

**FINAL DRAINAGE REPORT FOR
LOT 2 BECKETT AT WOODMEN HILLS FILING NO. 3
7368 MCLAUGHLIN ROAD
COLORADO SPRINGS, COLORADO**

**October 4, 2017
Revised April 2018**

Prepared For:

**TBONE CONSTRUCTION
1310 FORD STREET
COLORADO SPRINGS, CO 80915
(719) 570-1456**

Prepared By:

**TERRA NOVA ENGINEERING, INC.
721 S. 23RD STREET
Colorado Springs, CO 80904
(719) 635-6422**

Job No. 1729.00
PCD FILE NO. PPR-17-055

**FINAL DRAINAGE REPORT FOR
LOT 2 BECKETT AT WOODMEN HILLS FILING NO. 3
7368 MCLAUGHLIN ROAD
COLORADO SPRINGS, COLORADO**

TABLE OF CONTENTS

Engineer's Statement	Page 3
Purpose	Page 4
General Description	Page 4
Historic Drainage Conditions	Page 5
Developed Drainage Conditions	Page 5
Hydrologic Calculations	Page 5
Floodplain Statement	Page 6
Erosion Control	Page 6
Construction Cost Opinion	Page 6
Drainage Fees	Page 6
Maintenance	Page 6
Summary	Page 7
Bibliography	Page 8

REQUIRED MAPS AND DRAWINGS

GENERAL LOCATION MAP

S.C.S. SOILS MAP

FEMA FIRM MAP

HYDROLOGIC/HYDRAULIC CALCULATIONS

DRAINAGE MAP

CERTIFICATION STATEMENT:

Engineers Statement

This attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

L Ducett, P.E. 32339

Seal

Developers Statements

I, _____, the developer have read and will comply with all of the requirements specified in this drainage report and plan.

Shops at McLaughlin 2 LLC

Business Name

By: _____
Title: _____
Address: _____

El Paso County Approval:

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 & 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

Jennifer Ervine, P.E.
County Engineer / ECM Administrator

Date

Conditions:

**FINAL DRAINAGE LETTER FOR
LOT 2 BECKETT AT WOODMEN HILLS FILING NO. 3
7368 MCLAUGHLIN ROAD
COLORADO SPRINGS, COLORADO**

PURPOSE

The purpose of this Final Drainage Report is to identify and analyze the existing drainage patterns, determine existing runoff quantities and to analyze the current development of this site as a commercial site. This lot was previously platted with an existing drainage report entitled "Final Drainage Report for Beckett at Woodmen Hills Filing 3" by URS dated May 27, 2003. The proposed use and development is in conformance with the previously approved report.

GENERAL DESCRIPTION

This Final Drainage Letter (F.D.L.) for the site located at 7368 McLaughlin Road is an analysis of approximately 37,497 square feet. The site is currently vacant and is platted as Lot 2 Beckett at Woodmen Hills Filing No. 3. This area is part of a previous study entitled "Final Drainage Report for Becket at Woodmen Hills Filing No. 3" by URS dated May 27, 2003. The property is located in the northwest quarter of Section 7, Township 13 South, Range 64 West of the 6th Principal Meridian in the El Paso County, Colorado, near the intersection of McLaughlin and Woodmen Roads (See vicinity map, Appendix A) More specifically, the site is bounded by platted acreage properties with the same zoning on all sides.

The site lies within the Falcon Drainage Basin

The site consists of Columbine gravelly sandy loam (19) and is part of the hydrologic soil group 'B' therefore hydrologic group "B" was used to represent the dominant soil type. (See map in appendix)

The study area consists of undeveloped land consisting of prairie vegetation. The existing topography is sloping from the north west to the south east.

HISTORIC DRAINAGE CONDITIONS- Basin 1 from the URS Report

Currently the existing storm runoff drains overland to the southwest via sheet flow and then into the existing McLaughlin Road curb and gutter and into the existing 10' sump inlet at the south east corner of the site. From here, the flow continues in existing storm sewer to the existing regional detention pond 5 east of the site. This pond was designed with water quality and detention volume for this developed site. Total onsite existing flows from approximately 0.88 acres is 0.2 cfs in the 5 year event and 1.5 cfs in the 100 year event.

DEVELOPED DRAINAGE CONDITIONS

In the proposed condition, there will be an onsite storm sewer system that will convey flows to the existing inlet in McLaughlin Road. This inlet is sized for the developed flows. The sizing and basin areas for the onsite storm sewer are shown on the map and calculations in the appendix. The roof of the proposed building will drain into a proposed 12" storm sewer. **Include a proposed drainage map.** to be 12" minimum pipe with 1% minimum slope.

Basin A, B, C and D are roof areas that will drain into the storm sewer. **Unresolved. Include the proposed drainage map in the drainage report** nts 6, 7, 8, and 9. Flows at each point are less than 0.4 cfs in both the 5 and 100 year events.

Basins J and E will flow to the proposed storm sewer and join roof flows. These combined flows will be approximately 3 cfs in the 100 year even and will be piped to the existing inlet at the south east corner of the site. An easement will need to be granted from the adjacent land owner for this connection.

Basin F's 0.27 acres will flow much as it does now. **Per the plat the proposed stormline appears to be within the 10' drainage easement along lot lines. Unless there are improvements (structures, fencing, etc) that will be impacted then an easement from the adjacent land owner is not required. However, staff recommends the applicant do inform the adjacent land owner of the work being done within the drainage easement of their property.** flows from basin I and Basin H and G for a total of 1.5 cfs in the 100 year event at Design Point 1. These flows are consistent with the flows at Design Point 1. Please see detailed calculations in the appendix.

HYDROLOGIC CALCULATIONS

Hydrologic calculations were performed using the El Paso County Storm Drainage Design Criteria Manual Volumes 1 & 2 latest editions. The Rational Method was used to estimate storm water runoff anticipated from the 24-Hour Rainfall Depths listed in the El Paso County Drainage Criteria Manual. Figure 6-5 Intensity Frequency Duration Curve was used to obtain the intensity.

FLOODPLAIN STATEMENT

No portion of this site is within a designated F.E.M.A. floodplain, as determined by Flood Insurance Rate Map No. 08041C0575 F dated March 17, 1997 (see appendix).

EROSION CONTROL/WATER QUALITY

An erosion control plan is included with this drainage report as we are under one acre.

Below is a description of the BMP's to be used for erosion control and water quality. For more detail see the erosion control plan.

The first and most effective way to control erosion is shown on the plan to reseed as soon as possible.

List the 4 step process (I.7.2) and summarize how each step were considered/incorporated.

Unresolved. These are not the 4-step listed in ECM Appendix I Section I.7.2 (pg I-21) referenced in the original comment. This appears to be the City's 4 step process.

In an effort to protect receiving water and as part of the "four step process to minimize adverse impacts of urbanization" this site was analyzed in the following manner:

1. Reduce Runoff- The new improvements and impervious area to the site will be routed to a existing public extended detention basin (EDB). In addition to this runoff will be trapped behind the back of walks and curbs. There is also the surface roughing that has been added to the undeveloped slopes that some of the flow will be trapped and infiltrate into the ground. These above mentioned items will reduce the volume of runoff using ponding and infiltration.
2. Treat Slowly Release WQCV- The EDB has been sized and designed to sufficiently capture the required WQCV and slowly release it through the restrictor plate outlet, thereby also allowing solids and contaminants to settle out.
3. Stabilize Stream Channel- By reducing the rate of runoff to the adjacent watershed the site is helping to stabilize the creek. The creek is currently stable as it was regraded with low flow water channel and stabilized with vegetation with previous development.
4. Source Controls- As this development will not include outdoor storage or the potential for the introduction of contaminants to the City's MS4, since it is not an industrial or commercial site, no source controls are proposed or necessary.

CONSTRUCTION COST OPINION

Public Non Reimbursable

NOT APPLICABLE

Private Non Reimbursable

12" Storm Sewer	273 LF	\$40.00/ LF	\$10,920.00
Area Inlet	2 EA	\$2,000.00/ EA	<u>\$ 4,000.00</u>
Total			\$14,920.00

DRAINAGE FEES

This site is not being platted. Drainage or bridge fees do not apply.

MAINTENANCE

The proposed erosion control and water quality measures will be repaired and maintained by the property owner or owner's representative as required.

SUMMARY

Development of this site will not adversely affect the surrounding development at this time per the previously approved drainage reports, this site will drain into the existing storm sewer system that drains into the existing pond. See the attached previous drainage report in the appendix.

PREPARED BY:

TERRA NOVA ENGINEERING, INC.

L Ducett P.E.
President
Terra Nova Engineering, Inc.

BIBLIOGRAPHY

“El Paso County Drainage Criteria Manual-Volumes 1 & 2, latest edition”

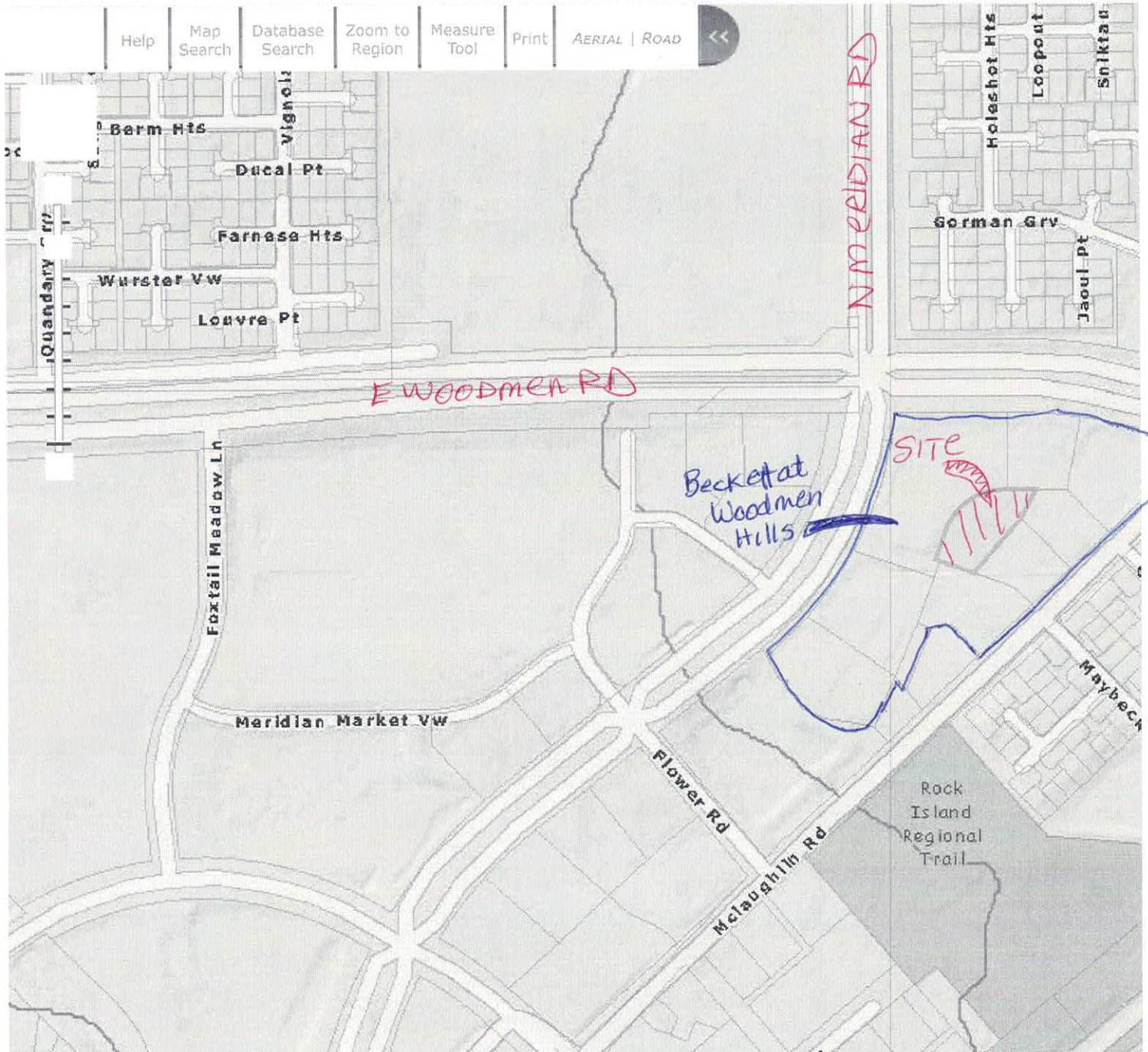
SCS Soils Map for El Paso County

Federal Emergency Management Agency (FEMA) flood maps

“Final Drainage Report for Beckett at Woodmen Hills Filing 3” by URS dated May 27, 2003

