Table of Contents

File 1994-0035 Name: North Valley Subdivision – Final Plat/Plan

Present	Scanned	A few items are denoted with an asterisk (*), which means they are to be scanned for permanent record on the ISYS retrieval system. In some instances, items are found on the list but are not present in the scanned electronic development file because they are already scanned elsewhere on the system. These scanned documents are denoted with (**) and will be found on the ISYS query system in their designated categories. Documents specific to certain files, not found in the standard checklist materials, are listed at the bottom of the page. Remaining items, (not selected for scanning), will be listed and marked present. This index can serve as a quick guide for the contents of each file.
X	X	**Table of Contents**
		***Review Sheet Summary**
X	X	***Application form**
X		Review Sheets
X		Receipts for fees paid for anything
X	X	***Submittal checklist**
X	X	***General project report**
		Reduced copy of final plans or drawings
X		Reduction of assessor's map.
		Evidence of title, deeds, easements
X	X	***Mailing list to adjacent property owners**
		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 non-bound reports
		Traffic studies
X	X	***Review Comments**
X	X	***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**

DOCUMENT DESCRIPTION:

X	X	Planning Commission Minutes – 7/5/94 - **	X	X	Su bsurface Soils Exploration – 5/26/94
X	X	Composite Plan	X	X	Final Drainage Report – 5/31/94
X		Re-imbursement Agreement – Bk 2146 / Pg 738	X	X	North Valley Plan – to be sent to GIS for scanning of pertinent documents and returned
X		Requests for Disbursement-construction loan draw request-Mesa National Bank	X		Notice of Public Hearing mail-out – 6/24/94
X		Declaration of of Covenants – Bk 2110 / Pg 903			
X	X	Certification of Plat			
X		Posting of Public Notice Signs – 4/21/94			
X		Treasurer's Certificate of Taxes Due – 5/26/94			
X		Commitment for Title Ins. – 3/17/94			
X	X	Correspondence			
X	X	Checking the Inlets Capacity for North Valley Sub.			
X		E-mails			
X	X	North Valley Subdivision – filing one, filing two - ** - GIS Historical files			

DEVELOPMENT APPLICATION

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

Original
Do NOT Remove
From Office

Receipt 1277
Date 6-3-94
Rec'd By MP
File No. #35 94(3)

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
[X] Subdivision Plat/Plan	[ ] Minor [X] Major [ ] Resub	2 plats 10 acres	24 3/4 Rd N of G	PR	Residential
[ ] Rezone				From: To:	
[X] Planned Development	[ ] ODP [ ] Prelim [X] Final	"	"	"	"
[ ] Conditional Use					
[ ] Zone of Annex					
[ ] Text Amendment					
[ ] Special Use					
[ ] Vacation					[ ] Right-of-Way [ ] Easement

[X] PROPERTY OWNER	[X] DEVELOPER	[X] REPRESENTATIVE
G Road LLC	G Road LLC	Rolland Engineering
Name	Name	Name
22 Pyramid Road	1401 N 1st	405 Ridges Blvd.
Address	Address	Address
Aspen, CO 81611	Grand Junction, CO 81501	Grand Jct., CO 81503
City/State/Zip	City/State/Zip Chris Carnes	City/State/Zip
(303) 241-4000(Remax)	(303)241-4000(Remax)	(303)243-8300
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.

X _____ 5/24/94
Signature of Person Completing Application — Date

X _____ 5/24/94

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

#35-94

Bonny Austin
743 24 3/4 Road
Grand Junction, CO 81505

Payton & Barbara Roberson
717 24 3/4 Road
Grand Junction, CO 81505

Lambert & Madeline Diettrich
3154 Lakeside Dr. #103
Grand Junction, CO 81506

Fountainhead Development Corp.
1133 Patterson Road, #1
Grand Junction, CO 81506

Danny & Starlyn Gillespie
712 24 3/4 Road
Grand Junction, CO 81505

Phillip & Margie Hagen
714 24 3/4 Road
Grand Junction, CO 81505

Ethel A. Boydstun
2454 "G" Road
Grand Junction, CO 81505

Ona Dawson
1509 W Sherwood Dr.
Grand Junction, CO 81501

Alton E. Pettyjohn
736 24 3/4 Raod
Grand Junction, CO 81505

Linda Yeager
2466 "G" Road
Grand Junction, CO 81505

Clarence & Myrna Chamblee
720 24 1/2 Road
Grand Junction, CO 81505

Tracy R. Steele
735 24 3/4 Road
Grand Junction, CO 81505

George & Carrie Euler
720 24 3/4 Road
Grand Junction, CO 81505

Klara W. Nicholson
Adrian Baumgartner
P.O. Box 55382
Grand Junction, CO 81505

Carl & Debbie Boydstun
562 Court Road
Grand Junction, CO 81501

G Road LLC
22 Pyramid Road
Aspen, CO 81611

G Road LLC
c/o Remax - Chris Carnes
1401 N 1st Street
Grand Junction, CO 81501

Rolland Engineering
405 Ridges Boulevard
Grand Junction, CO 81503

City of Grand Junction
Community Development Dept.
250 N 5th Street
Grand Junction, CO 81501

6/1/94 Submit DEADLINE

SUBMITTAL CHECKLIST

MAJOR SUBDIVISION: FINAL

Location: 24 3/4 Rd - N of G Rd   Project Name: North Valley

#35 96 (3)
Original Do NOT Remove From Office

ITEMS: 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 G.V.	● Drainage District G.J.	● Water District Ute	○ 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 plus $15/par	VII-1	1																											
● Submittal Checklist*	VII-3	1																											
● 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	
● 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	
● Evidence of Title	VII-2	1			1			1																					
~~● Appraisal of Raw Land~~	VII-1	1			1	1																							
● Names and Addresses	VII-3	1																											
● Legal Description	VII-2	1			1																								
○ Deeds	VII-1	1			1			1																					
○ Easements	VII-2	1	1	1	1			1													1	1	1						
○ Avigation Easement	VII-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																											
● Improvements Agreement/Guarantee*	VII-2	1	1	1				1																					
○ 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	2	1	1	1	1	1	1	
● 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															
● 11"x17" Reduction of Final Plat	IX-15	1							8	1	1	1			1	1	1	1	1	1	1	1	1				1		
● Cover Sheet	IX-11	1	2																										
● Grading & Stormwater Mgmt Plan	IX-17	1	2															1							1	1			
● Storm Drainage Plan and Profile	IX-30	1	2															1			1	1	1						
● Water and Sewer Plan and Profile	IX-34	1	2	1			1												1	1	1	1	1					1	
● Roadway Plan and Profile	IX-28	1	2															1											
○ Road Cross-sections	IX-27	1	2																										
● Detail Sheet	IX-12	1	2																										
○ Landscape Plan	IX-20	2	1	1																									
● Geotechnical Report	X-8	1	1										1													1			
○ Phase I & II Environmental Report	X-10,11	1	1																										
● Final Drainage Report	X-5,6	1	2															1											
○ 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					

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.

PRE-APPLICATION CONFERENCE

Date: 5/11/94
Conference Attendance: Mark Y., Trevor B, Chris C, Jody K., Kathy P, Michael D
Proposal: _____
Location: _____

Tax Parcel Number: _____
Review Fee: $720 plus $15/acre
(Fee is due at the time of submittal. Make check payable to the City of Grand Junction.)

Additional ROW required? _____
Adjacent road improvements required? _____
Area identified as a need in the Master Plan of Parks and Recreation? _____
Parks and Open Space fees required? _____ Estimated Amount: _____
Recording fees required? _____ Estimated Amount: _____
Half street improvement fees required? _____ Estimated Amount: _____
Revocable Permit required? _____
State Highway Access Permit required? _____

Applicable Plans, Policies and Guidelines _____

Located in identified floodplain? FIRM panel # _____
Located in other geohazard area? _____

Located in established Airport Zone? Clear Zone, Critical Zone, Area of Influence? _____
Avigation Easement required? _____

While all factors in a development proposal require careful thought, preparation and design, the following "checked" items are brought to the petitioner's attention as needing special attention or consideration. Other items of special concern may be identified during the review process.

O Access/Parking	O Screening/Buffering	O Land Use Compatibility
O Drainage	O Landscaping	O Traffic Generation
O Floodplain/Wetlands Mitigation	O Availability of Utilities	O Geologic Hazards/Soils

O Other _____
Related Files: _____

It is recommended that the applicant inform the neighboring property owners and tenants of the proposal prior to the public hearing and preferably prior to submittal to the City.

PRE-APPLICATION CONFERENCE

WE RECOGNIZE that we, ourselves, or our representative(s) must be present at all hearings relative to this proposal and it is our responsibility to know when and where those hearings are.

In the event that the petitioner is not represented, the proposed item will be dropped from the agenda, and an additional fee shall be charged to cover rescheduling expenses. Such fee must be paid before the proposed item can again be placed on the agenda. Any changes to the approved plan will require a re-review and approval by the Community Development Department prior to those changes being accepted.

WE UNDERSTAND that incomplete submittals will not be accepted and submittals with insufficient information, identified in the review process, which has not been addressed by the applicant, may be withdrawn from the agenda.

WE FURTHER UNDERSTAND that failure to meet any deadlines as identified by the Community Development Department for the review process may result in the project not being scheduled for hearing or being pulled from the agenda.

X _____ √ _____ 5-31-94
Signature(s) of Petitioner(s) Signature(s) of Representative(s)

file in North Valley

City of Grand Junction, Colorado
250 North Fifth Street
81501-2668
FAX: (303) 244-1599

Chris Carnes
1401 N. 1st Street
Grand Junction, CO 80501

Project: **North Valley Subdivision**

Subject: **Final Acceptance**

Dear Mr. Carnes:

A final inspection of the **streets**, **drainage** and **sewer facilities** in above subdivision was conducted on April 21, 1995. As a result of this inspection, a list of remaining items was given to **Chris Carnes** for completion. These items were reinspected and found to be satisfactorily completed.

"As Built" record drawings and required test results for the streets and drainage facilities were received on June 6, 1995. These have been reviewed and found to be acceptable.

In light of the above, the streets, drainage, and sewer improvements are eligible to be accepted for future maintenance by the City of Grand Junction one year after the date of substantial completion. The date of substantial completion is **April 21, 1995**.

Your warranty obligation for all materials and workmanship for a period of one year beginning with the date of substantial completion will expire upon acceptance by the city. If you are required to replace or correct any defects which are apparent during the period of the warranty, a new acceptance date (and extended warranty period) will be established by the City.

If any of the facilities for which you have made a warranty, and for which you desire acceptance, is located anywhere other than a City right of way, at the time of acceptance you must also provide proof of good title (to be transferred to the City at the time of acceptance) as well as proof of the 'new' right of way or easement is free from hazardous, toxic or other regulated materials and substances.

Thank you for your cooperation in the completion of the work on this project.

Sincerely,

Jody Kliska
Development Engineer

Trent Prall
Acting Utility Engineer

cc: Doug Cline, Streets Superintendent
Sandi Glaze, Utility Billing Supervisor
Walt Hoyt, Senior Inspector
Jerry O'Brien, Persigo Wastewater Plant Superintendent
Kathy Portner, Planning Supervisor
Rolland Engineering, 405 Ridges Blvd, Suite A, Grand Junction, CO 81503

COLEMAN, JOUFLAS & WILLIAMS
ATTORNEYS AT LAW

Joseph Coleman
Gregory Jouflas
John Williams

2452 Patterson Road, Suite 200
P.O. Box 55245
Grand Junction, CO 81505

Telephone
(970) 242-3311

Telecopier
(970) 242-1893

May 2, 1995

Mr. Ron Maupin
City Hall
250 North 5th Street
Grand Junction, CO 81501

RE: North Valley Subdivision

Dear Mr. Maupin:

I will be representing Chris Carnes, owner of North Valley Subdivision, at the City Council meeting on May 3, 1995. North Valley Subdivision is a part of the Pomona Park Annexation. The City Council will establish zoning for North Valley Subdivision at this meeting. I anticipate a large crowd for the Pomona Park zoning issues. Consequently, please let me communicate to you, via this letter, the history of North Valley Subdivision and the views of my client. I think this communication will make for a more efficient hearing.

When Mr. Carnes purchased his 20 acres it was zoned PR-12 (12 units per acre) by the county. Mr. Carnes purchased this particular property because of its location and because of its zoning. It was, and is, important to Chris Carnes to have the flexibility that the PR-12 zoning allows. The Community Development Department now recommends to you that the North Valley Subdivision be "down zoned" to a PR-4.1 (4.1 units per acre). Mr. Carnes opposes the change in zoning. It is not what he bought. A change is also contrary to the representations that were made to him by the Grand Junction Community Development Department over the past 18 months. Mr. Carnes was continually lead to believe that he could maintain his PR-12 zone. The recommendation to PR-4.1 zoning by the Community Development Department at this time is unfair to Mr. Carnes.

To illustrate the unfairness, the following is a history of the North Valley Subdivision with attached documentation.

1. Carnes purchased his 20 acres with PR-12 zoning.

2. Believing the property would at some point be annexed to the City, Carnes agreed to the annexation of his property to the City and began the subdivision process through the Community Development Department.

3. Carnes decided to subdivide the south 10 acres of the property into single family lots. He submitted all drawings, etc., to the Community Development Department. The

Community Development Department staff, by Staff Review dated March 17, 1994, stated that existing zoning is PR-12 with no proposed change in zoning. (See Exhibit A attached).

4. The Community Development Department pulled the subdivision from the Planning Commission agenda set for April 15, 1994, because Carnes had not submitted a sketch plan for the north 10 acres which he, at that time, did not intend to immediately develop. (See letter attached as Exhibit B). In several meetings with the Community Development Department, Carnes explained that he did not know what he was going to do with the north 10 acres and did not want any sketch plan for the north 10 acres to be binding upon him. He specifically stated he did not want any submittal to effect the PR-12 zoning. Carnes was assured by Kathy Portner and Dave Thornton that submittal of the sketch plan would not effect zoning. As a result, and in reliance upon the assurances of the staff, Carnes submitted a plan for the north 10 acres. It was identical to the south 10 acres, because Chris Carnes desired to save costs of engineering and drawing for a plan that was not binding upon him anyway.

5. The Staff Review (attached as Exhibit C) dated April 27, 1994, recommends preliminary approval with a PR-12 zone.

6. The Planning Commission approved the preliminary plat for the south 10 acres with a PR-12 zoning.

7. The south 10 acres of the North Valley Subdivision was set for final plat approval on July 5, 1994. By Staff Review dated June 21, 1994, the Community Development Department recommended a zone change (for the first time) from PR-12 to PR-4.1. (See attached Exhibit D). At this same time, the City informed Chris Carnes that it would annex only the south 10 acres and would leave annexation of the north 10 acres to another time. This Staff Review was the first indication that Carnes had that the Community Development Department desired a different zoning. Carnes had always been assured by staff that the PR-12 zoning would stay intact.

8. At the Planning Commission Meeting on July 5, 1994, there was lively discussion concerning zoning change from PR-12 to PR-4.1. The Community Development Department was insistent on the change to PR-4.1, even for the north 10 acres which were not to be annexed and not part of the subdivided plat that was before the planning commission. A deal was struck. If Carnes would not object to the PR-4.1 on the south 10 acres, the City would not impose or attempt to impose it upon the north 10 acres. Little did Chris Carnes understand that by excluding the north 10 acres from that current annexation process, that he would now be facing the "down zoning" of the north 10 acres as part of the larger Pomona Park Annexation.

9. On April 4, 1995, the North Valley Subdivision went before the Grand Junction Planning Commission as part of the zoning designation on the Pomona Park Subdivision. Despite its earlier assurance (and that of the Community Development Department) of the PR-12 zone on the north 10 acres, the planning commission now recommends a PR-4.1 zone. Carnes believes that this last decision from the Planning Commission had more to do with the crowd at the meeting, the late hour of the decision and the full agenda before the commission than it did a full understanding of the history of the project and earlier decisions.

Chris Carnes has not been treated fairly. He feels deceived. To get approval on the south 10 acres, he was required to file a sketch plan with the Community Development Department for the north 10 acres, all of which was located outside of the city limits. Because he did not know how he would develop the north 10 acres in the future, he simply submitted a plan that was identical to the one he submitted for the south 10 acres. He submitted this plan to save money, but only after the Community Development Department assured him that the submittal would not effect his PR-12 zoning. In fact, it now appears that it will effect his zoning. The Community Development Department is pushing for the PR-4.1 zoning simply because this is the density submitted in the sketch plan by Chris Carnes. The result is unfair.

Mr. Carnes requests that the Council allow the continuance of the PR-12 zoning that he was assured by the City staff he would retain.

My apologies for the length of this letter. I appreciate the fact that you have read it all. It will make my job easier tomorrow at the meeting.

Sincerely,

COLEMAN, JOUFLAS & WILLIAMS

John Williams

Enclosure

SUBSURFACE SOILS EXPLORATION

NORTH VALLEY SUBDIVISION

GRAND JUNCTION, CO

Prepared For:

ROLLAND ENGINEERING
405 RIDGES BLVD.
GRAND JUNCTION, CO

Prepared By:

LINCOLN-DeVORE, INC.
1441 Motor Street
Grand Junction, CO 81505

MAY 26, 1994

Lincoln DeVore, Inc.
Geotechnical Consultants
1441 Motor St.
Grand Junction, CO 81505

TEL: (303) 242-8968
FAX: (303) 242-1561

May 26, 1994

Rolland Engineering
405 Ridges Blvd.
Grand Junction, CO 81503

Re: Subsurface Soils Exploration
North Valley Subdivision
Grand Junction, CO

Gentlemen:

Transmitted herein are the results of a Subsurface Soils Exploration for the proposed construction of North Valley Subdivision, a single family residential subdivision to contain approximately 38 building sites.

If you have any questions after reviewing this report, please feel free to contact this office at any time. This opportunity to provide Geotechnical Engineering services is sincerely appreciated.

Respectfully submitted,
LINCOLN-DeVORE, INC.

By: Edward M. Morris
Edward M. Morris, E.I.T.
Western Slope Branch Manager
Grand Junction, Office

Reviewed by: George D. Morris 5/31/94
George D. Morris, P.E.
Colorado Springs Office

GEORGE D. MORRIS
STATE OF COLORADO

LD Job #80635-J

EMM/ss

Lincoln DeVore, Inc.
Geotechnical Consultants
1441 Motor St.
Grand Junction, CO 81505

TEL: (303) 242-8968
FAX: (303) 242-1561

May 26, 1994

Rolland Engineering
405 Ridges Blvd.
Grand Junction, CO 81503

Re: Subsurface Soils Exploration
North Valley Subdivision
Grand Junction, CO

Gentlemen:

Transmitted herein are the results of a Subsurface Soils Exploration for the proposed construction of North Valley Subdivision, a single family residential subdivision to contain approximately 38 building sites.

If you have any questions after reviewing this report, please feel free to contact this office at any time. This opportunity to provide Geotechnical Engineering services is sincerely appreciated.

Respectfully submitted,
LINCOLN-DeVORE, INC.

By: _____
Edward M. Morris, E.I.T.
Western Slope Branch Manager
Grand Junction, Office

Reviewed by: _____
George D. Morris, P.E.
Colorado Springs Office

LD Job #80635-J

EMM/ss

TABLE OF CONTENTS

INTRODUCTION

PROJECT DESCRIPTION

This report presents the results of our geotechnical evaluation performed to determine the general subsurface conditions of the site applicable to construction of a single family residential subdivision containing approximately 38 building sites. A vicinity map is included in the Appendix of this report.

To assist in our exploration, we were provided with a copy of the preliminary plat prepared by Rolland Engineering. The Boring Location Plan attached to this report is based on that plan provided to us.

We understand that the proposed structures will consist of one and two story, wood framed structures with no basements and the possibility of concrete floor slabs-on-grade. Lincoln DeVore has not seen a full set of building plans, but structures of this type typically develop wall loads on the order of 600 to 1700 plf and column loads on the order of 5 to 16 kips.

The characteristics of the subsurface materials encountered were evaluated with regard to the type of construction described above. Recommendations are included herein to match the described construction to the soil characteristics found. The information contained herein may or may not be valid for other purposes. If the proposed site use is changed or types of construction proposed, other than noted herein, Lincoln DeVore should be contacted to determine if the information in

this report can be used for the new construction without further field evaluations.

PROJECT SCOPE

The purpose of our exploration was to evaluate the surface and subsurface soil and geologic conditions of the site and, based on the conditions encountered, to provide recommendations pertaining to the geotechnical aspects of the site development as previously described. The conclusions and recommendations included herein are based on an analysis of the data obtained from our field explorations, laboratory testing program, and on our experience with similar soil and geologic conditions in the area.

The scope of our geotechnical exploration consisted of a surface reconnaissance, a geophoto study, subsurface exploration, obtaining representative samples, laboratory testing, analysis of field and laboratory data, and a review of geologic literature.

Specifically, the intent of this study is to:

1. Explore the subsurface conditions to the depth expected to be influenced by the proposed construction.
2. Evaluate by laboratory and field tests the general engineering properties of the various strata which could influence the development.
3. Define the general geology of the site including likely geologic hazards which could have an effect on site development.
4. Develop geotechnical criteria for site grading and earthwork.
5. Identify potential construction difficulties and provide recommendations concerning these problems.

6. Recommend an appropriate foundation system for the anticipated structure and develop criteria for foundation design.

FIELD EXPLORATION AND LABORATORY TESTING

A field evaluation was performed on May 19, 1994, and consisted of a site reconnaissance by our geotechnical personnel and the drilling of 5 shallow exploration borings. These shallow exploration borings were drilled within the proposed building envelopes near the locations indicated on the Boring Location Plan and along 24-3/4 Road which is to be improved. The exploration borings were located to obtain a reasonably good profile of the subsurface soil conditions. All exploration borings were drilled using a CME 45B, truck mounted drill rig with continuous flight auger to depths of approximately 8 to 18 feet. Samples were taken with a standard split spoon sampler, California lined sampler, thin wall Shelby tubes, and by bulk methods. Logs describing the subsurface conditions are presented in the attached figures.

Laboratory tests were performed on representative soil samples to determine their relative engineering properties. Tests were performed in accordance with test methods of the American Society for Testing and Materials or other accepted standards. The results of our laboratory tests are included in this report. The in-place moisture content and the standard penetration test values are presented on the attached drilling logs.

FINDINGS

SITE DESCRIPTION

The project site is located in the Southwest Quarter of the Southeast Quarter of Section 33, Township 1 North, Range 1 West of the Ute Principal Meridian, in Mesa County, Colorado. More specifically the site is located on the East side of 24-3/4 Road and approximately 800 feet North of G Road. The tract is approximately 3 to 3-1/2 miles Northwest of the main downtown business district of the City of Grand Junction and is within the City of Grand Junction limits.

The topography of the site is relatively flat, being located on an outwash plain of ancient mud flows which originated in the Bookcliffs to the North. The ground surface in the vicinity of the site has an overall gradient to the South. The exact direction of surface runoff on this site will be controlled to an extent by the proposed new construction and will be variable. Surface and subsurface drainage on this site can be described as poor.

GENERAL GEOLOGY AND SUBSURFACE DESCRIPTION

The geologic materials encountered under the site consist of a thick sequence of alluvial soils which overlie the Mancos Shale Formation which is bedrock beneath this site. The geologic and engineering properties of the materials found in our 5 shallow exploration borings will be discussed in the following sections.

The soils on this site consist of a series of silty clay and sandy silt soils which are a product of

mud flow/debris flow features which originate on the south-facing slopes of the Bookcliffs. These mud flow/debris flow features are a small part of a very extensive mud flow/debris flow complex along the base of the Bookcliffs and extending to the Colorado River. Utilizing recent events and standard evaluation techniques, this tract is not considered to be within with an active debris flow hazard area. The surface soils are an erosional product of the upper Mancos Shale and the Mount Garfield Formations which are exposed on the slopes of the Bookcliffs. The soils contained within these mud flow/debris flow features normally exhibit a metastable condition which can range from very slight to severe. Metastable soil is subject to internal collapse and is very sensitive to changes in the soil moisture content. Based on the field and laboratory testing of the soils on this site, the severity of the metastable soils can be described as slight.

The alluvial soils encountered in the exploration borings can be broadly described as sandy silts and silty clays with relatively thin interbeds of silty sand. For purposes of this report, these soils have been grouped together and designated Soil Type I.

This Soil Type was classified as a sandy silt (ML) under the Unified Classification System. This material is of very low plasticity, of low to moderate permeability, and was encountered in a low density, wet condition. If this soil is found in a relatively dry condition, it may undergo mild expansion with the entry of small amounts of moisture, but will undergo long-term consolidation upon the addition of larger amounts of

moisture. This soil will settle after being loaded. The maximum allowable bearing capacity for this soil was found to be 1000 psf, with 150 psf minimum dead load pressure required. The finer grained portion of Soil Type I contains sulfates in detrimental quantities.

These alluvial soils overlie the Mancos Shale Formation which is considered bedrock beneath this site. The Mancos Shale Formation was not encountered in any of the exploration borings, to the depths drilled. Based on information from nearby sites, it is anticipated the expansive clays of the Mancos Shale Formation are deeper than 25 feet below the existing ground surface. It is not anticipated the expansive clays of the formational shale will affect the construction and performance of foundations within this subdivision.

The lines defining the change between soil types or rock materials on the attached boring logs and soil profiles are determined by interpolation and therefore are approximations. The transition between soil types may be abrupt or may be gradual.

The boring logs and related information show subsurface conditions at the date and location of this exploration. Soil conditions may differ at locations other than those of the exploratory borings. If the structure is moved any appreciable distance from the locations of the borings, the soil conditions may not be the same as those reported here. The passage of time may also result in a change in the soil conditions at the boring locations.

GROUND WATER:

A free water table came to equilibrium during drilling at 5-1/2 to 8 feet, with saturated soils at 3-1/2 to 5 feet below the present ground surface. This is probably not a true phreatic surface but is an accumulation of subsurface seepage moisture (perched water). In our opinion the subsurface water conditions shown are a permanent feature on this site. The depth to free water would be subject to fluctuation, depending upon external environmental effects.

Because of capillary rise, the soil zone within a few feet above the free water level identified in the borings will be quite wet. Pumping and rutting may occur during the excavation process, particularly if the bottom of the foundations are near the capillary fringe. Pumping is a temporary, quick condition caused by vibration of excavating equipment on the site. If pumping occurs, it can often be stopped by removal of the equipment and greater care exercised in the excavation process. In other cases, geotextile fabric layers can be designed or cobble sized material can be introduced into the bottom of the excavation and worked into the soft soils. Such a geotextile or cobble raft is designed to stabilize the bottom of the excavation and to provide a firm base for equipment.

