTECHNICAL INVESTIGATION FOR TRACT C OF MONARCH PARK

INTRODUCTION

The five (5) test borings were drilled on April 21, 1981 using a Mobile B-56 "Pacemaker" rotary drill powered by a Ford Industrial Engine and mounted on a 1969 Dodge 4 x 4 truck. The test holes were advanced "dry" using 6-3/8" O.D. by 3-1/4" I.D. continuous flight, 5-foot sectional hollow stem augers. Standard penetration tests (A.S.T.M. D-1586) 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 standard penetration test provides a measure of the relative density or consistency of the subsurface soils encountered while obtaining samples of the soils for visual inspection and laboratory testing.

TEST DATA AND RESULTS

All recovered soil samples were sealed at the site in watertight containers and returned to the laboratory where they were classified according to the Unified Soils Classification System (A.S.T.M. D-2487) by either a Geologist or Geotechnical Engineer. All samples were tested to determine in-situ moisture content. Representative samples were tested further to determine dry density, grain size classification and Atterberg Limits. The "Boring Log Graphs" presented in the Appendix depict the subsurface soils encountered in the test holes along with the results of laboratory tests.

SITE CONDITIONS

The ground surface at the site slopes downward toward the southwest and is covered with various amounts of surface rubble. The subsurface soils consisted of sand and silt (SM-ML) with decomposed granite gravel and some thin seams containing clayey sand (SC). Most of the soil strata were in a Medium Dense state of relative density. No water bearing stratum was encountered and all recovered soil samples exhibited low moisture content.

PROPOSED CONSTRUCTION

It is our understanding that one to two story duplexes will be constructed on the site. In addition, two east-west streets and one north-south street will be provided.

FOUNDATIONS

The very loose state of the soils at the expected foundation depths at test location 4 indicate that other loose soil zones are likely to be present elsewhere on the site. (Please note the Consolidation Test data in the Appendix) It is therefore recommended that all continuous wall footings, turned down slab edges, or individual spot footings be based on a minimum one (1) foot compacted thickness of engineered fill soils for one story structures and a two (2) foot compacted thickness for two story structures. Soils removed from excavations or imported soils may be used as engineered, compacted fill for support of foundations. These soils should be thoroughly mixed with optimum moisture (±2%) outside of excavations. Prior to placement of fill soils, the exposed cut or overexcavated ground surface should be scarified to a minimum depth of 8 inches, moistened with optimum moisture (±2%) to as deep as practical 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 maximum 8 inch loose lifts and compacted to a minimum of 95 percent of Modified Proctor Density and brought up to the desired grade beneath the footings. The lateral distance of compacted fill extending from footing edges should be equal to the depth of fill beneath the footings. Foundations should be based at a minimum depth of 2 feet below the adjacent exterior finished grade. For foundations based as recommended entirely on engineered compacted fill soils, a soil bearing pressure of 2,000 pounds per square foot may be used. Full dead plus the maximum reasonable live loads that can act at any one time should be used to design the foundations. Minimum continuous footing widths should be 1'-4". Minimum least dimension of "spot" footings should be 2'-0". If turned down slab edges are used as foundations, the design should be such that wall loads are distributed over a significant portion of the slab area.

"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 soils consisting of a pit-run sand and gravel, crushed rock, or similar material having a Plasticity Index not exceeding 6. Prior to placement of the slab fill, the building areas should be completely cleared of rubbish and stripped of vegetation. The exposed subgrade should be scarified to a minimum depth of 8 inches, moistened with optimum moisture (±2%) and compacted to a minimum of 90 percent of Modified Proctor Density. The slab fill should then be placed and compacted to a minimum of 95 percent of Modified Proctor Density.

PAVEMENTS

Asphaltic concrete pavements should be based on a minimum 6 inch compacted thickness of a well graded crushed gravel and fines base course fill placed and compacted as described above. Subgrade preparation should also be as described above. A minimum total pavement thickness of 3 inches is recommended. In addition, the asphalt pavement should conform to the following specifications:

Stability (Marshall - 75 blow briquette)	1500 minimum
Flow (Marshall)	16 maximum
Percent Voids in Compacted Mix	3 to 7
Percent Voids Filled with Asphalt	75 to 85
Percent Asphalt Cement Content by Weight of Total Mix	5 to 7
Sand Equivalent	40 minimum
Compaction	96% of Laboratory Molded Specimen

Additional 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.