Falcon Drainage Basin Planning Study

VICINITY MAP



NOT TO SCALE

0 200 400ft

S.C.S. SOILS MAP

Area of Interest (AOI)

Soil Map

Soil Data Explorer

Download Soils Data

Shopping Cart (Free)

[Printable Version](#)[Add to Shopping Cart](#)

Search

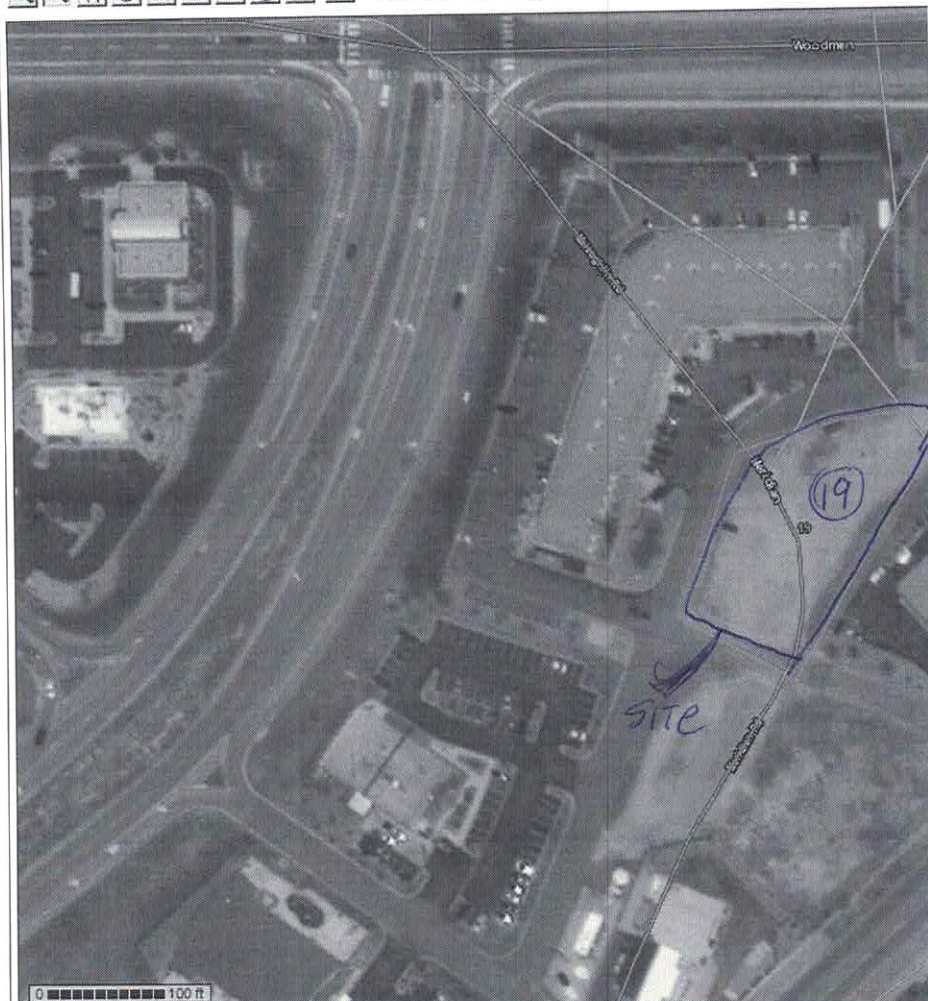
Map Unit Legend

El Paso County Area, Colorado (CO625)

El Paso County Area, Colorado (CO625)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	0.7	100.0%
Totals for Area of Interest		0.7	100.0%

Soil Map

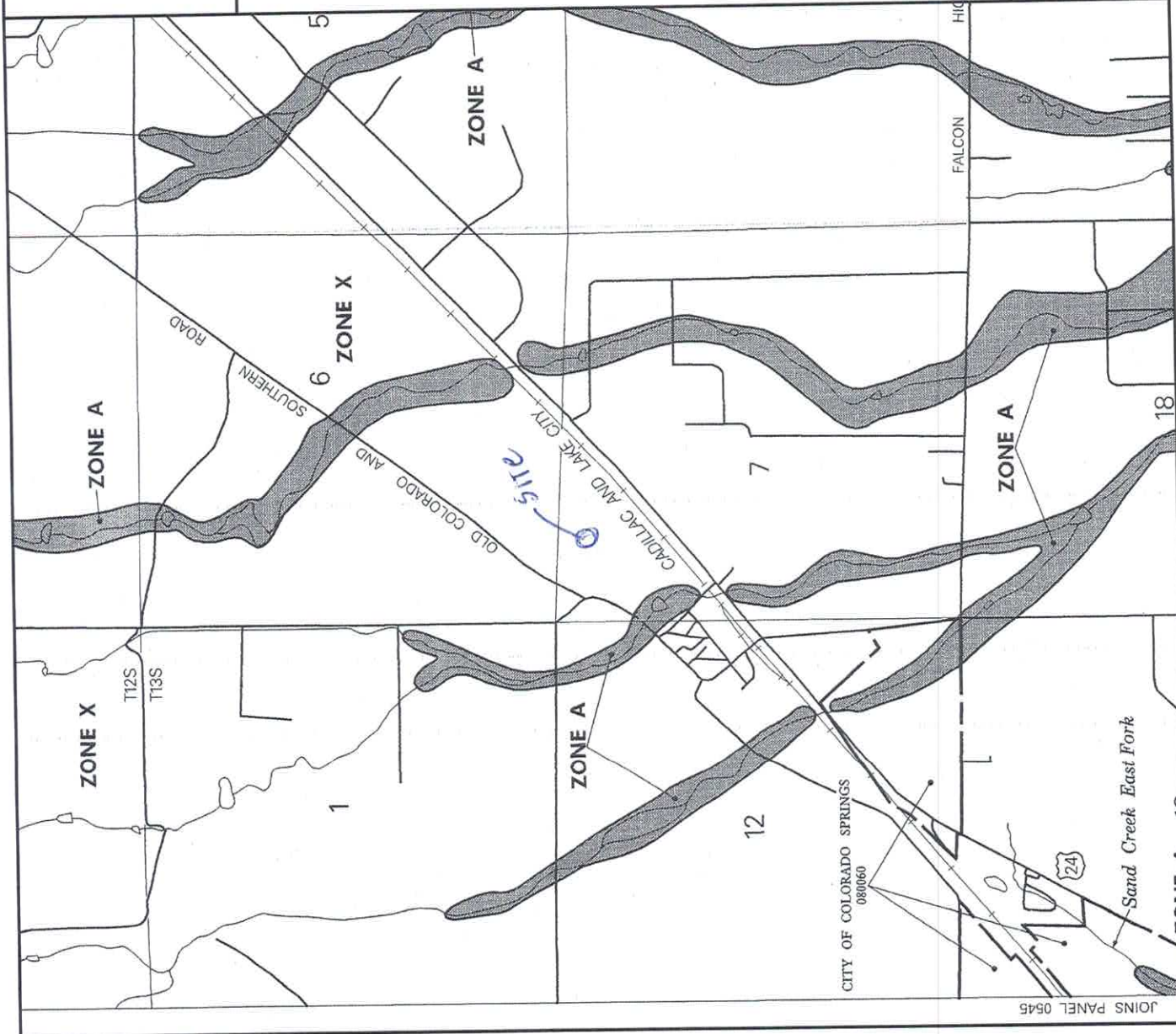

 Scale (not to scale)
**Warning: Soil Map may not be valid at this scale.**

You have zoomed in beyond the scale at which the soil map for this area is intended to be used. Map AOI were mapped at 1:24,000. The design of map units and the level of detail shown in the resulting enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of map areas of contrasting soils that could have been shown at a more detailed scale.

FEMA FIRM MAP



APPROXIMATE SCALE IN FEET
2000 0 2000



NATIONAL FLOOD INSURANCE PROGRAM

FIRM FLOOD INSURANCE RATE MAP EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 575 OF 1300
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:	COMMUNITY	NUMBER	PANEL	SUFFIX
	COLORADO SPRINGS, CITY OF	080680	6376	F
	EL PASO COUNTY, UNINCORPORATED AREAS	080559	6575	F

MAP NUMBER
08041C0575 F

EFFECTIVE DATE:
MARCH 17, 1997



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

HYDROLOGIC/HYDRAULIC CALCULATIONS

SHOPS AT MCLAUGHLIN II AREA DRAINAGE SUMMARY

EXISTING CONDITIONS

		WEIGHTED		OVERLAND			STREET / CHANNEL FLOW			T _t		INTENSITY		TOTAL FLOWS		
BASIN	AREA TOTAL (Acres)	C ₅	C ₁₀₀	C ₅	Length (ft)	Height (ft)	T _c (min)	Length (ft)	Slope (%)	Velocity (fps)	T _t (min)	TOTAL (min)	I ₅ (in/hr)	I ₁₀₀ (in/hr)	Q ₅ (c.f.s.)	Q ₁₀₀ (c.f.s.)
* For Culverts See Runoff Summary																
EX-1	0.88	0.09	0.36	0.09	220	5.0	21.4	172	1.7%	2.5	1.1	22.5	2.9	4.8	0.2	1.5

Shops at McLaughlin II
Area Runoff
Existing and Proposed

PROPOSED CONDITIONS

BASIN	DEVELOPED			UNDEVELOPED			WEIGHTED		WEIGHTED CA		
	TOTAL AREA (Acres)	AREA (Acres)	C ₅	C ₁₀₀	AREA (Acres)	C ₅	C ₁₀₀	C ₅	C ₁₀₀	CA5	CA100
A	0.04	0.04	0.73	0.81	0.00	0.81	0.88	0.73	1.00	0.04	0.04
B	0.03	0.03	0.73	0.81	0.00	0.81	0.88	0.73	0.81	0.03	0.03
C	0.03	0.03	0.73	0.81	0.00	0.81	0.88	0.73	0.81	0.028	0.028
D	0.04	0.04	0.73	0.81	0.00	0.81	0.88	0.73	0.81	0.035	0.035
E	0.12	0.12	0.81	0.88	0.00	0.81	0.88	0.81	0.88	0.115	0.115
F	0.27	0.27	0.81	0.88	0.00	0.81	0.88	0.81	0.88	0.219	0.238
G	0.01	0.01	0.81	0.88	0.00	0.81	0.88	0.81	0.88	0.006	0.006
H	0.08	0.08	0.81	0.88	0.00	0.81	0.88	0.81	0.88	0.068	0.074
I	0.17	0.17	0.81	0.88	0.00	0.81	0.88	0.81	0.88	0.134	0.145
	0.09	0.09	0.81	0.88	0.00	0.81	0.88	0.81	0.88	0.0729	0.0792

Add a footnote identify what the corresponding surface characteristics the corresponding c-values are or include Table 6-6 in the report and identify (circle/mark) the corresponding surface characteristics.

