



# FINAL DRAINAGE REPORT FOR ZINDORF — MCDANIEL'S SUBDIVISION

PCD FILE NO. MS-22-006



**PREPARED BY**

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**PREPARED FOR**

Greg Zindorf  
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Colorado Springs, CO

August 2023





## ENGINEER'S STATEMENT

This report and plan for the drainage design of Zindorf - McDaniels Subdivision, was prepared by me (or under my direct supervision) and is correct to the best of my knowledge and belief. Said report and plan 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 understand that El Paso County does not, and will not, assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

\_\_\_\_\_  
Richard Gallegos, P.E.

\_\_\_\_\_  
Date

Registered Professional Engineer State of Colorado No. 36247

## DEVELOPER'S STATEMENT

Greg Zindorf hereby certifies that the drainage facilities for the Zindorf – McDaniels Subdivision shall be constructed according to the design presented in this report. I understand that El Paso County does not, and will not, assume liability for the drainage facilities designed and/or certified by my engineer and that are submitted to El Paso County; and cannot, on behalf of the Zindorf – McDaniels Road guarantee that final drainage design review will absolve Greg Zindorf and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

\_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
Date

Greg Zindorf

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Owner

Address:

PO Box 50005

\_\_\_\_\_  
Title

Colorado Springs, CO

## EL PASO COUNTY STATEMENT

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

\_\_\_\_\_  
Joshua Palmer, P.E.

\_\_\_\_\_  
Date

County Engineer/ECM Administrator





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## 1.0 PURPOSE

This drainage report is for the design of Zindorf – McDaniels Subdivision (McDaniels Tract). The site is located at 22755 McDaniels Road, Calhan CO in eastern El Paso County. See Vicinity Map in the Appendix below for reference. It is further described as the Northeast One-Quarter of the Northeast One-Quarter of Section 11, Township 14 South, Range 63 West of the 6<sup>th</sup> P.M.

This site is located in the Ellicott Consolidation – CHBS1200 Drainage Basin. Work will include subdividing the 39.7-acre site into four residential lots. An existing home will remain, and the driveway will be reconstructed. On the other three lots, home pads and gravel driveways will be constructed.

## 2.0 SOIL CONDITIONS

According to the El Paso County Area Soil Survey, the soil on the site is classified as follows:

SOIL #	SOIL TYPE	HYDROLOGIC CLASSIFICATION
19	Columbine Gravelly Sandy Loam	A
28	Ellicot Loamy Coarse Sand	A
95	Truckton Loamy Sand	A

The Columbine soil can be described as having a very high permeability, very low surface runoff, and slight hazard of erosion. The Ellicot soil also can be described as very low surface runoff and slight erosion hazard. The Truckton soil includes a moderate hazard of erosion and low water surface runoff. The soil classification used for this study is 'A'. See Soils Map below in the Appendix for reference.

## 3.0 DRAINAGE CRITERIA

The methodology utilized for this report is in accordance with the *El Paso County Drainage Criteria Manual*. The Rational Method for computation of runoff was used.

Q =  $cia$                       Where  
Q = maximum rate of runoff in cubic feet per second  
c = runoff coefficient representing drainage area characteristics  
i = average rainfall intensity, in inches per hour, for the duration required for the runoff to become established  
a = drainage basin size in acres

The storm recurrence intervals used for this study were the 5-year storm and the 100-year storm. ManningSolver Version 1.019 was used in this analysis to calculate the Manning's normal depth within the proposed swale.



## 4.0 EXISTING DRAINAGE CONDITIONS

The overall site consists of 39.7 acres, of this area approximately 1.03 acres is developed as a single family home, yard, and gravel driveway accessing McDaniel's Road. The areas of the site not covered by gravel road or the residential home are covered with short grass pastures. These undeveloped areas include slopes that range from 0.5% to 2.4%. The overall existing site is approximately 2.1% impervious. See Existing Drainage Map in Appendix for reference.

Flows from Sub-basins EX1 through EX3 and OS1 through OS3 are tributary to the Ellicott Consolidated Drainage Basin (CHBS1200).

Sub-basin OS1 contains 8.67 acres and drains southeast into Subbasin EX2. It produces flows of 1.1 cfs for the 5-year storm and 8.2 cfs for the 100-year storm. These flows sheetflow and continue towards the FEMA 100-year floodway in the middle of the site.

Sub-basin OS2 contains 0.49 acres and drain southwest into the Haegler Ranch floodway that runs through the middle of the site. It produces flows of 0.1 cfs for the 5-year storm and 1.0 cfs for the 100-year storm. These flows sheetflow to the southwest.

Sub-basin OS3 contains 1.02 acres and drains the east along McDaniels Road. It contains half of McDaniels Road that drains south into the ditch. It produces flows of 0.5 cfs for the 5-year storm and 1.5 cfs for the 100-year storm. All flows north of the site are directed into a drainage ditch that flows into a culvert under McDaniels Road. These flows bypass the development occurring on the site in a ditch along North Log Road. Flows overtopping the intersection of McDaniels Road and North Log Road sheetflow to the east.

Sub-basin EX1 contains 1.06 acres and drains due southwest. It produces flows of 0.2 cubic feet per second (cfs) for the 5-year storm and 1.4 cfs for the 100-year storm. These flows are directed to the southerly direction.

Sub-basin EX2 contains 14.59 acres and drains southeast into the Haeglar Ranch floodway in the middle of the site. It produces flows of 1.8 cfs for the 5-year storm and 14.0 cfs for the 100-year storm. These flows sheetflow to the southeast.

Sub-basin EX3 contains 22.89 acres and sheetflows to the southwest into the Haegler Ranch floodway in the middle of the site. It produces flows of 3.5 cfs for the 5-year storm and 22.8 cfs for the 100-year storm. These flows will combine with flows from Sub-basin EX2, Sub-basin EX3, Sub-basin OS1, Sub-basin OS2, and Sub-basin OS3 to produce total flows of 7.1 cfs for the 5-year storm and 48.0 cfs for the 100-year storm at Design Point 1. FEMA Zone 'A' 100-year floodplain flows entering the site are approximately 1,900 cfs.

The total flow leaving the site at Design Point 1 (DP1) is 7.1 cfs for the 5-year storm and 48.0 cfs for the 100-year storm. The estimated runoff amounts produced for the project under Existing Conditions are shown in Table 1 below.



Sub-basin	Q <sub>5</sub> (CFS)	Q <sub>100</sub> (CFS)
EX1	0.2	1.4
EX2	1.8	14.0
EX3	3.5	22.8
OS1	1.1	8.2
OS2	0.1	1.0
OS3	0.5	1.5
DP1 (EX2 + EX3 + OS1 + OS2 + OS3)	7.1	48.0

## 5.0 ELLICOTT CONSOLIDATED FLOODPLAIN ANALYSIS

FEMA has previously studied the Ellicott Consolidated floodway with limited results presented on the Flood Insurance Rate Map and Flood Insurance Study. The available information from FEMA is presented in the Appendix of this report. The peak 100-year flow rate of 7,019 cfs at the confluence of the East Tributary is the only flow value provided in the study, and is located approximately 1.6 miles downstream of our site.

The information provided in the FEMA study does not provide sufficient detail to determine the channel's stability. A more detailed analysis hydraulic analysis was completed utilizing several sources of information, including

- Colorado LiDAR data from the Colorado Hazard Mapping and Risk MAP Portal
- FEMA GIS data
- Hydrologic and hydraulic data from the "Haegler Ranch Basin Drainage Basin Planning Study," by URS, May 2009

A HEC-RAS version 6.2 hydraulic model was prepared utilizing the same cross section locations as the previous FEMA study, except for modifications made at Log Road at the downstream end of the project. Cross sections in this vicinity were modified to cross the channel and better consider the roadway alignment and profile. A total of eight cross sections were used to model 2609 linear feet of channel, including an existing 48" CMP under Log Road. Peak flow rates of 570 cfs for the 5-year and 3200 cfs for the 100-year storms were used and are based upon the downstream most portion of the Haegler Ranch Basing Drainage Planning Study (DBPS) located at McDaniels Road. A total tributary area of 16.6 square miles drains to McDaniels Road. Mannings coefficients of 0.074 for light brush and 0.065 for native grasses were used and are the same values recommended in the DBPS. Photographs from 2023 are also included in the Appendix of this report to help support the assumptions used.

The project site is located between HEC-RAS river cross section station s 3609 to 1814, see Floodplain Evaluation Map in the Appendix. The additional cross sections located downstream of the site were used to model the backwater effects resulting from the Log Road crossing. Within the site, three key items were reviewed to help determine that the natural channel is scour stable:



1. Vegetative cover at the site, including shrubs, native grasses and trees appear well established indicating that the channel is stable.
2. The computed flow velocities through the project site range between 2.0 fps and 5.9 fps for the 100-year flow rate. Based on Table 12-3, Hydraulic Design Criteria for Natural Unlined Channels from the Drainage Criteria Manual, the maximum allowable 100-year flow velocity is 7.0 fps. The flow rate is further supported by the publication by Craig Fischenich with the USAE Research and Development Center, "Stability Thresholds for Stream Restoration Materials," dated May 2001, which indicates that for long native grasses, the maximum permissible velocity of a channel is 7.0 fps.
3. The Froude number for the 100-year storm ranges from 0.17 to .53, indicating a subcritical flow regime. Any number less than 1.0 (critical depth), and, ideally, less than 0.80, is expected to be stable. Per Table 12-3, Hydraulic Design Criteria for Natural Unlined Channels from the Drainage Criteria Manual, the maximum allowable Froude Number is 0.80 for the 100-year flow rate.

Based on the floodplain analysis completed as part of this study, no additional channel stabilization measures are needed as a result of this project. The channel, in its natural condition, is considered scour stable.

## 6.0 DEVELOPED DRAINAGE CONDITIONS

Although the overall site consists of 39.7 acre only approximately 1.37 acres will be disturbed. The site will be subdivided into four separate lots with three house and gravel driveway being constructed on the four lots. The existing house will remain and the gravel driveway will be reconstructed. See Proposed Conditions Map below in Appendix for reference.

The overall drainage pattern will remain the same as existing conditions with developed flows directed to the same locations as described in the Existing Conditions Section. Proposed site imperviousness is 2.8%, versus 2.1% in the existing conditions.

Sub-basin OS1 contains 8.67 acres and drains southeast into Subbasin PP2. It produces flows of 1.1 cfs for the 5-year storm and 8.2 cfs for the 100-year storm. These flows continue towards the FEMA 100-year floodway in the middle of the site.

Sub-basin OS2 contains 0.49 acres and drain southwest into the Haegler Ranch floodway that runs through the middle of the site. It produces flows of 0.1 cfs for the 5-year storm and 1.0 cfs for the 100-year storm. These flows sheetflow to the southwest and will combine with flows from Design Point 1, described above.

Sub-basin OS3 contains 1.02 acres and drains the east along McDaniels Road. It contains half of McDaniels Road that drains south into the ditch. It produces flows of 0.5 cfs for the 5-year storm and 1.5 cfs for the 100-year storm. All flows north of the site are directed into a drainage ditch that flows into a culvert under McDaniels Road. These flows bypass the development occurring on the site in a



ditch along North Log Road. Flows overtopping the intersection of McDaniels Road and North Log Road sheetflow to the east.

Sub-basin PP1 contains 1.06 acres and drains due southwest. It produces flows of 0.2 cfs for the 5-year storm and 1.4 cfs for the 100-year storm. These flows sheetflow in a southerly direction.

Sub-basin PP2 contains 14.59 acres and drains southeast into the Haeglar Ranch floodway in the middle of the site. It produces flows of 1.8 cfs for the 5-year storm and 14.0 cfs for the 100-year storm. These flows sheetflow to the southeast.

Sub-basin PP3 contains 22.89 acres and sheetflows to the southwest into the Haeglar Ranch floodway in the middle of the site. It produces flows of 3.9 cfs for the 5-year storm and 22.9 cfs for the 100-year storm. These flows will combine with flows from Sub-basin PP2, Sub-basin PP3, Sub-basin OS1, Sub-basin OS2, and Sub-basin OS3 to produce total flows of 7.5 cfs for the 5-year storm and 48.0 cfs for the 100-year storm at Design Point 1. The majority of runoff will sheet flow and have similar time of concentrations as seen in the existing conditions. The 100-year peak rate in the proposed conditions is the same as that of the existing, and the 5-year increases 0.4 cfs in the proposed conditions, existing 5-year flow rate of 7.1 cfs versus the proposed flow rate of 7.5 cfs. Because the peak flow rate for the 100-year storm event remains unchanged, and only a slight increase in the 5-year flow rate is seen, mitigation is not required. All flows north of the site are directed into a drainage ditch that flows into a culvert under McDaniels Road. These flows bypass the development occurring on the site in a ditch along North Log Road. Flows overtopping the intersection of McDaniels Road and North Log Road sheetflow to the east.

Flows from Design Point 1 will sheetflow into Ellicott Consolidated channel and continue downstream toward an existing public 48" CMP under Log Road. The flows from the floodplain do overtop Log Road and continue downstream to the southeast. The computed flows are either generated from this site, or sheet flow through the site from adjacent parcels, but do not include the flows within the floodplain from the upstream watershed.

The estimated runoff amounts produced for the project for Developed Conditions are shown in Table 2 below.

TABLE 2 - DEVELOPED CONDITIONS		
Sub-basin	Q <sub>5</sub> (CFS)	Q <sub>100</sub> (CFS)
PP1	0.2	1.4
PP2	1.8	14.0
PP3	3.9	22.9
OS1	1.1	8.2
OS2	0.1	1.0
OS3	0.5	1.5
DP1 (PP2 + PP3 + OS1 + OS2 + OS3)	7.5	48.0



## 6.0 WATER QUALITY

The total disturbance for this development will be 1.37 acres. According to the El Paso County Engineering Criteria Manual (ECM), "The following types of sites and associated land disturbances are excluded from the requirements of this Section 1.7". Furthermore, in El Paso County ECM Appendix I.7, 1.B, a "Large Lot Single Family Site" is excluded from the requirements defined in Section 1.7. Since this site will be divided in single-family residential lots greater than 2.5 acres in size per dwelling and having a total lot imperviousness of less than 10 percent, the site can be excluded from water quality control measure requirements.

## 7.0 EROSION CONTROL PLAN

The site construction consists of four single family residential lots, which includes four houses and gravel driveways that all occupy greater than 2.5 acres in size per dwelling and a total lot imperviousness of less than 10 percent. With single family residential lots greater than 2.5 acres in size and less than 10 percent imperviousness, the site is excluded from stormwater quality control measures and ESQCP requirements. Although exclusions apply, each lot is still responsible for providing appropriate temporary control measures when each site is developed, which may include items such as silt fence, vehicle tracking control surfaces, etc.

## 8.0 FLOODPLAIN STATEMENT

Portions of the site are within the designated FEMA 100-year floodplain and designated FEMA 100-year floodway as designated on Map No. 08041C0810G and Map No. 08041C0807G, both dated December 7<sup>th</sup>, 2018. A large portion of the site consists of a FEMA Flood Zone 'AE'. A small portion on the north end of the site is considered a FEMA Flood Zone 'A'.

