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File FPP-1995-010

Date 8/19/99

Present	Scanned	A few items denoted with an asterisk (*), which means they are to be scanned for permanent record on the ISYS retrieval system. In some instances, not all entries designated to be scanned, are present in the file. There are also documents specific to certain files, not found on the standard list. For this reason, a checklist has been included. Remaining items, (not selected for scanning), will be marked present on the checklist. This index can serve as a quick guide for the contents of each file. Files denoted with (**) are to be located using the ISYS Query System. Planning Clearance will need to be typed in full, as well as other entries such as Ordinances, Resolutions, Board of Appeals, and etc.
X	X	***Summary Sheet – Table of Contents**
X	X	Application form
		Receipts for fees paid for anything
X	X	***Submittal checklist**
		***General project report**
		Reduced copy of final plans or drawings
X		Reduction of assessor's map
		Evidence of title, deeds
X	X	***Mailing list**
		Public notice cards
		Record of certified mail
X		Legal description
		Appraisal of raw land
		Reduction of any maps – final copy
		***Final reports for drainage and soils (geotechnical reports)**
		Other bound or nonbound reports
		Traffic studies
X		Individual review comments from agencies
X	X	***Consolidated review comments list**
		***Petitioner's response to comments**
X	X	***Staff Reports**
		***Planning Commission staff report and exhibits**
		***City Council staff report and exhibits**
		***Summary sheet of final conditions**
		***Letters and correspondence dated after the date of final approval (pertaining to change in conditions or expiration date)**

DOCUMENTS SPECIFIC TO THIS DEVELOPMENT FILE:

X	X	Preliminary Geotechnical Report for Planned Multi-family Residence	X		Detail Sheet
X	X	Location Map	X		Location Map
X	X	Country Crossing Subdivision Map – Filing No. 2	X		Country Crossing Sub. – Filing #1, #2, #3
X	X	Planning Commission Minutes – 2/7/95 - **	X		Street Plan & Profile
X	X	Letter from Thomas Logue to City of Grand Junction	X		Storm Sewer Plan & Profile
X	X	Pavement Section Design	X		Sewer & Water Plan
X		Letter from Monty Stroup to City of Grand Junction	X		Utility Composite
X		E-mail to Marcia Rabideaux from Jody Kliska – 1/17/95	X		Grading Plan
X		Letter from Grady McNure to Tom Dixon – 2/2/95			
X	X	Letter to Denny Granum from Michael Drollinger – 1/18/96			
X		Chicago Title Insurance Co.			
X	X	Development Improvement Agreement - **			
X		Posting of Public Notice Signs			
X		Notes to file			
X		Grading & Drainage Plan			
x		Storm Water & Erosion Control Plan			
X		Conceptual Plan			
X		Sewer and Water Plan			
X		Official Development Plan			

SUBMITTAL CHECKLIST

MAJOR SUBDIVISION: FINAL

Location: 25 Rd, South of G Rd Project Name: Phase II Country Crossing

Date Received 1-3-95

Receipt #

File # FPP-95-10

ITEMS		DISTRIBUTION																																
DESCRIPTION	SSID REFERENCE	● City Community Development	● City Dev. Eng.	● City Utility Eng.	● City Property Agent	● City Parks/Recreation	● City Fire Department	● City Attorney	● City G.J.P.C. (8 sets)	○ City Downtown Dev. Auth.	● City Police	○ County Planning	○ County Bldg. Dept.	● County Surveyor	○ Walker Field	● School Dist. #51	● Irrigation District	● Drainage District	● Water District	○ Sewer District	● U.S. West	● Public Service	○ GVRP	○ CDOT	● Corps of Engineers	○ Colorado Geologic Survey	● U.S. Postal Service	● Persigo WWTF							TOTAL REQ'D.
● Application Fee $720 + 15ac	VII-1	1																																
● Submittal Checklist*	VII-3	1																																2
● Review Agency Cover Sheet*	VII-3	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						
● Application Form*	VII-1	1	1	1	1	1	1	1	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						26
● 11"x17" Reduction of Assessor's Map	VII-1	1	1	1	1	1	1	1	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						26
● Evidence of Title	VII-2	1			1			1																										3
○ Appraisal of Raw Land	VII-1	1			1	1																												
● Names and Addresses	VII-2	1																																12
● Legal Description	VII-2	1			1																													2
○ Deeds	VII-1	1			1			1																										
○ Easements	VII-2	1	1	1	1			1													1	1	1											
○ Avigation Easement	VII-1	1			1			1							1																			
○ ROW	VII-3	1	1	1	1			1													1	1	1											
○ Covenants, Conditions, & Restrictions	VII-1	1	1					1																										
○ Common Space Agreements	VII-1	1	1					1																										
● County Treasurer's Tax Cert.	VII-1	1																																2
● Improvements Agreement/Guarantee*	VII-2	1	1	1				1																										5
○ CDOT Access Permit	VII-3	1	1																															
○ 404 Permit	VII-3	1	1																															
○ Floodplain Permit*	VII-4	1	1																															
● General Project Report	X-7	1	1	1	1	1	1	1	8	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1						26
● Composite Plan	IX-10	1	2	1	1																													
● 11"x17" Reduction Composite Plan	IX-10	1				1	1	1	8	1	1	1	1				1	1	1	1	1	1	1	1	1	1		1						
● Final Plat	IX-15	1	2	1	1			1						1																				5
● 11"x17" Reduction of Final Plat	IX-15	1							8	1	1	1			1	1	1	1	1	1	1	1	1				1							25
● Cover Sheet	IX-11	1	2																															
● Grading & Stormwater Mgmt Plan	IX-17	1	2															1							1	1								5
● Storm Drainage Plan and Profile	IX-30	1	2															1			1	1	1											7
● Water and Sewer Plan and Profile	IX-34	1	2	1			1												1	1	1	1	1					1						11
● Roadway Plan and Profile	IX-28	1	2															1																
○ Road Cross-sections	IX-27	1	2																															
● Detail Sheet	IX-12	1	2																															5
● Landscape Plan	IX-20	2	1	1					8																									
● Geotechnical Report	X-8	1	1										1													1								4
○ Phase I & II Environmental Report	X-10,11	1	1																															
● Final Drainage Report	X-5,6	1	2															1																5
○ Stormwater Management Plan	X-14	1	2															1							1									
○ Sewer System Design Report	X-13	1	2	1																	1													
○ Water System Design Report	X-16	1	2	1															1															
○ Traffic Impact Study	X-15	1	2																					1										
○ Site Plan	IX-29	1	2	1	1		1		8																									

NOTES:
1) An asterisk in the item description column indicates that a form is supplied by the City.
2) Required submittal items and distribution are indicated by filled in circles, some of which may be filled in during the pre-application conference. Additional items or copies may be subsequently requested in the review process.
3) Each submitted item must be labeled, named, or otherwise identified as described above in the description column.

DEVELOPMENT APPLICATION

Community Development Department
250 North 5th Street Grand Junction, CO 81501
(303) 244-1430

Receipt _____
Date _____
Rec'd By _____

File No. _____

We, the undersigned, being the owners of property situated in Mesa County, State of Colorado, as described herein do hereby petition this:

PETITION	PHASE	SIZE	LOCATION	ZONE	LAND USE
■ Subdivision Plat/Plan	[ ] Minor ■ Major [ ] Resub	3.78 ac 21 units		P.R.	Residental
[ ] Rezone				From: To:	
■ Planned Development	[ ] ODP [ ] Prelim ■ Final		S.E. 25 Road & G Road	P.R.	Residental
[ ] Conditional Use					
[ ] Zone of Annex					
[ ] Text Amendment					
[ ] Special Use					
[ ] Vacation					[ ] Right-of-Way [ ] Easement

[X] PROPERTY OWNER [ ] DEVELOPER [X] REPRESENTATIVE

Denny Granum		Landesign Ltd., c/o Tom Logue
Name	Name	Name
759 Horizon Drive, Suite A		200 N. 6th Street
Address	Address	Address
Grand Jct. CO. 81506		Grand Junction, CO. 81501
City/State/Zip	City/State/Zip	City/State/Zip
243-4890		245-4099
Business Phone No.	Business Phone No.	Business Phone No.

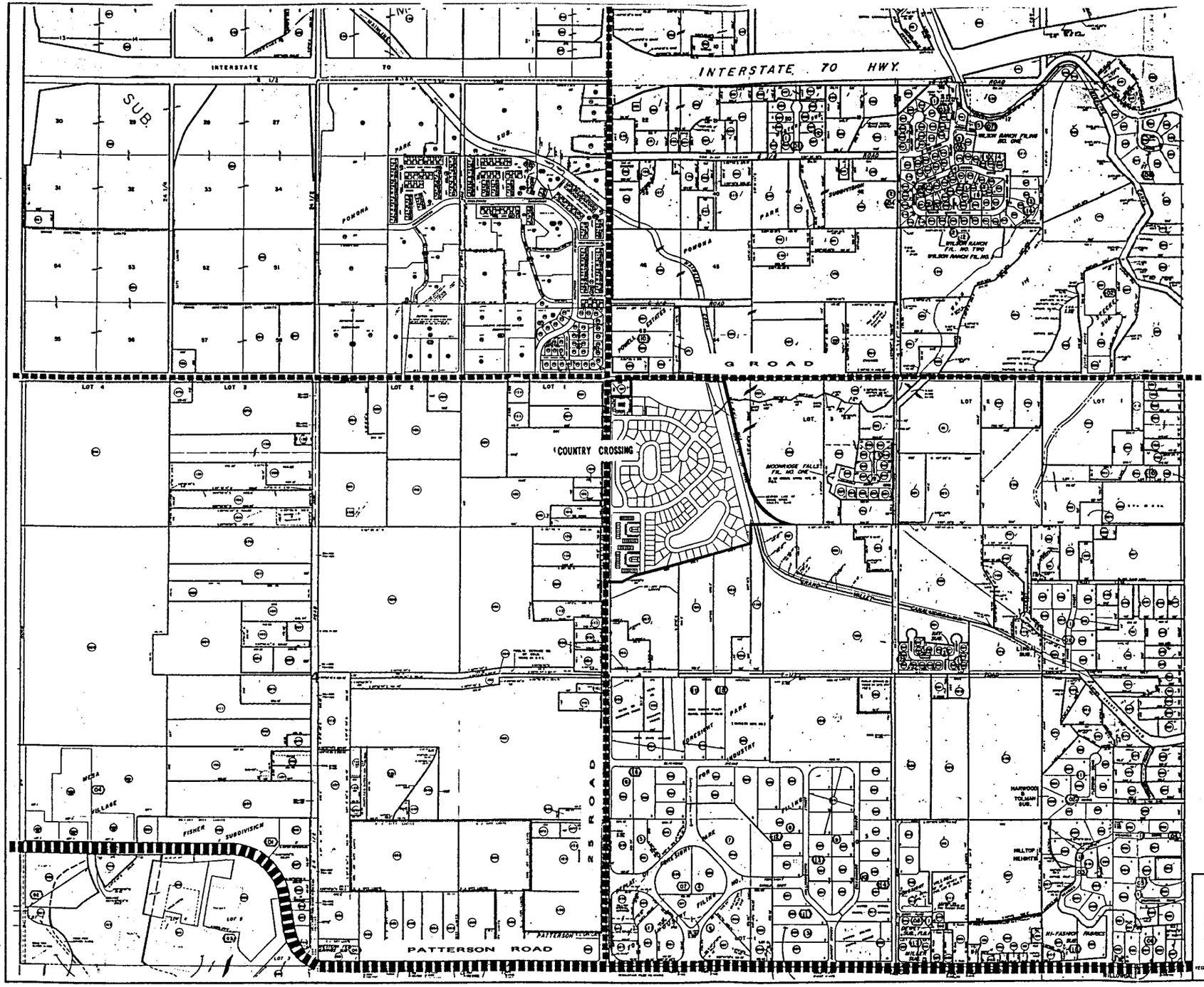
NOTE: Legal property owner is owner of record on date of submittal.

We hereby acknowledge that we have familiarized ourselves with the rules and regulations with respect to the preparation of this submittal, that the foregoing information is true and complete to the best of our knowledge, and that we assume the responsibility to monitor the status of the application and the review comments. We recognize that we or our representative(s) must be present at all hearings. In the event that the petitioner is not represented, the item will be dropped from the agenda, and an additional fee charged to cover rescheduling expenses before it can again be placed on the agenda.

Thomas A. Logue — 12/30/94
Signature of Person Completing Application — Date

_____

_____
Signature of Property Owner(s) - Attach Additional Sheets if Necessary



LOCATION MAP

COUNTRY CROSSING SUBDIVISION

LANDesign, Ltd.

ENGINEERS · SURVEYORS · PLANNERS

200 NORTH 6TH STREET SUITE 300 / GRAND JUNCTION, COLORADO 81501 (303) 241-1060

PHILIP H. HART
REGISTERED PROFESSIONAL ENGINEER
P.E. NO. 19346

PROJECT NO. 10066	DRAWN BY	SHEET	OF
DATE: OCTOBER 1994	TAL	DEP-1	1

Leemon Reynolds
695 25 Road
Grand Junction, CO 81505

Gary Johnson
693 25 Road
Grand Junction, CO 81505

Robert Van Doozer
685 25 Road
Grand Junction, CO 81505

Robert Hilgenfeld
683 25 Road
Grand Junction, CO 81505

Sandra Pierce
681 25 Road
Grand Junction, CO 81505

Vern Wood
2533 Q Road
Cedaredge, CO 81413

Raedene Basinger
679 25 Road
Grand Junction, CO 81505

Mary States
675 25 Road
Grand Junction, CO 81505

Michael Melgoza
11514 Lindale Street
Norwalk, CA 90650

Cosmo Fazio
669 25 Road
Grand Junction, CO 81505

Gertrude Soencer
667 25 Road
Grand Junction, CO 81505

Herman Crist
145 Willow Brook Road
Grand Junction, CO 81506

Edward Dry
655 25 Road
Grand Junction, CO 81505

Leroy McKee
652 25 Road
Grand Junction, CO 81505

Delbert Wanzer
2520 F 1/2 Road
Grand Junction, CO 81505

Herbert High
2524 F 1/2 Road
Grand Junction, CO 81505

David Christensen
3330 Norwalk Street
Grand Junction, CO 81506

Richard Watson
653 26 Road
Grand Junction, CO 81506

Moonridge Falls LTD
Liability Company
677 25 1/2 Road
Grand Junction, CO 81505

Marieta Hockett
2527 G Road
Grand Junction, CO 81505

Steve Gaudio
2485 E Harbor Cir.
Grand Junction, CO 81505

James Parker
2487 E Harbor Cir.
Grand Junction, CO 81505

Kenneth Simons
2489 E Harbor Cir.
Grand Junction, CO 81505

J Quentin Jones
2491 E Harbor
Grand Junction, CO 81505

Sharon Patrick
2493 E Harbor Cir.
Grand Junction, CO 81505

Chester Elder
2495 E Harbor Cir.
Grand Junction, CO 81504

Alfred Reeder
2497 E Harbor Cir.
Grand Junction, CO 81505

John Foreman
2499 E Harbor Cir.
Grand Junction, CO 81505

Stephen Miller
702 E Harbor
Grand Junction, CO 81505

Phyllis Mcclellan
2532 G Road
Grand Junction, CO 81505

Nancy Eaton
2526 G Road
Grand Junction, CO 81505

Wayde Dockery
2524 G Road
Grand Junction, CO 81505

Heather Walton
702 25 Road
Grand Junction, CO 81505

Just Companies INC
1716 N 18th Street
Grand Junction, CO 81501

Patricia Davis
1023 24 Road
Grand Junction, CO 81505

FINAL DRAINAGE STUDY

FOR

COUNTRY CROSSING FILINGS NO. 1 AND 2

January , 1995

Prepared For:

Denny Granum
Prudential Monument Realty
759 Horizon Drive, Suite A
Grand Junction, Colorado 81506

Prepared By:

LANDesign LTD.
200 North 6th. Street, Suite 102
Grand Junction, Colorado 81501
(303) 245-4099

Prepared By: Monty D. Stroup 01/03/95
Monty D. Stroup

"I hereby certify that this Final Drainage Study for Country Crossing Filings No. 1 and 2 was prepared under my direct supervision."

Reviewed By: Philip M. Hart
Philip M. Hart, P.E.
State of Colorado, #19346

COLORADO REGISTERED PHILIP M. HART 19346 PROFESSIONAL ENGINEER

I. General Location and Description

A. Site and Major Basin Location:

The Country Crossing property contains approximately 46.34 acres. The project is located in the City of Grand Junction, State of Colorado, more particularly in the NW 1/4, NW 1/4 of Section 3, Township One South, Range One West, of the Ute Meridian. A Preliminary Plan was previously approved for the site by Mesa County in 1982 known as "Persigo Village". A Preliminary Master Drainage Study for Country Crossing Subdivision was prepared by this office in October, 1994 and is on file with the City of Grand Junction (Reference 12).

The Preliminary Drainage Study (Reference 12) addressed concerns regarding the 100 Year Flood Plain of Leach Creek. None of the proposed lots or areas included in Filings No. 1 and 2 are within the Designated Flood Plain, therefore the scope of this study shall be limited to those improvements associated with Filings No. 1 and 2 and the conveyance elements required to control stormwater runoff and discharge it safely to Leach Creek.

Streets in the vicinity include 25 Road running from the south to the north defining the west boundary line of the property. G Road runs from the east to west and defines the north boundary line of the project.

Development in the vicinity and surrounding the site is rural in nature. To the north, south and west are single family residential dwellings on acreage sized parcels. These parcels are typically put to pasture and agricultural uses. To the east is the main line of the Grand Valley Canal with Moon Ridge Falls Subdivision a new single family development beyond.

B. Site and Major Basin Description:

The total proposed Country Crossing site contains approximately 46.34 acres and is planned for single family residential lots, duplex townhomes, a multi-family parcel, RV storage area and open space. The total number of residential units planned for the site is 174. Country Crossing Filing No. 1 (3.41 Ac.) is planned for a multi-family tract and 4 single family residential lots. Country Crossing Filing No. 2 (3.78 Ac.) is planned for 21 single family residential lots. Both of the proposed filings are located is the south portion of the Country Crossing development.

Presently there is one single family dwelling, two out-buildings and a one multi-family structure on the subject property. The multi-family structure was constructed as part of the original Persigo Village project in 1982 and has never been occupied. Agricultural use of the property has been limited to pasture land and is currently in a fallow state.

Based on the "Soil Survey, Grand Junction Area" (Reference 8, Exhibit 1.0) on and off-site soils are defined as (Bc), Billings silty clay loam, 0 to 2 percent slopes, hydrological soil group "C" (10% of the site) and (Rf), Ravola very fine sandy loam, 0 to 2 percent slopes, hydrological soils group "B" (90% of the site).

II. Existing Drainage Conditions

A. Major Basin:

The subject property is a small percentage of a much larger area wide basin defined as the Leach Creek Watershed (References 3, 4, 5 & 11) which drains from the northeast to the southwest and ultimately discharges to the Colorado River. The Leach Creek watershed originates approximately 8.85 miles northeast of the site at the crest of the "Book Cliffs" plateau. An estimate of the tributary area within the Leach Creek Watershed as defined by the 1982 report by Turner, Collie & Braden Inc. (Reference 11) is 26.4 square miles. The Flood Insurance Study (Reference 5) defines the tributary area as approximately 25 square miles.

Leach Creek is adjacent to the south right-of-way line of G Road flowing from the east to the west through the north portion of the site. The creek enters the site as it passes under large concrete flume conveying the Main Line of the Grand Valley canal. The creek continues west approximately 1,100-feet where it is conveyed under 25 Road via an existing bridge. The creek and it's overbanks vary in depth from 9 to 10 feet and in width from 80 to 130 feet as it traverses the site. An existing Public Service Company gas regulator station occupies an area immediately southeast of the bridge at 25 Road and is located within the floodway fringe.

Field inspection of the site reveals various types of plant life indigenous to wetlands on the site within the Leach Creek waterway. These areas are confined to the existing channel area of Leach Creek.

The northeast portion of the subject site, approximately 8.6 acres, located adjacent to 25 Road is within the Effective Floodplain and is classified as Zone "AO" as determined by the FIRM Flood Insurance Rate Map (Reference 6, Exhibit 1.1). Leach Creek and it's associated floodway are classified as Zone "AE". A long narrow backwater reel is apparent along the east boundary line of the site adjacent to the Grand Valley Canal and is subject to inundation, however it is not designated on the FIRM map.

The Effective Floodplain, floodway elevations and discharge to downstream properties from Leach Creek is governed in large part by the existing bridge at 25 Road and G Road. The Effective Floodplain at this location appears to be the result of backwater effects due to the existing bridge hydraulics and the subsidence of the south overbank for approximately 170 feet upstream of the bridge.

B. Site:

Historically the property drains in a sheet flow fashion from the east to the west at slopes of 0.7 to 1.2 percent towards 25 Road. At 25 Road the drainage from the north one-half of the site is conveyed via roadside ditches and swales north where it discharges to Leach Creek. The south one-half of the site is conveyed south along 25 Road where it is entrapped by the roadway embankment of 25 Road at 2 well defined low areas and does not exit the site. Country Crossing Filings No. 1 and 2 are located is the south portion of the site.

With the exception of the Leach Creek watershed there are no offsite tributary sub-basins which affect the subject property.

III. Proposed Drainage Conditions

A. Changes in Drainage Patterns:

Historic drainage patterns within the south 1/2 of the Country Crossing site will be altered. The development of Filings No. 1 and No. 2 will require that existing drainage patterns within the south portion of the site be changed to convey stormwater runoff north towards Leach Creek. The proposal calls for the development of a multi-family tract (1.75 Ac.) and 25 single family lots. The proposed site plan divides south portion of the Country Crossing development into 7 sub-basins labeled as "A1" thru "A7".

Sub-basin "A1" is located south and east of Filings No. 1 and 2 and is planned as a future phase of the total development. This future phase shall consist of single family residential lots and a proposed irrigation storage pond. Developed runoff from this sub-basin shall be conveyed northwest through Filing No. 1 to a outfall channel originating at the northwest intersection of Country Circle and Crossing Lane and subsequently north to Leach Creek. The proposed storm sewer conveying this runoff is a 24-inch diameter RCP sized to carry the 100 year storm event.

Sub-Basin "A2" is situated south of and adjacent to Filing No. 1 and is planned as a future multi-family area. Developed runoff from this sub-basin shall be collected within a proposed parking lot and conveyed by a storm sewer west to a proposed v-pan. The v-pan shall convey this runoff north adjacent to 25 Road to proposed storm sewer line "D" a 18-inch diameter RCP. The storm sewer will discharge runoff directly to the proposed outfall channel and subsequently to Leach Creek.

Sub-Basin "A3" is situated within Filing No. 1 and is planned as a multi-family area. Developed runoff from this sub-basin shall be collected within a proposed parking lot and conveyed by a 12" diameter PVC storm sewer west to a proposed v-pan. The v-pan shall

convey this runoff north adjacent to 25 Road to proposed storm sewer line "D" a 18-inch diameter RCP. The storm sewer will discharge runoff directly to the proposed outfall channel and subsequently to Leach Creek.

Sub-basin "A4" is located adjacent to and includes the east 1/2 of 25 Road. Runoff from this sub-basin shall be collected and conveyed via a v-pan north to storm sewer line "D" and subsequently to the proposed outfall channel.

Sub-basins "A5" and "A6" includes portions of both Filings No. 1 and 2 as well as portions of future phases of the overall development. These sub-basins are made up of single family lots and associated roadway improvements. Runoff from these sub-basins shall be conveyed via roadway improvements to proposed storm sewer lines "A" and "B". These lines shall convey runoff directly to the proposed outfall channel and subsequently north to Leach Creek.

Sub-basin "A7" consists entirely of the roadway improvements for Country Circle and Crossing Lane. Runoff from this sub-basin shall be conveyed via roadway improvements to storm sewer line "A" and subsequently to the proposed outfall channel.

The proposed storm sewer systems are designed to collect and convey the 100 year storm event. The capacity of storm sewer line "A" between Inlet #1 and the outfall channel is exceeded by 4.32 cfs. This excess will overtop the back of walk along Crossing Lane and discharge directly to the proposed outfall channel. This discharge is not considered unacceptable.

B. Maintenance Issues:

Access to and through the site shall be by dedicated public R.O.W..

Ownership and responsibility for maintenance of the proposed drainage improvements within public R.O.W. shall be that of the City of Grand Junction.

Ownership and responsibility for maintenance of the proposed drainage improvements private property shall be that of the homeowners association.

IV. Design Criteria & Approach

A. Hydrology:

The "Stormwater Management Manual, City of Grand Junction, Colorado" (Reference 1) and the "Mesa County Storm Drainage Criteria Manual" (Reference 2) were used as the basis for analysis and facility design.

Since the project is a commercial development containing approximately 7.19 acres the "Rational Method" is used to calculate historic and developed flow rates. The minor storm is the 2 year frequency rainfall event and the major storm is the 100 year frequency rainfall event.

Runoff Coefficients used in the computations are based on the most recent City of Grand Junction criteria as defined in Reference 1 and shown on Exhibit 2.0. These coefficients were assigned based on land use and hydrological soils groups "B" and "C". Weighted coefficients were calculated where applicable and are shown on Exhibits 3.0 thru 9.0.

The project is located within the Grand Junction Urbanized area, therefore the Intensity Duration Frequency Curves (IDFC) shown on Exhibits 10.0 and 11.0 were used in the analysis and design.

Times of Concentration were calculated based on the Determination of Overland Flow Time and Average Velocities for Overland Flow Curves as provided in Reference 1.

Due to the project's proximity to Leach Creek a major drainageway, the requirement for onsite detention is considered mitigated. This position has been previously presented to the City of Grand Junction Engineering Department.

Because offsite flows are directed away from the project site, compliance with offsite drainage considerations are mitigated.

B. Hydraulics:

All site facilities and conveyance elements are designed in accordance with the City of Grand Junction guidelines as provided in Reference 1.

V. Conclusions

The construction of the outfall drainage channel to Leach Creek is considered an interim measure and is to be replaced by storm sewer with the development of future phases of this project.

The drainage improvements, sub-basins and design points referenced herein are presented on the Grading and Drainage Plan Exhibit.

This Drainage Report has been prepared to address site-specific drainage concerns in accordance with the requirements of the City of Grand Junction, Colorado. The Appendix of this report includes criteria, exhibits, tables and calculations used in the design and analysis.

V. References

1. Stormwater Management Manual, (SWMM), Public Works Department, City of Grand Junction, Co., June 1994.

2. Mesa County Storm Drainage Criteria Manual, Final Draft, Mesa County, Colorado, March, 1992.

3. Flood Hazard Information, Colorado River and Tributaries, Grand Junction, Colorado, prepared for the City of Grand Junction and Mesa County, by The Department Of The Army, Sacramento District, Corps Of Engineers, Sacramento, California, November, 1976.

4. Flood Insurance Study, City of Grand Junction, Colorado, Mesa County, Community Number 080117, Federal Emergency Management Agency, Revised July 15th, 1992.

5. Flood Insurance Study, Mesa County, Colorado (Unincorporated Areas), Community Number 080115, Federal Emergency Management Agency, Revised July 15th, 1992.

6. Flood Insurance Rate Map, City of Grand Junction, Colorado, Mesa County, Community-Panel Number 080117 0003 E, Federal Emergency Management Agency, Map Revised July 15th, 1992.

7. Flood Insurance Rate Map, Mesa County, Colorado, (Unincorporated Areas), Community Panel Number 080115 0460 B, Federal Emergency Management Agency, Map Revised July 15th, 1992.

8. Soil Survey, Grand Junction Area, Colorado, Series 1940, No. 19, U.S. Department of Agriculture, issued November, 1955.

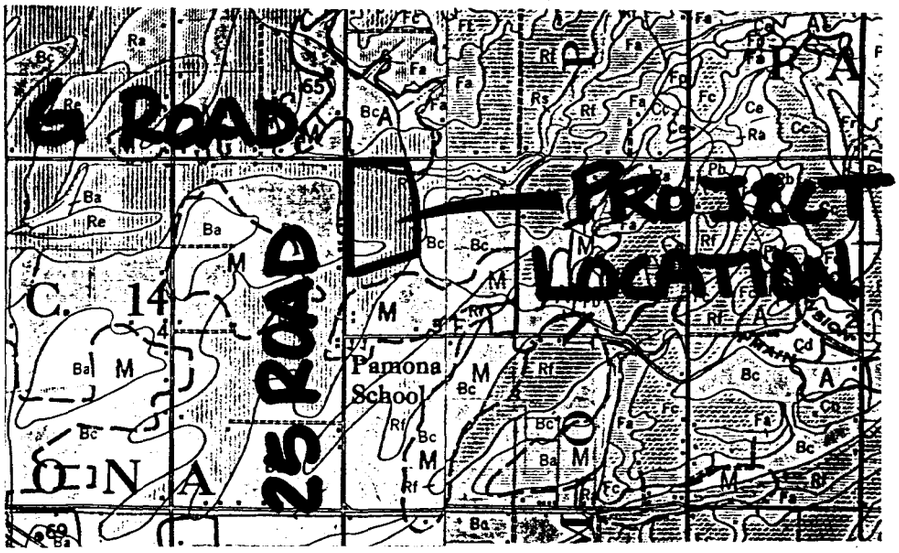
9. HEC 1, Flood Hydrograph Package, US Army Corps of Engineers, September, 1990.

