REVISION TO:
MASTER DEVELOPMENT
DRAINAGE PLAN
MERIDIAN RANCH
EL PASO COUNTY, COLORADO

MERIDIAN RANCH
A GOLF & RECREATIONAL COMMUNITY

March 2021

Prepared For:

GTL DEVELOPMENT, INC.
P.O. Box 80036
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Prepared By:
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PCD Project No. SKP-XXX

CERTIFICATIONS

Design 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 County for drainage reports and said report is in conformity with the applicable 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.

______________________________________ ________________

Thomas A. Kerby, P.E. #31429 Date

Owner/Developer's Statement:

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

______________________________________ ______________

Raul Guzman, Vice President Date
GTL Development, Inc.
P.O. Box 80036
San Diego, CA 92138

El Paso County:

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

______________________________________ ____________

Jennifer Irvine, P.E. Date
County Engineer / ECM Administrator

2021 Meridian Ranch Revised MDDP

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EXECUTIVE SUMMARY

The purpose of the revision to the following Master Development Drainage Plan is to present updated conceptual drainage improvements for the remaining undeveloped portions of the Meridian Ranch Development based upon the proposed sketch plan amendment and to update data from within the development tributary to area of interest. Runoff quantities and proposed facilities have been calculated using the current City of Colorado Springs/El Paso County Drainage Criteria Manual (DCM) (1994 version) and portions of the City of Colorado Springs Drainage Criteria Manual, Volume 1 (DCM-1) ((2014 version). Concepts presented in this report will be refined and specific improvements addressed during the Final Plat process.

The revisions included within this report include the density increase as proposed with this sketch plan amendment. The previous revision to the MDDP (2017) included the removal of the 40-acre business park near the northwest corner of Stapleton Dr. and Eastonville Rd. and repurposing it to residential land use. The developed calculations reflect the density increase sought in this revision.

The hydrologic calculations within this report follow method outlined in Chapter 6 of the 2014 version of the City of Colorado Springs Drainage Criteria Manual (COSDCM) as adopted by the El Paso County Board of County Commissioners by Resolution 15-042. Chapter 6 addresses the hydrologic calculation methods and includes an updated hydrograph to be used with storm drainage runoff. The Board adopted by the same resolution, Section 3.2.1 of Chapter 13 of the COSDCM referencing Full Spectrum Detention; the concept "provides better control of the full range of runoff rates that pass-through detention facilities than the convention multi-stage concept. This section of the COSDCM identifies the necessity to provide full spectrum detention but does not prescribe a methodology to reach such the detention requirements. This report includes hydrologic models from HEC-HMS for the historic and future conditions for the 2-yr, 5-yr, 10-yr, 50-yr, and 100-yr design storm frequencies. The future conditions include detention facilities sized and modeled such that *"frequent and infrequent inflows are released at rates approximating undeveloped conditions."*

On November 16, 2000 the El Paso County Board of County Commissioners approved the rezoning of the Meridian Ranch project (PUD-00-010) from A-35 to PUD with several conditions. Condition number seven stated in part that "drainage plans shall release and/or retain at approximately eighty percent (80%) of historic rates." The previous report (2017 MDDP) removed this condition and allow the project to release developed flow at historic rates as outlined in the current City of Colorado Springs/El Paso County Drainage Criteria Manual (DCM) (1994 version) and those portions of the City of Colorado Springs Drainage Criteria Manual, Volume 1 (DCM-1) ((2014 version) adopted by the El Paso County Board of County Commissioners by Resolution No. 15-042.

The original boundary limits of Meridian Ranch encompassed 2620 acre proposed development and is located approximately 12 miles northeast of the City of Colorado Springs, 2.5 miles north of the town of Falcon and immediately north of the Woodmen Hills development.

The Sketch Plan amendment includes all the remaining 197 acres of the undeveloped portion of Meridian Ranch. Of the undeveloped land it is proposed to have 110 acres of residential development, 49 acres of open space, drainage/detention facilities and park sites, and 38 acres of R.O.W.

The calculated developed flow rates in excess of the historic discharge flow rates will be mitigated with the use of full spectrum detention facilities to be located within the project and along eastern boundary of the project. The Meridian Ranch Development will not adversely impact the downstream properties.

INTRODUCTION

Purpose

The purpose of the revision to the following Master Development Drainage Plan is to present updated conceptual drainage improvements for the Meridian Ranch Development based upon the proposed sketch plan amendment and to update runoff calculation for the already constructed areas tributary to the development. The calculated developed flow rates in excess of the historic runoff discharge flow rates across the eastern boundary of the project will be mitigated with the use of full spectrum detention facilities to be located within the project and along eastern project boundary. Concepts presented in this report will be refined and specific design details addressed during the Final Plat process.

Scope

The scope of this report includes:

- Location and description of the proposed development stating the proposed land use, density, acreage and adjacent features to the site.
- Calculations for design peak flows from off-site tributary drainage areas.
- Calculations for design peak flows within the proposed development for drainage areas.
- Discussion of major drainage facilities required as a result of the development.
- Discussion and analysis of existing and proposed facilities.

Runoff quantities and proposed facilities have been calculated using the current City of Colorado Springs/El Paso County Drainage Criteria Manual (DCM) (1994 version) and the City of Colorado Springs Drainage Criteria Manual, Volume 1 (DCM-1) ((2014 version) as adopted by the El Paso County Board of County Commissioners by Resolution No. 15-042.