All structures will be a minimum of 150' away from the FEMA-delineated Zone AE floodplains and homes shall be constructed in accordance with El Paso County's Chapter 12 for to either elevate any residence 1' above the 100-year base flood elevation of 6090 (NAVD 88 Datum), or floodproof the structure for any areas below the floodplain elevation. There is currently not an approved drainage basin planning study for the Ellicott Consolidated (CHBS1200) Drainage Basin, and no County identified improvements were identified for this segment of stream. Based upon field observations, significant vegetation consisting of rangeland grasses, shrubs and trees exist in the area meaning the floodplain area is scour stable. No baseflow exists within the channel. For these reasons, drainageway improvements and channel stabilization requirements have not been identified for the drainageway shown in the Drainage Maps below. No improvements are proposed for this drainageway as a result, an no additional hydraulic analysis beyond what FEMA has provided is needed for this Final Drainage Report.

Reported flow rates from the FEMA Flood Insurance Study list the 100-year peak flow rate as 7,019 cfs in the area. The FEMA hydrologic node location for this flow rate is located approximately 1.6 miles



downstream of the site and represents a combined flow from the main stem and East Tributary. Our site is located at the downstream most limits of the Haegler Ranch Drainage Basin Planning Study (DPBS) limits, which terminates at McDaniels Road at the subject property and is a sub-area of the East Tributary drainage area. Based on a review of the Haegler Ranch DBPS versus the flows listed in the FEMA Flood Insurance Study, the peak flow rates from the Haegler Ranch DBPS represent a more detailed study of the area and is considered the best available information for this study reach. Therefore the flows listed within the DBPS have been used for the floodplain analysis. The following table summarizes the flow velocity and Froude Number through the site.

100-Year Results  
Velocity and Froude Number

River Sta.	Flow Rate (cfs)	Velocity (fps)	Froude #
3609	3200	5.9	0.48
3061	3200	5.0	0.41
2579	3200	4.4	0.42
2093	3200	5.2	0.53
1814	3200	2.0	0.17

Per Table 12-3, Hydraulic Design Criteria for Natural Unlined Channels from the Drainage Criteria Manual, the maximum allowable velocity is listed as 7.0 fps with a maximum Froude Number of 0.8 for the 100-year storm even with erosion-resistant soils and established vegetative cover. The velocities and Froude Numbers are not exceeded at each cross section evaluated within the site. The NRCS Soil Survey does evaluate the erosion potential based on soil types. The soils identified within the channel limits are Columbine gravelly sandy loam (Soil ID 19) and Ellicott loamy course sand (Soil ID 28). These soils are identified as having a "slight" erosion potential. A "slight" rating indicates that little or no erosion is likely. The erosion hazard classification from the NRCS Soil Survey has been included in the Appendix of this report.

## 9.0 DRAINAGE BASIN FEES

The proposed development is located within the Ellicott Consolidated Drainage Basin.

### 2023 Ellicott Consolidated Drainage Fees

There are no drainage fees associated with the Ellicott Consolidated Drainage Basin.

### 2023 Ellicott Consolidated Bridge Fees

There are no bridge fees associated with the Ellicott Consolidated Drainage Basin.

## 10.0 CONSTRUCTION COST OPINION

There are no proposed drainage structures for this project, therefore, no engineer's estimate of probable costs are required for this drainage report.





## 11.0 CONCLUSIONS

For this 39.7-acre site, the site will be divided into four separate lots. The existing gravel driveway will be removed and reconstructed, while the 1850 sf house will remain. Three additional home pads and gravel driveways will be constructed on the other lots. The total estimated new disturbance area of the site will be 1.37 acres, which will allow for new driveways for all four lots, and home construction on three of the lots. The fourth lot currently has a single family residence, which will remain and only the gravel driveway will be reconfigured. Construction will occur within drainage sub-basin PP3. The development increases total routed flows exiting the site at Design Point 1 (DP1) from 7.1 cfs to 7.5 cfs for the 5-year storm, while the 100-year storm flow remains unchanged at 48.0 cfs. This is a 5.6% increase for the 5-year storm. These increases do not warrant the need for detention, nor water quality as each lot is also greater than five acres in size. All developed flows will continue to flow along existing drainage patterns. All areas disturbed by construction will be repaired, and erosion control measures will be installed during construction of the proposed site. The proposed project will not, with respect to stormwater runoff, negatively impact the adjacent properties and downstream properties. Because there is no increase to the 100-year peak flow rates from the site and only a minimal increase in the 5-year event, the proposed development will not adversely impact adjacent and downstream properties.

## 12.0 REFERENCES

**Haegler Ranch Drainage Basin Planning Study**, URS Corporation, Dated May 2009.

**LiDAR Data**, Colorado Hazard Mapping and Risk MAP Portal, obtained 2023

**Municipal Code Corporation (2018)**. *Engineering Criteria Manual of El Paso County, Colorado (ECM)*

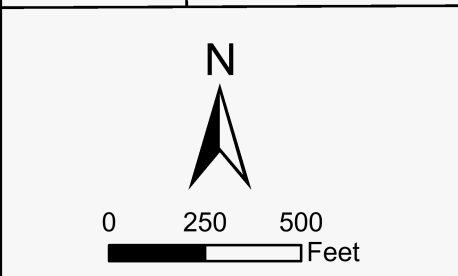
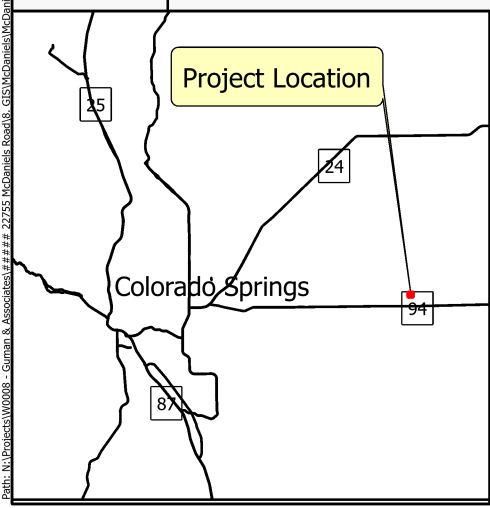
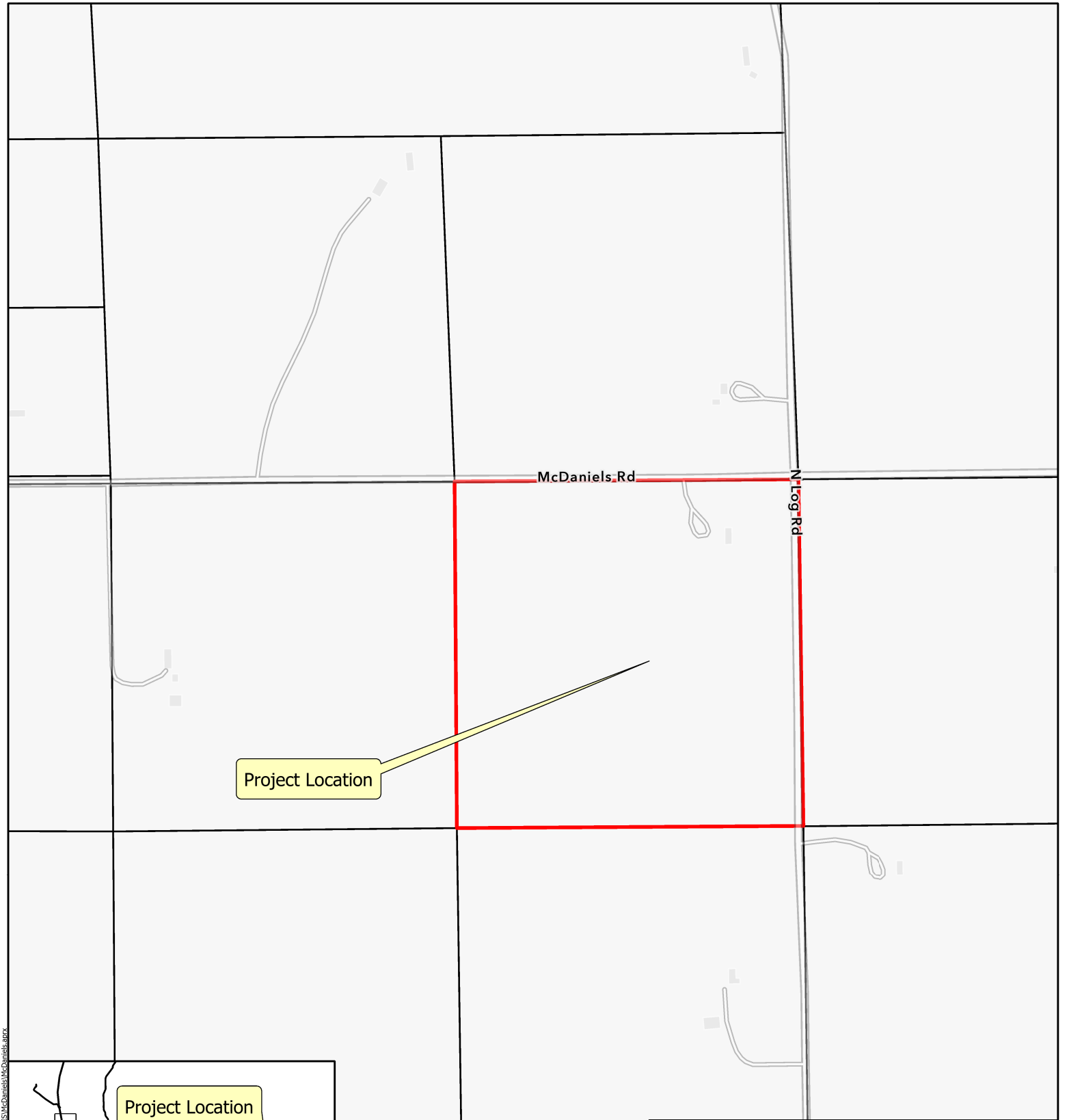
**Municipal Code Corporation (2018)**. *Drainage Criteria Manual of El Paso County, Colorado (DPM)*

**USDA, NRCS**. Soil Survey of El Paso County Area, Colorado.



# APPENDIX A

## MAPS



Prepared by:



121 S. TEJON ST., SUITE 1110  
COLORADO SPRINGS, CO 80903  
WWW.RESPEC.COM (719) 266-5212

22755 McDaniels Road

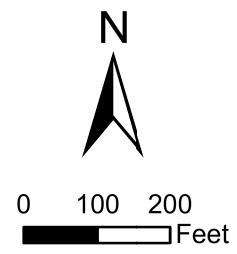
**VICINITY MAP**

Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc., METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

Path: N:\Projects\W0008 - Guman & Associates\### 22755 McDaniels Road\8\_GIS\McDaniels\McDaniels.aprx



Map Unit Symbol	Map Unit Name	Rating
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	A
28	Ellicot loamy coarse sand, 0 to 5 percent slopes	A
95	Truckton loamy sand, 1 to 9 percent slopes	A



Prepared by:

121 S. TEJON ST., SUITE 1110  
 COLORADO SPRINGS, CO 80903  
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22755 McDaniels Road

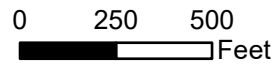
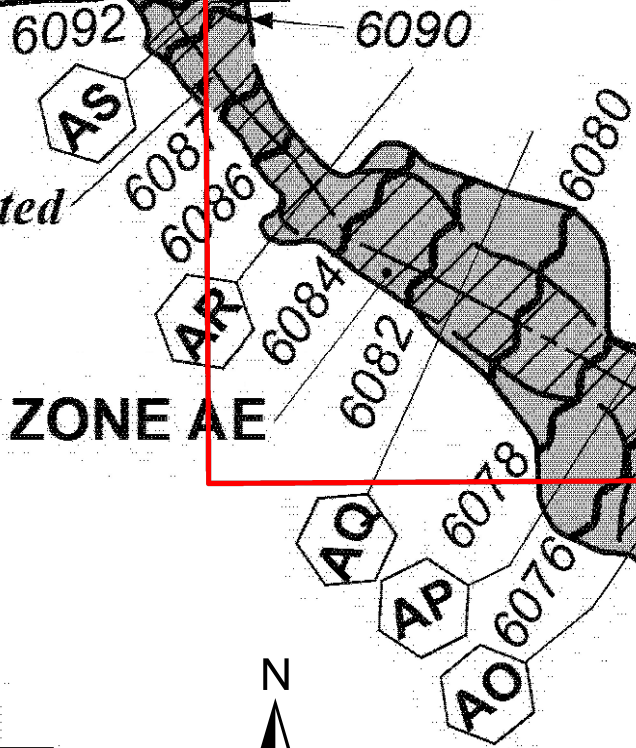
**SOILS MAP**

Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Maxar

Path: \\Projects\W0008 - Guman & Associates\### 22755 McDaniels Road\6. GIS\McDaniels\McDaniels.aprx

*Ellicott Consolidated*

**ZONE AE**



11

**NFP** PANEL 0810G

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

PANEL 810 OF 1300  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:			
COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	8008	810	G

Notice to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER  
08041C0810G

MAP REVISED  
DECEMBER 7, 2018

Federal Emergency Management Agency

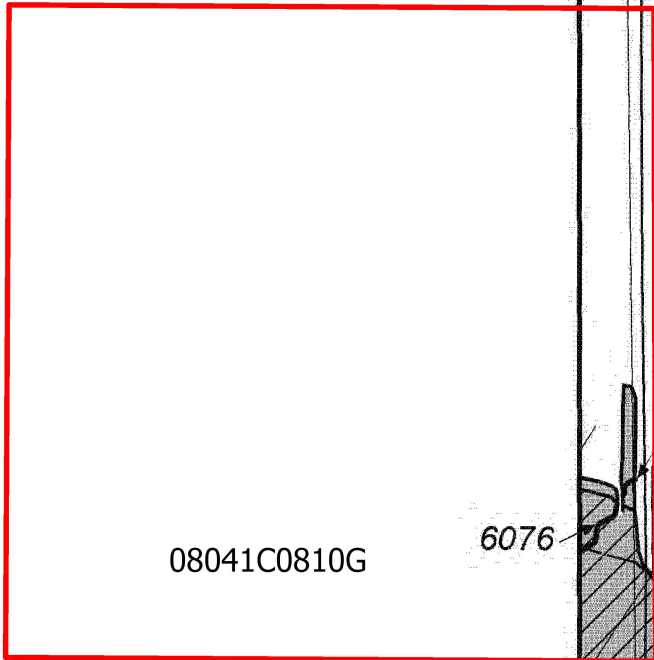
Prepared by:

121 S. TEJON ST., SUITE 1110  
COLORADO SPRINGS, CO 80903  
WWW.RESPEC.COM (719) 266-5212

22755 McDaniels Road

**FIRM MAP**





08041C0810G

6076

6076



*Ellicott Consolidated*

6072



ZONE AE

6068

6064

6064

6062

11



6062



LOG RD

6058



6056

1370000 FT

38° 50' 37.50"

104° 24' 22.00"



0 250 500 Feet

Prepared by:



**RESPEC**

121 S. TEJON ST., SUITE 1110  
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22755 McDaniels Road

**FIRM MAP**

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

PANEL 807 OF 1300  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	COMMUNITY	NUMBER	PANEL	SUFFIX
	EL PASO COUNTY	0807G	807	G

MAP NUMBER  
08041C0807G  
MAP REVISED  
DECEMBER 7, 2018  
Federal Emergency Management Agency