10. HEC 2, Water Surface Profiles, US Army Corps of Engineers, September, 1990.

11. Persigo Village Drainage Report, Prepared By: Turner, Collie & Braden Inc., Grand Junction, Colorado, September, 1982.

12. Preliminary Master Drainage Study for Country Crossing Subdivision, Prepared By: LANDesign LTD., Grand Junction, Colorado, October, 1994.

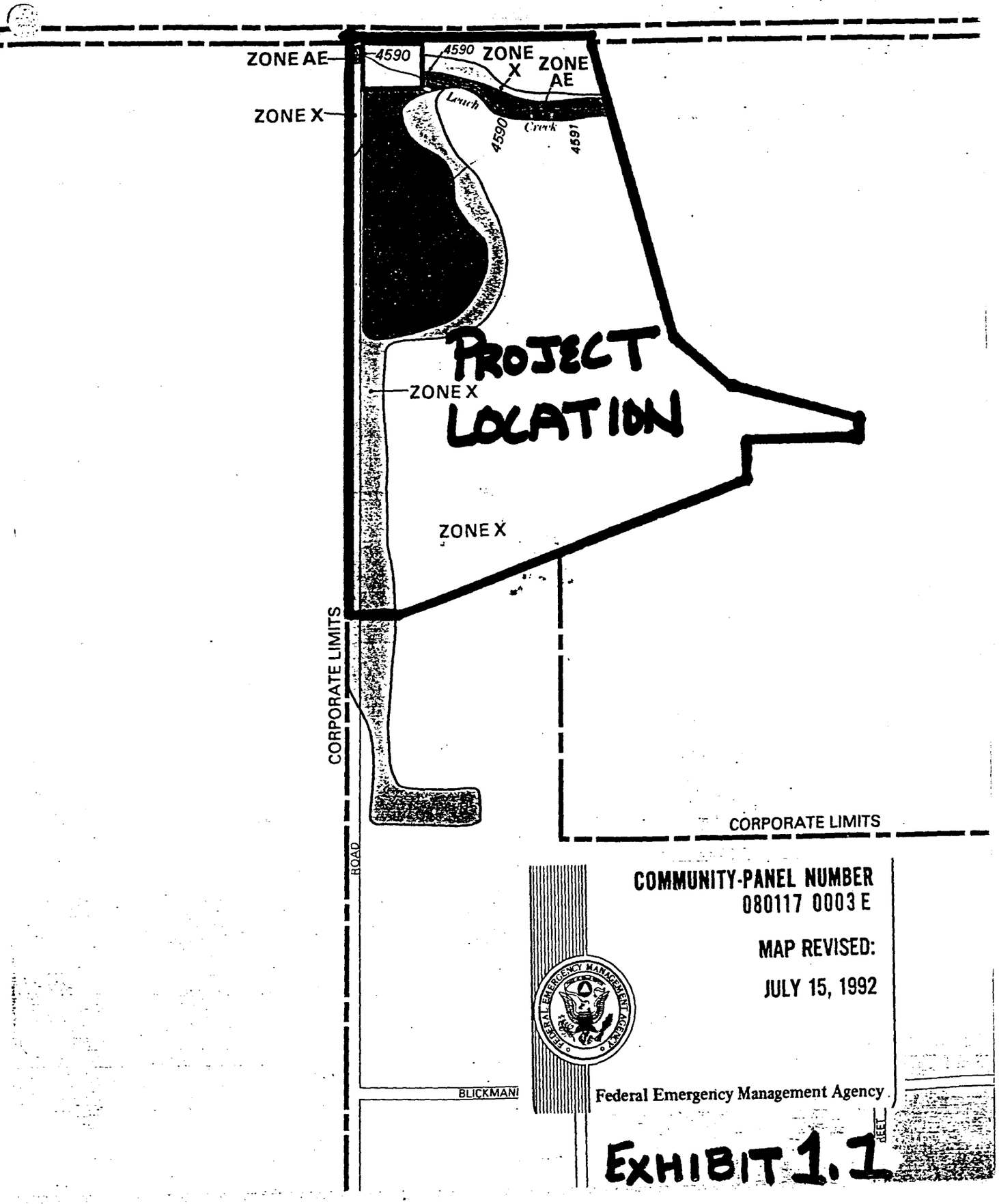
APPENDIX



(Rf) Ravola Very Fine Sandy Loam,
0 to 2 Percent Slopes. Group 'B'

(Bc) Billings Silty Clay Loam,
0 to 2 Percent Slopes. Group 'C'

SOILS MAP
EXHIBIT 1.0


ZONE AE
4590
4590
ZONE X
ZONE AE
ZONE X
Leach
Creek
4590
4591
PROJECT LOCATION
ZONE X
ZONE X
CORPORATE LIMITS
CORPORATE LIMITS
ROAD
BLICKMAN
COMMUNITY-PANEL NUMBER
080117 0003 E
MAP REVISED:
JULY 15, 1992
Federal Emergency Management Agency
EXHIBIT 1.1

LAND USE OR SURFACE CHARACTERISTICS	SCS HYDROLOGIC SOIL GROUP (SEE APPENDIX "C" FOR DESCRIPTIONS)											
	A			B			C			D		
	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
UNDEVELOPED AREAS Bare ground	.10 - .20 .14 - .24	.16 - .26 .22 - .32	.25 - .35 .30 - .40	.14 - .22 .20 - .28	.22 - .30 .28 - .36	.30 - .38 .37 - .45	.20 - .28 .26 - .34	.28 - .36 .35 - .43	.36 - .44 .40 - .48	.24 - .32 .30 - .38	.30 - .38 .40 - .48	.40 - .48 .50 - .58
Cultivated/Agricultural	.08 - .18 .14 - .24	.13 - .23 .18 - .28	.16 - .26 .22 - .32	.11 - .19 .16 - .24	.15 - .23 .21 - .29	.21 - .29 .28 - .36	.14 - .22 .20 - .28	.19 - .27 .25 - .33	.26 - .34 .34 - .42	.18 - .26 .24 - .32	.23 - .31 .29 - .37	.31 - .39 .41 - .49
Pasture	.12 - .22 .15 - .25	.20 - .30 .25 - .35	.30 - .40 .37 - .47	.18 - .26 .23 - .31	.28 - .36 .34 - .42	.37 - .45 .45 - .53	.24 - .32 .30 - .38	.34 - .42 .42 - .50	.44 - .52 .52 - .60	.30 - .38 .37 - .45	.40 - .48 .50 - .58	.50 - .58 .62 - .70
Meadow	.10 - .20 .14 - .24	.16 - .26 .22 - .32	.25 - .35 .30 - .40	.14 - .22 .20 - .28	.22 - .30 .28 - .36	.30 - .38 .37 - .45	.20 - .28 .26 - .34	.28 - .36 .35 - .43	.36 - .44 .44 - .52	.24 - .32 .30 - .38	.30 - .38 .40 - .48	.40 - .48 .50 - .58
Forest	.05 - .15 .08 - .18	.08 - .18 .11 - .21	.11 - .21 .14 - .24	.08 - .16 .10 - .18	.11 - .19 .14 - .22	.14 - .22 .18 - .26	.10 - .18 .12 - .20	.13 - .21 .16 - .24	.16 - .24 .20 - .28	.12 - .20 .15 - .23	.16 - .24 .20 - .28	.20 - .28 .25 - .33
RESIDENTIAL AREAS 1/8 acre per unit	.40 - .50 .48 - .58	.43 - .53 .52 - .62	.46 - .56 .55 - .65	.42 - .50 .50 - .58	.45 - .53 .54 - .62	.50 - .58 .59 - .67	.45 - .53 .53 - .61	.48 - .56 .57 - .65	.53 - .61 .64 - .72	.48 - .56 .56 - .64	.51 - .59 .60 - .68	.57 - .65 .69 - .77
1/4 acre per unit	.27 - .37 .35 - .45	.31 - .41 .39 - .49	.34 - .44 .42 - .52	.29 - .37 .38 - .46	.34 - .42 .42 - .50	.38 - .46 .47 - .55	.32 - .40 .41 - .49	.36 - .44 .45 - .53	.41 - .49 .52 - .60	.35 - .43 .43 - .51	.39 - .47 .47 - .55	.45 - .53 .57 - .65
1/3 acre per unit	.22 - .32 .31 - .41	.26 - .36 .35 - .45	.29 - .39 .38 - .48	.25 - .33 .33 - .41	.29 - .37 .38 - .46	.33 - .41 .42 - .50	.28 - .36 .36 - .44	.32 - .40 .41 - .49	.37 - .45 .48 - .56	.31 - .39 .39 - .47	.35 - .43 .43 - .51	.42 - .50 .53 - .61
1/2 acre per unit	.16 - .26 .25 - .35	.20 - .30 .29 - .39	.24 - .34 .32 - .42	.19 - .27 .28 - .36	.23 - .31 .32 - .40	.28 - .36 .36 - .44	.22 - .30 .31 - .39	.27 - .35 .35 - .43	.32 - .40 .42 - .50	.26 - .34 .34 - .42	.30 - .38 .38 - .46	.37 - .45 .48 - .56
1 acre per unit	.14 - .24 .22 - .32	.19 - .29 .26 - .36	.22 - .32 .29 - .39	.17 - .25 .24 - .32	.21 - .29 .28 - .36	.26 - .34 .34 - .42	.20 - .28 .28 - .36	.25 - .33 .32 - .40	.31 - .39 .40 - .48	.24 - .32 .31 - .39	.29 - .37 .35 - .43	.35 - .43 .46 - .54
MISC. SURFACES Pavement and roofs	.93 .95	.94 .96	.95 .97	.93 .95	.94 .96	.95 .97	.93 .95	.94 .96	.95 .97	.93 .95	.94 .96	.95 .97
Traffic areas (soil and gravel)	.55 - .65 .65 - .70	.60 - .70 .70 - .75	.64 - .74 .74 - .79	.60 - .68 .68 - .76	.64 - .72 .72 - .80	.67 - .75 .75 - .83	.64 - .72 .72 - .80	.67 - .75 .75 - .83	.69 - .77 .77 - .85	.72 - .80 .79 - .87	.75 - .83 .82 - .90	.77 - .85 .84 - .92
Green landscaping (lawns, parks)	.10 - .20 .14 - .24	.16 - .26 .22 - .32	.25 - .35 .30 - .40	.14 - .22 .20 - .28	.22 - .30 .28 - .36	.30 - .38 .37 - .45	.20 - .28 .26 - .34	.28 - .36 .35 - .43	.36 - .44 .42 - .52	.24 - .32 .30 - .38	.30 - .38 .40 - .48	.40 - .48 .50 - .58
Non-green and gravel landscaping	.30 - .40 .34 - .44	.36 - .46 .42 - .52	.45 - .55 .50 - .60	.45 - .55 .50 - .60	.42 - .50 .48 - .56	.50 - .58 .57 - .65	.40 - .48 .46 - .54	.48 - .56 .55 - .63	.56 - .64 .64 - .72	.44 - .52 .50 - .58	.50 - .58 .60 - .68	.60 - .68 .70 - .78
Cemeteries, playgrounds	.20 - .30 .24 - .34	.26 - .36 .32 - .42	.35 - .45 .40 - .50	.35 - .45 .40 - .50	.32 - .40 .38 - .46	.40 - .48 .47 - .55	.30 - .38 .36 - .44	.38 - .44 .45 - .53	.46 - .54 .54 - .62	.34 - .42 .40 - .48	.40 - .48 .50 - .58	.50 - .58 .60 - .68

NOTES:
1. Values above and below pertain to the 2-year and 100-year storms, respectively.
2. The range of values provided allows for engineering judgement of site conditions such as basic shape, homogeneity of surface type, surface depression storage, and storm duration. In general, during shorter duration storms (Tc ≤ 10 minutes), infiltration capacity is higher, allowing use of a "C" value in the low range. Conversely, for longer duration storms (Tc) 30 minutes), use a ""C value in the higher range.
3. For residential development at less than 1/8 acre per unit or greater than 1 acre per unit, and also for commercial and industrial areas, use values under MISC SURFACES to estimate "C" value ranges for use.

RATIONAL METHOD RUNOFF COEFFICIENTS
(Modified from Table 4, UC-Davis, which appears to be a modification of work done by Rawls)

TABLE "B-1"

EXHIBIT 2.0

DATE: 01-Jan-95
PROJECT: **COUNTRY CROSSING FILING 1 & 2**
SUBJECT: **FINAL DRAINAGE STUDY**
BASIN I.D.: **A1**
HYDROLOGIC SOILS GROUP **"B"**

COMPOSITE 2 YEAR "C" VALUE

DESCRIPTION	AREA AC.	"C"	"C" x "A"
RESIDENTIAL AREA 1/8 ACRE PER UNIT	6.10	0.46	2.81
GRASS OR LANDSCAPED AREAS INCLUDING OPENSPACE.	3.04	0.18	0.55
SUBTOTALS	9.14		3.35

COMPOSITE = $\frac{\text{"C" x "A"}}{\text{"A"}} = \frac{3.35}{9.14} =$ **0.37**

COMPOSITE 100 YEAR "C" VALUE

DESCRIPTION	AREA AC.	"C"	"C" x "A"
RESIDENTIAL AREA 1/8 ACRE PER UNIT	6.10	0.54	3.29
GRASS OR LANDSCAPED AREAS INCLUDING OPENSPACE.	3.04	0.24	0.73
SUBTOTALS	9.14		4.02

COMPOSITE = $\frac{\text{"C" x "A"}}{\text{"A"}} = \frac{4.02}{9.14} =$ **0.44**

EXHIBIT 3.0

DATE: 01-Jan-95
PROJECT: **COUNTRY CROSSING FILING 1 &**
SUBJECT: **FINAL DRAINAGE STUDY**
BASIN I.D.: **A2**
HYDROLOGIC SOILS GROUP **"C"**

COMPOSITE 2 YEAR "C" VALUE

DESCRIPTION	AREA AC.	"C"	"C" x "A"
BUILDINGS / PARKING AREA OR OTHER IMPERVIOUS SURFACES	0.58	0.93	0.54
GRASS OR LANDSCAPED AREAS	0.29	0.24	0.07
SUBTOTALS	0.87		0.61

COMPOSITE = $\frac{\text{"C" x "A"}}{\text{"A"}} = \frac{0.61}{0.87} =$ **0.70**

COMPOSITE 100 YEAR "C" VALUE

DESCRIPTION	AREA AC.	"C"	"C" x "A"
BUILDINGS / PARKING AREA OR OTHER IMPERVIOUS SURFACES	0.58	0.95	0.55
GRASS OR LANDSCAPED AREAS	0.29	0.30	0.09
SUBTOTALS	0.87		0.64

COMPOSITE = $\frac{\text{"C" x "A"}}{\text{"A"}} = \frac{0.64}{0.87} =$ **0.73**

EXHIBIT 4.0

DATE: 01-Jan-95
PROJECT: **COUNTRY CROSSING FILING 1 &**
SUBJECT: **FINAL DRAINAGE STUDY**
BASIN I.D.: **A3**
HYDROLOGIC SOILS GROUP **"C"**

COMPOSITE 2 YEAR "C" VALUE

DESCRIPTION	AREA AC.	"C"	"C" x "A"
BUILINGS / PARKING AREA OR OTHER IMPERVIOUS SURFACE	0.59	0.93	0.55
GRASS OR LANDSCAPED AREAS	0.29	0.24	0.07
SUBTOTALS	0.88		0.62

COMPOSITE = $\frac{\text{"C" x "A"}}{\text{"A"}} = \frac{0.62}{0.88} =$ **0.70**

COMPOSITE 100 YEAR "C" VALUE

DESCRIPTION	AREA AC.	"C"	"C" x "A"
BUILINGS / PARKING AREA OR OTHER IMPERVIOUS SURFACE	0.59	0.95	0.56
GRASS OR LANDSCAPED AREAS	0.29	0.30	0.09
SUBTOTALS	0.88		0.65

COMPOSITE = $\frac{\text{"C" x "A"}}{\text{"A"}} = \frac{0.65}{0.88} =$ **0.74**

EXHIBIT 5.0

DATE: 01-Jan-95
PROJECT: **COUNTRY CROSSING FILING 1 &**
SUBJECT: **FINAL DRAINAGE STUDY**
BASIN I.D.: **A4**
HYDROLOGIC SOILS GROUP **"C"**

COMPOSITE 2 YEAR "C" VALUE

DESCRIPTION	AREA AC.	"C"	"C" x "A"
BUILINGS / PARKING AREA OR OTHER IMPERVIOUS SURFACE	0.64	0.93	0.60
GRASS OR LANDSCAPED AREAS	1.45	0.24	0.35
SUBTOTALS	2.09		0.94

COMPOSITE = $\frac{\text{"C" x "A"}}{\text{"A"}} = \frac{0.94}{2.09} =$ **0.45**

COMPOSITE 100 YEAR "C" VALUE

DESCRIPTION	AREA AC.	"C"	"C" x "A"
BUILINGS / PARKING AREA OR OTHER IMPERVIOUS SURFACE	0.64	0.95	0.61
GRASS OR LANDSCAPED AREAS	1.45	0.30	0.44
SUBTOTALS	2.09		1.04

COMPOSITE = $\frac{\text{"C" x "A"}}{\text{"A"}} = \frac{1.04}{2.09} =$ **0.50**

EXHIBIT 6.0

DATE: 01-Jan-95
PROJECT: **COUNTRY CROSSING FILING 1 &**
SUBJECT: **FINAL DRAINAGE STUDY**
BASIN I.D.: **A5**
HYDROLOGIC SOILS GROUP **"B"**

COMPOSITE 2 YEAR "C" VALUE

DESCRIPTION	AREA AC.	"C"	"C" x "A"
RESIDENTIAL AREA 1/8 ACRE PER UNIT	5.97	0.42	2.51
GRASS OR LANDSCAPED AREAS INCLUDING OPENSPACE.	0.00	0.00	0.00
SUBTOTALS	5.97		2.51

COMPOSITE = $\frac{\text{"C" x "A"}}{\text{"A"}} = \frac{2.51}{5.97} =$ **0.42**

COMPOSITE 100 YEAR "C" VALUE

DESCRIPTION	AREA AC.	"C"	"C" x "A"
RESIDENTIAL AREA 1/8 ACRE PER UNIT	5.97	0.50	2.99
GRASS OR LANDSCAPED AREAS INCLUDING OPENSPACE.	0.00	0.00	0.00
SUBTOTALS	5.97		2.99

COMPOSITE = $\frac{\text{"C" x "A"}}{\text{"A"}} = \frac{2.99}{5.97} =$ **0.50**

EXHIBIT 7.0

DATE: 01-Jan-95
PROJECT: **COUNTRY CROSSING FILING 1 &**
SUBJECT: **FINAL DRAINAGE STUDY**
BASIN I.D.: **A6**
HYDROLOGIC SOILS GROUP **"B"**

COMPOSITE 2 YEAR "C" VALUE

DESCRIPTION	AREA AC.	"C"	"C" x "A"
RESIDENTIAL AREA 1/8 ACRE PER UNIT	3.24	0.42	1.36
GRASS OR LANDSCAPED AREAS INCLUDING OPENSPACE.	0.00	0.00	0.00
SUBTOTALS	3.24		1.36

COMPOSITE = $\frac{\text{"C" x "A"}}{\text{"A"}} = \frac{1.36}{3.24} =$ **0.42**

COMPOSITE 100 YEAR "C" VALUE

DESCRIPTION	AREA AC.	"C"	"C" x "A"
RESIDENTIAL AREA 1/8 ACRE PER UNIT	3.24	0.50	1.62
GRASS OR LANDSCAPED AREAS INCLUDING OPENSPACE.	0.00	0.00	0.00
SUBTOTALS	3.24		1.62

COMPOSITE = $\frac{\text{"C" x "A"}}{\text{"A"}} = \frac{1.62}{3.24} =$ **0.50**

EXHIBIT 8.0

DATE: 01-Jan-95
PROJECT: **COUNTRY CROSSING FILING 1 &**
SUBJECT: **FINAL DRAINAGE STUDY**
BASIN I.D.: **A7**
HYDROLOGIC SOILS GROUP **"B"**

COMPOSITE 2 YEAR "C" VALUE

DESCRIPTION	AREA AC.	"C"	"C" x "A"
RESIDENTIAL AREA 1/8 ACRE PER UNIT	0.00	0.00	0.00
GRASS OR LANDSCAPED AREAS INCLUDING OPENSPACE.	0.32	0.93	0.30
SUBTOTALS	0.32		0.30

COMPOSITE = $\frac{\text{"C" x "A"}}{\text{"A"}} = \frac{0.30}{0.32} =$ **0.93**

COMPOSITE 100 YEAR "C" VALUE

DESCRIPTION	AREA AC.	"C"	"C" x "A"
RESIDENTIAL AREA 1/8 ACRE PER UNIT	0.00	0.00	0.00
GRASS OR LANDSCAPED AREAS INCLUDING OPENSPACE.	0.32	0.95	0.30
SUBTOTALS	0.32		0.30

COMPOSITE = $\frac{\text{"C" x "A"}}{\text{"A"}} = \frac{0.30}{0.32} =$ **0.95**

EXHIBIT 9.0

STORM DRAINAGE SYSTEM DESIGN DATA

(2 YEAR STORM EVENT)
DEVELOPED CONDITION - CITY OF GRAND JUNCTION, COLORADO

DATE: 02-Jan-95

PROJECT: COUNTRY CROSSING FILING NO. 1 & 2
JOB # 93086
LANDesign LTD.

LOCATION OR NODE	BASINS	LENGTH FEET	INLET TIME min.	FLOW TIME STREET	FLOW TIME PIPE	Tc min.	COEFF. "C"	INTENSITY "I"	AREA "A" AC	DIRECT RUNOFF C.F.S.	OTHER RUNOFF C.F.S.	SUM RUNOFF C.F.S.	STREET SLOPE %	STREET CAPACITY ALLOWED C.F.S.	PIPE SLOPE %	PIPE SIZE IN.	PIPE CAPACITY ALLOWED C.F.S.	STREET DESIGN F.P.S.	STREET VELOC. F.P.S.	PIPE DESIGN F.P.S.	PIPE VELOC. F.P.S.	REMARKS
1	A1					24.94	0.37	0.99	9.14	3.35		3.35	0.60	8.52	0.35	24	13.38					FLOW FROM FUTURE STORM SEWER LINE "G" TO STORM SEWER LINE "C"
2	A2					5.00	0.70	1.95	0.87	1.19		1.19	0.60	N/A	0.50	12	3.28					FUTURE MULTIFAMILY AREA TO FUTURE LINE "F"
3	A3					5.00	0.70	1.95	0.88	1.20		1.20	0.60	N/A	0.50	12	3.28					FILING NO. 1 MULTIFAMILY AREA TO LINE "E"
4	A2						0.70		0.87													PIPE FLOW FROM LINE "F" TO V-PAN
	A3						0.70		0.88													PIPE FLOW FROM LINE "E" TO V-PAN
	A4					19.26	0.45		2.09													FLOW IN V-PAN FROM BLDGS. & 25 ROAD
						19.26	0.56	1.13	3.84	2.43		2.43			0.55	18	7.79					SUM OF FLOW IN V-PAN TO LINE "D"
" "	A2						0.70		0.87													PIPE FLOW FROM LINE "F" TO V-PAN
	A3						0.70		0.88													PIPE FLOW FROM LINE "E" TO V-PAN
	A4						0.45		2.09													FLOW IN V-PAN FROM BLDGS. & 25 ROAD
	A1	456.1			2.15	24.94	0.37		9.14						0.35	24	13.38			3.54		PIPE FLOW IN LINE "C" TO MANHOLE "C1"
						27.09	0.43	0.94	12.98	5.25		5.25										FLOW IN LINE "C" FROM MH "C1" TO OUTLET
5	A5					19.66	0.42	1.12	5.97	2.81		2.81	0.59	8.45	0.99	18	10.45					STREET FLOW IN COUNTRY CIRCLE TO LINE "B"
6	A6					17.55	0.42	1.19	3.24	1.62		1.62	0.59	8.45	1.27	12	4.02					STREET FLOW IN COUNTRY CIRCLE TO LINE "A"
7	A7					5.00	0.93	1.95	0.32	0.58		0.58	0.88	10.32	0.99	18	10.45					STREET FLOW IN CROSSING LANE TO LINE "A"

EXHIBIT 14.0

TABLE "A-1"
INTENSITY-DURATION-FREQUENCY (IDF) TABLE

Time (min)	2-Year Intensity (in/hr)	100-Year Intensity (in/hr)	Time (min)	2-Year Intensity (in/hr)	100-Year Intensity (in/hr)
5	1.95	4.95	33	0.83	2.15
6	1.83	4.65	34	0.82	2.12
7	1.74	4.40	35	0.81	2.09
8	1.66	4.19	36	0.80	2.06
9	1.59	3.99	37	0.79	2.03
10	1.52	3.80	38	0.78	2.00
11	1.46	3.66	39	0.77	1.97
12	1.41	3.54	40	0.76	1.94
13	1.36	3.43	41	0.75	1.91
14	1.32	3.33	42	0.74	1.88
15	1.28	3.24	43	0.73	1.85
16	1.24	3.15	44	0.72	1.82
17	1.21	3.07	45	0.71	1.79
18	1.17	2.99	46	0.70	1.76
19	1.14	2.91	47	0.69	1.73
20	1.11	2.84	48	0.68	1.70
21	1.08	2.77	49	0.67	1.67
22	1.05	2.70	50	0.66	1.64
23	1.02	2.63	51	0.65	1.61
24	1.00	2.57	52	0.64	1.59
25	0.98	2.51	53	0.63	1.57
26	0.96	2.46	54	0.62	1.55
27	0.94	2.41	55	0.61	1.53
28	0.92	2.36	56	0.60	1.51
29	0.90	2.31	57	0.59	1.49
30	0.88	2.27	58	0.58	1.47
31	0.86	2.23	59	0.57	1.45
32	0.84	2.19	60	0.56	1.43

Source: Mesa County 1991

EXHIBIT 10.0

INTENSITY DURATION FREQUENCY CURVES
MESA COUNTY, COLORADO

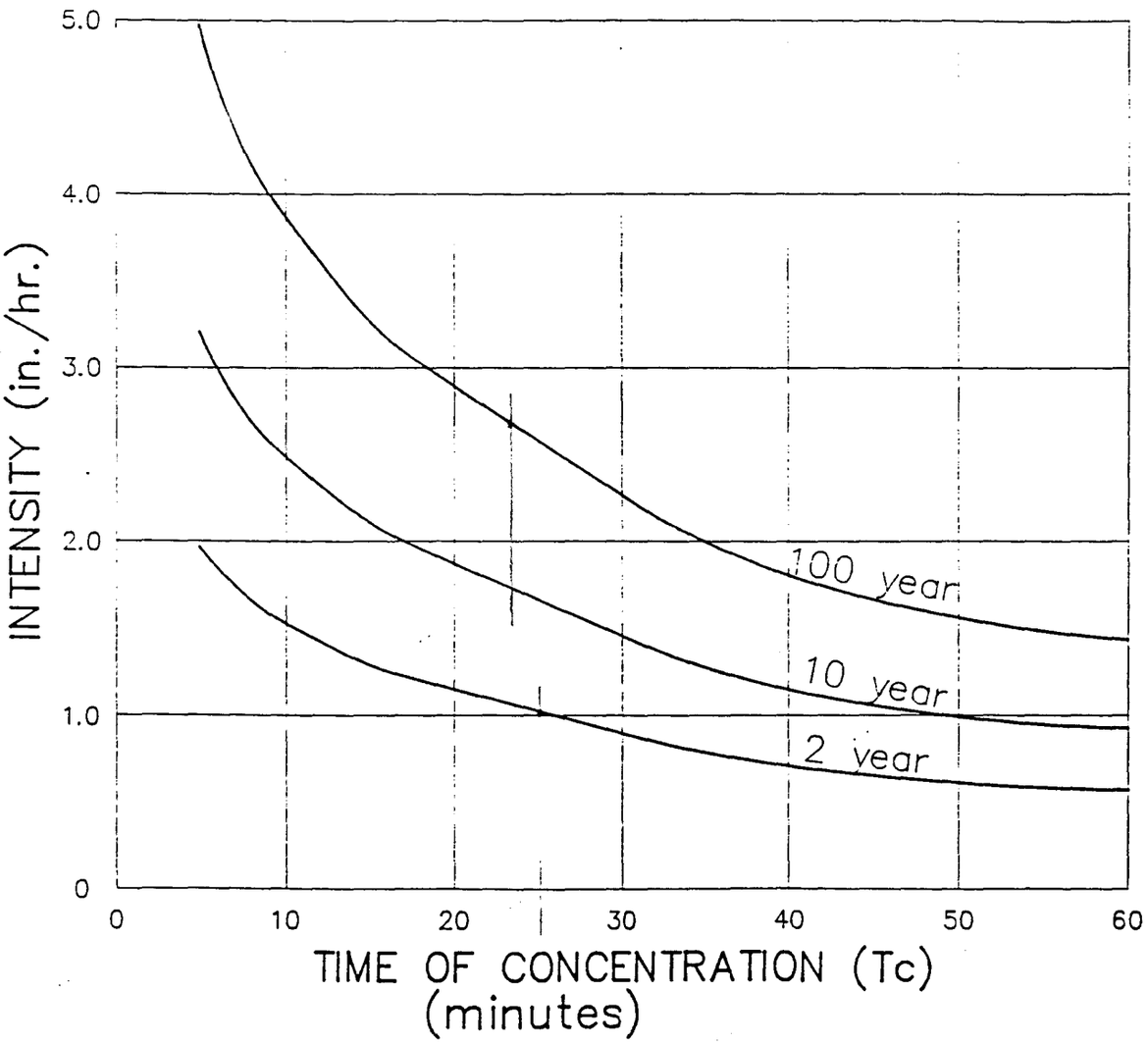


EXHIBIT 11.0

TIME OF CONCENTRATION CALCULATIONS

(2 YEAR STORM EVENT)
DEVELOPED CONDITION - CITY OF GRAND JUNCTION, COLORADO

PROJECT: **COUNTRY CROSSING FILING NO. 1 & 2**
JOB # 93086
LANDesign LTD.