Unresolved.

Provide a drainage map.
Unresolved.

SHOPS AT MCLAUGHLIN II AREA DRAINAGE SUMMARY

EXISTING CONDITIONS

BASIN	WEIGHTED		OVERLAND			STREET / CHANNEL FLOW				T _t	INTENSITY		TOTAL FLOWS	
	AREA TOTAL (Acres)	C ₅	C ₁₀₀	Length (ft)	Height (ft)	T _c (min)	Length (ft)	Slope (%)	Velocity (fps)	T _t (min)	I ₅ (in/hr)	I ₁₀₀ (in/hr)	Q ₅ (c.f.s.)	Q ₁₀₀ (c.f.s.)
EX-1	0.88	0.09	0.36	220	5.0	21.4	172	1.7%	2.5	1.1	2.9	4.8	0.2	1.5

* Four Cales See Drainage Summary

SHOPS AT MCLAUGHLIN II AREA DRAINAGE SUMMARY

DEVELOPED CONDITIONS

BASIN	AREA TOTAL (Acres)	WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T _t	INTENSITY		TOTAL FLOWS		
		C _s	C ₁₀₀	C _s	Length (ft)	Height (ft)	T _c (min)	Length (ft)	Slope (%)	Velocity (fps)	T _{t1} (min)		TOTAL (min)	I _s (in/hr)	I ₁₀₀ (in/hr)	Q _s (c.f.s.)	Q ₁₀₀ (c.f.s.)
* First Value See Baseoff Summary																	
A	0.04	0.73	1.00	0.73	0	0.0	0.0	45	2.0%	2.5	0.3	5.0	5.0	9.1	0.1	0.4	
B	0.03	0.73	0.81	0.73	0	0.0	0.0	45	2.0%	2.5	0.3	5.0	5.0	9.1	0.1	0.2	
C	0.03	0.73	0.81	0.73	0	0.0	0.0	45	2.0%	2.5	0.3	5.0	5.0	9.1	0.1	0.2	
D	0.04	0.73	0.81	0.73	0	0.0	0.0	45	2.0%	2.5	0.3	5.0	5.0	9.1	0.1	0.3	
E	0.12	0.81	0.88	0.81	30	1.0	2.0	60	5.0%	4.0	0.3	5.0	5.0	9.1	0.5	1.0	
F	0.27	0.81	0.88	0.81	10	0.5	1.0	320	3.0%	3.5	1.5	5.0	5.0	9.1	1.1	2.2	
G	0.01	0.81	0.88	0.81	5	0.5	0.6	5	3.8%	3.5	0.0	5.0	5.0	9.1	0.0	0.1	
H	0.08	0.81	0.88	0.81	50	4.0	1.9	0	#DIV/0!	3.4	0.0	5.0	5.0	9.1	0.3	0.7	
I	0.17	0.81	0.88	0.81	20	1.0	1.4	40	6.0%	3.4	0.2	5.0	5.0	9.1	0.7	1.3	
J	0.09	0.81	0.88	0.81	50	2.0	2.4	0	#DIV/0!	3.4	0.0	5.0	5.0	9.1	0.4	0.7	

Calculated by: Id

Date: 10/12/2017

Checked by: Id

SHOPS AT MCLAUGHLIN II

SURFACE ROUTING SUMMARY

	A	B	C	D	E	F	G	H	I	J
7	DEVELOPED CONDITIONS									
8	Design Point(s)	Contributing Basins	Area (Acres)	Equivalent CA₅	Equivalent CA₁₀₀	Maximum T_C	Intensity		Flow	
9							I₅	I₁₀₀	Q₅	Q₁₀₀
10	1	G+DP2	0.53	0.43	0.46	5.0	5.0	9.1	2.1	4.2
11	2	F+H+DP3	0.52	0.42	0.46	5.0	5.0	9.1	2.1	4.1
12	3	I	0.17	0.13	0.15	5.0	5.0	9.1	0.7	1.3
13	4	J	0.09	0.07	0.08	5.0	5.0	9.1	0.4	0.7
14	5	E	0.12	0.10	0.11	5.0	5.0	9.1	0.5	1.0
15	6	A	0.04	0.03	0.04	5.0	5.0	9.1	0.1	0.4
16	7	B	0.03	0.02	0.02	5.0	5.0	9.1	0.1	0.2
17	8	C	0.03	0.02	0.02	5.0	5.0	9.1	0.1	0.2
18	9	D	0.04	0.03	0.03	5.0	5.0	9.1	0.1	0.3
19	Date: 10/12/17									
20	Checked by: Id									
21										

Free Online Manning Pipe Flow Calculator

>> Nationalism not welcome here. <<

Manning Formula Uniform Pipe Flow at Given Slope and Depth

Can you help me translate, program, or host these calculators? (../contact.php) [Hide this request]

Check out our newest spreadsheet update: [Download Spreadsheet \(spreadsheet/Manning-Pipe-Flow.xlsx\)](#) [Open Google Sheets version \(spreadsheet/Manning-Pipe-Flow.php\)](#) [View All Spreadsheets](#)

(<http://www.hawsedc.com/engcalcs/SpreadsheetLibrary.php>)

--CAUTION: If you have downloaded the spreadsheet prior to September 24, you may have received incorrect results!--

Printable Title

Printable Subtitle

Set units:

Pipe diameter, d_0

12

in ▼

Manning roughness, n ?

(http://www.engineeringtoolbox.com/mannings-roughness-d_799.html)

0.013

Pressure slope (possibly ? (../pressureslope.php) equal to pipe slope), S_0

1.0

% rise/run ▼

Percent of (or ratio to) full depth (100% or 1 if flowing full)

75

% ▼

Results

Flow, Q	3.2485	cfs ▼
Velocity, v	5.1414	ft/sec ▼
Velocity head, h_v	0.4108	ft ▼
Flow area	0.6319	ft ² ▼
Wetted perimeter	2.0944	ft ▼
Hydraulic radius	0.3017	ft ▼
Top width, T	0.8660	ft ▼
Froude number, F	1.06	
Shear stress (tractive force), τ	22.4166	N/m ² ▼

DRAINAGE MAP

EROSION CONTROL MAP

**FINAL DRAINAGE REPORT FOR
BECKETT AT WOODMEN HILLS
FILING 3**

May 27, 2003

Prepared for:

**BECKETT DEVELOPMENT, LLP
P.O. BOX 49487
COLORADO SPRINGS, CO 80949**

Prepared by:

**URS
9960 FEDERAL DRIVE, SUITE 300
COLORADO SPRINGS, CO 80921**

URS Project No. 21710935

CERTIFICATIONS

Engineer's Statement:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the City/County for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

William D. Chaffin
William D. Chaffin, PE # 35136



Seal

Developer's Statement:

I, the developer have read and will comply with all of the requirements specified in this drainage report and plan.

Beckett Development LLP
Beckett Development, LLP.

By: Andrew C. Beckett

Title: Partner

Address: 1674 Pinon Glen Circle
Col Springs, Co, 80919

El Paso County's Statement

Filed in accordance with Section 51.1 of the El Paso Land Development Code, as amended.

John A. McCarty
John McCarty, County Engineer / Director
Conditions:

7-8-03
Date

TABLE OF CONTENTS

PURPOSE	1
GENERAL LOCATION AND DESCRIPTION	1
DRAINAGE BASINS AND SUB-BASINS	1
DRAINAGE DESIGN CRITERIA	2
SCS HYDROLOGIC CRITERIA	2
RATIONAL METHOD HYDROLOGIC CRITERIA	2
DETENTION STORAGE CRITERIA	2
DRAINAGE FACILITY DESIGN	2
GENERAL CONCEPT	2
EXISTING DRAINAGE CHARACTERISTICS	2
PROPOSED DESIGN DRAINAGE CHARACTERISTICS	3
EROSION CONTROL	4
GENERAL CONCEPT	4
DETENTION PONDS	4
SILT FENCING	4
EROSION BALES	4
MISCELLANEOUS	4
COST ESTIMATE	5
DRAINAGE FEES	5

LIST OF FIGURES

- FIGURE 1: Vicinity Map
- FIGURE 2: Woodmen Hills Development Filing No. 7
- FIGURE 3: FEMA Flood Insurance Rate Map
- FIGURE 4: Soils Map
- FIGURE 5: Drainage Plan
- FIGURE 6: Erosion Control Plan

APPENDICES

- A. Rational Method Calculations

PURPOSE

The purpose of this Final Drainage Report for Beckett at Woodmen Hills Filing 3 is to identify on-site drainage patterns and design adequate storm water facilities for routing and capturing developed storm water runoff.

This drainage report supercedes the previous drainage report submitted for Beckett at Woodmen Hills Filing No. 1. It contains the drainage information for the entire property as shown in Figure 1: Vicinity Map. This map includes areas previously platted as Beckett at Woodmen Hills Filing 1, Filing 2 and Woodmen Hills Filing 7D.

GENERAL LOCATION AND DESCRIPTION

Beckett at Woodmen Hills, Filing 3, is located approximately 1/2 mile north-northeast of Falcon, Colorado in El Paso County as shown on Figure 1, and further illustrated in Figure 2.

Filing 3, which is platted to be 9.21 acres, is located partly in Section 7, Township 13 South, Range 64 West, and partly in Section 12, Township 13 South, Range 65 West. Planned development for Filing 3 is commercial.

The terrain is generally flat with gentle northwest to southeast slopes ranging from 1% to 3%. The vegetation is typical eastern Colorado prairie grasses with little or no shrubs. Trees are present only near the existing drainage ways. The intermittent streams drain into the Black Squirrel Creek Basin which ultimately outfalls into the Arkansas River.

The site and surrounding area have soil characteristics of hydrologic soil Group A (Columbine and Blakeland) as classified by the Soil Conservation Service (See Figure 4). There are no irrigation facilities, utilities or other encumbrances that affect the drainage analysis of this site.

A FEMA regulated flood plain has been identified running adjacent with Filing 3 as shown in Figure 3.

The drainage design for Beckett at Woodmen Hills Filing 3 is consistent with the Final Drainage Report for Beckett at Woodmen Hills Filing 1 dated March 8, 2001.

DRAINAGE BASINS AND SUB-BASINS

The Falcon Basin Drainage Basin Planning Study was completed and adopted by El Paso County in December 2000. In addition, a Drainage Plan and Report was submitted to El Paso County for Phase III and Filing 7 Woodmen Hills in February 1999. This report is supplemental to the 1999 report. Drainage Reports have also been accepted and approved for Woodmen Hills Filings 1 through 11 and Drainage Letters have been approved for the Lot 3, Beckett at Woodmen Hills Filing 1 and Lot 2, Beckett at Woodmen Hills Filing No. 2.

