CANYON VIEW
MASTER DEVELOPMENT DRAINAGE PLAN (MDDP)
and
FINAL DRAINAGE REPORT CANYON VIEW FILING NO. 1

OCTOBER, 1999

Prepared for:

Development Management, Inc.
4065 Sinton Road, Suite 200
Colorado Springs, CO 80907
(719) 593-2600

Prepared by:

Rockwell-Minchow Consultants, Inc.
2928 Straus Lane, Suite 100
Colorado Springs, CO 80907
(719) 475-2575

Project# 97-097

CANYON VIEW
MASTER DEVELOPMENT DRAINAGE PLAN (MDDP)
and
FINAL DRAINAGE REPORT CANYON VIEW FILING NO. 1

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 of Colorado Springs for drainage reports, and said drainage 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.

Kent D. Rockwell, P.E.

COLORADO REGISTERED
KENT D. ROCKWELL
25086
11/15/99
PROFESSIONAL ENGINEER

DEVELOPER'S STATEMENT

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

Development Management, Inc.

BY: ______________________ DATE 11/15/99
Kent Petre

TITLE: President

ADDRESS: 4065 Sinton Road, Suite 200
Colorado Springs, CO 80907

CITY OF COLORADO SPRINGS

Filed in accordance with Section 15-3-906 of the code of the City of Colorado Springs, 1980, as amended.

______________________ Nov 19, 1999
CITY ENGINEER DATE

CANYON VIEW
MASTER DEVELOPMENT DRAINAGE PLAN (MDDP)
and
FINAL DRAINAGE REPORT CANYON VIEW FILING NO. 1OCTOBER, 1999

PURPOSE

The purpose of this MDDP is to identify the existing and proposed runoff patterns, major drainageways and drainage facilities tributary to the Canyon View Development and to recommend drainage facilities and improvements required for the development of the site. Site specific design should be completed with individual drainage plans and reports at the time of platting/development.

SUMMARY OF DATA

The sources of information used in the development of this study are listed below:

1. City of Colorado Springs and El Paso County "Drainage Criteria Manual", October 1987, revised November 1991.

2. Soil Survey for El Paso County, Colorado, U.S. Department of Agriculture, Soil Conservation Service, June 1980.

3. "Flood Insurance Studies for Colorado Springs and El Paso County, Colorado", prepared by the Federal Emergency Management Agency (FEMA), 1985.

4. "Cottonwood Creek Drainage Basin Planning Study" by URS Consultants, Inc., August 1995.

5. "Cottonwood Creek Prudent Line Study" by Ayres & Associates, 1996.

6. "Saddle Rock Drive Filing No. 1 Preliminary and Final Drainage Report, by Rockwell Minchow Consultants, Inc., March, 1999.

GENERAL LOCATION AND DESCRIPTION

The Canyon View Development is located within the northeastern portion of the City of Colorado Springs, El Paso County, Colorado. (see Vicinity Map - Figure 1). The site is within the north half of Section 14, and the south half of Section 11, Township 13 South, Range 66 West of the 6th P.M. The site is bound on the southwest by an existing drainageway, future multi-family development and Rangewood Drive; on the northwest by Dublin Boulevard; and on the northeast by an existing middle school and future high school.

The overall development contains approximately 68 acres, none of which has been developed to date. The Canyon View development will consist of single family residential development. Well-established native grasses exist throughout the proposed development. The northeast portion of the site slopes from southeast to northwest and the southwest portion of the site slopes to the southwest. The extreme southern portion of the site drains to the south toward existing Rangewood Drive. The entire development lies within the Cottonwood Creek Drainage Basin.

SOILS

According to the Soil Survey of El Paso County Area, Colorado, prepared by the U.S. Department of Agriculture Soil Conservation Service, the soils in the Canyon View Development fall under three soil classifications (see Soils Map - Figure 2). The soils underlying the site consist of the Blakeland Series (Soil 8), the Truckton Series (Soil 97) and the Stapleton\Bernal combination Series (Soil 85). The Blakeland series is classified as a Hydrologic Group "A" soil and Truckton is classified as a Hydrologic Group "B" soil. The Stapleton series is a Hydrological Group "B" soil and the Bernal series is a Hydrological Group "D". Hydrologic Group "A" and "B" runoff coefficients were utilized in the runoff calculations.

CLIMATE

This area of El Paso County can be described as the foothills, with total precipitation amounts typical of a semi-arid region. Winters are generally cold and dry, and summers relatively warm and dry. Precipitation ranges from 12 to 14 inches per year, with the majority of this moisture occurring in the spring and summer in the form of rainfall. Thunderstorms are common during the summer months.

FLOODPLAIN STATEMENT

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Numbers #08041C0517 F and #08041C0536 F, dated March 17, 1997, none of the site lies in a designated flood plain.

DRAINAGE CRITERIA

The current City of Colorado Springs/El Paso County Drainage Criteria was utilized in this report. Peak runoff quantities were determined using the Rational Method for both the 5 year and 100 year storms, as required for drainage basins less than 100 acres.

HISTORIC DRAINAGE BASIN DESCRIPTIONS

A brief description of each historic drainage basin for the site is provided in this section of the report. A summary of peak historic runoff for the basins is depicted on the Historic Drainage Plan provided in the appendix. The site has been divided into 3 on-site historical drainage basins and 1 off-site historical basin.

Basin H-1 consists of 21.55 acres just north of Rangewood Drive and west of Saddle Rock Drive. This basin generates runoff rates of 14.0 cubic feet per second (cfs) during the 5 year storm and 33.9 cfs during the 100 year storm. These flows sheet flow toward Rangewood Drive and continue westerly within Rangewood Drive as Bitterroot Drive.

Basin H-2 consists of an additional 25.63 acres to the north and west of Basin H-1. Runoff rates of Q_5 = 16.0 cfs and Q_{100} = 39.5 cfs, generated from this basin, are directed northwesterly toward Tributary 1 of Cottonwood Creek. These flows enter Tributary 1 and then are directed under Dublin Boulevard via an existing twin 132" corrugated metal pipe (CMP).

The area to the south and west of Basin H-2 comprises Basin H-3. This 22.65 acre basin generates runoff rates of 15.3 cfs during the 5 year storm and 37.3 cfs during the 100 year storm. These flows sheet flow to the southwest and enter an existing drainageway along the southwest side of the Canyon View subdivision. Flows within this drainageway are conveyed to the north side of Dublin Boulevard via a 126" CMP.

Off-site Basin OS-1 consists of 11.79 acres of School District 11 property. This area generates runoff rates of 8.5 cfs and 20.6 cfs during the 5 year and 100 year storms, respectively. These flows combine with the flows generated from Basin H-2 and continue northerly under Dublin Boulevard within the existing twin 132" CMP's mentioned above.

DEVELOPED DRAINAGE BASIN DESCRIPTIONS

A brief description of each developed drainage basin for the site is provided in this section of the report. Proposed drainage conditions and facilities are described. A summary of peak developed runoff for the basins is depicted on the Developed Drainage Plan provided in the appendix. All proposed drainage facilities are approximate in size and may vary with actual layout and design.

Developed Basin I consists of 1.88 acres along the west side of Saddle Rock Road. Runoff rates of $Q_5 =$ 5.0 cfs and $Q_{100} =$ 10.0 cfs are generated from this basin. These flows combine with the flows generated from the 18.40 acre Basin OS-1 located directly east of Basin I. Combined flows of $Q_5 =$ 49.6 cfs and Q_{100} = 92.9 cfs are generated from Basins I and OS-1 (Design Point #1). As proposed in the Saddle Rock Drive Filing No. 1 Preliminary and Final Drainage Report, a 20' inlet and 24" reinforced concrete pipe (RCP) is proposed along the east side of Saddle Rock Road to collect a portion of the flows generated from Basin OS-1. This inlet will collect approximately 12.6 cfs during the 5 year storm and 18.1 cfs during the 100 year storm. This pipe will connect to an existing 30" RCP extending northeasterly from the Rangewood Drive and Saddle Rock Drive intersection.

An additional 10' inlet is located along the north side of Rangewood Drive just east of Saddle Rock Road. This inlet collects an additional 11.4 cfs during the 5 year storm and 23.4 cfs during the 100 year storm. The collected flows will be conveyed within an existing system in Rangewood Drive. A series of 30" and 36" RCP's exists within the Rangewood Drive right-of-way. These pipes have a range of normal flow capacity of 88 cfs to 127 cfs. This system also conveys flows from the Sierra Ridge Development located south of Rangewood Drive. According to the Sierra Ridge Master Development Drainage Plan (MDDP), a maximum of 76.1 cfs discharges into the Rangewood Drive system during both the 10 year and 100 year storms. The remaining capacity is available to carry flows from the are tributary to Saddle Rock Drive.

Based on the above information, approximately 24.4 cfs will enter the Rangewood system from the existing 10' inlet on Rangewood and the proposed 20' inlet along Saddle Rock Drive. This means the Rangewood system will convey approximately 100 cfs during the 100 year storm. The remaining flows would be carried northwesterly within Rangewood Drive as street flow. These flows combine with the flows generated from Basin II.

Basin II consists of 5.85 acres and generates runoff rates of Q_5 = 14.0 cfs and $Q_{100} =$ 28.7 cfs. These flows combine with the street flows within Rangewood Drive. The total flows within the north half of Rangewood Drive, as stated in the Saddle Rock Road Drainage Report, are 38.4 cfs during the 5 year storm and 81.9 cfs during the 100 year storm.

Rangewood Drive from Saddle Rock Drive to a point approximately 1,200 feet west of Saddle Rock Drive has a slope of 6%. Based on the 4% limitation for street capacity, Rangewood Drive has a 5 year street capacity of 34 cfs. This is adequate to convey the flows within Rangewood Drive including the flows from Basin II.

An additional 10' inlet exists approximately 1,500 feet northwest of the Saddle Rock Drive and Rangewood Drive intersection. At this point, the slope of Rangewood Drive decreases to 1.9%. Just upstream of this inlet, the depth of flow at the northern curb face of Rangewood Drive is 0.60' during the 5 year storm and 0.78' during the 100 year storm. These depths are based on a street slope of 1.9%.

The existing 10' inlet along Rangewood Drive collects approximately 9.9 cfs during the 5 year storm and 15.3 cfs during the 100 year storm. This reduces the flows to Q_5 = 28.3 cfs and Q_{100} = 66.6 cfs. The flow depths within Rangewood Drive increases to 0.67' during the 5 year storm and 0.92' during the 100 year storm based on a street slope of 0.5%.

These flows reach an existing 13' sump inlet along the north side of Rangewood Drive. In addition, Basin XXIV, consisting of a portion of Rangewood Drive west of this inlet, contributes an additional 4.0 cfs during the 5 year storm and 6.9 cfs during the 100 year storm. Flow depths east of the inlet will remain at approximately 0.68' during the 5 year storm and 0.94' during the 100 year storm. Total ponding depths at the inlet will be 0.68' during the 5 year storm and 1.25' during the 100 year storm.

Approximately 3.43 acres along the south side of Barrel Race Drive comprise Basin III. Flows of 7.4 cfs and 14.6 cfs are generated from this basin during the 5 year and 100 year storms, respectively. Barrel Race Drive at a minimum slope of 0.5% at its intersection with Oasis Butte Drive has a 5 year street capacity of 8.0 cfs per side. Therefore, a 15' inlet will be constructed along the south side of Barrel Race Drive just east of Oasis Butte Drive. This inlet will collect 5.8 cfs during the 5 year storm and 10.2 cfs during the 100 year storm. Runoff rates of Q_5 = 1.6 cfs and Q_{100} = 4.4 cfs will bypass this inlet and enter Basin XIII.

Basin IV consists of the lots along the north and east side of Barrel Race Drive. This 7.17 acre basin generates runoff rates of Q_5 = 17.2 cfs and Q_{100} = 35.1 cfs which reach the intersection of Barrel Race Drive and Oasis Butte Drive. A low point exists along the east side of this tee-intersection. Approximately 20% of the flows generated from Basin IV reach the an inlet at this low point from the north and 80% from the south. Additional flows reach this inlet from Basin V from the north.

Basin V is located along the south side of Medicine Springs Drive. Runoff rates of 4.8 cfs and 9.6 cfs generated during the 5 year and 100 year storms, respectively, flow northwesterly within Medicine Springs Drive. Medicine Springs Drive with a minimum slope of 4 % and a corresponding street capacity of 22.5 cfs per side has adequate capacity to convey these flows to the Barrel Race Drive and Medicine Springs Drive intersection. These flows will turn south into Barrel Race Drive and combine with the flows generated from the northern portion of Basin IV.

A 15' sump inlet will be constructed along the east side of Barrel Race Drive to collect flows from Basins IV and V. Flow rates of 8.4 cfs during the 5 year storm and 17.0 cfs during the 100 year storm will reach this inlet from the north. Additional flows of Q_5 = 13.6 cfs and Q_{100} = 27.7 cfs will reach this inlet from the south. A 30" RCP will convey the collected flows from the sump inlet and the inlet within Basin III northwesterly within Oasis Butte Drive.

Basin VI consists of the area north of Medicine Springs Drive and generates runoff rates of $Q_5 = 4.9$ cfs and $Q_{100} = 9.9$ cfs. These flows continue northwesterly along the north side of Medicine Springs Drive as street flow to the intersection of Medicine Springs Drive and Clark Fork Place. Additional flows generated from Basin VII and VIII will enter the Medicine Springs Drive and Clark Fork Place intersection. Basin VII generates runoff rates of $Q_5 = 6.5$ cfs and $Q_{100} = 13.0$ cfs. Runoff rates of 4.7 cfs and 9.8 cfs are generated from Basin VIII during the 5 year and 100 year storms, respectively. Clark Fork Place at a minimum slope of 4% has the capacity to convey the flows generated from Basins VII and VIII to the Medicine Springs Drive and Clark Fork Place intersection.