DATE:
02-Jan-95

SUB-BASIN DATA			INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME TIME (Tt)				INITIAL	Tc CHECK (URBANIZED BASINS)		FINAL Tc	REMARKS
BASIN	C 2	AREA AC.	LENGTH FT.	SLOPE %	Ti MIN.	LENGTH FT.	SLOPE %	VEL F.P.S.	Tt MIN.	Tc MIN.	TOTAL LENGTH FT.	Tc = (L/180)+10 MIN.	MIN.	
A1	0.37	9.14	138.0	0.67	17.64									OVERLAND FLOW RESIDENTIAL LOTS
						1008.0	0.62	2.30	7.30	24.94	1146.00	16.37	24.94	STREET FLOW TO FUTURE LINE "G"
–	–	–	–	–	–	–	–	–	–	–	–	–	–	—
A2	0.70	0.87	15.0	3.00	1.93									OVERLAND FLOW MULTIFAMILY AREA
						241.0	0.60	2.27	1.77	3.70	256.00	11.42	5.00	FLOW THRU PARKING LOT TO LINE "F"
–	–	–	–	–	–	–	–	–	–	–	–	–	–	—
A3	0.70	0.88	15.0	3.00	1.93									OVERLAND FLOW MULTIFAMILY AREA
						241.0	0.60	2.27	1.77	3.70	256.00	11.42	5.00	FLOW THRU PARKING LOT TO LINE "E"
–	–	–	–	–	–	–	–	–	–	–	–	–	–	—
A4	0.45	2.09	198.0	2.27	12.53									OVERLAND FLOW MULTIFAMILY AREA
						541.3	0.40	1.34	6.73	19.26	739.30	14.11	19.26	FLOW IN V-PAN TO LINE "D"
–	–	–	–	–	–	–	–	–	–	–	–	–	–	—
A5	0.42	5.97	180.0	2.22	12.59									OVERLAND FLOW RESIDENTIAL LOTS
						954.3	0.59	2.25	7.07	19.66	1134.30	16.30	19.66	FLOW IN COUNTRY CIRCLE TO LINE "B"
–	–	–	–	–	–	–	–	–	–	–	–	–	–	—
A6	0.42	3.24	68.0	1.00	10.09									OVERLAND FLOW RESIDENTIAL LOTS
						1006.0	0.59	2.25	7.45	17.55	1074.00	15.97	17.55	FLOW IN COUNTRY CIRCLE TO LINE "A"
–	–	–	–	–	–	–	–	–	–	–	–	–	–	—
A7	0.93	0.32	10.0	1.00	0.97									OVERLAND FLOW OPENSPACE
						390.0	0.81	2.63	2.47	3.44	400.00	12.22	5.00	FLOW IN CROSSING LANE TO LINE "A"
–	–	–	–	–	–	–	–	–	–	–	–	–	–	—

FORMULAS

$$Ti = \frac{1.8(1.1-C)(L)^{1/2}}{1/3} \qquad Tt = \frac{(L)}{60 \text{ SEC/MIN. } (V \text{ F.P.S.})}$$

EXHIBIT 12.0

TIME OF CONCENTRATION CALCULATIONS

(100 YEAR STORM EVENT)
DEVELOPED CONDITION - CITY OF GRAND JUNCTION, COLORADO

PROJECT: **COUNTRY CROSSING FILING NO. 1 & 2**
JOB # 93086
LANDesign LTD.

DATE:
02-Jan-98

SUB-BASIN DATA			INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME TIME (Tt)				INITIAL	Tc CHECK (URBANIZED BASINS)		FINAL Tc	REMARKS
BASIN	C 10	AREA AC.	LENGTH FT.	SLOPE %	Ti MIN.	LENGTH FT.	SLOPE %	VEL F.P.S.	Tt MIN.	Tc MIN.	TOTAL LENGTH FT.	Tc = (L/180)+10 MIN.	MIN.	
A1	0.44	9.14	138.0	0.67	15.95									OVERLAND FLOW RESIDENTIAL LOTS
						1008.0	0.62	2.30	7.30	23.25	1146.00	16.37	23.25	STREET FLOW TO FUTURE LINE "G"
--	--	--	--	--	--	--	--	--	--	--	--	--	--	---
A2	0.73	0.87	15.0	3.00	1.79									OVERLAND FLOW MULTIFAMILY AREA
						241.0	0.60	2.27	1.77	3.56	256.00	11.42	5.00	FLOW THRU PARKING LOT TO LINE "F"
--	--	--	--	--	--	--	--	--	--	--	--	--	--	---
A3	0.74	0.88	15.0	3.00	1.74									OVERLAND FLOW MULTIFAMILY AREA
						241.0	0.60	2.27	1.77	3.51	256.00	11.42	5.00	FLOW THRU PARKING LOT TO LINE "E"
--	--	--	--	--	--	--	--	--	--	--	--	--	--	---
A4	0.50	2.09	198.0	2.27	11.56									OVERLAND FLOW MULTIFAMILY AREA
						541.3	0.40	1.34	6.73	18.30	739.30	14.11	18.30	FLOW IN V-PAN TO LINE "D"
--	--	--	--	--	--	--	--	--	--	--	--	--	--	---
A5	0.50	5.97	180.0	2.22	11.11									OVERLAND FLOW RESIDENTIAL LOTS
						954.3	0.59	2.25	7.07	18.18	1134.30	16.30	18.18	FLOW IN COUNTRY CIRCLE TO LINE "B"
--	--	--	--	--	--	--	--	--	--	--	--	--	--	---
A6	0.50	3.24	68.0	1.00	8.91									OVERLAND FLOW RESIDENTIAL LOTS
						1006.0	0.59	2.25	7.45	16.36	1074.00	15.97	16.36	FLOW IN COUNTRY CIRCLE TO LINE "A"
--	--	--	--	--	--	--	--	--	--	--	--	--	--	---
A7	0.95	0.32	10.0	1.00	0.85									OVERLAND FLOW OPENSPACE
						390.0	0.81	2.63	2.47	3.33	400.00	12.22	5.00	FLOW IN CROSSING LANE TO LINE "A"
--	--	--	--	--	--	--	--	--	--	--	--	--	--	---

FORMULAS

$$Ti = \frac{1.8(1.1-C)(L)^{1/2}}{1/3} \qquad Tt = \frac{(L)}{60 \text{ SEC/MIN. (V F.P.S.)}}$$

EXHIBIT 13.0

STORM DRAINAGE SYSTEM DESIGN DATA

(2 YEAR STORM EVENT)
DEVELOPED CONDITION - CITY OF GRAND JUNCTION, COLORADO

DATE: 02-Jan-95

PROJECT: COUNTRY CROSSING FILING NO. 1 & 2
JOB # 93086
LANDesign LTD.

													STREET		PIPE			STREET		PIPE	
LOCATION OR NODE	BASINS	LENGTH FEET	INLET TIME min.	FLOW STREET	TIME PIPE	Tc min.	COEFF. "C"	INTENSITY "I"	AREA "A" AC	DIRECT RUNOFF C.F.S.	OTHER RUNOFF C.F.S.	SUM RUNOFF C.F.S.	SLOPE %	CAPACITY ALLOWED C.F.S.	SLOPE %	SIZE IN.	CAPACITY ALLOWED C.F.S.	DESIGN F.P.S.	VELOC. F.P.S.	DESIGN F.P.S.	VELOC. F.P.S.	REMARKS
1	A1					24.94	0.37	0.99	9.14	3.35		3.35	0.60	8.52	0.35	24	13.38					FLOW FROM FUTURE STORM SEWER LINE "G" TO STORM SEWER LINE "C"
2	A2					5.00	0.70	1.95	0.87	1.19		1.19	0.60	N/A	0.50	12	3.28					FUTURE MULTIFAMILY AREA TO FUTURE LINE "F"
3	A3					5.00	0.70	1.95	0.88	1.20		1.20	0.60	N/A	0.50	12	3.28					FILING NO. 1 MULTIFAMILY AREA TO LINE "E"
4	A2						0.70		0.87													PIPE FLOW FROM LINE "F" TO V-PAN
	A3						0.70		0.88													PIPE FLOW FROM LINE "E" TO V-PAN
	A4					19.26	0.45		2.09													FLOW IN V-PAN FROM BLDGS. & 25 ROAD
						19.26	0.56	1.13	3.84	2.43		2.43			0.55	18	7.79					SUM OF FLOW IN V-PAN TO LINE "D"
" "	A2						0.70		0.87													PIPE FLOW FROM LINE "F" TO V-PAN
	A3						0.70		0.88													PIPE FLOW FROM LINE "E" TO V-PAN
	A4						0.45		2.09													FLOW IN V-PAN FROM BLDGS. & 25 ROAD
	A1	456.1			2.15	24.94	0.37		9.14						0.35	24	13.38			3.54		PIPE FLOW IN LINE "C" TO MANHOLE "C1"
						27.09	0.43	0.94	12.98	5.25		5.25										FLOW IN LINE "C" FROM MH "C1" TO OUTLET
5	A5					19.66	0.42	1.12	5.97	2.81		2.81	0.59	8.45	0.99	18	10.45					STREET FLOW IN COUNTRY CIRCLE TO LINE "B"
6	A6					17.55	0.42	1.19	3.24	1.62		1.62	0.59	8.45	1.27	12	4.02					STREET FLOW IN COUNTRY CIRCLE TO LINE "A"
7	A7					5.00	0.93	1.95	0.32	0.58		0.58	0.88	10.32	0.99	18	10.45					STREET FLOW IN CROSSING LANE TO LINE "A"

EXHIBIT 14.0

STORM DRAINAGE SYSTEM DESIGN DATA

(100 YEAR STORM EVENT)
DEVELOPED CONDITION - CITY OF GRAND JUNCTION, COLORADO

DATE: 02-Jan-95

PROJECT: COUNTRY CROSSING FILING NO. 1 & 2
JOB # 93086
LANDesign LTD.

													STREET		PIPE			STREET		PIPE	
LOCATION OR NODE	BASINS	LENGTH FEET	INLET TIME min.	FLOW STREET	TIME PIPE	Tc min.	COEFF. "C"	INTENSITY "I"	AREA "A" AC	DIRECT RUNOFF C.F.S.	OTHER RUNOFF C.F.S.	SUM RUNOFF C.F.S.	SLOPE %	CAPACITY ALLOWED C.F.S.	SLOPE %	SIZE IN.	CAPACITY ALLOWED C.F.S.	DESIGN F.P.S.	VELOC. F.P.S.	DESIGN F.P.S.	VELOC. F.P.S.	REMARKS
																						FLOW FROM FUTURE STORM SEWER LINE "G" TO
1	A1					23.25	0.44	2.62	9.14	10.54		10.54	0.60	75.67		24						STORM SEWER LINE "C"
2	A2					5.00	0.73	4.95	0.87	3.14		3.14	0.60	N/A	0.50	12	3.28					FUTURE MULTIFAMILY AREA TO FUTURE LINE "F"
3	A3					5.00	0.74	4.95	0.88	3.22		3.22	0.60	N/A	0.50	12	3.28					FILING NO. 1 MULTIFAMILY AREA TO LINE "E"
4	A2						0.73		0.87													PIPE FLOW FROM LINE "F" TO V-PAN
	A3						0.74		0.88													PIPE FLOW FROM LINE "E" TO V-PAN
	A4					18.30	0.50		2.09													FLOW IN V-PAN FROM BLDGS. & 25 ROAD
						18.30	0.61	2.97	3.84	6.96		6.96			0.55	18	7.79					SUM OF FLOW IN V-PAN TO LINE "D"
" "	A2						0.73		0.87													PIPE FLOW FROM LINE "F" TO V-PAN
	A3						0.74		0.88													PIPE FLOW FROM LINE "E" TO V-PAN
	A4						0.50		2.09													FLOW IN V-PAN FROM BLDGS. & 25 ROAD
	A1	456.1			1.61	23.25	0.44		9.14						0.35	24	13.38			4.72		PIPE FLOW IN LINE "C" TO MANHOLE "C1"
						24.86	0.49	2.52	12.98	16.03		16.03			0.57	24	17.08					FLOW IN LINE "C" FROM MH "C1" TO OUTLET
5	A5					18.18	0.50	2.98	5.97	8.90		8.90	0.59	75.03	0.99	18	10.45					STREET FLOW IN COUNTRY CIRCLE TO LINE "B"
6	A6					16.36	0.50	3.12	3.24	5.05		5.05	0.59	75.03	1.27	12	4.02	1.03 CFS BYPASS TO INLET #1				STREET FLOW IN COUNTRY CIRCLE TO LINE "A"
7	A7					5.00	0.95	4.95	0.32	1.50		1.50	0.88	91.64	0.99	18	10.45					STREET FLOW IN CROSSING LANE TO LINE "A"
																						PIPE FLOW IN LINE "B" TO OUTFALL
" "	A5					18.18	0.50		5.97													PIPE FLOW IN LINE "A" TO OUTFALL
	A6						0.50		3.24													STREET FLOW IN CROSSING LANE TO LINE "A"
	A7						0.95		0.32													FLOW IN LINE "A" FROM INLET #1 TO OUTLET
						18.18	0.52	2.98	9.53	14.77		14.77			0.99	18	10.45	4.32 CFS OVERTOPS B.O.W. TO OUTFALL CHANNEL				

EXHIBIT 15.0

NOTE: THIS IS A REPRODUCTION OF TABLE I, APPENDIX A,
"DESIGN CHARTS FOR OPEN CHANNEL FLOW", (HDS #3)

	Manning's n range [2]
I. Closed conduits:	
A. Concrete pipe	0.011–0.013
B. Corrugated-metal pipe or pipe-arch:	
1. 2⅔ by ½-in. corrugation (riveted pipe): [3]	
a. Plain or fully coated	0.024
b. Paved invert (range values are for 25 and 50 percent of circumference paved):	
(1) Flow full depth	0.021–0.018
(2) Flow 0.8 depth	0.021–0.016
(3) Flow 0.6 depth	0.019–0.013
2. 6 by 2-in. corrugation (field bolted)	0.03
C. Vitrified clay pipe	0.012–0.014
D. Cast-iron pipe, uncoated	0.013
E. Steel pipe	0.009–0.011
F. Brick	0.014–0.017
G. Monolithic concrete:	
1. Wood forms, rough	0.015–0.017
2. Wood forms, smooth	0.012–0.014
3. Steel forms	0.012–0.013
H. Cemented rubble masonry walls:	
1. Concrete floor and top	0.017–0.022
2. Natural floor	0.019–0.025
I. Laminated treated wood	0.015–0.017
J. Vitrified clay liner plates	0.015
II. Open channels, lined [4] (straight alinement): [5]	
A. Concrete, with surfaces as indicated:	
1. Formed, no finish	0.013–0.017
2. Trowel finish	0.012–0.014
3. Float finish	0.013–0.016
4. Float finish, some gravel on bottom	0.015–0.017
5. Gunite, good section	0.016–0.019
6. Gunite, wavy section	0.018–0.022
B. Concrete, bottom float finished, sides as indicated:	
1. Dressed stone in mortar	0.015–0.017
2. Random stone in mortar	0.017–0.020
3. Cement rubble masonry	0.020–0.025
4. Cement rubble masonry, plastered	0.016–0.020
5. Dry rubble (riprap)	0.020–0.030
C. Gravel bottom, sides as indicated:	
1. Formed concrete	0.017–0.020
2. Random stone in mortar	0.020–0.023
3. Dry rubble (riprap)	0.023–0.033
D. Brick	0.014–0.017
E. Asphalt:	
1. Smooth	0.013
2. Rough	0.016
F. Wood, planed, clean	0.011–0.013
G. Concrete-lined excavated rock:	
1. Good section	0.017–0.020
2. Irregular section	0.022–0.027
III. Open channels, excavated [4] (straight alinement,[5] natural lining):	
A. Earth, uniform section:	
1. Clean, recently completed	0.016–0.018
2. Clean, after weathering	0.018–0.020
3. With short grass, few weeds	0.022–0.027
4. In gravelly soil, uniform section, clean	0.022–0.025
B. Earth, fairly uniform section:	
1. No vegetation	0.022–0.025
2. Grass, some weeds	0.025–0.030
3. Dense weeds or aquatic plants in deep channels	0.030–0.035
4. Sides clean, gravel bottom	0.025–0.030
5. Sides clean, cobble bottom	0.030–0.040
C. Dragline excavated or dredged:	
1. No vegetation	0.028–0.033
2. Light brush on banks	0.035–0.050
D. Rock:	
1. Based on design section	0.035
2. Based on actual mean section:	
a. Smooth and uniform	0.035–0.040
b. Jagged and irregular	0.040–0.045
E. Channels not maintained, weeds and brush uncut:	
1. Dense weeds, high as flow depth	0.06–0.12
2. Clean bottom, brush on sides	0.05–0.08
3. Clean bottom, brush on sides, highest stage of flow	0.07–0.11
4. Dense brush, high stage	0.10–0.14

	Manning's n range [2]
IV. Highway channels and swales with maintained vegetation [6 7] (values shown are for velocities of 2 and 6 f.p.s.):	
A. Depth of flow up to 0.7 foot:	
1. Bermudagrass, Kentucky bluegrass, buffalograss:	
a. Mowed to 2 inches	0.07–0.045
b. Length 4–6 inches	0.09–0.05
2. Good stand, any grass:	
a. Length about 12 inches	0.15–0.09
b. Length about 24 inches	0.30–0.15
3. Fair stand, any grass:	
a. Length about 12 inches	0.14–0.08
b. Length about 24 inches	0.25–0.13
B. Depth of flow 0.7–1.5 feet:	
1. Bermudagrass, Kentucky bluegrass, buffalograss:	
a. Mowed to 2 inches	0.05–0.035
b. Length 4 to 6 inches	0.06–0.04
2. Good stand, any grass:	
a. Length about 12 inches	0.12–0.07
b. Length about 24 inches	0.20–0.10
3. Fair stand, any grass:	
a. Length about 12 inches	0.10–0.06
b. Length about 24 inches	0.17–0.09
V. Street and expressway gutters:	
A. Concrete gutter, troweled finish	0.012
B. Asphalt pavement:	
1. Smooth texture	0.013
2. Rough texture	0.016
C. Concrete gutter with asphalt pavement:	
1. Smooth	0.013
2. Rough	0.015
D. Concrete pavement:	
1. Float finish	0.014
2. Broom finish	0.016
E. For gutters with small slope, where sediment may accumulate, increase above values of *n* by	*0.002*
VI. Natural stream channels: [8]	
A. Minor streams [9] (surface width at flood stage less than 100 ft.):	
1. Fairly regular section:	
a. Some grass and weeds, little or no brush	0.030–0.035
b. Dense growth of weeds, depth of flow materially greater than weed height	0.035–0.05
c. Some weeds, light brush on banks	0.035–0.05
d. Some weeds, heavy brush on banks	0.05–0.07
e. Some weeds, dense willows on banks	0.06–0.08
f. For trees within channel, with branches submerged at high stage, increase all above values by	*0.01–0.02*
2. Irregular sections, with pools, slight channel meander; increase values given in 1a-e about	*0.01–0.02*
3. Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stage:	
a. Bottom of gravel, cobbles, and few boulders	0.04–0.05
b. Bottom of cobbles, with large boulders	0.05–0.07
B. Flood plains (adjacent to natural streams):	
1. Pasture, no brush:	
a. Short grass	0.030–0.035
b. High grass	0.035–0.05
2. Cultivated areas:	
a. No crop	0.03–0.04
b. Mature row crops	0.035–0.045
c. Mature field crops	0.04–0.05
3. Heavy weeds, scattered brush	0.05–0.07
4. Light brush and trees: [10]	
a. Winter	0.05–0.06
b. Summer	0.06–0.08
5. Medium to dense brush: [10]	
a. Winter	0.07–0.11
b. Summer	0.10–0.16
6. Dense willows, summer, not bent over by current	0.15–0.20
7. Cleared land with tree stumps, 100–150 per acre:	
a. No sprouts	0.04–0.05
b. With heavy growth of sprouts	0.06–0.08
8. Heavy stand of timber, a few down trees, little undergrowth:	
a. Flood depth below branches	0.10–0.12
b. Flood depth reaches branches	0.12–0.16
C. Major streams (surface width at flood stage more than 100 ft.): Roughness coefficient is usually less than for minor streams of similar description on account of less effective resistance offered by irregular banks or vegetation on banks. Values of *n* may be somewhat reduced. Follow recommendation in publication cited [9] if possible. The value of *n* for larger streams of most regular section, with no boulders or brush, may be in the range of	0.028–0.033

EXHIBIT 16.0

TYPICAL MANNING "n" VALUES | TABLE "F-1a"

NOTE: THIS IS A REPRODUCTION OF TABLE 3 IN HEC-15.

Lining Category	Lining Type	n - value: Flow Depth Ranges 0-0.5 ft	0.5-2.0 ft	>2.0 ft
Rigid	Concrete	0.015	0.013	0.013
	Grouted Riprap	0.040	0.030	0.028
	Stone Masonry	0.042	0.032	0.030
	Soil Cement	0.025	0.022	0.020
	Asphalt	0.018	0.016	0.016
Unlined	Bare Soil	0.023	0.020	0.020
	Rock Cut	0.045	0.035	0.025
Temporary*	Woven Paper Net	0.016	0.015	0.015
	Jute Net	0.028	0.022	0.019
	Fiberglass Roving	0.028	0.021	0.019
	Straw with Net	0.065	0.033	0.025
	Curled Wood Mat	0.066	0.035	0.028
	Synthetic Mat	0.036	0.025	0.021
Gravel Riprap	1-inch D_{50}	0.044	0.033	0.030
	2-inch D_{50}	0.066	0.041	0.034
Rock Riprap	6-inch D_{50}	0.104	0.069	0.035
	12-inch D_{50}	--	0.078	0.040

EXHIBIT 17.0

TYPICAL MANNING "n" VALUES	TABLE "F-1c"

STREET CARRING CAPACITY (2 YEAR)

PROJECT: **COUNTRY CROSSING FILINGS 1 & 2**
LOCATION: CITY OF GRAND JUNCTION, COLORADO
DATE: Jan-95

Street Information:				
	R.O.W. Width =	44.00	FT.	Flow Area = 3.76 SF.
	Flowline Width =	31.00	FT.	
	Classification =	URBAN		
	Mannings =	0.015		
	Max. Depth =	0.42	FT.	Above Gutter Flowline
	Str/ X-Slope =	1.00	%	
	Gutter Slope =	8.33	%	Drive Over Curb, Gutter and Walk
	Sidewalk Slope =	2.08	%	1/4" / FT.
	Roadside Slope =	2.08	%	1/4" / FT.

SLOPE OF STREET %	REDUCTION FACTOR FOR SLOPE	ALLOWABLE CAPACITY C.F.S.	VELOCITY F.P.S.
0.50	0.80	7.78	2.07
0.59	0.80	8.45	2.25
0.60	0.80	8.52	2.27
0.73	0.80	9.40	2.50
0.81	0.80	9.90	2.63
0.88	0.80	10.32	2.74
1.29	0.80	12.49	3.32

Formula: $Qa = F \times (1.49/N) \times R^{2/3} \times S^{1/2} \times A$

F = Reduction Factor For Slope		
N = Mannings Coefficient =	0.0150	
R = Hydraulic Radius = A/WP =	0.2234	
A = Cross Sectional Area Sq.Ft. =		3.760
WP = Wetted Perimeter Ft. =	16.83	
S = Street Slope FT./FT.		

EXHIBIT 18.0

STREET CARRING CAPACITY (100 YEAR)

PROJECT: COUNTRY CROSSING FILINGS 1 & 2
LOCATION: CITY OF GRAND JUNCTION, COLORADO
DATE: Jan-95

Street Information:					
	R.O.W. Width =	44.00	FT.	Flow Area =	15.49 SF.
	Flowline Width =	31.00	FT.		
	Classification =	URBAN			
	Mannings =	0.015			
	Max. Depth =	1.00	FT.	Above Gutter Flowline	
	Str/ X-Slope =	1.00	%		
	Gutter Slope =	8.33	%	Drive Over Curb, Gutter and Walk	
	Sidewalk Slope =	2.08	%	1/4" / FT.	
	Roadside Slope =	2.08	%	1/4" / FT.	

SLOPE OF STREET %	REDUCTION FACTOR FOR SLOPE	ALLOWABLE CAPACITY C.F.S.	VELOCITY F.P.S.
0.50	0.80	69.08	4.46
0.59	0.80	75.03	4.84
0.60	0.80	75.67	4.88
0.73	0.80	83.46	5.39
0.81	0.80	87.92	5.68
0.88	0.80	91.64	5.92
1.29	0.80	110.95	7.16

Formula: $Qa = F \times (1.49/N) \times R^{2/3} \times S^{1/2} \times A$

F = Reduction Factor For Slope
N = Mannings Coefficient = 0.0150
R = Hydraulic Radius = A/WP = 0.7070
A = Cross Sectional Area Sq.Ft. = 15.490
WP = Wetted Perimeter Ft. = 21.91
S = Street Slope FT./FT.