Developed condition basins for the Falcon Basin have been detailed in the previously mentioned Phase III Preliminary and Filing 7 Final Drainage and Erosion Control Report. These basin boundaries and designations are consistent with the earlier MDDP and Preliminary and Final Drainage Reports submitted for Woodmen Hills Subdivision Filing numbers 1 through 11 and remain consistent for this property. Beckett at Woodmen Hills Filing No. 3 is contained within basins 35A and 35B (the right-of-way for McLaughlin Road) as detailed in these previous reports.

DRAINAGE DESIGN CRITERIA

SCS Hydrologic Criteria

The SCS method was used in calculating drainage for Filing 7 (including this property). Please see Phase III Preliminary and Filing 7 Final Drainage and Erosion Control Report for HEC-1 computer model results.

Rational Method Hydrologic Criteria

The Rational Method was used to estimate stormwater runoff facilities for the 5-year and 100-year design storm. The Rational Method coefficients "C" were selected from Table 5-1 in the Drainage Criteria Manual. The time of concentration is calculated per Drainage Criteria Manual requirements. The intensities for each basin are calculated from Figure 5-1 of the Drainage Criteria Manual based upon the basin time of concentration. Because there is no current development plan for the property, maximum values for C and intensity were used. Proposed developed subbasins used in the Rational Method analysis are detailed in Figure 5.

Detention Storage Criteria

Detention Pond No. 5 was designed in Woodmen Hills Filing 7 to handle runoff from the Woodmen Hills development, including portions of this property. Please see Phase III Preliminary and Filing 7 Final Drainage and Erosion Control Report for calculations and discussion on design.

DRAINAGE FACILITY DESIGN

General Concept

This Final Drainage Report for Beckett at Woodmen Hills Filing 3 consists of seven drainage sub-basins as shown on Figure 5. Runoff from the area will drain to McLaughlin Road and to the existing FEMA floodplain along the southern boundary of the site. The direct flow to the FEMA floodplain will be compensated for by over detention of developed flows in Pond No. 5 as designed in the Phase III Preliminary and Filing 7 Final Drainage and Erosion Control Report.

Existing Drainage Characteristics

Currently, runoff from this property flows south and east and is intercepted by existing roads or flows over the curb and gutter into McLaughlin Road. Existing inlets intercept flows in McLaughlin Road per the Phase III Preliminary and Filing 7 Final Drainage and Erosion Control Report. Please see Phase III Preliminary and Filing 7 Final Drainage and Erosion Control Report for details.

Proposed Design Drainage Characteristics

The sub-basins shown on Figure 5 were developed based on the proposed lot layout for this site. The northwestern area (Basin 1) will be graded to drain to two 10-foot sump inlets located at Design Point 1. The inlets will discharge into an existing storm system and eventually discharge into Detention Pond 5. Design flows are estimated to be 15 cfs and 28 cfs for 5-year and 100-year storm.

Basin 2 contains 4.3 acres and is located in the northeastern part of the site. Runoff drains south to the existing access road from McLaughlin Road. Runoff travels along the curb and gutter to Design Point 2 located at the intersection with McLaughlin Road. Anticipated design flows are 13 cfs and 24 cfs for the 5-year and 100-year storm. Flows are routed south to Design Point 3 to the existing 15-foot on-grade inlet along the western flowline of McLaughlin Road.

Basin 3 contains 1.6 acres west of McLaughlin Road. Runoff drains south to a proposed access road from McLaughlin Road. Runoff is directed east, via curb and gutter, to Design Point 3. Anticipated flows from Basin 3 are 6 cfs and 12 cfs for the 5-year and 100-year storm.

Flows from Basin 2 and 3 are combined at Design Point 3 and intercepted by the existing 15-foot on-grade inlet. Routed flows to Design Point 3 are 17 cfs and 31 cfs. The 15-foot on-grade inlet at Design Point 3 will intercept approximately 10 cfs and 13 cfs and bypass 7 cfs and 18 cfs for the 5-year and 100-year storm. Bypassed flows continue south to Design Point 4.

Basin 4 contains 2.3 acres west of McLaughlin Road. Runoff drains south to a proposed access road from McLaughlin Road. Runoff is directed east and south, via curb and gutter, to an existing inlet in McLaughlin Road at Design Point 4. The inlet discharges directly into the FEMA floodplain. Anticipated design flows for Basin 4 are 6 cfs and 13 cfs for 5-year and 100-year storm. Routed flows from Basin 4 and Design Point 3 are 10 cfs and 25 cfs for the 5-year and 10-year storm at Design Point 4. The existing inlet along the western side of McLaughlin Road is a 5-foot type R inlet. The inlet will not handle the 5-year or 100-year storm. Both storms will overtop the curb and flow into the existing FEMA floodplain. Riprap protection can be added behind the inlet for stabilization.

Basin 5 is along the southern boundary of the site, adjacent to McLaughlin Road. This small basin drains south directly into the FEMA floodplain. Anticipated flows for Basin 5 are 2 cfs and 3 cfs for the 5-year and 100-year storm.

Basin 6 is centrally located and adjacent to the future Meridian Road. Runoff flows south to Design Point 5. Estimated runoff of 8 cfs and 14 cfs will be generated for the 5-year and 100-year storm.

Basin 7 is located along the southern boundary of the site, adjacent to the future Meridian Road. Anticipated flows for Basin 7 are 7 cfs and 13 cfs. Runoff from basins 6 and 7 are routed to Design Point 6 and discharge directly into the FEMA floodplain. Routed flows are estimated to be 14 cfs and 26 cfs for the 5-year and 100-year storm. The discharge structure at Design Point 6 will be designed as part of the individual development plan for these lots. The owner of the lot will be responsible for the installation of the required drainage structure. The structure at Design Point 6 will be equivalent to a 15-foot sump inlet.

EROSION CONTROL

General Concept

All ditches will be designed to meet El Paso County criteria for slope and velocity. During construction, best management practices for erosion control will be employed based on El Paso County Criteria and the erosion control plans shown in Figure 6.

Detention Ponds

The detention ponds will act as the primary erosion control facilities for this property and other tributary areas. The ponds will serve dual purposes in facilitating the settling of sediment in runoff during and after construction, and in maintaining runoff to existing levels.

Silt Fencing

Silt fencing will be placed along the southern and eastern property boundaries. This will prevent suspended sediment from leaving the site during construction. Silt fencing is to remain in place until vegetation is reestablished after completion of construction.

Erosion Bales

Erosion bales will be placed within the Woodmen Road ditch as check dams. Erosion bales will remain in place until vegetation is reestablished in drainage swales. Erosion bales will also be placed around all inlets to minimize sediment transport.

Miscellaneous

Best erosion control practices will be utilized as deemed necessary by the Contractor or Engineer and are not limited to the measures described above or as shown in Figure 6.

COST ESTIMATE

The following table is a summary of estimated costs for proposed drainage improvements and erosion control measures for Beckett at Woodmen Hills Filing 3. The cost estimate submitted herein is based on time-honored practices within the construction industry. As such, the engineer does not control the cost of labor, material, equipment or a contractor's method of determining prices and competitive bidding practices or market conditions. The estimate contained represents our best judgement as design professionals using current information available at the time of preparation. The engineer cannot guarantee that proposals, bids, and/or construction costs will not vary from this cost estimate.

Item	Quantity	Unit	Unit Cost	Extension
Erosion Control Measures				
Erosion Control Hay Bales	8	EA	\$ 15.00	120
Silt Fencing	1,000	LF	\$ 2.00	2,000
Subtotal, Erosion Control Measures				\$ 2,120
Subtotal, All Drainage & Erosion Control				\$ 2,120
Engineering (10%)				\$ 212
Contingency (10%)				\$ 212
TOTAL, DRAINAGE & EROSION CONTROL				\$ 2,544

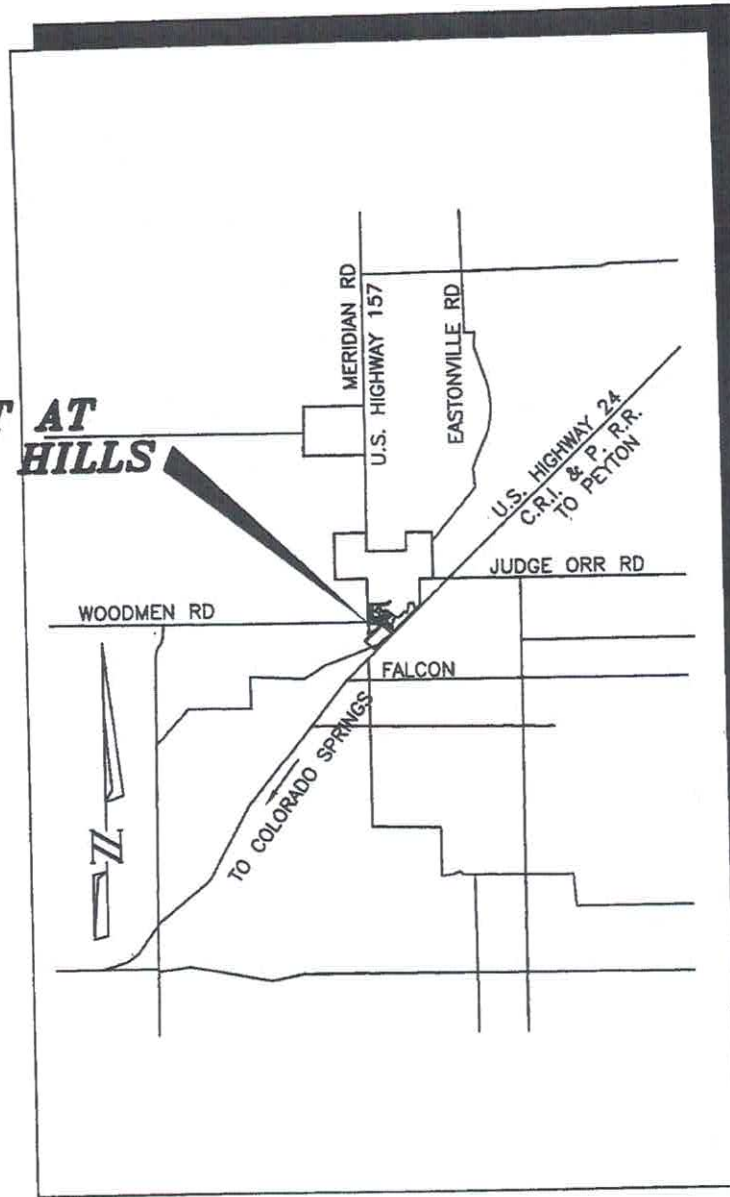
Drainage Fees

Drainage fees for Beckett at Woodmen Hills Filing 3 have been paid in the previous submittals for Beckett at Woodmen Hills Filing 1 and Filing 2.

FIGURES

\\S031n\file\6742451\CAD\FIGURES\FG01VMP01.dwg 05/29/2003 12:48:39 PM MDT

BECKETT AT WOODMEN HILLS



VICINITY MAP

N.T.S.