The total flows from Basins VI, VII and VIII combine at Design Point #2. The combined flows at this point are 15.5 cfs during the 5 year storm and 31.4 cfs during the 100 year storm. Medicine Springs Drive at a minimum slope of 4% has the capacity to convey these flows.

Additional flows enter Medicine Springs Drive from Basins IX and X at the Medicine Springs Drive and Flat Top Place intersection. Basin IX contributes runoff rates of 5.9 cfs and 11.9 cfs during the 5 year and 100 year storms, respectively. Runoff rates of $Q_5 = 2.7$ cfs and $Q_{100} = 5.5$ cfs are generated from Basin X. The total routed flows from Basins VI, VII, VIII, IX and X reach Design Point #3 at the intersection of Barrel Race Drive and Medicine Springs Drive. The total flows at this point from these 5 basins are 22.5 cfs during the 5 year storm and 45.2 cfs during the 100 year storm. At this point, the street capacity of Medicine Springs Drive is reached; therefore, two 20' inlets will be installed along the northeast side of Medicine Springs Drive just south of Barrel Race Drive.

These inlets will collect 19.0 cfs during the 5 year storm and 31.3 cfs during the 100 year storm. Runoff rates of $Q_5 = 3.5$ cfs and $Q_{100} = 13.9$ cfs bypassing these inlets will turn north in Medicine Springs Drive and enter Basin XVII as street flow.

Basin XI consists of 1.38 acres just west of the Barrel Race Drive and Medicine Springs Drive intersection. Runoff rates of 3.3 cfs and 6.8 cfs generated during the 5 year and 100 year storms, respectively, flow southerly within Barrel Race Drive and enter Basin XIV.

Basin XII consists of the rear portion of future lots along the drainageway located southwest of the Canyon View Development. The runoff rates of $Q_5 = 19.8$ cfs and $Q_{100} = 39.4$ cfs generated from this basin sheet flow off the rear portion of the the proposed lots into the existing drainageway.

The area just southwest of Oasis Butte Drive comprises Basin XIII. This 3.44 acre basin generates flows of 7.4 cfs during the 5 year storm and 14.7 cfs during the 100 year storm. These flows combine with the runoff rates of $Q_5 = 1.6$ cfs and $Q_{100} = 4.4$ cfs bypassing the inlet in Basin III (Inlet 1) and flow northerly within Oasis Butte Drive. The combined flows are 9.0 cfs and 19.1 cfs during the 5 year and 100 year storms, respectively. Oasis Butte Drive has a minimum slope of 1.33% and a corresponding 5 year street capacity of 12.8 cfs per side.

A 20' inlet will be installed along the west side of Oasis Butte Drive just south of Bitterroot Drive to collect a portion of these flows. Approximately 2.9 cfs will bypass Inlet 5 during the 5 year storm and 8.1 cfs during the 100 year storm and enter Basin XXIII.

Basin XIV consists of 7.23 acres along the northeast side of Oasis Butte Drive. The runoff rates of Q_5 = 15.6 cfs and Q_{100} = 30.9 cfs generated from Basin XIV combine with the flows generated from Basin XI. The combined flows of Q_5 = 16.5 cfs and Q_{100} = 33.1 cfs from these two basins reach Design Point #4 as street flow. Oasis Butte Drive has the capacity to convey these flows to the Oasis Butte Drive and Bitterroot Drive intersection. A 20' inlet will be installed at this point to collect a portion of the flows. Runoff rates of 6.5 cfs and 18.1 cfs will bypass this inlet during the 5 year and 100 year storms, respectively, and enter Basin XXIII.

The 4.40 acres along the south and west side of Bitterroot Drive comprise Basin XV. Bitterroot Drive conveys the runoff rates of Q_5 = 10.6 cfs and Q_{100} = 21.3 cfs toward the intersection of Oasis Butte Drive and Bitterroot Drive. Bitterroot Drive at a minimum slope of 4 % and a 5 year storm street capacity of 22.5 cfs has the capacity to convey these flows to the Oasis Butte Drive and Bitterroot Drive intersection. However, a 20' inlet will be installed just south of this intersection to reduce the flows continuing north in Bitterroot Drive into Basin XXIII. Inlet 7 (L = 20') will collect 7.0 cfs during the 5 year storm and 11.7 cfs during the 100 year storm. Runoff rates of Q_5 = 3.6 cfs and Q_{100} = 9.6 cfs will bypass this inlet and enter Basin XXIII.

Basin XVI consists of the 4.97 acres between Barrel Race Drive and Bitterroot Drive. This basin generates runoff rates of 11.6 cfs during the 5 year storm and 23.3 cfs during the 100 year storm. Barrel Race Drive has adequate capacity to convey these flows to the Barrel Race Drive and Bitterroot Drive intersection. However, a 20' inlet (Inlet 9) will be installed just east of this intersection to collect a portion of these flows before they enter Bitterroot Drive.

Inlet 9 (L = 20') will be constructed along the south side of Barrel Race Drive just east of Bitterroot Drive. Only a portion of the flows from Basin XVI will reach this inlet (Q_5 = 9.7 cfs and Q_{100} = 19.4 cfs). This inlet will collect 6.7 cfs during the 5 year storm and 11.8 cfs during the 100 year storm. The remaining flows from Basin XVI will reach Bitterroot Drive and continue northerly as street flow toward Basin XXII.

Basin XVII and XVIII consists of on-site and off-site areas along the northeasterly property line of the Canyon View Development. Runoff rates of Q_5= 10.9 cfs and Q_{100}= 26.9 cfs generated from the 8.47 acre Basin XVII reach the north and east half of Barrel Race Drive. Additional runoff rates of 10.2 cfs during the 5 year storm and 23.7 cfs during the 100 year storm enter Barrel Race Drive from Basin XVIII at the future middle school entrance (Design Point #5). The combined flows from Basins XVII and XVIII are 19.9 cfs during the 5 year storm and 48.2 cfs during the 100 year storm. Additional runoff rates of 3.5 cfs and 13.9 cfs bypassing Inlets 3 and 4 (Design Point #3) will combine with the flows from Basins XVII and XVIII. This results in total street flows of 23.4 cfs and 62.1 cfs reaching Design Point #5. The 5 year street capacity of Barrel Race Drive is just met at Design Point #5; therefore, a 20' inlet will be installed at this location. Inlet 8 will collect 12.3 cfs during the 5 year storm and 21.2 cfs during the 100 year storm. Runoff rates of Q_5= 11.1 cfs and Q_{100}= 40.9 cfs bypass this inlet and enter Basin XX.

Basin XIX consists of 3.24 acres of on-site and off-site development toward the northeast corner of the Canyon View Development. This basin generates runoff rates of 5.5 cfs during the 5 year storm and 12.2 cfs during the 100 year storm. These flows sheet flow into Tributary 1 of Cottonwood Creek. According to the Ayres & Associates Prudent Line Study, the outside curve of Tributary 1 just north of Basin XIX was to receive stabilization to reduce erosion and meandering of the stream bed. This stabilization was done as part of the middle school development.

Basin XX is located along the north side of Barrel Race Drive and consists of 2.04 acres. Runoff rates of $Q_5 = 4.7$ cfs and $Q_{100} = 10.7$ cfs generated from Basin XX combine with the flows bypassing Inlets 8 and 9 plus the flows generated from the south portion of Basin XVI and flow to Design Point #6. The combined flows at this point are 19.5 cfs during the 5 year storm and 60.3 cfs during the 100 year storm. An additional 20' inlet (Inlet 10) will be installed just north of Barrel Race Drive along the east side of Bitterroot Drive to collect a portion of these flows. Flow rates of $Q_5 = 7.6$ cfs and $Q_{100} = 37.7$ cfs will bypass this inlet and reach Inlet 11.

Runoff rates of $Q_5 = 7.4$ cfs and $Q_{100} = 16.8$ cfs are generated from Basin XXI which runs along Team Roper Place. Flows bypassing Inlet 10 combine with these flows and reach Inlet 11. The total flows reaching Inlet 11 are $Q_5 = 16.2$ cfs and $Q_{100} = 57.2$ cfs. Inlet 11 will be a 20' on-grade inlet and will be installed just north of Team Roper Place to collect a portion of these flows. Runoff rates of 6.3 cfs during the 5 year storm and 37.0 cfs during the 100 year storm will bypass this inlet and enter Basin XXII.

Basin XXII generates runoff rates of 6.2 cfs and 12.5 cfs during the 5 year and 100 year storms, respectively. These flows combine with the flows bypassing Inlet 11 resulting in total flows of $Q_5 = 12.5$ cfs and $Q_{100} = 49.5$ cfs reaching the north side of Basin XXII (Inlet 13). A 15' inlet will be constructed on the east side of Bitterroot Drive. Runoff rates of $Q_5 = 5.4$ cfs and $Q_{100} = 34.3$ cfs will bypass this inlet and enter Dublin Boulevard as street flow.

Runoff rates of 1.8 cfs during the 5 year storm and 3.7 cfs during the 100 year storm are generated from Basin XXIII. Additional flows bypassing Inlets 5, 6, and 7 also enter Basin XXIII as street flow. The total flows at the north side of Basin XXIII are 14.8 cfs during the 5 year storm and 39.6 cfs during the 100 year storm. Two on-grade inlets will be constructed along the west side of Bitterroot Drive to collect flows prior to entering Dublin Boulevard. These two inlets will collect a total of 12.4 cfs during the 5 year storm and 24.1 cfs during the 100 year storm, leaving flows of $Q_5 = 2.4$ cfs and $Q_{100} = 15.5$ cfs entering Dublin Boulevard from Basin XXIII. This means the total flows entering Dublin Boulevard from the Canyon View Development will be 7.8 cfs during the 5 year storm and 49.8 cfs during the 100 year storm. This is consistent with the Dublin Boulevard Filing No. 1 Preliminary and Final Drainage Report.

The channel along the southwest side of the Canyon View Place Development will not be considered a "Prudent Line" channel. Instead, this channel will be lined along certain stretches and left natural in others to protect the existing vegetation (See Plans in Appendix of this Report). A preliminary cost estimate for the channel lining has been prepared based on preliminary design plans prepared by Ayres and Associates. The costs of the improvements along this channel are public reimbursable items.

Individual lot drainage is the responsibility of the lot owner/builder. Upstream lots will drain through lower lots into downstream streets via side lot swales. These swales shall be constructed as part of the house construction.

EROSION CONTROL

Erosion control measures will be installed per the approved grading/erosion control plans.

DRAINAGE, BRIDGE AND POND FEES

The entire Canyon View consists of approximately 67.450 acres. At this time, it is anticipated that the entire development will be platted into one large plat. This entire development is within the Cottonwood Creek Drainage Basin. The 1999 Drainage, Bridge and Pond Fees for Canyon View are listed below.

	Acres	$/Acre	Total Fee
Drainage Fees	67.450	$5,673.00	$382,643.85
Add'l Drainage Fees	67.450	$ 709.00	$ 47,822.05
Bridge Fees	67.450	$ 285.00	$ 19,223.25
Add'l Bridge Fees	67.450	$ 280.00	$ 18,886.00
Pond Fees (Land)	67.450	$ 110.00	$ 7,419.50
Pond Fees (Facilities)	67.450	$ 344.00	$ 23,202.80
			$499,197.45

DRAINAGE FACILTIES

(Public Non-Reimbursable)

The following drainage facilities will be required for the entire Canyon View Development.

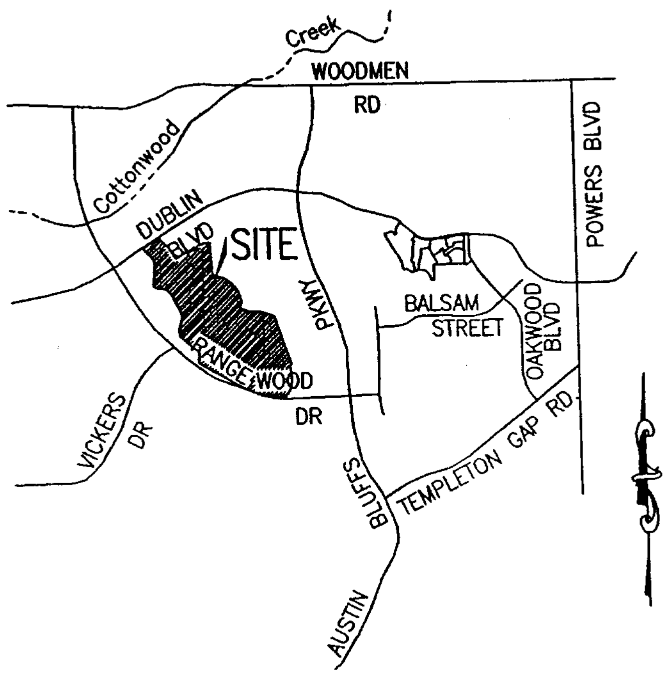
ITEM	QUANTITY		UNIT PRICE	EXTENDED COST
15' D-10-R Inlets	5	Ea.	$4,000.00	$20,000.00
20' D-10-R Inlets	9	Ea.	$5,000.00	$45,000.00
18" RCP	180	L.F.	$22.00	$3,960.00
24" RCP	1815	L.F.	$29.00	$52,635.00
30" RCP	960	L.F.	$40.00	$38,400.00
36" RCP	510	L.F.	$50.00	$25,500.00
Type II Manholes	6	Ea.	$2,000.00	$12,000.00
24" x 45° Bend	4	Ea.	$600.00	$2,400.00
18" x 24" Wye	2	Ea.	$500.00	$1,000.00
18" x 36" Wye	1	Ea.	$750.00	$ 750.00
24" x 30" Wye	2	Ea.	$800.00	$1,600.00
			Sub-Total	$203,245.00
			15% Eng. & Contingency	$30,486.75
			Grand Total	$233,731.75

Public Reimbursable Drainage Facilities

The channel along the western side of Canyon View is a public reimbursable drainage facility. Preliminary design concepts by Ayres and Associates indicate the bottom of the channel will remain natural with rip-rap lining at certain points along the slopes of the channel. It is anticipated that approximately half of the east slope of this channel will need to be lined.