EXHIBIT 19.0

Triangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: 4' V-PAN

Comment: 4-FOOT CONCRETE V-PAN TO DESIGN POINT 4

Solve For Discharge

Given Input Data:

Left Side Slope..	12.00:1 (H:V)
Right Side Slope.	12.00:1 (H:V)
Manning's n.....	0.013
Channel Slope....	0.0038 ft/ft
Depth.....	0.17 ft

Computed Results:

Discharge.....	0.45 cfs
Velocity.....	1.34 fps — USE FOR TC CALCS.
Flow Area.....	0.33 sf
Flow Top Width...	4.00 ft
Wetted Perimeter.	4.01 ft
Critical Depth...	0.15 ft
Critical Slope...	0.0058 ft/ft
Froude Number....	0.82 (flow is Subcritical)

EXHIBIT 20.0

'50 YEAR

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: STORM SEWER LINE A

Comment: STORM SEWER LINE A INLET #2 TO INLET #1

Solve For Full Flow Capacity

Given Input Data:

Diameter.....	1.00 ft
Slope.....	0.0127 ft/ft
Manning's n.....	0.013 RCP
Discharge.....	4.02 cfs

Computed Results:

Full Flow Capacity.....	4.02 cfs
Full Flow Depth.....	1.00 ft
Velocity.....	5.11 fps
Flow Area.....	0.79 sf
Critical Depth.....	0.85 ft
Critical Slope.....	0.0120 ft/ft
Percent Full.....	100.00 %
Full Capacity.....	4.02 cfs
QMAX @.94D.....	4.32 cfs
Froude Number.....	FULL

$Q_{100} = 5.05$ CFS

$-$ 4.02 CFS

1.03 CFS OVER TOPS CROWN AND IS INTERCEPTED BY INLET #1

Open Channel Flow Module, Version 3.16 (c) 1990
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

EXHIBIT 21.0

100 YEAR

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: STORM SEWER LINE A

Comment: STORM SEWER LINE A INLET #1 TO OUTLET

Solve For Full Flow Capacity

Given Input Data:

Diameter.....	1.50 ft
Slope.....	0.0099 ft/ft
Manning's n.....	0.013 RCP
Discharge.....	10.45 cfs

Computed Results:

Full Flow Capacity.....	10.45 cfs
Full Flow Depth.....	1.50 ft
Velocity.....	5.91 fps
Flow Area.....	1.77 sf
Critical Depth.....	1.24 ft
Critical Slope.....	0.0097 ft/ft
Percent Full.....	100.00 %
Full Capacity.....	10.45 cfs
QMAX @.94D.....	11.24 cfs
Froude Number.....	FULL

Q_{100} = 14.77 CFS

(-) 10.45 CFS

4.32 CFS OVERTOPS BACK OF WALK AND CONTINUES ALONG OUTFALL CHANNEL.

Open Channel Flow Module, Version 3.16 (c) 1990
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

EXHIBIT 22.0

100 YEAR

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: STORM SEWER LINE B

Comment: STORM SEWER LINE "B" INLET #3 TO INLET #1

Solve For Actual Depth

Given Input Data:

Diameter.....	1.50 ft
Slope.....	0.0099 ft/ft
Manning's n.....	0.013 RCP
Discharge.....	8.90 cfs — 100 YEAR

Computed Results:

Depth.....	1.06 ft
Velocity.....	6.64 fps
Flow Area.....	1.34 sf
Critical Depth....	1.15 ft
Critical Slope....	0.0081 ft/ft
Percent Full.....	70.92 %
Full Capacity.....	10.45 cfs — CAPACITY OK
QMAX @.94D.....	11.24 cfs
Froude Number.....	1.18 (flow is Supercritical)

EXHIBIT 23.0

2 YEAR

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: STORM SEWER LINE C

Comment: STORM SEWER LINE "C" DESIGN POINT 1 TO 4

Solve For Actual Depth

Given Input Data:

Diameter.....	2.00 ft
Slope.....	0.0035 ft/ft
Manning's n.....	0.013 RCP
Discharge.....	3.35 cfs - 2 YEAR

Computed Results:

Depth.....	0.68 ft
Velocity.....	3.54 fps — USE FOR T_C CALCS.
Flow Area.....	0.95 sf
Critical Depth....	0.64 ft
Critical Slope....	0.0045 ft/ft
Percent Full.....	34.10 %
Full Capacity.....	13.38 cfs
QMAX @.94D.....	14.40 cfs
Froude Number.....	0.88 (flow is Subcritical)

EXHIBIT 24.0

Circular Channel Analysis & Design
Solved with Manning's Equation

100 YEAR

Open Channel - Uniform flow

Worksheet Name: STORM SEWER LINE C

Comment: STORM SEWER LINE "C" DESIGN POINT 1 TO 4

Solve For Actual Depth

Given Input Data:

Diameter.....	2.00 ft
Slope.....	0.0035 ft/ft
Manning's n.....	0.013 RCP
Discharge.....	10.54 cfs - 100 YEAR

Computed Results:

Depth.....	1.34 ft
Velocity.....	4.72 fps
Flow Area.....	2.23 sf
Critical Depth....	1.16 ft
Critical Slope....	0.0053 ft/ft
Percent Full.....	66.89 %
Full Capacity.....	13.38 cfs
QMAX @.94D.....	14.40 cfs
Froude Number.....	0.76 (flow is Subcritical)

EXHIBIT 25.0

100 YEAR

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: STORM SEWER LINE C

Comment: STORM SEWER LINE "C" DES. POINT 4 TO OUTFALL

Solve For Actual Depth

Given Input Data:

Diameter.....	2.00 ft	
Slope.....	0.0057 ft/ft	— MIN SLOPE
Manning's n.....	0.013	RCP
Discharge.....	16.03 cfs	— 100 YEAR

Computed Results:

Depth.....	1.54 ft	
Velocity.....	6.18 fps	
Flow Area.....	2.59 sf	
Critical Depth....	1.44 ft	
Critical Slope....	0.0066 ft/ft	
Percent Full.....	76.94 %	
Full Capacity.....	17.08 cfs	— CAPACITY OK
QMAX @.94D.....	18.37 cfs	
Froude Number.....	0.88 (flow is Subcritical)	

INLET CONTROL Q_C = 28.30 CFS
OK

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EXHIBIT 26.0

Cc ITRY Crossing 1 and 2

LINE "C" 24 RCP

HW/D = 3.97/2.0

= 1.99

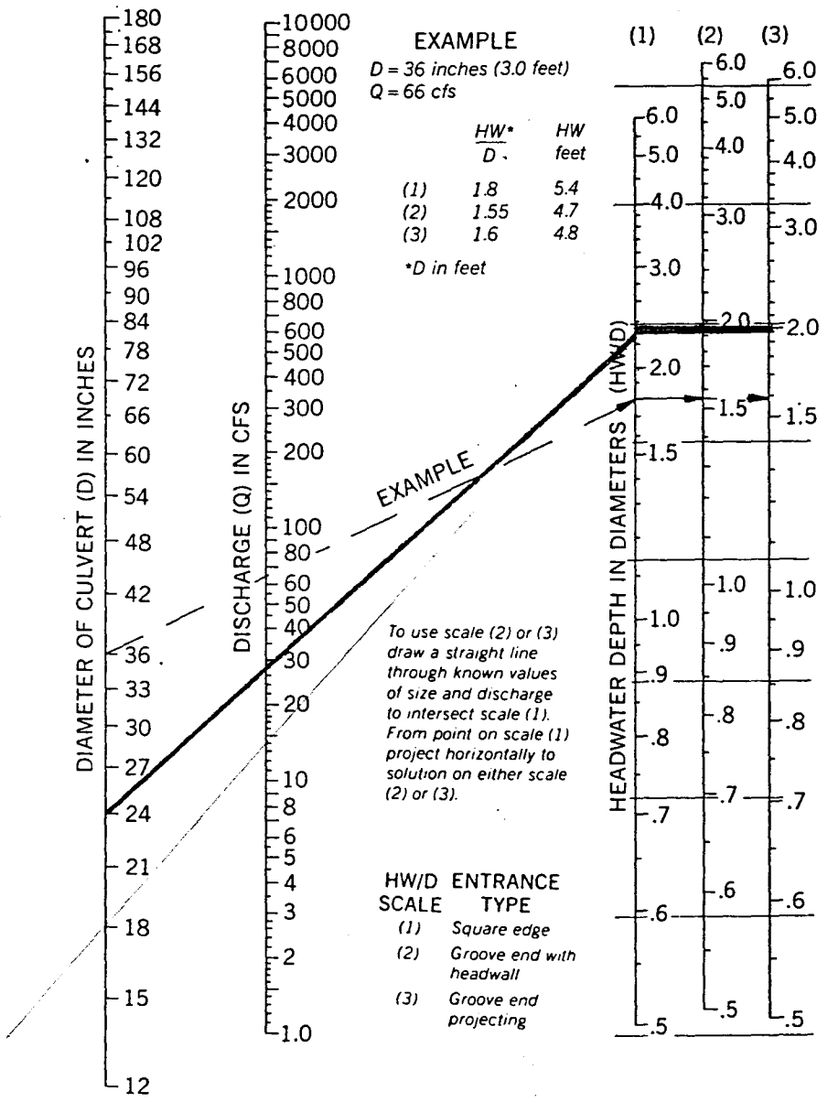
Qc = 28.30 CFS

Q100 = 16.03 CFS

OK

FIGURE 33

HEADWATER DEPTH FOR CIRCULAR CONCRETE PIPE CULVERTS WITH INLET CONTROL



BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER SCALES 2&3
REVISED MAY 1964

EXHIBIT 27.0

100 YEAR

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: STORM SEWER LINE D

Comment: STORM SEWER LINE "D" TO MH "C1"

Solve For Actual Depth

Given Input Data:

Diameter.....	1.50 ft
Slope.....	0.0055 ft/ft
Manning's n.....	0.013 RCP
Discharge.....	6.96 cfs - 100 YEAR

Computed Results:

Depth.....	1.11 ft
Velocity.....	4.98 fps
Flow Area.....	1.40 sf
Critical Depth....	1.02 ft
Critical Slope....	0.0067 ft/ft
Percent Full.....	73.71 %
Full Capacity.....	7.79 cfs - CAPACITY OK
QMAX @.94D.....	8.38 cfs
Froude Number.....	0.85 (flow is Subcritical)

EXHIBIT 28.0

100 YEAR

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: STORM SEWER LINE E

Comment: STORM SEWER LINE "E" INLET TO V-PAN

Solve For Actual Depth

Given Input Data:

Diameter.....	1.00 ft
Slope.....	0.0050 ft/ft
Manning's n.....	0.010 PVC
Discharge.....	3.22 cfs — 100 YEAR

Computed Results:

Depth.....	0.80 ft
Velocity.....	4.75 fps
Flow Area.....	0.68 sf
Critical Depth....	0.77 ft
Critical Slope....	0.0055 ft/ft
Percent Full.....	80.48 %
Full Capacity.....	3.28 cfs — CAPACITY OK
QMAX @.94D.....	3.52 cfs
Froude Number.....	0.91 (flow is Subcritical)

EXHIBIT 29.0

100 YEAR

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: STORM SEWER LINE F

Comment: FUTURE STORM SEWER LINE "F"

Solve For Actual Depth

Given Input Data:

Diameter.....	1.00 ft
Slope.....	0.0050 ft/ft
Manning's n.....	0.010
Discharge.....	3.14 cfs — 100 YEAR

Computed Results:

Depth.....	0.78 ft
Velocity.....	4.75 fps
Flow Area.....	0.66 sf
Critical Depth....	0.76 ft
Critical Slope....	0.0054 ft/ft
Percent Full.....	78.49 %
Full Capacity.....	3.28 cfs — CAPACITY OK
QMAX @.94D.....	3.52 cfs
Froude Number.....	0.93 (flow is Subcritical)

EXHIBIT 30.0

100 YEAR

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: OUTFALL CHANNEL

Comment: INTERIM OUTFALL CHANNEL TO LEACH CREEK

Solve For Depth

Given Input Data:

Bottom Width.....	3.00 ft
Left Side Slope..	1.50:1 (H:V)
Right Side Slope.	1.50:1 (H:V)
Manning's n.....	0.035 - UNIMPROVED BARE EARTH
Channel Slope....	0.0020 ft/ft
Discharge.....	30.80 cfs 2 SUM OF FLOW FROM STORM SEWERS

Computed Results:

Depth.....	2.20 ft
Velocity.....	2.22 fps
Flow Area.....	13.85 sf
Flow Top Width...	9.60 ft
Wetted Perimeter.	10.93 ft
Critical Depth...	1.21 ft
Critical Slope...	0.0215 ft/ft
Froude Number....	0.33 (flow is Subcritical)

OK < 0.80

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EXHIBIT 31.0

COUNTRY CROSSING 1 AND 2

ROAD TYPE	COMBINATION INLET CAPACITY (CFS)					
	SINGLE		DOUBLE		TRIPLE	
	2-YR	100-YR	2-YR	100-YR	2-YR	100-YR
Urban Residential (local)	6.4	13	9.5	22	12.7	31
Residential Collector, Commercial and Industrial Streets	3.2	13	4.9	22	6.5	31
Collector Streets (3000 - 8000 ADT)	2.7	13	4.0	22	5.3	31
Principal and Minor Arterials	6.0	13	9.0	22	12.0	31

Inlet capacities shown above are based upon: 1) use of non-curved vane grates (similar to HEC-12 P-1 7/8-4 grates; 2) HEC-12 procedures; 3) clogging factors per Section VI; and 4) City/County standard inlets with 2-inch radius on curb face and type C grates. Capacities shown for 2-year storms are based upon depths allowed by maximum street inundation per Figure "G-3". The 100-year capacities are based upon a ponded depth of 1.0 foot. Note that only combination inlets are allowed in sag or sump conditions.

MAXIMUM INLET CAPACITIES: SUMP OR SAG CONDITION — **TABLE "G-1"**

INLET #1 Q_{100} = 1.50 CFS

INLET #2 Q_{100} = 5.05 CFS

INLET #3 Q_{100} = 8.90 CFS

USE SINGLE COMBINATION INLETS.

EXHIBIT 32.0

GEO TESTING
Geotechnical Engineering and Materials Testing
LABORATORIES, INC.

Drawings should be in accordance with City or County

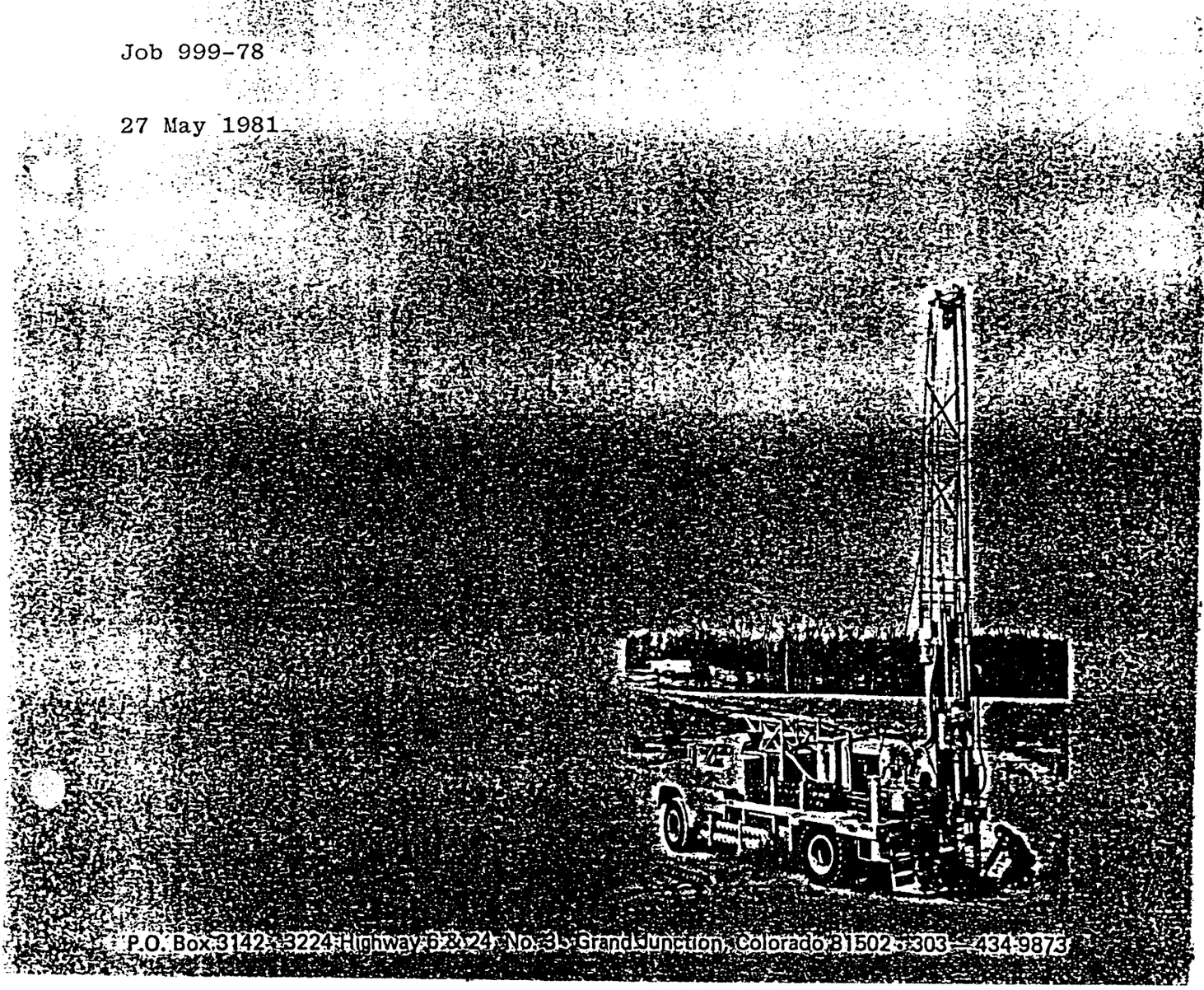
PH Management
P.O. Box 363
Grand Junction, Colorado 81502

Preliminary Geotechnical report for Planned Multi-family residence

Attention: Ken Shrum

Job 999-78

27 May 1981



P.O. Box 3142 · 3224 Highway 6 & 24 · No. 3 · Grand Junction, Colorado 81502 · 303 — 434-9873

GEO TESTING
Geotechnical Engineering and Materials Testing
LABORATORIES, INC.

27 May 1981

PH Management
P.O. Box 363
Grand Junction, Colorado 81502

Attention: Ken Shrum

Re: Preliminary Geotechnical report for planned Multi-family Residences; Job 999-78.

Gentlemen:

We have completed our preliminary geotechnical studies of the proposed Multi-family housing. Data from our field and laboratory studies, along with our preliminary analyses and recommended design criteria have been summarized and are presented in the attached report. If you have any questions, please call.

Yours truly,

GEO TESTING LABORATORIES, INC.

Stephen G. Rice

Stephen G. Rice
Secretary/Treasurer

SGR/dldl

P.O. Box 3142 • 3224 Highway 6 & 24, No. 3 • Grand Junction, Colorado 81502 • 303 — 434-9873

TABLE OF CONTENTS

INTRODUCTION

We made this preliminary study to assist in determining the best types and depths of foundations for the structures and design criteria for them. Data from our field and laboratory work are summarized on Figures #1 through 5, attached.

PROPOSED CONSTRUCTION

We understand the proposed structures planned at this time will be 2 story wood frame multi-family units and will consist of approximately 24 units per structure.

For the purpose of our analyses, we assumed maximum column loads on the order of 15 Kips and wall loads of 2½ Kips/Ft.

If final designs vary from these assumptions, we should be advised to permit re-evaluation of our recommendations and conclusions.

SITE CONDITIONS

The site contains 48 acres on the southeast corner of G Road and 25 Road. Grand Valley Canal runs along the east property line and Leach Creek borders along the north property line. At the time of our observations water was present in both locations.

The site was abandoned pasture consisting of grasses and weeds. Drainage was generally towards 25 Road to the west and southwest, however the northwest corner of the property, water has been known to "pond" at times during high periods of seasonal irrigation or runoff.

There are farm houses adjacent to the property, on both G Road and 25 Road. Most are wood frame single story and 2 story with no basements. No apparent damage to the foundation systems was noted.

No bodies of water or bedrock outcroppings were observed on the site.

SUB SOILS

Our test holes showed about 54.0 to as much as 70 feet of medium dense silts, soft silts, clays and medium dense clays overlying dense sands, gravels and cobbles which were encountered in test holes 1,3,6,8,11,13,14,16 and 18.

Groundwater was encountered in test holes 1,7,11,13,14,16 and 18 ranging in depth from 8.0 feet to 15.0 feet, caving had occurred in all test holes drilled. Due to the groundwater conditions we do not suggest basement type construction.

FOUNDATIONS

We have considered one type of foundation for the proposed buildings. Founding the building with spread footings on the natural upper silts involves a "normal" risk of foundation movement. Founding the building with driven piling would reduce the risk of foundation movement, however due to the depths of gravel encountered it would not be economical for the proposed structures to bear on piles. We believe considering safety, economy, and the ever present risk of movement involved in any type of foundation, spread footings on the natural silts would be the most practical. The preliminary foundation criteria included herein is for spread footings only. However, should you decide upon a lower risk alternative, such as driven piling, we would be happy to discuss the criteria for them with you.

Spread footings placed below frost depth of about 3.0 feet should be designed for a maximum soil bearing pressure of 1000 PSF.

FLOOR SLABS

We believe the most practical type of floor used in conjunction with spread footing foundations would be a floating slab-on-grade.

For slab-on-grade construction, we suggest the following:

1. Place a minimum of 4" of gravel beneath the compacted to a minimum of 70% relative density (ASTM D-2049) or 95% of Proctor density (ASTM D-698) whichever applies to the chosen material.

2. Provide moderate slab reinforcement and carry the reinforcement through the interior slab joints, but not to foundation walls or load bearing walls.

3. Omit under slab plumbing. Where such plumbing is unavoidable, pressure test it during construction to minimize the possibility of leaks that result in foundation wetting. Utility trenches should be compacted to a minimum of 95% maximum dry density as determined by ASTM D-698.

WETTING OF FOUNDATION SOILS

Wetting of foundation soils always causes some degree of volume change in the soils and should be prevented during and after construction. Methods of doing this include compaction of "impervious" backfill around the structure, provision of an adequate grade for rapid runoff of surface water away from the structure, and discharge of roof downspouts and other water collection systems well beyond the limits of the backfill.

GENERAL INFORMATION

Our exploratory test holes were spaced as closely as feasible in order to obtain a preliminary comprehensive picture of the sub soil conditions; however, erratic soil conditions may occur between test holes. When more design information is known it is advisable that we be notified to perform a more detailed analysis of the

soils encountered. This preliminary report is not intended to be used for design purposes.

GEO TESTING LABORATORIES, INC.

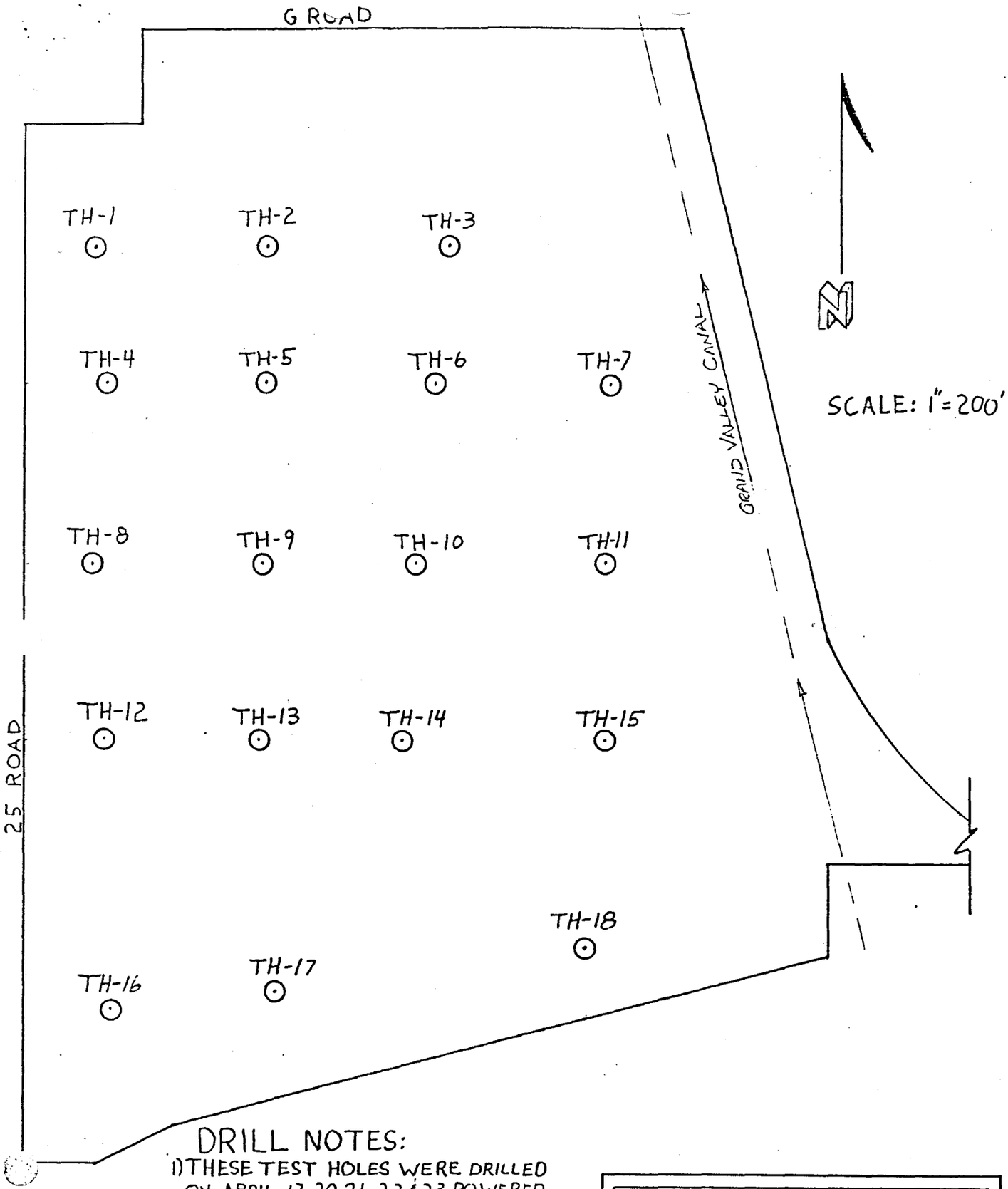
Stephen G. Rice

Drafted by:
Stephen G. Rice
Secretary/Treasurer

Andrew A. Porter

Reviewed by:
Andrew A. Porter, P.E.
President

SGR/dldl



DRILL NOTES:

1) THESE TEST HOLES WERE DRILLED ON APRIL 17, 20, 21, 22 & 23 POWERED BY A CME-55 DRILL RIG WITH 4" SOLID AUGER.
2) THESE TEST HOLES WERE LOCATED BY PARAGON ENGINEERS.
3) THIS DRAWING WAS REDUCED FROM A PLAN BY PARAGON ENGINEERS

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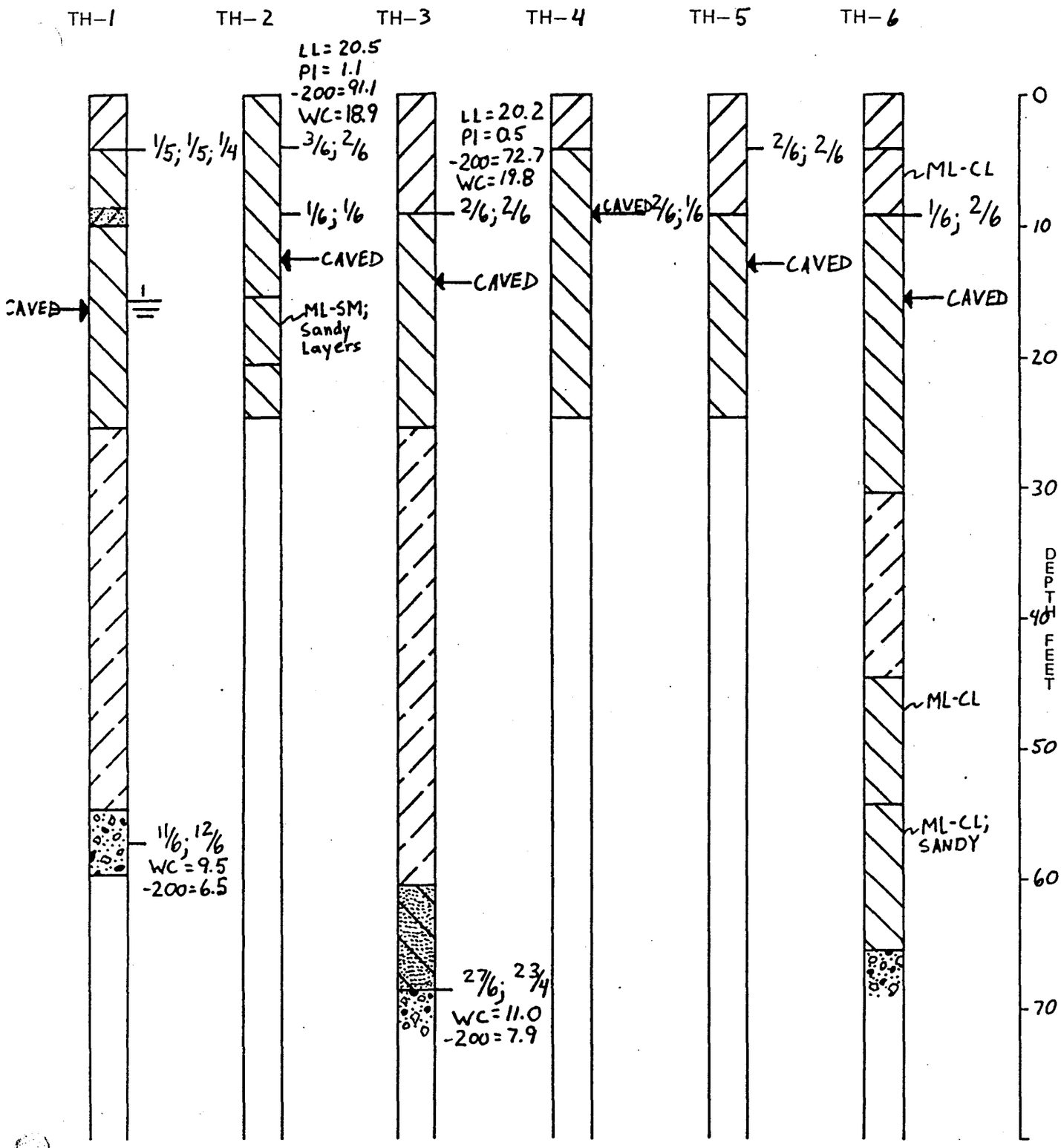
Geotechnical Engineering and Materials Testing

P-H MANAGEMENT JOB #999-78
LOCATION OF TEST HOLES

Fig. 1



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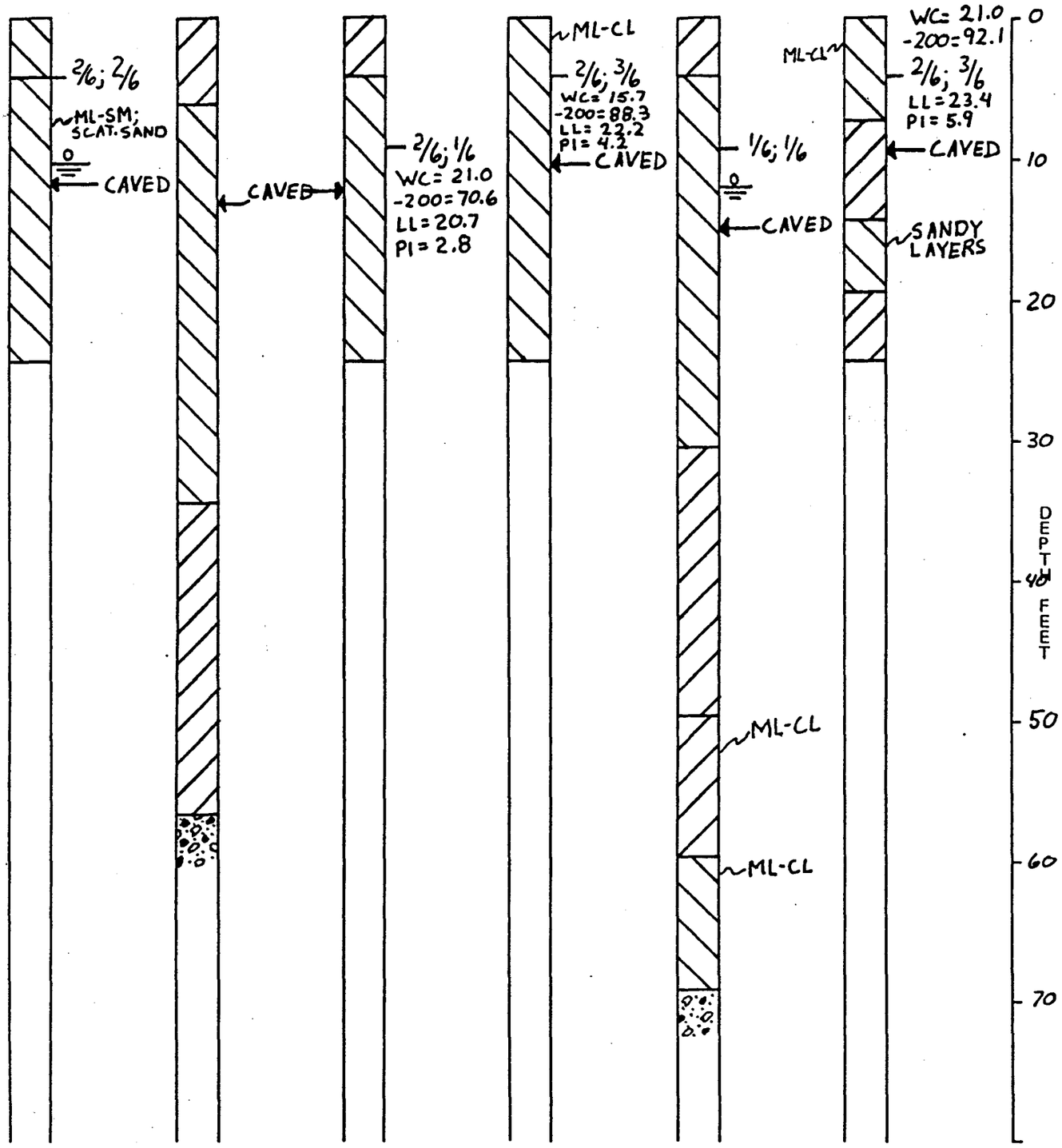
P-H MANAGEMENT JOB # 999-78
SUMMARY LOGS OF TESTS AND TEST HOLES