**APPENDIX B**  
**CALCULATIONS**

<b>McDaniels Subdivision</b>									
<b>C FACTOR CALCULATION SHEET</b>									
<b>EXISTING CONDITIONS</b>									
<b>RUNOFF COEFFICIENT</b>									
<b>TYPE A/B SOILS</b>									
<b>LAND USE</b>		<b>Imperv %</b>	<b>5 YR</b>	<b>100 YR</b>					
UNDEV		0	0.08	0.35					
GRAVEL ROAD		80	0.59	0.7					
ASPHALT ROAD		100	0.9	0.96					
ROOFS		90	0.73	0.81					
<b>EXISTING CONDITIONS</b>									
	<b>TOTAL</b>	<b>SURFACE CONDITION AREAS</b>				<b>CALCULATED C</b>			
<b>AREA</b>	<b>AREA</b>	<b>UNDEV</b>	<b>GRAVEL</b>	<b>ASPHALT</b>	<b>ROOFS</b>	<b>5</b>	<b>100</b>	<b>% IMPERVIOUS</b>	
<b>DESIG.</b>	<b>(acre)</b>		<b>ROAD</b>	<b>ROAD</b>		<b>YR</b>	<b>YR</b>		
EX1	1.06	1.06	0.00	0.00	0.00	<b>0.08</b>	<b>0.35</b>		<b>0.00</b>
EX2	14.59	14.59	0.00	0.00	0.00	<b>0.08</b>	<b>0.35</b>		<b>0.00</b>
EX3	22.86	21.83	0.98	0.00	0.05	<b>0.10</b>	<b>0.37</b>		<b>3.63</b>
OS1	8.67	8.67	0.00	0.00	0.00	<b>0.08</b>	<b>0.35</b>		<b>0.00</b>
OS2	0.49	0.49	0.00	0.00	0.00	<b>0.08</b>	<b>0.35</b>		<b>0.00</b>
OS3	1.02	0.60	0.42	0.00	0.00	<b>0.29</b>	<b>0.49</b>		<b>32.94</b>
Site Percent Impervious		2.11							



DEVELOPED CONDITIONS									
RUNOFF COEFFICIENT									
TYPE A/B SOILS									
LAND USE		Imperv %	5 YR	100 YR					
UNDEV		0	0.08	0.35					
GRAVEL ROAD		80	0.59	0.7					
ASPHALT ROAD		100	0.9	0.96					
ROOFS		90	0.73	0.81					
Developed Conditions									
	TOTAL	SURFACE CONDITION AREAS				CALCULATED C			
AREA	AREA	UNDEV	GRAVEL	ASPHALT	ROOFS	5	100	% IMPERVIOUS	
DESIG.	(acre)		ROAD	ROAD		YR	YR		
PP1	1.06	1.06	0.00	0.00	0.00	0.08	0.35		0.00
PP2	14.59	14.59	0.00	0.00	0.00	0.08	0.35		0.00
PP3	22.86	21.49	1.16	0.00	0.21	0.11	0.37		4.89
Total	38.51	37.14	1.16	0.00	0.21	TOTAL SITE IMPERVIOUSNESS			2.90
OS1	8.67	8.67	0.00	0.00	0.00	0.08	0.35		0.00
OS2	0.49	0.49	0.00	0.00	0.00	0.08	0.35		0.00
OS3	1.02	0.60	0.42	0.00	0.00	0.29	0.49		32.94
Site Percent Impervious		2.83							





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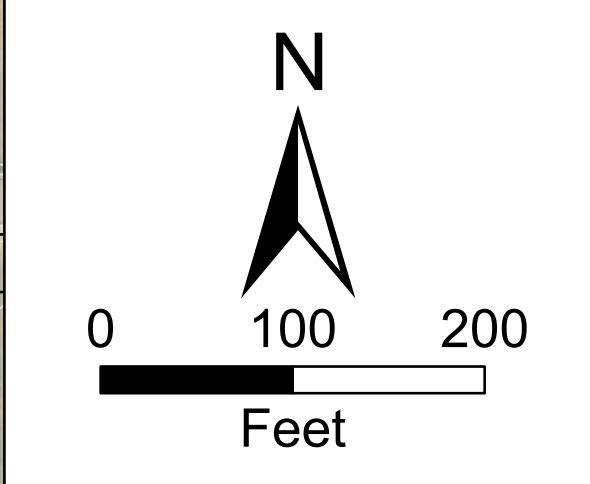
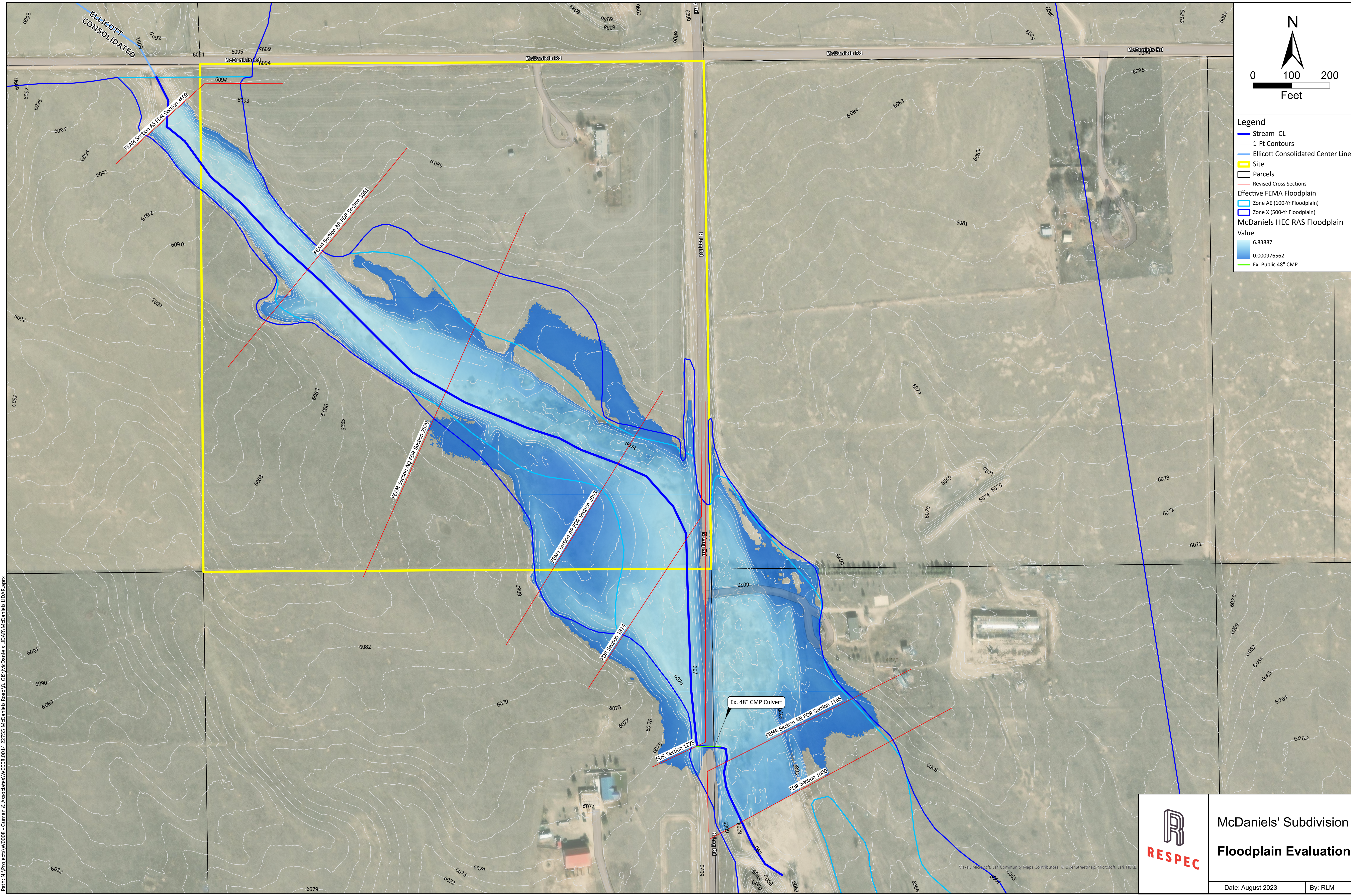
# APPENDIX C

## ELLICOTT CONSOLIDATED FLOODPLAIN ANALYSIS

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- Legend**
- Stream\_CL
  - 1-Ft Contours
  - Ellicott Consolidated Center Line
  - Site
  - Revised Cross Sections
  - Effective FEMA Floodplain**
  - Zone AE (100-Yr Floodplain)
  - Zone X (500-Yr Floodplain)
  - McDaniels HEC RAS Floodplain**
  - Value**
  - 6.83887
  - 0.000976562
  - Ex. Public 48" CMP



**McDaniels' Subdivision  
Floodplain Evaluation**

Date: August 2023 By: RLM

Path: N:\Projects\W0008 - Guman & Associates\W0008.0014 22755 McDaniels Road\8. GIS\McDaniels LIDAR\McDaniels LIDAR.aprx

Mapax, Microsoft, Esri, Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, HERE

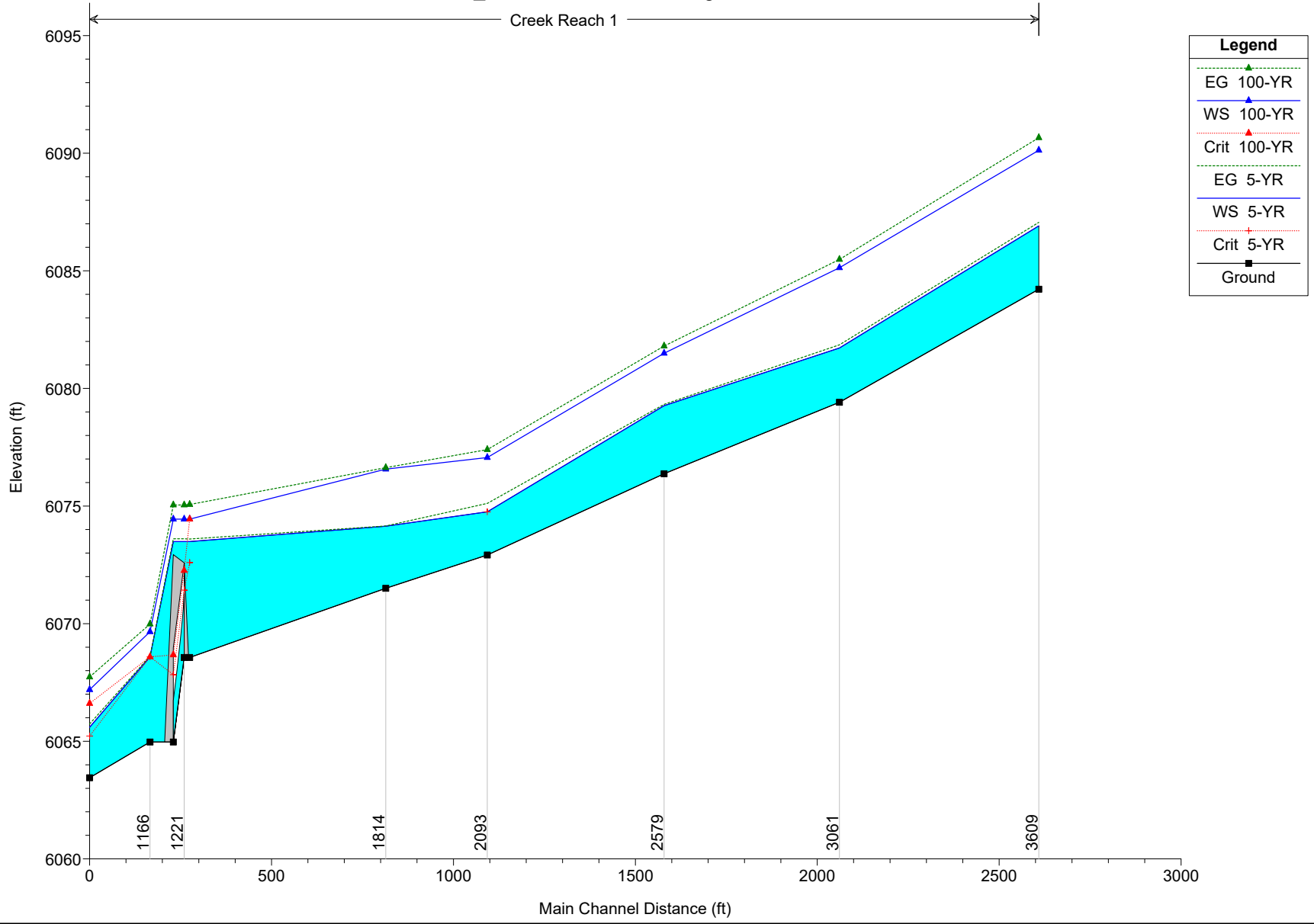


HEC-RAS Plan: Existing River: Creek Reach: Reach 1

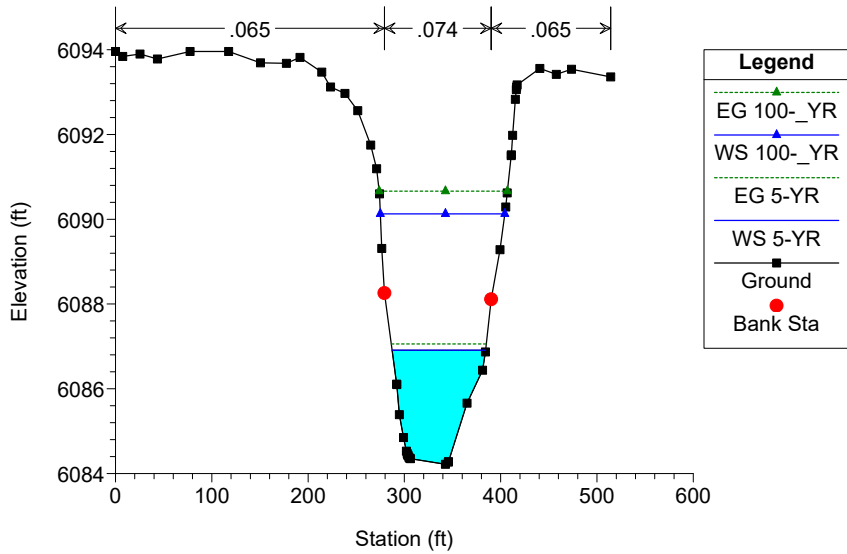
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	3609	5-YR	570.00	6084.22	6086.91		6087.06	0.009843	3.07	185.91	97.05	0.39
Reach 1	3609	100-YR	3200.00	6084.22	6090.13		6090.66	0.010752	5.91	552.72	129.32	0.48
Reach 1	3061	5-YR	570.00	6079.41	6081.72		6081.85	0.009166	2.97	191.95	99.59	0.38
Reach 1	3061	100-YR	3200.00	6079.41	6085.13		6085.49	0.008188	4.97	696.78	203.06	0.41
Reach 1	2579	5-YR	570.00	6076.37	6079.27		6079.32	0.003368	1.91	298.05	171.93	0.26
Reach 1	2579	100-YR	3200.00	6076.37	6081.50		6081.80	0.007120	4.43	729.05	271.04	0.42
Reach 1	2093	5-YR	570.00	6072.92	6074.75	6074.75	6075.11	0.053393	4.88	122.53	173.74	0.91
Reach 1	2093	100-YR	3200.00	6072.92	6077.06		6077.40	0.011847	5.18	798.25	528.22	0.53
Reach 1	1814	5-YR	570.00	6071.50	6074.14		6074.15	0.000435	0.81	706.10	325.46	0.10
Reach 1	1814	100-YR	3200.00	6071.50	6076.57		6076.63	0.001031	2.04	1665.55	444.88	0.17
Reach 1	1275	5-YR	570.00	6068.56	6073.49	6072.60	6073.60	0.004497	2.98	274.92	293.02	0.32
Reach 1	1275	100-YR	3200.00	6068.56	6074.44	6074.44	6075.07	0.022462	8.11	631.73	461.52	0.74
Reach 1	1221		Culvert									
Reach 1	1166	5-YR	570.00	6064.97	6068.59	6068.59	6068.62	0.001328	1.38	416.37	213.24	0.17
Reach 1	1166	100-YR	3200.00	6064.97	6069.66	6068.59	6069.99	0.009293	4.76	771.19	418.96	0.47
Reach 1	1000	5-YR	570.00	6063.45	6065.60	6065.22	6065.74	0.020012	2.98	191.22	215.85	0.56
Reach 1	1000	100-YR	3200.00	6063.45	6067.19	6066.61	6067.73	0.020008	5.90	546.94	238.09	0.66