Background

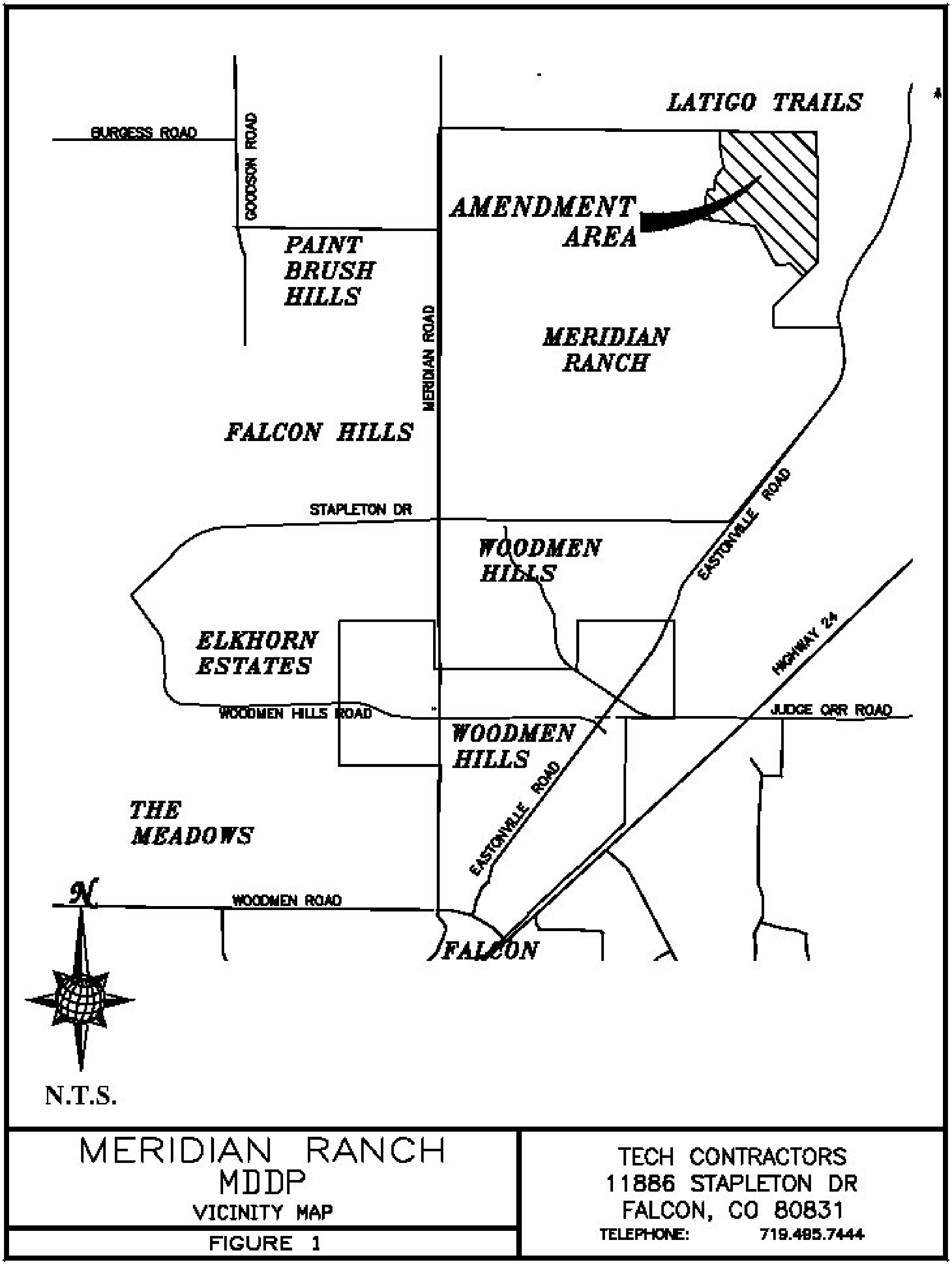
On November 16, 2000 the El Paso County Board of County Commissioners approved the rezoning of the Meridian Ranch project (PUD-00-010) from A-35 to PUD with several conditions. Condition number seven stated in part that "drainage plans shall release and/or retain at approximately eight percent (80%) of historic rates." The Sketch Plan for Meridian Ranch (SKP-17-001) approved on March 13, 2018 by Board of County Commissioners' Resolution 18-104 removed the eighty percent of historic rate condition allowing developed flows to be released downstream of Meridian Ranch at historic flow rates.

EXISTING CONDITIONS

General Location

Meridian Ranch encompasses 2620 acres of proposed residential development and is located approximately 12 miles northeast of the City of Colorado Springs, 2.5 miles north of the town of Falcon and immediately north of the Woodmen Hills development in El Paso County. Please see Figure 1: Vicinity Map.

Figure 1: Vicinity Map



Land Use

In the past farming and ranching dominated the area surrounding Meridian Ranch. However, urbanization has been occurring in the general vicinity for several years. Most notably, urbanization is occurring within the Meridian Ranch Development with the completion of several filings, Woodmen Hills to the south, to the west is the Paint Brush Hills subdivision, 4 Way Ranch to the east and Latigo Trails and Antlers Ridge to the north.

The Sketch Plan amendment includes 197 acres of undeveloped land within Meridian Ranch. Of the undeveloped land it is proposed to have 110 acres of residential development; 49 acres of open space, drainage/detention facilities and park sites; and 38 acres of R.O.W.

Table 1: Master Plan Land Use

Land Use	Original Acres	Amended	Notes
Single Family Residential	1115	110	5000 DU
Commercial/Business	15	0	
Dedicated School Sites	128	0	
Metro District Facilities	46	0	
Wastewater Facility	14	0	
Right of Way	387	38	
Park/Open Space/Det. Fac.	875	49	
Total	**2620**	**197**	