Data presented in this report concerning ground water levels are representative of those levels at the time of our field exploration. Groundwater levels are subject to change seasonally or by changed environmental conditions.

Quantitative information concerning rates of flow into excavations or pumping capacities necessary to dewater excavations is not included and is beyond the scope of this report. If this information is desired, permeability and field pumping tests will be required.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL DISCUSSION

No geologic conditions were apparent during our reconnaissance which would preclude the site development as planned, provided the recommendations contained herein are fully complied with. Based on our investigation to date and the knowledge of the proposed construction, the site condition which would have the greatest effect on the planned development is the low density soils and the very high water table.

Since the exact magnitude and nature of the foundation loads are not precisely known at the present time, the following recommendations must be somewhat general in nature. Any special loads or unusual design conditions should be reported to Lincoln DeVore so that changes in these recommendations may be made, if necessary. However, based upon our analysis of the soil conditions and project characteristics previously outlined, the following recommendations are made.

OPEN FOUNDATION OBSERVATION

Since the recommendations in this report are based on information obtained through random borings, it is possible that the subsurface materials between the boring points could vary. Therefore, prior to placing forms or pouring concrete, an open excavation observation should be performed by representatives of Lincoln DeVore. The purpose of this observation is to determine if the subsurface soils directly below the proposed foundations are similar to those encountered in our exploration borings. If the materials below the proposed founda-

tions differ from those encountered, or in our opinion, are not capable of supporting the applied loads, additional recommendations could be provided at that time.

DRAINAGE AND GRADIENT:

Adequate site drainage should be provided in the foundation area within each building site both during and after construction to prevent the ponding of water and the saturation of the subsurface soils. We recommend that the ground surface around the structure be graded so that surface water will be carried quickly away from the building. The minimum gradient within 10 feet of the building will depend on surface landscaping. We recommend that paved areas maintain a minimum gradient of 2%, and that landscaped areas maintain a minimum gradient of 8%. It is further recommended that roof drain downspouts be carried across all backfilled areas and discharged at least 10 feet away from the structure. Proper discharge of roof drain downspouts may require the use subsurface piping in some areas. Planters, if any, should be so constructed that moisture is not allowed to seep into foundation areas or beneath slabs or pavements.

If adequate surface drainage cannot be maintained, or if subsurface seepage is encountered during excavation for foundation construction, a full perimeter drain is recommended for this building. It is recommended that this drain consist of a perforated drain pipe and a gravel collector, the whole being fully wrapped in a geotextile filter fabric. We recommend that this drain be constructed with a gravity outlet. If sufficient grade does not exist on the site for a gravity

outlet, then a sealed sump and pump is recommended. Under no circumstances should a dry well be used on this site.

The high water level found on this site should be controlled to prevent large upward fluctuations of this water surface. For this purpose, we recommend that this be accomplished by construction of an area drain beneath the building areas for any structures with a finished floor or crawl space elevation within 2 feet of the high ground water level. To control water surface movement, it is recommended that the drain outfall in a free gravity drain. If a gravity outfall is not possible, a sealed sump and pump is recommended to remove the water.

Should an automatic lawn irrigation system be used on this site, we recommend that the sprinkler heads be installed no less than 5 feet from the building. In addition, these heads should be adjusted so that spray from the system does not fall onto the walls of the building and that such water does not excessively wet the backfill soils.

It is recommended that lawn and landscaping irrigation be reasonably limited, so as to prevent complete saturation of subsurface soils. Several methods of irrigation water control are possible, to include, but not limited to:

* Metering the Irrigation water.
* Sizing the irrigation distribution service piping to limit on-site water usage.
* Encourage efficient landscaping practices.
* Enforcing reasonable limits on the size of high water usage landscaping for each lot and any park areas.

EXCAVATION & STRUCTURAL FILL:

Subgrade

Site preparation in all areas to receive structural fill should begin with the removal of all topsoil, vegetation, and other deleterious materials. Prior to placing any fill, the subgrade should be observed by representatives of Lincoln DeVore to determine if the existing vegetation has been adequately removed and that the subgrade is capable of supporting the proposed fills. The subgrade should then be scarified to a depth of 10 inches, brought to near optimum moisture conditions and compacted to at least 90% of its maximum modified Proctor dry density [ASTM D-1557]. The moisture content of this material should be within + or - 2% of optimum moisture, as determined by ASTM D-1557.

Structural Fill

In general, we recommend all structural fill in the area beneath any proposed structure or roadway be compacted to a minimum of 90% of its maximum modified Proctor dry density (ASTM D1557). We recommend that fill be placed and compacted at approximately its optimum moisture content (+/-2%) as determined by ASTM D 1557. Structural fill should be a granular, coarse grained, non-free draining, non-expansive soil. This structural fill should be placed in the overexcavated portion of this site in lifts not to exceed 6 inches after compaction. This Structural Fill must be brought to the required density by mechanical means. No soaking, jetting or puddling techniques of any

type should be used in placement of fill on this site.

Non-Structural Fill

We recommend that all backfill placed around the exterior of the building, and in utility trenches which are outside the perimeter of the building and not located beneath roadways or parking lots, be compacted to a minimum of 80% of its maximum modified Proctor dry density (ASTM D-1557).

Fill Limits

To provide adequate lateral support, we recommend that the zone of overexcavation extend at least 3 feet beyond the perimeter of the building on all sides. The Structural Fill should be a minimum of 3 feet in final compacted thickness.

No major difficulties are anticipated in the course of excavating into the surficial soils on the site. It is probable that safety provisions such as sloping or bracing the sides of excavations over 4 feet deep will be necessary. Any such safety provisions shall conform to reasonable industry safety practices and to applicable OSHA regulations. The OSHA Classification for excavation purposes on this site is Soil Class C.

Field Observation & Testing:

During the placement of any structural fill, it is recommended that a sufficient amount of field tests and observation be performed under the direction of the geotechnical engineer. The geotechnical engineer should determine the amount of observation time and field density tests required to

determine substantial conformance with these recommendations. It is recommended that surface density tests be taken at maximum 2 foot vertical interval.

The opinions and conclusions of a geotechnical report are based on the interpretation of information obtained by random borings. Therefore the actual site conditions may vary somewhat from those indicated in this report. It is our opinion that field observations by the geotechnical engineer who has prepared this report are critical to the continuity of the project.

Slope Angles

Allowable slope angle for cuts in the native soils is dependent on soil conditions, slope geometry, the moisture content and other factors. Should deep cuts be planned for this site, we recommend that a slope stability analysis be performed when the location and depth of the cut is known.

FOUNDATIONS

Assuming that some amount of differential movement can be tolerated, then a conventional shallow foundation system, possibly underlain by structural fill if required by the geotechnical engineer, placed in accordance with the recommendations contained within this report may be utilized. The foundation would consist of continuous spread footings beneath all bearing walls and isolated spread footings beneath all columns and other points of concentrated load. Such a shallow foundation system, resting on the properly constructed structural fill, may be designed on the basis of an allowable bearing capacity of 1000 psf maximum.

Recommendations pertaining to balancing, reinforcing, drainage, and inspection are considered extremely important and must be followed. Contact stresses beneath all continuous walls should be balanced to within + or - 150 psf at all points. Isolated interior column footings should be designed for contact stresses of about 150 psf less than the average used to balance the continuous walls. The criteria for balancing will depend somewhat on the nature of the structure.

Single-story, slab-on-grade structures may be balanced on the basis of dead load only. Multi story structures may be balanced on the basis of dead load plus one half live load, for up to and including two stories.

If it is desired to utilize structural fill beneath any buildings on this site, the recommendations of a previous section of this report, entitled Excavation and Struc-

tural Fill, should be followed. The amount of soil bearing capacity improvement which can be realized is dependent upon the amount of structural fill used and the actual building configuration.

Structural Slab

If the design of the upper structure is such that loads can be balanced reasonably well, a floating structural slab type of foundation could be used on this site. Such a slab would require heavy reinforcing to resist differential bending along the rim wall. It is possible to design such a slab either as a thickened edge only, a solid or a ribbed slab. A rim wall must be used for confinement purposes. Any such slab must be specifically designed for the anticipated loading.

Such a foundation system may settle to some degree however, the use of a structural fill beneath the slab and rim wall will help reduce settlement and hold differential movement to a minimum. Relatively large slabs will tend to experience minor cracking and heave of lightly loaded interior portions, unless the slabs are specifically designed with this movement in mind.

The placement of a geotextile fabric for separation between the native soils and the structural fill may be recommended to aid the fill placement and to improve the stability of the completed fill.

When The structural fill is completed

and if the fill is a minimum of 2 feet in thickness below the footing areas, an allowable bearing capacity of 1700 psf maximum may be assumed for proportioning the footings.

The placement of the structural fill a minimum of two feet beyond the edge of the structural slab should provide additional support for the eccentrically placed wall loads on the slab edges.

SETTLEMENT:

Close estimates of total and differential settlement will not be provided in this report since Lincoln DeVore has not been given exact foundation loads. Upon completion of the structural plans, the predicted settlements can be supplied upon request.

FROST PROTECTION

We recommend that the bottom of all foundation components rest a minimum of 2 feet below finished grade or as required by the local building codes. Foundation components must not be placed on frozen soils.

Monolithic slab-on-grade foundation systems typically have an effective soil cover of less than 12 inches. Under normal use, the building and foundation system radiates sufficient heat that frost heave from the underlying

soils is not normally a problem. However, additional protection can be provided by applying an insulation board to the exterior of the foundation and extending this board to approximately 18 inches below the final ground surface grade. This board may be applied either prior to or after the concrete is cast and it is very important that all areas of soil backfill be compacted. Local building officials should be consulted for regulatory frost protection depths.

CONCRETE SLABS ON GRADE

Slabs could be placed directly on the natural soils or on a structural fill. We recommend that all slabs on grade be constructed to act independently of the other structural portions of the building. One method of allowing the slabs to float freely is to use expansion material at the slab-structure interface.

Any partitions which will be located on slabs on grade should be constructed with a minimum space of 1-1/2 inches at the bottom of the wall. This space should allow for any future potential upward movement of the floor slabs and minimize damage to the walls and roof sections above the slabs. If a structural fill is placed beneath the slab, the geotechnical engineer may determine that this space between the slab and the wall may not be required.

It is recommended that slabs on grade be constructed over a capillary break of approximately 6 inches in thickness. We recommend that the material used to form the capillary break be free draining, granular material and not contain significant fines. A free draining outlet is also recommended for this break so that it will not trap water beneath the slab. A vapor barrier is recommended beneath the floor slab and above the capillary break. To prevent difficulty in finishing concrete, a 2 inch sand layer should be placed above the break. An alternate method of reducing finishing problems would be to place the vapor barrier beneath approximately 6 inches of a minus 3/4 inch gravel fill. This method must be very carefully accomplished to minimize excessive puncturing and tearing of the vapor barrier. This

vapor barrier and capillary break may be incorporated into any structural fill which is placed beneath the slab.

It is recommended that floor slabs on grade be constructed with control joints placed to divide the floor into sections not exceeding 360 square feet, maximum. Also, additional control joints are recommended at all inside corners and at all columns to control cracking in these areas.

Problems associated with slab 'curling' are usually minimized by proper curing of the placed concrete slab. This period of curing usually is most critical within the first 5 days after placement. Proper curing can be accomplished by continuous water application to the concrete surface or by the placement of a 'heavy' curing compound, formulated to minimize water evaporation from the concrete. Curing by continuous water application must be carefully undertaken to prevent the wetting or saturation of the subgrade soils.

EARTH RETAINING STRUCTURES

The active soil pressure for the design of earth retaining structures may be based on an equivalent fluid pressure of 48 pounds per cubic foot. The active pressure should be used for retaining structures which are free to move at the top (unrestrained walls). For earth retaining structures which are fixed at the top, such as basement walls, an equivalent fluid pressure of 60 pounds per cubic foot may be used. It should be noted that the above values should be modified to take into account any surcharge loads, sloping backfill or other externally applied forces. The above equivalent fluid pressures should also be modified for the effect of free water, if any.

The passive pressure for resistance to lateral movement may be considered to be 231 pcf per foot of depth. The coefficient of friction for concrete to soil may be assumed to be .27 for resistance to lateral movement. When combining frictional and passive resistance, the latter must be reduced by approximately 1/3.

Drainage behind retaining walls is considered critical. If the backfill behind the wall is not well drained, hydrostatic pressures are allowed to build up and lateral earth pressures will be considerably increased. Therefore, we recommend a vertical drain be installed behind any impermeable retaining walls. Because of the difficulty in placement of a gravel drain, we recommend the use of a composite drainage mat similar to Exxon Battledrain or Tensar MD Series NS-1100. An outfall must be provided for this drain.

REACTIVE SOILS

Since groundwater in the Grand Junction and Appleton area typically contains sulfates in quantities detrimental to a Type I cement, a Type II or Type I-II or Type II-V cement is recommended for all concrete which is in contact with the subsurface soils and bedrock. Calcium chloride should not be added to a Type II, Type I-II or Type II-V cement under any circumstances.

PAVEMENTS

Samples of the surficial native soils at this site that may be required to support pavements have been evaluated using the Hveem-Carmany method (ASTM D-2844) to determine their support characteristics. The results of the laboratory testing are as follows:

R = 20
Expansion @ 300 psi = 1.0
Displacement @ 300 psi = 3.95

No estimates of traffic volumes have been provided to Lincoln DeVore. However, we assume that the roads will be classified as residential. The design procedures utilized are those recognized by the Colorado Department of Highways and the 1986 AASHTO design procedure. The terminal Serviceability Index of 2.0, a Reliability of 70 and a design life of 20 years have been utilized, based on recommendations by the Highway Department. An 18 kip ESAL of 5, also recommended by the Highway Department, was used for the analysis.

PROPOSED PAVEMENT SECTIONS

Based on the soil support characteristics outlined above, the following pavement sections are recommended:

Residential Roadway:

3 inches of asphaltic concrete pavement
on 6 inches of aggregate base course
on 12 inches of recompacted native material

Full Depth Asphalt:

5 inches of asphaltic concrete pavement
on 12 inches of recompacted native material

Rigid Concrete:

6 inches of portland cement pavement
on 4 inches of aggregate base course
on 8 inches of recompacted native material

Due to the very high soil moisture in the subgrade soils, the use of a Geotextile Fabric for separation and minor reinforcement (such as Mirafi 500-X or 140-N), placed beneath either the Aggregate Base Course or an additional 12 inches of granular Pit Run material, will probably be required on this site.

PAVEMENT SECTION CONSTRUCTION

We recommend that the asphaltic concrete pavement meet the State of Colorado requirements for a Grade C mix. In addition, the asphaltic concrete pavement should be compacted to a minimum of 95% of its maximum Hveem density. The aggregate base course should meet the requirements of State of Colorado Class 5 or Class 6 material, and have a minimum R value of 78. We recommend that the base course be compacted to a minimum of 95% of its maximum Modified Proctor dry density (ASTM D-1557), at a moisture content within + or -2% of optimum moisture. The native subgrade shall be scarified and recompacted to a minimum of 90% of their maximum Modified Proctor day density (ASTM D-1557) at a moisture content within + or -2% of optimum moisture.

All pavement should be protected from moisture migrating beneath the pavement structure. If surface drainage is allowed to pond behind curbs, islands or other areas of the site and allowed to seep beneath pavement, premature deterioration or possibly pavement failure could result.

Concrete Pavement

We recommend that the rigid concrete pavement have a minimum flexural strength (F_t) of 650 psi at 28 days. This strength requirement can be met using Class P or AX or A or B Concrete as defined in Section 600 of the Standard Specifications for Road and Bridge Construction, Colorado DOT. It is recommended that field control of the concrete mix be made utilizing compressive strength criteria.

Flexural Strength should **only** be used for the design process. Concrete with a lower flexural strength may be allowed by the agency having jurisdiction however, the design section thicknesses should be confirmed. In addition, the final durability of the pavement should be carefully considered.

Control joints should be placed at a minimum distance of 12 feet in all directions. If it is desired to increase the spacing of control joints, then 66-66 welded wire fabric should be placed in the mid-point of the slab. If the welded wire fabric is used, the control joint spacing can be increased to 40 feet. Construction joints designed so that positive joint transfer is maintained by the use of dowels is recommended.

The concrete should be placed at the lowest slump practical for the method of placement. In all circumstances, the maximum slump should be limited to 4 inches. Proper consolidation of the plastic concrete is important. The placed concrete must be properly protected and cured.

LIMITATIONS

This report is issued with the understanding that it is the responsibility of the owner, or his representative to ensure that the information and recommendations contained herein are brought to the attention of the individual lot purchasers for the subdivision. In addition, it is the responsibility of the individual lot owners that the information and recommendations contained herein are brought to the attention of the architect and engineer for the individual projects and the necessary steps are taken to see that the contractor and his subcontractors carry out the appropriate recommendations during construction.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in acceptable or appropriate standards may occur or may result from legislation or the broadening of engineering knowledge. Accordingly, the findings of this report may be invalid, wholly or partially, by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of 3 years.

The recommendations of this report pertain only to the site investigated and are based on the assumption that the soil conditions do not deviate from those described in this report. If any variations or undesirable conditions are encountered during construction or the proposed construction will differ from that planned on the day of this

report, Lincoln DeVore should be notified so that supplemental recommendations can be provided, if appropriate.

Lincoln DeVore makes no warranty, either expressed or implied, as to the findings, recommendations, specifications or professional advice, except that they were prepared in accordance with generally accepted professional engineering practice in the field of geotechnical engineering.

SOILS DESCRIPTIONS:

SYMBOL	USCS	DESCRIPTION
		Topsoil
		Man-made Fill
	GW	Well-graded Gravel
	GP	Poorly-graded Gravel
	GM	Silty Gravel
	GC	Clayey Gravel
	SW	Well-graded Sand
	SP	Poorly-graded Sand
	SM	Silty Sand
	SC	Clayey Sand
	ML	Low-plasticity Silt
	CL	Low-plasticity Clay
	OL	Low-plasticity Organic Silt and Clay
	MH	High-plasticity Silt
	CH	High-plasticity Clay
	OH	High-plasticity Organic Clay
	Pt	Peat
	GW/GM	Well-graded Gravel, Silty
	GW/GC	Well-graded Gravel, Clayey
	GP/GM	Poorly-graded Gravel, Silty
	GP/GC	Poorly-graded Gravel, Clayey
	GM/GC	Silty Gravel, Clayey
	GC/GM	Clayey Gravel, Silty
	SW/SM	Well-graded Sand, Silty
	SW/SC	Well-graded Sand, Clayey
	SP/SM	Poorly-graded Sand, Silty
	SP/SC	Poorly-graded Sand, Clayey
	SM/SC	Silty Sand, Clayey
	SC/SM	Clayey Sand, Silty
	CL/ML	Silty Clay

ROCK DESCRIPTIONS:

SYMBOL	DESCRIPTION
	SEDIMENTARY ROCKS
	CONGLOMERATE
	SANDSTONE
	SILTSTONE
	SHALE
	CLAYSTONE
	COAL
	LIMESTONE
	DOLOMITE
	MARLSTONE
	GYPSUM
	Other Sedimentary Rocks
	IGNEOUS ROCKS
	GRANITIC ROCKS
	DIORITIC ROCKS
	GABBRO
	RHYOLITE
	ANDESITE
	BASALT
	TUFF & ASH FLOWS
	BRECCIA & Other Volcanics
	Other Igneous Rocks
	METAMORPHIC ROCKS
	GNEISS
	SCHIST
	PHYLLITE
	SLATE
	METAQUARTZITE
	MARBLE
	HORNFELS
	SERPENTINE
	Other Metamorphic Rocks

SYMBOLS & NOTES:

SYMBOL	DESCRIPTION
	9/12 Standard penetration drive Numbers indicate 9 blows to drive the spoon 12" into ground.
	ST 2-1/2" Shelby thin wall sample
	W_o Natural Moisture Content
	W_x Weathered Material
Free water	Free water table
	γ^o Natural dry density
	T.B. – Disturbed Bulk Sample
	② Soil type related to samples in report
15' W_x Form.	Top of formation
	Test Boring Location
	Test Pit Location
	Seismic or Resistivity Station. Lineation indicates approx. length & orientation of spread (S = Seismic, R = Resistivity)

Standard Penetration Drives are made by driving a standard 1.4" split spoon sampler into the ground by dropping a 140 lb. weight 30". ASTM test des. D-1586.

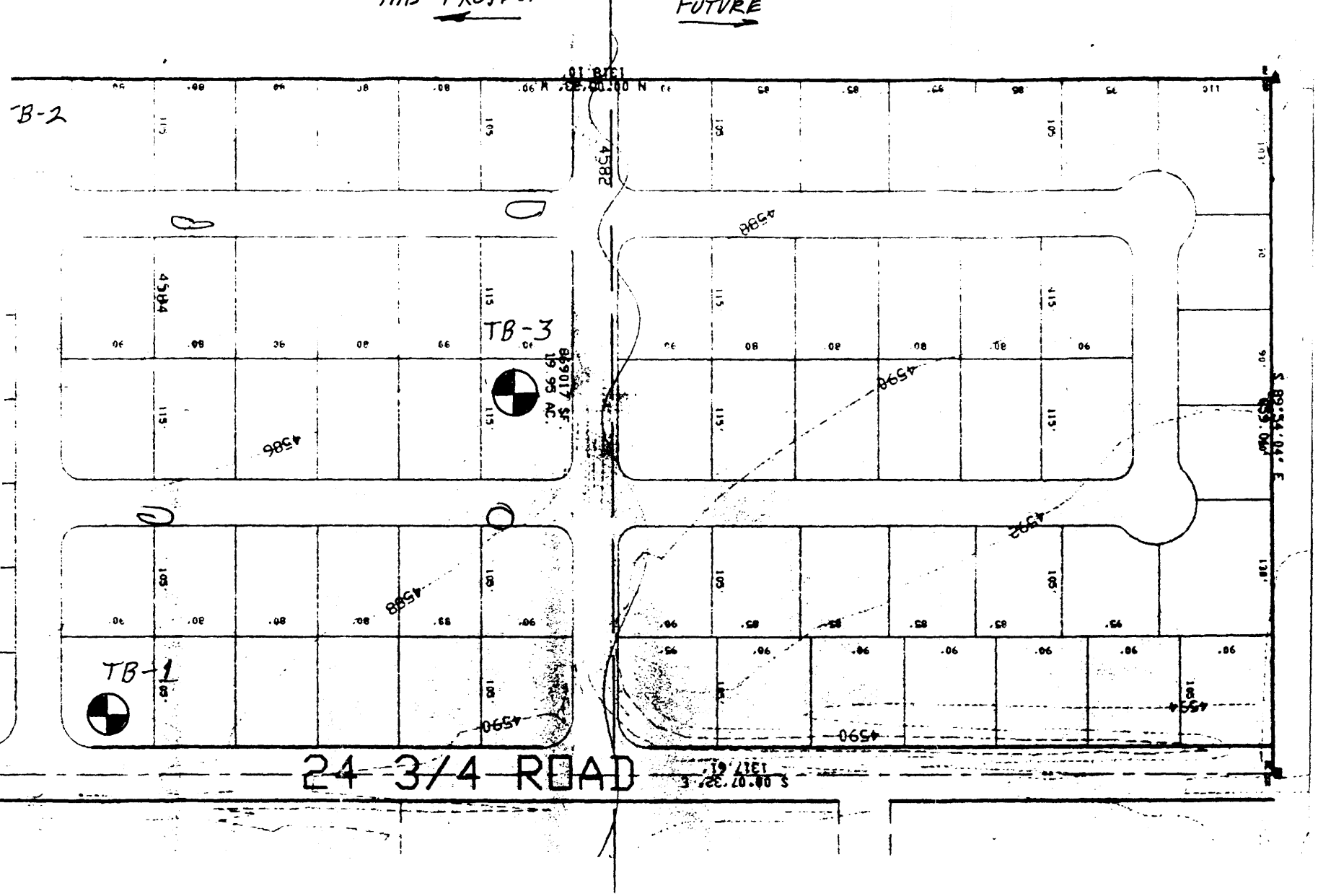
Samples may be bulk, standard split spoon (both disturbed) or 2-1/2" I.D. thin wall ("undisturbed") Shelby tube samples. See log for type.

The boring logs show subsurface conditions at the dates and locations shown, and it is not warranted that they are representative of subsurface conditions at other locations and times.

LINCOLN DeVORE TESTING LABORATORY

COLORADO: Colorado Springs, Pueblo, Glenwood Springs, Montrose, Gunnison, Grand Junction. – WYO. – Rock Springs

EXPLANATION OF BOREHOLE LOGS AND LOCATION DIAGRAMS



EXPLORATION BORING LOCATION

NORTH VALLEY SUB. GRAND JUNCTION

LINCOLN DeVORE

1441 MOTOR STREET
GRAND JCT., COLORADO
COLO. SPRINGS—PUEBLO

SUMMARY SHEET

Soil Sample SANDY SILT (ML)

Test No. 80635-J

Location North VALLEY SUB. Grd. Jct.

Date 5-24-94

Boring No. 1 Depth 3'

Sample No. I

Test by JLS

Natural Water Content (w) 22.3 %

Specific Gravity (Gs) _____

In Place Density (γ_o) 101.3 pcf

SIEVE ANALYSIS:

Sieve No.	% Passing
1 1/2"	
1"	
3/4"	
1/2"	100
4	99
10	90
20	83
40	82
100	77
200	65

HYDROMETER ANALYSIS:

Grain size (mm)	%
.02	40
.005	32

Plastic Limit P.L. 18 %

Liquid Limit L. L. 22 %

Plasticity Index P.I. 4 %

Shrinkage Limit _____ %

Flow Index _____

Shrinkage Ratio _____ %

Volumetric Change _____ %

Lineal Shrinkage _____ %

MOISTURE DENSITY: ASTM METHOD

Optimum Moisture Content - w_o _____ %

Maximum Dry Density - γ_d _____ pcf

California Bearing Ratio (av) _____ %

Swell: _____ Days _____ %

Swell against _____ psf Wo gain _____ %

BEARING:

Housel Penetrometer (av) 900 psf

Unconfined Compression (qu) _____ psf

Plate Bearing: _____ psf

Inches Settlement _____

Consolidation 1.2% under 940 psf

2.8% under 2040 psf

PERMEABILITY:

K (at 20°C) _____

Void Ratio _____

Sulfates 1000 ppm.