McDaniels\_June23 Plan: Existing Conditions 7/18/2023

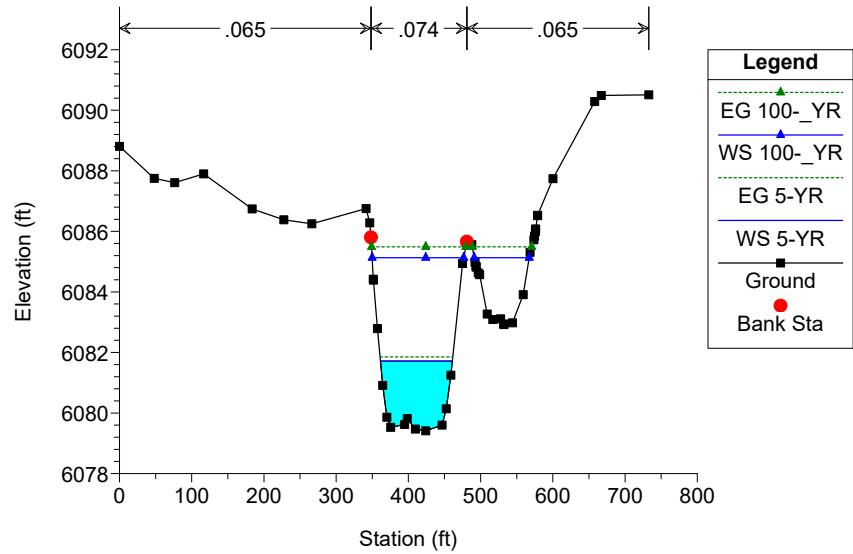
Creek Reach 1



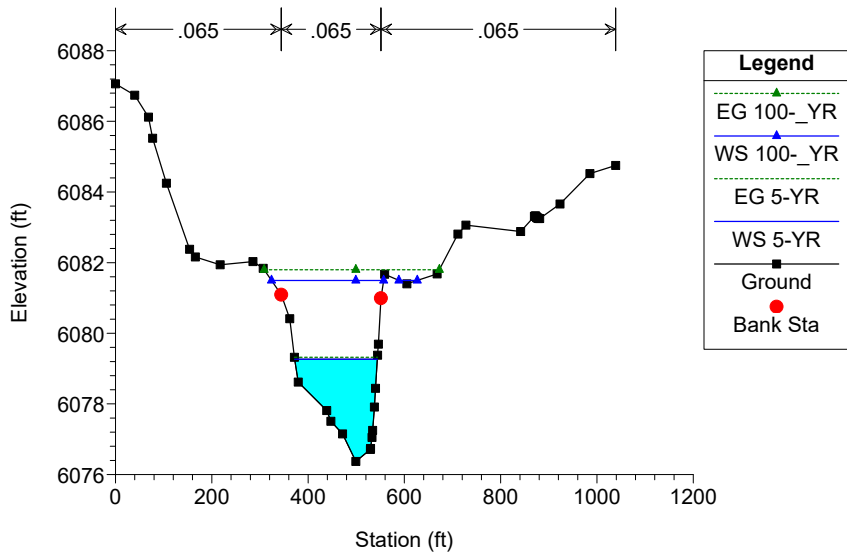
McDaniels\_June23 Plan: Existing Conditions 7/18/2023



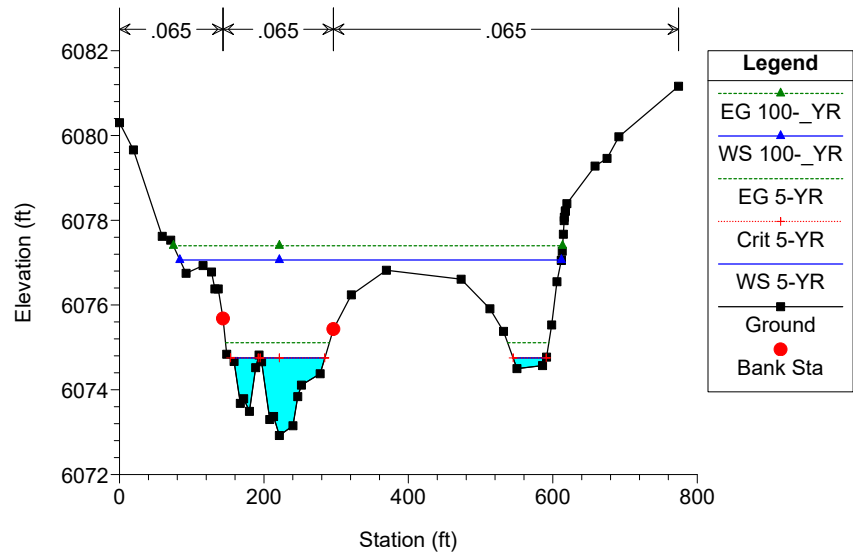
McDaniels\_June23 Plan: Existing Conditions 7/18/2023



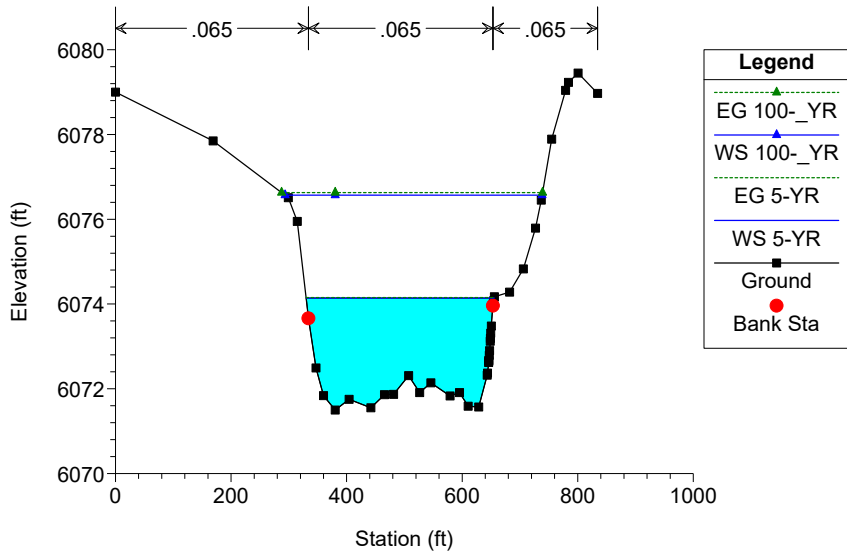
McDaniels\_June23 Plan: Existing Conditions 7/18/2023



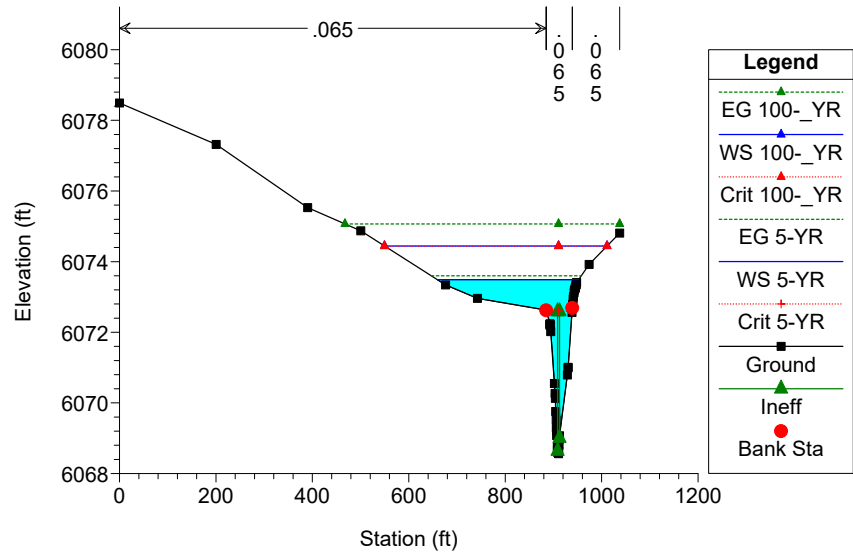
McDaniels\_June23 Plan: Existing Conditions 7/18/2023



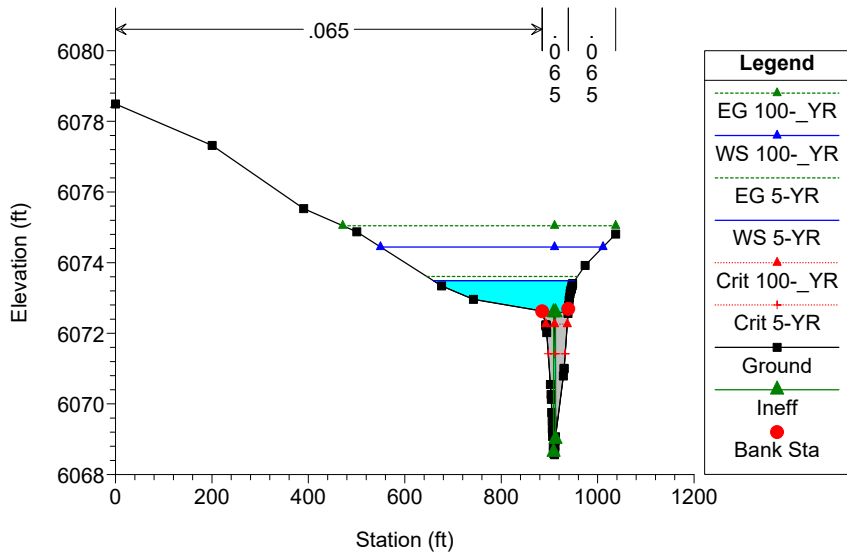
McDaniels\_June23 Plan: Existing Conditions 7/18/2023



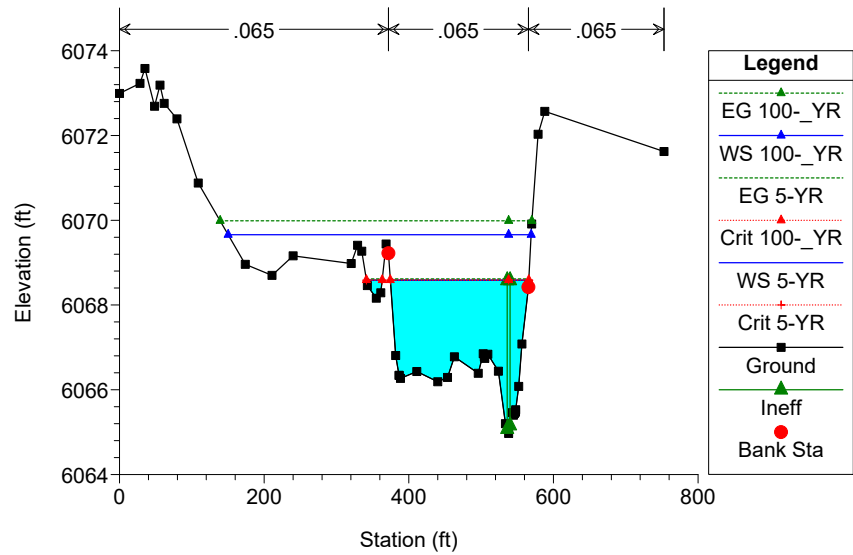
McDaniels\_June23 Plan: Existing Conditions 7/18/2023



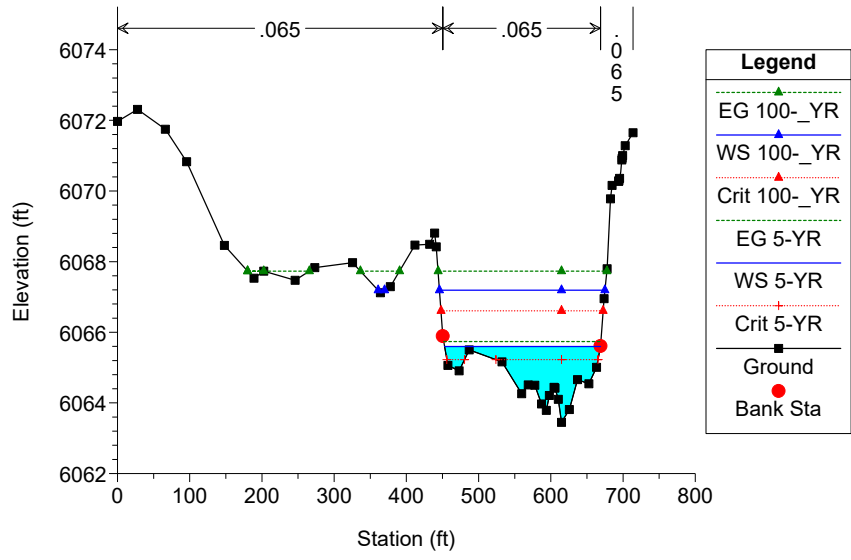
McDaniels\_June23 Plan: Existing Conditions 7/18/2023



McDaniels\_June23 Plan: Existing Conditions 7/18/2023









Woody shrubs along channel thalweg on north end of site (looking southeast)



Native grasses within channel within midpoint of property (looking northwest)





Native grasses within channel within midpoint of property (looking southeast)



48" CMP at North Log Road crossing (downstream of project, looking west)





48" CMP at North Log Road Crossing (downstream of project, looking east)

HEC-RAS HEC-RAS 6.2 March 2022  
 U.S. Army Corps of Engineers  
 Hydrologic Engineering Center  
 609 Second Street  
 Davis, California

```

X   X  XXXXXX   XXXX       XXXX       XX       XXXX
X   X  X        X   X      X   X      X   X      X
X   X  X        X         X   X      X   X      X
XXXXXXXX XXXX   X         XXX XXXX   XXXXXXXX   XXXX
X   X  X        X         X   X      X   X          X
X   X  X        X   X      X   X      X   X          X
X   X  XXXXXX   XXXX       X   X      X   X      XXXXX
  
```

PROJECT DATA

Project Title: McDaniels\_June23  
 Project File : McDaniels\_Jun23.prj  
 Run Date and Time: 7/18/2023 7:05:20 AM

Project in English units

PLAN DATA

Plan Title: Existing Conditions  
 Plan File : n:\Projects\W0008 - Guman & Associates\W0008.0014 22755 McDaniels Road\5. ENG\HEC-RAS\McDaniels\_Jun23.p01

Geometry Title: McDaniels  
 Geometry File : n:\Projects\W0008 - Guman & Associates\W0008.0014 22755 McDaniels Road\5. ENG\HEC-RAS\McDaniels\_Jun23.g01