Topography and Floodplains

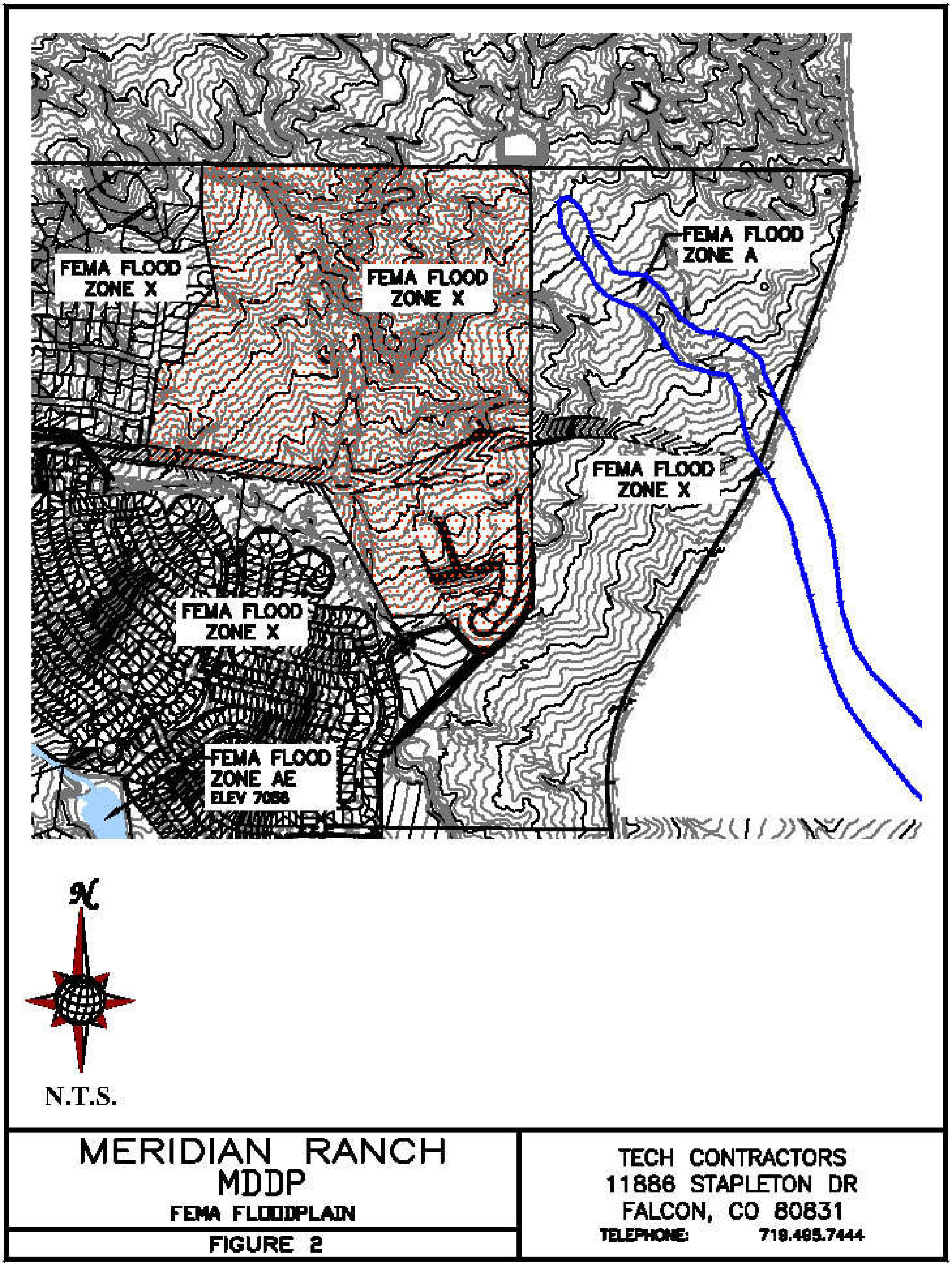
The topography of the site is typical of a high desert, short grass prairie with relatively flat slopes generally ranging from 2% to 4%. The area drains generally from northwest to southeast being tributary to the Bennett Ranch, Haegler Ranch and Gieck Ranch Drainage Basins, all of which are tributary to Black Squirrel Creek.

The Flood Insurance Rate Maps (FIRM No. 08041C0552G, dated 12/07/2018) indicates the project is not located within a designated floodplain. Please see Figure 2: Rolling Hills Ranch Filing 2 Federal Emergency Management Agency (FEMA) Floodplain Map.

Geology

Soil Conservation Service soil survey records indicate that the service area is predominately covered by soils classified in the Stapleton series (83) with portions classified from the Columbine soils (19) also found on the site and is categorized in the Hydrological Group A. For the purposes of this report all soils were assumed to be from the Hydrological Group B, producing a higher runoff value. Typically, these soils are well drained, gravelly sandy loams that form on alluvial terraces and fans and exhibit high permeability and low available water capacity with depth to bedrock greater than 6 feet.

Figure 2: FEMA Floodplain Map



Pring series

The Pring series consists of deep, well drained soils that formed in arkosic sandy sediment, these soils are on valley side slopes and uplands. They have slopes of 3 to 30 percent, Average annual precipitation is about 17 inches, and average annual air temperature is about 43 degrees F.

Pring soils are similar to Kutler and Stapleton soils and are near Elbeth, Peyton, and Tomah soils, Kutler soils have a paralithic contact at a depth of 20 to 40 inches, Stapleton soils have warmer soil temperatures, Elbeth soils have A2 and B2t horizons, Peyton soils have a B2t horizon, Tomah oils have an A2 horizon and a B2t horizon in which clay is accumulating in lamellae and thin bands.

Typical pedon of Pring coarse sandy loam, 8 to 15 percent slopes, about 950 feet south and 300 feet east of the northwest comer of the NW 1/4SE1/4 of sec, 17, T, 11 S., R. 63 W.:

> A1-0 to 4 inches; dad< grayish brown (10YR 4/2) coarse sandy loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable; slightly acid; c1ear smooth boundary.
>
> AC-4 to 14 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark brown (10YR 2/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; hard, very friable; neutral; clear smooth boundary.
>
> C-14 to 60 inches; pale brown (10YR (6/3) gravelly sandy loam, brown (10YR 5/3) moist; massive; very hard, very friable; 15 percent fine and medium gravel; neutral.

The solum ranges from 10 to 20 inches in thickness. It is 0 to 15 percent coarse fragments. It is slightly acid or neutral. The A1 horizon is dark grayish brown to very dark grayish brown. The C horizon is pale brown or brown.