Fig. 2A



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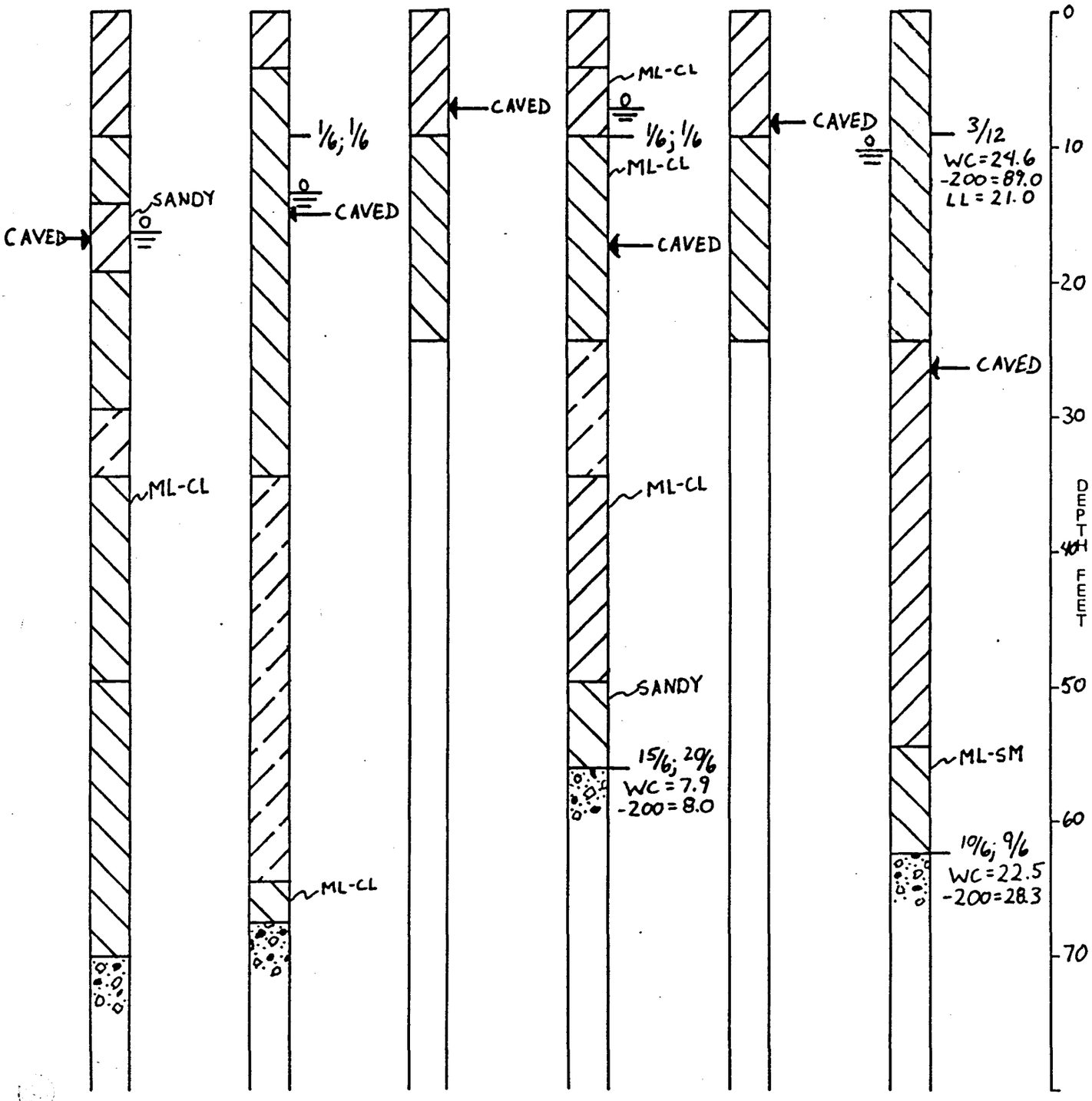
LABORATORIES, INC.
P-H MANAGEMENT JOB #999-78
SUMMARY LOGS OF TESTS AND TEST HOLES

Fig. 2B



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LABORATORIES, INC.
RH MANAGEMENT JOB # 999-78
SUMMARY LOGS OF TESTS AND TEST HOLES

Fig. 2C

CL, CL-CH, CH
CLAY, medium stiff to very stiff

CL, CL-CH, CH
CLAY, soft to very soft

SP, SW, SP-SW, SP-SC, SP-SM, SW-SC, SW-SM
SAND, medium to very dense, clean to slightly dirty

SP, SW, SP-SW, SP-SC, SP-SM, SW-SC, SW-SM
SAND, loose to medium dense, clean to slightly dirty

SC, SC-SM
SAND, clayey, ~~loose~~ dense to ~~medium~~ very dense

SC, SC-SM
SAND, clayey loose to medium dense

ML, ML-CL
SILT, dense to very dense

ML, ML-CL
SILT, loose to medium dense

SM, SM-SC
SAND, silty, dense to very dense

SM, SM-SC
SAND, silty, loose to medium dense

GW-SW, GP-SP, GW, GP, SW-GW, SP-GP, GW-GC, GW-GM
GRAVEL and SAND, clean to slightly dirty, dense to very dense

GRAVEL and SAND, clean, loose to medium dense

GC-CL, GC
GRAVEL and SAND, very clayey, dense to very dense

GC-CL, GC
GRAVEL and SAND, very clayey, loose to medium dense

GM-ML
GRAVEL and SAND, very silty, dense to very dense

GM-ML
GRAVEL and SAND, very silty, loose to medium dense

CL-CH, CH, CL
CLAY (highly weathered claystone) or SHALE

SP, SM, SC, SW
SAND (highly weathered sandstone)

CLAYSTONE or SHALE firm to medium hard

SANDSTONE, firm to medium hard

SANDSTONE, CLAYSTONE, SHALE, or SILTSTONE, hard to very hard

CLAYSTONE, SHALE, or SILTSTONE, layered, firm to medium hard

SILTSTONE, firm to medium hard

CONCRETE or ASPHALT PAVING and BASECOURSE, etc.

TOPSOIL

FILL, man made, loose or unknown

FILL, man made, dense, controlled

GRANITE or similar hard competent rock

Gradual change in materials. Exact strata change not located.

Undisturbed sample taken by Shelby, Denison, Pitcher, etc.

Indicates practical Rig Refusal. More than one such symbol indicated depth in adjacent hole attempted at same location

Free water level and number of days after drilling that measurement was taken.

9/12 Indicated that 9 blows of a 140 pound hammer falling 30 inches were required to drive a 2-inch diameter sample 12 inches.

WC = Water content percent

DD = Dry density, PCF

UC = Unconfined compression strength, PSF

LL = Liquid limit, percent

PI = Plasticity index, percent

SS = Shear Stress, direct shear, torvane, etc. PSF

-200 = Percent passing number 200 sieve

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SUMMARY LOGS LEGEND
Fig. 3

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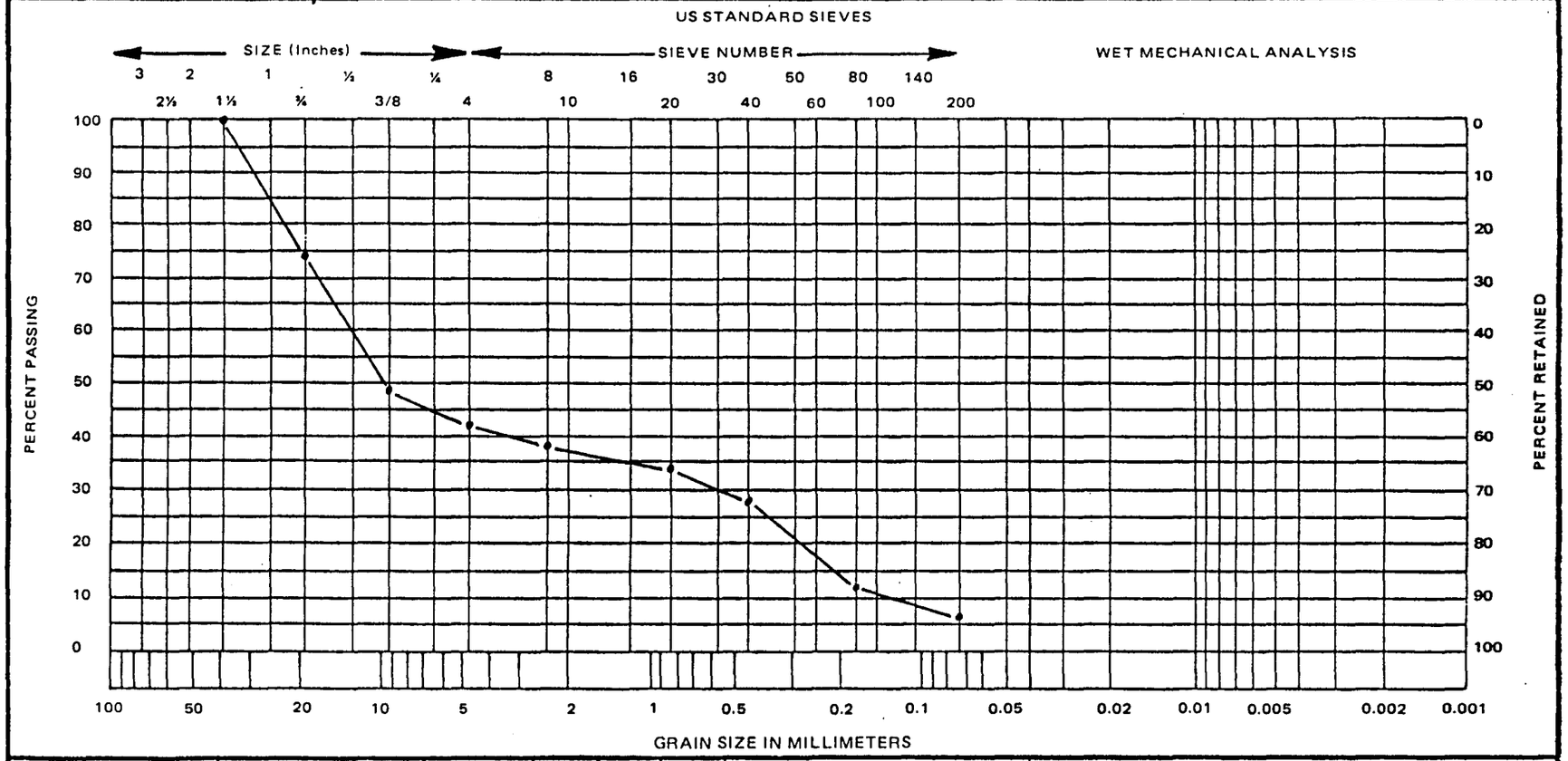
Geotechnical Engineering and Materials Testing

GRAIN SIZE DISTRIBUTION GRAPH AGGREGATE GRADING CHART

DATE: 4/28/81

PROJECT: P-H Management 999-78



EXCAVATION NUMBER	SAMPLE NUMBER	NATURAL % MOISTURE	W_L	W_P	I_P	CLASSIFICATION	REMARKS
1 @ 59'-0		9.5	—	—	—	GP-GM	Gravel - 57.7%, Sands - 35.9%, fines - 6.4%

TECHNICIAN (Signature): Conny Thelps

PLOTTED BY (Signature): Conny Thelps

CHECKED BY (Signature): C. Hester

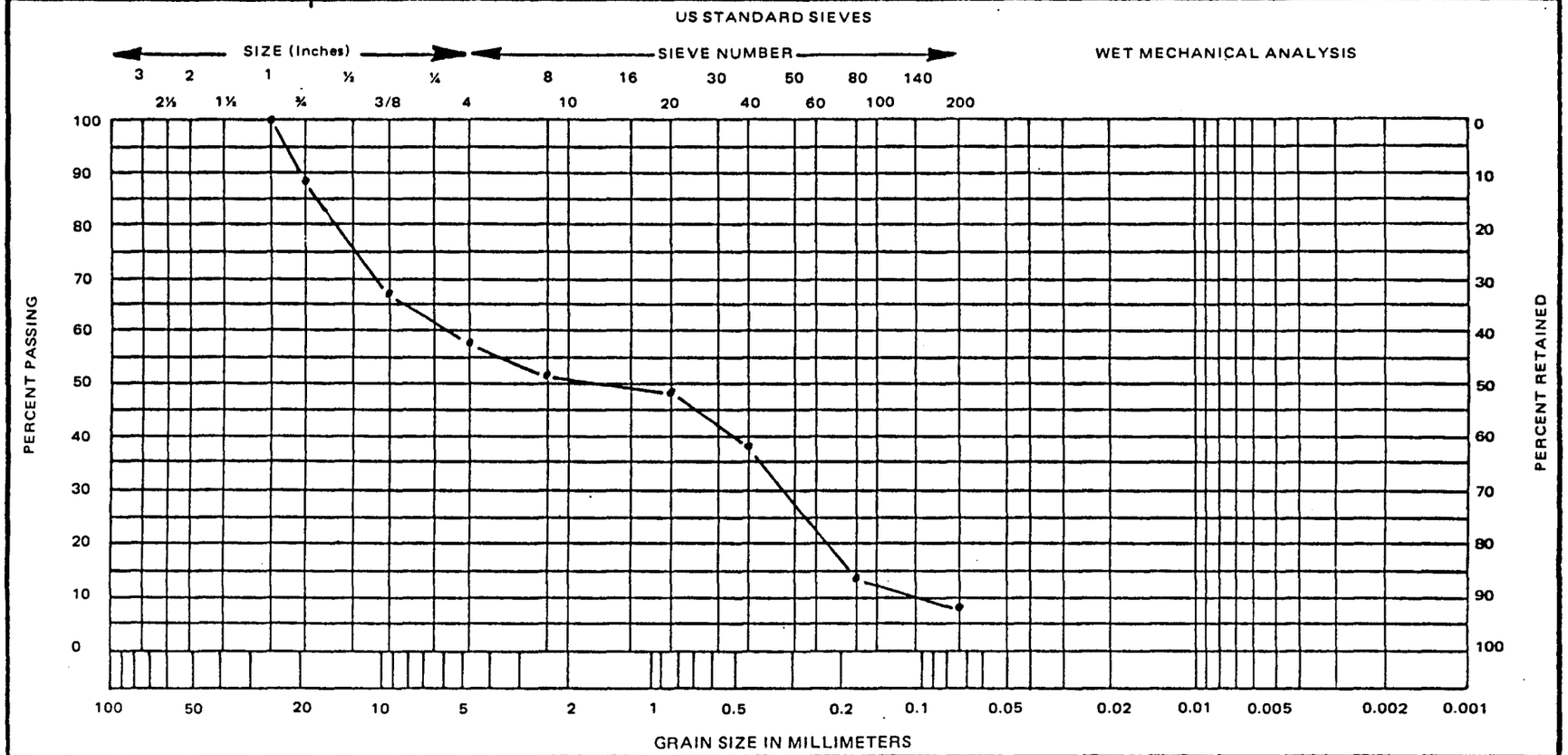
Fig. 4

GEO TESTING LABORATORIES, INC.
Geotechnical Engineering and Materials Testing

GRAIN SIZE DISTRIBUTION GRAPH AGGREGATE GRADING CHART

DATE: 4/28/81

PROJECT: P-H Management 999-78



EXCAVATION NUMBER	SAMPLE NUMBER	NATURAL % MOISTURE	W_L	W_P	I_P	CLASSIFICATION	REMARKS
3 @ 68'-0		11.0	—	—	—	SP-SM (gravelly)	Gravel - 42.4%, Sands -
							49.7%, Fines - 7.9%

TECHNICIAN (Signature): Lonny Thelps

PLOTTED BY (Signature): Lonny Thelps

CHECKED BY (Signature): [illegible]

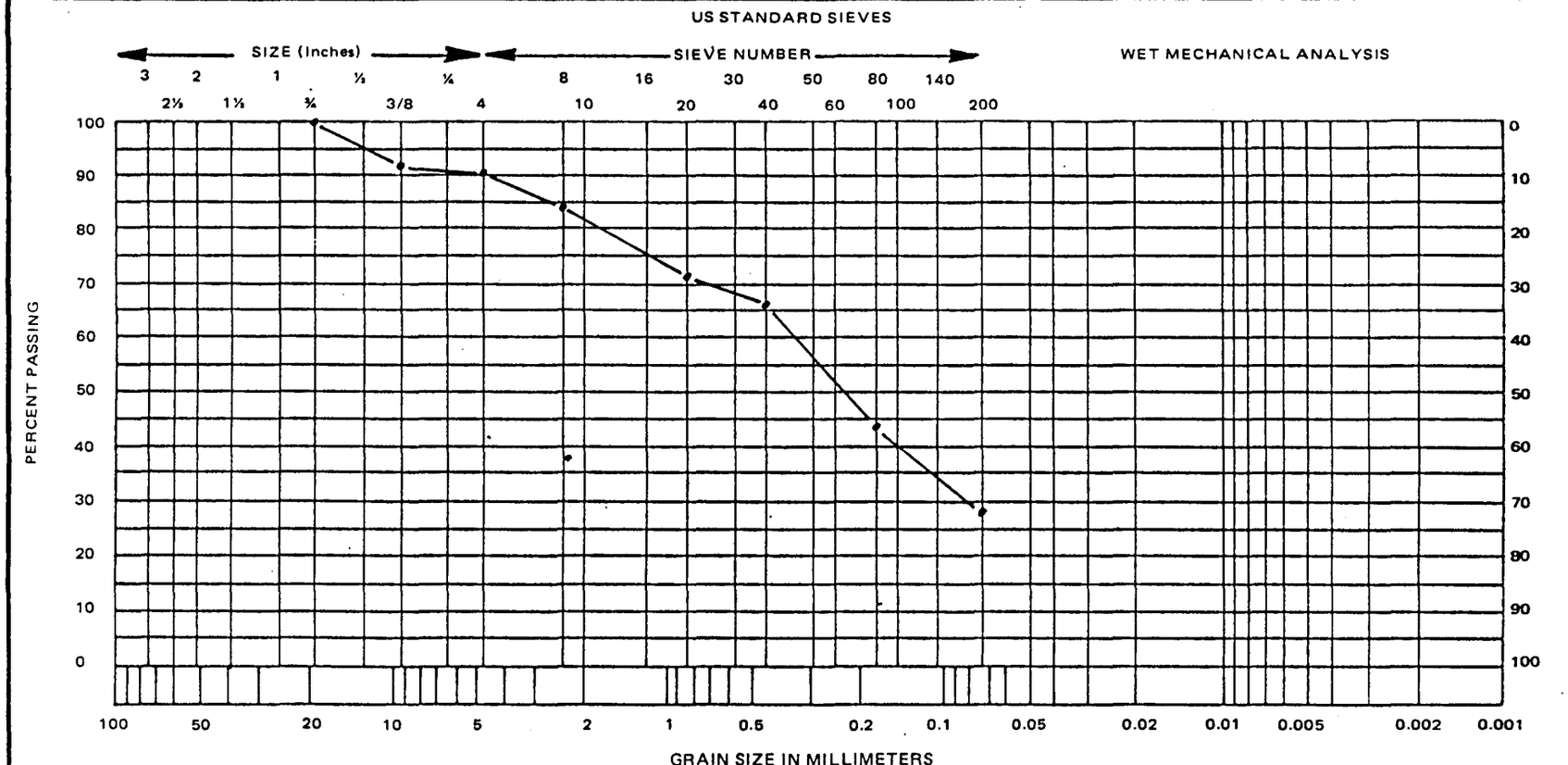
FIG. 5

GTL GEO TESTING LABORATORIES, INC. Geotechnical Engineering and Materials Testing

GRAIN SIZE DISTRIBUTION GRAPH AGGREGATE GRADING CHART

DATE: 4/28/81

PROJECT: P-H Management 999-78



EXCAVATION NUMBER	SAMPLE NUMBER	NATURAL % MOISTURE	W_L	W_P	I_P	CLASSIFICATION	REMARKS
18 @ 62'-0		22.5	—	—	—	SM	Gravel - 9.7%, Sands - 62.0%, Fines - 28.3%

TECHNICIAN (Signature): Lonny Thelps

PLOTTED BY (Signature): Lonny Thelps

CHECKED BY (Signature): A Hatter

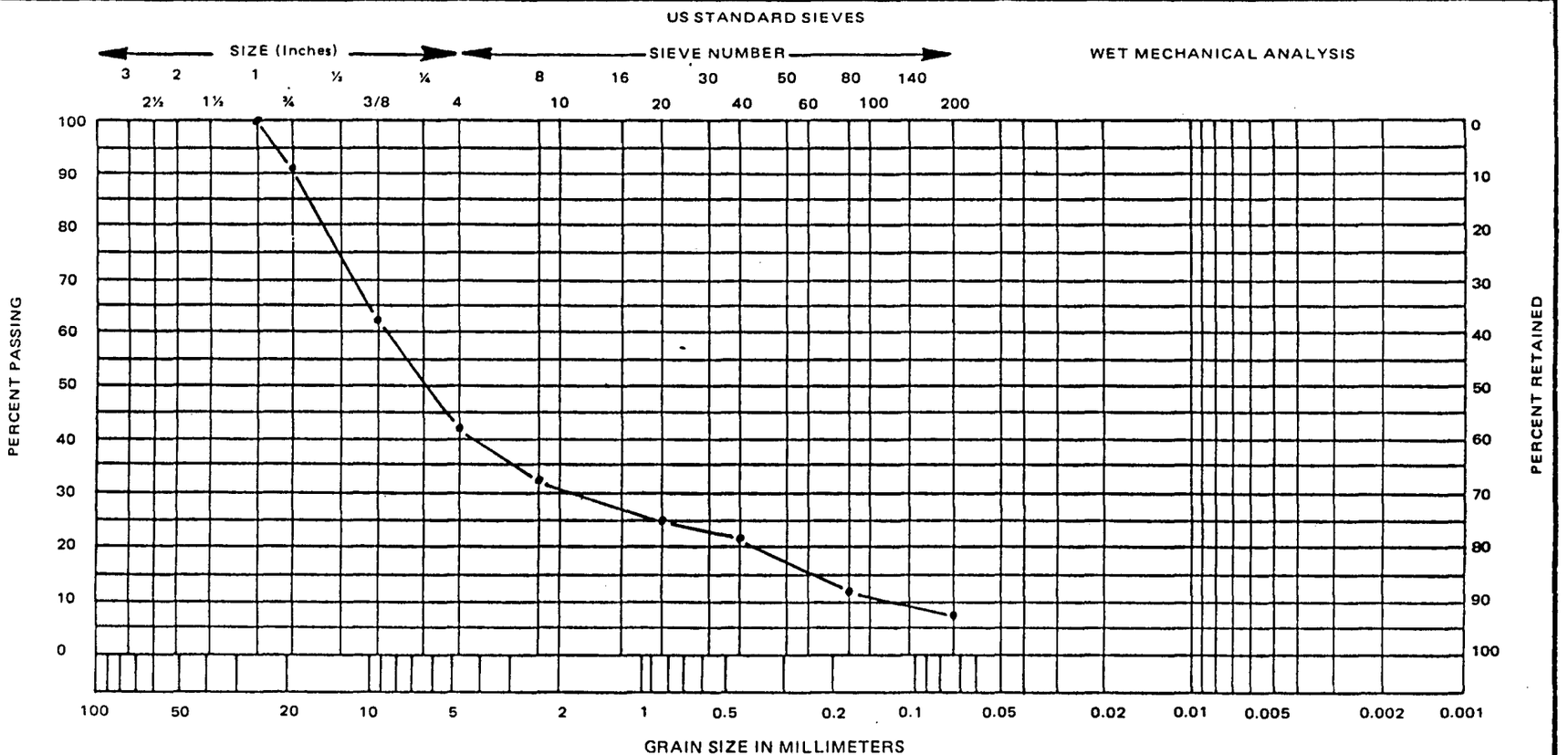
Fig. 7

GTL GEO TESTING LABORATORIES, INC. Geotechnical Engineering and Materials Testing

GRAIN SIZE DISTRIBUTION GRAPH AGGREGATE GRADING CHART

DATE: 4/28/81

PROJECT: P-H Management 999-78



EXCAVATION NUMBER	SAMPLE NUMBER	NATURAL % MOISTURE	W_L	W_P	I_P	CLASSIFICATION	REMARKS
16 @ 55.5'		7.9	—	—	—	GP-GM	Gravel - 56.4%, Sands - 35.6%, Fines - 8.0%

TECHNICIAN (Signature): Lonny Thelps

PLOTTED BY (Signature): Lonny Thelps

CHECKED BY (Signature): C Hoites

Fig. 6

Pavement Section Design

Persigo Village
25 Rd. & G Road
Grand Junction, CO

24 September 1982

WESTERN TECHNOLOGIES, INC.