Rip-Rap Lining	2000	C.Y.	$40.00/C.Y	$80,000.00
Grading	1	L.S.	$25,000.00/L.S.	$25,000.00
Reseeding	1	L.S.	$10,000.00/L.S.	$10,000.00
			Sub-Total	$115,000.00
			15% Eng. & Contingency	$ 17,250.00
			Grand Total	$132,250.00

APPENDIX



Vicinity Map

NOT TO SCALE

FIGURE 1

SOILS MAP
FIGURE 2

CANYON VIEW DRAINAGE REPORT

INLET - RANGEWOOD DRIVE & SADDLE ROCK DRIVE

Q5 =	15.9	Q100 =	29.7
SL =	0.06	SO =	0.02

5 YEAR		100 YEAR	
T	14.54	T	18.38
FW	3.19	FW	3.34
L1	35.7	L1	47.2
L2	21.4	L2	28.3
L3	76.5	L3	101.1

Li =	10.00		
5 YR Q =	15.9	100 YR Q	29.7
5 YR Qi =	4.5	100 YR Qi	6.3
5 YR Qfb =	11.4	100 YR Qfb	23.4

ROCKWELL MINCHOW
CONSULTANTS, INC.

TOTAL FLOWS ENTERING RANGEWOOD FROM SADDLE ROCK

$Q_5 = 23.1$ $Q_{100} = 50.7$

THESE FLOWS COMBINE WITH FLOWS FROM UPSTREAM OF SADDLE ROCK

ROUTING FLOWS FROM UPSTREAM

$Q_5 = 11.4$ $Q_{100} = 23.4$

EQ AREA $= \frac{11.4}{4.0(0.75)}$ EQ AREA $= \frac{23.4}{7.0(0.80)}$

$A = 3.80$ ACRES $A = 4.18$ ACRES

ROUTED FLOWS BYPASSING 10' INLET

$Q_5 = 3.80(0.75)(3.4)$ $Q_{100} = 4.18(0.80)(5.8)$

$= 9.7$ $= 19.4$

Q_5 TOTAL STREET FLOW Q_{100}

$= 23.1 + 9.7$ $= 19.4 + 50.7$

$= 32.8$ $= 70.1$

ROUTE STREET FLOWS TO NEXT 10' INLET

EQ AREA (5 YR) $= \frac{32.8}{3.4(0.71)}$ EQ AREA (100 YR) $= \frac{70.1}{5.8(0.79}$

$A_5 = 13.6$ $A_{100} = 15.3$ ACRES

A 10' INLET EXIST ALONG THE NORTH SIDE OF RANGEWOOD APPROXIMATELY 1500' NORTHWEST OF SADDLE ROCK ($S = 1.9\%$)

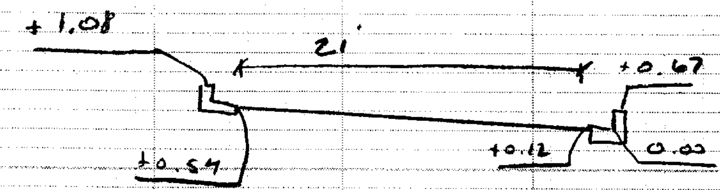
$Q_5 = 38.2$ $Q_{100} = 81.9$

ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT
2928 Straus Lane, Suite #100 Colorado Springs, CO 80907 (719) 475-2575 Fax (719) 475-9223

ROCKWELL MINCHOW CONSULTANTS, INC.

DATE PAGE of

DETERMINE FLOW WIDTH AT THIS POINT (PRIOR TO COLLECTION)



ASSUME D=0.60 @ ℄ 5 YR

A=6.79 P=24.60

$Q = \frac{1.486}{n}(A)\left(\frac{A}{P}\right)^{0.67} S^{1/2}$

$Q = \frac{1.486}{0.016}(6.79)\left(\frac{6.79}{24.60}\right)^{0.67}(0.019)^{1/2}$

Q = 36.7

FOR 100 YR STORM

ASSUME D=0.78 @ ℄

A=11.11 P= 24.99

$Q = \frac{1.486}{0.016}(11.11)\left(\frac{11.11}{24.99}\right)^{0.67}(0.019)^{1/2}$

= 82.6

ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT
2928 Straus Lane, Suite #100 Colorado Springs, CO 80907 (719) 475-2575 Fax (719) 475-9223

INLET - RANGEWOOD DRIVE

Q5 =	38.4	Q100 =	81.9
SL =	0.019	SO =	0.02

5 YEAR		100 YEAR	
T	25.10	T	33.35
FW	1.99	FW	2.09
L1	38.4	L1	53.7
L2	23.1	L2	32.3
L3	82.3	L3	115.1

Li =	10.00		
5 YR Q =	38.4	100 YR Q	81.9
5 YR Qi =	10.0	100 YR Qi	15.2
5 YR Qfb =	28.4	100 YR Qfb	66.7

ROCKWELL MINCHOW
CONSULTANTS, INC.

DATE PAGE of

STREET REACHES $S = 0.5\%$

CHECK SPREAD

ASSUME $D = 0.67$

$A = 8.47'$ $P = 24.77$

$$Q = \frac{1.486}{0.016}(8.47)\left(\frac{8.47}{24.77}\right)^{0.67}(0.005)^{1/2}$$

$= 27.1$

ASSUME $D_{100} = 0.92$

$A = 14.47$ $P = 25.27$

$$Q = \frac{1.486}{0.016}(14.47)\left(\frac{14.47}{25.27}\right)^{0.67}(0.005)^{1/2}$$

65.4

ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT
2928 Straus Lane, Suite #100 Colorado Springs, CO 80907 (719) 475-2575 Fax (719) 475-9223

ROCKWELL MINCHOW CONSULTANTS, INC.

DATE PAGE of

SUMP INLET RANGEWOOD @ VICKERS $L=20'$

$Q_5 = 28.3$ FROM EAST $Q_{100} = 66.6$ FROM EAST

$Q_5 = 4.0$ FROM WEST (BASIN XXIV) $Q_{100} = 6.9$ FROM WEST (BASIN XXIV)

APPROACH FLOWS

$$28.3 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$$

$$d = 0.68$$

$$66.6 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2} d^{8/3}$$

$$d = 0.94$$

TOTAL FLOWS $L=25'$

$$32.3 = 1.7(13 + 1.8(3))(d_{max} + 0.33)^{1.85}$$

$$d_{max} = 0.68$$

$$73.5 = 1.7(13 + 1.8(3))(d_{max} + 0.33)^{1.85}$$

$$d_{max} = 1.26$$

ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT
2928 Straus Lane, Suite #100 Colorado Springs, CO 80907 (719) 475-2575 Fax (719) 475-9223

CANYON VIEW DRAINGE REPORT

INLET 1 Basin III

Q5 =	7.4	Q100 =	14.6
SL =	0.005	SO =	0.02

5 YEAR		100 YEAR	
T	17.39	T	22.44
FW	0.95	FW	1.00
L1	12.8	L1	17.3
L2	7.7	L2	10.4
L3	27.3	L3	37.0

Li =	15.00		
5 YR Q =	7.4	100 YR Q	14.6
5 YR Qi =	5.8	100 YR Qi	10.2
5 YR Qfb =	1.6	100 YR Qfb	4.4

ROCKWELL MINCHOW
CONSULTANTS, INC.

BASIN III INLET 1

$Q_5 = 7.4$ $Q_{100} = 14.6$

$Q_i = 5.8$ $Q_i = 10.2$

$Q_{FB} = 1.6$ $Q_{FB} = 4.4$

THESE FLOWS ENTER BASIN XIII AS STREET FLOWS

BASIN IV

$Q_5 = 17.2$ $Q_{100} = 35.1$

APPROXIMATELY 21% APPROACHES PROPOSED INLET FROM THE NORTH & 79% FROM THE SOUTH

BASIN V

$Q_5 = 4.8$ $Q_{100} = 9.6$

NORTH

$Q_5 = (17.2)(0.21) + 4.8 = 8.4$

$Q_{100} = (35.1)(0.21) + 9.6 = 17.0$

SOUTH

$Q_5 = (17.2)(0.79) = 13.6$

$Q_{100} = (35.1)(0.79) = 27.7$

ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT
2928 Straus Lane, Suite #100 Colorado Springs, CO 80907 (719) 475-2575 Fax (719) 475-9223

ROCKWELL MINCHOW
CONSULTANTS, INC.

BASIN IV INLET 2

APPROACH FLOWS

WORSE CASE $Q_5 = 13.6$

$$Q = 0.56\left(\frac{1}{n\,S_x}\right)(S_L)^{1/2}\,d^{8/3}$$

$$13.6 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2}\,d^{8/3}$$

$d = 0.52$

SLOPE @ APPROACH MUST EQUAL 0.243%

$Q_{100} = 27.7$

$$27.7 = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2}\,d^{8/3}$$

$d = 0.68$ ∴ OK

TOTAL FLOWS

$$Q = 1.7(L_i + 1.8(w))(d_{max} + a)^{1.85}$$

TRY $L = 15'$

$$22.0 = 1.7(15 + 1.8(3))(d_{max} + 0.33)^{1.85}$$

$d = 0.45$

5 YR

$$44.7 = 1.7(15 + 1.8(3))(d_{max} + 0.33)^{1.85}$$

$d = 0.82$

100 YR

INLET 3 Design Point #3

Q5 =	22.5	Q100 =	45.2
SL =	0.04	SO =	0.02

5 YEAR		100 YEAR	
T	17.87	T	23.21
FW	2.71	FW	2.84
L1	37.3	L1	50.8
L2	22.4	L2	30.5
L3	79.9	L3	108.9

Li =	20.00		
5 YR Q =	22.5	100 YR Q	45.2
5 YR Qi =	12.1	100 YR Qi	17.8
5 YR Qfb =	10.4	100 YR Qfb	27.4

INLET 4 Design Point #3

Q5 =	10.4	Q100 =	27.4
SL =	0.04	SO =	0.02

5 YEAR		100 YEAR	
T	13.38	T	19.24
FW	2.56	FW	2.75
L1	26.4	L1	40.7
L2	15.9	L2	24.4
L3	56.6	L3	87.2

Li =	20.00		
5 YR Q =	10.4	100 YR Q	27.4
5 YR Qi =	6.9	100 YR Qi	13.5
5 YR Qfb =	3.5	100 YR Qfb	13.9

CANYON VIEW DRAINGE REPORT

INLET 5 Basin XIII

Q5 =	9	Q100 =	19.1
SL =	0.04	SO =	0.02

5 YEAR		100 YEAR	
T	12.67	T	16.80
FW	2.54	FW	2.68
L1	24.7	L1	34.6
L2	14.9	L2	20.8
L3	53.0	L3	74.2

Li =	20.00		
5 YR Q =	9	100 YR Q	19.1
5 YR Qi =	6.1	100 YR Qi	11.0
5 YR Qfb =	2.9	100 YR Qfb	8.1

CANYON VIEW DRAINGE REPORT

INLET 6 XIV

Q5 =	16.5	Q100 =	33.1
SL =	0.04	SO =	0.02

5 YEAR		100 YEAR	
T	15.91	T	20.65
FW	2.65	FW	2.78
L1	32.5	L1	44.2
L2	19.5	L2	26.6
L3	69.5	L3	94.8

Li =	20.00		
5 YR Q =	16.5	100 YR Q	33.1
5 YR Qi =	10.0	100 YR Qi	15.0
5 YR Qfb =	6.5	100 YR Qfb	18.1

CANYON VIEW DRAINGE REPORT

INLET 7 XV

Q5 =	10.6	Q100 =	21.3
SL =	0.04	SO =	0.02

5 YEAR		100 YEAR	
T	13.47	T	17.50
FW	2.57	FW	2.70
L1	26.6	L1	36.4
L2	16.0	L2	21.8
L3	57.1	L3	77.9

Li =	20.00		
5 YR Q =	10.6	100 YR Q	21.3
5 YR Qi =	7.0	100 YR Qi	11.7
5 YR Qfb =	3.6	100 YR Qfb	9.6

ROCKWELL MINCHOW
CONSULTANTS, INC.