Stapleton series

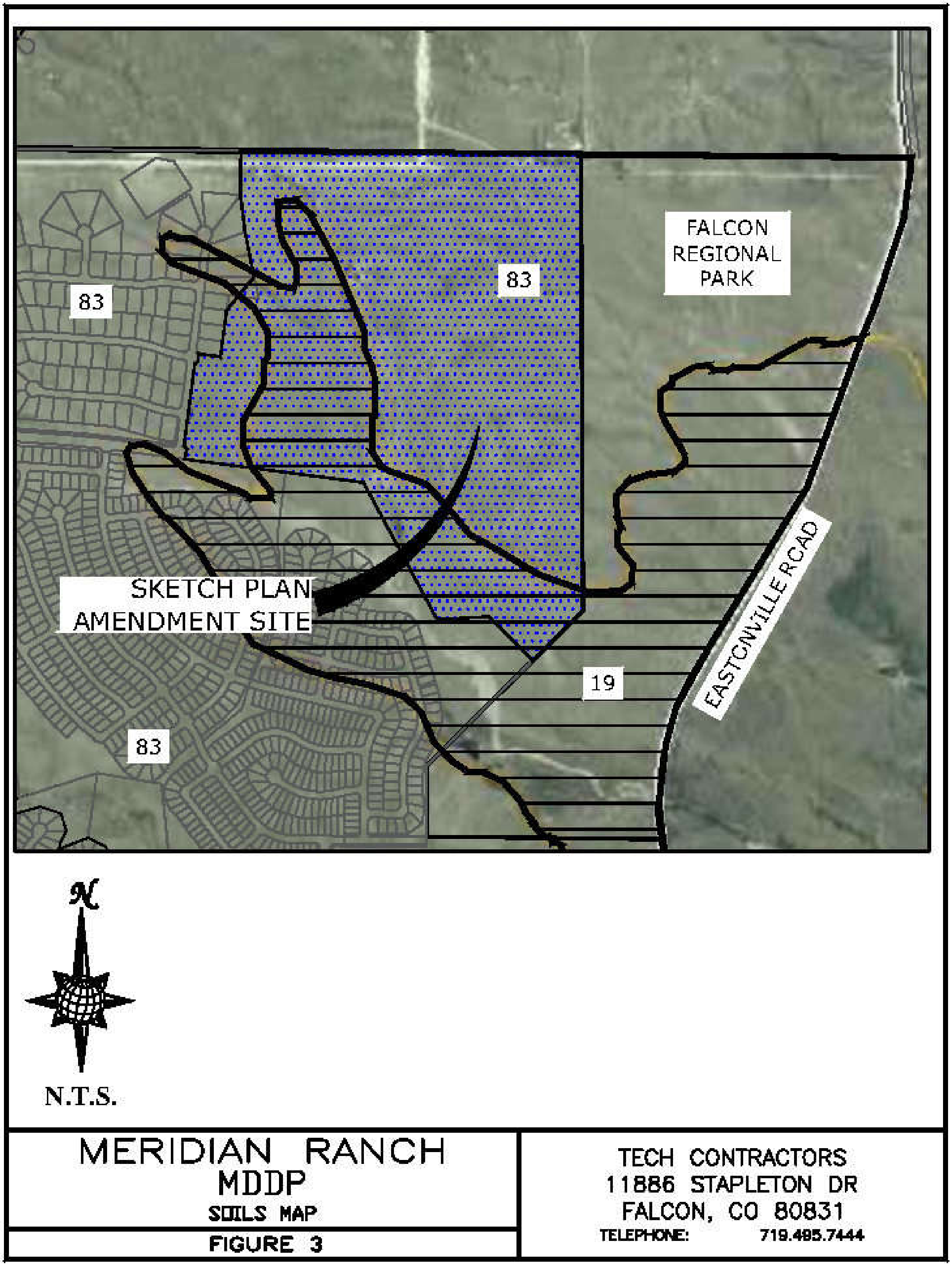
The Stapleton series consists of deep, well drained soils that formed in sandy alluvium derived from arkosic bedrock. These soils are on uplands. They have slopes of 3 to 20 percent. Average annual precipitation is about 15 inches, and average annual air temperature is about 47 degrees F.

Stapleton soils are similar to Columbine and Pring soils. They are near Bresser and Truckton soils. Columbine soils have more than 35 percent coarse fragments. Pring soils have mean annual soil temperatures of less than 47 degrees F. Bresser soils have a B2t horizon of sandy clay loam. Truckton soils have a B2t horizon of sandy loam.

Typical pedon of Stapleton sandy loam, 3 to 8 percent slopes, about 800 feet north and 300 feet east of the southwest corner of sec. 16, T. 12 S., R. 64 W.:

> Al-O to 11 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable; 5 percent gravel; neutral; clear smooth boundary.

Figure 3: Soils Map



B2-11 to 17 inches; grayish brown (10YR 5/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular structure; slightly hard, very friable, slightly sticky; 15 percent fine gravel; neutral; gradual smooth boundary.

C1-17 to 26 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 4/3) moist; massive; very hard, very friable; 15 percent fine gravel; neutral; gradual smooth boundary.

C2-26 to 60 inches; pale brown (10YR 6/3) gravelly loamy sand, brown (10YR 5/3) moist; massive; 30 percent gravel; neutral.

The solum ranges from 12 to 20 inches in thickness. It is 0 to 35 percent coarse fragments. It is slightly acid or neutral. The A1 horizon is grayish brown or dark grayish brown sandy loam or gravelly sandy loam. The B horizon is brown or grayish brown gravelly sandy loam or coarse sandy loam. The C horizon is pale brown or light brownish gray.

Note: (#) indicates Soil Conservation Survey soil classification number. See Figure 3: Soils Map.

Climate

Mild summers and winters, light precipitation, high evaporation and moderately high wind velocities characterize the climate of the study area.

The average annual monthly temperature is 48.4 F with an average monthly low of 30.3 F in the winter and an average monthly high of 68.1 F in the summer. Two years in ten will have a maximum temperature higher than 98 F and a minimum temperature lower than -16 F. Precipitation averages 15.73 inches annually, with 80% of this occurring during the months of April through September. The average annual Class A pan evaporation is 45 inches.

Natural Hazards Analysis

Natural hazards analysis indicates that no unusual surface or subsurface hazards are located near the vicinity. However, because the soils are cohesionless, sloughing of steep banks during drilling and/or excavation could occur. By placing improvements in a manner that provides an opportunity to lay the banks of excavations back at a slope greater than 1:1 during construction, the problems associated with sloughing soils can be minimized.