Phoenix
3737 East Broadway Road
P.O. Box 21387
Phoenix, Arizona 85036
(602) 268-1381

Flagstaff
2400 East Huntington Drive
Flagstaff, Arizona 86001
(602) 774-8708

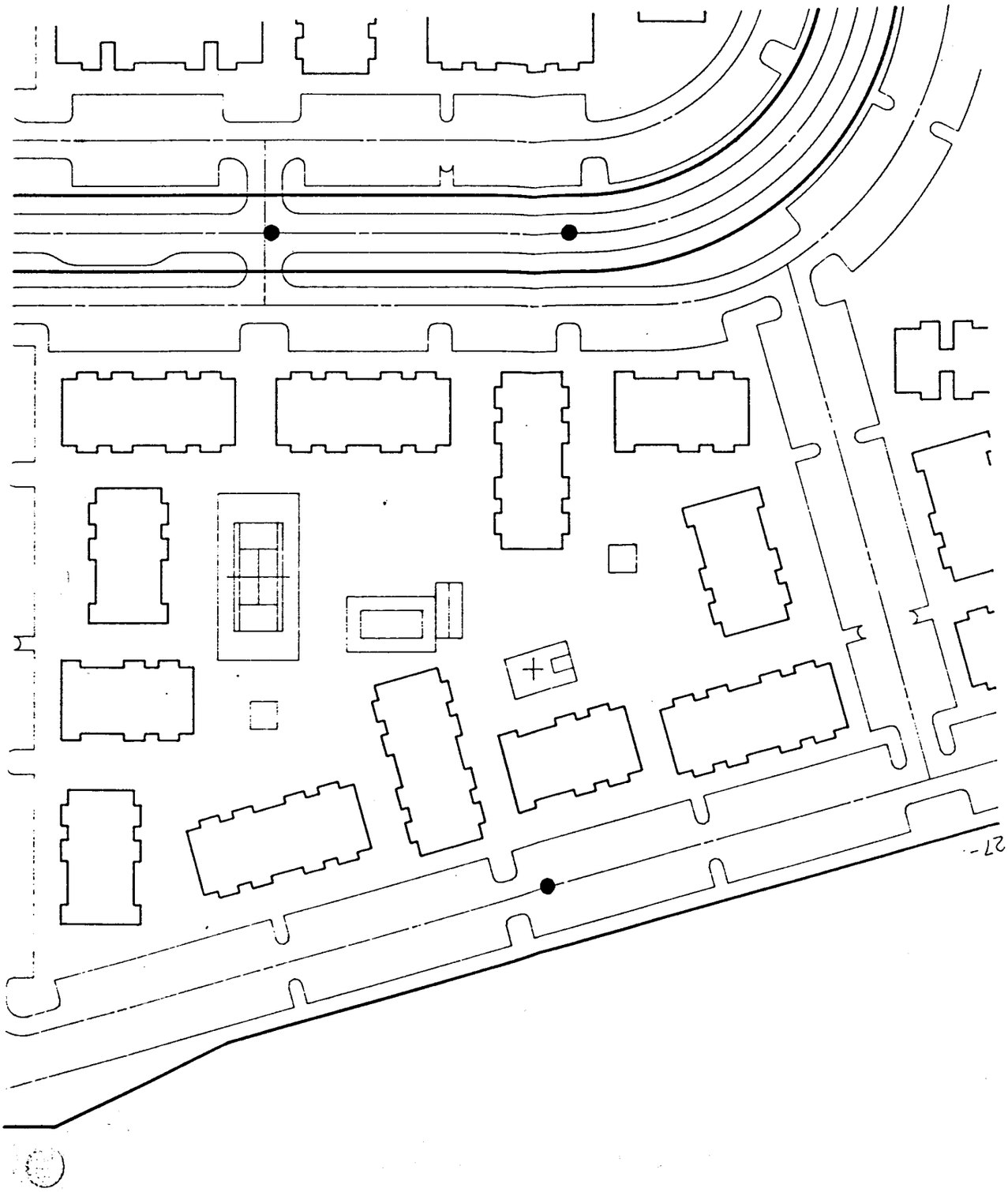
Tucson
423 South Olsen Avenue
Tucson, Arizona 85719
(602) 624-8894

Farmington
400 South Lorena
Farmington, New Mexico 87401
(505) 327-4966

Las Vegas
300 West Boston Avenue
Las Vegas, Nevada 89102
(702) 382-7483

Grand Junction
P.O. Box 177
3224 Highway 6 & 24, No. 3
Clifton, Colorado 81520
(303) 434-9873

G ROAD



Persigo Village
Job No. 6142J077

ALTERNATE PAVEMENT SECTIONS

Description		CBR	DIN	BCS	ABC	SBC	TOTAL
Residential Streets	A	4	40	8			8
(2650 trips/day)	B			3	10		13
	C			3	4	8	15
	D			3	14		17
	E			3	4	16	23
Parking Areas	A	4	8	6			6
(800 trips/day)	B			3	6		9
	C			3	4	3	10
	D			3	9		12
	E			3	4	7	14

CBR = California Bearing Ratio Value
DIN = Equivalent 18K Daily Traffic Number
BCS = Bituminous Concrete Surface
ABC = Aggregate Base Course
SBC = Subbase Course

A = Bituminous Concrete Pavement
B = Bituminous Concrete Pavement + Aggregate Base Course (Replacement Method)
C = Bituminous Concrete Pavement + Aggregate Base Course + Subbase Course (Replacement Method)
D = Bituminous Concrete Pavement + Aggregate Base Course (Colorado Highway Department Method)
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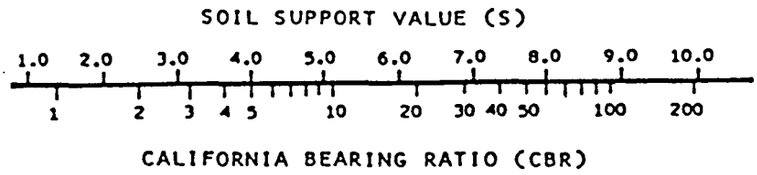


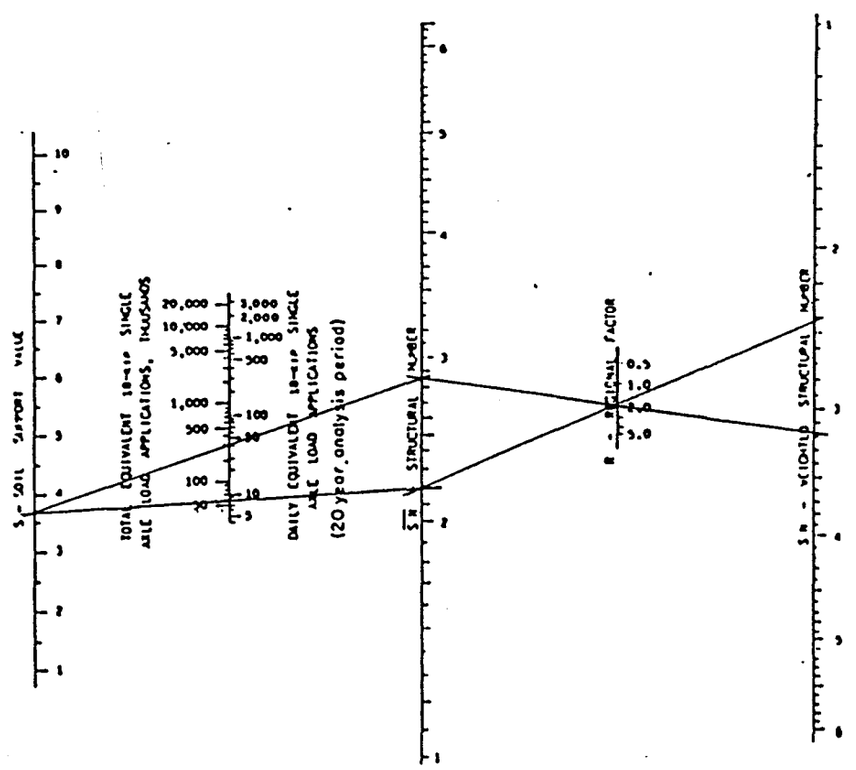


Figure II-2 Design Chart for Flexible Pavements, p_t = 2.0

WESTERN TECHNOLOGIES, INC.

P.O. Box 177
322 Highway 6 & 24, No. 3
Clifton, Colorado 81520
(303) 434-9873

Turner Collie & Braden, Inc.
P.O. Box 3944
Grand Junction, CO 81501

24 September 1982

Job No. 6142J077
Invoice No. 61420158

ATTENTION: Jim Langford

PROJECT: Persigo Village
25 Rd. & G Road
Grand Junction, CO

The following report presents the pavement section design on the roads within the above referenced project limits. The design was performed using the Asphalt Institute's Replacement Method and the Colorado State Highway Department Method. Traffic criteria was provided by Turner Collie and Braden. The recommended pavement sections were calculated for a twenty year design life.

If you have any questions concerning this information or if we may be of any additional service, please do not hesitate to contact us.

Sincerely yours,
WESTERN TECHNOLOGIES, INC.

Jim Fife

Jim Fife

JF/jf

Copies: Addressee (2)

Reviewed by:

COLORADO REGISTERED CRAIG P. WIEDEMAN 19564 PROFESSIONAL ENGINEER

Craig P. Wiedeman, P.E.
Division Manager

Persigo Village
Job No. 6142J(

Introduction

This report presents the results of our field investigation, laboratory testing and pavement section design for residential streets in Persigo Village near the interesection of 25 Rd. and G Rd. in Grand Junction, Colorado.

Field Investigation

Seven subgrade samples were obtained by hand methods on 17 September 1982, at the locations shown on the accompanying site plan. All samples were a composite of material from existing grade to a depth of approximately 18 inches. No groundwater was encountered at any sample location at the time of this exploration. All samples were returned to the laboratoary for testing to determine their physical properties. Any vegetation or debris recovered was removed prior to testing.

Laboratory Testing

Visual classification was performed on all samples obtained. Four samples were then chosen for laboratory testing. The samples were classified using both the Unified and the AASHTO Classification Systems, with group indices calculated according to the United States Bureau of Public Roads Method.

Results indicated that the soils were relatively uniform and consisted of clays, silts and fine sands. For design purposes a composite of the clays and silts was used. The composite sample of these soils was tested for CBR values in the soaked condition with the following results:

Soil Group	CBR Value*
Clays & Silts	4

*Value in the soaked condition at 95% of maximum density as determined in accordance with ASTM D698.

Test results are enclosed in the summary data sheets and include initial compaction data, CBR value and swell results at four days. Due to the limited extent of the sandy silt material encountered during our field investigation, the CBR value obtained on the clayey material was used for design purposes.

Design Recommendations

Several alternate pavement sections are tabulated and included hereinafter. Based on a total evaluation of existing and projected future conditions, the following pavement section appears to be the most feasible for the proposed streets and parking areas:

Proposed Streets

3 inches - asphaltic concrete pavement
4 inches - aggregate base course
8 inches - aggregate subbase course

Proposed Parking Areas

3 inches - asphaltic concrete pavement
6 inches - aggregate base course

Construction Recommendations

It is recommended that all materials conform with Colorado Highway Department Specifications. Aggregate subbase material should conform with Class 1 specifications. Aggregate base course should conform with Class 6 specifications. Asphaltic concrete pavement should conform with Grading E specifications and consist of an approved mix design giving required Marshall properties, optimum asphalt content, job mix tolerances, and recommended mixing and placement temperatures. Asphaltic concrete should be compacted to a minimum of 95 percent of maximum density as determined using the 75 blow Marshall method. The compaction of all subgrade and fill materials should be performed to the following recommended percent compaction and moisture content:

Material	Test Method	Minimum Percent Compaction	Moisture Content
Existing Subgrade	AASHTO T-99	95	Optimum ± 2%
Subbase Fill	ASSHTO T-99	95	Optimum ± 2%
Subbase Course	ASSHTO T-180	95	Optimum ± 3%
Base Course	ASSHTO T-180	95	Optimum ± 3%

Acceptance testing of fill materials and mineral aggregates should be performed prior to construction to assess compliance with project requirements. Positive drainage should be provided during construction and maintained throughout the life of the proposed streets. Adequate drainage is essential for continuing performance of these streets.

Persigo Village
Job No. 6142J077

Construction Procedure

The following procedure is recommended for preparation of all alignments:

- Strip and remove existing vegetation, debris, rubble and excavate to the subgrade level. Clean and widen depressions, pits and ditches to accommodate compaction equipment.
- Rework, moisten or dry as required, and compact all subgrade soils to a minimum depth of 8 inches. Reworking may be accomplished by scarification, discing, removal and replacement or other methods which will result in uniform moisture contents and densities.
- Place and compact required fill in horizontal lifts at thicknesses consistent with compaction equipment used to achieve uniform densities throughout lift thickness.

It is recommended that all excavation, subgrade preparation, fill placement and asphalt laydown be accomplished under observation and testing directed by the geotechnical/materials engineer to assess compliance with the project requirements.

Sincerely yours,
WESTERN TECHNOLOGIES, INC.

Jim Fife

Reviewed by:

Craig P. Wiedeman, P.E.
Division Manager

Persigo Village
Job No. 6142J077

CALIFORNIA BEARING RATIO RESULTS

Soil: Composite of Clays & Silts

INITIAL COMPACTION DATA	Point 1	Point 2	Point 3
Number of Blows per Layer	15	26	56
Initial Wet Density (PCF)	115.6	126.4	129.3
Initial Moisture Content (%)	14.7	17.1	16.1
Initial Dry Density (PCF)	100.8	105.3	109.4
Initial Compaction (%) (Proctor - 110.7 pcf @ 14.0)	91	95	99

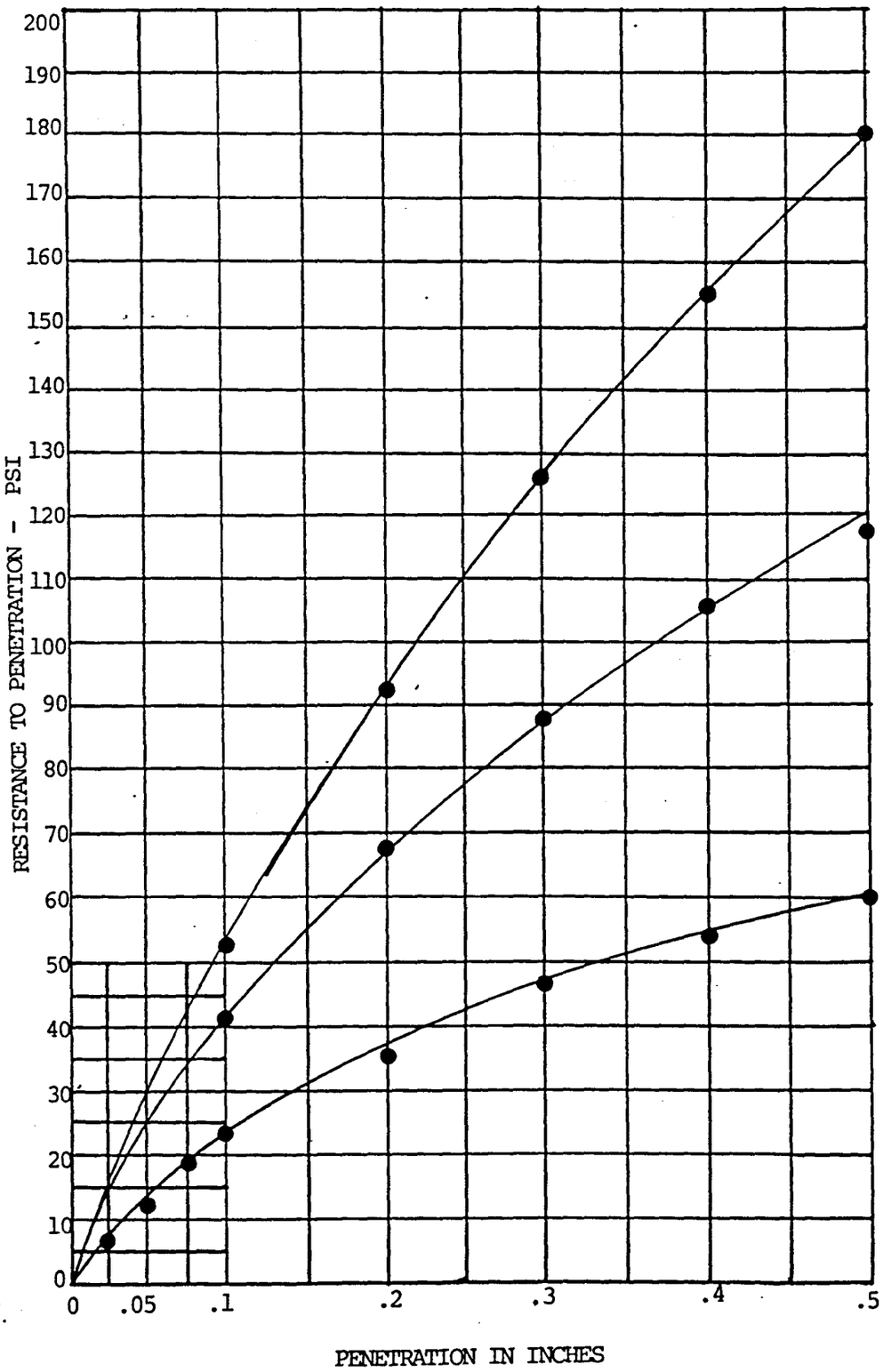
SWELL RESULT (4 Days)			
Swell (inches)	.035	.036	.046
Swell (%)	.8	.8	1.0
Soaked Wet Density (PCF)	121.3	126.4	129.3
Soaked Moisture Content (%)	20.1	18.6	17.3
Soaked Dry Density			
Divided by Original M.C.	105.7	107.9	111.4
Divided by Soaked M.C.	101.0	106.6	110.2

PENETRATION TEST RESULTS			
Surcharge Weight (lbs)	12.5	12.5	12.5
Piston Seating Pressure (lbs)	10	10	10
Load for Penetration-Inches	lbs/PSI	lbs/PSI	lbs/PSI
0.025	6.1	12.1	12.1
0.050	12.7	25.8	25.8
0.075	18.5	34.8	37.9
0.100	24.2	42.4	51.5
0.200	34.5	68.2	90.9
0.300	45.8	87.9	127.3
0.400	53.0	105.8	154.5
0.500	60.0	116.7	180.6

Corrected Pressure for Penetration-Inches	CBR	CBR	CBR
0.10	2.4	4.2	5.2
0.20	2.3	4.5	6.1
0.30	2.4	4.6	6.7
0.40	2.3	4.6	6.7
0.50	2.3	4.5	6.9

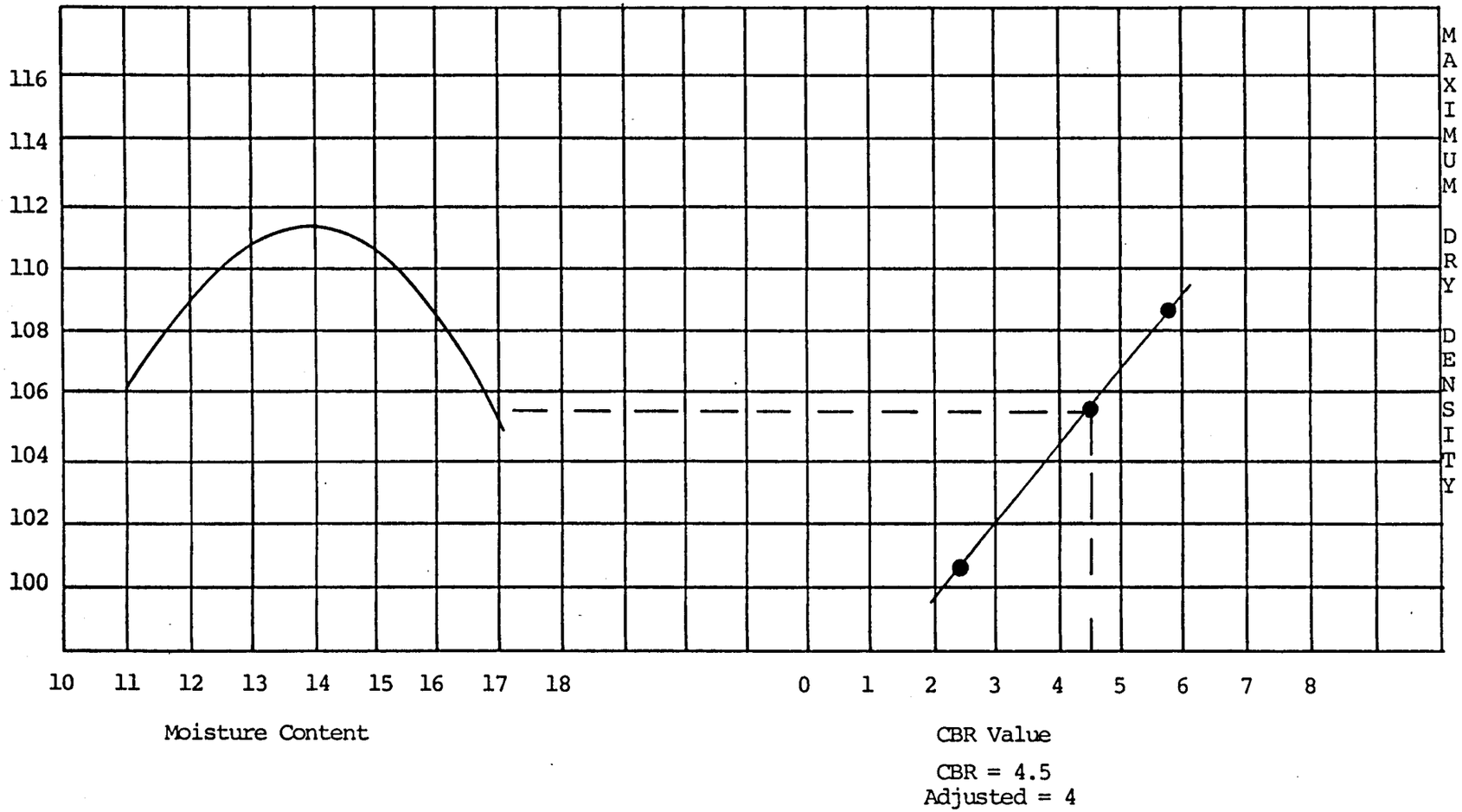
Persigo Village
Job No. 6142J07

CBR STRESS - STRAIN RESULTS



Persigo Village
Job No. 6142J077

MOISTURE DENSITY CBR CURVES



CBR = 4.5
Adjusted = 4

Pavement Section Design

Persigo Village
25 Rd. & G Road
Grand Junction, CO

24 September 1982

WESTERN TECHNOLOGIES, INC.

Phoenix
3737 East Broadway Road
P.O. Box 21387
Phoenix, Arizona 85036
(602) 268-1381

Flagstaff
2400 East Huntington Drive
Flagstaff, Arizona 86001
(602) 774-8708

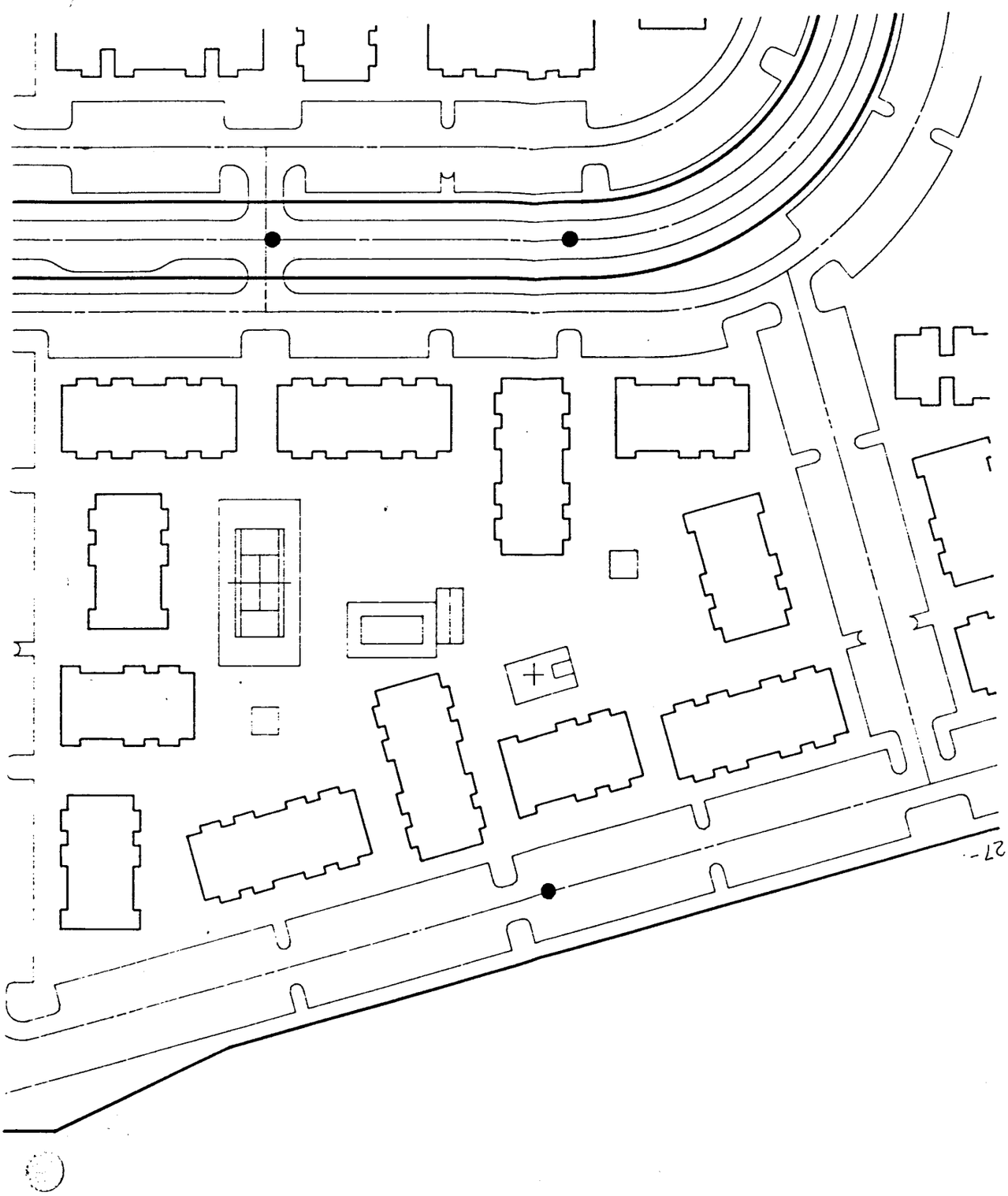
Tucson
423 South Olsen Avenue
Tucson, Arizona 85719
(602) 624-8894

Farmington
400 South Lorena
Farmington, New Mexico 87401
(505) 327-4966

Las Vegas
300 West Boston Avenue
Las Vegas, Nevada 89102
(702) 382-7483

Grand Junction
P.O. Box 177
3224 Highway 6 & 24, No. 3
Clifton, Colorado 81520
(303) 434-9873

G ROAD



Persigo Village
Job No. 6142J077

ALTERNATE PAVEMENT SECTIONS

Description		CBR	DTN	BCS	ABC	SBC	TOTAL
Residential Streets	A	4	40	8			8
(2650 trips/day)	B			3	10		13
	C			3	4	8	15
	D			3	14		17
	E			3	4	16	23
Parking Areas	A	4	8	6			6
(800 trips/day)	B			3	6		9
	C			3	4	3	10
	D			3	9		12
	E			3	4	7	14

CBR = California Bearing Ratio Value
DTN = Equivalent 18K Daily Traffic Number
BCS = Bituminous Concrete Surface
ABC = Aggregate Base Course
SBC = Subbase Course

A = Bituminous Concrete Pavement
B = Bituminous Concrete Pavement + Aggregate Base Course (Replacement Method)
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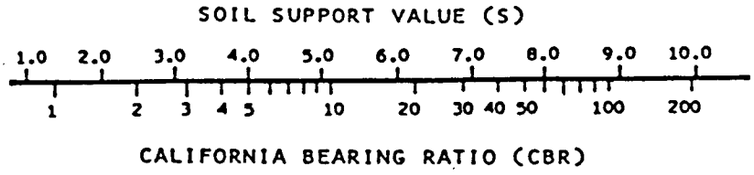

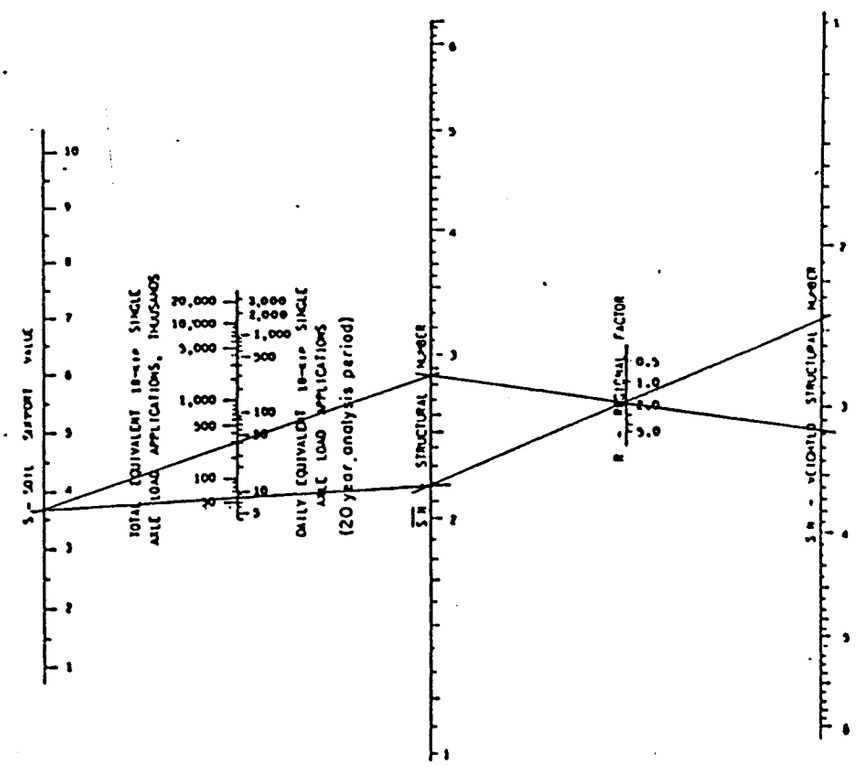

2.42

3.18

Figure II-2 Design Chart for Flexible Pavements, p_t = 2.0

WESTERN TECHNOLOGIES, INC.

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P.O. Box 3944
Grand Junction, CO 81501

24 September 1982

Job No. 6142J077
Invoice No. 61420158

ATTENTION: Jim Langford

PROJECT: Persigo Village
25 Rd. & G Road
Grand Junction, CO

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Sincerely yours,
WESTERN TECHNOLOGIES, INC.

Jim Fife

Jim Fife

Reviewed by:

COLORADO REGISTERED CRAIG P. WIEDEMAN 19564 PROFESSIONAL ENGINEER

Craig P. Wiedeman, P.E.
Division Manager

JF/jf

Copies: Addressee (2)

Persigo Village
Job No. 6142J077

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Several alternate pavement sections are tabulated and included hereinafter. Based on a total evaluation of existing and projected future conditions, the following pavement section appears to be the most feasible for the proposed streets and parking areas:

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Persigo Village
Job No. 6142J077

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The following procedure is recommended for preparation of all alignments:

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Sincerely yours,
WESTERN TECHNOLOGIES, INC.