DATE PAGE of

BASIN XVI

$Q_5 = 11.6$ $Q_{100} = 23.3$

APPROXIMATELY 4.14 ACRES OF 4.97 ACRES DRAINS TO STREET A

APPROXIMATELY 0.83 ACRES OF 4.97 ACRES DRAINS TO STREET F

STREET A $Q_5 = \frac{4.14}{4.97}(11.6)$ $Q_{100} = \frac{4.14}{4.97}(23.3)$

$Q_5 = 9.7$ $Q_{100} = 19.4$

STREET F $Q_5 = 1.9$ $Q_{100} = 3.9$

INSTALL INLET ALONG STREET A JUST EAST OF STREET F

$S = 3\%$ $L = 20'$

INLET 9 $Q_5 = 9.7$ $Q_{100} = 19.4$

$Q_{\_} = \underline{6.7}$ $Q_{\_} = \underline{11.8}$

$Q_{CB} = 3.0$ $Q_{FB} = 7.6$

ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT
2928 Straus Lane, Suite #100 Colorado Springs, CO 80907 (719) 475-2575 Fax (719) 475-9223

INLET 9

Q5 =	9.7	Q100 =	19.4
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	13.75	T	17.84
FW	2.23	FW	2.35
L1	23.6	L1	32.2
L2	14.2	L2	19.3
L3	50.6	L3	69.0

Li =	20.00		
5 YR Q =	9.7	100 YR Q	19.4
5 YR Qi =	6.7	100 YR Qi	11.8
5 YR Qfb =	3.0	100 YR Qfb	7.6

INLET 8 DESIGN PT #5

Q5 =	23.4	Q100 =	62.1
SL =	0.04	SO =	0.02

5 YEAR		100 YEAR	
T	18.13	T	26.15
FW	2.72	FW	2.91
L1	37.9	L1	58.5
L2	22.8	L2	35.1
L3	81.3	L3	125.3

Li =	20.00		
5 YR Q =	23.4	100 YR Q	62.1
5 YR Qi =	12.3	100 YR Qi	21.2
5 YR Qfb =	11.1	100 YR Qfb	40.9

ROCKWELL MINCHOW
CONSULTANTS, INC.

DATE PAGE of

FLOWS AT DESIGN PT #6

FLOWS BYPASSING INLETS 8 & 9 + FLOWS FROM SOUTHWEST PORTION OF BASIN XVI PLUS 75% OF FLOWS FROM BASIN XX

$Q_5 = 11.1 + 3.0 + 1.9 + 0.75(4.7) = 19.5$

$Q_{100} = 40.9 + 7.6 + 3.9 + 0.75(10.7) = 60.3$

FLOWS AT INLET (11)

$Q_5 = 7.6 + 1.2 + 7.4 = 16.2$

$Q_{100} = 37.7 + 2.7 + 16.8 = 57.2$

ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT
2928 Straus Lane, Suite #100 Colorado Springs, CO 80907 (719) 475-2575 Fax (719) 475-9223

INLET 10

Q5 =	19.5	Q100 =	60.3
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	17.87	T	27.29
FW	2.35	FW	2.54
L1	32.3	L1	53.3
L2	19.4	L2	32.0
L3	69.2	L3	114.2

Li =	20.00		
5 YR Q =	19.5	100 YR Q	60.3
5 YR Qi =	11.9	100 YR Qi	22.6
5 YR Qfb =	7.6	100 YR Qfb	37.7

ROCKWELL MINCHOW CONSULTANTS, INC.

DATE PAGE of

BASIN XXI

$Q_5 = 7.4$	$Q_{100} = 16.8$
+ 8.8	40.5
16.2	57.3

INSTALL 20' INLET (INLET (17)) JUST DOWNSTREAM OF STREET F & STREET G INTERSECTION

L=20' S = 4%

$Q_i = 9.9$	$Q_i = 20.3$
$Q_5 = 6.3$	$Q_{100} = 37.0$

FLOWS ENTER BASIN XXIII

ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT
2928 Straus Lane, Suite #100 Colorado Springs, CO 80907 (719) 475-2575 Fax (719) 475-9223

INLET 11

Q5 =	16.2	Q100 =	57.3
SL =	0.04	SO =	0.02

5 YEAR		100 YEAR	
T	15.80	T	25.37
FW	2.65	FW	2.89
L1	32.2	L1	56.4
L2	19.3	L2	33.9
L3	69.0	L3	120.9

Li =	20.00		
5 YR Q =	16.2	100 YR Q	57.3
5 YR Qi =	9.9	100 YR Qi	20.3
5 YR Qfb =	6.3	100 YR Qfb	37.0

ROCKWELL MINCHOW
CONSULTANTS, INC.

DATE PAGE of

5 YR ARTERIAL STREET CAPACITY $= 171.7(S)^{1/2}$

$= 171.7(0.01)^{1/2}$

$= 17.2$ cfs / SIDE

SUMP INLET IS LOCATED 500' EAST OF CANYON VIEW DEVELOPMENT ENTRANCE.

APPROACH FLOWS SHOULD BE LIMITED TO

$$Q = 0.56\left(\frac{1}{0.016(0.02)}\right)(0.002)^{1/2}(0.5)^{8/3}$$

$Q = 12.3$ DURING THE 5 YR STORM

IN THE DUBLIN BOULEVARD FILING NO. 1 DRAINAGE REPORT BASIN VII CONTRIBUTES $Q_5 = 4.5$ cfs AND $Q_{100} = 8.1$ cfs TO THIS SAME LOW PT FROM THE WEST. THEREFORE, 5 YR STORM FLOWS EXITING THE CANYON VIEW DEVELOPMENT SHOULD BE LIMITED TO 7.8 cfs (12.3 - 4.5).

STREET SLOPE = 3%

BASIN XXIII

	$Q_5 = 1.8$	$Q_{100} = 3.7$
+ INLET (5) FLOWBY	2.9	8.2
INLET (6) FLOWBY	6.5	18.1
INLET (7) FLOWBY	3.6	9.6
	14.8	39.6

ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT
2928 Straus Lane, Suite #100 Colorado Springs, CO 80907 (719) 475-2575 Fax (719) 475-9223

ROCKWELL MINCHOW
CONSULTANTS, INC.

DATE PAGE of

BASIN XXII

$Q_5 = 6.2$ $Q_{100} = 12.5$

	Q_5	Q_{100}
	6.2	12.5
Flowby Inlet (11)	6.3	37.0
	12.5	49.5

TOTAL FLOWS ENTERING OVERLIN BOULEVARD

$Q_5 = 2.4 + 5.4 = 7.8$

$Q_{100} = 15.5 + 34.3 = 49.8$

ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT
2928 Straus Lane, Suite #100 Colorado Springs, CO 80907 (719) 475-2575 Fax (719) 475-9223

INLET 12

Q5 =	14.8	Q100 =	39.6
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	16.12	T	23.31
FW	2.30	FW	2.46
L1	28.6	L1	44.2
L2	17.1	L2	26.6
L3	61.2	L3	94.8

Li =	15.00		
5 YR Q =	14.8	100 YR Q	39.6
5 YR Qi =	7.8	100 YR Qi	13.4
5 YR Qfb =	7.0	100 YR Qfb	26.2

CANYON VIEW DRAINAGE REPORT

INLET 12A

Q5 =	7	Q100 =	26.2
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	12.17	T	19.97
FW	2.18	FW	2.39
L1	20.4	L1	36.8
L2	12.3	L2	22.1
L3	43.7	L3	78.9

Li =	15.00		
5 YR Q =	7	100 YR Q	26.2
5 YR Qi =	4.6	100 YR Qi	10.7
5 YR Qfb =	2.4	100 YR Qfb	15.5

INLET 13

Q5 =	12.5	Q100 =	49.5
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	15.13	T	25.34
FW	2.27	FW	2.50
L1	26.5	L1	48.8
L2	15.9	L2	29.3
L3	56.7	L3	104.6

Li =	15.00		
5 YR Q =	12.5	100 YR Q	49.5
5 YR Qi =	7.1	100 YR Qi	15.2
5 YR Qfb =	5.4	100 YR Qfb	34.3

H_ rology

Location: H-1
Area: 21.55 Ac.
Soil or Land Use: ____

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
PASTURE	0.25	0.35	

Composite: C5 0.25 C100 0.35 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	1000	7.2%		26.2

T_c Total: 26.2

Intensity, I (inches/hr) from Fig 5-1

I5: 2.6 in/hr I100 4.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 14.0 cfs Q100: 33.9 cfs

Hydrology

Location: H-2
Area: 25.63 Ac.
Soil or Land Use: ____

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
PASTURE	0.25	0.35	

Composite: C5 0.25 C100 0.35 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	1000	8.2%		25.1
SWALE	1200	5.7%	10	2.0

T_c Total: 27.1

Intensity, I (inches/hr) from Fig 5-1

I5: 2.5 in/hr I100 4.4 in/hr

Peak Flow: Q = CIA in cfs

Q5 16.0 cfs Q100: 39.5 cfs

Hydrology

Location: H-3
Area: 22.65 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
PASTURE	0.25	0.35	

Composite: C5 0.25 C100 0.35 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	1000	10%		23.5

T_c Total: 23.5

Intensity, I (inches/hr) from Fig 5-1

I5: 2.7 in/hr   I100 4.7 in/hr

Peak Flow: Q = CIA in cfs

Q5 15.3 cfs   Q100: 37.3 cfs

Hydrology

Location: OS-1
Area: 11.79 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
PASTURE	0.25	0.35	

Composite: C5 0.25 C100 0.35 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	700	8.6%		20.7

T_c Total: 20.7

Intensity, I (inches/hr) from Fig 5-1

I5: 2.9 in/hr   I100 5.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 8.5 cfs   Q100: 20.6 cfs

Hydrology

Location: I

Area: 1.88 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	130	4.6%		6.4
STREET	350	4%	4.0	1.5

T_c Total: 7.9

Intensity, I (inches/hr) from Fig 5-1

I5: 4.4 in/hr I100 7.6 in/hr

Peak Flow: Q = CIA in cfs

Q5 5.0 cfs Q100: 10.0 cfs

Hydrology

Location: II

Area: 5.85 Ac.

Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	10.7%		5.2
STREET	1250	4.8%	4.4	4.7

T_c Total: 9.9

Intensity, I (inches/hr) from Fig 5-1

I5: 4.0 in/hr I100 7.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 14.0 cfs Q100: 28.7 cfs

Hydrology

Location: III
Area: 3.43 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	4.0%		7.2
STREET	1350	3.4%	3.7	6.1

T_c Total: 13.3

Intensity, I (inches/hr) from Fig 5-1

I5: 3.6 in/hr I100 6.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 7.4 cfs Q100: 14.6 cfs

Hydrology

Location: IV
Area: 7.17 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	200	12%		5.8
STREET	900	3.4%	3.7	4.1

T_c Total: 9.9

Intensity, I (inches/hr) from Fig 5-1

I5: 4.0 in/hr I100 7.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 17.2 cfs Q100: 35.1 cfs

Hydrology

Location: V
Area: 1.90 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	50	3%		4.6
STREET	1000	4.2%	4.1	4.1

T_c Total: 8.7

Intensity, I (inches/hr) from Fig 5-1

I5: 4.2 in/hr I100 7.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 4.8 cfs Q100: 9.6 cfs

Hydrology

Location: VI
Area: 2.00 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	200	5%		7.8
STREET	500	4.2	4.1	2.0

T_c Total: 9.8

Intensity, I (inches/hr) from Fig 5-1

I5: 4.1 in/hr I100 7.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 4.9 cfs Q100: 9.9 cfs

Hydrology

Location: VII
Area: 2.50 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/3 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	4%		5.9
STREET	600	4.7%	4.4	2.3

T_c Total: 8.2

Intensity, I (inches/hr) from Fig 5-1

I5: 4.3 in/hr I100 7.4 in/hr

Peak Flow: Q = CIA in cfs

Q5 6.5 cfs Q100: 13.0 cfs

Hydrology

Location: VIII
Area: 1.82 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/3 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	3%		6.5
STREET	450	4.9%	4.5	1.7

T_c Total: 8.2

Intensity, I (inches/hr) from Fig 5-1

I5: 4.3 in/hr I100 7.7 in/hr

Peak Flow: Q = CIA in cfs

Q5 4.7 cfs Q100: 9.8 cfs

Hydrology

Location: IX
Area: 2.36 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	200	6%		7.3
STREET	350	4%	4.0	1.5

T_c Total: 8.8

Intensity, I (inches/hr) from Fig 5-1

I5: 4.2 in/hr I100 7.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 5.9 cfs Q100: 11.9 cfs

Hydrology

Location: X
Area: 0.95 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	50	3%		4.6
STREET	450	4%	4.0	1.9

T_c Total: 6.5

Intensity, I (inches/hr) from Fig 5-1

I5: 4.8 in/hr I100 8.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 2.7 cfs Q100: 5.5 cfs

Hydrology

Location: XI
Area: 1.38 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	4%		7.2
STREET	500	2.4%	3.0	2.8

T_c Total: 10.0

Intensity, I (inches/hr) from Fig 5-1

I5: 4.0 in/hr I100 7.0 in/hr

Peak Flow: Q = CIA in cfs

Q5 3.3 cfs Q100: 6.8 cfs

Hydrology

Location: XII
Area: 6.86 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	200	10%		6.2

T_c Total: 6.2

Intensity, I (inches/hr) from Fig 5-1

I5: 4.8 in/hr I100 8.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 19.8 cfs Q100: 39.4 cfs

Hydrology

Location: XIII
Area: 3.44 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/3 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	100	3%		6.5
STREET	1600	3.6%	3.7	7.2

T_c Total: 13.7

Intensity, I (inches/hr) from Fig 5-1

I5: 3.6 in/hr I100 6.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 7.4 cfs Q100: 14.7 cfs

Hydrology

Location: XIV
Area: 7.23 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/3 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	200	8.5%		6.5
STREET	1580	3.6%	3.7	7.1

T_c Total: 13.6

Intensity, I (inches/hr) from Fig 5-1

I5: 3.6 in/hr I100 6.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 15.6 cfs Q100: 30.9 cfs

Hydrology

Location: XV
Area: 4.40 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/3 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	4%		7.2
STREET	950	5.7%	4.7	3.4

T_c Total: 10.6

Intensity, I (inches/hr) from Fig 5-1

I5: 4.0 in/hr I100 6.9 in/hr

Peak Flow: Q = CIA in cfs

Q5 10.6 cfs Q100: 21.3 cfs

Hydrology

Location: XVI
Area: 4.97 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/3 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	150	3%		8.0
STREET	850	3.5%	3.8	3.7

T_c Total: 11.7

Intensity, I (inches/hr) from Fig 5-1

I5: 3.9 in/hr I100 6.7 in/hr

Peak Flow: Q = CIA in cfs

Q5 11.6 cfs Q100: 23.3 cfs

Hydrology

Location: XVII
Area: 8.47 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area	Area
1/3 Ac Res	0.60	0.70	42%	3.57
Ball Fields	0.30	0.55	58%	4.90

Composite: C5 0.43 C100 0.61 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	300	5.3%		15.9
Street	1050	6.0%	5.0	3.5

T_c Total: 19.4

Intensity, I (inches/hr) from Fig 5-1

I5: 3.0 in/hr I100 5.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 10.9 cfs Q100: 26.9 cfs

Hydrology

Location: XVIII
Area: 7.25 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area	Area
Parking	0.90	0.90	36%	2.62
Ball Fields	0.30	0.55	64%	4.63

Composite: C5 0.52 C100 0.68 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	300	2%		21.9
Street	200	2%	2.9	1.2

T_c Total: 23.1

Intensity, I (inches/hr) from Fig 5-1

I5: 2.7 in/hr I100 4.8 in/hr

Peak Flow: Q = CIA in cfs

Q5 10.2 cfs Q100: 23.7 cfs

Hydrology

Location: XIX

Area: 3.24 Ac.