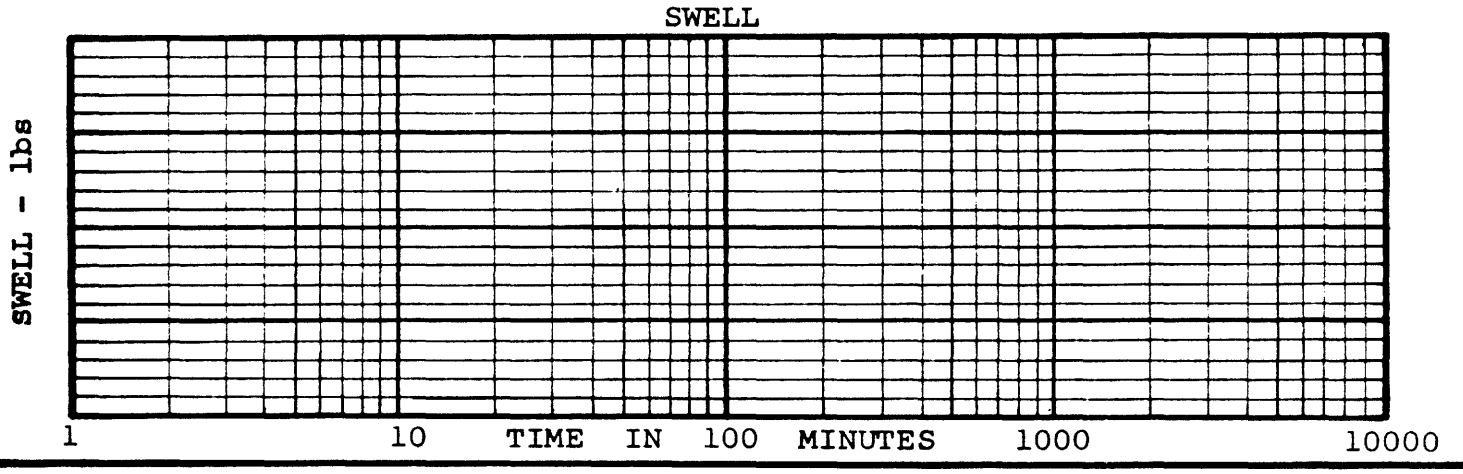
SOIL ANALYSIS

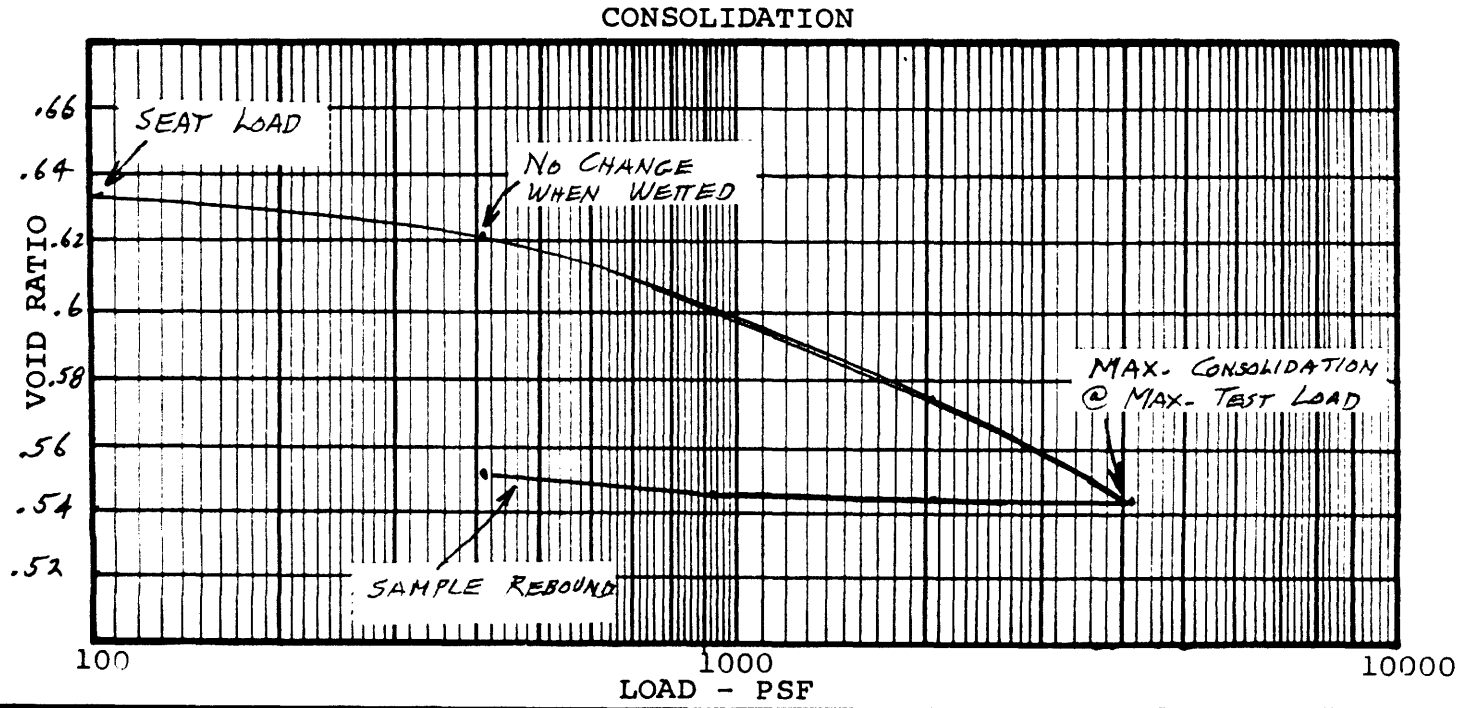
LINCOLN-DeVORE TESTING LABORATORY
COLORADO SPRINGS, COLORADO

SOIL SAMPLE Sandy Silt (ML) Test No. 90675-J

Project North Valley Sub - Grd. Jct. Date 5-20-94

Sample Location TB 1 @ 3' Test by LRS





Sample Conditions	Initial	Maximum Load	Expanded
Dry Density	101.3 pcf	107.2 pcf	106.5 pcf
% Moisture	22.3 %	20.5 %	20.6 %
% Saturation	93 %	100 %	100 %
Void Ratio	.632	.543	.552

Specific Gravity 2.65

Maximum Load used 4416 lb. Ring Number 140.30

Apparatus Densoil #3 Volume 2.5" Ring .002841 cu.ft.

LOAD - CONSOLIDATION

LINCOLN-DeVORE, INC.
COLORADO SPRINGS, COLORADO

SAMPLE: SANDY SILT (ML)

			A	B	C	D	E
TEST SPECIMAN							
DATE TESTED			5-21-94	5-21-94	5-21-94		
SPECIMEN FABRICATION	Compactor Air Pressure	psi					
	Initial Moisture	%	8.1	8.1	8.1		
	Moisture at Compaction	%	12.1	11.1	10.1		
	Briquette Height	in.	2.52	2.50	2.50		
	Density	pcf	116.9	119.5	120.9		
EXUDATION PRESSURE		psi	223	326	533		
EXPANSION PRESSURE DIAL			0.5	1.2	2.1		
STABIL-OMETER	P_h at 1000 pounds	psi	52	40	28		
	P_h at 2000 pounds	psi	127	108	85		
	Displacement	turns	4.26	3.90	3.75		
	"R" Value		13	24	37		
CORRECTED "R" VALUE							

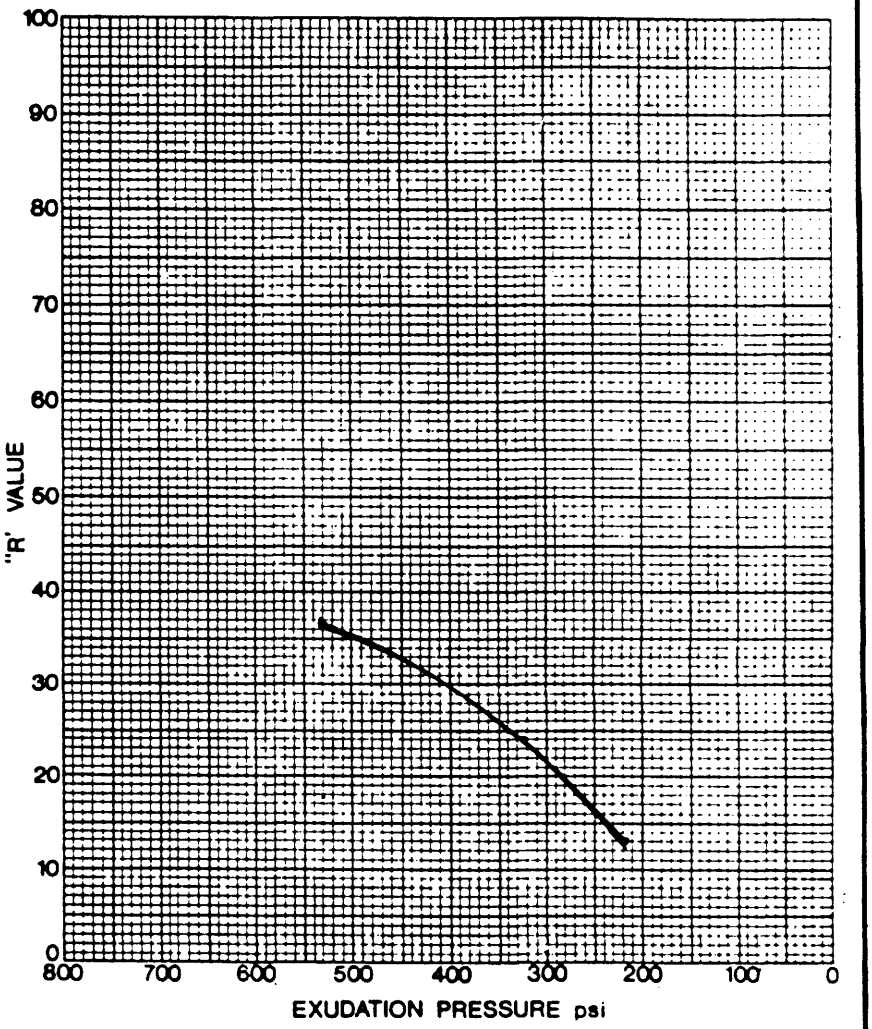
EXPANSION @ 300 PSI EXUDATION PRESSURE 1.0

DISPLACEMENT @ 300 PSI EXUDATION PRESSURE 3.95

"R: VALUE @ 300 PSI EXUDATION PRESSURE 20

1½"	
1"	
3/4"	
1/2"	
3/8"	
4	100
10	99
20	98
40	97
100	87
200	68
.02 mm	43
.005 mm	31

LIQUID LIMIT	18
PLASTIC LIMIT	22
PLASTICITY INDEX	4
SAND EQUIVALENT	



Lincoln DeVore, Inc.
Geotechnical Consultants

NORTH VALLEY SUB. - GRAND JUNCTION, CO

ROLLAND ENGINEERING

DATE 5-31-94

JOB NO. 80635-J

DRAWN EHM

BORING NO. 1

BORING ELEVATION:

DEPTH (FT.)	SOIL LOG	DESCRIPTION				BLOW COUNT	SOIL DENSITY pcf	WATER %
		Agriculturally Reworked soils on Surface						
		Debris Fan Deposits	Alluvial	Dessicated Surface				
	I	Low Density		'Capillary Fringe'		ST	101.3	22.3%
5	ML	Sandy Silt	High Sulfates			5		
		Compressible		Wet				
		Very Sandy Strata	Very Stratified					
	I	**Free Water**	Free water at sand strata		BULK			25.1%
10	ML	Sandy Silt	Saturated			10		
		Compressible	Very Soft					
		Drill Hole is squeezing Shut						
	I				BULK			26.0%
15	ML	Sandy Silt	Very Soft			15		
			Surface Soils are very					
			Susceptible to 'Pumping'					
20		TD @ 13'				20		
25						25		
30						30		

Blow Counts are cumulative for each 6 inches of sampler penetration.

Free Water @ 8'

During Drilling 5-19-94

LOG OF SUBSURFACE EXPLORATION

NORTH VALLEY SUB.
Grand Junction, Colorado

ROLLAND ENGINEERING

Date: 5-31-94

LINCOLN - DeVORE, Inc.

Grand Junction, Colorado

Job No. 80635-J

Drawn EMM

BORING NO. 2

BORING ELEVATION:

DEPTH (FT.)	SOIL LOG	DESCRIPTION				BLOW COUNT	SOIL DENSITY pcf	WATER %
		Agriculturally Reworked soils on Surface						
		Debris Fan Deposits	Dessicated Surface					
	I	Low Density	Alluvial	'Capillary Fringe'	SPT	3/6		18.6%
5	ML	Sandy Silt		High Sulfates	5	4/12		
		Free Water ▽	Wet			5/18		
			Very Stratified			6/24		
		Very Sandy Strata						
	I	Low Density			BULK			23.3%
10	ML	Sandy Silt	Saturated		10			
			Free water at sand strata					
		Compressible	Very Soft					
			Drill Hole is squeezing Shut					
	I				BULK			25.6%
15	ML	Sandy Silt			15			
		Very Soft						
			Surface Soils are very					
			Susceptible to 'Pumping'					
20		TD @ 18'			20			
25					25			
30					30			
		Blow Counts are cumulative for each						
		6 inches of sampler penetration.						
		Free Water @ 5-1/2'						
		During Drilling 5-19-94						

LOG OF SUBSURFACE EXPLORATION

NORTH VALLEY SUB.
Grand Junction, Colorado

ROLLAND ENGINEERING

Date: 5-31-94

LINCOLN - DeVORE, Inc.

Grand Junction, Colorado

Job No. 80635-J

Drawn EMM

BORING NO. 3

BORING ELEVATION:

DEPTH (FT.)	SOIL LOG	DESCRIPTION				BLOW COUNT	SOIL DENSITY pcf	WATER %
		Agriculturally Reworked soils on Surface						
		Debris Fan Deposits	Alluvial	Dessicated Surface				
	I	Low Density	Wet	High Sulfates	CS	3/6	97.8	20.0%
5	ML	Sandy Silt			5	5/12		
		Compressible	'Capillary Fringe'			6/18		
		Very Sandy Strata	Very Stratified			7/24		
		Free Water ▽	Free water at sand strata					
	I				BULK			27.1%
10	ML	Sandy Silt		Saturated	10			
		Compressible	Very Soft					
			Drill Hole is squeezing Shut					
	I				BULK			25.8%
15	ML	Sandy Silt	Very Soft		15			
			Surface Soils are very					
			Susceptible to 'Pumping'					
20		TD @ 13'			20			
25					25			
30					30			

Blow Counts are cumulative for each 6 inches of sampler penetration.

Free Water @ 7'
During Drilling 5-19-94

LOG OF SUBSURFACE EXPLORATION

LINCOLN - DeVORE, Inc.

Grand Junction, Colorado

NORTH VALLEY SUB.
Grand Junction, Colorado

ROLLAND ENGINEERING

Date: 5-31-94

Job No.: 80635-J

Drawn: EMM

BORING NO. **4 Road**

BORING ELEVATION:

DEPTH (FT.)	SOIL LOG	DESCRIPTION	BLOW COUNT	SOIL DENSITY pcf	WATER %
		Gravel and Asphalt Treated Road Surface			
		Debris Fan Deposits — Alluvial — Very Sandy Strata			
	I	Low Density — High Sulfates — BULK			
5	ML	Sandy Silt — 'Capillary Fringe'	5		
		Compressible — Wet			
		Very Stratified			
	I	Free water at sand strata — BULK			
10	ML	Sandy Silt — Saturated	10		
		Compressible — Very Soft			
		FREE WATER ▽ — Drill Hole is squeezing Shut			
		2" diameter PVC Set in Hole			
		Free Water developed at 12'-3", Pipe sanded in bottom 3 feet			
15		Surface Soils are very	15		
		Susceptible to 'Pumping'			
		TD @ 13'			
20			20		
25			25		
30			30		
		Blow Counts are cumulative for each			
		6 inches of sampler penetration.			
		Free Water @ 12'-3"			
		During Drilling 5-19-94			

LOG OF SUBSURFACE EXPLORATION

NORTH VALLEY SUB.
Grand Junction, Colorado

ROLLAND ENGINEERING

Date: 5-31-94

LINCOLN - DeVORE, Inc.

Grand Junction, Colorado

Job No. **80635-J**

Drawn **EMM**

BORING NO. **5 Road**

BORING ELEVATION:

DEPTH (FT.)	SOIL LOG	DESCRIPTION	BLOW COUNT	SOIL DENSITY pcf	WATER %
		Gravel and Asphalt Treated Road Surface			
		Debris Fan Deposits — Alluvial — Very Sandy Strata			
	I	Low Density — High Sulfates — BULK			
5	ML	Sandy Silt — 'Capillary Fringe'	5		
		Compressible — Wet			
		Very Stratified			
	I	BULK			
10	ML	Sandy Silt — Saturated	10		
		Compressible — Very Soft			
		Free water at sand strata			
		Drill Hole is squeezing Shut			
		FREE WATER ▽			
15		2" diameter PVC Set in Hole	15		
		Free Water developed at 13'-6", Pipe sanded in bottom 1 feet			
		Surface Soils are very			
		Susceptible to 'Pumping'			
		TD @ 15'			
20			20		
25			25		
30			30		

Blow Counts are cumulative for each 6 inches of sampler penetration.

Free Water @ 13'-6"
During Drilling 5-19-94

LOG OF SUBSURFACE EXPLORATION

NORTH VALLEY SUB.
Grand Junction, Colorado

ROLLAND ENGINEERING

Date: 5-31-94

LINCOLN - DeVORE, Inc.

Grand Junction, Colorado

Job No. 80635-J

Drawn: EMM

NORTH VALLEY SUBDIVISION
GENERAL PROJECT REPORT

PREPARED FOR:

G ROAD LLC
C/O Mr. C. Carnes
1401 N. 1st
Grand Junction, CO 81501

PREPARED BY:

ROLLAND ENGINEERING
405 Ridges Boulevard
Suite A
Grand Junction, CO 81503

#35 04 (3)

May 27, 1994

file: norfinal.sam

North Valley Subdivision is an approximate twenty acre site located at 24 3/4 Road North of G Road. G Road LLC, owners of the property, are proposing the development of approximately 38 single family residential homes on the south 10 acres. The north 10 acres will be platted as one large lot for future continuation of the development. The site lies immediately north of Payton Subdivision and northwest of Fountainhead and Golden Meadows Estates Subdivisions. The proposed area is approximately 660 feet wide and 1320 feet long (north to south). Lots will average 9,000 square feet with the anticipated house size being 1450-1900 square feet. The value of the houses are anticipated to be in the $115,000 to $130,000 range. This final submittal is for approval of the entire lower 10 acres with development occurring in phases. Four to five acres in the southern portion, 18 lots, will have the plat recorded as phase one. The remaining lots in the lower 10 acres will be recorded and phased in as marketing conditions allow.

The development will provide an alternative for housing in the northern part of the city. The site allows easy access anywhere in the Grand Junction area. The fact that 24 3/4 Road is a "dead-end" type of street allows the development to maintain a non-congested environment. The proposed number of lots/houses, at approximately 3.8 per acre, is much lower than the presently zoned 12 units per acre (PR-12).

The surrounding land use is varied. Fountainhead Subdivision lies north of G Road and between 24 3/4 and 25 Roads. The Golden Meadows Estates Subdivision is located at G and 24 3/4 Roads with Payton Subdivision located across 24 3/4 Road. The areas to the north and east are low density housing/agricultural in nature. Most of the surrounding homes, except for Fountainhead, reside on one to twenty acres.

Lot setbacks are proposed as follows: 20 foot front ; 5 foot sides; 15 foot rear. These lot setbacks allow the greatest flexibility for building location/envelope on the lots.

Site access is from 24 3/4 Road. Traffic flow is low volume. 24 3/4 Road is a typical two lane county road. We foresee no potential problems involving ingress and egress to the site.

Utilities will be supplied by accessing existing utilities along G and 24 3/4 Roads. Water, sewer, and an existing fire hydrant are located at G and 24 3/4 Roads. Fire hydrants will be constructed in the development. Gas is located at the south end of the property in the middle of 24 3/4 Road. Electrical service can be accessed from existing lines along 24 3/4 Road. Storm water will be routed directly into Leach Creek. City engineering concurred at the preliminary submittal that storm water drainage into Leach Creek is a good solution at this location. All utilities and services will be coordinated with the responsible authorities.

There will be be no unusual demands placed on utilities by the development of North Valley Subdivision. The developer will be responsible for 1/2 road improvements on 24 3/4 Road adjacent to North Valley property. 24 /34 Road improvements will be phased with the same progression as the development.

Site soils and geology are addressed in the Geotechnical Report. The site soils consist of a Fruita clay loam and Ravola sandy loam. The site slopes gently at a 1 to 2 percent grade to the southwest. We anticipate no impact to the site geology or potential geologic hazards.

file: norfinal.sam

As stated earlier, the development will be accomplished in phases with the first phase, southern four to five acres, beginning immediately upon final approval of North Valley Subdivision. Improvements along 24 3/4 Road will be constructed in the same progression as the development.

file: norfinal.sam

FINAL DRAINAGE REPORT
FOR
NORTH VALLEY SUBDIVISION

PREPARED FOR:

G ROAD LLC
C/O MR. CHRIS CARNES
1401 N. 1ST
GRAND JUNCTION, CO 81501

PREPARED BY:

ROLLAND ENGINEERING
405 RIDGES BOULEVARD
SUITE A
GRAND JUNCTION, CO 81503

MAY 31, 1994

file: nv-lw.sam

TABLES OF CONTENTS

GENERAL LOCATION AND DESCRIPTION

NORTH VALLEY SUBDIVISION IS AN APPROXIMATE 20 ACRE SITE LOCATED AT 24 3/4 AND G ROADS. THE SITE LIES IMMEDIATELY NORTH OF PAYTON SUBDIVISION AND NORTHWEST OF FOUNTAINHEAD AND GOLDEN MEADOWS ESTATES SUBDIVISIONS. THE PROPOSED SITE IS APPROXIMATELY 660 FEET WIDE AND 1320 FEET LONG. ACCESS TO THE SITE CAN BE GAINED THROUGH 24 3/4 ROAD. THE SITE LIES AT THE TOP OF A MAJOR DRAINAGE BASIN WHICH IS BOUND ON THE NORTH BY THE GRAND VALLEY CANAL AND FLOWS SOUTHWEST FROM THE SITE. A LARGE COLLECTION DITCH THAT IS CONTROLLED BY THE GRAND JUNCTION DRAINAGE DISTRICT STARTS AT NORTHEAST CORNER OF THE PROJECT SITE, RUNS SOUTH ALONG THE 24 3/4 ROAD AND TURNS WEST AT APPROXIMATELY THE MIDDLE OF THE PROPERTY. THE DITCH IS ABOUT 8 FEET DEEP ON AVERAGE. A SMALL PART OF THE HISTORIC FLOW OF THE MAJOR BASIN IS COLLECTED BY THE DITCH, AND MOST OF THE HISTORIC FLOW FROM THE MAJOR BASIN RUNS TO THE LEACH CREEK. THE MAJOR BASIN AREA IS HARDLY DEVELOPED.

THE SOILS ON THE SITE CONSIST LARGELY OF A RAVOLA SANDY LOAM AND SOME FRUITA CLAY LOAM. THE GROUND COVER CONSISTS OF CULTIVATED STRAIGHT ROW AND SOME GRASSES, WEEDS, WILLOW ON THE WEST AND SOUTH EDGES.

EXISTING DRAINAGE CONDITIONS

THE GROUND SURFACE OF THE MAJOR DRAINAGE BASIN GENERALLY HAS GENTLE SLOPES UP TO 1% TO THE SOUTH AND WEST. THERE ARE NO PREVIOUSLY DETERMINED 100-YEAR FLOODPLAIN IN THE BASIN. RUNOFF FROM NORTH HALF OF THIS SITE PLUS SOME OUTSIDE RUNOFF CAN DRAIN TO THE DITCH. THE SOUTH HALF RUNOFF OF THIS SITE TOGETHER WITH ABOUT 15 ACRE OFFSITE RUNOFF FROM THE EAST SIDE CAN DRAIN TO THE SOUTHWEST CORNER TO A TAIL WATER DITCH THAT CONVEYS THE RUNOFF TO LEACH CREEK.

PROPOSED DRAINAGE CONDITIONS

BASED ON THE EXISTING CONDITIONS OF THIS SITE. TWO OPTIONS WERE CONSIDERED FOR THE EXISTING COLLECTION DITCH ON THE SITE. ONE OPTION IS THAT THE DITCH WILL STAY IN PLACE. UNDER THIS CONDITION, THE NORTH HALF DEVELOPED RUNOFF OF THIS SITE AND SOME OFFSITE HISTORIC RUNOFF WILL BE DRAINED TO THE DITCH. THE OTHER HALF OF THE DEVELOPED RUNOFF FROM THIS SITE AND SOME OFFSITE HISTORIC RUNOFF FROM THE EAST SIDE OF THE PROJECT SITE WILL BE DRAINED TO LEACH CREEK. ANOTHER OPTION FOR THE DITCH IS THAT THE DITCH WILL BE ADJUSTED AS SHOWN ON APPENDIX C, THEN ABOUT 35% DEVELOPED RUNOFF PLUS SOME HISTORIC RUNOFF WILL DRAIN TO THE DITCH, AND THE OTHER DEVELOPED RUNOFF OF THIS SITE AND OFFSITE HISTORIC RUNOFF WILL DRAIN TO LEACH CREEK.

ACCESS FOR THE MAINTENANCE OF THE DRAINAGE FACILITIES WILL BE VIA A COMBINATION OF PUBLIC RIGHT-OF -WAY AND DEDICATED DRAINAGE EASEMENTS. OWNERSHIP AND MAINTENANCE RESPONSIBILITY OF THE DRAINAGE FACILITIES WILL BE THAT OF THE CITY OF GRAND JUNCTION.

DESIGN CRITERIA AND APPROACH

WE ARE NOT AWARE OF ANY MASTER PLAN OR ANY OTHER LIMITATIONS ON THIS SITE. THE HYDROLOGY AND HYDRAULIC CALCULATIONS CONDUCTED FOR THIS SITE UTILIZED THE INTERIM OUTLINE OF GRADING AND DRAINAGE CRITERIA (JULY 1992) FOR THE CITY OF GRAND JUNCTION. THE RATIONAL METHOD WAS USED TO PERFORM THE ANALYSIS FOR THE 2 AND 100 YEAR DESIGN EVENTS.

THE 100 YEAR DESIGN EVENT WAS USED TO DETERMINE THE DRAINAGE PIPE SIZE. OFFSITE HISTORIC RUNOFF ON THE EAST , NORTH AND SOUTH SIDES OF THE SITE WAS ANALYZED AND INCLUDED IN DETERMINING THE PIPE SIZE. THERE WILL NOT BE ANY ON-SITE DETENTION.