Jim Fife

Reviewed by:

Craig P. Wiedeman, P.E.
Division Manager

Persigo Village
Job No. 6142J077

CALIFORNIA BEARING RATIO RESULTS

Soil: Composite of Clays & Silts

INITIAL COMPACTION DATA	Point 1	Point 2	Point 3
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SWELL RESULT (4 Days)			
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PENETRATION TEST RESULTS			
Surcharge Weight (lbs)	12.5	12.5	12.5
Piston Seating Pressure (lbs)	10	10	10
Load for Penetration-Inches	lbs/PSI	lbs/PSI	lbs/PSI
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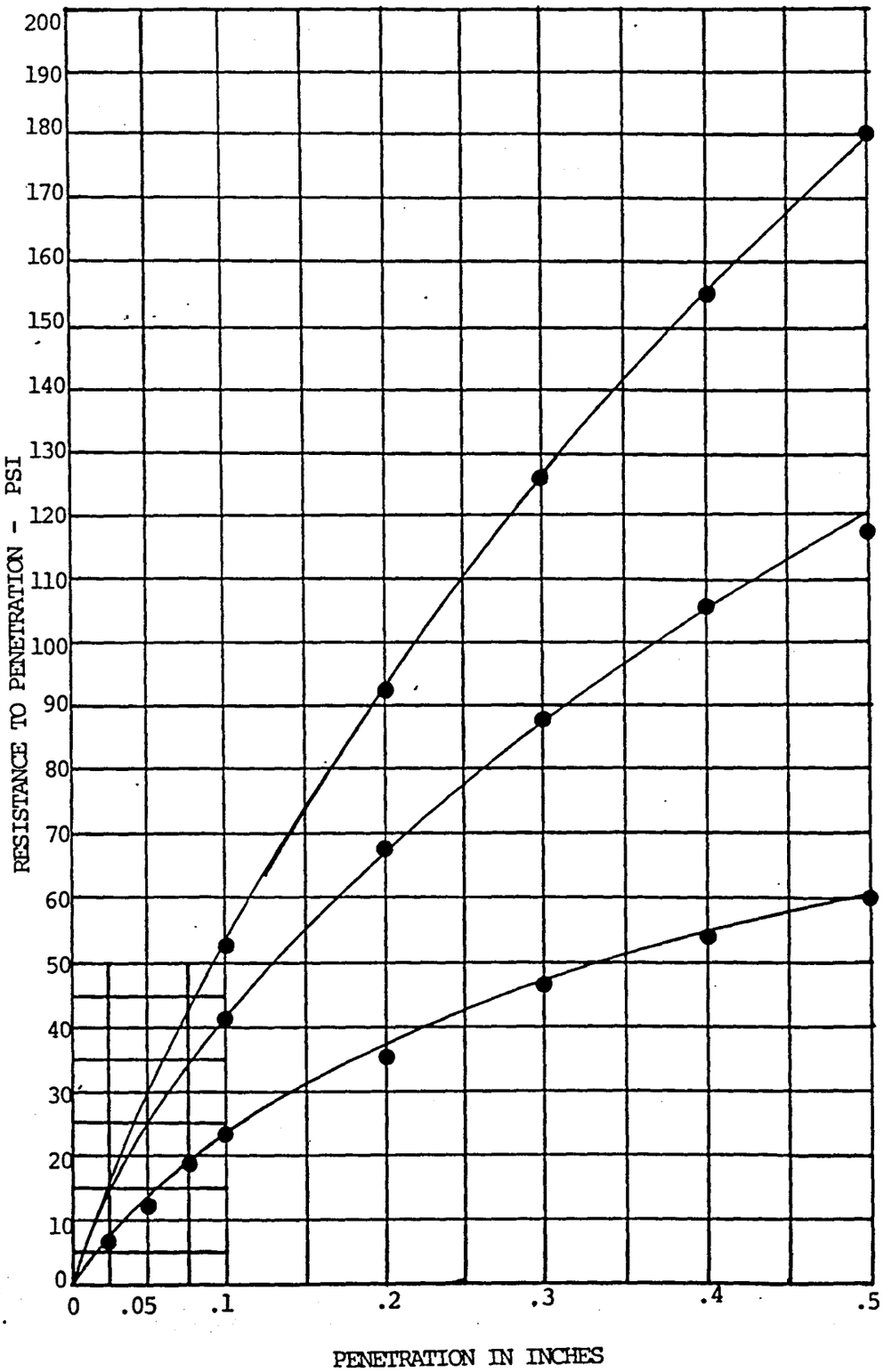
0.40	2.3	4.6	6.7
0.50	2.3	4.5	6.9

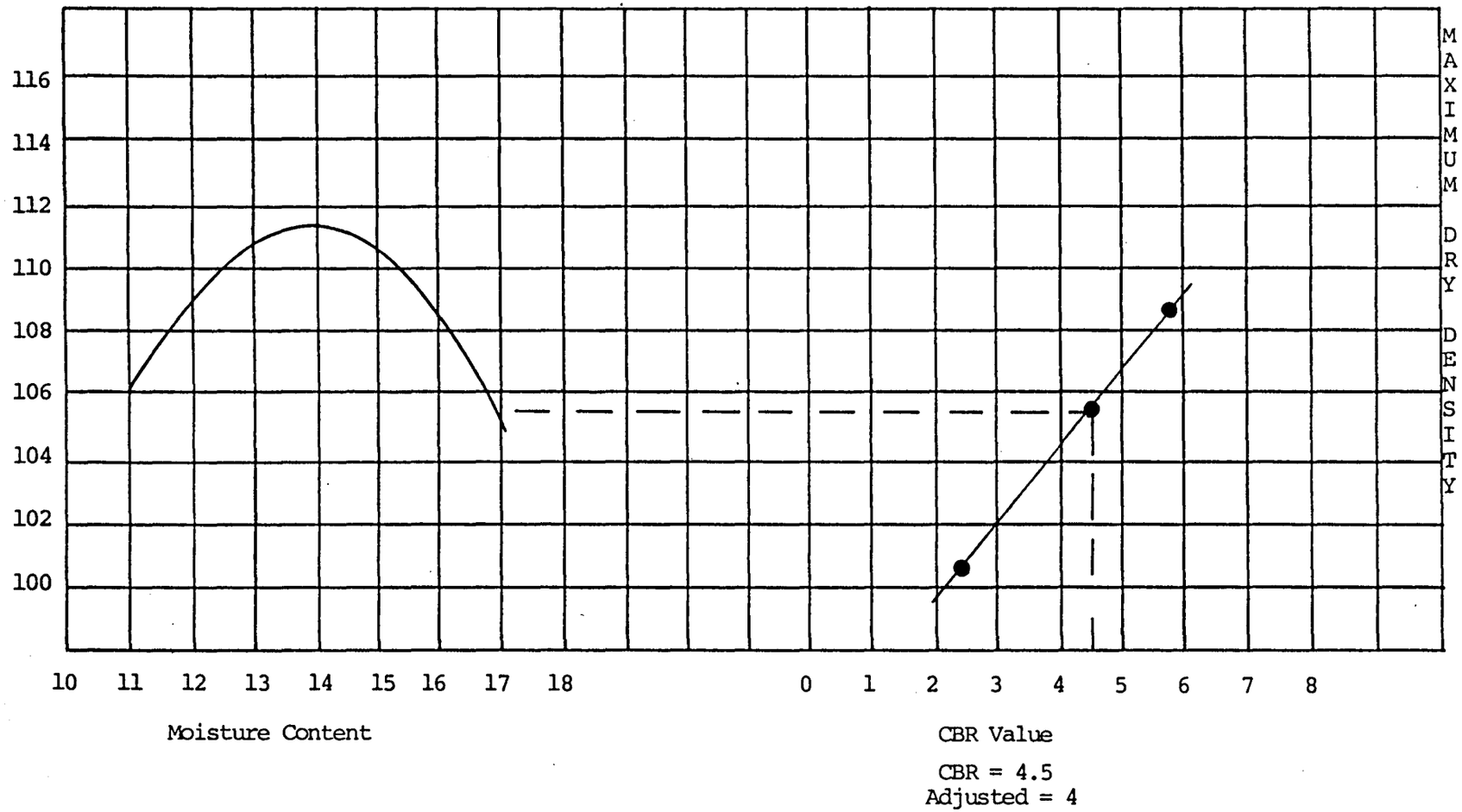
Persigo Village
Job No. 6142J077

CBR STRESS - STRAIN RESULTS



Persigo Village
Job No. 6142J077

MOISTURE DENSITY CBR CURVES



CBR = 4.5
Adjusted = 4

STORMWATER MANAGEMENT PLAN

FOR

COUNTRY CROSSING FILINGS NO. 1 AND 2

January , 1995

Prepared For:

Denny Granum
Prudential Monument Realty
759 Horizon Drive, Suite A
Grand Junction, Colorado 81506

Prepared By:

LANDesign LTD.
200 North 6th. Street, Suite 102
Grand Junction, Colorado 81501
(303) 245-4099

Stormwater Management Plan for Country Crossing Filings No. 1 and 2.

Prepared By: _____ 01/05/95
Monty D. Stroup

Reviewed By: _____
Philip M. Hart, P.E.
State of Colorado, #19346

A. Site and Project Description

1. Site Location:

The Country Crossing Filings No. 1 and 2 are located in the City of Grand Junction, State of Colorado, more particularly in the NW 1/4, NW 1/4 of Section 3, Township One South, Range One West, of the Ute Meridian, 39-06-07 Latitude, 108-35 -20 Longitude, (Tax I.D. #2945-03-108 and 114).

Streets in the vicinity include 25 Road running from the south to the north defining the west boundary line of the property. G Road runs from the east to west and defines the north boundary line of the project.

Development in the vicinity and surrounding the site is rural in nature. To the north, south and west are single family residential dwellings on acreage sized parcels. These parcels are typically put to pasture and agricultural uses. To the east is the main line of the Grand Valley Canal with Moon Ridge Falls Subdivision a new single family development beyond.

2. Description of Property:

The entire Country Crossing site contains approximately 46.34 acres and is planned for single family residential lots, duplex townhomes, a multi-family parcel, RV storage area and open space. The total number of residential units planned for the site is 174. Country Crossing Filing No. 1 (3.41 Ac.) is planned for a multi-family tract and 4 single family residential lots. Country Crossing Filing No. 2 (3.78 Ac.) is planned for 21 single family residential lots. Both of the proposed filings are located is the south portion of the Country Crossing development.

Presently there is one single family dwelling, two out-buildings and one multi-family structure on the subject property. The multi-family structure was constructed as part of the original Persigo Village project in 1982 and has never been occupied. Agricultural use of the property has been limited to pasture land and is currently in a fallow state.

3. Description of Proposed Construction Activity:

Activity shall include the construction of roadway, water, sanitary sewer, storm sewer, irrigation, dry utility infrastructures followed by the construction of 25 single family residential structures, 3 multi-family building structures and associated landscaping.

4. Proposed Sequence of Major Construction Activities:

Phase I Clearing and grubbing of proposed roadway alignments and disposal of construction debris.

Phase II Construction of roadways to proposed subgrade elevations including cut and fill activities as required. Excess embankment material to be stockpiled in designated areas.

Phase III Utility infrastructures to be installed including storm sewers and culverts, swales and permanent erosion control features.

Phase IV Curb, gutter and sidewalks installed.

Phase V Clearing, Grubbing and overlot grading of single or multiple lots as sales and market conditions allow.

Phase VI Construction of single or multiple building structures as sales and market conditions allow.

Phase VII Final landscaping of individual lots as required by the project Covenants, Conditions and Restrictions.

5. Estimate of Areas Subject to Clearing, Grubbing and Excavation:

Country Crossing Filing No. 1 and 2 combined contain a total of 7.19 acres. Construction Phases I through IV will consist of approximately 1.72 acres. Phases V through VII will consist of the residual area of 5.47 acres.

6. Preconstruction and Postconstruction Runoff Coefficients:

The historic runoff coefficients ("C") for the 2 year and 100 year storm events respectively are 0.22 and 0.27.

With the construction of proposed roadways coefficients are expected to increase as follows per Reference 12:

Basin I.D.	2 Year "C"	100 Year "C"
A1	0.37	0.44
A2	0.70	0.73
A3	0.70	0.74
A4	0.45	0.50
A5	0.42	0.50
A6	0.42	0.50
A7	0.93	0.95

Note that Basin A1 contains area to be included with future phases of the Country Crossing development.

7. Soil Erosion Potential:

Based on the "Soil Survey, Grand Junction Area" (Reference 8) on and off-site soils are defined as (Bc), Billings silty clay loam, 0 to 2 percent slopes, hydrological soil group "C" (10% of the site) and (Rf), Ravola very fine sandy loam, 0 to 2 percent slopes, hydrological soils group "B" (90% of the site).

Erosion hazard for (Bc) is defined as being "none to slight". Erosion hazard for (Rf) is defined "slight" (Reference 8).

8. Existing Vegetation:

Field inspection of the site reveals various types of plant life indigenous to wetlands on the site within the Leach Creek waterway. These areas are confined to the existing channel area of Leach Creek.

Ground cover on upland areas above Leach Creek includes native and pasture grasses. The estimated existing ground cover for Filing No. 1 and 2 is 80 to 90 percent.

9. Storage of Fuel Oils, Chemicals, Fertilizers or Other Potential Pollution Sources:

The storage of fuel oils, chemicals, fertilizers or other potential pollutants is prohibited without prior written notice to the owner by the contractor, subcontractor or other persons doing work on the site. In the event in becomes necessary to store such items, storage areas shall be designated. Storage areas shall be located above and away from drainages, waterways and other apparent conveyance elements. Appropriate measures shall be taken to protect such areas from spills or vandalism including but not limited to spill control berms and fencing.

10. Anticipated Non-Stormwater Components of Discharge:

Future irrigation facilities include a pressurized under ground system supplied by a storage pond to be located southeast of to Filing 2 in a future phase of the overall development. The irrigation storage pond will serve to water open-space only. Individual lots shall be irrigated with potable water. Tailwater discharge from and through the pond shall be routed via the proposed storm sewer system to Leach Creek.

11. Name and Location of Receiving Waters:

The overall project site is bounded to the north by Leach Creek the flowing from the east to the west, ultimately discharging to the Colorado River.

Leach Creek serves to convey return irrigation water, storm water runoff and ground water from areas northeast of the site.

As defined in the Flood Insurance Study, City of Grand Junction, Colorado (Reference 4), Country Crossing Filings No. 1 and 2 are not within the designated floodway nor the 100 Year Floodplain. A small portion of Filing No. 1 adjacent to 25 Road is within the 500 Year Floodplain, designated as Zone X. This area runs north and south adjacent to 25 Road and is approximately 130 feet wide as measured from the center of 25 Road.

B. Management During Construction

1. Anticipated Problems and Corrective (BMPs) Best Management Practices:

Structural Erosion Control Areas below the toe of fill slopes shall be isolated from fill areas by the installation of prefabricated silt fences as shown on the Drainage and Grading Plan and as detailed on the Erosion Control Plan. Straw bales shall be installed along side and rear yard swales at the locations shown on the plans. Straw bale outlet barriers shall be installed immediately below discharge points and pipe outlets in the locations as designated on the plans.

Non-Structural Erosion Control Disturbed areas not designated for immediate construction or permanent landscaping shall be temporarily re-vegetated. In the event construction activity ceases for a period of 60 calendar days disturbed areas including cut and fill slopes shall be re-vegetated with a annual and perennial seed mixture as indicated on the Erosion Control Plan.

Dust Abatement The contractor shall be required to provide a consistent and reliable source of construction water. Watering to prevent dust shall be ongoing for the duration of the project. In the event high winds and heavy traffic loads create a situation where watering by itself is not sufficient the contractor is to apply an approved dust palliative other than or in addition to water.

Soil Tracking Access to Filing No. 1 and 2 shall be from Country Circle. Where construction traffic enters or exits unimproved areas onto asphalted public roadways a crushed rock construction staging pad shall be installed to minimize soil tracking.

Waste Disposal Construction debris shall be stockpiled in a central location. Debris shall be removed from the site and disposed of at appropriate locations secured by the contractor.

Sedimentation Control The contractor shall be responsible for inspecting the entire site on a weekly basis to ensure compliance and identify existing or potential sedimentation problems. The Final Drainage Study For Country Crossing Filing No. 1 and 2 (Reference 12) identifies one major waterway (Leach Creek) which receives stormwater runoff from the site. This natural drainage is heavily vegetated with dense pockets of brush, willows, trees and native grasses. Based on field investigations the mannings (N) value for each approaches 0.08. This drainage will provide an excellent sediment control and filtering

effect and are to be maintained in their natural state.

A local major drainage channel (Outfall Drainage Channel) is to be constructed onsite to convey developed runoff to Leach Creek. Because all site drainage is to be routed to and along the channel it shall serve as the primary sediment control element for the entire development. Straw Bail Check Structures shall be installed along the channel at minimum 200 foot intervals. Where the outfall channel discharges to Leach Creek a Outlet Straw Bail Barrier shall be constructed. This barrier shall be augmented by the placement of Rip-Rap, size, quantity and location as directed by the engineer.

Final Stabilization and Long Term Management

The project's Covenants Conditions and Restrictions shall obligate each lot owner to fully landscape front yard within 90 days and the rear yard within 1 year from the issuance of a Certificate of Occupancy. Other areas including open-space are to be landscaped by the developer and maintained by the Homeowners Association.

Permanent structural BMP's include pipe outlet protection, rip-rap over filter fabric and grassed and concrete swales as shown on the Drainage and Grading Plan.

Inspection and Maintenance

The Contractor shall be ultimately responsible for compliance and maintenance during construction. The owners representative and the contractor shall make weekly inspections of the site to assure compliance and implementation of the proposed BMPs.

Conclusion

The information contained herein is augmented by the information, calculations and requirements as presented in the Final Drainage Study For Country Crossing Filings No. 1 and 2 (Reference 12). A copy of this report shall accompany the CDPS General Permit application for Stormwater Discharges Associated With Construction Activity.

V. References

1. Stormwater Management Manual, (SWMM), Public Works Department, City of Grand Junction, Co., June 1994.

2. Mesa County Storm Drainage Criteria Manual, Final Draft, Mesa County, Colorado, March, 1992.

3. Flood Hazard Information, Colorado River and Tributaries, Grand Junction, Colorado, prepared for the City of Grand Junction and Mesa County, by The Department Of The Army, Sacramento District, Corps Of Engineers, Sacramento, California, November, 1976.

4. Flood Insurance Study, City of Grand Junction, Colorado, Mesa County, Community Number 080117, Federal Emergency Management Agency, Revised July 15th, 1992.

5. Flood Insurance Study, Mesa County, Colorado (Unincorporated Areas), Community Number 080115, Federal Emergency Management Agency, Revised July 15th, 1992.

6. Flood Insurance Rate Map, City of Grand Junction, Colorado, Mesa County, Community-Panel Number 080117 0003 E, Federal Emergency Management Agency, Map Revised July 15th, 1992.

7. Flood Insurance Rate Map, Mesa County, Colorado, (Unincorporated Areas), Community Panel Number 080115 0460 B, Federal Emergency Management Agency, Map Revised July 15th, 1992.

8. Soil Survey, Grand Junction Area, Colorado, Series 1940, No. 19, U.S. Department of Agriculture, issued November, 1955.

9. Urban Storm Drainage Criteria Manual, Urban Drainage and Flood Control District, prepared by Wright-McLaughlin Engineers, March 1969, Revised May, 1984.

10. Douglas County Storm Drainage Design and Technical Criteria, Addendum A, Erosion Control Criteria, prepared by HydroDynamics Incorporated, Parker, Colorado, October, 1992.

11. Colorado Department of Transportation, Erosion Control and Stormwater Quality Guide, Draft version, November 27, 1992.

12. Final Drainage Study For Country Crossing Filings No. 1 and 2. Prepared By: LANDesign LTD., Grand Junction, Colorado, January 1995.

APPENDIX

Seeding

Planting of temporary or permanent vegetation on all disturbed area.

I. Application

Disturbed areas not designated for immediate construction or permanent landscaping shall be temporarily re-vegetated. In the event construction activity ceases for a period of sixty (60) calendar days, disturbed areas including cut and fill slopes shall be re-vegetated with an annual and perennial seed mixture as indicated on the Erosion Control Plan.

II. Site Seed Mixture

15% Annual Rye Grass
25% Perennial Rye Grass
12% Nordan Crested Wheatgrass
12% Fairway Crested Wheatgrass
12% Blue Gramma
12% Red Fescue
12% Buffalo Grass

A minimum of 5 lbs/acre shall be used and planted using drill seeding methods and 10 lbs/acre when using a broadcast method.

III. Construction Guidelines

Seeding in areas that are unirrigated or that are not provided with sprinkling or watering systems, shall be restricted to the seasons described in Table S-1.

Table S-1
Seeding Seasons

ZONE	SPRING SEEDING	FALL SEEDING
Below 6000'	Spring thaw - June 15th	Sept. 1st - Consistent ground freeze
6000' - 7000'	Spring thaw - July 1st	Aug. 15th - Consistent ground freeze
7000' - 8000'	Spring thaw - July 15th	Aug. 1st - Consistent ground freeze
Above 8000'	Spring thaw (starts)	Consistent ground freeze (ends)

For the purpose of Table S-1 "spring thaw" is the earliest date when seed can be buried 1/2 inch into the soil through normal drill seeding methods. "Consistent ground freeze" is that latest date when seed can no longer be buried 1/2 into the soil through normal drill seeding methods. During permanent seeding, apply topsoil prior to applying seed.

When use of fertilizers and herbicides is required, apply according to the manufacturer's recommended rates.

All seeding operations shall be performed at right angles to the slope.

When needed to improve germination of seeds, apply mulching immediately after seeding. Use soil retention blankets on steep slopes (2:1 and steeper). Some locations with 3:1 slopes facing south or west or 20 feet or more high may also require soil retention blankets.

Seeded areas shall be inspected frequently. Areas with failures shall be repaired and reseeded within the planting season.

Mulching

Application of plant residues or other suitable material to the soil surface. Typical mulching material includes straw, hay, and wood cellulose fiber.

I. Application

Used to provide temporary protection for exposed soils against erosion where temporary or permanent seeding operations are not feasible, especially during adverse growing seasons.

Used as part of seeding practices to protect newly seeded areas.

Used to protect soil stockpiles.

II. Use Limitations

Use only on disturbed areas as a temporary cover.

Hydraulic mulching with wood cellulose fibers shall be limited to slopes steeper than 3:1 or where access is limited.

III. Construction Guidelines

Material

Hay shall consist of native grasses free of noxious weed seeds.

Straw shall consist of clean cereal grain.

Wood cellulose fiber shall consist of virgin wood cellulose processed into a uniform fibrous physical state.

Tackifiers (for anchoring) shall consist of a free flowing non-corrosive powder produced from the natural plant gum of Plantago Insularis (Desert Indianwheat). This material shall not contain any mineral filler, recycled cellulose fiber, clays, or other substances which may inhibit germination or growth of plants.

Spreading Procedure

Hay and straw mulch shall be spread at a rate of two tons per acre.

At a minimum, 50% of the mulch, by weight, shall be 10 inches or more than two inches.

Applied mulch shall reach a uniform distribution so that no more than 10% of the soil surface shall be exposed.

Hay and straw mulch shall be anchored to the soil surface using Tackifiers, blankets, or nets, or with a mulch crimping machine., Mechanical anchoring is preferred and recommended for slopes flatter than 3:1. When using blankets or nets, these may need to be anchored to the soil with staples, or as required by the manufacturer's specifications.

Wood cellulose fiber mulch shall be mixed with water (maximum 50 lbs. of wood cellulose per 100 gallons of water) and a tackifying agent. Application shall be at a rate of 1500 pounds per acre with a hydraulic seeder or mulcher.

Tackifiers (for anchoring) shall be applied in a slurry with water and wood fiber (100 lbs. of powder and 150 lbs. of fiber per 700 gallons of water). Application rate of the powder shall be 100 lbs. per acre.

Erosion Bale

A temporary sediment barrier consisting of a row of entrenched and anchored straw, or hay bales.

I. Application

Use as filters along the toe of fills.

Use as erosion checks in ditches.

Use for diversions and filters in unfinished drop inlets, culvert inlets, and outlets.

II. Use Limitations

Do not use if size of the drainage area is greater than 1/4 acre per 100 feet of barrier length.

Maximum slope length behind the barrier is 100 feet.

Maximum slope gradient behind the barrier is 50%.

In minor swales or ditch lines where the maximum contributing drainage area is no greater than one acre.

Where effectiveness is required for less than 3 months.

Under no circumstances should erosion bale barriers be constructed in active streams or in swales where there is the possibility of a washout.

Should be used only in areas of sheet flow or very low flow.

Not to be used where the control of sediment is critical or in high risk areas.

Not to be used where it cannot be entrenched as required and firmly anchored. Useful life of erosion bale barriers is relatively short; the barrier may have to be replaced one or more times during construction.

III. Construction Guidelines

All bales shall be either wire-bound or string-tied. Erosion bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales (in order to prevent deterioration of bindings).

The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked, the excavated soil shall be backfilled against the barrier. Backfill soil shall conform to the ground level on the downhill side and shall be built up to 4 inches against the uphill side of the barrier.

Each base shall be securely anchored by at least two 2"X2" stakes or #4 rebars driven toward the previously laid bale to force the bales together. Stakes or rebars shall be driven 12 inches minimum into the ground to securely anchor the bales.

The gaps between bales shall be filled by wedging with straw to prevent water from escaping between the bales. The main consideration is to obtain tight joints. Erosion bales will not filter sediment out of the water if the water is allowed to flow between, around, or under the bales. Loose straw or hay scattered over the area immediately uphill from an erosion bale barrier tends to increase barrier efficiency.

Since erosion bales deteriorate quickly, the inspection during construction shall be frequent and repair or replacement shall be made promptly as needed.

Erosion bales shall be removed when they have served their usefulness, but not before the upslope areas have been permanently stabilized.

Trenches where erosion bales were located shall be graded and stabilized.

Sheet Flow Applications

Bales shall be placed in a single row, lengthwise on the contour with ends of adjacent bales tightly abutting.

Channel Flow Applications

Bales shall be placed in a single row, lengthwise, oriented perpendicular to the contour, with ends of adjacent bales tightly abutting one another.

The barrier shall be extended to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale to assure that sediment-laden runoff will flow either through or over the barrier but not around it.

Silt Fence

A temporary vertical barrier of filter fabric attached and supported by posts and entrenched to the ground.

I. Application

Used to intercept and detain small amounts of sediment from disturbed areas during construction operations to prevent sediment from leaving the site.

Used to decrease the velocity of sheet flows and low-to-moderate level channel flows.

Typically used along the toe of fills, in transition areas between cut and fills, adjacent to streams and along private property.

Also used around median and yard inlets as applicable, and behind curb and gutter to prevent silting of the pavement.

II. Use Limitations

Where the size of the drainage areas is no more than 1/4 acre per 100 feet of silt fence length; the maximum slope length behind the barrier is 100 feet; and the maximum gradient behind the barrier is 50% (2:1).

On steep slopes care should be given to placing alignment of fence perpendicular to the general direction of the flow.

Should not be used in areas where rocky soils will prevent keying in the filter fabric.

III. Construction Guidelines

Materials

The synthetic filter fabric shall conform to the requirements described in CDOT's Standard Specifications for Road and Bridge Construction.

The Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 to 120 degrees F.

If a burlap is used, it shall be purchased in a continuous roll and cut to the length of the barrier to avoid than use of joints and thus improve the strength and efficiency of the barrier.

Posts for silt fences shall be metal or hardwood with a minimum length of 42 inches. Pine wood shall not be used. Wood posts shall have a minimum diameter or cross section of 1.25 inches. Metal posts shall be "studded tee" or "U" type with minimum weight of 1.33 lbs/lin. ft., and they shall be protected against corrosion. Metal posts should also have projections for fastening wire to them.

Wire fence reinforcement for silt fences using standard strength filter cloth shall be a minimum of 42 inches in height, a minimum of 14 gauge and shall have a maximum mesh spacing of 6 inches.

Installation

Silt fences must be located along a terrain contour and the area below the fence must be undisturbed or stabilized.

The posts shall be driven vertically into the ground to a minimum depth of 18 inches.

A trench shall be excavated approximately 6 inches wide and 6 inches deep along the line of posts and upslope from the barrier; the bottom one foot of the filter fabric shall be buried into this trench.

The trench shall be backfield and the soil compacted.

The filter materials shall be fastened securely to metal or wood posts using wire ties, or to the wood posts with 3/4 inches long #9 heavy duty staples. Filter material shall not be stapled to existing trees.

If a filter barrier is to be constructed across a ditch line or swale, the barrier shall be of sufficient length to eliminate end flow, and the plan configuration shall resemble an arc or horseshoe with the ends oriented upslope.

When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum 6-inch overlap, and securely sealed.

When standard strength filter fabric is used, a wire mesh support fence shall be fastened securely to the upslope side of the posts using heavy duty wire staples at least 3/4 inch long, tie wires or hog rings. The wire shall extend into the trench a minimum of 2 inches and shall not extend more than 36 inches above the original ground surface.

When extra strength filter fabric and closer post spacing are used, the wire mesh support fence may be eliminated. In such a case, the filter fabric is stapled or wired directly to the posts with all other provisions of the above item applying.

Silt fences shall be periodically maintained to prevent sediment from passing over or under the fence. Sediments shall be removed from behind the silt fence when it accumulates to one-half the exposed fabric height.