SITE DRAINAGE AND PROTECTION OF FOUNDATION SOILS

In order to help prevent moisture intrusions into the foundation strata, we advise that the following precautions be taken:

1. Provide and maintain positive surface water drainage around and away from all exterior walls.
2. Keep all foundation excavations dry with concreting operations to follow as soon as is practical.
3. Properly compact all backfill around foundations, exterior walls, and in utility trenches to a minimum of 90 percent of Modified Proctor Density.
4. Discourage the planting of vegetation adjacent to exterior walls unless underdrains are provided beneath the planted areas to lead irrigation waters away from the foundations.

Any changes or deviations in the planned development should be brought to our attention before finalization of plans and prior to construction. Your attention is directed to the fact that only a very small, fractional part of the site area was "opened" and subsurface soils exposed and tested through the test borings. Subsurface soils and their in-situ properties which can materially affect design considerations may be different in areas not covered by the test borings. Therefore, if during construction and when excavations for footings are opened, foundation conditions differ from those encountered by the test borings of this report, our laboratory should be notified for possible revision of 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 standard of our profession at this time.

Respectfully submitted,
ATL ENGINEERING SERVICES
Nicholas T. Korecki
Nicholas T. Korecki, E.I.T.

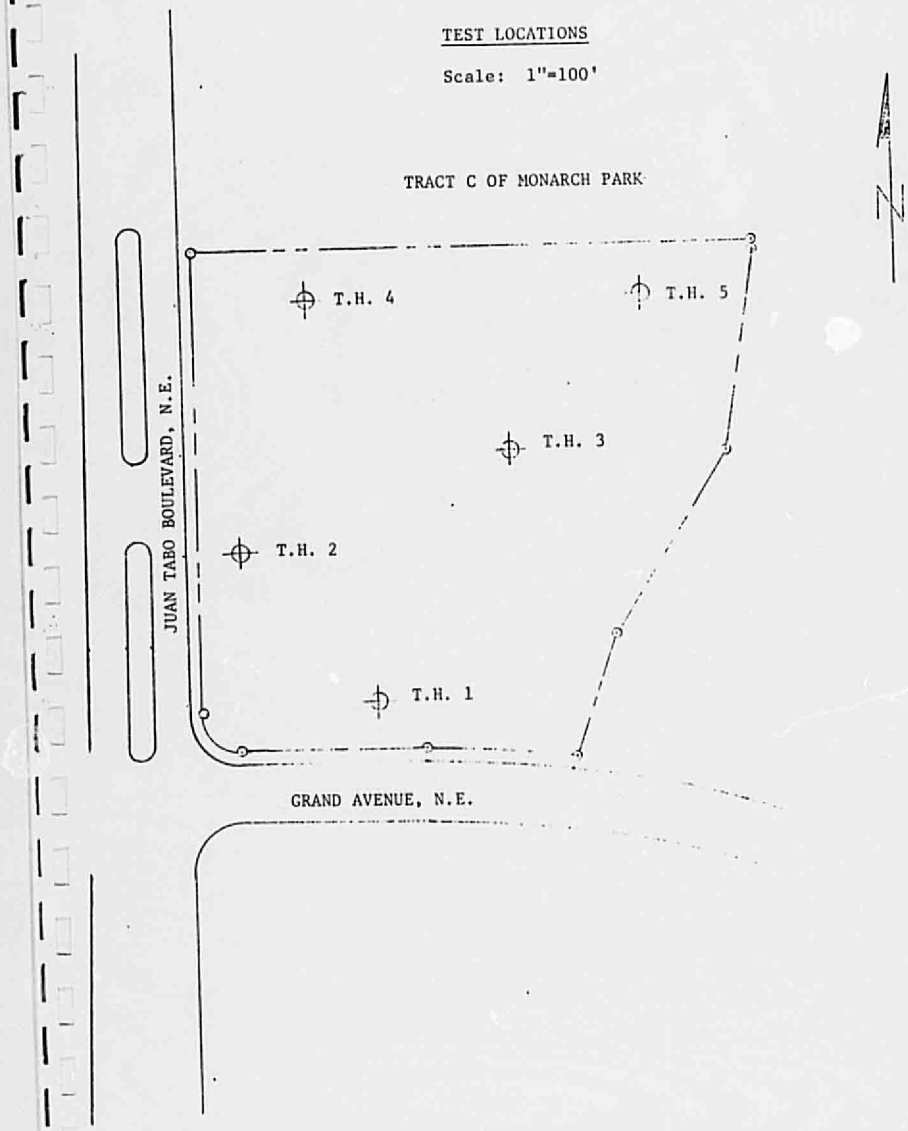
Reviewed by:
Robert K. Lloyd
Robert K. Lloyd, P.E.