Flow Title : DBPS Flows  
 Flow File : n:\Projects\W0008 - Guman & Associates\W0008.0014 22755 McDaniels Road\5. ENG\HEC-RAS\McDaniels\_Jun23.f01

Plan Summary Information:

Number of:	Cross Sections =	8	Multiple Openings =	0
	Culverts =	1	Inline Structures =	0
	Bridges =	0	Lateral Structures =	0

Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculation tolerance =	0.01
Maximum number of iterations =	20
Maximum difference tolerance =	0.3
Flow tolerance factor =	0.001

Computation Options

Critical depth computed only where necessary  
 Conveyance Calculation Method: At breaks in n values only  
 Friction Slope Method: Average Conveyance  
 Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: DBPS Flows  
 Flow File : n:\Projects\W0008 - Guman & Associates\W0008.0014 22755 McDaniels Road\5. ENG\HEC-RAS\McDaniels\_Jun23.f01

Flow Data (cfs)

River	Reach	RS	5-YR	100-YR
Creek	Reach 1	3609	570	3200

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Creek	Reach 1	5-YR		Normal S = 0.02
Creek	Reach 1	100-YR		Normal S = 0.02

GEOMETRY DATA

Geometry Title: McDaniels  
 Geometry File : n:\Projects\W0008 - Guman & Associates\W0008.0014 22755 McDaniels Road\5. ENG\HEC-RAS\McDaniels\_Jun23.g01

CROSS SECTION

RIVER: Creek  
 REACH: Reach 1 RS: 3609

INPUT

Description:

Station Elevation Data	num=	50							
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev									
0 6093.96 7.5 6093.84 25.5 6093.9 43.5 6093.78 77.5 6093.96									
117.5 6093.96 150.6 6093.69 177.5 6093.68 191.5 6093.82 214.2 6093.47									
223.4 6093.12 238.2 6092.97 251.6 6092.56 265.1 6091.75 271.1 6091.19									
274.1 6090.6 276.5 6089.31 279.3 6088.26 292 6086.11 292.1 6086.1									
294.8 6085.39 299.1 6084.85 302 6084.53 302.9 6084.47 303.4 6084.44									
303.9 6084.42 304.8 6084.38 305.6 6084.36 306.2 6084.35 342.6 6084.22									
345.6 6084.27 345.8 6084.28 365 6085.66 381.2 6086.44 384.1 6086.87									
390.2 6088.11 399.2 6089.28 405.3 6090.29 406.7 6090.62 410.9 6091.5									
411 6091.52 412.4 6091.98 415.2 6092.83 416.3 6093.06 416.6 6093.12									
417 6093.17 440.6 6093.56 457.7 6093.42 473.6 6093.54 514.27 6093.36									

Manning's n Values	num=	3			
Sta n Val Sta n Val Sta n Val					
0 .065 279.3 .074 390.2 .065					

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
279.3	390.2	548	548	548	.1	.3	

CROSS SECTION

RIVER: Creek  
 REACH: Reach 1 RS: 3061

INPUT

Description:

Station Elevation Data	num=	50							
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev									
0 6088.81 48 6087.75 76.4 6087.61 116.5 6087.9 183.6 6086.74									
227.5 6086.38 266.2 6086.25 341.5 6086.75 346.4 6086.28 348.2 6085.8									
351.4 6084.42 351.5 6084.39 357.1 6082.79 364.4 6080.91 370.3 6079.86									
375.6 6079.53 394.8 6079.62 398.4 6079.82 409.7 6079.47 424 6079.41									
446.7 6079.6 452.5 6080.14 458.8 6081.25 475.1 6084.94 480.9 6085.66									
487.9 6085.56 492.2 6084.98 493.5 6084.85 493.9 6084.82 496.7 6084.63									
498.8 6084.57 509.2 6083.27 516.9 6083.09 527.7 6083.11 532 6082.94									
532.4 6082.92 544.1 6082.98 559 6083.91 568.5 6085.31 573.7 6085.72									
574.6 6085.84 575.7 6085.99 576 6086.04 576.3 6086.08 578.8 6086.52									
578.9 6086.53 600.2 6087.74 657.9 6090.29 667 6090.49 732.82 6090.51									

Manning's n Values	num=	3			
Sta n Val Sta n Val Sta n Val					

0 .065 348.2 .074 480.9 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
348.2 480.9 482 482 482 .1 .3

CROSS SECTION

RIVER: Creek  
REACH: Reach 1 RS: 2579

INPUT

Description:

Station Elevation Data		num= 47							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6087.06	39.9	6086.74	68.4	6086.12	77.2	6085.52	105.6	6084.25
153.8	6082.38	165.9	6082.16	217.3	6081.94	285.6	6082.03	306.8	6081.84
344.4	6081.09	361.9	6080.41	371.4	6079.32	379.5	6078.62	438.5	6077.81
447.3	6077.51	471.4	6077.15	499.1	6076.37	529.4	6076.71	529.6	6076.74
532.7	6077.05	533.9	6077.25	537.6	6077.91	540	6078.44	544.5	6079.38
545.9	6079.69	551.3	6080.99	559	6081.67	605	6081.4	668.1	6081.68
711.1	6082.81	727.7	6083.06	841.5	6082.88	869.9	6083.31	871.6	6083.32
872.2	6083.32	873.1	6083.31	873.8	6083.3	874.6	6083.28	875.1	6083.27
876.6	6083.26	877.7	6083.26	878.8	6083.25	881	6083.25	923.1	6083.66
985.2	6084.52	1038.69	6084.75						

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .065 344.4 .065 551.3 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
344.4 551.3 486 486 486 .1 .3

CROSS SECTION

RIVER: Creek  
REACH: Reach 1 RS: 2093

INPUT

Description:

Station Elevation Data		num= 49							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6080.3	19.3	6079.66	59.2	6077.62	71	6077.53	92.1	6076.75
115.6	6076.93	127.4	6076.78	132	6076.38	136.8	6076.38	143.3	6075.68
148.5	6074.84	158.6	6074.67	167.3	6073.68	172	6073.79	180	6073.49
188.5	6074.52	193.2	6074.82	196.7	6074.66	208.1	6073.3	213.4	6073.37
221.4	6072.92	240.2	6073.15	246.8	6073.84	251.9	6074.11	277.8	6074.38
296.2	6075.43	321	6076.24	369.5	6076.82	472.9	6076.61	512.8	6075.91
531.6	6075.38	550.4	6074.5	585.7	6074.57	591.3	6074.77	598.5	6075.53
605.8	6076.55	611.6	6077.05	611.8	6077.06	613.1	6077.27	614.5	6077.67
615.6	6077.99	616	6078.07	617.3	6078.21	617.4	6078.22	619.4	6078.39
658.5	6079.28	675	6079.46	691.5	6079.97	774.14	6081.16		

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .065 143.3 .065 296.2 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
143.3 296.2 279 279 279 .1 .3

CROSS SECTION

RIVER: Creek  
REACH: Reach 1 RS: 1814

INPUT

Description:

Station Elevation Data		num= 44							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	6079	169	6077.85	299.1	6076.51	314.7	6075.95	334.1	6073.66
347.1	6072.49	360.1	6071.84	380.2	6071.5	404.4	6071.75	442	6071.55
465.6	6071.86	481.4	6071.87	507.4	6072.31	526.5	6071.91	545.7	6072.14
579.2	6071.83	595.5	6071.91	610.3	6071.59	628.7	6071.57	643.2	6072.32
643.8	6072.37	645.8	6072.62	646.1	6072.65	646.2	6072.67	646.9	6072.79
647.5	6072.9	648.6	6073.12	648.9	6073.19	649.5	6073.31	650.4	6073.48
653.3	6073.96	653.4	6073.97	653.9	6074.01	654.7	6074.08	655.8	6074.17
682.1	6074.28	706	6074.83	726.9	6075.79	736.8	6076.45	755	6077.89
778.9	6079.04	784.1	6079.23	800.6	6079.45	834.33	6078.97		

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .065 334.1 .065 653.3 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 334.1 653.3 539 539 539 .1 .3

CROSS SECTION

RIVER: Creek  
 REACH: Reach 1 RS: 1275

INPUT

Description:

Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6078.49	200.3	6077.32	390.3	6075.53	500.3	6074.87	676.3	6073.34
742.3	6072.96	884.3	6072.63	885.1	6072.62	892.6	6072.24	892.8	6072.22
892.9	6072.22	893.1	6072.19	894.3	6072.02	902.1	6070.55	903.3	6070.27
903.9	6070.13	904.8	6069.76	905.5	6069.52	906.1	6069.29	906.3	6069.21
906.8	6069.08	907.8	6068.77	908.3	6068.65	909.3	6068.6	909.6	6068.59
910.5	6068.56	910.8	6068.63	911.5	6068.8	912.4	6068.97	912.7	6069.07
928.9	6070.79	930.3	6070.99	930.4	6071.01	938.6	6072.56	939.2	6072.69
939.4	6072.72	939.9	6072.79	940.9	6072.94	941.4	6073.01	942.7	6073.12
943.6	6073.19	944.7	6073.23	945.5	6073.27	945.8	6073.28	946.9	6073.34
947	6073.35	948	6073.41	974.1	6073.92	1037.31	6074.81		

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .065 885.1 .065 939.2 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 885.1 939.2 109 109 109 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	908.5	6072.59	F
912.5	1037.31	6072.59	F

CULVERT

RIVER: Creek  
 REACH: Reach 1 RS: 1221

INPUT

Description:

Distance from Upstream XS = 15  
 Deck/Roadway Width = 30  
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num= 10

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	6078.49			6060	200.3	6077.32			6060	390.3	6075.53			6060
500.3	6074.87			6060	676.3	6073.34			6060	742.3	6072.96			6060
884.3	6072.63			6060	885.1	6072.62			6060	961.4	6072.57			6060
1126.32	6071.62			6060										

Upstream Bridge Cross Section Data

Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-----	------	-----	------	-----	------	-----	------	-----	------



0	6078.49	200.3	6077.32	390.3	6075.53	500.3	6074.87	676.3	6073.34
742.3	6072.96	884.3	6072.63	885.1	6072.62	892.6	6072.24	892.8	6072.22
892.9	6072.22	893.1	6072.19	894.3	6072.02	902.1	6070.55	903.3	6070.27
903.9	6070.13	904.8	6069.76	905.5	6069.52	906.1	6069.29	906.3	6069.21
906.8	6069.08	907.8	6068.77	908.3	6068.65	909.3	6068.6	909.6	6068.59
910.5	6068.56	910.8	6068.63	911.5	6068.8	912.4	6068.97	912.7	6069.07
928.9	6070.79	930.3	6070.99	930.4	6071.01	938.6	6072.56	939.2	6072.69
939.4	6072.72	939.9	6072.79	940.9	6072.94	941.4	6073.01	942.7	6073.12
943.6	6073.19	944.7	6073.23	945.5	6073.27	945.8	6073.28	946.9	6073.34
947	6073.35	948	6073.41	974.1	6073.92	1037.31	6074.81		

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .065 885.1 .065 939.2 .065

Bank Sta: Left Right Coeff Contr. Expan.  
 885.1 939.2 .3 .5

Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 0 908.5 6072.59 F  
 912.5 1037.31 6072.59 F

Downstream Deck/Roadway Coordinates num= 10  
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord  
 0 6078.49 6060 200.3 6077.32 6060 390.3 6075.53 6060  
 500.3 6074.87 6060 676.3 6073.34 6060 742.3 6072.96 6060  
 884.3 6072.63 6060 885.1 6072.62 6060 961.4 6072.57 6060  
 1126.32 6071.62 6060

Downstream Bridge Cross Section Data Station Elevation Data num= 50  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
 0 6072.99 28.4 6073.23 35.1 6073.58 48.5 6072.69 55.9 6073.19  
 61.8 6072.76 79.4 6072.39 108.9 6070.88 173.8 6068.96 210.8 6068.7  
 240 6069.16 320.3 6068.98 329.2 6069.41 334.9 6069.27 342.6 6068.46  
 355 6068.16 361.3 6068.29 368.5 6069.44 371.8 6069.22 381.9 6066.81  
 386.4 6066.34 386.7 6066.34 388.6 6066.27 411 6066.43 440.1 6066.19  
 453.5 6066.29 463.1 6066.78 496 6066.39 502.9 6066.85 504.4 6066.77  
 505 6066.74 509.4 6066.84 523.8 6066.44 533.6 6065.2 538.1 6064.97  
 543.4 6065.46 544.6 6065.4 546.1 6065.44 547.1 6065.47 547.5 6065.48  
 547.6 6065.5 547.8 6065.53 552.1 6066.08 556.5 6067.08 565.4 6068.42  
 565.5 6068.45 569.9 6069.91 578.8 6072.03 588 6072.57 752.92 6071.62

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .065 371.8 .065 565.4 .065

Bank Sta: Left Right Coeff Contr. Expan.  
 371.8 565.4 .3 .5

Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 0 536.1 6068.58 F  
 540.1 752.92 6068.58 F

Upstream Embankment side slope = 3 horiz. to 1.0 vertical  
 Downstream Embankment side slope = 3 horiz. to 1.0 vertical  
 Maximum allowable submergence for weir flow = .98  
 Elevation at which weir flow begins = 6072.59  
 Energy head used in spillway design =  
 Spillway height used in design =  
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span  
 Culvert #1 Circular 4 4  
 FHWA Chart # 2 - Corrugated Metal Pipe Culvert  
 FHWA Scale # 2 - Mitered to conform to slope  
 Solution Criteria = Highest U.S. EG  
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef

15 30 .024 .024 0 .5 1  
 Upstream Elevation = 6068.56  
 Centerline Station = 910.5  
 Downstream Elevation = 6064.97  
 Centerline Station = 538.1

CROSS SECTION

RIVER: Creek  
 REACH: Reach 1 RS: 1166

INPUT

Description:

Station Elevation Data		num= 50		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6072.99	28.4	6073.23	35.1	6073.58	48.5	6072.69	55.9	6073.19		
61.8	6072.76	79.4	6072.39	108.9	6070.88	173.8	6068.96	210.8	6068.7		
240	6069.16	320.3	6068.98	329.2	6069.41	334.9	6069.27	342.6	6068.46		
355	6068.16	361.3	6068.29	368.5	6069.44	371.8	6069.22	381.9	6066.81		
386.4	6066.34	386.7	6066.34	388.6	6066.27	411	6066.43	440.1	6066.19		
453.5	6066.29	463.1	6066.78	496	6066.39	502.9	6066.85	504.4	6066.77		
505	6066.74	509.4	6066.84	523.8	6066.44	533.6	6065.2	538.1	6064.97		
543.4	6065.46	544.6	6065.4	546.1	6065.44	547.1	6065.47	547.5	6065.48		
547.6	6065.5	547.8	6065.53	552.1	6066.08	556.5	6067.08	565.4	6068.42		
565.5	6068.45	569.9	6069.91	578.8	6072.03	588	6072.57	752.92	6071.62		

Manning's n Values		num= 3		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.065	371.8	.065	565.4	.065				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	371.8	565.4	166	166	166		.3	.5

Ineffective Flow		num= 2		Sta L Sta R Elev Permanent	
	0	536.1	6068.58	F	
	540.1	752.92	6068.58	F	

CROSS SECTION

RIVER: Creek  
 REACH: Reach 1 RS: 1000

INPUT

Description:

Station Elevation Data		num= 49		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6071.97	27.7	6072.31	66.2	6071.75	95.7	6070.83	148.1	6068.46		
189	6067.53	202.6	6067.73	245.9	6067.47	273.1	6067.83	325.4	6067.97		
364.1	6067.12	377.8	6067.29	411.9	6068.47	432.3	6068.49	439.1	6068.81		
441.4	6068.42	450.5	6065.89	457.4	6065.06	473.1	6064.91	486.9	6065.5		
532.4	6065.16	559.7	6064.26	568.8	6064.51	577.8	6064.5	587	6063.97		
593.8	6063.79	598	6064.21	604.4	6064.44	605.2	6064.43	605.8	6064.42		
610.3	6064.1	614.7	6063.45	625.7	6063.81	637	6064.66	652.6	6064.54		
663.4	6065.01	668.9	6065.61	673.7	6066.95	678	6067.8	682.6	6069.78		
684.8	6070.16	693.9	6070.27	694.4	6070.3	695.3	6070.36	698.4	6070.88		
698.8	6070.93	699.5	6071	703	6071.28	713.77	6071.65				

Manning's n Values		num= 3		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.065	450.5	.065	668.9	.065				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	450.5	668.9	50	50	50		.1	.3

SUMMARY OF MANNING'S N VALUES

River:Creek

Reach	River Sta.	n1	n2	n3
Reach 1	3609	.065	.074	.065
Reach 1	3061	.065	.074	.065
Reach 1	2579	.065	.065	.065
Reach 1	2093	.065	.065	.065
Reach 1	1814	.065	.065	.065
Reach 1	1275	.065	.065	.065
Reach 1	1221	Culvert		
Reach 1	1166	.065	.065	.065
Reach 1	1000	.065	.065	.065

SUMMARY OF REACH LENGTHS

River: Creek

Reach	River Sta.	Left	Channel	Right
Reach 1	3609	548	548	548
Reach 1	3061	482	482	482
Reach 1	2579	486	486	486
Reach 1	2093	279	279	279
Reach 1	1814	539	539	539
Reach 1	1275	109	109	109
Reach 1	1221	Culvert		
Reach 1	1166	166	166	166
Reach 1	1000	50	50	50

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Creek

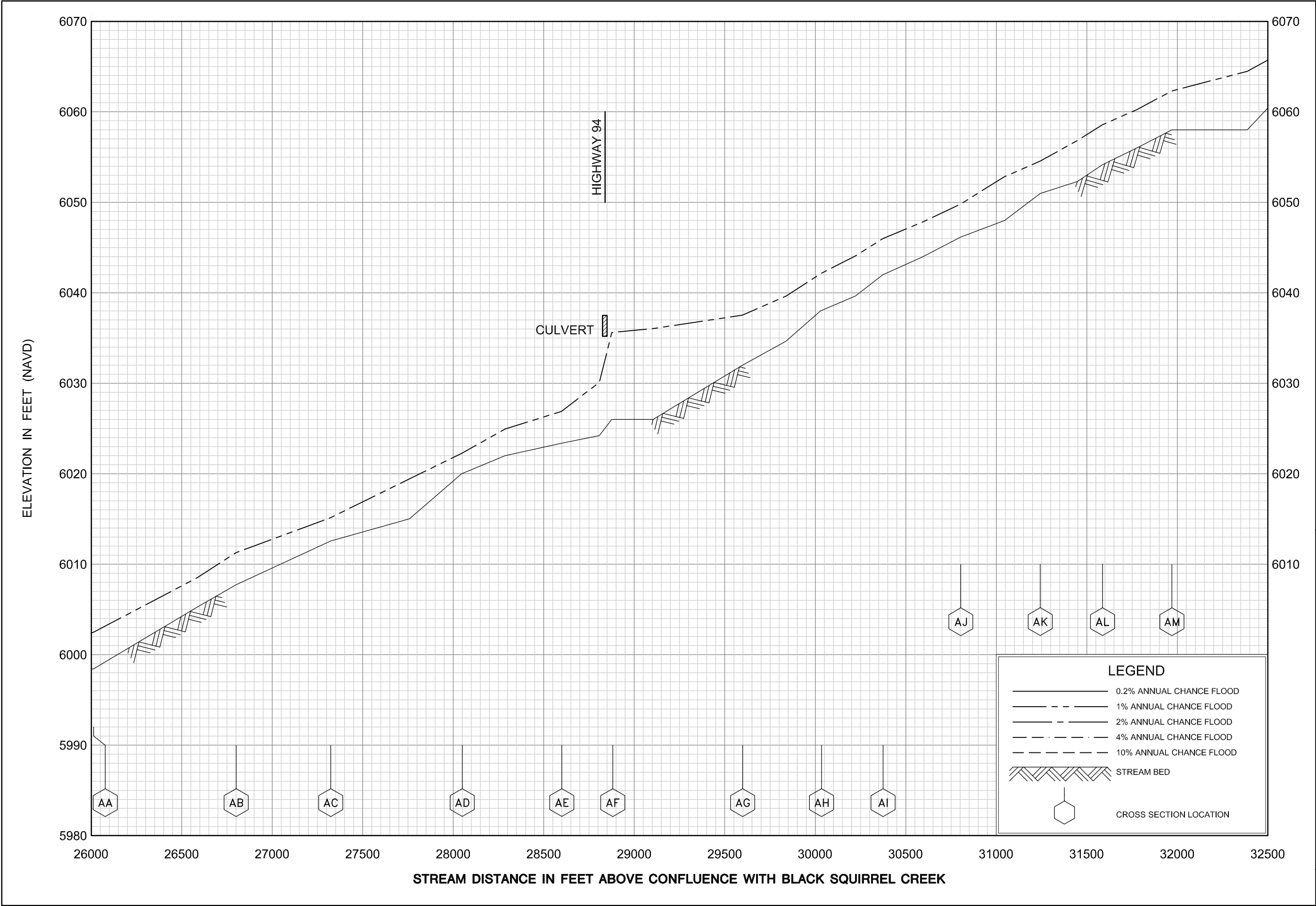
Reach	River Sta.	Contr.	Expan.
Reach 1	3609	.1	.3
Reach 1	3061	.1	.3
Reach 1	2579	.1	.3
Reach 1	2093	.1	.3
Reach 1	1814	.1	.3
Reach 1	1275	.3	.5
Reach 1	1221	Culvert	
Reach 1	1166	.3	.5
Reach 1	1000	.1	.3

Table 4. Summary of Discharges (cont.)

<u>Flooding Source and Location</u>	<u>Drainage Area (Square Miles)</u>	<u>Peak Discharges (Cubic Feet Per Second)</u>			
		<u>10-Year</u>	<u>50-Year</u>	<u>100-Year</u>	<u>500-Year</u>
East Cherry Creek At Walker Road	10.30	-- <sup>1</sup>	-- <sup>1</sup>	2,000	-- <sup>1</sup>
East Tributary to Black Squirrel Creek At confluence with Black Squirrel Creek	0.97	-- <sup>1</sup>	-- <sup>1</sup>	569	-- <sup>1</sup>
East Tributary to Black Squirrel Creek – West Fork Bennett Ranch Basin At Black Squirrel Creek – West Fork Bennett Ranch Basin	0.40	-- <sup>1</sup>	-- <sup>1</sup>	230	-- <sup>1</sup>
Ellicott Consolidated At confluence with Black Squirrel Creek	-- <sup>1</sup>	-- <sup>1</sup>	-- <sup>1</sup>	8,000	-- <sup>1</sup>
At confluence with East Tributary	-- <sup>1</sup>	-- <sup>1</sup>	-- <sup>1</sup>	7,019	-- <sup>1</sup>
Ellicott Consolidated – East Tributary At confluence with Ellicott Consolidated	-- <sup>1</sup>	-- <sup>1</sup>	-- <sup>1</sup>	183	-- <sup>1</sup>
Fairfax Creek At Research Parkway	0.70	-- <sup>1</sup>	-- <sup>1</sup>	1,000	-- <sup>1</sup>
Fisher’s Canyon At confluence with Fountain Creek	5.30	1,420	2,590	3,090	4,800
Fisher’s Canyon-Above Loomis Avenue At West Meadows Drive	3.59	-- <sup>1</sup>	-- <sup>1</sup>	1,640	-- <sup>1</sup>
Upstream of Fisher’s Canyon-South Branch	2.36	-- <sup>1</sup>	-- <sup>1</sup>	440	-- <sup>1</sup>
Fisher’s Canyon-South Branch At confluence with Fisher’s Canyon	1.23	-- <sup>1</sup>	-- <sup>1</sup>	1,290	-- <sup>1</sup>

Flow rate  
through  
project  
reach

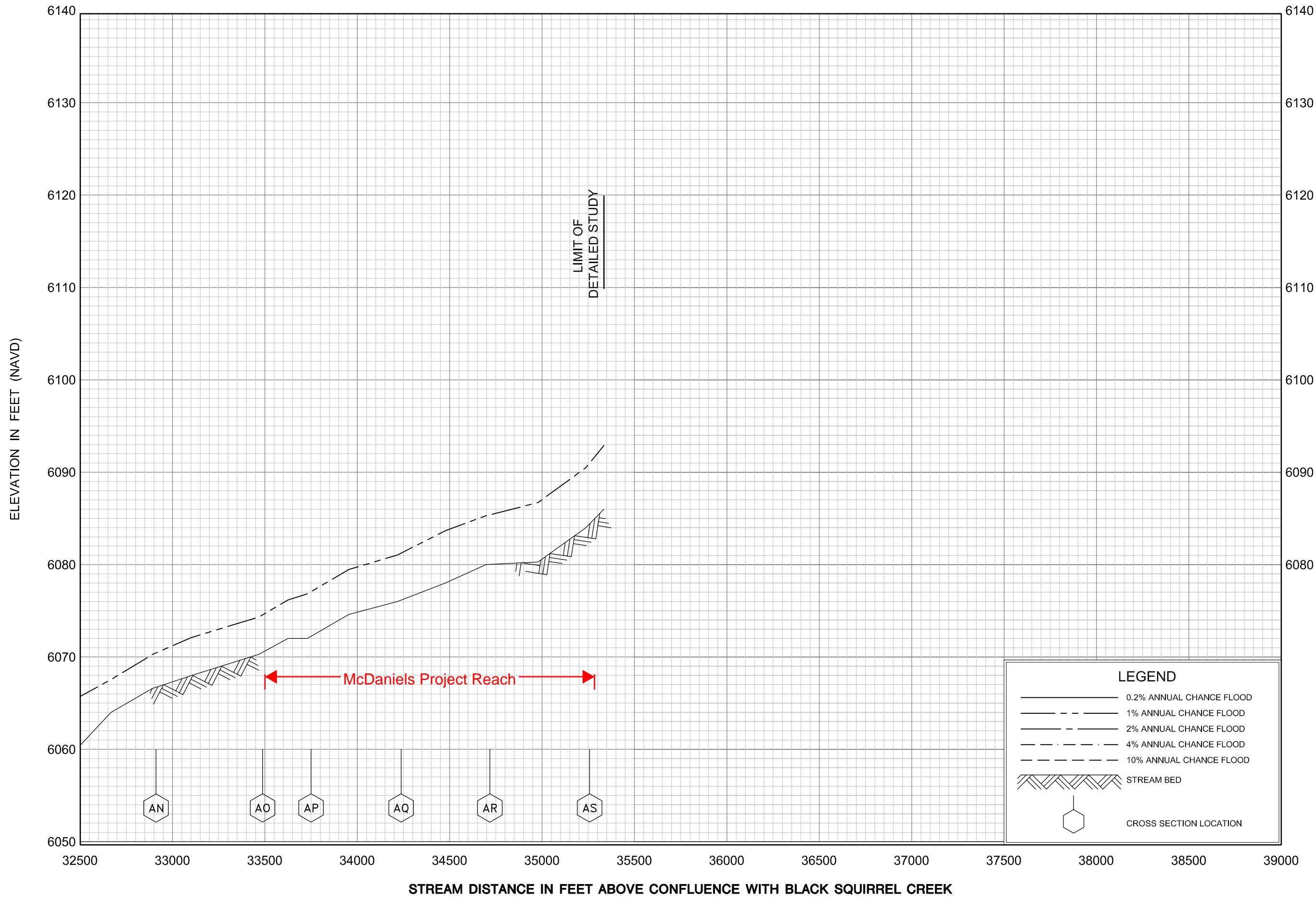
<sup>1</sup>Data not available



FLOOD PROFILES  
ELLICOTT CONSOLIDATED

FEDERAL EMERGENCY MANAGEMENT AGENCY  
EL PASO COUNTY, CO  
AND INCORPORATED AREAS





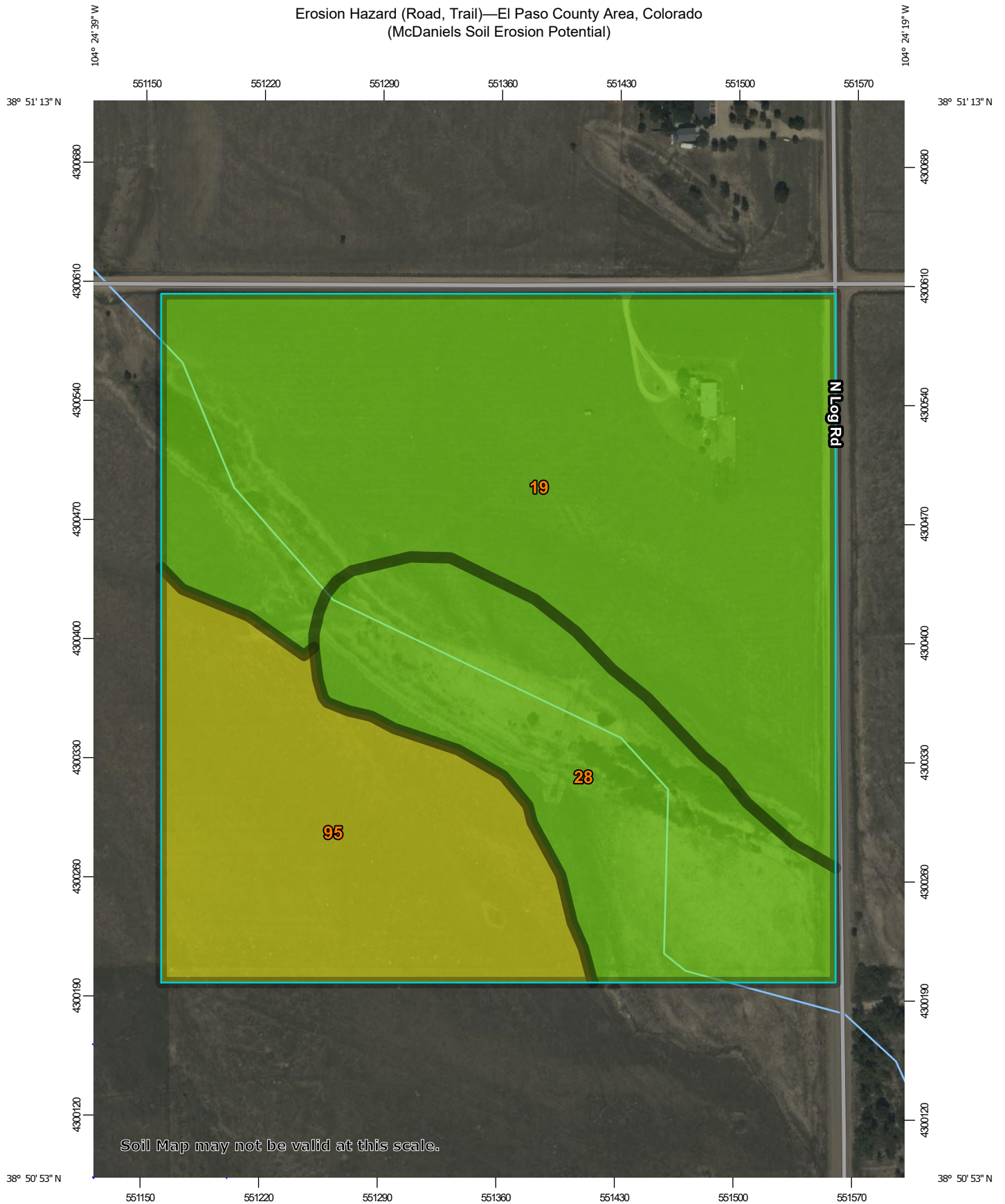
**FLOOD PROFILES**

**ELLICOTT CONSOLIDATED**

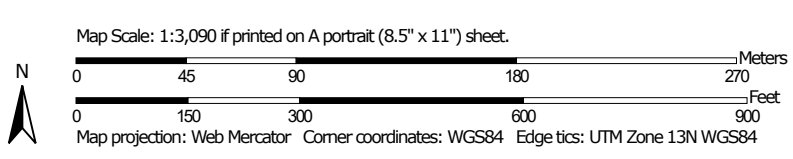
FEDERAL EMERGENCY MANAGEMENT AGENCY

**EL PASO COUNTY, CO  
AND INCORPORATED AREAS**

Erosion Hazard (Road, Trail)—El Paso County Area, Colorado  
(McDaniels Soil Erosion Potential)




Soil Map may not be valid at this scale.