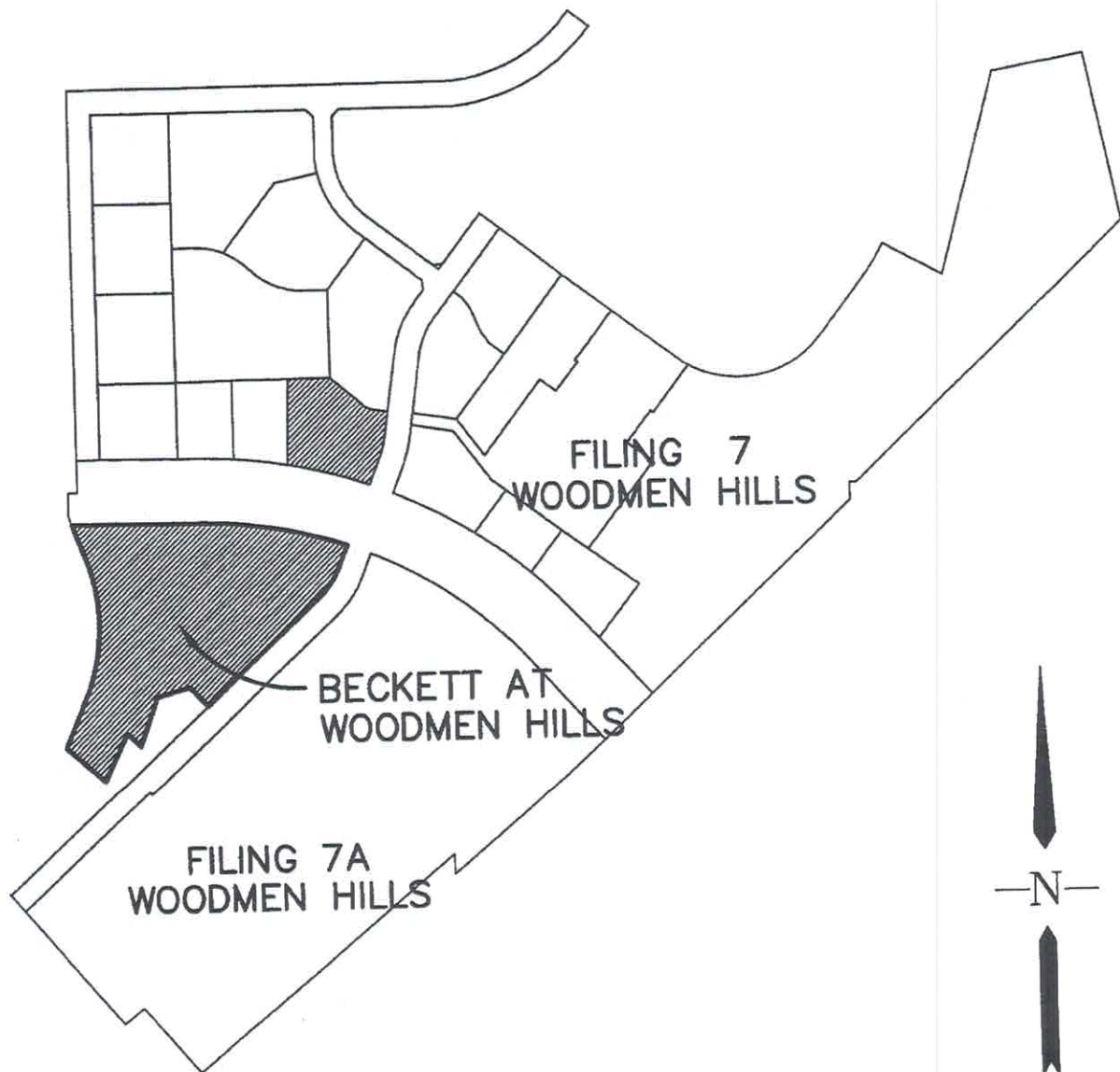
BECKETT AT WOODMEN HILLS
VICINITY MAP

URS

PROJ NO. 6742451

FIGURE 1

\\S031ntfile1\6742451\CAD\FIGURES\FG01VMP02.dwg 05/29/2003 12:49:05 PM MDT



*BECKETT AT
WOODMEN HILLS*

SITE MAP

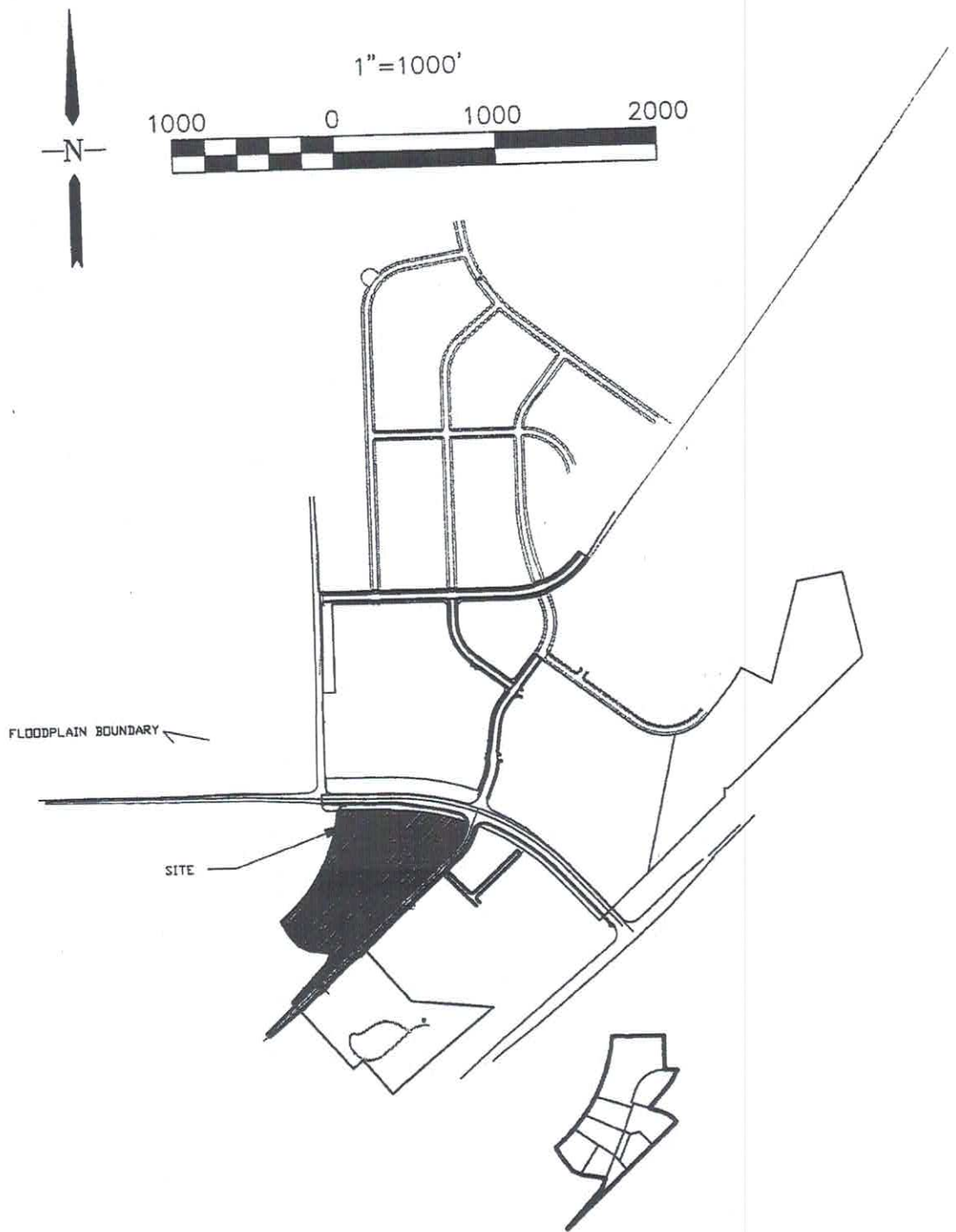
NO SCALE

URS

PROJ NO. 6742451

FIGURE 2

\\S031ntfile1\6742451\CAD\21710935\figures\FG01FMA03.dwg 05/29/2003 12:50:25 PM MDT



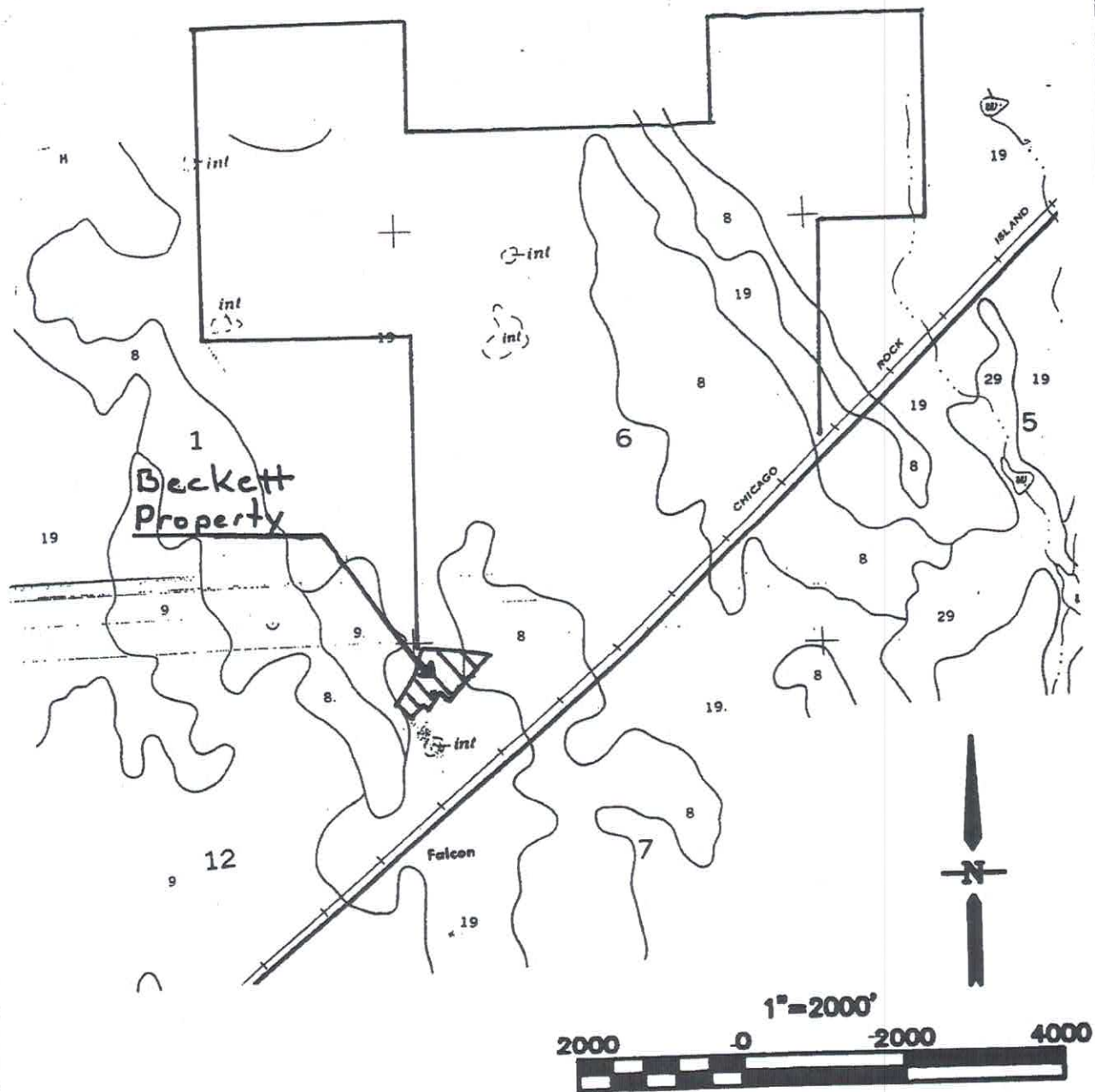
BECKETT AT WOODMEN HILLS

FEMA FLOOD INSURANCE RATE MAP

URS

PROJ NO. 6700042451

FIGURE 3



BECKETT AT WOODMEN HILLS

SOILS MAP

URS

PROJ NO. 6742451

FIGURE 4

APPENDIX A:
Rational Method Calculations

BECKETT @ WOODMEN HILLS FILING 3 ON-GRADE INLET CALCULATIONS

Based on table 7-2 Drainage Criteria Manual

Based on table 7-2 Drainage Criteria Manual																			
DP	Inlet size L(f)	CROSS SLOPE	STREET SLOPE	Q(5)	Q(100)	Q ₅							Q ₁₀₀					Bypass	
						Qi (5)	T	F _w	L1	L2	L3	Qi (100)	T	F _w	L1	L2	L3	Q ₅	Q ₁₀₀
3	16	2.0%	2.0%	17	31	10	18	1.9244	27	16	58	13	23	2.0077	36	21	75	7	18