CONCLUSION

SUMMARIZED BELOW ARE THE DRAINAGE CALCULATIONS FOR THIS PROJECT:

DRAINAGE CALCULATIONS

RATIONAL METHOD: 2& 100 YEAR DESIGN STORMS

EXISTING TOTAL SITE RUNOFF RATES

2-YEAR STORM HISTORIC

Q_{2h} = 2.71 cfs (to ditch)
Q_{2h} = 3.33 cfs

100-YEAR STORM HISTORIC

Q_{100h} = 17.07 cfs (to ditch)
Q_{100h} = 21.15 cfs

PROPOSED TOTAL SITE RUNOFF RATES - DITCH STAYS IN PLACE

2-YEAR STORM DEVELOPED

Q_{2d} = 7.33 cfs (to ditch)
Q_{2d} = 11.93 cfs

100-YEAR STORM DEVELOPED

Q_{100d} = 25.39 cfs (to ditch)
Q_{100d} = 52.38 cfs

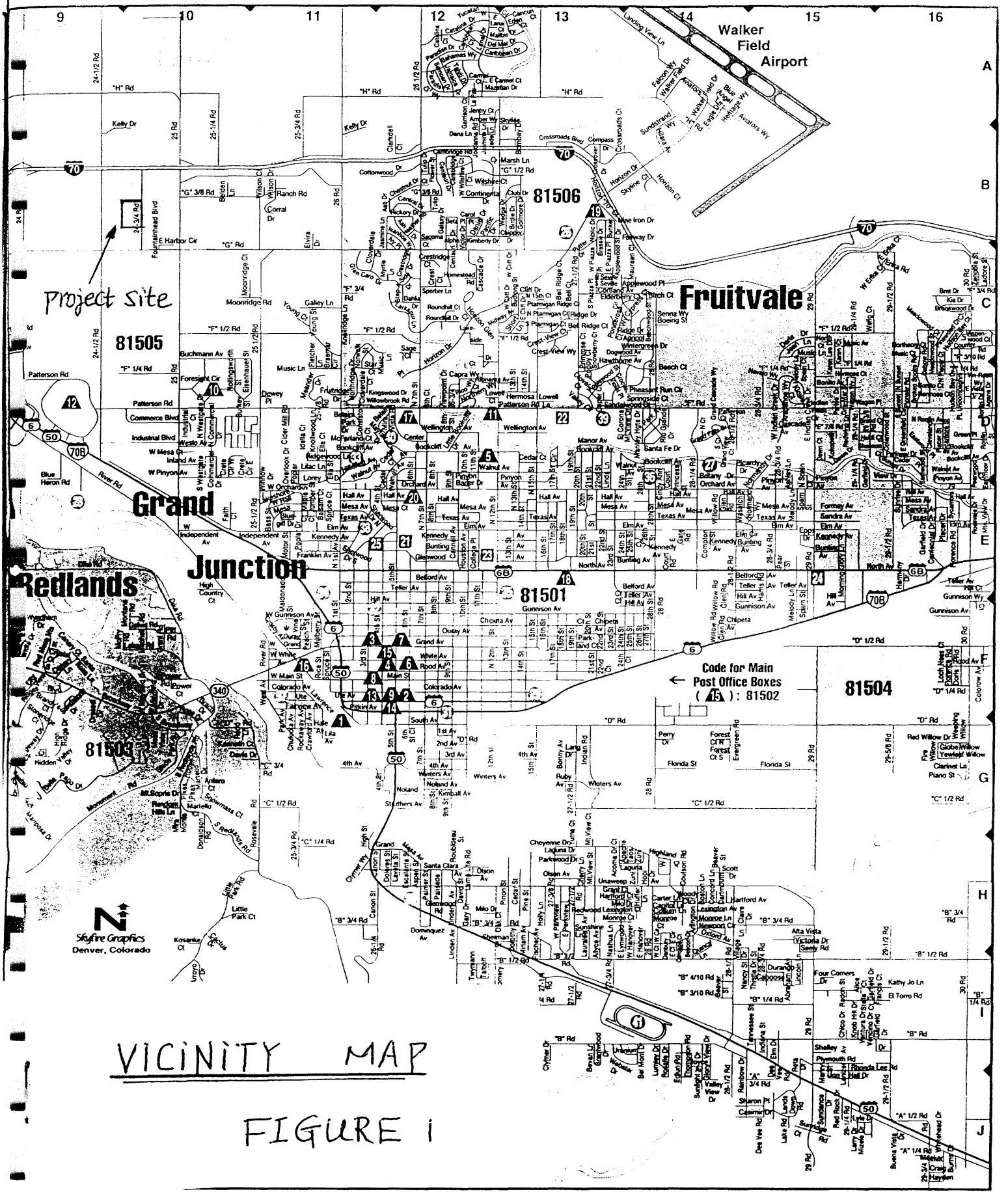
PROPOSED TOTAL SITE RUNOFF RATES - DITCH PRE-ADJUSTED

2-YEAR STORM DEVELOPED

Q_{2d} = 5.55 cfs (to ditch)
Q_{2d} = 13.45 cfs

100-YEAR STORM DEVELOPED

Q_{100d} = 20.40 cfs (to ditch)
Q_{100d} = 55.87 cfs



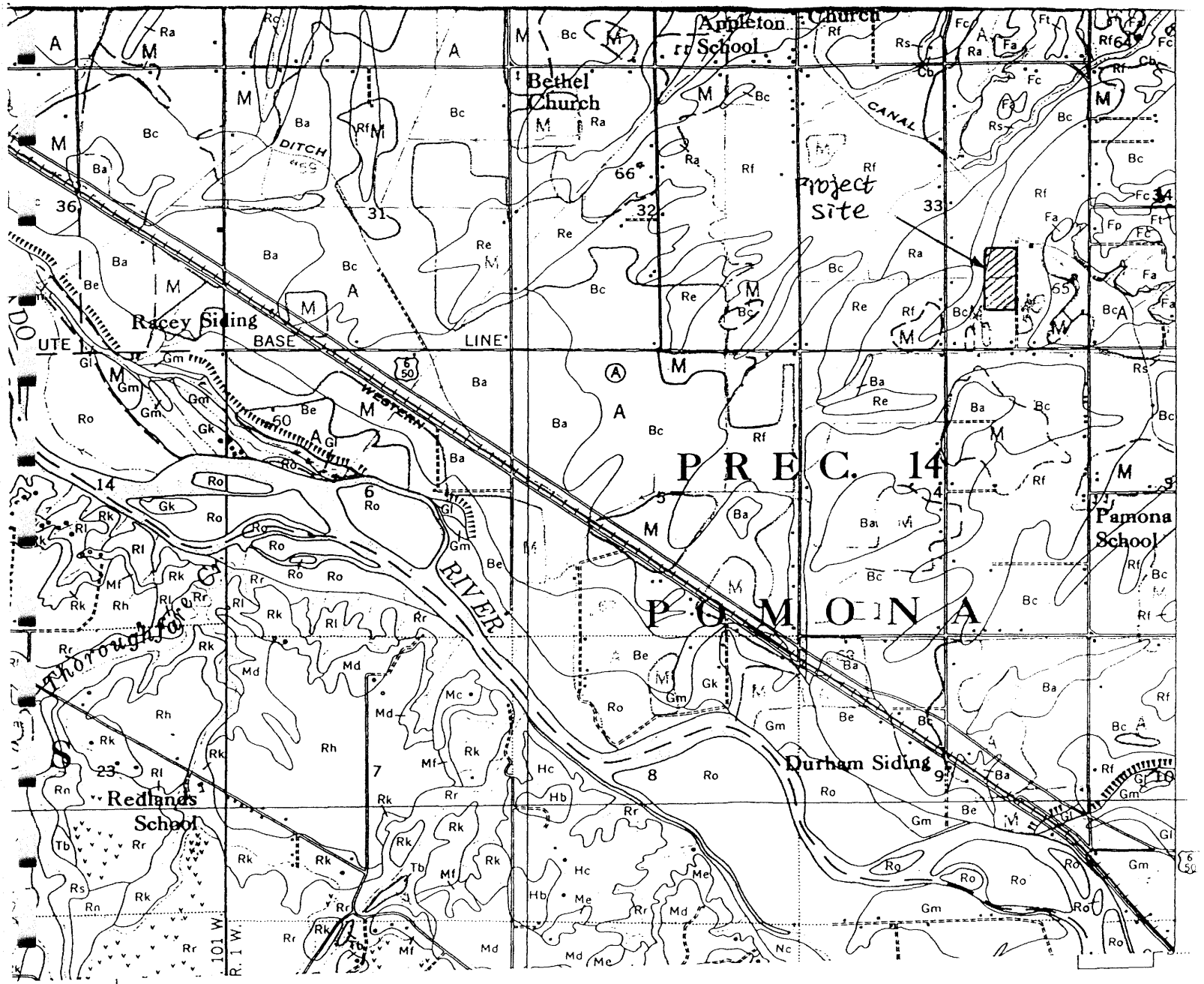
VICINITY MAP

FIGURE 1

SOIL MAP

GRAND JUNCTION AREA - COLORADO

SHEET NO. 2



SOILS OF RECENT ALLUVIAL FANS AND LOCAL STREAM FLOOD PLAINS

MODERATELY COARSE TO MEDIUM-TEXTURED SOILS WITH MODERATELY PERMEABLE SUBSOILS

Genola fine sandy loam, deep over gravel, 0-2 percent slopes
Genola loam, 2-5 percent slopes
Genola very fine sandy loam, deep over gravel, 0-2 percent slopes
Naples fine sandy loam, 0-2 percent slopes
Ravola fine sandy loam, 0-2 percent slopes
Ravola fine sandy loam, 2-5 percent slopes
Ravola loam, 0-2 percent slopes
Ravola very fine sandy loam, 0-2 percent slopes
Ravola very fine sandy loam, 2-5 percent slopes
Thoroughfare fine sandy loam, 0-2 percent slopes
Thoroughfare fine sandy loam, 2-5 percent slopes
Thoroughfare fine sandy loam, 5-10 percent slopes

FINE-TEXTURED SOI
SUBSOILS

SOILS OF THE MESAS

SLIGHTLY TO MODE
MEDIUM-TEXTURED
PERMEABLE SUBSOI

FIGURE 2.

APPENDIX A

North Valley Drainage: Ditch stay in place

2-YEAR STORM-HISTORIC: (to ditch)

Onsite A_n = 10 ac; Offsite A_f = 10.5 ac
Hydrologic soil group = B (Moderate infiltration); C_{2h} = 0.10
V = 0.75 ft/s (cultivated straight row); S = 0.70%
L = 650 ft
$T_{c2h} = (\frac{650}{0.75})/60 = 14.44\text{min} = 14.44\text{min}$; I_{2h} = 1.32 in/hr

$Q_{2h\,n} = (0.10)(1.32)(10) = \underline{1.32\text{ cfs}}$
$Q_{2hf} = (0.10)(1.32)(10.5) = \underline{1.39\text{ cfs}}$
$Q_{2h} = 1.32+1.39 = \underline{2.71\text{ cfs}}$

100-YEAR STORM-HISTORIC: (to ditch)

C_{100h} = 0.25; I_{100h} = 3.33 in/hr
$Q_{100hn} = (0.25)(3.33)(10) = \underline{8.33\text{cfs}}$
$Q_{100hf} = (0.25)(3.33)(10.5) = \underline{8.74\text{ cfs}}$
$Q_{100h} = 8.33+8.74 = \underline{17.07\text{ cfs}}$

2-YEAR STORM-HISTORIC: (to Leach Creek)

Onsite A_n = 10 ac; L = 2000 ft
Off sitet A_f = 35 ac; C_{2h} = 0.10;
S = 0.80%; V = 0.80 ft/s
$T_{c2h} = (\frac{200}{0.80})/60 = 41.67\text{min} = 42\text{ min}$; I_{2h} = 0.74 in/hr
$Q_{2hn} = (0.10)(0.74)(10) = \underline{0.74\text{ cfs}}$
$Q_{2hf} = (0.10)(0.74)(35) = \underline{2.59\text{ cfs}}$
$Q_{2h} = 0.74+2.59 = \underline{3.33\text{ cfs}}$

100-YEAR STORM-HISTORIC: (to Leach Creek)

C_{100h} = 0.25; I_{100h} = 1.88 in/hr
$Q_{100hn} = (0.25)(1.88)(10) = \underline{4.70\text{ cfs}}$
$Q_{100hf} = (0.25)(1.88)(35) = \underline{16.45\text{ cfs}}$
$Q_{100h} = 4.70+16.45 = \underline{21.15\text{ cfs}}$

2-YEAR STORM-DEVELOPED: (to ditch)

Onsite area A_n = 10ac; C_{2d} = 0.45
Offsite area A_f = 10.5 ac; C_{2h} = 0.10
L = 650 ft; S = 0.70%
V = 0.75 ft/s

North Valley Drainage: Ditch stays in place

2-YEAR STORM-DEVELOPED: (to ditch) (continued)

$T_{c2d} = (\frac{650}{0.75})/60 = 14.44\text{min} = 14\text{min};$ $I_{2d} = 1.32$ in/hr

$Q_{2dn} = (0.45)(1.32)(10) = \underline{5.94 \text{ cfs}}$
$Q_{2df} = (0.10)(1.32)(10.5) = \underline{1.39 \text{ cfs}}$
$Q_{2d} = 5.94+1.39 = \underline{7.33 \text{ cfs}}$

2-YEAR STORM-DEVELOPED: storm sewer

4-3 Segment:
$A_{4-3} = 5.26$ ac; $C_{2d} = 0.45$
$S = 0.70\%$; $L = 550$ ft
$V = 1.70$ ft/s
$T_{c2d} = (\frac{550}{1.70})/60 = 5.39\text{min} = 5\text{min};$ $I_{2d} = 1.95$ in/hr

$Q_{4-3} = (0.45)(1.95)(5.26) = \underline{4.62 \text{ cfs}}$
$D_{4-3} = 12"$; $S_{4-3} = 0.86\%$
$V_{4-3} = 6.1$ ft/s; $L_{4-3} = 270$ ft
$t_{4-3} = (\frac{270}{6.1})/60 = 0.74\text{min}$

3-2 Segment:
$A_{3-2} = A_{4-3} + 3.16 = 8.42$ ac; $C_{2d} = 0.45$
$T_{c2d} = 5.39 + t_{4-3} = 6.33\text{min} = 6\text{min};$ $I_{2d} = 1.83$ in/hr

$Q_{3-2} = (0.45)(1.83)(8.42) = \underline{6.93\text{cfs}}$
$D_{3-2} = 15"$; $S_{3-2} = 0.58\%$
$V_{3-2} = 5.8$ ft/s; $L_{3-2} = 250$ ft
$t_{3-2} = (\frac{250}{5.8})/60 = 0.72\text{min}$

2-1 Segment:
Onsite area A_{n2-1} =A3-2 + 1.58 = 10 ac; $C_{2d} = 0.45$
Offsite area $A_{f2-1} = 10$ac; $C_{2h} = 0.10$
$T_{c2-1} = 6.33+t_{3-2} = 7.05\text{min} = 7.00\text{min};$ $I_{2-1} = 1.74$ in/hr

Qn2-1 = (0.45)(1.74)(10) = 7.83 cfs
Qf2-1 = (0.10)(1.74)(10) = 1.74 cfs
$Q_{2-1} = 7.83+1.74 = \underline{9.57 \text{ cfs}}$
$D_{2-1} = 18"$; $S_{2-1} = 0.45\%$
$V_{2-1} = 5.8$ ft/s; $L_{2-1} = 650$ ft
$t_{2-1} = (\frac{650}{5.8})/60 = 1.87\text{min}$

1-Leach Creek Segment:

A2

North Valley drainage: Ditch stays in place

2-YEAR STORM-DEVELOPED (continued)

Onsite area $A_{n1\text{-}Lc}$ = 10ac; C_{2d} = 0.45
Offsite area $A_{f1\text{-}Lc}$ = 10*3 = 30ac; C_{2h} = 0.10
$T_{c1\text{-}Lc}$ = 7.05+$t_{2\text{-}1}$ = 8.92min = 9.0min; $I_{1\text{-}Lc}$ = 1.59 in/hr

$Q_{n1\text{-}Lc}$ = (0.45)(1.59)(10) = 7.16cfs
$Q_{f1\text{-}Lc}$ = (0.10)(1.59)(30) = 4.77 cfs
$Q_{1\text{-}Lc}$ = 7.16+4.77 = 11.93 cfs
$D_{1\text{-}Lc}$ =18"; $S_{1\text{-}Lc}$ = 0.64%
$V_{1\text{-}Lc}$ = 6.8 ft/s

100-YEAR STORM-DEVELOPED:(to ditch)

Onsite A_n = 10 ac; C_{100d} = 0.50
Offsite A_f = 10.5 ac; C_{100h} = 0.25
L = 650 ft; S = 0.70%
V = 0.75 ft/s
T_{c100d} = $(\frac{650}{0.75})/60$ = 14.44min = 14min; I_{100d} = 3.33 in/hr

Q_{n100d} = (0.50)(3.33)(10) = 16.65 cfs
Q_{f100h} = (0.25)(3.33)(10.5) = 8.74 cfs
Q_{100d} = 16.65+8.74 = 25.39 cfs

100-YEAR STORM-DEVELOPED: (storm sewer)

4-3 Segment:

$A_{4\text{-}3}$ = 5.26 ac; C_{100d} = 0.50
S = 0.70%; L = 550 ft
V = 1.70 ft/s
T_{c100d} = $(\frac{550}{1.70})/60$ = 5.39min = 5min; $I_{4\text{-}3}$ = 4.83 in/hr

$Q_{4\text{-}3}$ = (0.50)(4.95)(3.4) = 8.42 cfs
$D_{4\text{-}3}$ = 18"; $S_{4\text{-}3}$ = 0.64%
$V_{4\text{-}3}$ = 6.8 ft/s; $L_{4\text{-}3}$ = 270 ft
$t_{4\text{-}3}$ = $(\frac{270}{6.8})/60$ = 0.66min

3-2 Segment:

$A_{3\text{-}2}$ = $A_{4\text{-}3}$ +3.16= 8.42 ac; C_{100d} = 0.50
$T_{c3\text{-}2}$ = 5.39+$t_{4\text{-}3}$ = 6.03min = 6min; $I_{3\text{-}2}$ = 4.65 in/hr

$Q_{3\text{-}2}$ = (0.50)(4.65)(8.42) = 19.58 cfs
$D_{3\text{-}2}$ = 24"; $S_{3\text{-}2}$ = 0.37%

North Valley Drainage: Ditch stays in place

100-YEAR STORM-DEVELOPED (continued)

V_{3-2} = 6.3 ft/s; L_{3-2} = 250 ft
$t_{3-2} = (\frac{250}{6.30})/60 = 0.66$min

2-1 Segment:

Onsite A_{n2-1}= 8.42+1.38 =10 ac; C_{100d} = 0.50
Offsite area A_{f2-1} = 10 ac; C_{100h} = 0.25
T_{c2-1} = 6.03+t_{3-2} = 6.69 min =7min; I_{2-1} = 4.40 in/hr

$Q_{n2-1} = (0.50)(4.40)(10) =$ 22 cfs
$Q_{f2-1} = (0.25)(4.40)(10) =$ 11 cfs
Q_{2-1} = 22+11 = 33 cfs
D_{2-1} = 27"; S_{2-1} = 0.61%
V_{2-1} = 8.8 ft/s; L_{2-1} = 650 ft
$t_{2-1} = (\frac{650}{8.80})/60 = 1.23$min

1-Leach Creek Segment:

Onsite A_{n1-Lc} = 7.25 ac; C_{100d} = 0.50
Offsite A_{f1-Lc} = 3*10 = 30 ac; C_{100h} = 0.25
T_{1-Lc} = 6.69+t_{2-1} = 7.92min = 8min; I_{1-Lc} = 4.19 in/hr

$Q_{n1-Lc} = (0.50)(4.19)(10) =$ 20.95 cfs
$Q_{f1-Lc} = (0.25)(4.19)(30) =$ 31.43cfs
Q_{1-Lc} = 20.95+31.43 = 52.38 cfs
D_{1-Lc} = 33"; S_{1-Lc} = 0.52%
V_{1-Lc} = 9.2 ft/s

North Valley Drainage: Ditch pre-adjusted

2-YEAR STORM-HISTORIC: (to ditch)

Onsite A_n = 10 ac; C_{2h} = 0.10
Offsite A_f = 10.5 ac; S = 0.70%
L = 650 ft; V = 0.75 ft/s
$T_{c2h} = (\frac{650}{0.75})/60 = 14.44\text{min} = 14\text{min}$; I_{2h} = 1.32 in/hr

$Q_{n2h} = (0.10)(1.32)(10) = \underline{1.32 \text{ cfs}}$
$Q_{n2f} = (0.10)(1.32)(10.5) = \underline{1.39 \text{ cfs}}$
$Q_{2h} = 1.32+1.39 = \underline{2.71 \text{ cfs}}$

100-YEAR STORM-HISTORIC: (to ditch)

I_{100h} = 3.33 in/hr; C_{100h} = 0.25
$Q_{n100h} = (0.25)(3.33)(10) = \underline{8.33 \text{ cfs}}$
$Q_{f100h} = (0.25)(3.33)(10.5) = \underline{8.74 \text{ cfs}}$
$Q_{100h} = 8.33+8.74 = \underline{17.07 \text{ cfs}}$

2-YEAR STORM-HISTORIC: (to Leach Creek)

Onsite A_n = 10 ac; S = 0.80%
Offsite A_f = 35ac; C_{2h} = 0.10
L = 2000 ft; V = 0.80 ft/s
$T_{c2h} = \frac{2000}{0.80} * (\frac{1}{60}) = 41.67\text{min} = 42\text{min}$; I_{2h} = 0.74 in/hr

$Q_{n2h} = (0.10)(0.74)(10) = \underline{0.74 \text{ cfs}}$
$Q_{f2h} = (0.10)(0.74)(35) = \underline{2.59 \text{ cfs}}$
$Q_{2h} = 0.74+2.59 = \underline{3.33 \text{ cfs}}$

100-YEAR STORM-HISTORIC: (to Leach Creek)

I_{100h} = 1.88 in/hr; C_{100h} =0.25
$Q_{n100h} = (0.25)(1.88)(10) = \underline{4.7 \text{ cfs}}$
$Q_{f100h} = (0.25)(1.88)(35) = \underline{16.45 \text{ cfs}}$
$Q_{100h} = 4.7+16.45 = \underline{21.15 \text{ cfs}}$

2-YEAR STORM-DEVELOPED: (to ditch)

Onsite area A_n = 7.00 ac; C_{2d} = 0.45
Offsite area A_f = 10.5 ac; C_{2h} = 0.10
L = 650 ft; S = 0.70%
V = 0.75 ft/s

North Valley Drainage : Ditch pre-adjusted

2-YEAR STORM -DEVELOPED (to ditch)(continued)

$T_{c2d} = (\frac{650}{0.75})/60 = 14.44\text{min};$ $I_{2d} = 1.32$ in/hr
$Q_{n2d} = (0.45)(1.32)(7) = \underline{4.16 \text{ cfs}}$
$Q_{f2d} = (0.10)(1.32)(10.5) = \underline{1.39 \text{ cfs}}$
$Q_{2d} = 4.16+1.39 = \underline{5.55 \text{ cfs}}$

2-YEAR STORM-DEVELOPED: (storm sewer)

5-3 Segment:
$A_{5-3} = 3$ ac; $C_{2d} = 0.45$
$L = 250$ ft; $S = 0.60\%$
$V = 1.60$ ft/s
$T_{c2d} = (\frac{250}{1.60})/60 = 2.60\text{min} = 5\text{min};$ $I_{5-3} = 1.95$ in/hr

$Q_{5-3} = (0.45)(1.95)(3) = \underline{2.63 \text{ cfs}}$
$D_{5-3} = 10"$; $S_{5-3} = 0.70\%$
$V_{5-3} = 4.80$ ft/s; $L_{5-3} = 676$ ft
$t_{5-3} = (\frac{676}{4.80})/60 = 2.35\text{min}$

4-3 Segment:
$A_{4-3} = 5.26$ ac; $C_{2d} = 0.45$
$L = 550$ ft; $S = 0.70\%$
$V = 1.70$ ft/s
$T_{c2d} = (\frac{550}{1.70})/60 = 5.39\text{min} = 5\text{min};$ $I_{4-3} = 1.95$ in/hr

$Q_{4-3} = (0.45)(1.95)(5.26) = \underline{4.62 \text{ cfs}}$
$D_{4-3} = 12"$; $S_{4-3} = 0.82\%$
$V_{4-3} = 6.10$ ft/s; $L_{4-3} = 270$ ft
$t_{4-3} = (\frac{270}{6.10})/60 = 0.74\text{min}$

3-2 Segment:
$A_{3-2} = A_{5-3}+A_{4-3}+3.16 = 11.42\text{ac};$ $C_{2d} = 0.45$
$T_{3-2} = 5+t_{5-3} = 7.35\text{min} = 7\text{min};$ $I_{3-2} = 1.74$ in/hr

$Q_{3-2} = (0.45)(1.74)(11.42) = \underline{8.94 \text{ cfs}}$
$D_{3-2} = 18"$; $S_{3-2} = 0.41\%$
$V_{3-2} = 5.5$ ft/s; $L_{3-2} = 250$ ft
$t_{3-2} = (\frac{250}{5.5})/60 = 0.76\text{min}$

2-1 Segment:
Onsite $A_{n2-1} = A_{3-2}+1.58 = \underline{13 \text{ ac;}}$ $C_{2d} = 0.45$

North Valley Drainage: Ditch pre-adjusted

2-YEAR STORM-DEVELOPED (continued)

Offsite A_{f2-1} = 10 ac; C_{2h} =0.10
$T_{c2-1} = 7.35+t_{3-2} = 8.11\text{min} = 8\text{min}$; I_{2-1} = 1.66 in/hr

$Q_{n2-1} = (0.45)(1.66)(13) = \underline{9.71 \text{ cfs}}$
$Q_{f2-1} = (0.10)(1.66)(10) = \underline{1.66}$
$Q_{2-1} = 9.71+1.66 = \underline{11.37 \text{ cfs}}$
D_{2-1} = 18"; S_{2-1} = 0.66%
V_{2-1} = 6.80 ft/s; L_{2-1} = 650ft
$t_{2-1} = (\frac{650}{6.80})/60 = 1.59\text{min}$