DRAINAGE BASINS AND SUB-BASINS

El Paso County has identified four major drainage basins within the entirety of Meridian Ranch. There is one major drainage basin, the Gieck Ranch Drainage Basin, located within the Sketch Plan Amendment associated with this MDDP. Please see Figure 4: Existing Condition - SCS Map and narrative below.

Gieck Ranch Basin

Approximately 1,300 acres of Meridian Ranch is located within the Gieck Ranch Basin. Surface runoff enters the site unplatted land, Antlers Ridge and Latigo Trails located to the north and continues in a southeasterly direction toward the El Paso County Regional Park along easterly boundary of the site and Eastonville Road. There are several points along the eastern boundary of the project and Eastonville Road that discharge the runoff off the site.

Information obtained from the Latigo Trails MDDP completed in October 2001 identifies several acres that discharge un-detained developed flow onto Meridian Ranch property; these areas are modeled as developed 2.5-acre density in both the Existing and Developed models. Those areas that drain un-detained directly onto Meridian Ranch were modeled using a Curve Number (CN) of 66.

Additionally, the Latigo MDDP used higher CN values for the existing condition, therefore the existing detention facilities located on the Latigo property release at a higher rate than the original Meridian Ranch MDDP had modeled. The calculations within these areas of Latigo were re-modeled with the 2015 Revised MDDP; this report makes no changes to the Latigo calculations from the 2015 Revised MDDP. Latigo run off that is released through a detention pond onto Meridian Ranch has been modeled using the higher Latigo undeveloped pasture CN value of 65 in both models.

The Gieck Ranch Drainage Basin has been approved by the County, during the process it was determined that the existing boundary line between the Gieck Ranch Basin and the Haegler Ranch Basin should be shifted south. (Figure 4: Existing Condition Major Drainage Basin Map).

DRAINAGE DESIGN CRITERIA

SCS Hydrograph Procedure

The Soil Conservation Service (SCS) Hydrograph (HEC-HMS) procedure was used to determine final design parameters for the major drainage facilities within the project. Onsite basin areas were calculated using aerial topography of the site and approved final design data. Times of concentration were estimated using the SCS procedures described in the DCM. Based upon the hydrologic soil type, the natural conditions found in the basins and the runoff curve numbers (CN) chart from Table 6-9 for Pre-development Thunderstorm Conditions (ARCI) and Table 6-10 for Frontal Storms &Thunderstorms for Developed Conditions (ARCII), the following CN values were used for the given conditions.

Table 2: SCS Runoff Curve Numbers

Condition	CN*
Residential Lots (5 acre)	63
Residential Lots (2.5 acre)	66
Residential Lots (1 acre)	68
Residential Lots (1/2 acre)	70
Residential Lots (1/3 acre)	72
Residential Lots (1/4 acre)	75
Residential Lots (1/5 acre)	78
Residential Lots (1/6 acre)	80

School	80
Parks/Open Space	62
Commercial	85
Roadways	98
Golf Course	62
Latigo (undetained)	66
Latigo (detained)	65
Undeveloped	61

*Curve Numbers were interpolated and based on amount of impervious area per lot. The 24 hour storm precipitation values were selected from the NOAA Atlas 14, Volume 8, Version 2 for the Meridian Ranch location (Latitude 38.9783°, Longitude -104.5842°, Elevation 7054 ft). These numbers along with SCS information were used as input to the U.S. Army Corp of Engineers HEC-HMS computer model to determine design runoffs.

Channel Improvements

It has always been the intent that the existing channels shall be preserved as natural as possible outside the limits of the proposed detention facilities. The channels were analyzed using the methods outlined in the DCM to determine if protection is necessary due to the increased flows as a result of development. The main channel traversing this project has been studied and riprap embankment protection has been placed as needed to maintain proper velocities within this portion of the channel.

Detention Storage Criteria

There are two existing detention facilities located with the area tributary to the Meridiain Ranch Sketch Plan Amendment. The detention facilities have been modeled graphically using the SCS calculations from the HEC-HMS model and stage storage routing. The relationship between allowable outflow (Qout) and inflow (Qin) to the pond is directly correlated to the volume of direct runoff (Vr) and volume of storage (Vstor) to obtain a graphic solution.

The actual storage volumes and discharge rates will be refined by a complete analysis for each detention facility at each final plat submission. The detention facilities are designed as per those sections of the City of Colorado Springs Drainage Criteria Manual (DCMV1), Volume 1 dated May 2014 as adopted by El Paso County by Resolution 15-042 on January 28, 2015. Section 3.2.1 of Chapter 13 of the DCMV1 states detention ponds are to be designed to meet the Full Spectrum Design (FSD) concept introduced by the Urban Drainage and Flood Control District. The concept of FSD is for the detention pond to discharge the developed flow at rates similar to the predevelopment (historic) rate for each design storm as identified in Chapter 6 (Hydrology) of the DCMV1. The existing detention facilities located within Meridian Ranch, the storage volumes and discharge rates for these ponds were calculated using as-built information. No modifications are proposed for any existing detention pond that has been designed and constructed prior to this Sketch Plan Amendment nor the effective date of Resolution 15-042.

Water Quality Capture Volume (WQCV) is to be included with the detention volume calculated to provide for water quality, allowing sediment to settle out and accumulate over time to improve the quality of the discharged flow from the project site. To maintain full volume for detention during the life of the facility regular maintenance must be performed to remove sediment. The WQCV is to be based on the equations found in Volume 2, City of Colorado Springs/El Paso County Drainage Criteria Manual. Detention of the WQCV is used to meet El Paso County criteria for a storm water quality discharge. The release rates from the WQCV are generally small, which help minimize downstream impacts. Detaining the WQCV also serves to cleanse the "first flush" of runoff from the higher initial concentration of sediment and pollutants by allowing for sedimentation. This greatly improves the quality of runoff leaving the facilities and reduces the potential for erosion. The positive impact on water quality is expected to be significant, particularly during construction. WQCV is required for all detention facilities within the Meridian Ranch development.