Erosion Hazard (Road, Trail)—El Paso County Area, Colorado  
(McDaniels Soil Erosion Potential)






### MAP LEGEND

**Area of Interest (AOI)**






 Area of Interest (AOI)

**Soils**






**Soil Rating Polygons**

-  Very severe
-  Severe
-  Moderate
-  Slight
-  Not rated or not available


**Soil Rating Lines**

-  Very severe
-  Severe
-  Moderate
-  Slight
-  Not rated or not available

**Soil Rating Points**




-  Very severe
-  Severe
-  Moderate
-  Slight
-  Not rated or not available

**Water Features**


 Streams and Canals

**Transportation**

-  Rails
-  Interstate Highways

-  US Routes
-  Major Roads
-  Local Roads

**Background**

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

**Warning:** Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado  
Survey Area Data: Version 20, Sep 2, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 11, 2018—Oct 20, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Erosion Hazard (Road, Trail)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	Slight	Columbine (97%)		21.0	52.6%
28	Ellicott loamy coarse sand, 0 to 5 percent slopes	Slight	Ellicott (97%)		9.1	22.8%
95	Truckton loamy sand, 1 to 9 percent slopes	Moderate	Truckton (87%)	Slope/erodibility (0.50)	9.9	24.7%
			Blakeland (5%)	Slope/erodibility (0.50)		
<b>Totals for Area of Interest</b>					<b>40.0</b>	<b>100.0%</b>

Rating	Acres in AOI	Percent of AOI
Slight	30.1	75.3%
Moderate	9.9	24.7%
<b>Totals for Area of Interest</b>	<b>40.0</b>	<b>100.0%</b>

## Description

### FOR - Forestry

The ratings in this interpretation indicate the hazard of soil loss from unsurfaced roads and trails. The ratings are based on soil erosion factor K, slope, and content of rock fragments.

The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," or "severe." A rating of "slight" indicates that little or no erosion is likely; "moderate" indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and "severe" indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher





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# APPENDIX D

## DESIGN CHARTS

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**Table 6-6. Runoff Coefficients for Rational Method**  
(Source: UDFCD 2001)

Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients											
		2-year		5-year		10-year		25-year		50-year		100-year	
		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
<b>Business</b>													
Commercial Areas	95	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89
Neighborhood Areas	70	0.45	0.49	0.49	0.53	0.53	0.57	0.58	0.62	0.60	0.65	0.62	0.68
<b>Residential</b>													
1/8 Acre or less	65	0.41	0.45	0.45	0.49	0.49	0.54	0.54	0.59	0.57	0.62	0.59	0.65
1/4 Acre	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
1/3 Acre	30	0.18	0.22	0.25	0.30	0.32	0.38	0.39	0.47	0.43	0.52	0.47	0.57
1/2 Acre	25	0.15	0.20	0.22	0.28	0.30	0.36	0.37	0.46	0.41	0.51	0.46	0.56
1 Acre	20	0.12	0.17	0.20	0.26	0.27	0.34	0.35	0.44	0.40	0.50	0.44	0.55
<b>Industrial</b>													
Light Areas	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Heavy Areas	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
<b>Parks and Cemeteries</b>													
Parks and Cemeteries	7	0.05	0.09	0.12	0.19	0.20	0.29	0.30	0.40	0.34	0.46	0.39	0.52
<b>Playgrounds</b>													
Playgrounds	13	0.07	0.13	0.16	0.23	0.24	0.31	0.32	0.42	0.37	0.48	0.41	0.54
<b>Railroad Yard Areas</b>													
Railroad Yard Areas	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
<b>Undeveloped Areas</b>													
Historic Flow Analysis-- Greenbelts, Agriculture	2	0.03	0.05	0.09	0.16	0.17	0.26	0.26	0.38	0.31	0.45	0.36	0.51
Pasture/Meadow	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Forest	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Exposed Rock	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Offsite Flow Analysis (when landuse is undefined)	45	0.26	0.31	0.32	0.37	0.38	0.44	0.44	0.51	0.48	0.55	0.51	0.59
<b>Streets</b>													
Paved	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Gravel	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
<b>Drive and Walks</b>													
Drive and Walks	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
<b>Roofs</b>													
Roofs	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
<b>Lawns</b>													
Lawns	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50

Figure 6-25. Estimate of Average Concentrated Shallow Flow

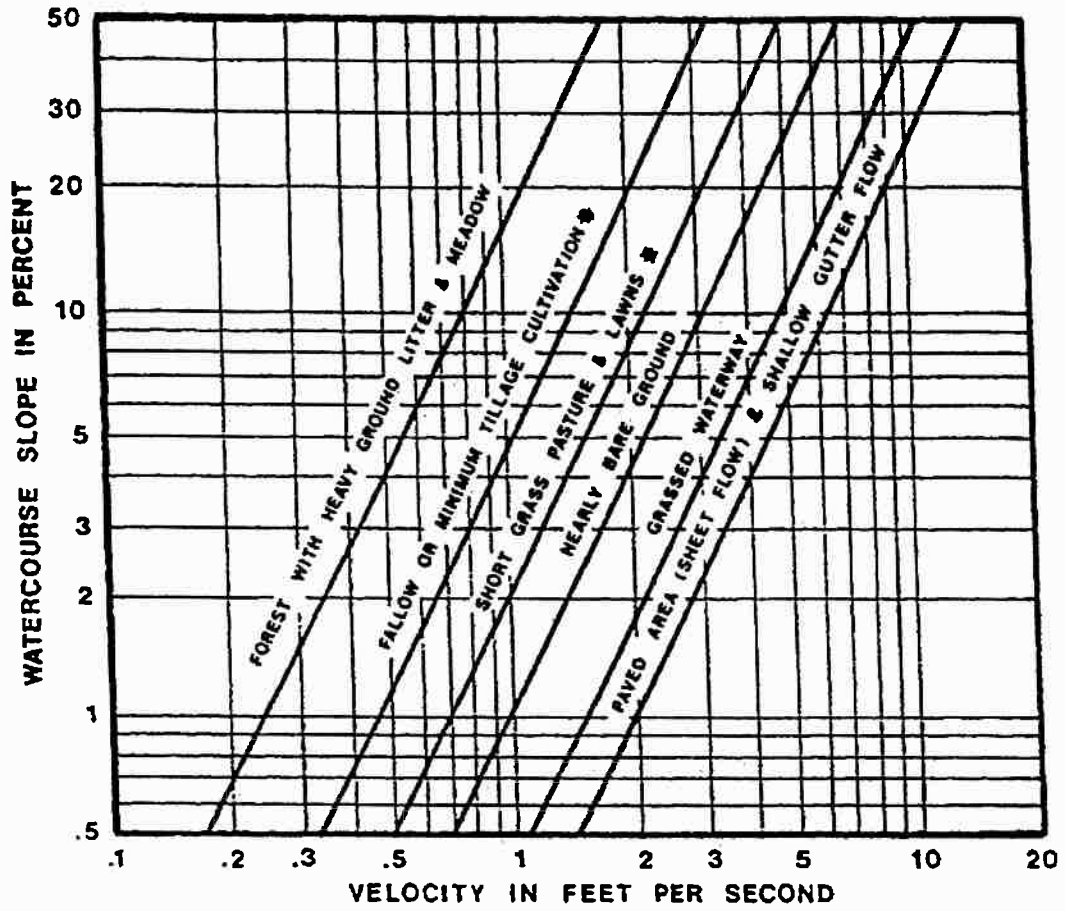
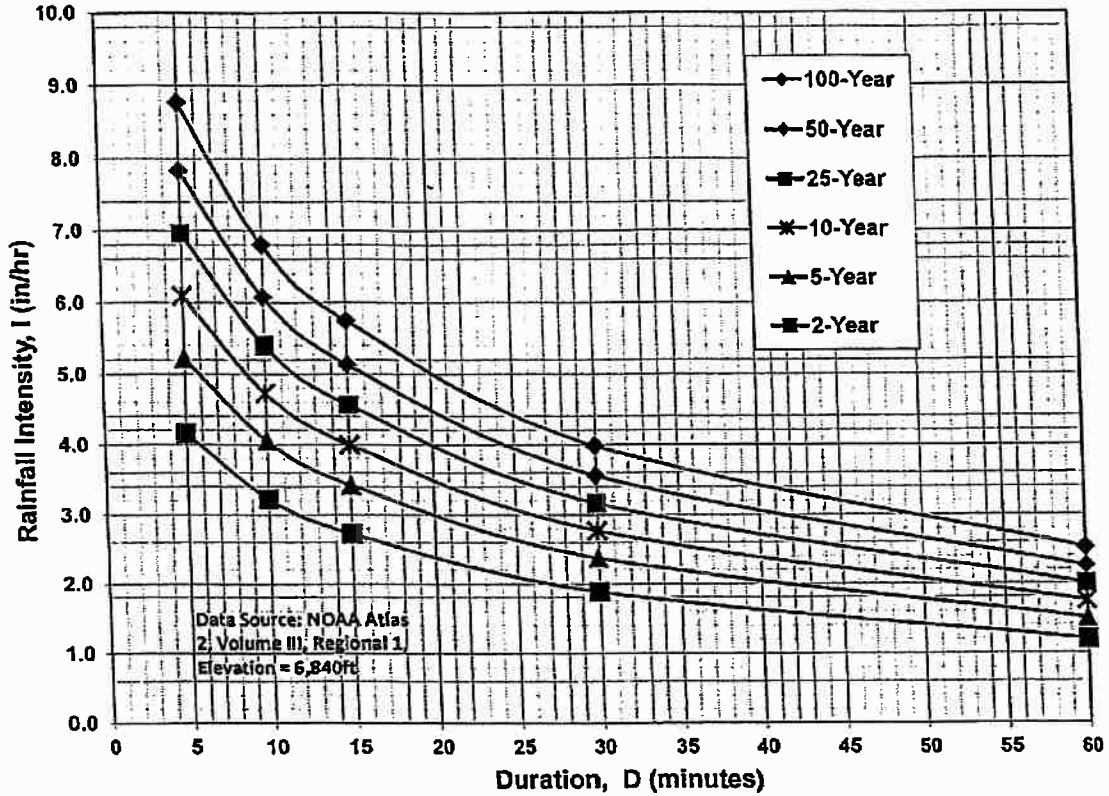


Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



**IDF Equations**

$$I_{100} = -2.52 \ln(D) + 12.735$$

$$I_{50} = -2.25 \ln(D) + 11.375$$

$$I_{25} = -2.00 \ln(D) + 10.111$$

$$I_{10} = -1.75 \ln(D) + 8.847$$

$$I_5 = -1.50 \ln(D) + 7.583$$

$$I_2 = -1.19 \ln(D) + 6.035$$

Note: Values calculated by equations may not precisely duplicate values read from figure.

**Table 2. Permissible Shear and Velocity for Selected Lining Materials<sup>1</sup>**

Boundary Category	Boundary Type	Permissible Shear Stress (lb/sq ft)	Permissible Velocity (ft/sec)	Citation(s)
<u>Soils</u>	Fine colloidal sand	0.02 - 0.03	1.5	A
	Sandy loam (noncolloidal)	0.03 - 0.04	1.75	A
	Alluvial silt (noncolloidal)	0.045 - 0.05	2	A
	Silty loam (noncolloidal)	0.045 - 0.05	1.75 – 2.25	A
	Firm loam	0.075	2.5	A
	Fine gravels	0.075	2.5	A
	Stiff clay	0.26	3 – 4.5	A, F
	Alluvial silt (colloidal)	0.26	3.75	A
	Graded loam to cobbles	0.38	3.75	A
	Graded silts to cobbles	0.43	4	A
	Shales and hardpan	0.67	6	A
<u>Gravel/Cobble</u>	1-in.	0.33	2.5 – 5	A
	2-in.	0.67	3 – 6	A
	6-in.	2.0	4 – 7.5	A
	12-in.	4.0	5.5 – 12	A
<u>Vegetation</u>	Class A turf	3.7	6 – 8	E, N
	Class B turf	2.1	4 - 7	E, N
	Class C turf	1.0	3.5	E, N
	Long native grasses	1.2 – 1.7	4 – 6	G, H, L, N
	Short native and bunch grass	0.7 - 0.95	3 – 4	G, H, L, N
	Reed plantings	0.1-0.6	N/A	E, N
<u>Temporary Degradable RECPs</u>	Hardwood tree plantings	0.41-2.5	N/A	E, N
	Jute net	0.45	1 – 2.5	E, H, M
	Straw with net	1.5 – 1.65	1 – 3	E, H, M
	Coconut fiber with net	2.25	3 – 4	E, M
	Fiberglass roving	2.00	2.5 – 7	E, H, M
<u>Non-Degradable RECPs</u>	Unvegetated	3.00	5 – 7	E, G, M
	Partially established	4.0-6.0	7.5 – 15	E, G, M
	Fully vegetated	8.00	8 – 21	F, L, M
<u>Riprap</u>	6 – in. d <sub>50</sub>	2.5	5 – 10	H
	9 – in. d <sub>50</sub>	3.8	7 – 11	H
	12 – in. d <sub>50</sub>	5.1	10 – 13	H
	18 – in. d <sub>50</sub>	7.6	12 – 16	H
	24 – in. d <sub>50</sub>	10.1	14 – 18	E
<u>Soil Bioengineering</u>	Wattles	0.2 – 1.0	3	C, I, J, N
	Reed fascine	0.6-1.25	5	E
	Coir roll	3 - 5	8	E, M, N
	Vegetated coir mat	4 - 8	9.5	E, M, N
	Live brush mattress (initial)	0.4 – 4.1	4	B, E, I
	Live brush mattress (grown)	3.90-8.2	12	B, C, E, I, N
	Brush layering (initial/grown)	0.4 – 6.25	12	E, I, N
	Live fascine	1.25-3.10	6 – 8	C, E, I, J
	Live willow stakes	2.10-3.10	3 – 10	E, N, O
	<u>Hard Surfacing</u>	Gabions	10	14 – 19
Concrete		12.5	>18	H

<sup>1</sup> Ranges of values generally reflect multiple sources of data or different testing conditions.