1-Leach Creek Segment:

Onsite A_{n1-Lc} = 13.00ac; C_{2d} = 0.45
Offsite A_{f1-Lc} = 10*3 = 30 ac; C_{2h} = 0.10
$T_{c1-Lc} = 8.11+t_{2-1} = 9.7\text{min} = 10\text{min}$; I_{1-Lc} = 1.52 in/hr

$Q_{n1-Lc} = (0.45)(1.52)(13) = \underline{8.89 \text{ cfs}}$
$Q_{f1-Lc} = (0.10)(1.52)(30) = \underline{4.56 \text{ cfs}}$
$Q_{1-Lc} = 8.89+4.56 = \underline{13.45 \text{ cfs}}$
D_{1-Lc} = 18"; S_{1-Lc} = 0.8%
V_{1-Lc} = 7.6 ft/s

100-YEAR STORM-DEVELOPED: (to ditch)

Onsite A_n = 7.00 ac; C_{100d} = 0.50
Offsite A_f = 10.5 ac; C_{100h} = 0.25
L = 650 ft; S = 0.70%
V = 0.75 ft/s
$T_{c100d} = (\frac{650}{0.75})/60 = 14.44\text{min} = 14\text{min}$; I_{100d} = 3.33 in/hr

$Q_{n100d} = (0.50)(3.33)(7) = \underline{11.66 \text{ cfs}}$
$Q_{f100h} = (0.25)(3.33)(10.5) = \underline{8.74 \text{ cfs}}$
$Q_{100d} = 11.66+8.74 = \underline{20.40\text{cfs}}$

100-YEAR STORM-DEVELOPED: (storm sewer)

5-3 Segment:

A_{5-3} = 3 ac; C_{100d} = 0.50
L = 250 ft; S = 0.60%
V = 1.60 ft/s
$T_{c100d} = (\frac{250}{1.60})/60 = 2.60\text{min} = 5\text{min}$; I_{5-3} = 4.95 in/hr

North Valley Drainage: Ditch pre-adjusted

100-YEAR STORM-DEVELOPED (continued)

$Q_{5-3} = (0.50)(4.95)(3) = \underline{7.43 \text{ cfs}}$
$D_{5-3} = 15"$; $S_{5-3} = 0.67\%$
$L_{5-3} = 676$ ft; $V_{5-3} = 6.2$ ft/s
$t_{5-3} = (\frac{676}{6.2})/60 = 1.82\text{min}$

4-3 Segment:
$A_{4-3} = 4.68$ ac; $C_{100d} = 0.50$
$L = 550$ ft; $S = 0.70\%$
$V = 1.70$ ft/s;
$T_{c100d} = (\frac{550}{1.70})/60 = 5.39\text{min}$; $I_{4-3} = 4.83$ in/hr

$Q_{4-3} = (0.50)(4.83)(5.26) = \underline{12.70 \text{ cfs}}$
$D_{4-3} = 18"$; $S_{4-3} = 0.64\%$
$V_{4-3} = 7.0$ ft/s; $L_{4-3} = 270$ ft
$t_{4-3} = (\frac{270}{7.0})/60 = 0.64\text{min}$

3-2 Segment:
$A_{3-2} = 11.42$ ac; $C_{100d} = 0.50$
$T_{c3-2} = 5.00+t_{5-3} = 6.82\text{min} = 7.00\text{min}$; $I_{3-2} = 4.40$ in/hr

$Q_{3-2} = (0.50)(4.40)(11.42) = \underline{25.12 \text{ cfs}}$
$D_{3-2} = 24"$; $S_{3-2} = 0.64\%$
$V_{3-2} = 8.20$ ft/s; $L_{3-2} = 250$ ft
$t_{3-2} = (\frac{250}{8.20})/60 = 0.51$ min

2-1 Segment:
Onsite $A_{n2-1} = 13$ac; $C_{100d} = 0.50$
Offsite $A_{f2-1} = 10$ ac; $C_{100h} = 0.25$
$T_{c2-1} = 6.82+t_{3-2} = 7.33\text{min} = 7.00\text{min}$; $I_{2-1} = 4.33$in/hr

$Q_{n2-1} = (0.50)(4.33)(13) = \underline{28.15 \text{ cfs}}$
$Q_{f2-1} = (0.25)(4.33)(10) = \underline{10.83 \text{ cfs}}$
$Q_{2-1} = 28.15+10.83 = \underline{38.98\text{cfs}}$
$D_{2-1} = 30"$; $S_{2-1} = 0.49\%$
$V_{2-1} = 8.4$ ft/s $L_{2-1} = 650$ ft
$t_{2-1} = (\frac{650}{8.40})/60 = 1.31\text{min}$

1- Leach Creek Segment:
Onsite $A_{n1-Lc} = 13.00$ ac; $C_{100d} = 0.50$
Offsite $A_{f1-Lc} = 3*10 = 30$ ac; $C_{100h} = 0.25$

North Valley Drainage: Ditch pre-adjusted

100-YEAR STORM-DEVELOPED (continued)

$T_{c1\text{-}Lc} = 7.33+t_{2\text{-}1} = 8.64\text{min} = 9.00\text{min};$ $I_{1\text{-}Lc} = 3.99$ in/hr

$Q_{n\text{-}Lc} = (0.50)(3.99)(13) = \underline{25.94 \text{ cfs}}$
$Q_{f\text{-}Lc} = (0.25)(3.99)(30) = \underline{29.93 \text{ cfs}}$
Q1-Lc = 25.94+29.93 = <u>55.87 cfs</u>
$D_{1\text{-}Lc} = 33"$; $S_{1\text{-}Lc} = 0.58$ %
$V_{1\text{-}Lc} = 9.6$ ft/s

North Valley Drainage: Sub-basin Drainage

Sub-basin Area (1): $A_1 = 5.26$ ac

Historic Condition:

2-YEAR STORM

$C_{2h} = 0.10$; $S = 0.60\%$

$L = 650$ ft; $V = 1.60$ ft/s

$T_{c2h} = (650/1.60)/60 = 6.77\text{min} = 7\text{min}$; $I_{2h1} = 1.74$ in/hr

$Q_{2h1} = (0.10)(1.74)(5.26) = \underline{0.92 \text{ cfs}}$

100-YEAR STORM

$C_{100h} = 0.25$; $I_{100h1} = 4.40$ in/hr

$Q_{100h1} = (0.25)(4.40)(5.26) = \underline{5.79 \text{ cfs}}$

Developed Condition:

2-YEAR STORM

$C_{2d} = 0.45$; $S = 0.70\%$

$L = 550$ ft; $V = 1.70$ ft/s

$T_{c2d} = (550/1.70)/60 = 5.39\text{min} = 5\text{min}$; $I_{2d1} = 1.95$ in/hr

$Q_{2d1} = (0.45)(1.95)(5.26) = \underline{4.62 \text{ cfs}}$

100-YEAR STORM

$C_{100d} = 0.50$; $I_{100d1} = 4.83$ in/hr

$Q_{100d1} = (0.50)(4.83)(5.26) = \underline{12.70 \text{ cfs}}$

Sub-basin Area (2): $A_2 = 3.16$ ac

Historic Condition:

2-YEAR STORM

$C_{2h} = 0.10$; $S = 0.60\%$

$L = 550$ ft; $V = 1.60$ ft/s

$T_{c2h} = (550/1.6)/60 = 5.73\text{min} = 6$ min; $I_{2h2} = 1.83$ in/hr

$Q_{2h2} = (0.10)(1.83)(3.16) = \underline{0.58 \text{ cfs}}$

100-YEAR STORM

$C_{100h} = 0.25$; $I_{100h2} = 4.65$ in/hr

$Q_{100h2} = (0.25)(4.65)(3.16) = \underline{3.67 \text{ cfs}}$

Developed Condition:

2-YEAR STORM

$C_{2d} = 0.45$; $S = 0.70\%$

North Valley Drainage: Sub-basin Drainage

Sub-basin Area (2): A_2 = 3.16ac (continued)

L = 550 ft; V = 1.70 ft/s
T_{c2d} = (550/1.70)/60 = 5.39min = 5min; I_{2d2} = 1.95 in/hr
Q_{2d2} = (0.45)(1.95)(3.16) = 2.13 cfs

100-YEAR STORM
C_{100d} = 0.50; I_{100d2} = 4.95 in/hr
Q_{100d2} = (0.50)(4.95)(3.16) = 7.82 cfs

Sub-basin Area (3): A_3 = 1.58 ac

Historic Condition:

2-YEAR STORM
C_{2h} = 0.10; S = 0.60%
L = 550 ft; V = 1.60 ft/s
T_{c2h} = (550/1.60)/60 = 5.73min = 6min; I_{2h3} = 1.83 in/hr
Q_{2h3} = (0.10)(1.83)(1.58) = 0.29 cfs

100-YEAR STORM
C_{100h} = 0.25; I_{100h} = 4.65 in/hr
Q_{100h3} = (0.25)(4.65)(1.58) = 1.84 cfs

Developed Condition:

2-YEAR STORM
C_{2d} = 0.45; S = 0.70%
L = 550 ft; V = 1.70 ft/s
T_{c2d} = (550/1.70)/60 = 5.39min = 5min; I_{2d3} = 1.95 in/hr
Q_{2d3} = (0.45)(1.95)(1.58) = 1.39 cfs

100-YEAR STORM
C_{100d} =0.50; I_{100d3} = 4.95 in/hr
Q_{100d3} = (0.50)(4.95)(1.58) = 3.91 cfs

Sub-basin Area (4): A_4 = 3ac

Historic Condition:

2-YEAR STORM
C_{2h} = 0.10; S = 0.70 %
L = 250 ft; V = 0.75 ft/s
T_{c2h} = (250/0.75)/60 = 5.55min = 6min; I_{2h4} = 1.83 in/hr

North Valley Drainage: Sub-basin drainage

Sub-basin Area (4): $A_4 = 3$ ac (continued)

$Q_{2h4} = (0.10)(1.83)(3) = \underline{0.55 \text{ cfs}}$

100-YEAR STORM

$C_{100h} = 0.25$; $I_{100h4} = 4.65$ in/hr

$Q_{100h4} = (0.25)(4.65)(3) = \underline{3.49 \text{ cfs}}$

Developed Conditions

2-YEAR STORM

$C_{2d} = 0.45$; $S = 0.70\%$

$L = 250$ ft; $V = 1.70$ ft/s

$T_{c2d} = (250/1.70)/60 = 2.45\text{min} = 5\text{min}$; $I_{2d4} = 1.95$ in/hr

$Q_{2d4} = (0.45)(1.95)(3) = \underline{2.63 \text{ cfs}}$

100-YEAR STORM

$C_{100d} = 0.50$; $I_{100d4} = 4.95$ in/hr

$Q_{100d4} = (0.50)(4.95)(3) = \underline{7.43 \text{ cfs}}$

Sub-basin Area (5): $A_5 = 10$ ac (to ditch)- ditch stays in place

For the runoff flowrate from this sub-basin, see Q_n under 2-YEAR STORM HISTORIC (to ditch), 100-YEAR STORM HISTORIC (to ditch), 2-YEAR STORM DEVELOPED (to ditch) and 100-YEAR STORM DEVELOPED (to ditch) respectively.

Sub-basin Area (6): $A_6 = 7$ ac (to ditch)- ditch pre-adjusted

For the runoff flowrate from this sub-basin, see Q_n under 2-YEAR STORM HISTORIC (to ditch), 100-YEAR STORM HISTORIC (to ditch), 2-YEAR STORM DEVELOPED (to ditch) and 100-YEAR STORM DEVELOPED (to ditch) respectively.

SUMMARY OF RUNOFF CALCULATIONS

DITCH STAYS IN PLACE

HISTORIC RUNOFF: (To Ditch)

Onsite Area A_n = 10ac;	Q_{2hn} = 1.32 cfs;	Q_{100hn} = 8.33 cfs
Offsite Area A_f = 10.5 ac;	Q_{2hf} = 1.39 cfs;	Q_{100hf} = 8.74 cfs
Total Area A_T = 20.5 ac;	Q_{2h} = 2.71 cfs;	Q_{100h} = 17.07 cfs

DEVELOPED RUNOFF: (To Ditch)

Onsite Area A_n = 10 ac;	Q_{2dn} = 5.94 cfs;	Q_{100dn} = 16.65 cfs
Offsite AreaA_f = 10.5 ac;	Q_{2hf} = 1.39 cfs;	Q_{100hf} = 8.74 cfs
Total Area A_T = 20.5 ac;	Q_{2d} = 7.33 cfs;	Q_{100d} = 25.39 cfs

HISTORIC RUNOFF: (Storm Sewer)

Onsite Area A_n = 10 ac;	Q_{2hn} = 0.74 ac;	Q_{100hn} = 4.70 cfs
Offsite Area A_f = 35 ac;	Q_{2hf} = 2.59 ac;	Q_{100hf} = 16.45 cfs
Total Area A_T = 45 ac;	Q_{2h} = 3.33 cfs;	Q_{100h} = 21.15 cfs

DEVELOPED RUNOFF: (Storm Sewer)

Onsite Area A_n = 10ac;	Q_{2dn} = 7.16 cfs;	Q_{100dn} = 20.95 cfs
Offsite Area A_f = 30 ac;	Q_{2hf} = 4.77 cfs;	Q_{100hf} = 31.43 cfs
Total Area A_T = 40 ac;	Q_{2d} = 11.93 cfs;	Q_{100d} = 52.38 cfs

DITCH PRE-ADJUSTED

HISTORIC RUNOFF: (To Ditch)

Onsite Area A_n = 10ac;	Q_{2hn} = 1.32 cfs;	Q_{100hn} = 8.33 cfs
Offsite Area A_f = 10.5 ac;	Q_{2hf} = 1.39 cfs;	Q_{100hf} = 8.74 cfs
Total Area A_T = 17.5 ac;	Q_{2h} = 2.71 cfs;	Q_{100h} = 17.07 cfs

DEVELOPED RUNOFF: (To Ditch)

Onsite Area A_n = 7 ac;	Q_{2dn} = 4.16 cfs;	Q_{100dn} = 11.66cfs
Offsite Area A_f = 10.5 ac;	Q_{2hf} = 1.39 cfs;	Q_{100hf} = 8.74 cfs
Total Area A_T = 17.5 ac;	Q_{2d} = 5.55 cfs;	Q_{100d} = 20.40 cfs

HISTORIC RUNOFF: (Storm Sewer)

Onsite Area A_n = 10 ac;	Q_{2hn} = 0.74 ac;	Q_{100hn} = 4.70 cfs
Offsite Area A_f = 35 ac;	Q_{2hf} = 2.59 ac;	Q_{100hf} = 16.45 cfs
Total Area A_T = 45 ac;	Q_{2h} = 3.33 cfs;	Q_{100h} = 21.15 cfs

DEVELOPED RUNOFF: (Storm Sewer)

Onsite Area A_n = 13ac;	Q_{2dn} = 8.89 cfs;	Q_{100dn} = 25.49 cfs
Offsite Area A_f = 30 ac;	Q_{2hf} = 4.56cfs;	Q_{100hf} = 29.93 cfs
Total Area A_T = 43 ac;	Q_{2d} = 13.45 cfs;	Q_{100d} = 55.87cfs

SUMMARY OF SUB-BASINS DRAINAGE

Sub-basin Area (1): $A_1 = 5.26$ ac

Historic Runoff:	$Q_{2h1} = 0.92$ cfs;	$Q_{100h1} = 5.79$ cfs
Developed Runoff:	$Q_{2d1} = 4.62$ cfs;	$Q_{100d1} = 12.70$ cfs

Sub-basin Area (2): $A_2 = 3.16$ ac

Historic Runoff:	$Q_{2h2} = 0.58$ cfs;	$Q_{100h2} = 3.67$ cfs
Developed Runoff:	$Q_{2d}2 = 2.13$ cfs;	$Q_{100d2} = 7.82$ cfs

Sub-basin Area (3): $A_3 = 1.58$ ac

Historic Runoff:	$Q_{2h3} = 0.29$ cfs;	$Q_{100h3} = 1.84$ cfs
Developed Runoff:	$Q_{2d3} = 1.39$ cfs;	$Q_{100d3} = 3.91$ cfs

Sub-basin Area (4): $A_4 = 3$ac

Historic Runoff:	$Q_{2h4} = 0.55$ cfs;	$Q_{100h4} = 3.49$ cfs
Developed Runoff:	$Q_{2d4} = 2.63$ cfs;	$Q_{100d4} = 7.43$ cfs

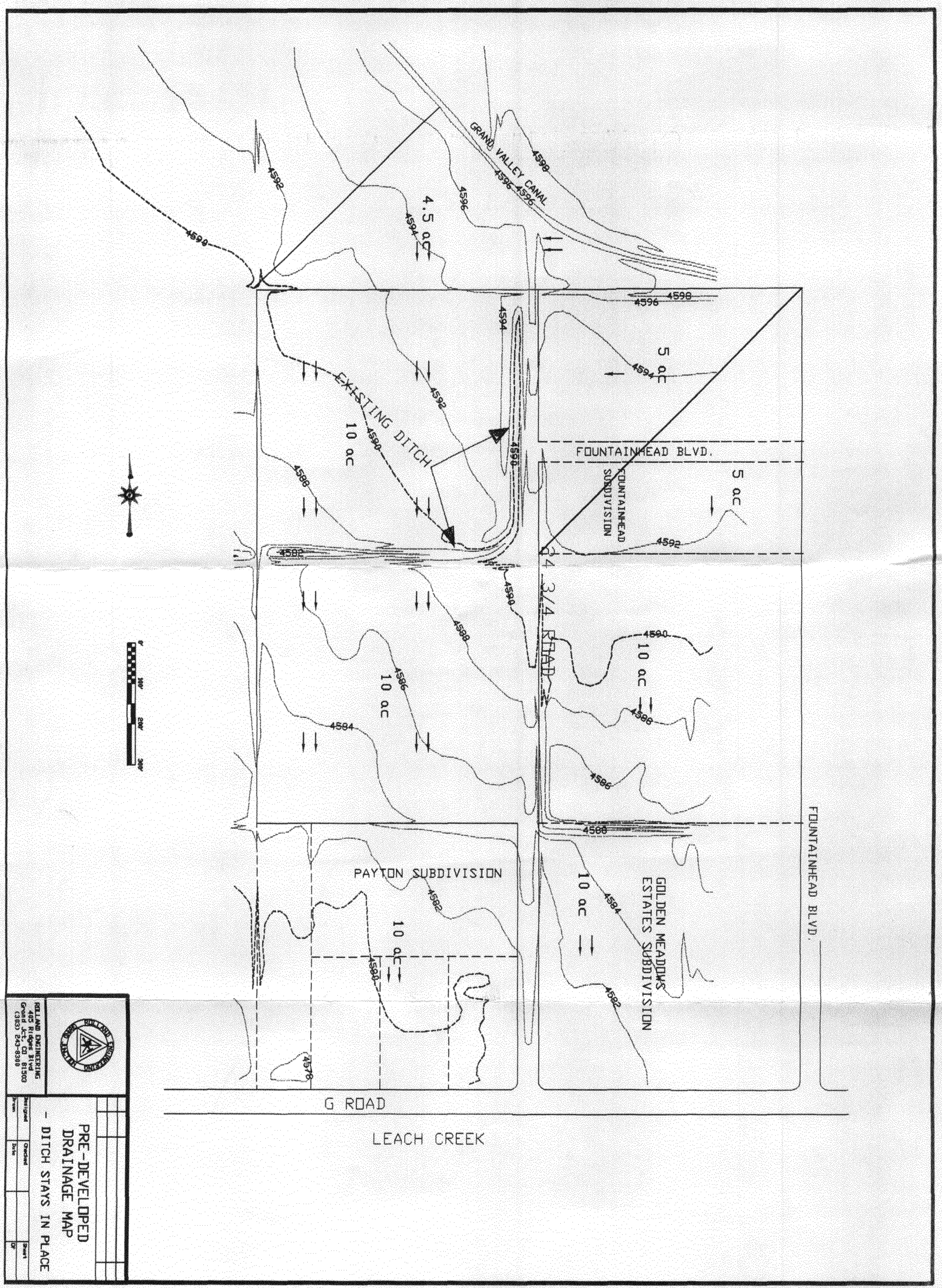
Sub-basin Area (5): $A_5 = 10$ ac (to ditch, ditch stays in place)

Historic Runoff:	$Q_{2h5} = 1.32$ cfs;	$Q_{100h5} = 8.33$ cfs
Developed Runoff:	$Q_{2d5} = 5.94$ cfs;	$Q_{100d5} = 16.65$cfs

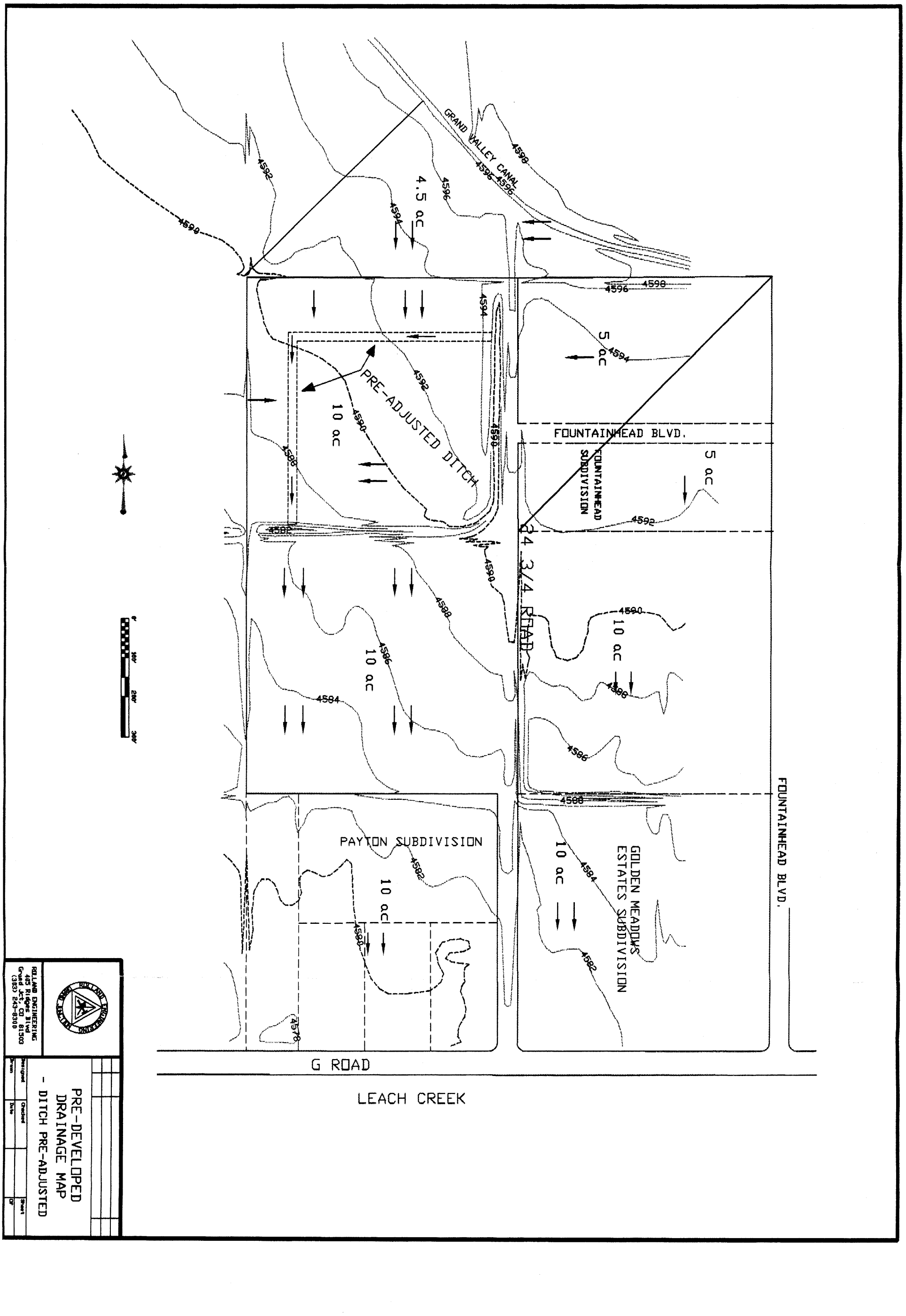
Sub-basin Area (6): A6 = 7ac (to ditch, ditch pre-adjusted)

Historic Runoff:	$Q_{2h6} = 0.92$ cfs;	$Q_{100h6} = 5.83$cfs
Developed Runoff:	$Q_{2d6} = 4.16$ cfs;	$Q_{100d6} = 11.66$ cfs