DRAINAGE CALCULATIONS

General Concept

Drainage patterns on the project site generally flow in a southeasterly direction. The project site has been analyzed with the SCS method for both the historic and the developed conditions for the design storms outlined in the adopted sections of the City of Colorado Springs Hydrology Chapter of the Drainage Criteria Manual, Volume 1. Detention ponds have been placed within the development or at the downstream boundary of the project such that the release rate for each design storm will approximate the historic flow rates as determined by the historic model.

Existing Drainage Characteristics

Table 3: Historic Condition Peak Flows summarizes existing condition peak flows for the subbasins.

Gieck Ranch Basin

Most of the eastern portion of Meridian Ranch lies within the Gieck Ranch Basin. Surface runoff enters the site via overland flow from Antlers Ridge and Latigo Trails subdivisions and unplatted land located to the north. Runoff is generally southeasterly, there are several culvert crossings under Eastonville Road to discharge runoff from the site.

Table 3 - Historic Condition Peak Flow Rates

HISTORIC SCS (Full Spectrum)						
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS06	0.1313	80	52	12	3.8	0.5
OS06-G02	0.1313	77	52	11	3.7	0.5
OS05	0.0578	39	26	5.6	1.8	0.2
OS05-G01	0.0578	38	25	5.5	1.7	0.2
HG01	0.0547	32	21	4.7	1.5	0.2
G01	0.1125	70	46	10	3.2	0.5
G01-G02	0.1125	68	46	9.9	3.2	0.5
HG02	0.0906	45	30	6.7	2.3	0.4
G02	0.3344	191	127	27	9.0	1.3
G02-G03	0.3344	190	125	27	9.0	1.3
HG03	0.1828	77	51	12	4.3	0.7
OS07	0.0328	25	17	4.5	1.7	0.3
OS07-G03	0.0328	24	17	4.3	1.7	0.3
G03	0.5500	291	192	42	15	2.3
G03-G04	0.5500	281	189	42	14	2.3
OS09	0.1547	91	63	19	8.3	1.9
OS09-G04	0.1547	90	62	18	8.3	1.9
HG04	0.0891	40	26	5.9	2.1	0.3
HG05	0.1125	49	32	7.4	2.6	0.4
OS08	0.0406	35	25	7.7	3.4	0.7
OS08-G04	0.0406	34	24	7.4	3.4	0.7
G04	0.9469	493	332	76	28	4.7
G04-G05	0.9469	488	318	76	27	4.7
HG06A	0.1375	49	32	7.6	2.9	0.5
G05	1.0844	536	350	84	30	5.2
G05-G06	1.0844	520	348	83	30	5.2

Explain why the Historic SCS peak discharge for G4, G5, G6 changed (decreased) from the previously approved MDDP.

HISTORIC SCS (Full Spectrum)						
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
HG06B	0.1031	33	22			
G06	1.1875	551	369			
HG14	0.2297	79	52			
HG13	0.0844	54	37			
G14	0.0844	54	37			
G14-G16	0.0844	53	36			
G16	0.3141	117	77			

During the research to discover the reason the 2017 MDDP Historic flow rates were higher than the 2021 MDDP Historic flow rates.

- The Control Specification for the run had a 2 minute interval as opposed to the current 6 minute interval.
- This change in interval periods resulted in lower Historic flow rates and higher Future rates for all design storms.

The interval will remain at 6 minutes as this appears to be more conservative. Lower target historic rates to be matched with higher developed flow rates. I believe this will result in storm drain facilities being designed to convey larger flow rates and the detention ponds designed to hold a larger volume.

No change to the report.

The main drainage course begins at offsite E
Road. The drainage accepts runoff off-site f
property boundary from Antlers Ridge unpl
collects surface runoff from approximately
traverses southeasterly toward DP G05 (Fal
Road where a total flow of Q_5= 32 cfs, Q_{100}

Proposed Design Drainage Characteristics

Figure 5: Developed Condition Subbasins il
hydrologic analysis for the post developmen
boundaries, design points, and numbers do r
developed conditions. Table 4: Developed Condition Peak Flow summarizes developed condition peak flows for the subbasins.

<u>Gieck Ranch Basin</u>

The project accepts surface runoff from the Latigo Trails Subdivision located to the north of Meridian Ranch. Runoff is generally southeasterly; there are several culvert crossings under Eastonville Road to discharge runoff from the site. The Offsite and onsite flows for developed subbasins are summarized in Table 4: Developed Condition Peak Flow.

Runoff begins offsite and flows southeasterly toward Eastonville Road. The runoff will be collected in a combination of storm drains and open channels and conveyed southeasterly toward detention Pond G where the pond will discharge to the El Paso County Falcon Regional Park. The detention facility will release near DP G12 at a rate similar to or below the historic flow rate for the full spectrum of design storms into the existing drainage course within the Regional Park and drain southeasterly to Eastonville Road near DP G06.

Table 4 - Developed Condition Peak Flow Rates

FUTURE SCS (Full Spectrum)						
	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS06	0.1313	80	52	12	3.8	0.5
G1a	0.1313	80	52	12	3.8	0.5
G1a-G2	0.1313	79	52	11	3.7	0.5