A. Chang, H.H. (1988).

B. Florineth. (1982)

C. Gerstgraser, C. (1998).

D. Goff, K. (1999).

E. Gray, D.H., and Sotir, R.B. (1996).

F. Julien, P.Y. (1995).

G. Kouwen, N.; Li, R. M.; and Simons, D.B., (1980).

H. Norman, J. N. (1975).

I. Schiechl, H. M. and R. Stern. (1996).

J. Schoklitsch, A. (1937).

K. Sprague, C.J. (1999).

L. Temple, D.M. (1980).

M. TXDOT (1999)

N. Data from Author (2001)

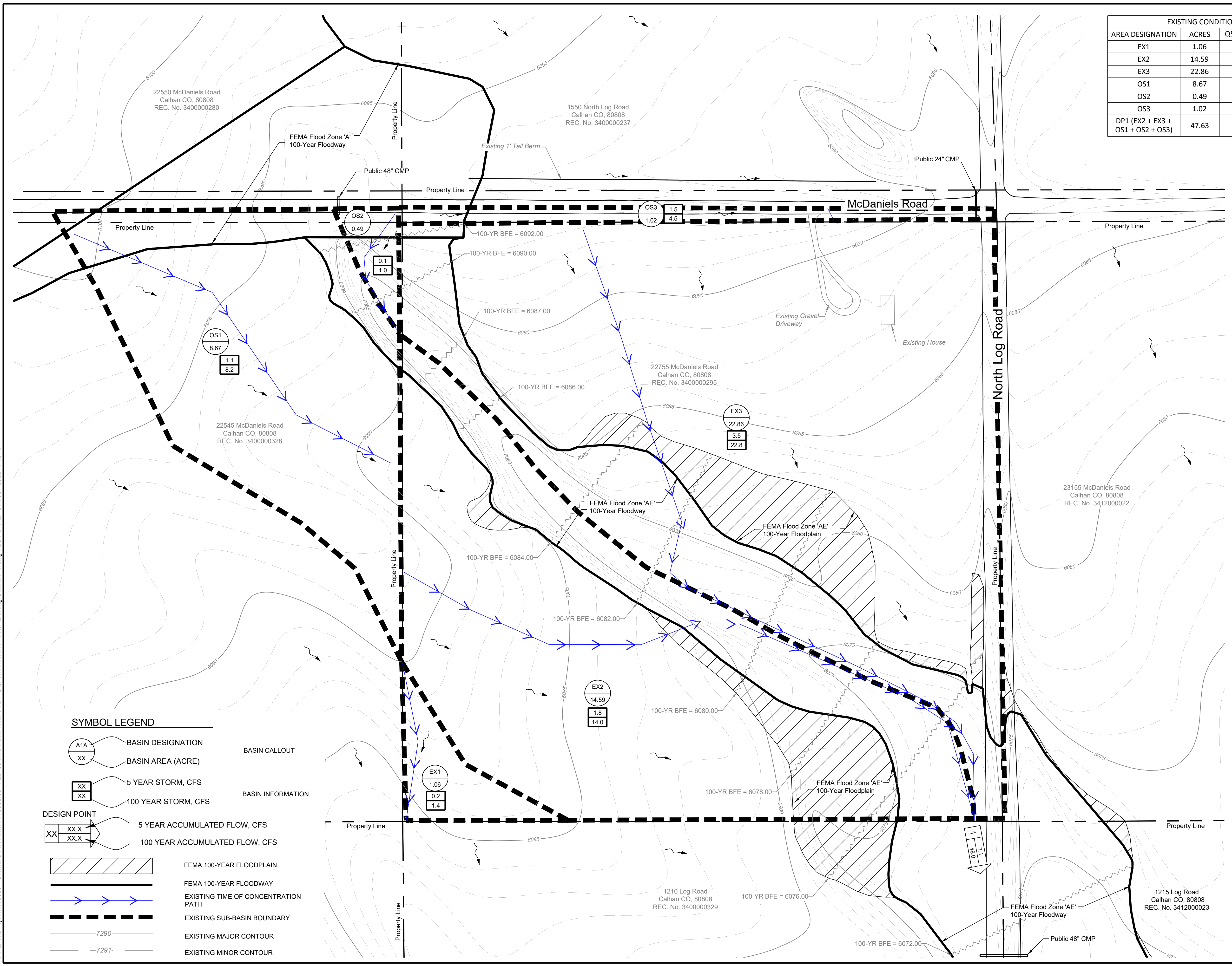
O. USACE (1997).



# BACK POCKET



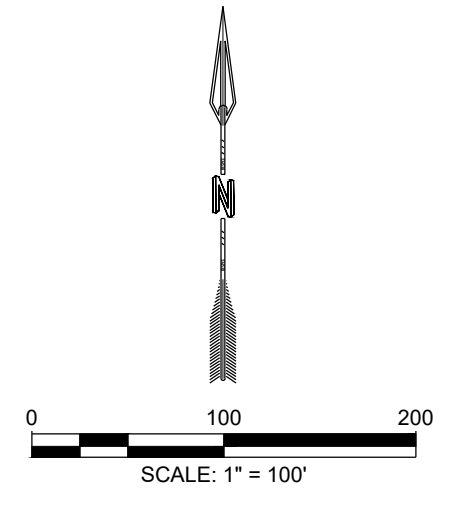
NAME: N:\Projects\W0008 - Guman & Associates\W0008\0014 22755 McDaniels Road.dwg SHEETS\Sheet Set\1 Existing Conditions.dwg PLOT DATE: Jan 03, 2023 11:07am



EXISTING CONDITIONS			
AREA DESIGNATION	ACRES	Q5 (CFS)	Q100 (CFS)
EX1	1.06	0.2	1.4
EX2	14.59	1.8	14.0
EX3	22.86	3.5	22.8
OS1	8.67	1.1	8.2
OS2	0.49	0.1	1.0
OS3	1.02	1.5	4.5
DP1 (EX2 + EX3 + OS1 + OS2 + OS3)	47.63	7.1	48.0

NOTE: ALL ELEVATIONS IN NAVD88

- SYMBOL LEGEND**
- A1A BASIN DESIGNATION
  - XX BASIN AREA (ACRE)
  - XX 5 YEAR STORM, CFS
  - XX 100 YEAR STORM, CFS
  - XX 5 YEAR ACCUMULATED FLOW, CFS
  - XX 100 YEAR ACCUMULATED FLOW, CFS
  - FEMA 100-YEAR FLOODPLAIN
  - FEMA 100-YEAR FLOODWAY
  - EXISTING TIME OF CONCENTRATION PATH
  - EXISTING SUB-BASIN BOUNDARY
  - EXISTING MAJOR CONTOUR
  - EXISTING MINOR CONTOUR



<p>DESIGNED CTD DRAWN RGG CHECKED RGG DATE 1.03.2023</p>	<p>REVISION</p>
<p><b>RESPEC</b> COMMUNITY DESIGN SOLUTIONS 17 SOUTH PEARSON STREET SUITE 1110 CALHAN CO, CALHAN, SD 57516 WWW.RESPEC.COM PHONE (605) 896-5212</p>	
<p>STAMP</p>	
<p><b>PRELIMINARY</b> NOT FOR CONSTRUCTION 1/2023</p> <p>THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS STAMPED, SIGNED AND DATED</p>	
<p><b>811</b> Know what's below. Call before you dig.</p>	
<p>PROJECT NAME: <b>Zindorf - McDaniels Subdivision</b></p>	
<p>SHEET TITLE: <b>Existing Conditions</b></p>	
<p>SUBMITTED FOR: <b>Greg Zindorf</b></p>	
<p>SHEET NUMBER: <b>1 OF 2</b></p>	



NAME: N:\Projects\W0008 - Guman & Associates\W0008\0014 22755 McDaniels Road\4. DWG\5\_Sheets\Sheet Set\2\_Proposed Conditions.dwg PLOT DATE: Jan 03, 2023, 11:08am

PROPOSED CONDITIONS			
AREA DESIGNATION	ACRES	Q5 (CFS)	Q100 (CFS)
PP1	1.06	0.2	1.4
PP2	14.59	1.8	14.0
PP3	22.86	3.9	22.9
OS1	8.67	1.1	8.2
OS2	0.49	0.1	1.0
OS3	1.02	1.5	4.5
DP1 (PP2 + PP3 + OS1 + OS2 + OS3)	47.63	7.5	48.0

DESIGNED CTD		DRAWN CTD		CHECKED RGG		DATE	
RESPEC	RESPEC	RESPEC	RESPEC	RESPEC	RESPEC	RESPEC	RESPEC
COMMUNITY DESIGN SOLUTIONS		COMMUNITY DESIGN SOLUTIONS		COMMUNITY DESIGN SOLUTIONS		COMMUNITY DESIGN SOLUTIONS	
21 SOUTH TEARON STREET SUITE 1110		21 SOUTH TEARON STREET SUITE 1110		21 SOUTH TEARON STREET SUITE 1110		21 SOUTH TEARON STREET SUITE 1110	
CALHAN, CO 80808		CALHAN, CO 80808		CALHAN, CO 80808		CALHAN, CO 80808	
WWW.RESPEC.COM PHONE: (719) 266-5212		WWW.RESPEC.COM PHONE: (719) 266-5212		WWW.RESPEC.COM PHONE: (719) 266-5212		WWW.RESPEC.COM PHONE: (719) 266-5212	

STAMP  
**PRELIMINARY**  
 NOT FOR CONSTRUCTION  
 1/2023  
 THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS STAMPED, SIGNED AND DATED

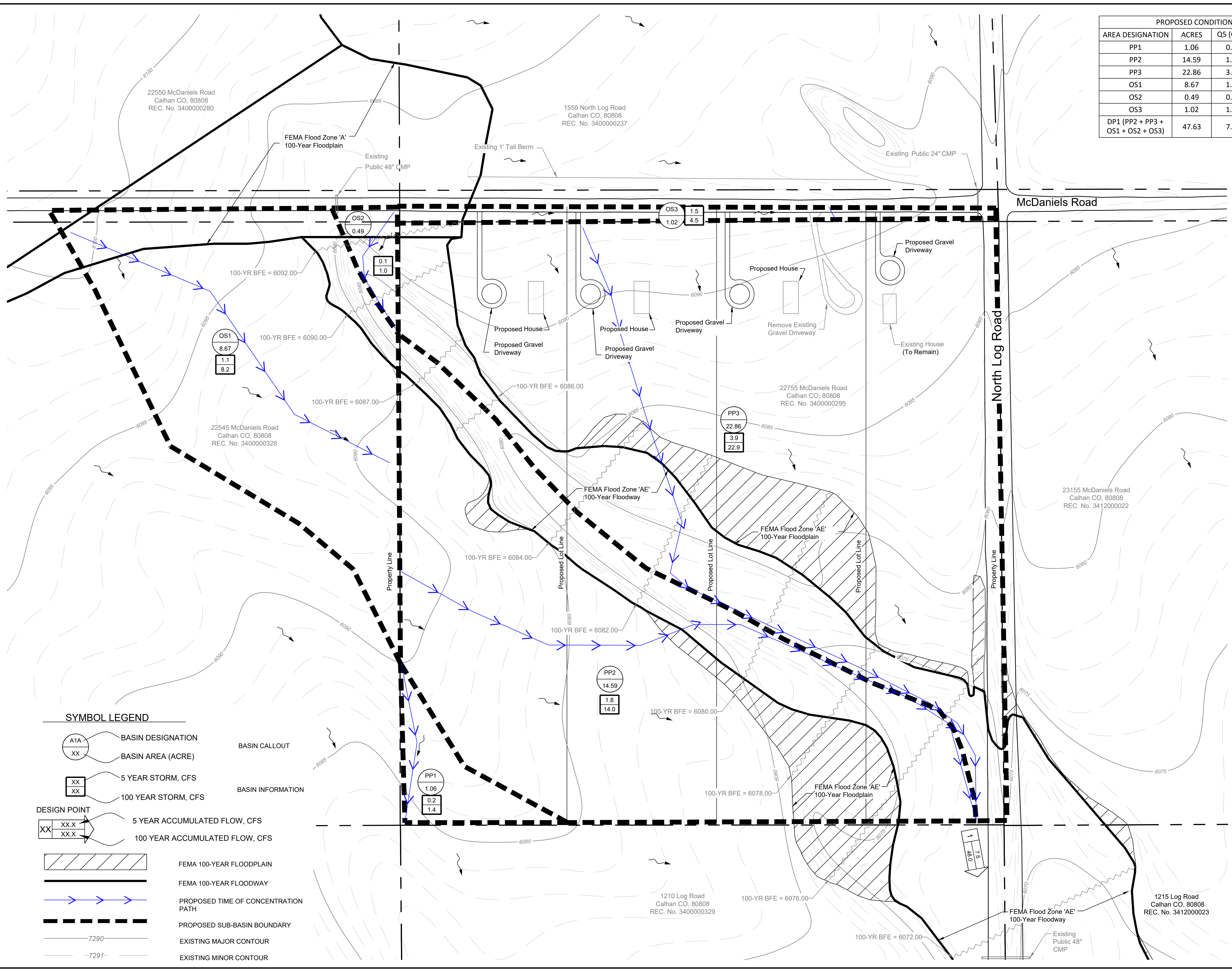


PROJECT NAME:  
**Zindorf - McDaniels Subdivision**

SHEET TITLE:  
**Proposed Conditions**

SUBMITTED FOR:  
**Greg Zindorf**

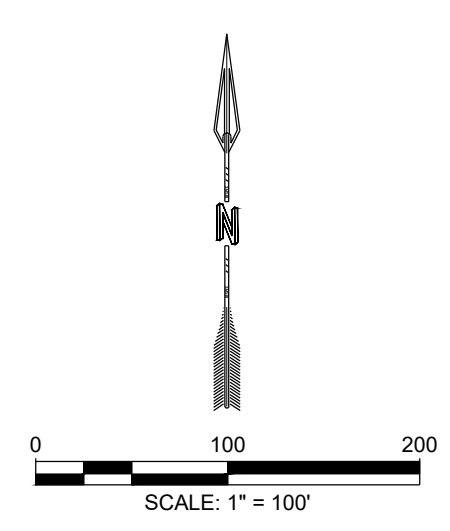
SHEET NUMBER:  
**2 OF 2**



NOTE: ALL ELEVATIONS IN NAVD88

**SYMBOL LEGEND**

- BASIN DESIGNATION**: A1A
- BASIN AREA (ACRE)**: XX
- 5 YEAR STORM, CFS**: XX
- 100 YEAR STORM, CFS**: XX
- DESIGN POINT**:
  - 5 YEAR ACCUMULATED FLOW, CFS: XX.X
  - 100 YEAR ACCUMULATED FLOW, CFS: XX.X
- FEMA 100-YEAR FLOODPLAIN**: [Hatched Area]
- FEMA 100-YEAR FLOODWAY**: [Dashed Line]
- PROPOSED TIME OF CONCENTRATION PATH**: [Blue Arrow]
- PROPOSED SUB-BASIN BOUNDARY**: [Dashed Line]
- EXISTING MAJOR CONTOUR**: -7290
- EXISTING MINOR CONTOUR**: -7291



PCD File No. MS-22-006