Soil or Land Use: ______

Runoff Coefficient, C:

Area Zone	C5	C100	%Area	Area
1/8 Ac Res	0.60	0.70	55%	1.78
Ball Fields	0.30	0.55	40%	1.29
Tennis Courts	0.90	0.90	5%	0.17

Composite: C5 0.50 C100 0.65 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	300	6%		15.2

T_c Total: 15.2

Intensity, I (inches/hr) from Fig 5-1

I5: 3.4 in/hr I100 5.8 in/hr

Peak Flow: Q = CIA in cfs

Q5 5.5 cfs Q100: 12.2 cfs

Hydrology

Location: XX

Area: 2.04 Ac.

Soil or Land Use: ______

Runoff Coefficient, C:

Area Zone	C5	C100	%Area	Area
1/8 Ac Res	0.60	0.70	60%	1.23
Ball Fields	0.30	0.55	40%	0.80

Composite: C5 0.48 C100 0.64 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	50	3%		4.6
Street	500	4%	4.0	2.1

T_c Total: 6.7

Intensity, I (inches/hr) from Fig 5-1

I5: 4.8 in/hr I100 8.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 4.7 cfs Q100: 10.7 cfs

Hydrology

Location: XXI
Area: 3.80 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area	Area
1/8 Ac Res	0.60	0.70	58%	2.22
Ball Fields	0.30	0.55	37%	1.40
Tennis Courts	0.90	0.90	5%	0.18

Composite: C5 0.50 C100 0.65 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	300	6%		9.0
Street	350	2.3%	3.0	1.9

T_c Total: 10.9

Intensity, I (inches/hr) from Fig 5-1

I5: 3.9 in/hr I100 6.8 in/hr

Peak Flow: Q = CIA in cfs

Q5 7.4 cfs Q100: 16.8 cfs

Hydrology

Location: XXII
Area: 2.35 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/8 Ac Res	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	130	4.6%		6.4
Street	350	4.6%	4.3	1.4

T_c Total: 7.8

Intensity, I (inches/hr) from Fig 5-1

I5: 4.4 in/hr I100 7.6 in/hr

Peak Flow: Q = CIA in cfs

Q5 6.2 cfs Q100: 12.5 cfs

Hydrology

Location: XXIII
Area: 0.64 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area
1/3 ac. R?	0.60	0.70	

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Overland	60	3%		5.0
Street	300	4.6%	4.3	1.2

T_c Total: 6.2

Intensity, I (inches/hr) from Fig 5-1

I5: 4.8 in/hr I100 8.2 in/hr

Peak Flow: Q = CIA in cfs

Q5 1.8 cfs Q100: 3.7 cfs

Hydrology

Location:
Area: Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area

Composite: C5 C100 100%

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c

T_c Total:

Intensity, I (inches/hr) from Fig 5-1

I5: in/hr I100 in/hr

Peak Flow: Q = CIA in cfs

Q5 cfs Q100: cfs

Hydrology

Location: OS-1
Area: 18.40 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	C5	C100	%Area

Composite: C5 0.73 C100 0.80 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
OVERLAND	225	4.5		14.5
STREET	250	4%	4.0	1.0

T_c Total: 15.5

Intensity, I (inches/hr) from Fig 5-1

I5: 3.4 in/hr I100 5.8 in/hr

Peak Flow: Q = CIA in cfs

Q5 45.7 cfs Q100: 85.4 cfs

Hydrology

Location: DP #1
Area: 20.28 Ac.
Soil or Land Use:

Runoff Coefficient, C:

Area Zone	Area	C5	C100	%Area
OS-1	18.40	0.73	0.80	91%
I	1.88	0.60	0.70	9%
	20.28			

Composite: C5 0.72 C100 0.79 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c

T_c Total: 15.5

Intensity, I (inches/hr) from Fig 5-1

I5: 3.4 in/hr I100 5.8 in/hr

Peak Flow: Q = CIA in cfs

Q5 49.6 cfs Q100: 92.9 cfs

Hydrology

Location: DP # 2

Area: ______ Ac.

Soil or Land Use: ______

Runoff Coefficient, C:

Area Zone	Area	C5	C100	%Area
VI	2.00			
VII	2.50			
VIII	1.82			
	6.32			

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Use Basin VI				

T_c Total: 9.8

Intensity, I (inches/hr) from Fig 5-1

I5: 4.1 in/hr I100 7.1 in/hr

Peak Flow: Q = CIA in cfs

Q5 15.5 cfs Q100: 31.4 cfs

Hydrology

Location: DP #3

Area: ______ Ac.

Soil or Land Use: ______

Runoff Coefficient, C:

Area Zone		C5	C100	%Area
DP #2	6.32			
IX	2.36			
X	0.95			
	9.63			

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
Basin VI				9.8
Street	500	4%	4.0	2.1

T_c Total: 11.9

Intensity, I (inches/hr) from Fig 5-1

I5: 3.9 in/hr I100 6.7 in/hr

Peak Flow: Q = CIA in cfs

Q5 22.5 cfs Q100: 45.2 cfs

Hydrology

Location: DESIGN POINT #4
Area: ______ Ac.
Soil or Land Use: ______

Runoff Coefficient, C:

Area Zone	AREA	C5	C100	%Area
XI	1.38			
XIV	7.23			
	8.61			

Composite: C5 0.60 C100 0.70 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
BASIN XI				10.0
STREET FLOW	1650	3.6%	3.7	7.4

T_c Total: 17.4

Intensity, I (inches/hr) from Fig 5-1

I5: 3.2 in/hr I100 5.5 in/hr

Peak Flow: Q = CIA in cfs

Q5 16.5 cfs Q100: 33.1 cfs

Hydrology

Location: DESIGN POINT #5
Area: ______ Ac.
Soil or Land Use: ______

Runoff Coefficient, C:

Area Zone	AREA	C5	C100	%Area
XVII	8.47	0.43	0.61	54%
XVIII	7.25	0.52	0.68	46%
	15.72			

Composite: C5 0.47 C100 0.64 100%

Time of Concentration: T_c in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c
USE BASIN XVIII				23.1

T_c Total: 23.1

Intensity, I (inches/hr) from Fig 5-1

I5: 2.7 in/hr I100 4.8 in/hr

Peak Flow: Q = CIA in cfs

Q5 19.9 cfs Q100: 48.2 cfs

Hydrology

Location: ____________________

Area: ____________________ Ac.

Soil or Land Use: ____________________

Runoff Coefficient, C:

Area Zone	C5	C100	%Area

Composite: C5 ______ C100 ______ 100% ______

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c

T_c Total: ____________

Intensity, I (inches/hr) from Fig 5-1

I5: ______ in/hr   I100 ______ in/hr

Peak Flow: Q = CIA in cfs

Q5 ______ cfs   Q100: ______ cfs

Hydrology

Location: ____________________

Area: ____________________ Ac.

Soil or Land Use: ____________________

Runoff Coefficient, C:

Area Zone	C5	C100	%Area

Composite: C5 ______ C100 ______ 100% ______

Time of Concentration: T_c, in minutes:

Travel Type	L(ft)	s%	v(fps)	T_c

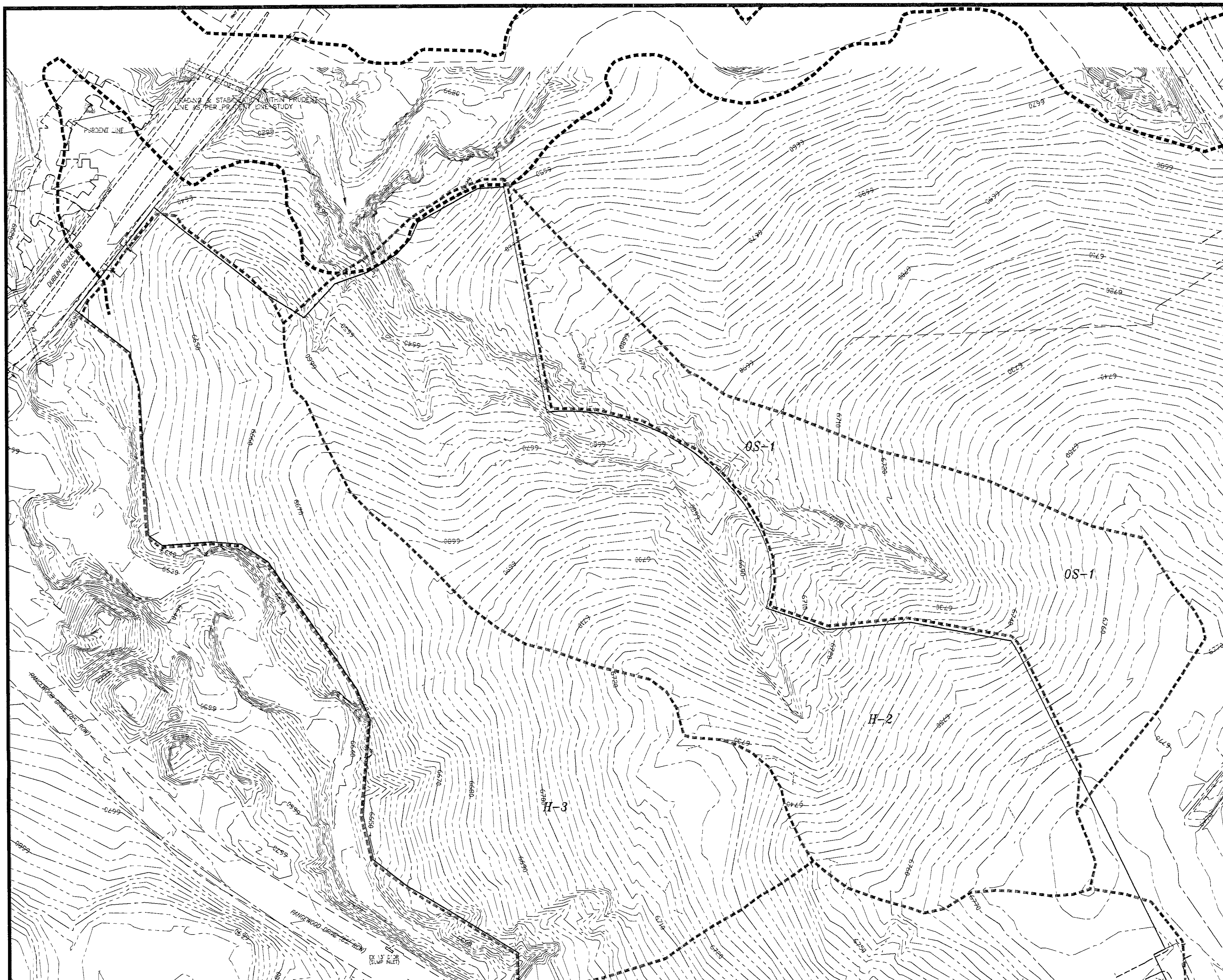
T_c Total: ____________

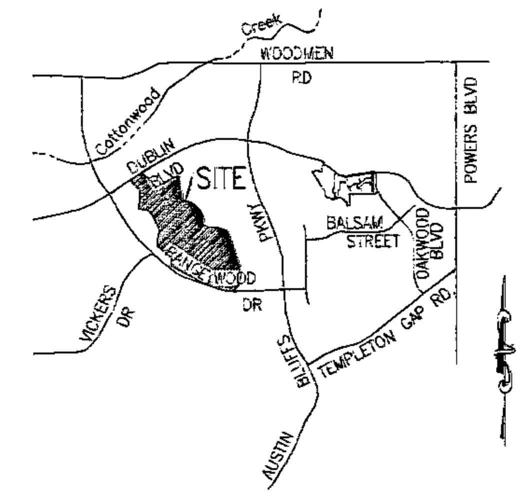
Intensity, I (inches/hr) from Fig 5-1

I5: ______ in/hr   I100 ______ in/hr

Peak Flow: Q = CIA in cfs

Q5 ______ cfs   Q100: ______ cfs





Vicinity Map

NOT TO SCALE

LEGEND

6100 EXISTING CONTOURS

BASIN BOUNDARIES

H–1 BASIN DESIGNATOR

DIRECTION OF FLOW

HISTORIC DRAINAGE BASIN TABLE

BASIN	AREA (Ac)	Q_5 cfs	Q_{100} cfs
CS-1	11.79	8.5	20.6
H-1	21.55	14.0	33.9
H-2	25.63	16.0	39.5
H-3	22.65	15.3	37.3