	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS05	0.0578	39	26	5.6	1.8	0.2
OS05-G1	0.0578	39	25	5.5	1.7	0.2
FG01	0.0538	31	22	7.0	3.4	0.9
FG01-G1	0.0538	31	22	7.0	3.4	0.9
G1	0.1116	61	41	11	4.9	1.1
G1-G2	0.1116	61	41	11	4.8	1.1
FG02	0.0391	32	22	6.4	2.7	0.5
G2	0.2820	167	112	27	10	1.9
G2-G3	0.2820	164	109	27	10	1.9
FG03	0.0203	24	17	5.9	3.0	0.8
FG04	0.0172	22	16	5.8	3.1	0.9
G3	0.3195	185	123	31	12	2.4
FG06	0.0675	56	40	12	5.8	1.3
FG05	0.0580	45	33	12	6.7	2.4
OS07ab	0.0170	14	9.2	2.5	0.9	0.1
OS07a-POND F	0.0170	13	9.1	2.3	0.9	0.1
POND F IN	0.4620	295	202	56	23	5.1
POND F	0.4620	178	122	16	8.1	2.1
POND F-G7	0.4620	178	121	16	8.1	2.1
OS07c	0.0156	15	10	2.6	1.0	0.1
OS07c-G4	0.0156	14	9.5	2.5	0.9	0.1
FG21a	0.0095	5.9	4.0	1.0	0.4	0.1
G4	0.0251	20	13	3.5	1.3	0.2
G4-G7	0.0251	18	13	3.3	1.2	0.2
FG21b	0.0150	21	16	6.5	3.9	1.7
G7	0.5021	192	130	18	8.9	2.3
G7-G8	0.5021	191	130	18	8.9	2.3
FG22	0.1409	125	90	32	17	5.4
OS08	0.0394	34	24	7.5	3.3	0.7
OS08-G8	0.0394	33	23	7.3	3.3	0.7
FG23a	0.0216	21	15	5.2	2.7	0.8
G8	0.7040	285	181	51	27	8.3
G8-G10	0.7040	284	181	50	26	8.1
OS09	0.1527	90	62	18	8.2	1.9
OS09-G9	0.1527	89	62	18	8.2	1.9
FG24	0.1372	134	100	41	24	10
G9	0.2899	200	141	44	24	10
G9-G10	0.2899	179	120	32	13	2.6
FG23b	0.0247	17	11	2.6	0.9	0.1
G10	1.0186	470	302	66	28	8.5
G10-G11	1.0186	466	300	66	28	8.2
FG23c	0.0113	11	7.4	2.4	1.1	0.2
G11	1.0299	470	302	66	28	8.3
FG25	0.1086	112	85	36	22	9.9
FG26	0.0970	101	77	35	23	11
FG26-POND G	0.0970	100	77	35	22	11
FG27	0.0614	82	65	34	24	14
FG28	0.0166	13	9.2	2.6	1.0	0.2
POND G IN	1.3135	697	449	152	81	35
POND G	1.3135	487	342	62	25	5.6
G12	1.3135	487	342	62	25	5.6
G12-G06	1.3135	487	342	62	25	5.6
FG29	0.0997	64	42	10	3.6	0.6
FG32	0.0402	72	57	29	20	11
FG32-G06	0.0402	69	54	27	18	11
G06	1.4534	514	360	66	27	11

FUTURE SCS (Full Spectrum)						
	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
FG37	0.0828	58	90	41	27	13
FG34	0.0516	40	86	41	27	13
G14	0.0516	40	67	31	20	10
G14-G15	0.0516	39	65	29	19	10
FG35	0.0263	15	36	14	8.3	3.2
G15	0.0779	54	36	14	8.0	3.2
G15-G08	0.0779	52	31	12	7.0	2.7
FG36	0.0273	17	215	94	59	29
FG36-G08	0.0273	17	77	32	20	8.6
G16	0.1880	124	59	28	19	9.8

Table 5 - Allowable Discharge Rates from Meridian Ranch

MERIDIAN RANCH DISCHARGE KEY DESIGN POINTS (FUTURE)						
		PEAK DISCHARGE Q_{100} (CFS)	PEAK DISCHARGE Q_{50} (CFS)	PEAK DISCHARGE Q_{10} (CFS)	PEAK DISCHARGE Q_5 (CFS)	PEAK DISCHARGE Q_2 (CFS)
G12 - POND G OUTLET REGIONAL PARK (G05 - HISTORIC)	Historic	536	350	84	30	5.2
	Future	487	342	62	25	5.6
	% of Historic	91%	98%	74%	83%	108%
G06 - EASTONVILLE ROAD[1]	Historic	551	369	88	32	5.5
	Future	514	360	66	27	11
	% of Historic	93%	97%	75%	85%	191%
G14 - REGIONAL PARK NORTH OF REX ROAD (G14 - HISTORIC)	Historic	54	37	9.5	3.8	0.7
	Future	40	28	7.5	3.2	0.5
	% of Historic	74%	75%	79%	84%	83%
G16 - EASTONVILLE ROAD[1]	Historic	117	77	19	7.4	1.4
	Future	48	36	14	8.0	3.2
	% of Historic	41%	46%	73%	108%	231%

[1] Flow rate at Eastonville Rd. listed for reference only

Table 6 - Detention Pond Summary

EXISTING POND F				
	PEAK INFLOW	PEAK OUTFLOW	PEAK STORAGE	PEAK ELEVATION
	CFS	CFS	AC-FT	FT
FUTURE CONDITIONS				
2-YEAR STORM	5.1	2.1	0.9	7130.1
5-YEAR STORM	23	8.1	1.9	7131.2
10-YEAR STORM	56	16	3.4	7132.6
50-YEAR STORM	202	122	6.7	7134.9
100-YEAR STORM	295	178	8.9	7136.0

EXISTING POND G				
	PEAK INFLOW	PEAK OUTFLOW	PEAK STORAGE	PEAK ELEVATION
	CFS	CFS	AC-FT	FT
FUTURE CONDITIONS				
2-YEAR STORM	35	5.6	5.9	7026.9
5-YEAR STORM	81	25	8.7	7027.5
10-YEAR STORM	152	62	11.5	7028.0
50-YEAR STORM	449	342	20.7	7029.6
100-YEAR STORM	697	487	26.5	7030.5

MAJOR DRAINAGE STRUCTURES

major drainage crossings exist along Eastonville Road either are undersized for the historic flow rates generated upstream. Two locations were identified in the original Meridian Ranch MDDP in 2000 at the beginning of the project as existing road crossings along Eastonville Road that are a part of this Revised MDDP are undersized to convey existing flow. These crossings will require replacement with improvements to Eastonville Road. Please see Table 7: Major Drainage Structures for the crossings located at Rex Road or Eastonville Road. The actual size and type of conduit will be determined during final design.