APPENDIX B



APPENDIX C

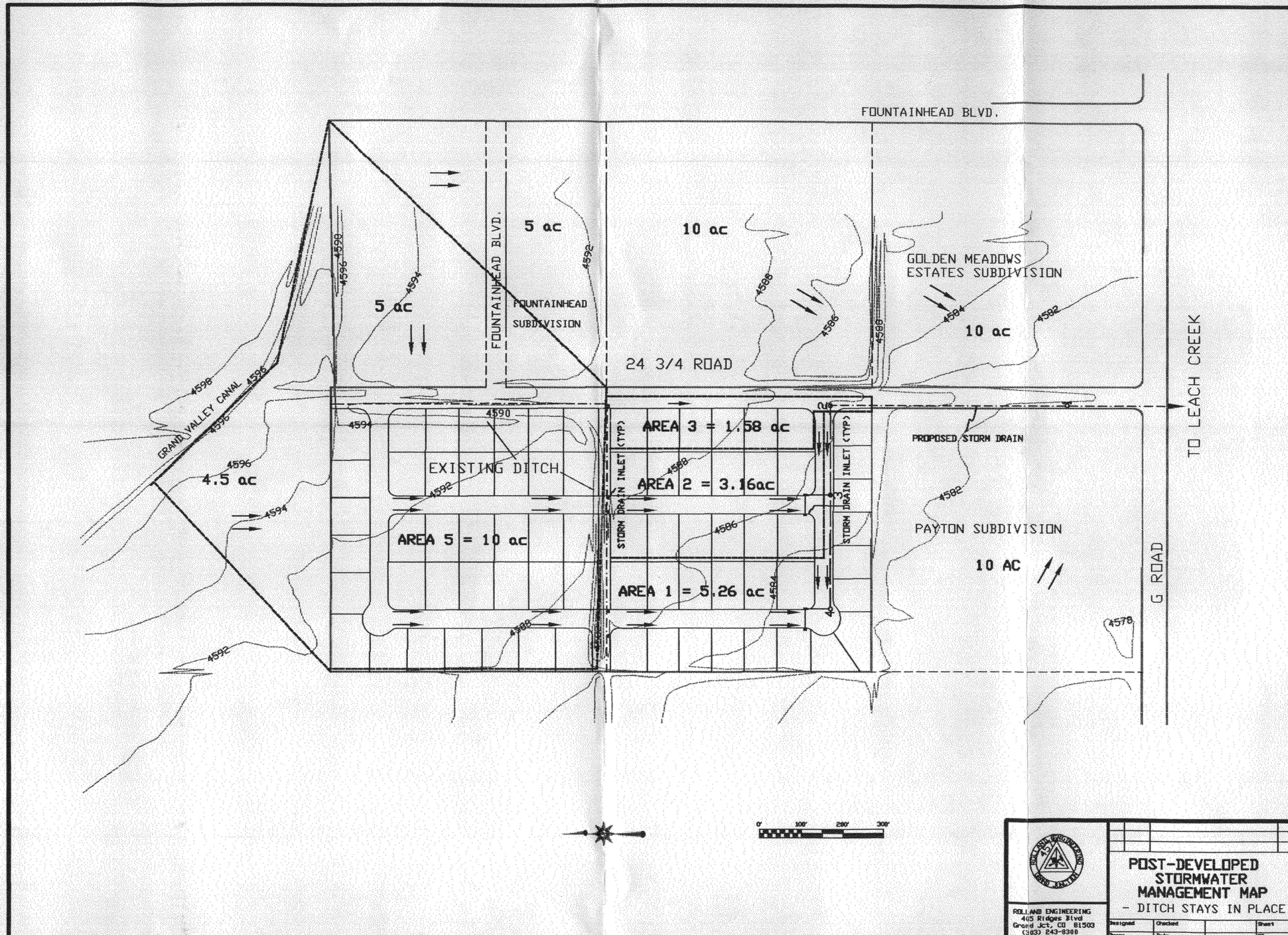


ROLLAND ENGINEERING
435 Ridges Blvd
Grand Jct, CO 81503
(303) 243-8300

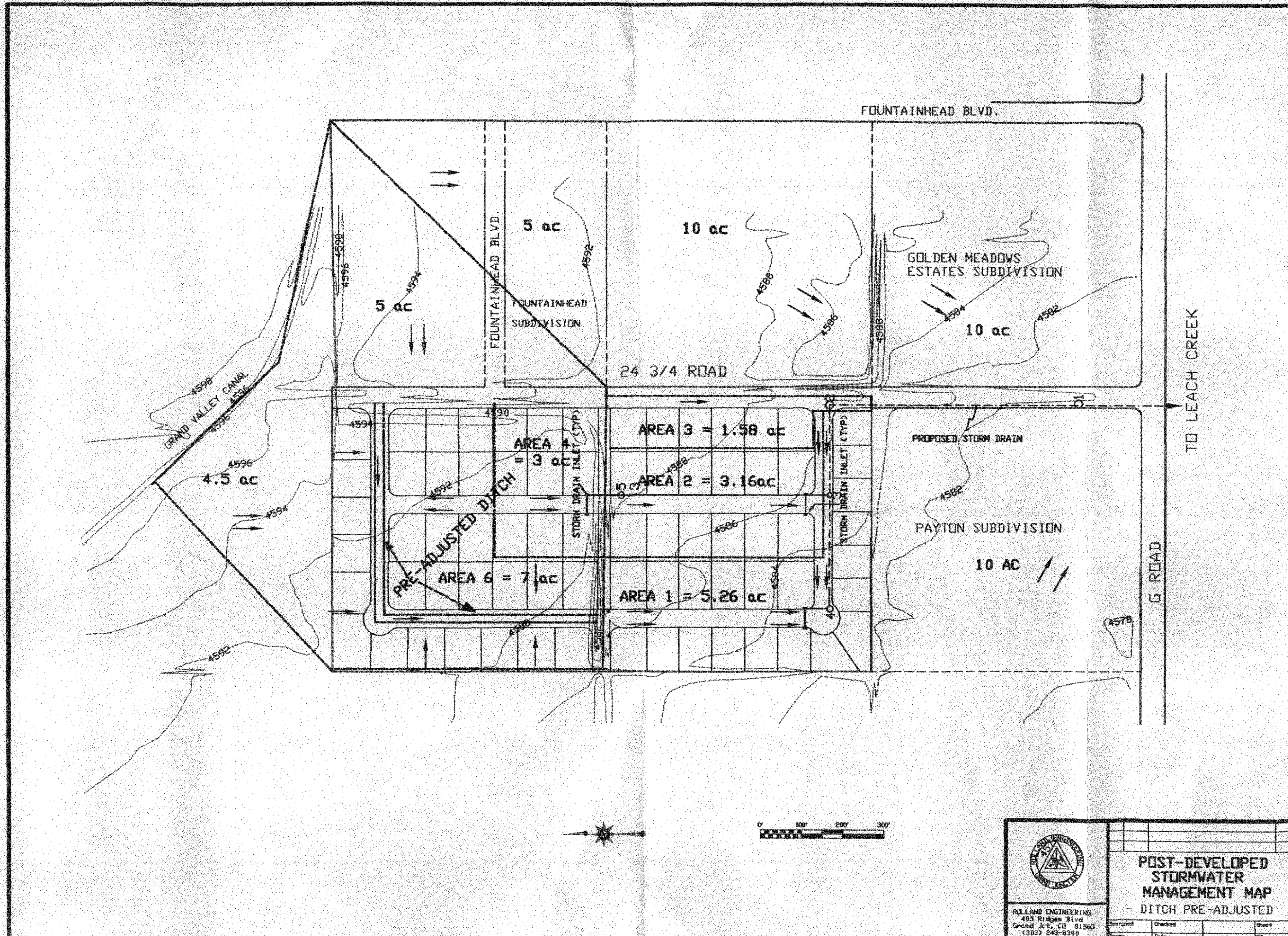
PRE-DEVELOPED
DRAINAGE MAP
- DITCH PRE-ADJUSTED

Designed | Drawn | Checked | Date | Sheet | Of

APPENDIX D


FOUNTAINHEAD BLVD.
GOLDEN MEADOWS
ESTATES SUBDIVISION
10 ac
10 ac
5 ac
5 ac
FOUNTAINHEAD BLVD.
FOUNTAINHEAD
SUBDIVISION
24 3/4 ROAD
TO LEACH CREEK
GRAND VALLEY CANAL
4.5 ac
EXISTING DITCH
AREA 3 = 1.58 ac
AREA 2 = 3.16ac
AREA 1 = 5.26 ac
AREA 5 = 10 ac
STORM DRAIN INLET (TYP)
STORM DRAIN INLET (TYP)
PROPOSED STORM DRAIN
PAYTON SUBDIVISION
10 AC
G ROAD
0' 100' 200' 300'
ROLLAND ENGINEERING
405 Ridges Blvd
Grand Jct, CO 81503
(303) 243-8300
POST-DEVELOPED
STORMWATER
MANAGEMENT MAP
- DITCH STAYS IN PLACE
Designed
Checked
Sheet
Drawn
Date
OF

APPENDIX E


FOUNTAINHEAD BLVD.
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FOUNTAINHEAD
SUBDIVISION
24 3/4 ROAD
TO LEACH CREEK
GRAND VALLEY CANAL
4.5 ac
AREA 4
= 3 ac
AREA 3 = 1.58 ac
AREA 2 = 3.16ac
AREA 1 = 5.26 ac
AREA 6 = 7 ac
PRE-ADJUSTED DITCH
STORM DRAIN INLET (TYP)
PROPOSED STORM DRAIN
PAYTON SUBDIVISION
10 AC
G ROAD
ROLLAND ENGINEERING
405 Ridges Blvd
Grand Jct, CO 81503
(303) 243-8300
POST-DEVELOPED
STORMWATER
MANAGEMENT MAP
- DITCH PRE-ADJUSTED
Designed
Checked
Sheet
Drawn
Date
OF

SUPPLEMENT 1

comparatively sharp rises or undulations having slopes of more than 5 percent that extend 4 to 6 feet above the prevailing level or in small irregularly shaped bodies on relatively smooth topography. Wherever the areas of Chipeta soil occur, they are too small and too intricately associated with the Persayo soil to be mapped separately.

Use and management.—About 25 percent of this complex is cultivated, but practically all of it could be. The Chipeta soil is not difficult to level, but the expense of leveling and the isolated location of the areas have not favored development for irrigation and cropping. The kinds of crops grown, the management practiced, and the yields produced are approximately the same as for Persayo-Chipeta silty clay loams, 0 to 2 percent slopes.

Ravola clay loam, 0 to 2 percent slopes (RA).—This soil, the second most extensive in the area, has developed in material that consists largely of reworked Mancos shale but includes an appreciable amount of sandy alluvium from the higher Mesaverde formation. The surface of these deposits is relatively level, but the depth of the deposits ranges from 5 to 30 feet. The soil is associated with the Billings silty clay loams and the Ravola fine sandy loams. The most important areas are east, northeast, and southeast of Fruita, north and northwest of Palisade, and north and northwest of Clifton.

The soil is much like the Billings silty clay loams but more porous because it contains more fine sand, especially in the subsoil. Ordinarily, the 10- or 12-inch surface layer consists of light brownish-gray to very pale-brown light clay loam. The underlying layers vary from place to place in thickness and texture and become more sandy below depths of 4 to 5 feet. The range in the subsoil is from fine sandy loam to clay loam.

Small fragments of shale and sandstone are common from the surface downward and are especially noticeable in areas nearest the source of the soil material. The entire profile is calcareous and friable, so internal drainage is medium and development of plant roots is not restricted. The surface is smooth. Most areas are at slightly higher levels than the associated areas of Billings silty clay loams and therefore have better drainage and a lower content of salts. The soil, however, is slightly saline under native cover, and in places it has strongly saline spots and a high water table.

Use and management.—About 95 percent of this soil is cultivated. The chief crops are alfalfa, corn, pinto beans, small grains, and, where climate is favorable, orchard fruits. Practically all the acreage used for tree fruits is near Clifton and Palisade. The acreage used for field crops varies from year to year, but by rough estimate about 30 percent is cropped to corn, 25 percent to alfalfa, 15 percent to pinto beans, 13 percent to orchard fruits, 10 percent to small grains, and the rest to sugar beets, tame hay, tomatoes, and various vegetable crops.

In general, the tilth and workability of this soil are favorable. The content of organic matter is generally less than 1 percent, but many farmers are improving the supply by growing more alfalfa and by using other improved management.

Ravola clay loam, 2 to 5 percent slopes (RB).—This soil differs from Ravola clay loam, 0 to 2 percent slopes, mainly in having greater slopes. Although the combined areas total only seven-tenths of a square mile, this soil is important because the largest single area—approximately 300 acres—is located southeast of Palisade in the Vinelands and is used for peach growing. The remaining areas, widely scattered over the valley, total about 150 acres and are of minor importance.

The large area occupies a position intermediate between the Green River soils and the higher Mesa soils. Its underlying gravel and stone strata consist not only of sandstone but also of granite, schist, basalt, and lava. Much of the lava was deposited by drainage from the southeast. This large area was included with the soil unit largely because its color was similar to that of the other soil areas. Not many years ago subdrainage became inadequate for existing tree fruits and it was not until a number of tile drains were laid, as deep as 7 to 8 feet in places, that subdrainage was corrected in parts of this particular area.

Use and management.—All of the large soil area is in peaches. On it peach yields average as high as in any section of the valley, primarily because the danger of frost damage is negligible. Some of the orchards are now more than 50 years old but have produced steadily and still yield more than 400 bushels an acre according to reports from local growers. About half of the small scattered areas are cultivated. They are used largely for field crops because climatic conditions are not so favorable for peach growing. In building up the organic matter content, the growing of legumes, application of manure in large amounts, and use of commercial fertilizer generally are practiced.

Ravola very fine sandy loam, 0 to 2 percent slopes (RF).—This extensive and important soil occurs either along washes or arroyas extending from the north or on broad coalescing alluvial fans. The alluvial material from which the soil has developed was derived from sandstone and shale and ranges from 4 to 20 feet deep. The principal areas of the soil are north and northwest of Grand Junction and north, northwest, and southwest of Fruita.

This soil is much like Ravola fine sandy loam, 0 to 2 percent slopes, but is generally more uniformly level. The texture is prevailingly very fine sandy loam, but the percentage of silt is noticeably higher in some places. A few small areas that have a loam texture are included.

The 10- or 12-inch surface layer consists of light brownish-gray to very pale-brown very fine sandy loam. In some places the underlying thin depositional layers vary only slightly in color or texture. In other places, especially near drainage courses, the layers are more variable and may grade to loam, silt loam, or fine sandy loam. Nevertheless, layers of very fine sandy loam are more numerous. Below depths of 4 to 5 feet, the texture is sandier, and at depths of 8 to 12 feet strata of loamy fine sand, gravel, and scattered sandstone rock are common.

Disseminated lime occurs from the surface downward. Owing to the friable consistence of the successive layers, the tilth, internal drainage, available supply of moisture for plants, permeability to plant roots, and other physical properties are favorable and assure a wide suitability range for crops. The organic-matter content, however, is low. The soil is slightly saline under native cover and has a few strongly saline spots. Occasionally the water table is high.

Use and management.—More than 99 percent of this soil is cultivated. The chief crops are alfalfa, corn, pinto beans, small grains,

SUPPLEMENT 2

SECTION 3

HYDROLOGIC SOIL GROUPS

This section gives definition of four soil groups that are used in determining hydrologic soil-cover complexes, for estimating runoff from rainfall.

Definitions

The hydrologic soil groups, according to their infiltration and transmission rates, are:

A. (Low runoff potential). Soils have high infiltration rates even when thoroughly wetted. These consist chiefly of deep, well to excessively drained sands or gravel. These soils have a high rate of water transmission in that water readily passes through them.

B. Soils having moderate infiltration rates when thoroughly wetted. These consist chiefly of moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

C. Soils having slow infiltration rates when thoroughly wetted. These consist chiefly of soils with a layer that impeded downward movement of water or soils with moderately fine to fine texture. These soils have a slow rate of water transmission.

D. (High runoff potential). Soils having very slow infiltration rates when thoroughly wetted. These consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very slow rate of water transmission.

Source of Data

Local Soil Conservation Service field offices have soil survey data for their respective areas. Much of this existing data was mapped with soil symbols or with soil series names that may not be current. These symbols or soil series names may be converted to current names with assistance from respective SCS offices. The 1979 publication, "Soils of Colorado" has current soil series names and hydrologic groups. This information is included in Table S-2 of this publication.

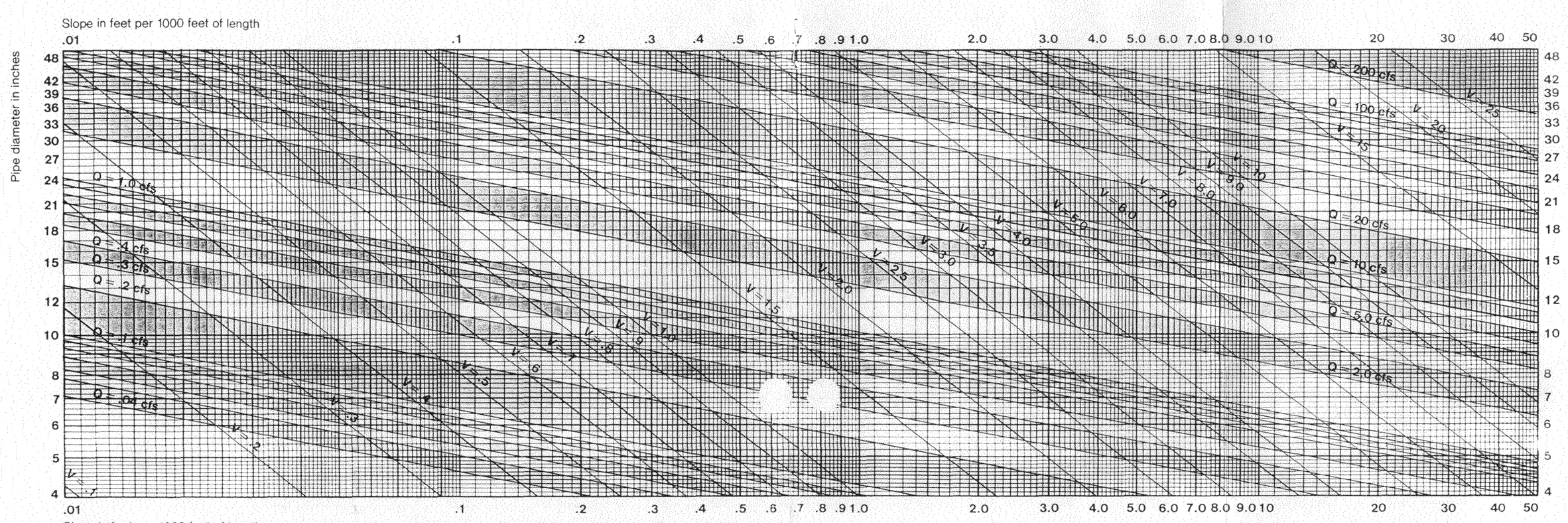
REFERENCES

Coefficient of flow
n = 0.009

Derived from the Manning Formula

$$v = \frac{1.486}{n} R^{2/3} S^{1/2}$$

PVC gravity sewer pipes have a coefficient of n = 0.009. Their high carrying capacities may often result in the use of flatter grades or in the use of smaller diameter pipe.



(Above Graph Based On Pipe Flowing Full.)

Slope values
Slope values derived from this chart are for coefficient of flow n = 0.009. They may be converted to slopes for other coefficients of flow by means of the following multiplying factors:

0.79	for n = 0.008	1.77	for n = 0.012
1.00	for n = 0.009	2.086	for n = 0.013
1.23	for n = 0.010	2.42	for n = 0.014
1.494	for n = 0.011	2.778	for n = 0.015

Diameters
Diameters derived from this chart are for coefficient of flow n = 0.009. These may be converted to diameters for other coefficients of flow by means of the following multiplying factors:

0.956	for n = 0.008	1.114	for n = 0.012
1.000	for n = 0.009	1.147	for n = 0.013
1.040	for n = 0.010	1.180	for n = 0.014
1.078	for n = 0.011	1.211	for n = 0.015

Conversion factors
CFS, MGD, GPM
To convert cubic feet per second (cfs) to million gallons per day (mgd), multiply cfs by 0.646. To convert cubic feet per second (cfs) to gallons per minute, multiply cfs by 448.83.

One cubic foot of water = 7.48 gallons

Assume:

Flow coefficient n = 0.009
Length = 2800 ft.
Pipe size = 8 inch
Elevations—Upstream = 215'- 0"
Downstream = 213'- 0"

Required:

1) Flow rate when flowing full
2) Velocity

Difference in elevation divided by length of pipe line equals slope in ft./ft. Multiplying by 1000 = slope 0.7 ft./1000 ft. Enter graph at 0.7 slope and also at 8 inch diameter pipe. At intersection, lines for velocity and flow rate also intersect. These give flow rate of 0.5 cu. ft. per second and velocity of 1.3 feet per second.

(Based On Manning Equation, Flow Co-Efficients As Noted, A Slope Of 0.5% Or 5.0 Feet Per 1,000 Feet.)

Perma-Loc (n = .009)			Reinforced Concrete (n = .013)		Corrugated Metal (n = .021)	
Dia. (In.)	Avg. ID (In.)	Flow (CFS)	Diameter Needed for Same Flow (In.)	Closest Pipe Size Available (In.)	Diameter Needed for Same Flow (In.)	Closest Pipe Size Available (In.)
36	35.50	32.82	40.75	42	48.78	54
30	29.50	20.03	33.86	36	40.53	42
27	26.50	15.05	30.42	33	36.41	42
24	23.50	10.92	26.97	27	32.30	33
21	20.75	7.84	23.81	24	28.51	30
18	17.65	5.09	20.26	21	24.25	27

(Above Chart Based On Pipe Flowing Half-Full.)

APPENDIX A

INTENSITY - DURATION - FREQUENCY (I-D-F) TABLE

(Based upon The 1992 Mesa County Drainage Criteria Manual)

TIME (MIN)	2-YEAR ITENSITY (IN/HR)	100-YEAR ITENSITY (IN/HR)	TIME (MIN)	2-YEAR ITENSITY (IN/HR)	100-YEAR ITENSITY (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	0.69	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

APPENDIX B

RATIONAL METHOD
RECOMMENDED AVERAGE RUNOFF COEFFICIENTS

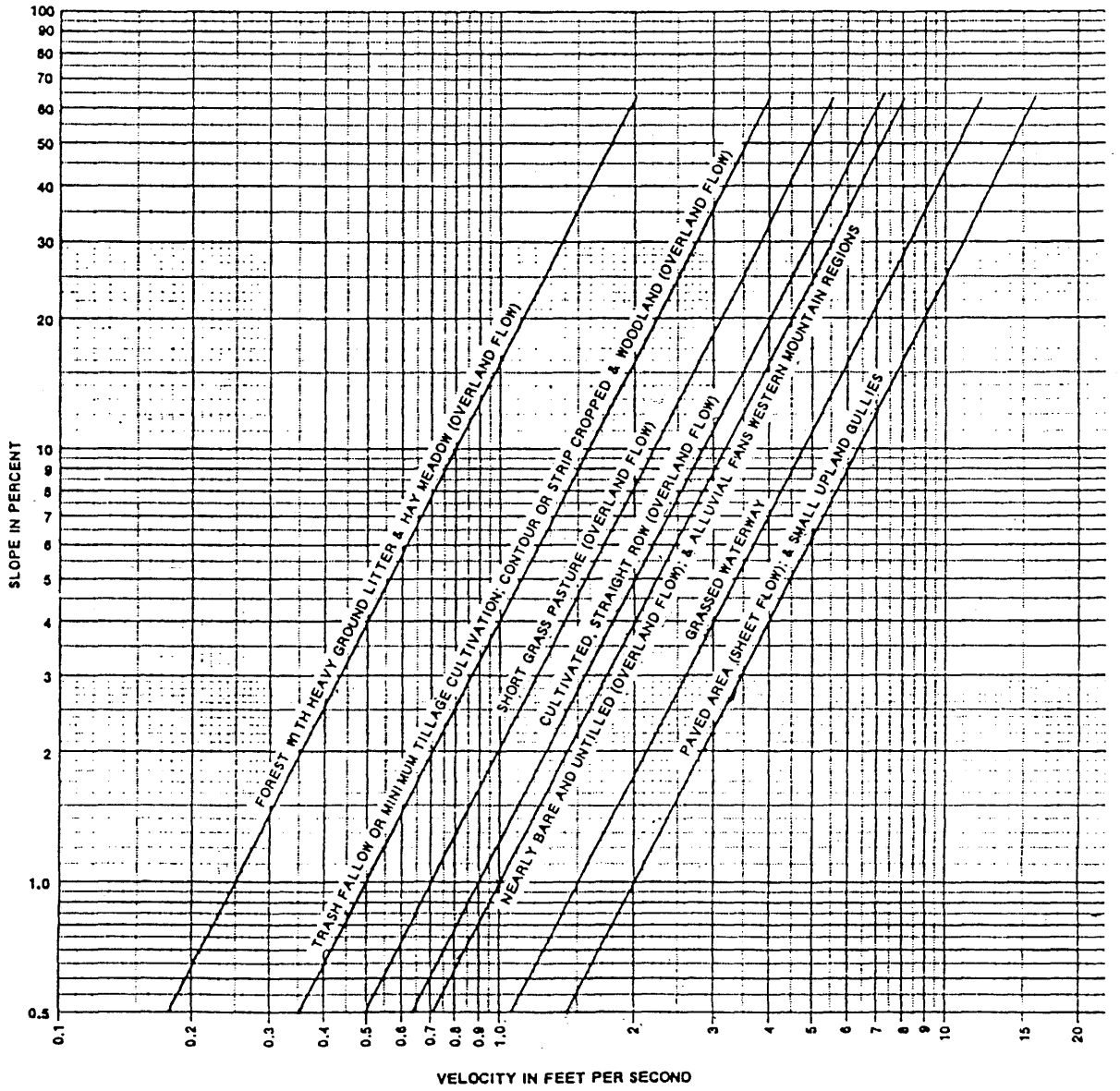
Land Use or Surface Characteristics	"C" VALUES 2-YR STORM A&B*	2-YR STORM C&D*	100-YR STOR A&B*	100-YR STOR C&D*
Undeveloped Areas (Vacant or pre-development analysis condition)	0.10	0.20	0.25	0.35
Residential Areas				
Less than 1/8 acre per unit	0.55	0.65	0.70	0.80
1/8 acre per unit	0.50	0.60	0.65	0.75
1/4 acre per unit	0.40	0.50	0.55	0.65
1/3 acre per unit	0.35	0.45	0.50	0.60
1/2 acre per unit	0.30	0.40	0.45	0.55
1 acre per unit	0.25	0.35	0.40	0.50
Pavement and Roofs	0.90	0.90	0.95	0.95
Gravel and Soil Traffic areas	0.70	0.70	0.85	0.85
Lawns and Green Landscaping	0.15	0.25	0.30	0.40
Gravel and Non-Green Landscaping	0.45	0.50	0.60	0.70
Parks, Cemeteries, Pastures	0.25	0.35	0.40	0.50
Schools	0.45	0.50	0.60	0.70

* Refers to SCS soil hydrologic group classification.

MESA COUNTY
STORM DRAINAGE CRITERIAL MANUAL

FIGURE 402

Taken from TR-55 (1975) and NEH-4, both SCS publications.



AVERAGE VELOCITIES FOR OVERLAND FLOW

June 2, 1995

City of Grand Junction, Colorado
250 North Fifth Street
81501-2668
FAX: (303) 244-1599

Mr. Chris Carnes
1401 N. 1st Street
Grand Junction, Colorado

RE: North Valley Subdivision Drainage Fee

Dear Chris,

The drainage fee in lieu of on-site detention applies to your development and was calculated by Rolland Engineering as $7298.00 as shown in the attached letter.

The fee will be reduced by the amount you paid for the oversizing of the storm sewer pipe across G Road. Please include a copy of the bill from Travis Jordan when you pay the drainage fee and that amount will be deducted from the drainage fee.

The fee may be paid through the City Community Development Department and they will give you a receipt.

If I can offer any assistance, please call me.

Sincerely,

Jody Kliska
City Development Engineer

cc: Kathy Portner

Total bill: 7298.
Travis Jordan Credit 2600.
$4,698 Total due Grand Jct.