APPENDIX

Lab. No. 2789 **ALBUQUERQUE TESTING LABORATORY**

TEST LOCATIONS

Scale: 1"=100'



ALBUQUERQUE TESTING LABORATORY

PROJECT: Monarch Park Subdivision

Lab No. 2789

Date: April 24, 1981

BORING LOG GRAPH - TEST HOLE NO. 1

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.
0	Sand and Silt, brown (SM, ML) with decomposed granite gravel and some clayey sand seams (SC).	10	4 3 7		S	6.5					24	14	10
½		24	11 13 11		C	3.9 -- 2.3	92 -- 105						
5	Loose at the surface to Medium Dense with depth.	36	5 10 26		S	3.8							
		27	6 13 14		S	2.5							
10		30	8 13 17		S	5.6							
15		23	7 9 14		S	3.0							

ALBUQUERQUE TESTING LABORATORY

PROJECT: Monarch Park Subdivision

Lab No. 2789

Date: April 24, 1981

BORING LOG GRAPH - TEST HOLE NO. 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.
0	Sand and Silt, brown (SM, ML) with decomposed granite gravel and some clayey sand seams (SC)	8	4 3 5		S	4.0		11	61	28			
2½		23	12 10 13		C	4.2 -- 4.4	99 -- 101	3	64	33			
5	Loose at the surface to Medium Dense with depth.	20	9 9 11		S	3.3		12	68	20			
7½		27	6 11 16		S	1.8		8	79	13			
10		63	29 35 28		S	4.6		12	58	30			
		24	11 10 14		S	2.7		16	55	29			

ALBUQUERQUE TESTING LABORATORY

PROJECT: Monarch Park Subdivision

ab No. 2789

Date: April 24, 1981 BORING LOG GRAPH - TEST HOLE NO. 3

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.
0	Sand and Silt,	14	6 8 6		S	7.7							
	brown (SM, ML) with decomposed												
½	granite gravel	21	8 9 12		C	2.3 -- 3.7	104 -- 105						
	and some clayey sand seams (SC).												
5	and "clean" Sand (SP)	63	22 32 31		S	5.2							
½	Medium Dense	23	12 10 13		S	11.2					24	16	8
10		17	9 9 8		S	6.3							
5		9	4 4 5		S	4.2							

ALBUQUERQUE TESTING LABORATORY

PROJECT: Monarch Park Subdivision

Lab No. 2789

Date: April 24, 1981

BORING LOG GRAPH - TEST HOLE NO. 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.
0	Sand and Silt, brown (SM, ML) with decomposed granite gravel and some clayey sand seams (SC).	12	5 5 7		S	6.6		11	54	35			
½		5	5 3 2		C	7.0 3.9 --	97 97 --	3	62	35			
5	and some "clean" Sand (SP)	12	5 6 6		S	2.4		28	65	7			
7½	Very Loose at 2½' depth to Medium Dense with depth.	12	6 6 6		S	2.3		15	77	8			
10		23	7 13 10		S	5.5		8	67	25			
15		18	9 9 9		S	2.8		20	59	21			

ALBUQUERQUE TESTING LABORATORY

PROJECT: Monarch Park Subdivision

Lab No. 2789

Date: April 24, 1981

BORING LOG GRAPH - TEST HOLE NO. 5

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.	
0	Sand and Silt, brown (SM, ML) with decomposed	15	8 7 8		S	6.9								
½	granite gravel and some clayey sand seams (SC).	14	9 7 7		C	4.7 -- 4.2	93 -- 93							
5	and some "clean" Sand (SP)	19	12 9 10		S	5.6								
	Medium Dense to Loose at 10' depth.	12	7 7 5		S	2.6								
10		9	9 4 5		S	7.2								
		11	8 4 7		S	3.3								

ALBUQUERQUE TESTING LABORATORY, INC.