1" = 100'

0 25 50 100 200

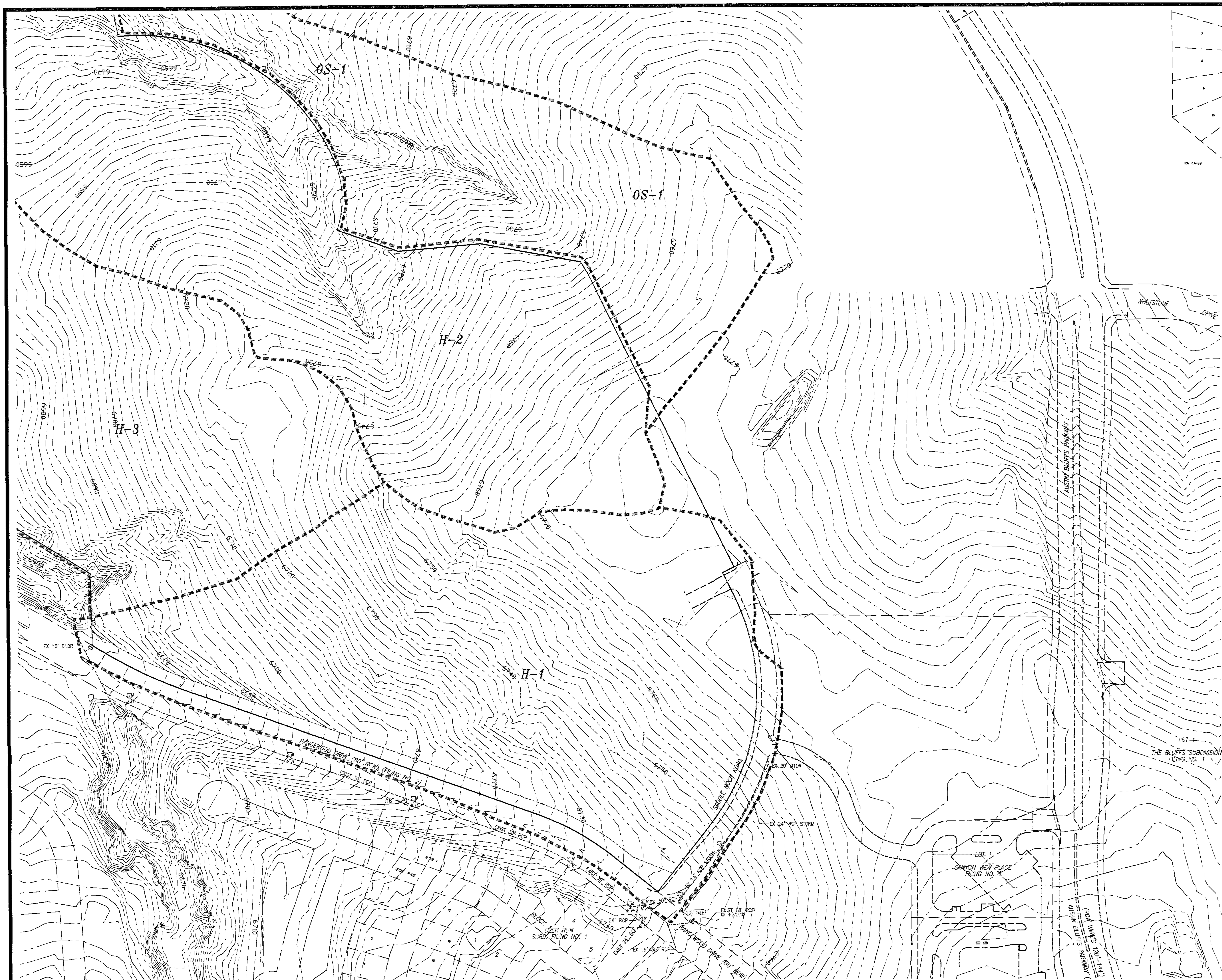
Scale in Feet

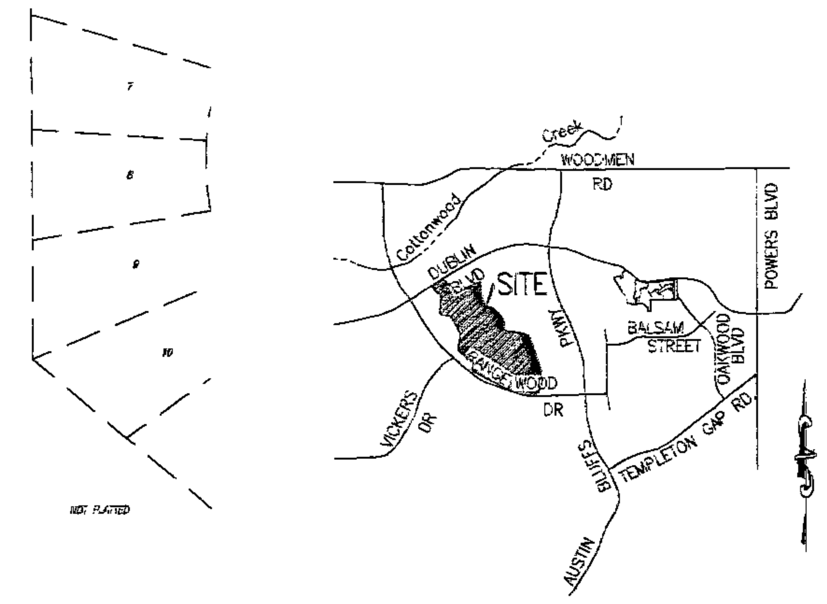
FILE: 97097DV2.DWG 11/13/99

ROCKWELL MINCHOW CONSULTANTS, INC.

ENGINEERING • SURVEYING
2926 STRAUS LANE, SUITE #100
COLORADO SPRINGS, CO 80907
(719) 475-2575 • FAX (719) 475-9223

TITLE :	CANYON VIEW HISTORIC DRAINAGE PLAN	
SCALE : 1"=100'	DRAWN BY : KC	97-097
DATE : 11/13/99	CHECKED BY : KDR	JOB NO.





Vicinity Map

NOT TO SCALE

LEGEND

- EXISTING CONTOURS
- BASIN BOUNDARIES
- *H-1* BASIN DESIGNATOR
- DIRECTION OF FLOW

HISTORIC DRAINAGE BASIN TABLE

BASIN	AREA (Ac)	Q_5 cfs	Q_{100} cfs
OS-1	11.79	8.5	20.6
H-1	21.55	14.0	33.9
H-2	25.63	16.0	39.5
H-3	22.65	15.3	37.3

1" = 100'

0 25 50 100 200

Scale in Feet

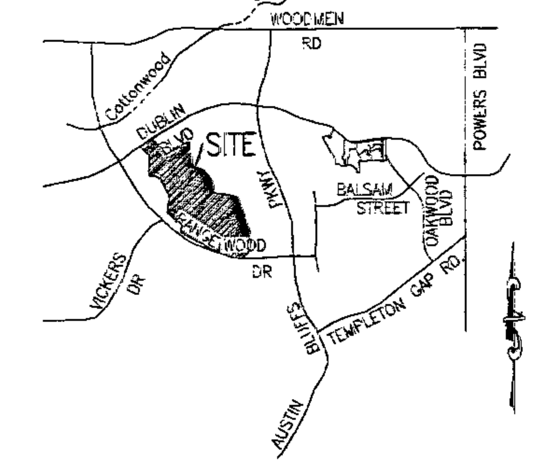
SHEET 1 OF 2

FILE: 97097DV2.DWG 11/13/99

ROCKWELL MINCHOW CONSULTANTS, INC.

ENGINEERING • SURVEYING
2928 STRAUS LANE, SUITE #100
COLORADO SPRINGS, CO 80907
(719) 475-2575 • FAX (719) 475-9223

TITLE :	CANYON VIEW HISTORIC DRAINAGE PLAN
SCALE : 1"=100'	DRAWN BY : KC
DATE : 11/13/99	CHECKED BY : KDR
JOB NO.	97-097



Vicinity Map

NOT TO SCALE

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac)	Q_5 cfs	Q_{100} cfs
I	1.88	5.0	10.0
II	5.85	14.0	28.7
III	3.43	7.4	14.6
IV	7.17	17.2	35.1
V	1.90	4.8	9.6
VI	2.00	4.9	9.9
VII	2.50	6.5	13.0
VIII	1.82	4.7	9.8
IX	2.36	5.9	11.9
X	0.95	2.7	5.5
XI	1.38	3.3	6.8
XII	6.86	19.8	39.4
XIII	3.44	7.4	14.7
XIV	7.23	15.6	30.9
XV	4.40	10.6	21.3
XVI	4.97	11.6	23.3
XVII	8.47	10.9	26.9
XVIII	7.25	10.2	23.7
XIX	3.24	5.5	12.2
XX	2.04	4.7	10.7
XXI	3.80	7.4	16.8
XXII	2.35	6.2	12.5
XXIII	0.64	1.8	3.7
XXIV	0.85	4.0	6.9
OS-1	18.40	45.7	85.4
DF#1	20.28	49.6	92.9
DF#2	6.32	15.5	31.4
DF#3	9.63	22.5	45.2
DF#4	8.61	16.5	33.1
DF#5	15.72	19.9	48.2

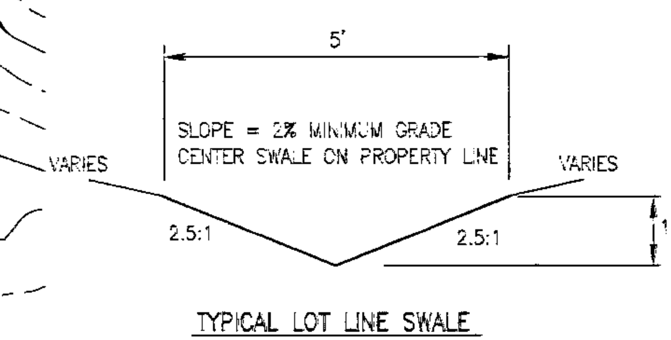
DESIGN POINT TABLE

DP	AREA (Ac)	Q_5 cfs	Q_{100} cfs
DF#1	10.0	12.5	30.4

1" = 100'

0 25 50 100 200

Scale in Feet



TYPICAL LOT LINE SWALE

NO SCALE

NOTES:

1. ALL SIDE LOT LINE SWALES ARE TO BE CONSTRUCTED AT A MINIMUM DEPTH, WIDTH AND SLOPE PER THE SECTION SHOWN ON THIS PLAN.
2. BUILDER IS RESPONSIBLE FOR ALL LOT DRAINAGE.
3. THIS PLAN IS A GUIDE, THE BUILDER MAY REQUEST A DIFFERENT DRAINAGE SCHEME FOR AN INDIVIDUAL LOT FROM DEVELOPMENT MANAGEMENT INC.
4. ALL CURB AND GUTTER TO BE TYPE 2 (RAMP) UNLESS NOTED OTHERWISE.