~~DATE~~	CHARGES AND CREDITS	~~BALANCE~~
	North Valley Storm Drain Cross BALANCE FORWARD	G. - Rd.
50'	36" R.C.P. @ 22.00 ft. -	$1,100.00
1 -	M.H.	1,500.00
	Pd. 8/4/95	
	J # 1025	
		$2,600.00

Thank You

PAY LAST AMOUNT IN THIS COLUMN

TRAVIS JORDAN TRENCHING

Larry Timm
C: Tom D

GOLDEN, MUMBY, SUMMERS & LIVINGSTON
ATTORNEYS AT LAW
NORWEST BANK BUILDING, SUITE 400
2808 NORTH AVENUE
P.O. BOX 398
GRAND JUNCTION, COLORADO 81502

JAMES GOLDEN
KEITH G. MUMBY
K.K. SUMMERS
J. RICHARD LIVINGSTON

SUSAN M. DACKONISH

AREA CODE 303
TELEPHONE 242-7322
FAX 242-0698

RECEIVED
JUN 8 1994

June 7, 1994

VIA TELECOPIER

C: Larry T
Jim S
Bill C
6/8/94
G

Dan Wilson, Esq.
City Attorney
Grand Junction
250 North 5th Street
Grand Junction, CO 81501

Re: North Valley Subdivision
24 3/4 and G Roads

Dear Dan:

I spoke with Chris Carnes regarding the City's request to delay annexation of the north 15 acres of North Valley until after the first of the year. The delay is acceptable so long as the City agrees to process the annexation within sixty (60) days of the owner's request should the City program not be implemented in a time frame adequate to meet the needs of North Valley.

We have discussed the possibility of a recapture agreement for the cost of 24 3/4 Road improvements or, alternatively, the possibility of City participation in road improvements. Please advise as to the City's position. We also talked briefly about the possibility of the sewer line extension up 24 3/4 Road being classified as a trunk extension. Please advise.

Jim?

Bill?

Lastly, North Valley would like to deliver storm water down 24 3/4 Road. They would like to have the cost of the storm sewer credited against the fee to be paid in lieu of on-site retention.

Jim?

Please let me know if you need additional data or information. I look forward to hearing from you.

Please let me know your reaction; Carnes has cooperated to date....

Sincerely,

GOLDEN, MUMBY, SUMMERS & LIVINGSTON

J. Richard Livingston

JRL:jlc

cc: Chris Carnes

See Addendum

STAFF REVIEW

FILE: #35-94(3)

DATE: June 17, 1994

STAFF: Tom Dixon

REQUEST: Final Plat for Filings #1 & 2, North Valley Subdivision

LOCATION: 24 3/4 Road, north of G Road

APPLICANT: G Road LLC

EXISTING LAND USE: Agricultural

PROPOSED LAND USE: Residential

SURROUNDING LAND USE:
NORTH: Single-family Residential/Agricultural
SOUTH: Single-family Residential
EAST: Single-family Residential/Agricultural
WEST: Single-family Residential

EXISTING ZONING: PR-12

PROPOSED ZONING: PR-4.1

SURROUNDING ZONING:
NORTH: AFT (Mesa County)
SOUTH: RSF-2
EAST: PR
WEST: AFT (Mesa County)

RELATIONSHIP TO COMPREHENSIVE PLAN/POLICIES/GUIDELINES:

No Comprehensive Plan presently exists for this area.

STAFF ANALYSIS:

This site is 19.19 acres in size and is presently used as an agriculture field. The entire site is flat and there are no evident improvements. When reviewed as a preliminary subdivision plan, the site area was stated as approximately 20 acres.

The North Valley Subdivision is proposed for the site. This subdivision will potentially

have 74 single-family residential lots on the 19+-acre site and is intended to begin with two filings. Filing #1 will have 18 lots and will be located on the southern most portion of the property. Access will be to 24 3/4 Road from proposed Cimmarron Drive which will connect with North Valley Drive and Monument View Drive, both of which will be stubbed streets running parallel to 24 3/4 Road. Filing #2 will provide for an additional 20 single-family residential lots. Access and circulation will continue the alignments of North Valley and Monument View Drives, both of which will be stubbed with the remaining vacant portion of the property to the north. Subsequent phasing of development will occur as market and opportunity factors allow.

Services to the site will have to be extended. 24 3/4 Road is presently improved only with asphalt from G Road to the southeast corner of this site where it then becomes a gravel roadway. Water and sewer will have to be extended. The applicants have provided a Development Improvements Agreement to assure the City that needed service improvements will occur.

The site is presently situated beyond the City limits. Annexation is proposed for this project although the timing of annexation will likely occur in at least two phases. This will result in the southern half of the property being developed at an effective density of 4.1 units per acre (38 lots on 9.31 acres) and this will be the first portion of the site to be annexed. A subsequent annexation is intended to occur on the northern half of the site sometime in the next year. Although the effective density of the entire site is 3.9 (74 lots on 19.19 acres), the zoning designation of PR 4.1 has to be applied in the event that the expected annexation to the north does not occur in the expected time period. The zone of annexation is thus proposed to be PR-4.1 to reflect the actual development density for the first 38 lots. Zoning for the second annexation will reflect a limit on density of 36 lots on the remaining 9.88 acres.

The applicant proposes the following setbacks:
front yards = 20 feet, side yards = 5 feet, rear yards = 15 feet. Staff finds that these are appropriate setbacks given the lot sizes and density approved.

STAFF RECOMMENDATION:

Staff recommends approval of the final plan for North Valley Subdivision, subject to the following conditions:

1) The following setbacks apply to all residences and accessory structures: front yards, 20 feet; side yards 5 feet; rear yards 15 feet.

2) The northern lot containing 9.88 acres, identified as Outlot B, will be limited to 34 lots when annexed into the City.

SUGGESTED PLANNING COMMISSION MOTION:

Mr. Chairman, on item #35-94(3), final plan approval for filings #1 and # 2 for the North

Valley Subdivision, I move that we approve this subject to the staff recommendation.

REVIEW COMMENTS

FILE #35-94(3) **TITLE HEADING:** Final Plat/Plan - North Valley Subdivision

LOCATION: 24 3/4 Road; North of G Road

PETITIONER: G Road LLC

PETITIONER'S ADDRESS/TELEPHONE: Chris Carnes
1401 North 1st Street
Grand Junction, CO 81501
241-4000

PETITIONER'S REPRESENTATIVE: Rolland Engineering

STAFF REPRESENTATIVE: Tom Dixon

NOTE: WRITTEN RESPONSE BY THE PETITIONER TO THE REVIEW COMMENTS IS REQUIRED ON OR BEFORE 5:00 P.M., JUNE 24, 1994.

GRAND JUNCTION FIRE DEPARTMENT **6/3/94**
George Bennett **244-1400**

The fire hydrant at the northwest corner of Lot 12 of Block 2 needs to be moved to between Lots 6 & 8 of Block 2. An approved turnaround or access must be provided at the north end of Monument View Drive and North Valley Drive. Submit revised plans that reflect these changes for our review.

U.S. WEST **6/3/94**
Leon Peach **244-4964**

New or additional telephone facilities necessitated by this project may result in a "contract" and up-front monies required from developer, prior to ordering or placing of said facilities. For more information, please call Leon Peach, 244-4964.

U.S. POSTAL SERVICE **6/6/94**
Cheryl Fiegel **244-3435**

1. This is rural delivery - mail delivery can be curbside (not behind the sidewalk) or centralized. If curbside is the preferred delivery and sidewalks are planned, the sidewalks must be detached from the curb.
2. Our delivery area currently has 9 different streets with "Valley" as the name, this can be very confusing.

CITY PARKS & RECREATION DEPARTMENT **6/6/94**
Don Hobbs **244-1542**

Per filing

Open space fees will be required for the proposed 38 units @ $225 pre unit or $8,550. The 10 acre norther section will be calculated at time of platting.

CITY UTILITY ENGINEER **6/14/94**
Bill Cheney **244-1590**

See attached comments.

CITY PROPERTY AGENT **6/15/94**
Tim Woodmansee **244-1565**

1. Please label the use (multi-purpose?) and provide appropriate dedication language for the 14' easements shown on both Filings.
2. The labeling for the 10' drainage and irrigation easement along the south line of Filing One appears to have been left dangling on the plat for Filing Two.
3. Should the lot numbering for Filing Two have some autonomy, rather than being carried over from Filing One?

CITY DEVELOPMENT ENGINEER **6/16/94**
Jody Kliska **244-1591**

See attached comments and red-lined drawings.

COMMUNITY DEVELOPMENT DEPARTMENT **6/17/94**
Tom Dixon **244-1447**

See attached comments.

STAFF REVIEW (Final)

FILE: #35-94(3)

DATE: June 21, 1994

STAFF: Tom Dixon

REQUEST: Final Plat for Filings #1 & #2, North Valley Subdivision

LOCATION: 24 3/4 Road, north of G Road

APPLICANT: G Road LLC

EXISTING LAND USE: Agricultural

PROPOSED LAND USE: Residential

SURROUNDING LAND USE:

NORTH: Single-family Residential/Agricultural
SOUTH: Single-family Residential
EAST: Single-family Residential/Agricultural
WEST: Single-family Residential

EXISTING ZONING: PR-12 (Mesa County)

PROPOSED ZONING: PR-4.1

SURROUNDING ZONING:

NORTH: AFT (Mesa County)
SOUTH: RSF-2
EAST: PR
WEST: AFT (Mesa County)

RELATIONSHIP TO COMPREHENSIVE PLAN/POLICIES/GUIDELINES:

No Comprehensive Plan presently exists for this area.

STAFF ANALYSIS:

This site is 19.19 acres in size and is presently used as an agriculture field. The entire site is flat and there are no evident improvements. When reviewed as a preliminary subdivision plan, the site area was stated as approximately 20 acres.

The North Valley Subdivision is proposed for the site. This subdivision could potentially

have 74 single-family residential lots on the 19+-acre site and is intended to begin with two filings. Filing #1 will have 18 lots and will be located on the southern most portion of the property. Access will be to 24 3/4 Road from proposed Cimmarron Drive which will connect with North Valley Drive and Monument View Drive, both of which will be stubbed streets running parallel to 24 3/4 Road. Filing #2 will provide for an additional 20 single-family residential lots. Access and circulation will continue the alignments of North Valley and Monument View Drives, both of which will be stubbed with the remaining vacant portion of the property to the north. Subsequent phasing of development, or perhaps re-platting, will occur as market and opportunity factors allow.

Services to the site will have to be extended. 24 3/4 Road is presently improved only with asphalt from G Road to the southeast corner of this site where it then becomes a gravel roadway. Water and sewer will have to be extended. The applicants have provided a Development Improvements Agreement to assure the City that needed service improvements will occur.

The site is presently situated beyond the City limits. Annexation is proposed for this project although the timing of annexation will likely occur in at least two phases. This will result in the southern half of the property being developed at an effective density of 4.1 units per acre (38 lots on 9.31 acres) and this will be the first portion of the site to be annexed. A subsequent annexation is intended to occur on the northern half of the site sometime in the next year. Although the effective density of the site is 3.9 (74 lots on 19.19 acres), the zoning designation of PR 4.1 has to be applied to the south half of the entire site in the event that the expected annexation to the north does not occur in the intended time period. The zone of annexation is thus proposed to be PR-4.1 on the south half to reflect the actual development density for the first 38 lots.

Zoning for the second annexation will reflect a limit on density of 36 lots on the remaining 9.88 acres unless a new development proposal is submitted, reviewed and approved to develop the north half differently from the approved preliminary plan. For the time being, the north half of the site will remain in unincorporated Mesa County and will retain the PR-12 county zoning designation.

The applicant proposes the following setbacks:
front yards = 20 feet, side yards = 5 feet, rear yards = 15 feet. Staff finds that these are appropriate setbacks except for the perimeter lots to south and west sides of the site.

A concern with these setbacks is that lots to the south and west have been developed with greater setbacks. For example, the area to the south of this site is zoned RSF-2 which has a rear setback of 30 feet. New lots in the North Valley Subdivision having only a 15-foot rear yard setback could create an awkward fit of development standards as the surrounding area becomes built-up at various densities. Therefore, it is recommended that all perimeter lots on the west and south edges of the subdivision have rear yard setbacks of 20 feet. The exception to this is Lot 7, Block 1 which would have two rear yards effected. For this lot, a 15-foot setback will be allowed on its west rear property line.

No lot coverage limitations were addressed by the applicants. Therefore, a 35% limitation will be prescribed which is the standard in both the RSF-4 and RSF-5 zones.

STAFF RECOMMENDATION:

Staff recommends approval of the final plan for North Valley Subdivision, subject to the following conditions:

1) The following setbacks apply to all lots not on the south or west perimeter of the site. Residential and garage structures:
front yards, 20 feet;
side yards, 5 feet;
rear yards, 15 feet.

2) The following setbacks apply only to those lots on the south or west perimeter of the site, except for Lot 7, Block 1. Residential and garage structures:
front yards, 20 feet;
side yards, 5 feet;
rear yards, 20 feet.

Lot 7, Block 1 shall be allowed a setback of 15 feet along its west or south rear property line.

3) All accessory structures (except garages) shall have a setback of 3 feet when located on the rear half of the lot.

4) The northern lot containing 9.88 acres, identified as Outlot B, will be limited to 34 lots when annexed into the City unless a new preliminary plan is submitted, reviewed and approved for an altered development layout and/or density.

5) A maximum lot coverage by structures on each lot shall not exceed 35%.

A-0

SUGGESTED PLANNING COMMISSION MOTION:

Mr. Chairman, on item #35-94(3), final plan approval for filings #1 and # 2 for the North Valley Subdivision, I move that we approve this subject to the staff recommendation.

June 24, 1994

Mr. Tom Dixon
Community Development
City of Grand Junction
250 N. 5th Street
Grand Junction, CO 81501

Re: **RESPONSE TO REVIEW COMMENTS**
NORTH VALLEY SUBDIVISION FILE #35-94(3)

Dear Tom,

Attached are our written responses to the review comments dated 6/17/94.

We have outlined the responses to coincide with your original comments. Please contact us if you have any questions or need additional information.

Sincerely,

Trevor Brown
ROLLAND ENGINEERING

cc: Chris Carnes

TAB

NVRES3.SAM

ROLLAND ENGINEERING 405 RIDGES BLVD., GRAND JUNCTION, CO 81503
(303) 243-8300

RESPONSE TO REVIEW COMMENTS

NORTH VALLEY SUBDIVISION
FINAL PLAN
FILE #35-94(3)
24 3/4 ROAD & "G" ROAD

Grand Junction Fire Department

Fire Hydrant will be moved between Lots 6&8 of Block 2 as requested. An approved temporary turnaround will be provided at the north end of Monument Valley Drive and North Valley Drive.

U.S. West

We are aware of the requirements of U. S. West.

U.S. Postal Service

1) Centralized Mail service is desired for the subdivision. Centralized box location will be shown on plans.
2) Developer has requested that street names remain as shown on plans.

City Parks & Recreation Department

Filing One will be recorded initially with 18 Lots. 18 Lots @ $225 per Lot for open space fees is $4,050.00. $4,050.00 will be provided at time of recording for Filing One.

City Utility Engineer

Water
1) All water/sewer line crossings will be shown on profiles.

Sewer
1) All utility crossings will be shown on profiles.
2) A note to run sewer lines thru manholes will be provided if there is no horizontal or vertical break or a minimum of 0.2' fall will be provided.
3) MH D-2 will be shown on "Plan" view.
4) See General Notes.
5) MH 2-AA placement will be coordinated with adjacent property owner with stubout provided to the west.
6) See Plans.
7) See Plans.
8) Exhibit "I", standard details, will be included in package.
9) Final approved plans will be stamped by a Registered Professional Engineer.

10) Compliance with IX-34 of the City "SSID" manual is noted.

City Property Agent

1) 14' easements will be labeled multi-purpose and dedication language will be revised.
2) Labeling of 10' drainage and irrigation easement will be revised.
3) Lot numbering will be revised for Filing Two.

City Development Engineer

* Storm drain inlets will be clarified. Drainage report will indicate that the inlets are appropriately sized.
* Material specifications will be called out for storm drain pipe
* A detail will be included showing the storm drain end section and erosion control at the discharge to Leach Creek.
* The soils report indicates that there is a possibility that extra granular material or a geotextile type of layer may be required if adverse conditions are present during the actual road construction. However, our present road section design is of a more substantial nature than called for in the soils report. We believe that the improvements agreement should contain the costs as shown using our present road section.
* Plat dedications will be revised and multipurpose easements will be labeled as such.
* Street signs, stop signs, and street lights will be noted.

Community Development Department

Items 1 & 2: Residential structure setbacks will be as follows for all lots not on the south or west perimeters:
front yards, 20 feet
side yards, 5 feet
rear yards, 15 feet

Residential structure setbacks will be as follows for lots on the south and west perimeters:
front yards, 20 feet
side yards, 5 feet
rear yards, 20 feet

Per discussion with Tom Dixon on June 21, 1994, Lot 7, Block 1 will have a rear yard setback of 15 feet. In all cases, accessory structure setbacks will be 3 feet for side and rear yard.

Item 3: We request that zoning remain PR12 for the entire Subdivision. Throughout the submittal process the developer has always stressed that he wanted to retain PR12. All discussions and file paperwork, up until Final Submittal Comments, have shown that PR12 would not be a problem to maintain. The Developer has never requested a zoning change at any time during this submittal process. The Developer has always maintained

that he wants to retain bulk density, allowing flexibility, in this Subdivision. A zoning change from PR12 was not a condition of preliminary approval.

Item 4: Maximum lot coverage by structures will not exceed 35% on each lot.

35-94(3)

June 30, 1994

REVIEW COMMENTS FOR: **North Valley Subdivision**

TYPE OF REVIEW: **Response to Review Comment Response**

REVIEWED BY: **Jody Kliska**

Pavement Structural Section

The Subsurface Soils Exploration Report for this project contains the following sentence on page 24:

"Due to the very high soil moisture in the subgrade soils, the use of a Geotextile Fabric for separation and minor reinforcement (such as Mirafi 500-X or 140-N), placed beneath either the Aggregate Base Course or an additional 12 inches og granular Pit Run material, will probably be required on this site."

In the opinion of the City Engineering staff, the options outlined are a requirement. Elsewhere in the report, the consultant writes "In our opinion the subsurface water conditions shown are a permanent feature on this site." The natural water content in the soils sample was 22.3%, well above the optimum moisture content required for compaction, prompting the concern that adequate compaction may not be achieved.

The recommended pavement structure in the report is 3" asphalt concrete, 6" aggregate base course, and 12" recompacted native material. The proposed structural section for the internal streets is 3" of asphalt concrete, 8" aggregate base course, and an unspecified depth of compacted subgrade.

The proposed pavement structural sections will be acceptable with the following requirements added to the plans:

The subgrade will be scarified and recompacted to 95% of AASHTO T-99.

A note will be added to the plans stating inspection of the subgrade by the city is required prior to placement of aggregate base course material.

STAFF REVIEW

FILE: #78-94

DATE: July 5, 1994

STAFF: David Thornton

ACTION REQUESTED: Staff requests that Planning Commission approve and recommend to City Council the zone of annexation of Planned Residential with a maximum of 4.1 units per acre (PR-4.1) for the North Valley Annexation.

LOCATION: 24 3/4 Road, north of G Road

APPLICANT: City of Grand Junction

EXISTING LAND USE: Agricultural

PROPOSED LAND USE: Single Family Residential

SURROUNDING LAND USE:

NORTH:	Single Family Residential/Agricultural
SOUTH:	Single Family Residential
EAST:	Single Family Residential/Agricultural
WEST:	Single Family Residential

EXISTING ZONING: PR-12 in the County

PROPOSED ZONING: PR-4.1

SURROUNDING ZONING:

NORTH:	AFT (County)
SOUTH:	RSF-2
EAST:	PR
WEST:	AFT (County)

EXECUTIVE SUMMARY: A City shall establish an appropriate zone for all annexations within 90 days of the effective date of an annexation. The properties within the North Valley Annexation have received preliminary plan approval by the City Planning Commission. The proposed Planned Residential single family final plat for filings 1 & 2 consisting of 38 lots on 9.31 acres complys with the approved preliminary plan. The density is 4.1 units per acre. Staff is proposing that the North Valley Annexation be zoned Planned Residential with a maximum of 4.1 units per acre (PR-4.1).

STAFF ANALYSIS: The previous County zoning has been Planned Residential with a maximum of 12 units per acre. The developer has received Preliminary Plan approval from the City Planning Commission for this 9.31 acre parcel as well as the 9.88 acre parcel to the North not included in this annexation. The proposed final plats for filings 1 & 2 are consistant with the approved preliminary plan and consist of all single family homes with lots sizes ranging from 8,381 sq. ft. (0.18 acres) to 11,640 sq. ft. (0.25 acres). These lots sizes are consistent with the development occuring in the Fountain Head Subdivision development to the East.

STAFF RECOMMENDATION:

Staff recommends approval of the Planned Residential with a maximum of 4.1 units per acre zone.

SUGGESTED PLANNING COMMISSION MOTION:

Mr Chairman, on item #78-94, I recommend that we forward this on to City Council with the recommendation of zoning the North Valley annexation to Planned Residential with a maximum of 4.1 units per acre.

(northval.rpt)

CHECKING THE INLETS CAPACITY
FOR
NORTH VALLY SUBDIVISION

1. INLET CAPACITY

(1) Single Inlet Capacity (Neenah R-3246, type C inlet)

Clear opening of the inlet: $A = 7*(1.375"*33") = 317.625\ in^2 = 2.21\ ft^2$

$C = 0.60$; $H = 0.70$ ft; $g = 32.174\ ft/s^2$

$Q = CA\sqrt{2gH} = 0.60*2.21\sqrt{2(32.174)(0.70)} = \underline{8.90\ cfs}$

(2) Sub-basin Area 1, $A_1 = 5.26$ ac, two inlets for this area

$Q_{inlets} = 2*8.90 = 17.80$ cfs

$Q_{2d1} = 4.62$ cfs (Ok)

$Q_{100d1} = 12.70$ cfs (Ok)

(3) Sub-basin Area 2, $A_2 = 3.16$ ac, two inlets for this area

$Q_{inlets} = 2*8.90 = 17.80$ cfs

$Q_{2d2} = 2.13$ cfs (Ok)

$Q_{100d2} = 7.82$ cfs (Ok)

(4) Sub-basin Area 3, $A_3 = 1.58$ ac; one inlet for this area

$Q_{inlet} = 8.90$ cfs

$Q_{2d3} = 1.39$ cfs (Ok)

$Q_{100d3} = 3.91$ cfs (Ok)

(5) Sub-basin Area 4, $A_4 = 3$ ac; two inlet for this area

$Q_{inlets} = 2*8.90 = 17.80$ cfs

$Q_{2d4} = 2.63$ cfs (Ok)

$Q_{100d4} = 7.43$ cfs (Ok)

(6) Sub-basin Area 5, On-site $A_5 = 10$ ac; Off-site $A_{off} = 10.50$ ac, four inlets for this area (Drainage to ditch, ditch stays in place)

$Q_{inlets} = 4*8.90 = 35.60$ cfs

$Q_{2d5} = 7.33$ cfs (Including off-site runoff) (Ok)

$Q_{100d5} = 25.39$ cfs (Including off-site runoff) (Ok)

(7) Sub-basin Area 6, On-site $A_6 = 7$ ac; Off-site $A_{off} = 10.50$ ac, four inlets for this area (Drainage to ditch, ditch pre-adjusted)

$Q_{inlets} = 4*8.90 = 35.60$ cfs

$Q_{2d6} = 5.55$ cfs (Including off-site runoff) (Ok)

$Q_{100d6} = 20.40$ cfs (Including off-site runoff) (Ok)

2. ESTIMATE THE DEPTH OF FLOW IN THE GUTTER

Formula $Q = K\frac{Z}{n}\sqrt{S}\,Y^{8/3}$

Where: K = 0.56 (a constant dependent on units and equal to 0.56ft^3/s, ft)
n = 0.015 (the roughness coefficient, 0.015 for smooth concrete gutter)
S = 0.007 (the lonitudinal slope of the gutter)
Z = 12 (the reciprocal of the transverse slope of the bottom of the gutter)
Q = gutter flowrate (ft^3/s)
Y = depth of water in the gutter (ft)

(1) Sub-basin Area 1, two gutters for this area

$Q_{2d1} = 4.62$ cfs

$\frac{1}{2} * 4.62 = 0.56 * \frac{12}{0.015}\sqrt{0.007}\,Y^{8/3}$

Solving the above equation, $Y_{2d} = 0.35$ ft = 4.22 in

Similarly, $Q_{100d1} = 12.70$ cfs; $Y_{100d} = 0.51$ ft = 6.17 in

(2) Sub-basin Area 2, two gutters for this area

$Q_{2d2} = 3.16$ cfs; $Y_{2d} = 0.26$ ft = 3.16 in

$Q_{100d2} = 7.82$ cfs; $Y_{100d} = 0.43$ ft = 5.14 in

(3) Sub-basin Area 3, one gutter for this area

$Q_{2d3} = 1.39$cfs; $Y_{2d} = 0.29$ ft = 3.49 in

$Q_{100d3} = 3.91$ cfs; $Y_{100d} = 0.43$ ft = 5.14 in

(4) Sub-basin Area 4, two gutteer for this area

$Q_{2d4} = 2.63$ cfs; $Y_{2d} = 0.28$ ft = 3.42 in

$Q_{100d4} = 7.43$ cfs; $Y_{100d} = 0.42$ ft = 5.04 in

(5) Sub-basin Area 5, four gutters for this area (Drainage to ditch, ditch stays in place)

$Q_{2d5} = 7.33$ cfs; $Y_{2d} = 0.32$ ft = 3.87 in

$Q_{100d5} = 25.39$ cfs; $Y_{100d} = 0.51$ ft = 6.17 in

(6) Sub-basin Area 6, four gutters for this area (drainage to ditch, ditch pre-adjusted)

$Q_{2d6} = 5.55$ cfs; $Y_{2d} = 0.29$ft = 3.49 in

$Q_{100d} = 20.40$ cfs; $Y_{100d} = 0.47$ ft = 5.68 in

LDEN, MUMBY, SUMMERS & LIVINGST
ATTORNEYS AT LAW
NORWEST BANK BUILDING, SUITE 400
2808 NORTH AVENUE
P.O. BOX 398
GRAND JUNCTION, COLORADO 81502

JAMES GOLDEN
KEITH G. MUMBY
K.K. SUMMERS
J. RICHARD LIVINGSTON

SUSAN MUMBY

AREA CODE 303
TELEPHONE 242-7322
FAX 242-0698

September 8, 1994

Mesa County Surveyor
544 Rood Avenue
Grand Junction, Colorado

HAND DELIVERED

Re: North Valley Subdivision

Attention: Ken

Dear Ken:

Rolland Engineering has advised that the plat for North Valley was rejected on the basis that the subject property was platted as a part of Fountainhead and a re-plat with vacation of public dedications is required. The circumstances in this case are somewhat unique and the conclusion reached in your office is not correct.