NOTES 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 ATTIRBERG 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

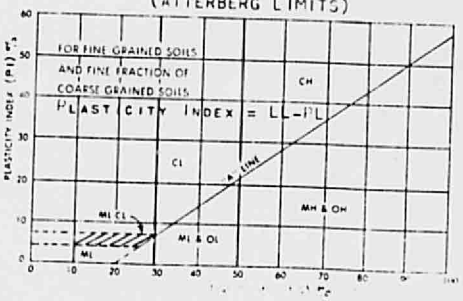
MORE THAN 50% SMALLER THAN 200 SIEVE SIZE

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			3 in. to ¾ in.
Fine gravel	G		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)



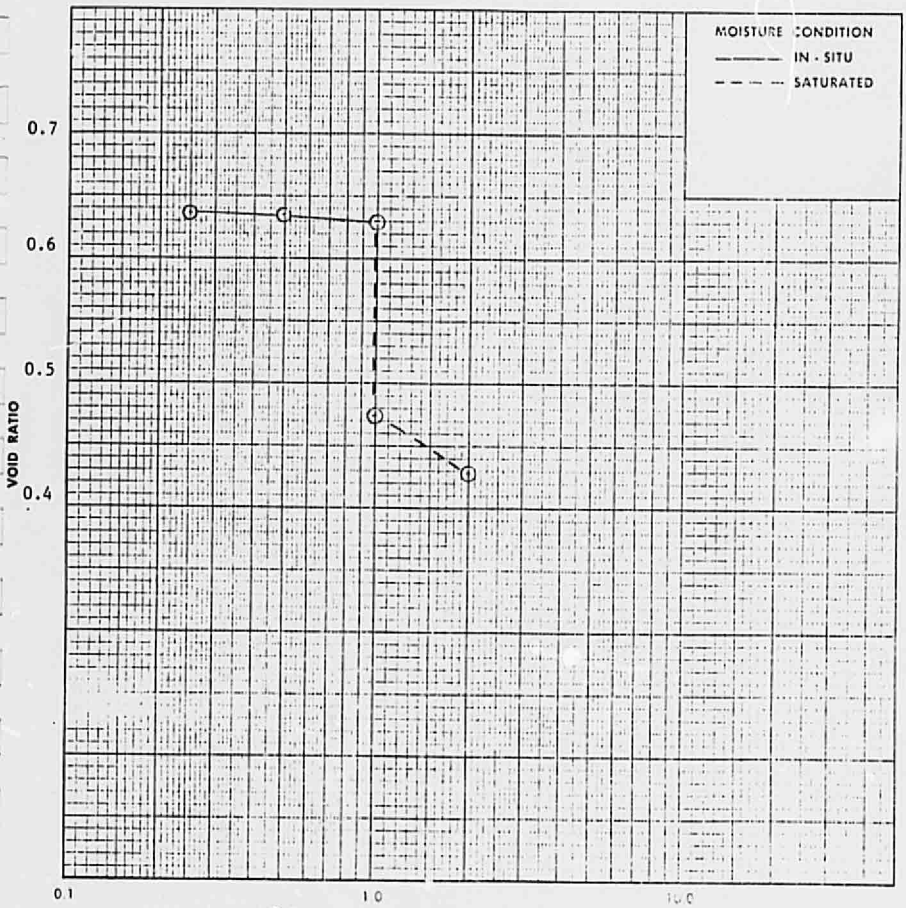
CONSOLIDATION TEST DATA

Lab. No. 2789

Project Monarch Park Development Location Albuquerque, New Mexico

Source of Sample Test Hole 4, Depth 2½ feet

Material Fine silt with medium and coarse sand



ATL ENGINEERING SERVICES

ATL ENGINEERING SERVICES

Project: Monarch Park Development
Location: Albuquerque, New Mexico
Sample Source: Test Hole 4, Depth 2½ feet
Material: Fine silt with medium and coarse san
Undisturbed [ ] ____ Remolded [X] Normal

CONSOLIDATION TEST

Date	Time	Load T/sf	Elasped Time (min)	Dial Reading	Date	Time	Load T/sf	Elasped Time (min)	Dial Reading
4/24/81	4:50	1/4	0	0.0000					0.0625
			1/4	0.0067				1	0.0830
			1/2	0.0068				2	0.1026
			1	0.0070				4	0.1065
			2	0.0071		3:23			0.1113
			4	0.0074		4:30			0.1118
4/25/81	8:49			0.0096		4:50			0.1119
4/27/81	7:45			0.0138	4/28/81	7:45			0.1128
	8:27	1/2	0	0.0138		8:20	2*	0	0.1128
			1/4	0.0142				1/4	0.1289
			1/2	0.0143				1/2	0.1301
			1	0.0143				1	0.1312
			2	0.0144				2	0.1324
			4	0.0144				4	0.1335
	9:53			0.0150		9:25			0.1377
	11:05	1	0	0.0151		11:01			0.1388
			1/4	0.0166		12:00			0.1391
			1/2	0.0167		1:02			0.1394
			1	0.0168		2:20			0.1396
			2	0.0169					
			4	0.0170					
	12:40			0.0179					
	1:45	1*	0	0.0181					
			1/4	0.0350					

Wet Wt. Soil + Ring 659.0 gm.
Ring Wt. 521.0 gm.
Wet Soil 138.0 gm.
Dry Soil 128.3 gm.