Filter barriers shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

Sheet Flow Applications

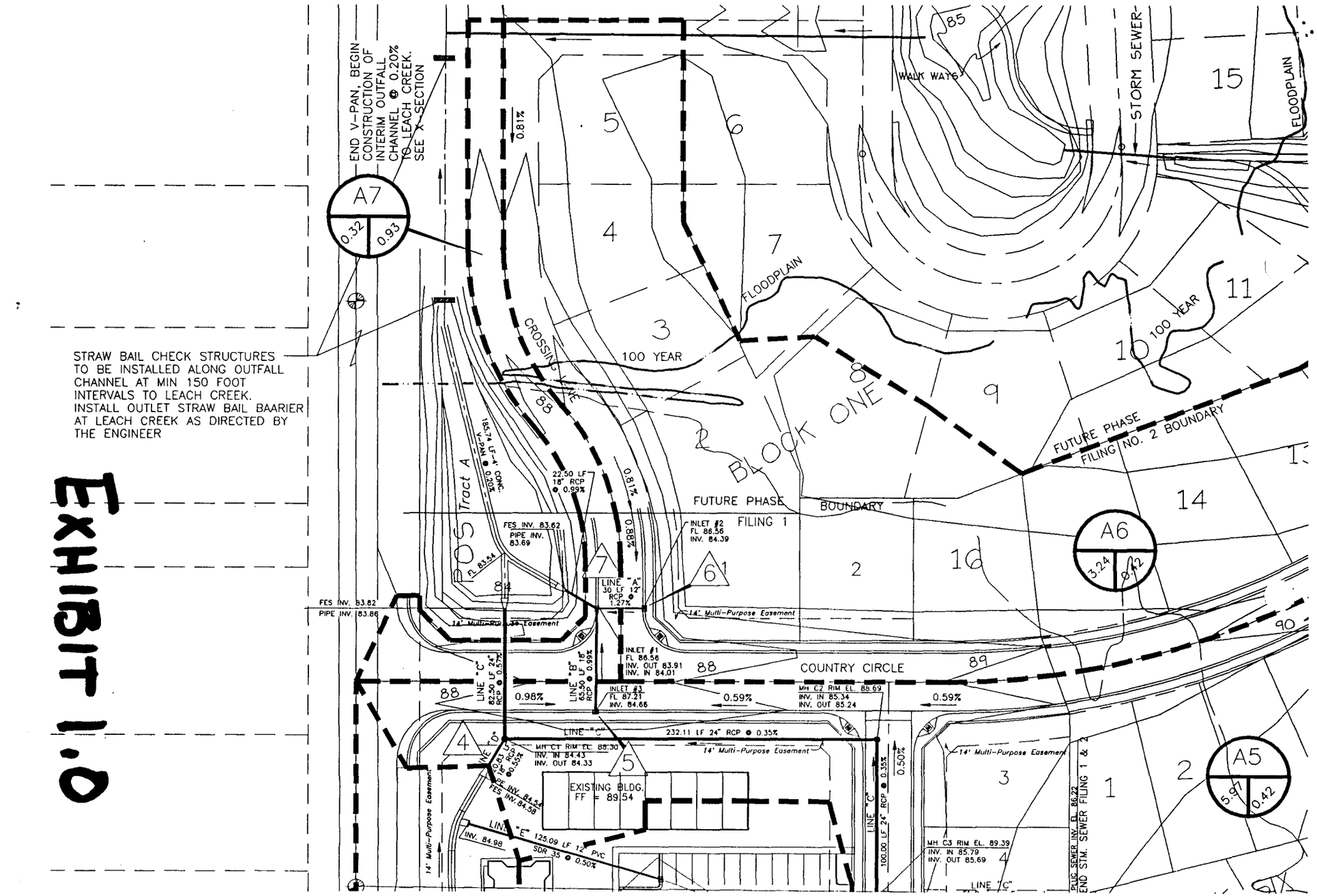
The height of the silt fence shall be minimum 22 inches and shall not exceed 36 inches; higher fences may impound volumes of water sufficient to cause failure of the structure.

Posts shall be spaced a maximum of 10 feet apart. If an extra strength filter fabric without the wire support fence is used, maximum space shall not exceed 6 feet.

Channel Flow Applications

The height of the silt fence shall be a minimum of 15 inches and shall not exceed 18 inches.

Posts shall be spaced a maximum of 3 feet apart.


END V-PAN, BEGIN CONSTRUCTION OF INTERIM OUTFALL CHANNEL @ 0.20% TO LEACH CREEK. SEE X-SECTION
A7
0.32
0.93
STRAW BAIL CHECK STRUCTURES TO BE INSTALLED ALONG OUTFALL CHANNEL AT MIN 150 FOOT INTERVALS TO LEACH CREEK. INSTALL OUTLET STRAW BAIL BAARIER AT LEACH CREEK AS DIRECTED BY THE ENGINEER
EXHIBIT 1.0
WALK WAYS
STORM SEWER
FLOODPLAIN
100 YEAR
CROSSING LANE
FUTURE PHASE FILING NO. 2 BOUNDARY
FUTURE PHASE BOUNDARY FILING 1
BLOCK ONE
POS Tract A
185.74 LF 4' CONC. V-PAN @ 0.20%
22.50 LF 18" RCP @ 0.99%
FES INV. 83.62
PIPE INV. 83.69
FES INV. 83.82
PIPE INV. 83.86
LINE "A" 30 LF 12" RCP @ 1.27%
INLET #2 FL 86.56 INV. 84.39
INLET #1 FL 86.58 INV. OUT 83.91 INV. IN 84.01
INLET #3 FL 87.21 INV. 84.66
LINE "B" 65.50 LF 18" RCP @ 0.99%
LINE "C" 82.50 LF 24" RCP @ 0.57%
LINE "C" 232.11 LF 24" RCP @ 0.35%
LINE "D" 0.83 LF 18" RCP @ 0.55%
LINE "E" 125.09 LF 12" PVC SDR 35 @ 0.50%
MH C1 RIM EL. 88.30 INV. IN 84.43 INV. OUT 84.33
MH C2 RIM EL. 88.69 INV. IN 85.34 INV. OUT 85.24
MH C3 RIM EL. 89.39 INV. IN 85.79 INV. OUT 85.69
100.00 LF 24" RCP @ 0.35%
EXISTING BLDG. FF = 89.54
14' Multi-Purpose Easement
COUNTRY CIRCLE
0.98%
0.59%
0.88%
0.81%
0.50%
A6
3.24
0.42
A5
5.97
0.42
PLUG SEWER INV. EL. 86.22 END STM. SEWER FILING 1 & 2

GENERAL PERMIT APPLICATION

STORMWATER DISCHARGES ASSOCIATED WITH:

CONSTRUCTION ACTIVITY

(Permit No. COR-030000)

OR AGENCY USE ONLY									
Certification Number									
C	O	R	-	0	3				

Date Received	Fee Category
Year Month Day	

Please print or type. All items must be completed accurately and in their entirety or the application will be deemed incomplete and processing of the permit will not begin until all information is received. Please refer to the instructions for information about the required items. An original signature of the applicant is **required.**

1. **Name and address of the permit applicant:**

Name Denny Granum

Mailing Address C/O Monument Realty, 759 Horizon Dr., Ste. A

City, State and Zip Code Grand Junction, CO 81506

Phone Number (303) 243-4890 Taxpayer (or Employer) ID 84-0632741

Who is applying? Owner ☐ Developer ☒ Contractor ☐

Entity Type: Private ☒ Federal ☐ State ☐ County ☐ City ☐ Other: _____

Local Contact Thomas Logue, LANDesign LTD, 200 N. 6th St., Grand Junction, CO 81501

Title General Partner Phone Number (303) 245-4099

2. **Location of the construction site:**

Street Address 25 Road and G Road

City, State and Zip Code Grand Junction, CO 81505

County Mesa Name of plan of development Country Crossin Filing No. 1 and 2

Township, Range, section, 1/4 section T.1S.,R.1W., U.M., Section 3, NW 1/4

Latitude and Longitude 39-06-07 Latitude, 108-35-20 Longitude

3. **Briefly describe the nature of the construction activity:**

Single family and multi-family residential construction including associated sewer, waterline, storm sewer, roadways and dry utilities.

4. **Anticipated construction schedule:**

Commencement date: February 1, 1995 Completion date: July 30, 1995

5. **Area of the construction site:** Total area 7.19 AC.

Area to undergo excavation or grading: 7.19 AC., Phased

6. **The name of the receiving stream(s). (If discharge is to a ditch or storm sewer, also include the name of the ultimate receiving water):** Leach Creek and subsequently the Colorado River.

7. **Other environmental permits held for this construction activity (include permit number):**

None

8. **Stormwater Management Plan Certification:**

I certify under penalty of law that a complete Stormwater Management Plan, as described in Appendix A of this application, has been prepared for my facility. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the Stormwater Management Plan is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for falsely certifying the completion of said SWMP, including the possibility of fine and imprisonment for knowing violations.

Signature of Applicant — Date Signed: 1-5-95

Denny Granum, President

Name (printed) — Title

9. **Signature of applicant:**

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Signature of Applicant — Date Signed: 1-5-95

Denny Granum, President

Name (printed) — Title

REVIEW COMMENTS

FILE #FPP-95-10 **TITLE HEADING:** Final Plat/Plan - Country Crossing Subdivision, Filing #2

LOCATION: SE corner of 25 Road & G Road

PETITIONER: Denny Granum

PETITIONER'S ADDRESS/TELEPHONE: Monument Homes
759 Horizon Drive, Suite A
Grand Junction, CO 81506
243-4890

PETITIONER'S REPRESENTATIVE: Tom Logue

STAFF REPRESENTATIVE: Tom Dixon

NOTE: THE PETITIONER IS REQUIRED TO SUBMIT FOUR (4) COPIES OF WRITTEN RESPONSE AND REVISED DRAWINGS ADDRESSING ALL REVIEW COMMENTS ON OR BEFORE 5:00 P.M., JANUARY 27, 1995.

GRAND JUNCTION FIRE DEPARTMENT **1/10/95**
Hank Masterson **244-1414**

The existing water line on 25 Road must be a looped line as stated in previous Fire Department comments. An additional hydrant is needed at either Block 3, Lot 8 or Block 2, Lot 3.

PARKS & RECREATION DEPARTMENT **1/11/95**
Don Hobbs **244-1542**

Fees for filing are based upon 21 units at $225 each = $4,725 due for open space fees.

GRAND VALLEY IRRIGATION COMPANY **1/12/95**
Phil Bertrand **242-2762**

The planning and plotting of this subdivision as it effects our canal and canal right-of-way needs to be declared, understood and accepted up front before we can proceed!

Please refer to comment sheets dated 11/11/94 for additional comments.

It appears this subdivision is not going through proper channels.

UTE WATER **1/13/95**
Gary R. Mathews **242-7491**

1. The 8" water main stubbed North must run to the far North side of Lot 1. Water line stub outs, 1 1/2" and larger are valved at the main.
2. Contact with Ute Water is needed to discuss water metering cost for Filing #1 and water valve locations. All fire hydrants are valved at the main.
3. POLICIES AND FEES IN EFFECT AT THE TIME OF APPLICATION WILL APPLY.

CITY DEVELOPMENT ENGINEER **1/17/95**
Jody Kliska **244-1591**

1. Plats - contain dedications for utility and irrigation easements, none are shown on the drawing.
2. Filing One Street Plan & Profile - Vertical curb is required on Country Circle within the 52' right-of-way. Shading on redlined plans indicates the limits. The right turn lane needs to be designed with a 15:1 taper, a 12' wide turn lane 100' in length. Appropriate striping and signing is the responsibility of the developer and must be shown on the plans. No typical sections are shown for 25 Road, Persigo Avenue, Crossing Lane. Pavement design must be updated and shown on the plans. Signing and street lights need to be indicated on the plans. Inlets need to be identified as single, combination inlets. The driveways to the multifamily area need to be curb cuts. Vertical curb should be maintained along this frontage.
3. Filing Two Street Plan & Profile - No typical section and pavement section shown for Country Circle. The temporary turn-around must be paved. Signs and street lights must be indicated.
4. Multi-family Area - The site plan needs to show the parking dimensions, aisle widths, identify the number of spaces in the garage. It is not clear if the minimum parking requirements are being met. Lighting in the parking area needs to be identified in conformance with the code for parking lot landscaping and lighting. Are the walkway widths sufficient? One is drawn at 2.5' width.
5. Improvements Agreement - The updated pavement design needs to be submitted to check quantities. An item for the 7' vertical curb, gutter and sidewalk needs to be added. Street lights need to be added.

CITY ATTORNEY **1/18/95**
Dan Wilson **244-1505**

Development Improvements Agreement is on the old form.

MESA COUNTY SCHOOL DISTRICT #51 **1/18/95**
L.A. Grasso **242-8500**

See previous review comments.

GRAND JUNCTION DRAINAGE DISTRICT **1/18/95**
John L. Ballagh **242-4343**

Filing #1 and Filing #2 do not cover any existing or planned GJDD facilities. The "Rice Tile" and the open "Rice Drain" are existing. They lie just westerly of the GVIC canal and parallel the canal. The tile originates at the south line of the site and flows northwesterly into the open "Rice Drain" which flows into Leach Creek.

COMMUNITY DEVELOPMENT DEPARTMENT **1/19/95**
Tom Dixon **244-1447**

See attached preliminary comments.

CITY UTILITY ENGINEER **1/20/95**
Bill Cheney **244-1590**

SEWER

1. Provide coordinates, offsets from monument line, or bearings and distance to located manholes in right-of-way.
2. Provide "Utility Composite" showing existing utilities in vicinity of proposal.
3. Minimum 10" line required on 25 Road. Reduce grade to 0.20% to provide additional cover as required on other lines within development.
4. How will proposed re-routing of sewer from original ODP affect future connections to east? Show how southeast portion of property will be sewered with new alignment for lines "D" and "E".

RESPONSE TO REVIEW COMMENTS

January 26, 1995

Title: COUNTRY CROSSING, FILING TWO, Final Plat/Plan

File No: FPP-95-10

Location: SE Corner of 25 Road & G Road

The following agency comments were informational in nature, or do not require a response:

PARKS & RECREATION DEPARTMENT
GRAND VALLEY IRRIGATION CO.
SCHOOL DISTRICT 51

RESPONSE TO FIRE DEPARTMENT
All fire hydrants in filings one and two are within 1000 feet from the connecting point of the new water main, with the existing water main in 25 Road. A looped main will be accomplished as part of the next filing's water system improvements.

RESPONSE TO UTE WATER:
The 8 inch water main in Crossing Lane will be stubbed out 10 feet north of the proposed street improvement.

RESPONSE TO DEVELOPMENT ENGINEER:
1. Irrigation easements have been added to the Final Plat for use, if it is determined by the homeowners that an irrigation delivery system is required in the future.

2. The street plans have been modified to indicate the construction of a 7'-0" vertical curbwalk on portions of Country Crossing Drive and Crossing Street. The right turn lane has been modified as requested. Street sections, signage, and lighting have been added to the street plans. All storm sewer inlets have been identified as "single combination inlets". A note has been added to the plans indicating the construction of driveway approaches from the vertical curbwalk areas, in accordance with City standard construction details.

3. A paved 30 foot radius temporary turn-around has been indicated on the street plans.

4. The Site Landscaping Plan for the multi-family area has been modified to indicate the

parking dimensions, aisle widths and the number of open and garaged parking spaces. All sidewalks within the multi-family area are either three or four feet in width.

5. An updated Development Improvements Agreement has been transmitted to the Community Development Department.

RESPONSE TO CITY ATTORNEY
An updated Development Improvements Agreement has been transmitted to the Community Development Department.

RESPONSE TO COMMUNITY DEVELOPMENT:
1. The Site Landscaping Plan for the multi-family area has been modified to indicate the parking dimensions, aisle widths and the number of open and garaged parking spaces.

2. Landscape plans for the multi-family area have been transmitted to the department for review.

3. The Landscape Plan calls for the construction of a bermed and landscaped area between the townhome units and 25 Road.

4. It is the petitioner's desire to transfer ownership of the 4.91 acre parcel along the canal to the City for public use, in conjunction with the future phase(s) of development which adjoins the canal.

5. The petitioner's representative has been contacted by the US Army Corps of Engineers local office. The Corps has indicated that there would not be any impacts of future phases, as currently proposed, by the project on Leach Creek and its adjoining floodway.

6. An updated Development Improvements Agreement has been transmitted to the Community Development Department.

RESPONSE TO CITY UTILITY ENGINEER:
1. Coordinate pairs have been indicated on the Sewer and Water Plans for the location of all new manholes. — WHERE?

2. Existing utilities located within 25 Road have been added to the Sewer and Water Plans.

3. The sewer main within 25 Road has been increased in size to 10 inches in diameter and designed at a grade of 0.20%.

4. A worksheet indicating approximate manhole elevations in the southeast corner of the property has been transmitted to the department under separate cover.

RESPONSE TO REVIEW COMMENTS

January 26, 1995

Title: COUNTRY CROSSING, FILING TWO, Final Plat/Plan

File No: FPP-95-10

Location: SE Corner of 25 Road & G Road

The following agency comments were informational in nature, or do not require a response:

PARKS & RECREATION DEPARTMENT
GRAND VALLEY IRRIGATION CO.
SCHOOL DISTRICT 51

RESPONSE TO FIRE DEPARTMENT
All fire hydrants in filings one and two are within 1000 feet from the connecting point of the new water main, with the existing water main in 25 Road. A looped main will be accomplished as part of the next filing's water system improvements.

RESPONSE TO UTE WATER:
The 8 inch water main in Crossing Lane will be stubbed out 10 feet north of the proposed street improvement.

RESPONSE TO DEVELOPMENT ENGINEER:
1. Irrigation easements have been added to the Final Plat for use, if it is determined by the homeowners that an irrigation delivery system is required in the future.

2. The street plans have been modified to indicate the construction of a 7'-0" vertical curbwalk on portions of Country Crossing Drive and Crossing Street. The right turn lane has been modified as requested. Street sections, signage, and lighting have been added to the street plans. All storm sewer inlets have been identified as "single combination inlets". A note has been added to the plans indicating the construction of driveway approaches from the vertical curbwalk areas, in accordance with City standard construction details.

3. A paved 30 foot radius temporary turn-around has been indicated on the street plans.

4. The Site Landscaping Plan for the multi-family area has been modified to indicate the

parking dimensions, aisle widths and the number of open and garaged parking spaces. All sidewalks within the multi-family area are either three or four feet in width.

5. An updated Development Improvements Agreement has been transmitted to the Community Development Department.

RESPONSE TO CITY ATTORNEY
An updated Development Improvements Agreement has been transmitted to the Community Development Department.

RESPONSE TO COMMUNITY DEVELOPMENT:
1. The Site Landscaping Plan for the multi-family area has been modified to indicate the parking dimensions, aisle widths and the number of open and garaged parking spaces.

2. Landscape plans for the multi-family area have been transmitted to the department for review.

3. The Landscape Plan calls for the construction of a bermed and landscaped area between the townhome units and 25 Road.

4. It is the petitioner's desire to transfer ownership of the 4.91 acre parcel along the canal to the City for public use, in conjunction with the future phase(s) of development which adjoins the canal.

5. The petitioner's representative has been contacted by the US Army Corps of Engineers local office. The Corps has indicated that there would not be any impacts of future phases, as currently proposed, by the project on Leach Creek and its adjoining floodway.

6. An updated Development Improvements Agreement has been transmitted to the Community Development Department.

RESPONSE TO CITY UTILITY ENGINEER:
1. Coordinate pairs have been indicated on the Sewer and Water Plans for the location of all new manholes.

2. Existing utilities located within 25 Road have been added to the Sewer and Water Plans.

3. The sewer main within 25 Road has been increased in size to 10 inches in diameter and designed at a grade of 0.20%.

4. A worksheet indicating approximate manhole elevations in the southeast corner of the property has been transmitted to the department under separate cover.

STAFF REVIEW (Preliminary comments)

FILE: FPP-95-10

DATE: January 19, 1995

STAFF: Tom Dixon, AICP

REQUEST: Final Plan/Plat review for Phase II of Country Crossing consisting of 25 residential units

STAFF ANALYSIS: Phase II will provide a total of 25 residential units. These will be created by the platting of 13 single-family lots and 12 duplex lots. Access for the lots will occur by extending Country Crossing Drive to the northeast and Persigo Avenue to the south. The previously approved Phase I, which gained final approval for 28 residential units, included two single-family lots, two duplex lots, and 24 multi-family units. Since the approval did not have sufficient street plans to warrant complete acceptance by the City Engineering Department, these are being provided in conjunction with Phase II.

Planning staff issues at this time are:

1) The parking lot plan for the multi-family lots needs to identify parking stall dimensions and total parking spaces. It is unclear exactly how many garage spaces are being provided.

2) A landscaping plan for the parking lot serving the multi-family units shall be provided which meets the requirements of Section 5-5-1 of the Zoning and Development Code.

3) The area between the townhome units and 25 Road will be bermed and landscaped in order to create a better separation. This should be shown on the landscaping plan in conjunction with the parking lot.

4) The 4.91-acre parcel containing a portion of the Grand Valley Canal shall be dedicated to the public for trail use with the Phase II platting.

5) The Army Corps of Engineers is reviewing the project for potential impacts of future phases of the project on Leach Creek and its adjoining floodway. The Corps will also look at any wetlands the site may have other than those created by irrigation water ponding.

6) A Development Improvements Agreement is needed to guarantee the public street improvements required of this project.

STAFF REVIEW (Final)

FILE: FPP-95-10

DATE: February 1, 1995

STAFF: Tom Dixon, AICP

REQUEST: Final Plan/Plat review for Phase II of Country Crossing consisting of 25 residential units

LOCATION: Southeast corner of 25 and G Roads

APPLICANT: Denny Granum

EXISTING LAND USE: Residential (unfinished residential structure)/Undeveloped

PROPOSED LAND USE: Residential (single-family, duplexes, multi-family)

SURROUNDING LAND USE (AND APPROXIMATE DENSITY):
NORTH: Single-family Residential (2 units per acre)
SOUTH: Undeveloped
EAST: Single-family Residential (1 unit per acre)
WEST: Single-family Residential (4 units per acre)

EXISTING ZONING: PR-3.8

SURROUNDING ZONING:
NORTH: PR-8 and AFT (Mesa County)
SOUTH: PR-21 and AFT (Mesa County)
EAST: AFT (Mesa County)
WEST: AFT (Mesa County)

RELATIONSHIP TO COMPREHENSIVE PLAN/POLICIES/GUIDELINES:

No such plans have been adopted in this area of the City.

STAFF ANALYSIS: Phase II will provide a total of 25 residential units. These will be created by the platting of 13 single-family lots and 12 duplex lots. Access for the lots will occur by extending Country Crossing Drive to the northeast and Persigo Avenue to the south. The previously approved Phase I, which gained final approval for 28 residential units, included two single-family lots, two duplex lots, and 24 multi-family units. Since the approval did not have sufficient street plans to warrant complete acceptance by the City Engineering Department, these are being provided in conjunction with Phase II.

Planning staff issues at initial review are as follows:

1) The parking lot plan for the multi-family lots needs to identify parking stall dimensions and total parking spaces. A lighting plan for the parking lot is also needed.

2) The area between the townhome units and 25 Road is to be bermed and landscaped. This is profiled on the landscaping plan.

3) The Army Corps of Engineers is evaluating future phases of this project for potential impacts on Leach Creek and its adjoining floodway. The Corps will also look at any wetlands the site may have other than those created by irrigation water ponding. Phases I and II are not impacted by the floodway or wetlands.

4) A joint Development Improvements Agreement is needed for both Phase I and II to guarantee the necessary public street improvements required of this project. Presently, there is no DIA for Phase I.

5) The 4.91-acre parcel containing a portion of the Grand Valley Canal is to be dedicated to the public for trail use. This trail is identified as a proposed Off-Road Bike Pedestrian Route in the Multi-Modal Transportation Study for the Grand Junction/Mesa County Urbanized Area.

STAFF RECOMMENDATION:

Approval of the Final Plan/Plat for the Country Crossing Subdivision, Phase II, subject to satisfaction of the following issues:

1) The 4.91-acre open space area along the Grand Valley Canal proposed by the petitioner to be dedicated to the City of Grand Junction for trail and park use purposes shall be deeded to the City prior to or in conjunction with Phase II platting.

2) A joint Development Improvements Agreement (DIA) for Phases I and II which will guarantee the necessary public improvements that are needed for this project and which will directly benefit this project shall be entered into between the petitioner and the City prior to platting of either phase.

3) Issues and/or concerns presented by the City of Grand Junction Fire Department, Parks and Recreation Department, Development Engineer, and Utility Engineer; the Grand Valley Irrigation Company, the Ute Water District; and the Grand Junction Drainage District are adequately satisfied.

4) The minimum building setbacks for Phase II will be as follows:

front yards = 15 feet
garages = 20 feet
side yards = 5 feet
rear yards = 10 feet

5) The landscaping for the parking lot for the multi-family units and for the drainageway located between those units and 25 Road shall substantially adhere to the submitted landscaping plan.

SUGGESTED PLANNING COMMISSION MOTION:

Mr. Chairman, on item #FPP 10-95, I move that we approve the Final Plat for Country Crossing Subdivision, Phase II, subject to staff recommendations.

* Drainage fee required with this project

LANDdesign Limited
200 North 6th. Street, Grand Junction, CO 81501
(303) 245-4099

January 3, 1995

City of Grand Junction
Planning Commission
250 North 5th. Street
Grand Junction, CO 81501

RE: COUNTRY CROSSING, FILING TWO, FINAL PLAT AND PLAN

Dear Members:

Accompanying is the final plat and plan for Country Crossing, Filing Two located southeast of 25 Road and G Road.

Filing Two consists of 21 dwelling units on 3.78 acres. The lot configuration for this filing is unchanged in relationship with the overall preliminary plan which was approved by the Planning Commission in December. A Land Use Summary for Filing Two follows:

USE	AREA in acres	% OF TOTAL
Single Family Lots	2.10	55.6
Duplex Units	0.86	22.7
Streets	0.77	20.4
Private Open Space	0.05	1.3
TOTAL	3.78	100.0
Single Family Lots	13	
Duplex Lots	8	
TOTAL UNITS	21	
Density	5.5 du/ac	

We have taken the liberty by including street, grading, utility and landscape plans for filing one improvements with this application for public review.

The applicant, Mr. Denny Granum, and will be present at the scheduled public meetings to discuss this application and answer any questions which may arise.

Respectfully,

Thomas A. Logue

Thomas A. Logue

xc: Denny Granum

To: Marcia Rabideaux
Cc: Tom Dixon
From: Jody Kliska
Subject: FPP-95-10 Country Crossing
Date: 1/17/95 Time: 4:56p

Plats - Contain dedications for utility and irrigation easements, none are shown on the drawing.

Filing One Street Plan & Profile - Vertical curb is required on Country Circle within the 52' right-of-way. Shading on redlined plans indicates the limits. The right turn lane needs to be designed with a 15:1 taper, a 12' wide turn lane 100' in length. Appropriate striping and signing is the responsibility of the developer and must be shown on the plans. No typical sections are shown for 25 Road, Persigo Ave., Crossing Lane. Pavement design must be updated and shown on the plans. Signing and street lights need to be indicated on the plans. Inlets need to be identified as single, combination inlets. The driveways to the multifamily area need to be curb cuts. Vertical curb should be maintained along this frontage.

Filing Two Street Plan & Profile - No typical section and pavement section shown for Country Circle. The temporary turn around must be paved. Signs and street lights must be indicated.

Multifamily area - The site plan needs to show the parking dimensions, aisle widths, identify the number of spaces in the garage. It is not clear if the minimum parking requirements are being met. Lighting in the parking area needs to be identified in conformance with the code for parking lot landscaping and lighting. Are the walkway widths sufficient? One is drawn at 2.5' wide.

Improvements Agreement - The updated pavement design needs to be submitted to check quantities. An item for the 7' vertical curb, gutter and sidewalk needs to be added. Street lights need to be added.

Grand Junction Community Development Department
Planning • Zoning • Code Enforcement
250 North Fifth Street
Grand Junction, Colorado 81501-2668
(970) 244-1430 FAX (970) 244-1599

January 18, 1996

Denny Granum
Monument Realty, Inc.
759 Horizon Drive, Suite A
Grand Junction CO 81506

Re: Country Crossing Filing #2 (Our File #FPP-95-10)

Dear Mr. Granum:

This letter is to confirm our discussion regarding the status of approvals for the above project. As you are aware, Filing #2 received final approval on February 7, 1996. By ordinance, final plat approval is valid for one year or as per an approved development schedule. In the case of Filing #2, one year is the prescribed approval date, however, we understand that you will be submitting a revised final plan/plat for Filing #1 for the March Planning Commission hearing. In order to preserve the approvals for Filing #2 while the revised Filing #1 is being processed, we agree to permit the following schedule for filings #1 & #2:

- *February 1, 1996* - submittal deadline for the revised Filing #1. A request for an amended Preliminary Plan which reflects the desired changes in phasing must accompany the Filing #1 submittal.

- *March 5, 1996* - Planning Commission hearing on the amended Preliminary Plan and the Final Plan/Plat for Filing #1.

- *April 1, 1996* - deadline for recording of the Filing #1 & #2 plats.

The approval period for the revised Filing #1 will be one year. Failure to record the Filing #2 plat by April 1,1996 will result in the expiration of final approval for that filing. If Filing #1 is deemed incomplete upon submittal or should be pulled from the March Planning Commission hearing for any reason, the Filing #2 approval will expire as scheduled on February 7th.

Please do not hesitate to contact me should you have any questions or require further explanation of any items. Thank you in advance for your cooperation.

Sincerely yours,

Michael T. Drollinger
Senior Planner

cc: Phil Hart, LANDesign
[redacted]

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