BECKETT @ WOODMEN HILLS FILING 3 SUMP INLET CALCULATIONS

Based on formula: $Q_i = 1.7(L_i + 1.8W)(d_{max} + W^{1/2})^{1.48}$

DP	Inlet size L(i) initial	CROSS SLOPE	Q(5)	Q(100)	Q ₅					Q ₁₀₀					Clogging Factor	Length Final
					Qi (5)	d _{max}	W	a	Qi (100)	d _{max}	W	a	Qi (100)	Length Final		
1	16	2.0%	15	28	15	0.5	2	0.17	28	1.0	2	0.2	28	90.00	1.25	90.00
6	12	2.0%	14	26	14	0.5	2	0.17	26	1.0	2	0.2	26	175.00	1.25	175.00
4	5	2.0%	10	25	8	0.5	2	0.17	19	1.0	2	0.2	19	N/A	NA	N/A

D	Q	SX	SO
0.48406	22	0.02	0.005
0.41014	20	0.02	0.01
0.38011	20	0.02	0.015
0.36015	20	0.02	0.02
0.3454	20	0.02	0.025
0.33379	20	0.02	0.03

BECKETT @ WOODMEN HILLS FILING 3
(RATIONAL METHOD Q=CIA)

BASIN	TOTAL FLOWS					AREA TOTAL (Ac)	WEIGHTED		OVERLAND				CHANNEL				Tc		INTENSITY		COMMENTS
	Q(5) (c.f.s.)	Q(100) (c.f.s.)	CA(equiv.) 5 YR	100 YR	C(5)		C(100)	C(5)	Length (ft)	Slope (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	TOTAL (min)	I(5) (in/hr)	I(100) (in/hr)			
1	15	28	3.53	3.72	3.92	0.90	0.95	0.25	35	3.0%	6.5	620	2.0%	4.5	2.3	8.8	4.3	7.4			
2	13	24	3.90	4.11	4.33	0.90	0.95	0.25	130	3.0%	12.6	780	2.0%	4.5	2.9	15.5	3.3	5.8			
3	6	12	1.41	1.49	1.57	0.90	0.95	0.25	30	2.0%	6.9	330	2.0%	5.5	1.0	7.9	4.4	7.8			
4	6	13	1.38	1.66	2.34	0.59	0.71	0.25	25	3.0%	5.5	660	1.9%	6.5	1.7	7.2	4.6	8.0			
5	1	3	0.13	0.17	0.37	0.35	0.45	0.25	25	3.0%	5.5	360	2.0%	7.5	0.8	6.3	4.8	8.4			
6	8	14	1.60	1.69	1.78	0.90	0.95	0.25	25	3.0%	5.5	280	3.1%	8.5	0.5	6.1	4.9	8.5			
7	7	13	1.46	1.54	1.62	0.90	0.95	0.25	25	3.0%	5.5	220	3.0%	5.5	0.7	6.2	4.8	8.5			

BECKETT @ WOODMEN HILLS FILING 3 SURFACE ROUTING

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS	
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)
2	2	3.90	4.11	15.5	3.3	5.8	13	24
		TRAVEL TIME						
		3.90	4.11	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)
3	2 3	3.90	4.11		320	4.5	1.2	16.7
		1.41	1.49	TRAVEL TIME				
		5.31	5.61	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)
4	4 2,3	1.38	1.66	16.7	3.2	5.6	17	31
		5.31	5.61		660	4.5	2.4	19.1
		6.69	7.27	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)
5	6	1.60	1.69	19.1	3.0	5.2	20	38
		1.60	1.69	TRAVEL TIME				
				Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)
6	6 7	1.60	1.69	6.1	4.9	8.5	8	14
		1.46	1.54		210	4.5	0.8	6.9
		3.06	3.23	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)

Flows intercepted at DP-3 are 10 cfs and 13 cfs
this flow is removed from the 20 cfs and 38 cfs
routed flows , $\frac{20 \text{ cfs}}{-10 \text{ cfs}} = 10 \text{ cfs } 5 \text{ year}$ $\frac{38 \text{ cfs}}{-13 \text{ cfs}} = 25 \text{ cfs } 100 \text{ yr}$
at DP-4

BECKETT @ WOODMEN HILLS FILING 3 ON-GRADE INLET CALCULATIONS

Based on table 7-2 Drainage Criteria Manual

Based on table 7-2, Drainage Criteria Manual

DP	Inlet size L(i)	CROSS SLOPE	STREET SLOPE	Q ₅										Q ₁₀₀						Bypass	
				Q(5)	Q(100)	Q _i (5)	T	F _w	L1	L2	L3	Q _i (100)	T	F _w	L1	L2	L3	Q ₅	Q ₁₀₀		
3	16	2.0%	2.0%	17	31	10	18	1.9244	27	16	58	13	23	2.0077	36	21	75	7	18		

BECKETT @ WOODMEN HILLS FILING 3 SUMP INLET CALCULATIONS

Based on formula: $Q_s = 1.7(L_i + 1.8W)(d_{max} + W/12)^{1.65}$

DP	Inlet size L(i)	CROSS SLOPE	Q ₅						Q ₁₀₀				Clogging Factor	Length Final
			Q(5)	Q(100)	Q _i (5)	d _{max}	W	a	Q _i (100)	d _{max}	W	a		
1	16	2.0%	15	28	15	0.5	2	0.17	28	1.0	2	0.2	1.25	20.00
6	12	2.0%	14	26	14	0.5	2	0.17	26	1.0	2	0.2	1.25	15.00
4	5	2.0%	10	25	8	0.5	2	0.17	19	1.0	2	0.2	NA	N/A

D	Q	SX	SO
0.48406	22	0.02	0.005
0.41014	20	0.02	0.01
0.38011	20	0.02	0.015
0.36015	20	0.02	0.02
0.3454	20	0.02	0.025
0.33379	20	0.02	0.03

STREET CAPACITY

FOR 1/2 STREET SECTION

	Formula	Longitudinal Slope	Cross Slope	n	Curb Type	Depth of flow	Q _{max}	Q	Comments
Residential	$Q=170.2 S^{1/2}$	0.5%	0.02	0.016	V/R	0.5	34	12.0	County ramp curb is 6"
		1.0%					34	17.0	
		1.5%					34	20.8	
		2.0%					34	24.1	
		2.5%					34	26.9	
		3.0%					34	29.5	
		3.5%					34	31.8	
Collector/Arterial	$Q=171.7 S^{1/2}$	4.0%					34	34.0	
		0.5%	0.02	0.016	V	0.5	34	12.0	
		1.0%					34	17.0	
		1.5%					34	20.8	
		2.0%					34	24.1	
		2.5%					34	26.9	
		3.0%					34	29.5	
		3.5%					34	31.8	
		4.0%					34	34.0	

GENERAL NOTES:

- ALL DRAINAGE CONSTRUCTION SHALL MEET THE SPECIFICATIONS OF THE CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE NOTIFICATION AND FIELD VERIFICATION OF ALL NECESSARY UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, BEFORE BEGINNING CONSTRUCTION. LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO ACTUAL CONSTRUCTION.
- THE SUE'S REPORT FOR THIS SITE DATED NOVEMBER 17, 2000 SHALL BE CONSIDERED A PART OF THESE PLANS AND SHALL BE NARRATED IN:
- A. THE CONSTRUCTION SHALL NOT BE LESS THAN (1) SOLOID CURB AND SLOES REPORT PREPARED FOR THIS SITE BY CIL, DATED FEBRUARY 17, 2000; AND AT LEAST ONE (1) COPY OF THE APPROPRIATE DESIGN, CONSTRUCTION STANDARDS AND SPECIFICATIONS AT THE JOB SITE AT ALL TIMES. MANUSCRIPTS SHALL INCLUDE, BUT NOT LIMITED TO THE FOLLOWING:
 - 1. EL PASO COUNTY SUBSLOPE CRITERIA MANUAL
 - 2. EL PASO COUNTY DRAINAGE CRITERIA MANUAL
 - 3. EL PASO COUNTY SUBSLOPE CRITERIA MANUAL
 - 4. CITY OF COLORADO SPRINGS/ EL PASO COUNTY DRAINAGE CRITERIA MANUAL
 - B. SUE'S & SPECIFICATIONS BETWEEN THE CONTRACTOR, ENGINEER, & EL PASO COUNTY DEPARTMENT OF TRANSPORTATION SHALL BE FIELD VERIFIED PRIOR TO ANY CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE THE MEETING TIME AND PLACE WITH ALL PERSONS TO ATTEND.
- BENCH-MARK: 2-1/2" METAL CIP, LS 17664, AT THE NW CORNER OF SECTION 7 (INTERSECTION OF WOODMEN ROAD AND MEXICAN ROAD).
- ALL APPROPRIATE PERMITS (SUCH AS EL PASO COUNTY GRADING PERMIT, NOTICE, FLOODPLAIN DEVELOPMENT, 404, 401-C) MUST BE OBTAINED BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION.
- 1. CONSTRUCTION SCHEDULING WILL BE PROVIDED BY THE ENGINEER.
 - 2. GRADING OPERATIONS TO BEGIN IN FEBRUARY 2001, TO BE COMPLETED FEBRUARY 2004.
 - 3. ALL FILL & CUT SLOPES SHALL NOT EXCEED 3:1 V.
 - 4. PROPOSED CONTIGUOUS AND SPOT ELEVATIONS SHOWN WITH THE RIGHT-OF-WAY ARE TO FINISHED GRADE.
 - 5. LOTS IS NOT RESPONSIBLE FOR THE ACCURACY OF THE EXISTING CONDITIONS.
 - 6. SLOPED ROADS SHALL BE SLOPED WITHIN THE SPACING SHOWN BELOW ON THESE PLANS OR AN APPROVED EQUAL TWO WEEKS AFTER FINAL PLANS IS ISSUED. EXISTING CONTOUR, FABRIC, SHALL BE USED ON SANDY SLOPES WHICH ARE EQUAL TO, OR GREATER THAN 3% V SLOPE.
 - 7. FORDON CONTROL WILL CONSIST OF, BUT NOT LIMITED TO STEW PLANTS PLACED AT THE POSITION SHOWN ON THIS PLAN, AND TOP SOIL MIXED WITH GRASS SEED WHICH WILL BE WATERED UNTIL VEGETATION HAS BEEN ESTABLISHED.
 - 8. THE FORDON CONTROL MEASURES OBTAINED ON THIS PLAN ARE THE RESPONSIBILITY OF THE DEVELOPER TO MONITOR AND REPLACE, REGRADE AND RESEED AS NECESSARY UNTIL ACQUISITION IS RESTORED.
 - 9. EXISTING CONTROL MEASURES SHALL BE IMPLEMENTED IN A MANNER THAT WILL PROTECT ADJACENT PROPERTIES AND PUBLIC FACILITIES FROM THE ADVERSE EFFECTS OF EROSION AND SEDIMENTATION AS A RESULT OF CONSTRUCTION AND EARTHQUAKE ACTIVITIES WITHIN THE PROJECT SITE.
 - 7. FORDON CONTROL BLANKET SHALL BE EXCESSIVE LOW-VELOCITY CURLED BARKWOOD OR EQUIVALENT, FOR ALL SLOPES EQUAL TO OR GREATER THAN 3%.
 - 8. ADDITIONAL STRUCTURES MAY BE REQUIRED AT TIME OF CONSTRUCTION.
 - 9. ADDITIONAL STRUCTURES MAY BE REQUIRED.