Assumed Sp. Gr. 2.65

CONSOLIDATION RING A
Dia. 2.50 in. Area 4.9087 sq.in.
Ht. 1.00 in. Vol. 0.00284 cu.ft.

Percent Moisture 7.6 Dry Density 99.6 pcf

$V_s = \frac{\text{Dry Density}}{(62.4)\text{Sp.Gr.}} = 0.6023$

$V_v = 1 - V_s = 0.3977$

Init.Void Ratio $(e_o) = \frac{V_v}{V_s} = 0.6603$

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

Load T/sf	Dial Reading	1-Dial Reading (△)	e	Percent Consolidation
0	0.0000	1.0000	0.6603	0
¼	0.0138	0.9862	0.6374	1.38
½	0.0151	0.9849	0.6352	1.51
1	0.0181	0.9819	0.6303	1.81
1*	0.1128	0.8872	0.4730	11.28
2*	0.1396	0.8604	0.4285	13.96
4*				
8*				
12*				
16*				

*Saturated

CONSOLIDATION TEST DATA

Lab. No. 2789

Project Monarch Park Development Location Albuquerque, New Mexico

Source of Sample Test Hole 4, Depth 2½ feet

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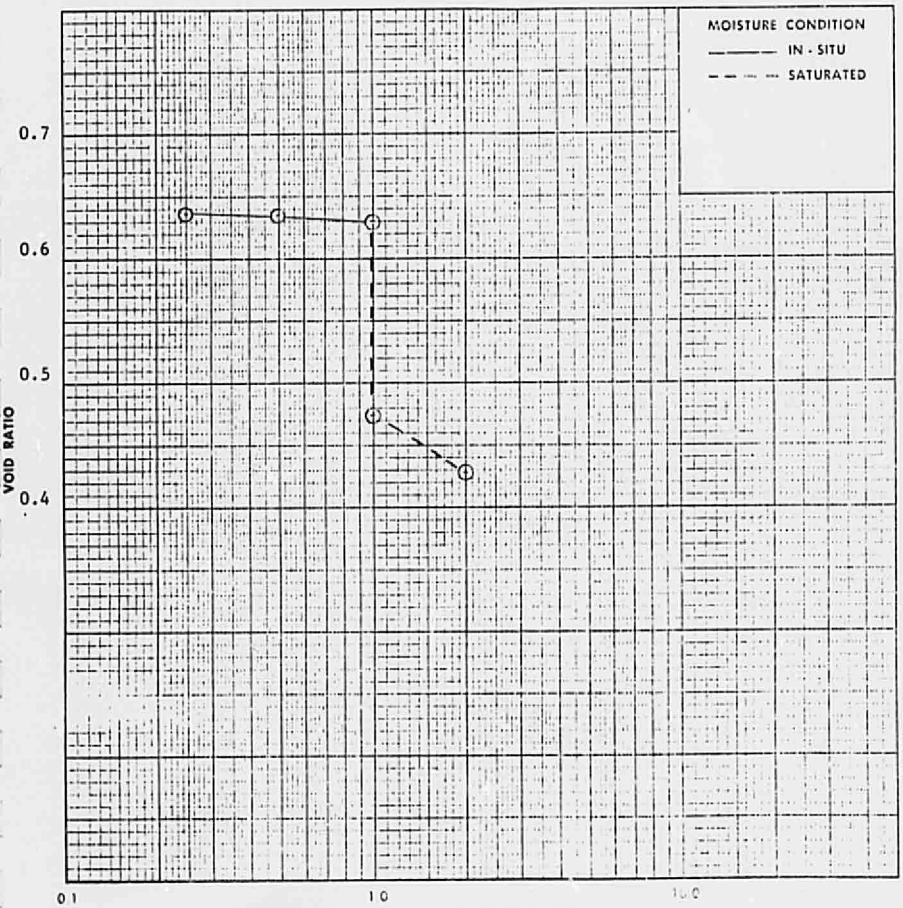

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Project Monarch Park Development
Location Albuquerque, New Mexico
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			1/2	0.0167		1:02			0.1394
			1	0.0168		2:20			0.1396
			2	0.0169					
			4	0.0170					
	12:40			0.0179					
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8*				
12*				
16*				

*Saturated

KAROLTON KLASP®
NO. 97 10 x 13
KAROLTON ENVELOPE
WEST CARROLLTON, OHIO