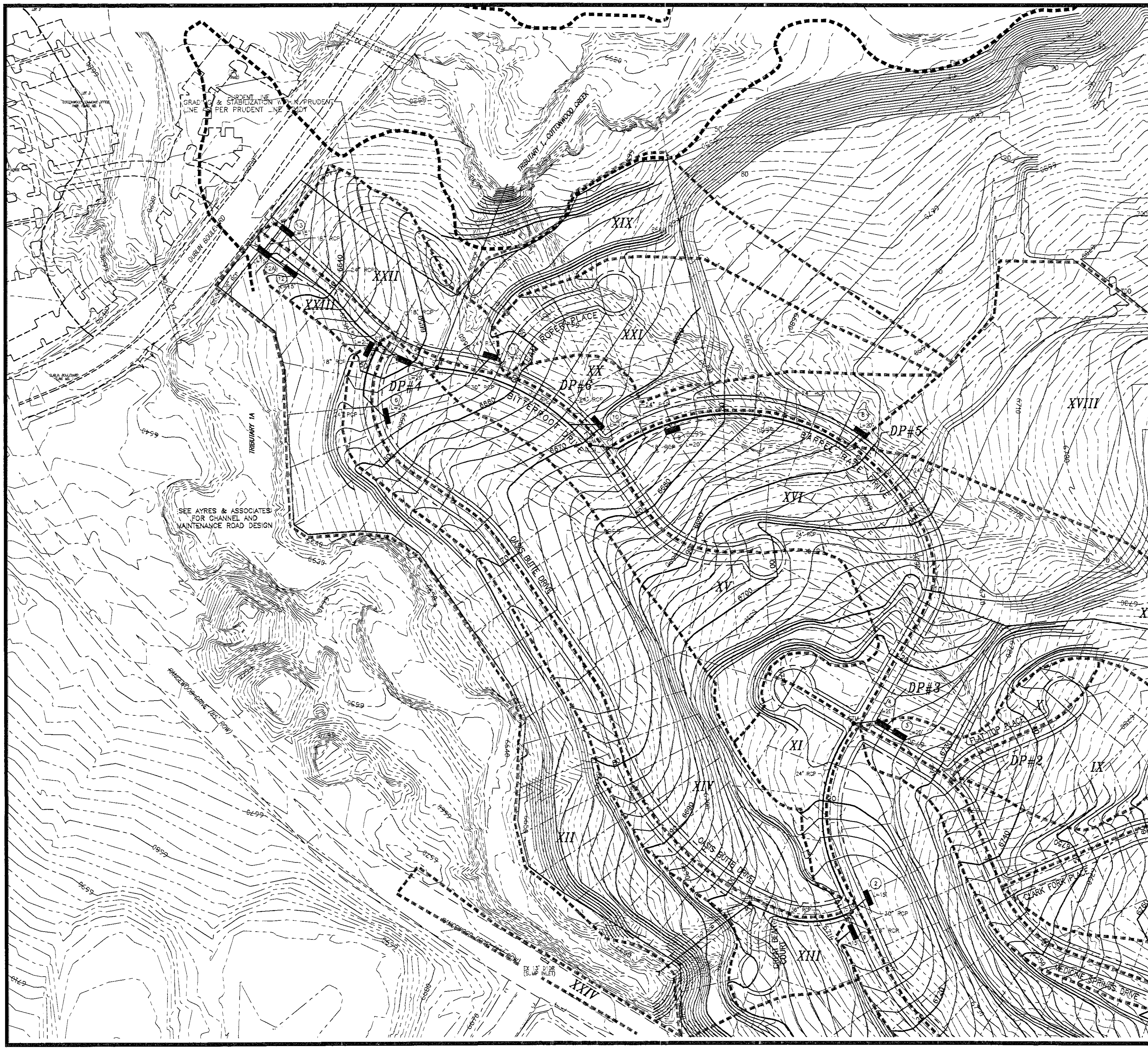
SHEET 1 OF 2

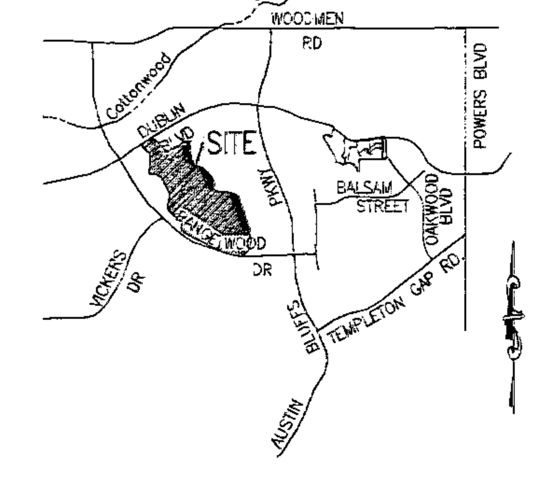
FILE: 97097DV2.DWG 11/15/99

ROCKWELL MINCHOW CONSULTANTS, INC.

ENGINEERING • SURVEYING
2926 STRAUS LANE, SUITE #100
COLORADO SPRINGS, CO 80907
(719) 475-2575 • FAX (719) 475-9223

TITLE :	CANYON VIEW DEVELOPED DRAINAGE PLAN		
SCALE : 1"=100'	DRAWN BY : FRC	97-097 JOB NO.	
DATE : 11/13/99	CHECKED BY : KDR		





Vicinity Map

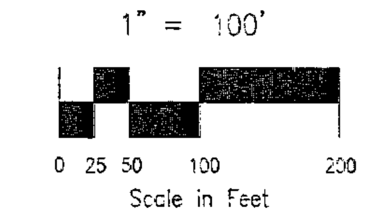
NOT TO SCALE

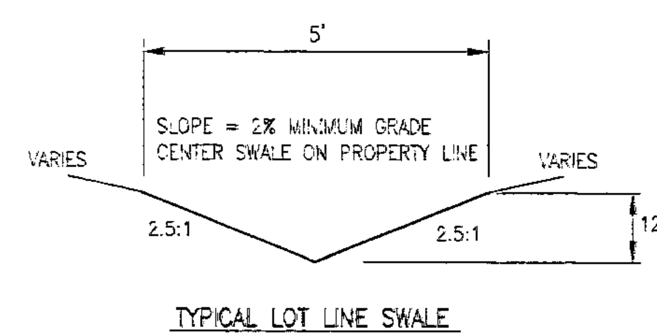
DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac)	Q_5 cfs	Q_{100} cfs
I	1.58	5.0	10.0
II	5.85	14.0	28.7
III	3.43	7.4	14.6
IV	7.17	17.2	35.1
V	1.90	4.8	9.6
VI	2.00	4.9	9.9
VII	2.50	6.5	13.0
VIII	1.82	4.7	9.8
IX	2.36	5.9	11.9
X	0.95	2.7	5.5
XI	1.38	3.3	6.8
XII	6.86	19.8	39.4
XIII	3.44	7.4	14.7
XIV	7.23	15.6	30.9
XV	4.40	10.6	21.3
XVI	4.97	11.6	23.3
XVII	8.47	10.9	26.9
XVIII	7.25	10.2	23.7
XIX	3.24	5.5	12.2
XX	2.04	4.7	10.7
XXI	3.80	7.4	16.8
XXII	2.35	6.2	12.5
XXIII	0.64	1.8	3.7
XXIV	0.85	4.0	6.9
OS-1	18.40	45.7	85.4
DP#1	20.28	49.6	92.9
DP#2	6.32	15.5	31.4
DP#3	9.63	22.5	45.2
DP#4	8.61	16.5	33.1
DP#5	15.72	19.9	48.2

DESIGN POINT TABLE

DP	AREA (Ac)	Q_5 cfs	Q_{100} cfs
DP#1	10.0	12.5	30.4





TYPICAL LOT LINE SWALE

NO SCALE

NOTES:

1. ALL SIDE LOT LINE SWALES ARE TO BE CONSTRUCTED AT A MINIMUM DEPTH, WIDTH AND SLOPE PER THE SECTION SHOWN ON THIS PLAN.
2. BUILDER IS RESPONSIBLE FOR ALL LOT DRAINAGE.
3. THIS PLAN IS A GUIDE, THE BUILDER MAY REQUEST A DIFFERENT DRAINAGE SCHEME FOR AN INDIVIDUAL LOT FROM DEVELOPMENT MANAGEMENT INC.
4. ALL CURB AND GUTTER TO BE TYPE 2 (RAMP) UNLESS NOTED OTHERWISE.

SHEET 2 OF 2

FILE: 97097DV2.DWG 11/13/99

ROCKWELL MINCHOW CONSULTANTS, INC.

ENGINEERING • SURVEYING
2926 STRAUS LANE, SUITE #100
COLORADO SPRINGS, CO 80907
(719) 475-2575 • FAX (719) 475-2223

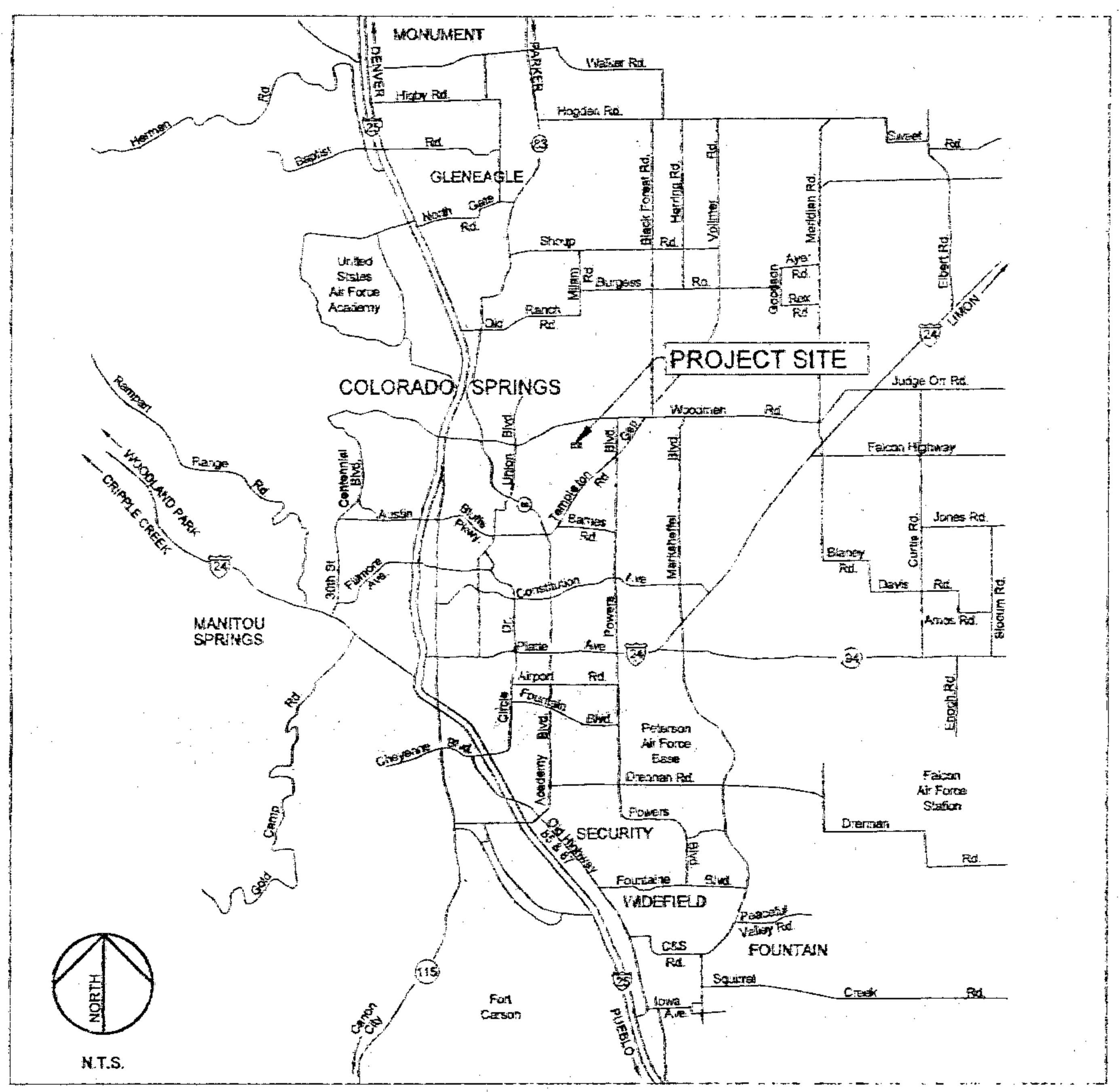
TITLE :	CANYON VIEW DEVELOPED DRAINAGE PLAN	
SCALE : 1"=100'	DRAWN BY : KC,FC	97-097 JOB NO.
DATE : 11/13/99	CHECKED BY : KDR	

BANK PROTECTION FOR COTTONWOOD CREEK TRIBUTARY 1B BETWEEN DAKOTA NORTH PUD AND THE COURTYARDS PUD

LOCATED IN THE CITY OF COLORADO SPRINGS

NOVEMBER 1999

PRELIMINARY
NOT FOR CONSTRUCTION



Vicinity Map

Sheet	Description
1	Cover Sheet and General Notes
2	Plan View
3	Cross Sections
4	Bank Protection and Construction Details

GENERAL NOTES

The types, size, location, and number of all known underground utilities are approximate when shown on the drawings. It shall be the responsibility of the contractor to verify the existence and location of all underground utilities along the route of work. Before commencing construction, the contractor shall be responsible for locating all unknown utilities and protecting them from harm.

Call 1-800-922-1987 for location of all member utilities

All construction activities on this site must comply with the State of Colorado Permitting process for "Stormwater discharges associated with construction activity." For information please contact Colorado Department of Health, Water Quality Control Division, WQCD-PE-B2, 4300 Cherry Creek Drive South, Denver, Colorado 80222-1530, Attention: Permits and Enforcement Section. Phone: (303) 692-3590

INSTALLATION NOTES

1. Before Armorflex Class 50s or approved equal are placed, slopes and or surfaces shall be graded and compacted. Compact to a 95% minimum standard Proctor Density. The maximum allowable slope for placement shall be 2H:1V, or as specified on sheet 2.

2. Geotextile fabric shall be placed over the prepared slope.
   A. The geotextile fabric shall be one foot longer than the articulated block mat on both ends, top and bottom.
   B. Contractor shall take care not to puncture the geotextile fabric during installation.

3. Bank protection shall be toed in and anchored at the top and toed in at the bottom (see detail sheet 2).

4. Fitting of the mats on inner and outer curves can be done by using triangle shaped mats, or by temporarily overlaying the mats and removing the blocks that are on top of each other and reattaching the cables.
   A. When seams between mats are greater than two inches, concrete grout must be used to fill the seam.