OWNER IS RESPONSIBLE FOR IMPROVING

1. UNDESIRABLE IMPROVEMENTS OF THE APPROVED GRADING AND DRAINAGE CONTROL MEASURES MUST BE SUBMITTED ALONG WITH SUBMITTING MATERIALS TO THE COUNTY ENGINEER, APPROVAL FOR WHICH MAY BE ISSUED 30 DAYS AFTER THE SUBMITTAL DATE. THE APPROVED MEASURES WILL PROVIDE SOIL EROSION CONTROLS CORRELATED TO, OR BETTER THAN THAT OF THE EXISTING OR PROPOSED SOIL DISTURBANCE PLANS.
2. AT LEAST TEN YEARS PRIOR TO THE ANTICIPATED CLOSURE OF CONSTRUCTION, FOR PROJECTS THAT WILL DISTURB 5 ACRES OR MORE AFTER COMPLETION OF CONSTRUCTION, THE CONSTRUCTION ACTIVITY SHALL SUBMIT A PERMIT APPLICATION FOR STORMWATER DISCHARGE TO THE REGIONAL COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT. WATER QUALITY SHALL BE A PERMIT APPLICATION REQUIREMENT FOR THE DISCHARGE OF A STORMWATER MANAGEMENT PLAN (SWMP), OF WHICH THIS GRADING AND DRAINAGE CONTROL PLAN MAY BE PART. FOR INFORMATION BY APPLICATION, CONTACT THE REGIONAL DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT.
3. SOIL SHALL NOT BE STOCKPILED FOR MORE THAN 3 MONTHS. ADDITIONAL DRAINAGE CONTROL MEASURES MAY BE REQUIRED IF STOCKPILED MATERIAL EXCEEDS 500 CUBIC FEET. STOCKPILES ARE LOCATED WITHIN THE SET OF FOUNDATION, ADDITIONAL EROSION CONTROLS MAY BE NECESSARY, SUCH AS DIMENSION DRAKS OR SKY FENCE.
4. ALL DISTURBED AREAS OUTSIDE OF THE PROPOSED PAVEMENT WILL REQUIRE RESEEDING WITHIN TWO WEEKS OF ESTABLISHING FINAL GRADE.
5. ALL EXISTING SOILS, SOIL SURFACES, AND SURFACES SHALL BE APPLIED TO ALL DISTURBED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNMAINTAINED) FOR PERIODS LONGER THAN AN ADDITIONAL 30 CALENDAR DAYS. TEMPORARY REVEGETATION IS REQUIRED ON ALL DISTURBED AREAS HAVING A PERIOD OF EXPOSURE PRIOR TO FINAL STABILIZATION OF 3 MONTHS OR LONGER. REVEGETATION SHALL BE MAINTAINED FOR A PERIOD OF 1 YEAR OR LONGER IF ANY INDETERMINATE AMOUNT OF THE DISTURBED AREAS WILL NOT BE PAID OR PAID FOR BY THE PROJECT.
6. GRADING OUTSIDE OF THE PROJECT'S BOUNDARIES WILL REQUIRE TEMPORARY CONSTRUCTION ELEMENTS. THE DEVELOPER IS RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS FOR TEMPORARY CONSTRUCTION ELEMENTS.

EROSION CONTROL

STEPS FOR CONSTRUCTION:

- STEPS FOR CONSTRUCTION:**
- THE INTEGRATED START FOR THIS PROJECT IS FEBRUARY 2003 WITH AN ANTICIPATED COMPLETION DATE OF FEBRUARY 2004. BELOW IS A BRIEF OUTLINE OF THE CONSTRUCTION SEQUENCE FOR THIS PROJECT:
- CONSTRUCTION OF EXISTING CONTROL STRUCTURES
 - ROUGH DRAINAGE
 - UTILITIES INSTALLATION

PROCESS AND STATEMENT CONTROLS

- EROSION AND SEDIMENT CONTROLS**
- STEEP SLOPES AND STRAIN BALE CHECK DAMS WILL BE INSTALLED IMMEDIATELY AFTER ANY EXCAVATION FOR THE MAJOR ROADS. STRAIN BALE CHECK DAMS WILL BE PLACED AT THE DOWNSTREAM END OF ANY EXCAVATION TO PREVENT TEMPORARY SEDIMENTATION. STRAIN BALE CHECK DAMS WILL BE INSTALLED FOR TRAPPING ANY SEDIMENT-LADEN RUNOFF FROM ANY CONSTRUCTION. STRAIN BALE DAMS WILL BE INSTALLED AROUND THE DRAINAGE DITCHES TO PREVENT EROSION OF THE DITCHES. THE DRAINAGE DITCHES WILL BE PROTECTED WITH RIP RAP ON THE DOWNSTREAM SIDE.
- NON-STRUCTURE PRACTICES TO CONTROL EROSION AND SEDIMENTATION WILL INCLUDE: SEEDINGS OF GRASS COVER IN EXISTING AND NEWLY EXCAVATED AREAS; TEMPORARY SEEDING OF THE DETENTION POND AND MALDRING ALONG SLOPES; AND TEMPORARY EROSION CONTROL BARRIERS.

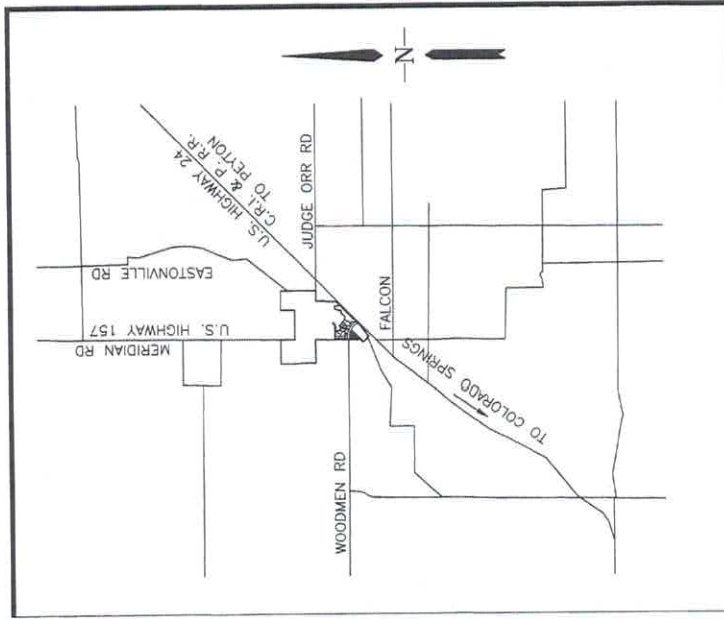
CONTACT: Dr. Peter Gosselin

- ### FINAL STABILIZATION AND LONG TERM STOREHOUSE MANAGEMENT

ONCE THE MAJOR ROADS ARE PAVED AND

- THESE ARE SOME OF THE MANY ADVANTAGES THAT CAN BE DERIVED FROM THE USE OF A HIGHLY EFFICIENT AND RELIABLE CONSTRUCTION MATERIAL. THE ADVANTAGES OF CONCRETE ARE:
- STRENGTH AND DURABILITY: CONCRETE IS A STRONG MATERIAL THAT CAN WITHSTAND HEAVY LOADS AND WEAR AND TEAR.
 - FIRE RESISTANCE: CONCRETE IS A NON-FLAMMABLE MATERIAL THAT CAN WITHSTAND HIGH TEMPERATURES.
 - SOUND BARRIER: CONCRETE CAN BE USED TO BUILD SOUND BARRIERS THAT REDUCE NOISE FROM TRAFFIC.
 - EASY TO MAINTAIN: CONCRETE IS A Durable Material That Requires Little Maintenance.
 - VERSATILE: CONCRETE CAN BE USED IN A WIDE RANGE OF APPLICATIONS, FROM BUILDINGS TO INFRASTRUCTURE.
- CONCRETE IS A VERSATILE MATERIAL THAT CAN BE USED IN A WIDE RANGE OF APPLICATIONS. IT IS A Durable Material That Requires Little Maintenance. IT IS A STRONG MATERIAL THAT CAN WITHSTAND HEAVY LOADS AND WEAR AND TEAR. IT IS A NON-FLAMMABLE MATERIAL THAT CAN WITHSTAND HIGH TEMPERATURES. IT CAN BE USED TO BUILD SOUND BARRIERS THAT REDUCE NOISE FROM TRAFFIC. CONCRETE IS A Durable Material That Requires Little Maintenance. IT IS A STRONG MATERIAL THAT CAN WITHSTAND HEAVY LOADS AND WEAR AND TEAR. IT IS A NON-FLAMMABLE MATERIAL THAT CAN WITHSTAND HIGH TEMPERATURES. IT CAN BE USED TO BUILD SOUND BARRIERS THAT REDUCE NOISE FROM TRAFFIC.
- OTHER CONCRETE**
- CONCRETE IS A VERSATILE MATERIAL THAT CAN BE USED IN A WIDE RANGE OF APPLICATIONS. IT IS A Durable Material That Requires Little Maintenance. IT IS A STRONG MATERIAL THAT CAN WITHSTAND HEAVY LOADS AND WEAR AND TEAR. IT IS A NON-FLAMMABLE MATERIAL THAT CAN WITHSTAND HIGH TEMPERATURES. IT CAN BE USED TO BUILD SOUND BARRIERS THAT REDUCE NOISE FROM TRAFFIC.

-



VICINITY MAP
N.T.S.

SHEET INDEX

1. COVER SHEET
2. CRACKING AND EROSION CONTROL

DEVELOPERS STATEMENT:

I, THE DEVELOPER HAVE REVIEWED AND WILL COMPLY WITH ALL OF THE REQUIREMENTS SPECIFIED IN THIS GRADING AND EROSION CONTROL PLAN

Andrew C. Beckett
DATE: 6/9/03

THESE DETAILED PLANS AND SPECIFICATIONS WERE PREPARED UNDER MY DIRECTION, AND SUPERVISION. SAO DETAILED THE CONVEY FOR DETAILED DRAINAGE PLANS AND SPECIFICA TIONS. THE CRITICAL DESIGN ELEMENTS OF THE DRAINAGE PLANS AND SPECIFICATIONS WERE THE DRAINAGE BASIN, SAID DETAILED DRAINAGE PLANS AND SPECIFICATIONS WITH THE PLAN FOR WHICH THE PARTICULAR DRAINAGE FACILITY IS DESIGNED. I ACCEPT RESPONSIBILITY FOR LIABILITY CAUSED BY ANY NEGLECT, ACTS, ERRORS OR OMISSIONS ON MY PART IN PREPARING THE DETAILED DRAINAGE PLANS AND SPECIFICATIONS.