At the time this property was included in the Fountainhead plat it was encumbered by a first lien deed of trust. The holder of the mortgage did not consent to the plat or ratify same. Subsequently, the deed of trust was foreclosed and the public trustee conveyed title back to the lender under the property description existing prior to the Fountainhead plat.

As noted in the Stagecoach case attached, the Colorado courts have held that a plat under these circumstances is a nullity and the dedication invalid. I believe the law is clear and Rolland Engineering properly platted the property without reference to Fountainhead.

Please review this issue and advise as to your position as soon as possible.

Sincerely,

GOLDEN, MUMBY, SUMMERS & LIVINGSTON

J. Richard Livingston

JRL:jar
enc.

cc: Chris Carnes
Rolland Engineering

ROLLAND ENGINEERING

405 RIDGES BOULEVARD, SUITE A
GRAND JUNCTION, COLORADO 81503
(303) 243-8300

October 3, 1994

Jodie Kliska, Development Engineer
City of Grand Junction
250 North Fifth Street
Grand Junction, Colorado 81501

RE: North Valley Subdivision; letter of transmittal comments dated 9/28/94.

Dear Jodie,
The following, out of sequence to your list, are answers to your comments/questions:

1) The City of Grand Junction will take over responsibility of the maintenance of the drainage easement that runs offsite from the southwest corner of the North Valley Subdivision to Leach Creek.

2) The Storm Drain plan and profile will not show the drainage pipe under "G" Road as oversized at this time. Per discussions between Don Newton and Tom Rolland, a Change Order will be written at the time of construction of the drainage pipe under "G" Road. The Change Order will allow detailed tracking of the extra cost of oversizing the pipe for reimbursement purposes to G Road LLC.

Items 1 & 2 should be looked at together within the context of how this drainage pipe routing came about. The original plan was to run all offsite drainage down 24 3/4 Road with over sized piping all the way to Leach Creek. Mr. Don Newton suggested to Mr. Carnes and Tom Rolland that drainage alignment directly south of North Valley Subdivision might be a better alternative. The present alignment with oversizing of the pipe at "G" Road suggests that the City wants the continued use of the drainage pipe as an access to Leach Creek. The City would have maintained all of the drainage system down 24 3/4 Road if that had been the routing employed. It is in the City's best interests to maintain the presently designed offsite drainage system as designed from North Valley Subdivision to Leach Creek. The City's scheduled maintenance and review of drainage systems will keep the new oversized Leach Creek drainage access under "G" Road in the best condition for continued future use.

file: nvkliska.sam

3) The drainage fee calculated for Filing No. 1 of North Valley Subdivision is $7,298.00.
Based on the Drainage Fee Equation: Fee ($) = $10,000(C_{100d}-C_{100b})A^{0.7}$
Where $C_{100d} = 0.50$, $C_{100b} = 0.25$ and A = 4.62 ac.

4) Documentation of easements through the Roberson and Mays properties are attached.

Sincerely,

ROLLAND Engineering
Trevor A. Brown

cc: Mr. C. Carnes

file: nvkliska.sam

Grand Junction Community Development Department
Planning • Zoning • Code Enforcement
250 North Fifth Street
Grand Junction, Colorado 81501-2668
(303) 244-1430 FAX (303) 244-1599

November 1, 1994

Dave Zollner
Mesa National Bank
131 N. 6th Street
Grand Junction, CO 81501

Dear Dave,

The Disbursement and Development Improvements Agreements, are routinely required to be signed and submitted to the City prior to the release of signed final mylar plats. You have expressed concern about the timing of that process and the risk to the financial institution providing financing for a subdivision.

To ameliorate your concern that MNB may be liable for development improvements without the benefit of a platted subdivision, the City is agreeable to transferring the final mylar plats for the Disbursement Agreement simultaneously. It is my understanding that this will satisfy your concern that MSB will not be bound to pay for improvements on a subdivision which may not be recorded.

The City never releases plats prior to having some form of guarantee. If a plat is recorded without a corresponding improvements guarantee, the City would have acknowledged platted (and buildable) lots absent any assurance for improvements.

The solution we have arrived at meets our collective concerns and purposes in platting the North Valley Subdivision; making sure the public is assured of necessary improvements; providing the petitioner Chris Carnes the ability to develop and sell residential lots; and giving your bank sufficient protection from undue financial risk should the subdivision not be recorded.

If you have a different understanding or if you have additional questions, feel free to contact me at 244-1447.

Sincerely,

Tom Dixon

Tom Dixon, AICP, Senior Planner

cc: File #35-94
Kathy Portner
John Shaver
Chris Carnes

1700943 01:46 PM 11/14/94
Monika Todd Clk&Rec Mesa County Co

(Form for approval of filing & recording of SUBDIVISION PLATS)

SB-69-94

MESA COUNTY LAND RECORDS
544 ROOD AVE.
GRAND JUNCTION, CO 81501
(303) 244-1823

To: Monika Todd, Mesa County Clerk & Recorder

This is to certify that the SUBDIVISION PLAT described below

NORTH VALLEY SUBDIVISION
FILING NO. ONE

has been reviewed under my direction and to the best of my knowledge it conforms with the neccessary requirements pursuant to the Colorado Revised Statute 1973, 38-51-106 for the recording of Land Survey Plats in the records of the County Clerk's Office. This approval does not certify as to the possibility of omissions of easements and other Rights-of-Way or Legal Ownerships.

Dated this 21st day of October, 1994.

Signed: Ken Swearengin
KEN SWEARENGIN

RECORDED IN MESA COUNTY RECORDS
DATE:
TIME:
BOOK: 14 PAGE: 293 & 294
RECEPTION NO.:

Drawer AA 145

Fee $20.00

NOTE:
The recording of this plat is subject to all approved signatures & dates.

file in North Valley - filing 3 ?4 Kathy T.

January 20, 2000

City of Grand Junction
Public Works Department
250 North 5TH Street
Grand Junction CO 81501-2668
FAX: (970) 256-4022

Mr. Chris Carnes
Carnes Construction & Development Inc.
1172 23 ½ Road
Grand Junction, CO 81505

RE: North Valley Subdivision – Deposit

Dear Mr. Carnes:

This letter is a follow up to several conversations we have had regarding your development, North Valley Subdivision, and a cash deposit you made to the City. As you know, to accommodate area access and to be consistent with the City's regional planning efforts, you were required to extend road improvements to the north end of the property. The alternative (to your having to build these facilities) would be to deny the project until others had upgraded the infrastructure in the area. You decided to proceed based on your business needs.

As a normal part of road improvements, development must accommodate existing facilities and uses. In this case, to avoid injury to other property owners, you must address the existing irrigation supply ditch. Your solution, which I think is reasonable, is to pipe the two road crossings of the open irrigation ditch that runs along your north property line. You expressed concerns that if you installed these pipe crossings now, you would have to pay for on-going maintenance required to prevent flooding. As an alternative to constructing the crossings as a part of the subdivision improvements, you proposed to give the City enough money to pay for this work. Under this agreement, the City would use the funds to engage a contractor, or make other arrangements, to perform the work in the future. You and I have agreed that such work is most likely to occur when development of the property to the north of your subdivision occurs. However, if the City deems it appropriate, based on needs or circumstances of which you and I are not aware, for example, we could use the money at any time to make such improvements.

The benefit for you is that you avoid the maintenance responsibilities you would otherwise incur. In addition, you avoid the actual work by delivering a check. You obtain satisfaction of a condition by payment of an estimate, instead of taking the risk that the work would cost more.

Your proposal has some disadvantages for the City. First, the work isn't done, so the City has to take the risk that the estimates are wrong. Second, if you build the crossings now, and you delegate the duty to maintain the crossings now, the HOA or you will be used to maintaining the structures from the very beginning. If so, it is less likely the city would ever be called upon to assume those duties in the future. If the City builds the structures later, and then tries to convince the HOA to maintain the culverts, even though it is legally clear, as a practical matter it will difficult to do so then. And, I assume that

you would not want to assume such duties then, either. Third, if the structures are built now, you must address the concerns and complaints of the irrigators who benefit from the open ditch. Under your scenario, ineluctably, when the construction occurs, the City will "inherit" those questions, concerns and complaints.

Your second related proposal was that the City would return this money after a few years, if the development to the north hadn't occurred. We don't like that proposal because it, again, puts the risk on the taxpayers if the development doesn't occur in the short-term. Rather than do that, it would make more sense to have you perform the work now. Then, we wouldn't have to worry about "when."

Therefore, it is the City's position that the estimate of the costs of construction will be retained by the City until such time that development does occur north of your subdivision. Of course, the City would refund this deposit if you elected to construct the crossings now. Additionally, the City would consider refunding this deposit if the development potential of the property north of your subdivision was eliminated (*i.e.*, the sale of the development rights or the dedication as open space).

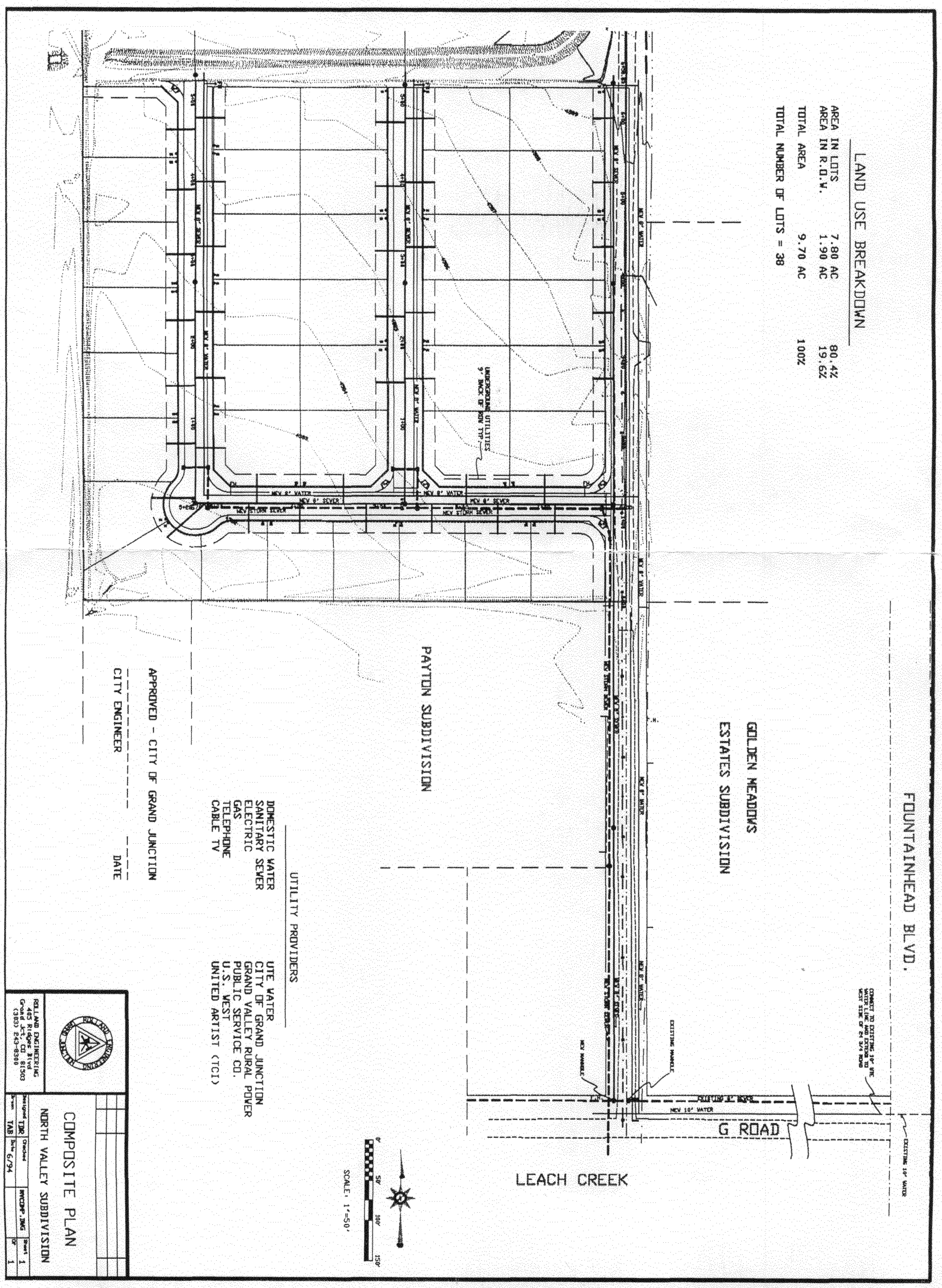
I understand you believe there is little potential for future development of this property, however, the City has an obligation to ensure that if this property does develop, adequate infrastructure is available to the owners. I hope this letter clarifies your options and answers your questions. Should you have additional concerns or questions, contact me at this office.

Very Truly Yours

Tim Moore

Tim Moore
Public Works Manager
CITY OF GRAND JUNCTION

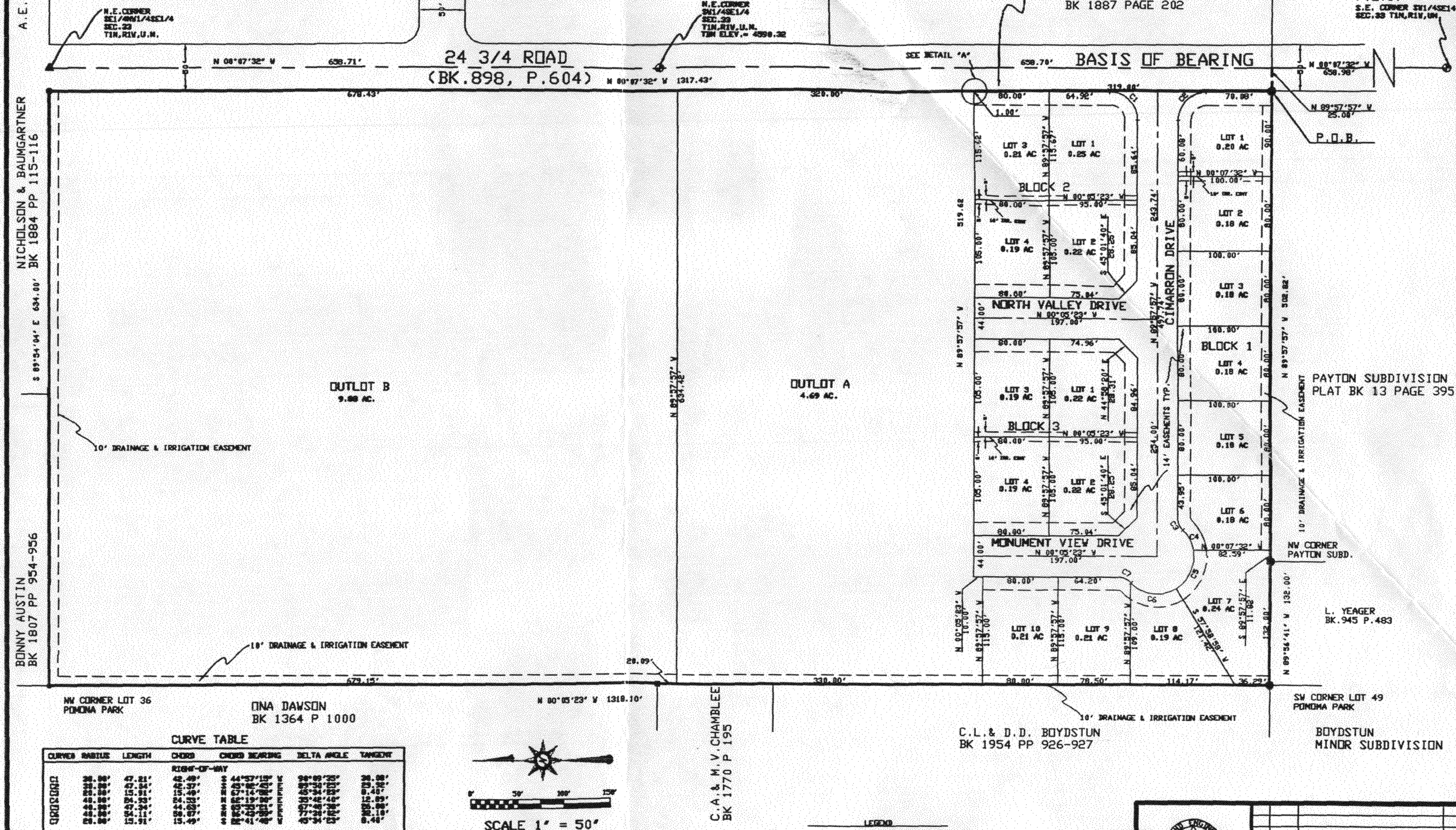
cc: Dan Wilson, City Attorney
David Varley, City Administration
Kathy Portner, Community Development



SURVEYOR'S CERTIFICATE
I, Richard A. Mason, do hereby certify that the accompanying plat of NORTH VALLEY SUB.,FILING ONE a subdivision of a part of the City of Grand Junction, County of Mesa, has been prepared under my direct supervision and accurately represents a field survey of the same. Also said plat conforms to all applicable survey requirements of the Zoning and Development Code of the City of Grand Junction and all applicable state laws and regulations.

Richard A. Mason
Registered Professional Land Surveyor
P.L.S. No. 18469

Date



CURVE TABLE

CURVE#	RADIUS	LENGTH	CHORD	CHORD BEARING	DELTA ANGLE	TANGENT
			RIGHT-OF-WAY			
C1	30.00'	47.21'	42.49'	S 44°57'15" W	90°09'25"	30.08'
C2	30.00'	47.34'	42.57'	S 45°02'45" E	89°50'35"	29.92'
C3	20.00'	15.91'	15.49'	N 67°14'08" E	45°34'03"	8.40'
C4	40.00'	24.93'	24.53'	N 62°19'50" E	35°42'40"	12.89'
C5	40.00'	47.34'	44.62'	S 65°53'21" E	67°48'30"	26.88'
C6	40.00'	54.11'	50.07'	S 86°43'50" W	77°30'02"	32.10'
C7	20.00'	15.91'	15.49'	S 22°41'40" W	45°34'03"	8.40'

NOTICE: According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event, may any action based upon any defect in this survey be commenced more than ten years from the date of the certification shown hereon.

AREA SUMMARY

AREA IN LOTS	3.67 AC.
AREA IN OUTLOTS	14.57 AC.
AREA IN ROW	0.95 AC.
TOTAL AREA	19.19 AC.

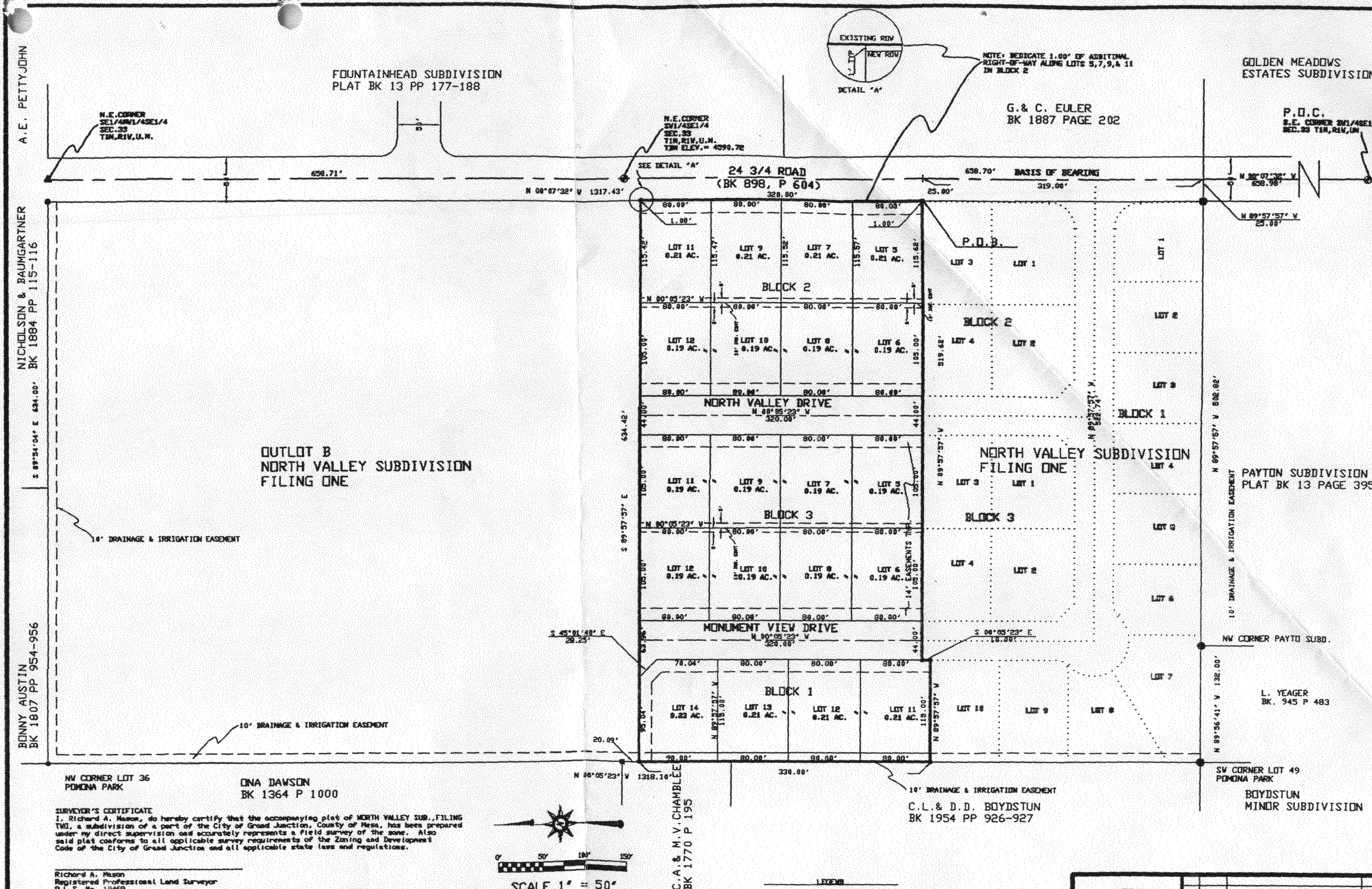
LEGEND

- ● - MESA COUNTY SURVEY MONUMENT
- ● - FOUND REBAR WITH NO CAP IN CONC
- ● - SET REBAR & CAP IN CONCRETE L.S. 18469
- ■ - FOUND 5/8" REBAR L.S.16413
- ● - FOUND 5/8" REBAR SET IN CONC. L.S.7964
- △ - FOUND SPIKE

ROLLAND ENGINEERING
405 Ridges Blvd
Grand Jct, CO 81503
(303) 243-8300

NORTH VALLEY SUBDIVISION FILING ONE
IN THE SE1/4 SEC 33 T1N,R1W,U.M.
GRAND JUNCTION, COLORADO

Designed	Checked	Sheet 2
Drawn	Date	Of 2


A.E. PETTYJOHN
FOUNTAINHEAD SUBDIVISION
PLAT BK 13 PP 177-188
N.E.CORNER
SE1/4NW1/4SE1/4
SEC.33
T1N,R1W,U.M.
N.E.CORNER
SW1/4SE1/4
SEC.33
T1N,R1W,U.M.
T1N ELEV.= 4390.72
SEE DETAIL 'A'
24 3/4 ROAD
(BK 898, P 604)
EXISTING ROW
NEW ROW
DETAIL 'A'
NOTE: DEDICATE 1.00' OF ADDITIONAL RIGHT-OF-WAY ALONG LOTS 5,7,9,& 11 IN BLOCK 2
G.& C. EULER
BK 1887 PAGE 202
GOLDEN MEADOWS
ESTATES SUBDIVISION
P.O.C.
S.E. CORNER SW1/4SE14
SEC.33 T1N,R1W,UM
BASIS OF BEARING
P.O.B.
NICHOLSON & BAUMGARTNER
BK 1884 PP 115-116
OUTLOT B
NORTH VALLEY SUBDIVISION
FILING ONE
10' DRAINAGE & IRRIGATION EASEMENT
BLOCK 2
NORTH VALLEY DRIVE
BLOCK 3
MONUMENT VIEW DRIVE
BLOCK 1
NORTH VALLEY SUBDIVISION
FILING ONE
PAYTON SUBDIVISION
PLAT BK 13 PAGE 395
NW CORNER PAYTO SUBD.
L. YEAGER
BK. 945 P 483
SW CORNER LOT 49
POMONA PARK
BOYDSTUN
MINOR SUBDIVISION
BONNY AUSTIN
BK 1807 PP 954-956
NW CORNER LOT 36
POMONA PARK
ONA DAWSON
BK 1364 P 1000
C.A.& M.V.CHAMBLEE
BK 1770 P 195
C.L.& D.D. BOYDSTUN
BK 1954 PP 926-927
SCALE 1" = 50'

SURVEYOR'S CERTIFICATE
I, Richard A. Mason, do hereby certify that the accompanying plat of NORTH VALLEY SUB.,FILING TWO, a subdivision of a part of the City of Grand Junction, County of Mesa, has been prepared under my direct supervision and accurately represents a field survey of the same. Also said plat conforms to all applicable survey requirements of the Zoning and Development Code of the City of Grand Junction and all applicable state laws and regulations.

Richard A. Mason
Registered Professional Land Surveyor
P.L.S. No. 18469

Date

NOTICE: According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event, may any action based upon any defect in this survey be commenced more than ten years from the date of the certification shown hereon.

AREA SUMMARY

AREA IN LOTS	4.03 AC.
AREA IN ROW	0.66 AC.
TOTAL AREA	4.69 AC.

LEGEND

- MESA COUNTY SURVEY MONUMENT
- FOUND REBAR WITH NO CAP IN CONC
- SET REBAR & CAP IN CONCRETE L.S. 18469
- FOUND 5/8" REBAR L.S.16413
- FOUND 5/8" REBAR SET IN CONC. L.S.7960
- FOUND SPIKE

ROLLAND ENGINEERING
485 Ridges Blvd
Grand Jct, CO 81503
(303) 243-8300

NORTH VALLEY SUBDIVISION FILING TWO
IN THE SE1/4 SEC 33 T1N,R1W,U.M.
GRAND JUNCTION, COLORADO

Designed | Checked | Sheet 2
Drawn | Date | OF 2