5. Contractor shall consult with manufacturers representative throughout installation.

AYRES ASSOCIATES
Engineers/Scientists/Surveyors
3665 JFK Parkway, Building 2, Suite 300
P.O. Box 270460
Fort Collins, CO 80527
(970) 223-5556
www.ayres-fc.com ftp.ayres-fc.com

COVER SHEET

BANK PROTECTION FOR COTTONWOOD CREEK TRIBUTARY 1B BETWEEN DAKOTA NORTH PUD AND THE COURTYARDS PUD

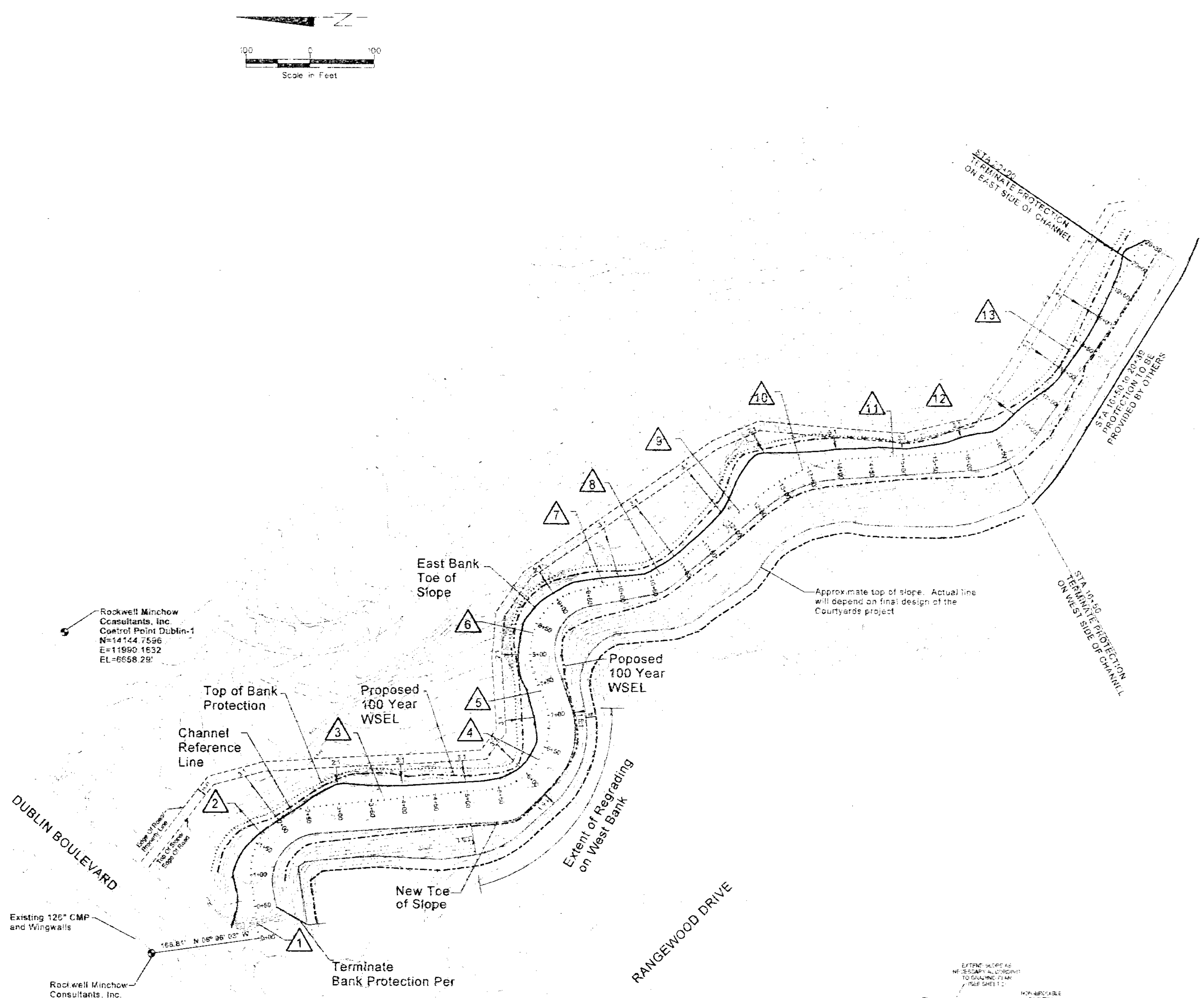
Revisions	Date

Filename: SHEET1.dgn

Designed By: JHB
Drawn By: JHB
Checked By: CAC
Approved By: CAC
Job#: 34-0468.01
Date: 11-12-99

Sheet 1 of 3

1	92.25' @ N82°22'30"E
2	Arc: R=100.00' Δ= 91°48'59" L=160.25' C=143.65'
3	285.67' S 5 48' 31" E
4	Arc: R=100.00' Δ= 106°40'30" L=186.13' C=160.43'
5	40.27' @ N67°30'58"E
6	Arc: R=100.00' Δ= 101°46'24" L=177.63' C=155.18'
7	99.50' @ S10°42'38"E
8	Arc: R=100.00' Δ= 28°17'46" L=49.39' C=48.89'
9	176.83' S 39° 00' 24" E
10	Arc: R=250.00' Δ= 35°22'48" L=154.37' C=151.93'
11	159.74' @ S3°37'36"E
12	Arc: R=150.00' Δ= 52°35'48" L=137.70' C=132.91'
13	316.91' S 56° 13' 24" E

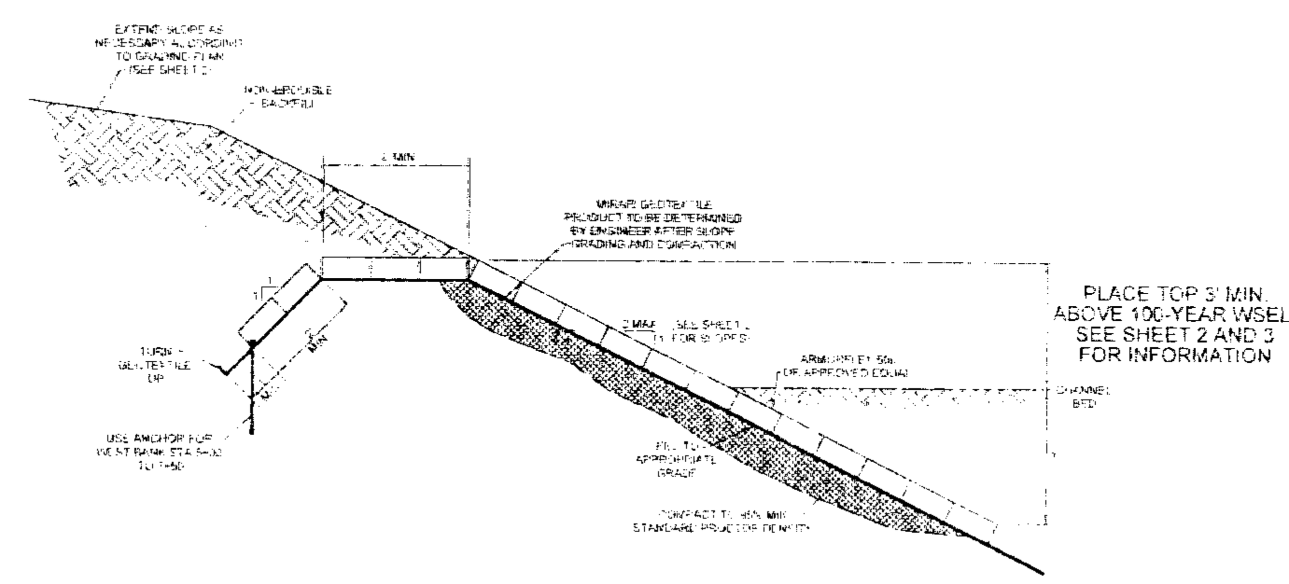


LEGEND

	Existing Contour
-------	Property or Easement Line
-·-·-·-	Proposed 100 - year WSEL
———	Toe of Slope
········	Top of Bank Protection

Bank Protection Reference Line Coordinates

Channel Reference Line Station (ft)	Offset From Channel Reference Line (ft)	Northing (ft)	Easting (ft)	Elevation (ft)
1+00.00	-27.75	13675.50	11613.32	6622.00
2+00.00	2.41	13809.12	11699.52	6626.01
3+00.00	-30.66	13716.92	11756.16	6626.12
4+00.00	18.67	13616.20	11753.41	6626.86
5+00.00	-14.77	13516.28	11759.67	6628.11
5+00.00	49.90	13509.64	11695.72	6628.83
5+50.00	-13.76	13490.14	11763.46	6630.50
6+00.00	40.85	13393.56	11741.56	6630.42
7+00.00	-22.02	13410.13	11859.78	6632.14
7+00.00	37.57	13350.54	11866.79	6632.52
8+00.00	-15.98	13436.46	11957.35	6634.00
9+00.00	-10.31	13381.85	12054.10	6636.00
10+00.00	-10.08	13281.29	12080.89	6636.16
11+00.00	-10.94	13194.04	12113.40	6639.52
12+00.00	-17.30	13120.34	12181.31	6639.24
13+00.00	-51.72	13057.62	12273.17	6640.00
14+00.00	-16.90	12939.56	12280.13	6642.07
15+00.00	-10.56	12838.37	12281.29	6645.07
16+00.00	22.56	12742.07	12300.61	6646.0
16+50.00	35.13	12673.61	12264.62	6646.11
17+00.00	14.36	12663.32	12036.09	6647.85
18+00.00	-10.61	12597.07	12403.05	6647.51
19+00.00	7.68	12533.91	12487.80	6646.47
20+00.00	15.20	12497.32	12553.65	6650.62



BANK PROTECTION DETAIL
N.T.S.

NOTES

1. Disturbance to wetlands in channel bottom shall be minimized. Wetland soils excavated for placement of toe-down protection shall be placed back in excavated trench after construction.

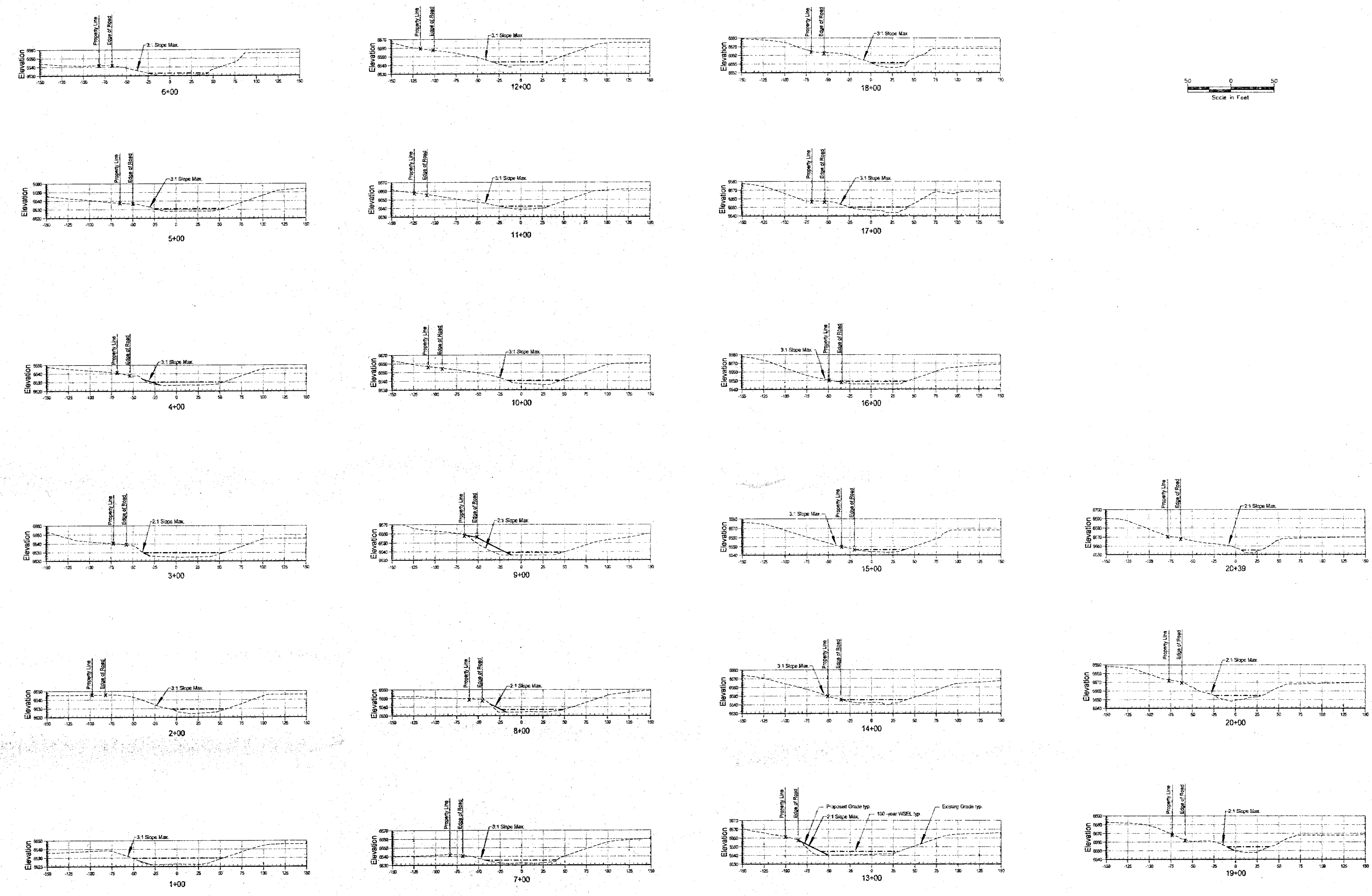
AYRES ASSOCIATES
Engineers/Scientists/Surveyors

PLAN VIEW AND BANK PROTECTION LAYOUT

BANK PROTECTION FOR COTTONWOOD CREEK TRIBUTARY 1B BETWEEN DAKOTA NORTH PUD AND THE COURTYARDS PUD

Designed By	JHB
Drawn By	JHB
Checked By	CAC
Approved By	CAC
Job #	34.0456
Date	11-12-09

Sheet 2 of 3



Note: Horizontal Axis Stationing Based on Left (negative) or Right (positive) From Reference Line Shown on Sheet 2 Looking Upstream.

AYRES ASSOCIATES
Engineers Scientists Surveyors

CROSS SECTIONS

BANK PROTECTION FOR COTTONWOOD CREEK TRIBUTARY 1B BETWEEN DAKOTA NORTH PUD AND THE COURTYARDS PUD

Revisions	Date
Add maint. road	4/28/99

Filename: Sheet3.dgn

Designed By:	JHB
Drawn By:	JHB
Checked By:	CAC
Approved By:	CAC
Job #:	34-0466.01
Date:	11-12-99

Sheet 3 of 3