THESE PLANS WERE PREPARED FOR OR ON BEHALF OF URS UNDER THE SUPERVISION OF:

WILLIAM DOUGLAS CHAFFIN © F. 35136
DATE: 1/4/02
William P. Chaffin

COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE COUN- TYPOLAR ASSURES NO RESPONSIBILITY FOR COMPLETION OF THE PROJECT AND THE ACCURACY OF THIS DOCUMENT.

John A. McQuay
JOHN A. MCQUAY, P.E.
COUNTY ENGINEER/DIRECTOR

COUNTY ENGINEER/DIRECTOR: _____
 MY PROPOSED MODIFICATION TO THE APPROVED
 GRADING AND EROSION CONTROL PLAN MUST BE
 SUBMITTED, ALONG WITH SUPPORTING DOCUMENTS,
 TO THE COUNTY ENGINEER FOR APPROVAL PRIOR TO
 ANY WORK RELATED TO THE PROPOSED MODIFICATION.
 TAKING PLACE. APPROVAL FROM THE COUNTY
 ENGINEER SHALL BE ISSUED IF THE APPLICANT
 DEMONSTRATES THAT THE MODIFICATION WILL PROVIDE
 SOIL EROSION CONTROLS EQUIVALENT TO OR
 EXCELLING THOSE OF THE PREVIOUSLY APPROVED
 GRADING AND EROSION CONTROL PLAN.

DEVELOPERS STATEMENT:

I, THE DEVELOPER HAVE REVIEWED AND WILL COMPLY WITH ALL OF THE REQUIREMENTS SPECIFIED IN THIS GRADING AND EROSION CONTROL PLAN

Andrew C. Beckett
DATE: 6/9/03



[illegible]

ENGINEER	DESIGNED BY: DC	DATE: 2-26-03
	DRAWN BY: DC	DATE: 2-26-03
	CHECKED BY: DC	DATE: 2-26-03

48 HOURS BEFORE YOU DIG,
CALL UTILITY LOCATORS
1-800-922-1987
(SEE COVER FOR LIST OF UTILITY CONTACTS)

VARIETY	AMOUNT IN PLS LBS. PER ACRE
EL RENO	3.0
BARTON	2.5
NATIVE	2.0
PASTURA	2.0
WYANDOTT	0.5
LITTLE BLUESTERN	0.5
GRASS	1.0
MORRIS	1.0
WYANDOTT GRASS	1.0
WYANDOTT LOVE GRASS	1.0

LEGEND

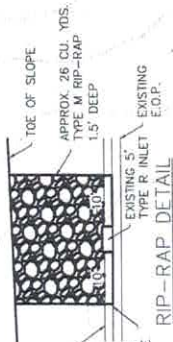
 SILT FENCE
 HAY BALES

SLOPE	INTERVALS IN FEET
0.5%	300'
1.0%	150'
2.0%	75'
3.0%	50'

HAY BALE PLACEMENT



VTC



N.T.S.

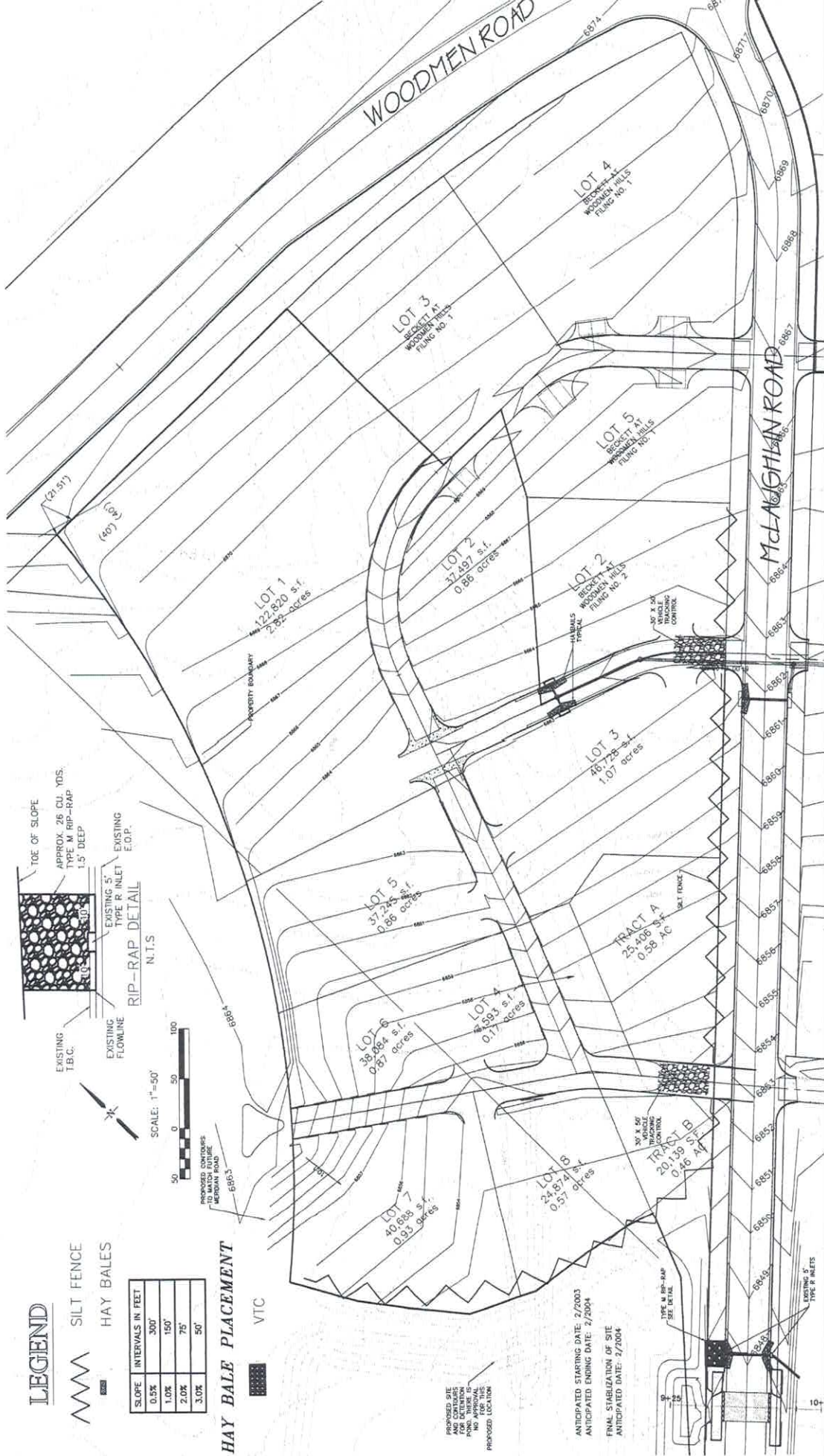
SCALE: 1"=50'



PROPOSED CONTOURS
TO MATCH EXISTING
ADJACENT ROAD

PROPOSED SITE
 FOR DETAIL
 FOR DETAIL
 FOR DETAIL
 FOR DETAIL
 FOR DETAIL

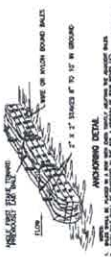
ANTICIPATED STARTING DATE: 2/2003
 ANTICIPATED ENDING DATE: 2/2004
 FINAL STABILIZATION OF SITE
 ANTICIPATED DATE: 2/2004



GRADING NOTES:

- 1) ALL FILL & CUT SLOPES SHALL NOT EXCEED 3H:1V.
- 2) PROPOSED CONTOURS AND SPOT ELEVATIONS ARE TO FINISHED GRADE.
- 3) URS IS NOT RESPONSIBLE FOR THE ACCURACY OF THE EXISTING CONTOURS.
- 4) EROSION CONTROL WILL CONSIST OF HAY BALES PLACED AT THE POSITIONS SHOWN ON THIS PLAN, AND TOP SOIL MIXED WITH GRASS SEED WHICH WILL BE WATERED UNTIL VEGETATION HAS BEEN REESTABLISHED.

- 5) THE EROSION CONTROL MEASURES OUTLINED ON THIS PLAN ARE THE RESPONSIBILITY OF THE DEVELOPER TO MAINTAIN AND REPLACE, REGRADE AND REBUILD AS NECESSARY UNTIL VEGETATION IS REESTABLISHED.
- 6) EROSION CONTROL MEASURES SHALL BE IMPLEMENTED IN A MANNER THAT WILL PROTECT ADJACENT PROPERTIES AND PUBLIC FACILITIES FROM THE ADVERSE EFFECTS OF EROSION. EROSION CONTROL MEASURES SHALL BE A RESULT OF CONSTRUCTION AND LATERAL ACTIVITIES WITHIN THE PROJECT SITE.
- 7) ALL LOTS SHOULD HAVE A GEOTECHNICAL REPORT PREPARED FOR DESIGN OF THE PROPER FOUNDATION REQUIRED FOR THE LOT.
- 8) ADDITIONAL MEASURES MAY BE REQUIRED.



REVISIONS	NO.	DESCRIPTION	DATE

ENGINEER:	DESIGNED BY:	DC	DATE:	2-1-01
DRAWN BY:	DC	DATE:	2-1-01	
CHECKED BY:	DC	DATE:	2-1-01	
4810 WOODMEN HILLS RD. DENVER, CO 80231 1-800-922-1987 CITY OF COLORADO SPRINGS, DEPT. OF UTILITIES GAS, ELECTRIC, WATER AND WASTEWATER				



Markup Summary

dsdlaforce (5)



Subject: Callout
Page Label: 5
Lock: Locked
Author: dsdlaforce
Date: 6/20/2018 2:04:04 PM
Color: ■

Per the plat the proposed stormline appears to be within the 10' drainage easement along lot lines. Unless there are improvements (structures, fencing, etc) that will be impacted then an easement from the adjacent land owner is not required. However, staff recommends the applicant do inform the adjacent land owner of the work being done within the drainage easement of their property.



Subject: Callout
Page Label: 5
Lock: Locked
Author: dsdlaforce
Date: 6/20/2018 2:04:04 PM
Color: ■

Include a proposed drainage map.

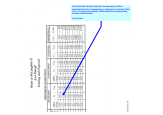
Unresolved. Include the proposed drainage map in the drainage report



Subject: Text Box
Page Label: 6
Lock: Locked
Author: dsdlaforce
Date: 6/20/2018 2:04:11 PM
Color: ■

List the 4 step process (I.7.2) and summarize how each step were considered/incorporated.

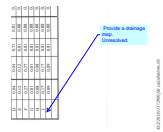
Unresolved. These are not the 4-step listed in ECM Appendix I Section I.7.2 (pg I-21) referenced in the original comment. This appears to be the City's 4 step process.



Subject: Callout
Page Label: 17
Lock: Locked
Author: dsdlaforce
Date: 6/20/2018 2:04:15 PM
Color: ■

Add a footnote identify what the corresponding surface characteristics the corresponding c-values are or include Table 6-6 in the report and identify (circle/mark) the corresponding surface characteristics.

Unresolved.



Subject: Callout
Page Label: 17
Lock: Locked
Author: dsdlaforce
Date: 6/20/2018 2:04:19 PM
Color: ■

Provide a drainage map.
Unresolved.