Table 7 - Major Drainage Structures

DESIGN POINT	ROAD NAME	BASIN	100-YR PEAK FLOW RATE	PROPOSED CULVERT TYPE	ESTIMATED EQUIVALENT CULVERT SIZE
G07[2]	REX ROAD	GIECK	192	BOX	2-8'x4' RCB
G09[1]	REX ROAD	GIECK	200	BOX	10'x4' RCB
G15[3]	REX ROAD	GIECK	54	CULVERT	2-36" RCP
G16[3]	EASTONVILLE ROAD	GIECK	124	CULVERT	2-36" RCP
G6[3]	EASTONVILLE ROAD	GIECK	514	BOX	2-8'x4' RCB

1 ACTUAL CULVERT SIZE AND TYPE DETERMINED AT FINAL DESIGN.
2 FUTURE INTERIOR CULVERT CROSSING
3 OFFSITE CULVERT BY OTHERS (FOR REFERENCE ONLY)

Revised

Staff's understanding was that the developer was responsible for constructing Rex Road to Eastonville across the Falcon Regional Park. Revise the superscript to (2).

EROSION CONTROL DESIGN

General Concept

Historically, erosion on this property has been held to a minimum by a variety of natural features and agricultural practices including:

- Substantial prairie grass growth
- Construction of drainage arresting berms.
- Construction of multiple stock ponds along drainage courses

Existing detention ponds will also help to minimize erosion by reducing both the volume and velocity of the peak runoff.

During construction, best management practices (BMP) for erosion control will be employed based on El Paso county Criteria. BMP's will be utilized as deemed necessary by the contractor and/or engineer and are not limited to the measures shown on the construction drawing set. The contractor shall minimize the amount of area disturbed during all construction activities. Final erosion control plans will be prepared with final plat submittal.

In general, the following shall be applied in developing the sequence of major activities:

- Install down-slope and side-slope perimeter BMP's before the land disturbing activity occurs.
- Do not disturb an area until it is necessary for the construction activity to proceed.
- Cover or stabilize as soon as possible.
- Time the construction activities to reduce the impacts from seasonal climatic changes or weather events.
- The construction of filtration BMP's should wait until the end of the construction project when upstream drainage areas have been stabilized.
- Do not remove the temporary perimeter controls until after all upstream areas are stabilized.

Four Step Process

The following four step process is recommended for selecting structural BMP's in developing urban areas:

Step 1: Employ Runoff Reduction Practices

This development incorporates wider rights-of-way than other developments, thus decreasing the amount area devoted to pavement. The rights-of-way within Meridian Ranch are 20% wider, 60 ft. instead of 50 ft., creating more landscaped area within the development.

The project has over ten acres of open space, accounting for over 20% of the entire project, creating a lower density development.

Homeowners and builders are encouraged to direct roof drains to the side yards where the runoff will travel overland to the streets and creating an opportunity to allow the runoff to infiltrate into the ground.

Step 2: Stabilize Drainageways

The drainage swale located adjacent and south of the project was designed to have a wide flat bottom and slope reducing the velocity of the concentrated flow traveling along the drainageway. The construction of the swale also included erosion control mat along the entire length of the swale. At steeper sections of the swale straw logs or riprap has been installed to reduce velocities and erosion.

Step 3: Provide Water Quality Capture Volume (WQCV)

An existing extended detention pond with water quality capture volume is located to the east of the project that was designed to accommodate the runoff from this development.

Step 4: Consider Need for Industrial and Commercial BMP's

This project is neither industrial nor commercial and therefore this section does not apply.

Detention Pond

The existing detention ponds will act as the primary sedimentation control facility for the areas upstream. Runoff will be diverted into the detention pond where practical. The pond will serve a dual purpose: first, by facilitating the settling of sediment in runoff during and after construction (by means of the WQCV) and second, by maintaining runoff at or below existing levels.

Silt Fence

Silt fence will be place along downstream limits of disturbed areas. This will prevent suspended sediment from leaving the site during infrastructure construction. Silt fencing is to remain in place until vegetation is reestablished.

Erosion Bales

Erosion bales will be placed ten (10) feet from the inlet of all culverts during construction to prevent culverts from filling with sediment. Erosion bales will remain in place until vegetation is reestablished. Erosion bale checks will be used on slopes greater than 1 percent to reduce flow velocities until vegetation is reestablished.

Miscellaneous

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

REFERENCES

1. “City of Colorado Springs/El Paso County Drainage Criteria Manual” September 1987, Revised November 1991, Revised October 1994.

2. Chapter 6, Hydrology and Chapter 11, Storage, Section 3.2.1 of the “City of Colorado Springs Drainage Criteria Manual” May 2014.

3. “Volume 2, El Paso County/City of Colorado Springs Drainage Criteria Manual-Stormwater Quality Policies, Procedures and Best Management Practices” November 1, 2002.

4. Flood Insurance Rate Study for El Paso County, Colorado and Incorporated Areas. Federal Emergency Management Agency, December 7, 2018.

5. Soils Survey of El Paso County area, Natural Resources Conservation Services of Colorado.

6. Master Development Drainage Plan Meridian Ranch. August 2000. Prepared by URS Corp.

7. Revision to Master Development Drainage Plan Meridian Ranch. May 2015. Prepared by Tech Contractors.

8. Revision to Master Development Drainage Plan Meridian Ranch. January 2018. Prepared by Tech Contractors.

9. Master Development Drainage Plan Latigo Trails. October 2001. Prepared by URS Corp.

10. Final Drainage Report for Meridian Ranch Estates Filing 2. July 2013. Prepared by Tech Contractors.

11. Final Drainage Report for Meridian Ranch Estates Filing 3. October 2015. Prepared by Tech Contractors.

12. Preliminary Drainage Report for Rolling Hills Ranch 1-3 PUD. February 2020. Prepared by Tech Contractors.

13. Final Drainage Report for Estates at Rolling Hills Ranch 1. March 2020. Prepared by Tech Contractors.

14. Final Drainage Report for Estates at Rolling Hills Ranch 2. September 2020. Prepared by Tech Contractors.

15. Final Drainage Report for Rolling Hills Ranch 2. November 2020. Prepared by Tech Contractors.

Appendices

Appendix A - SCS Input Data (HEC-HMS)

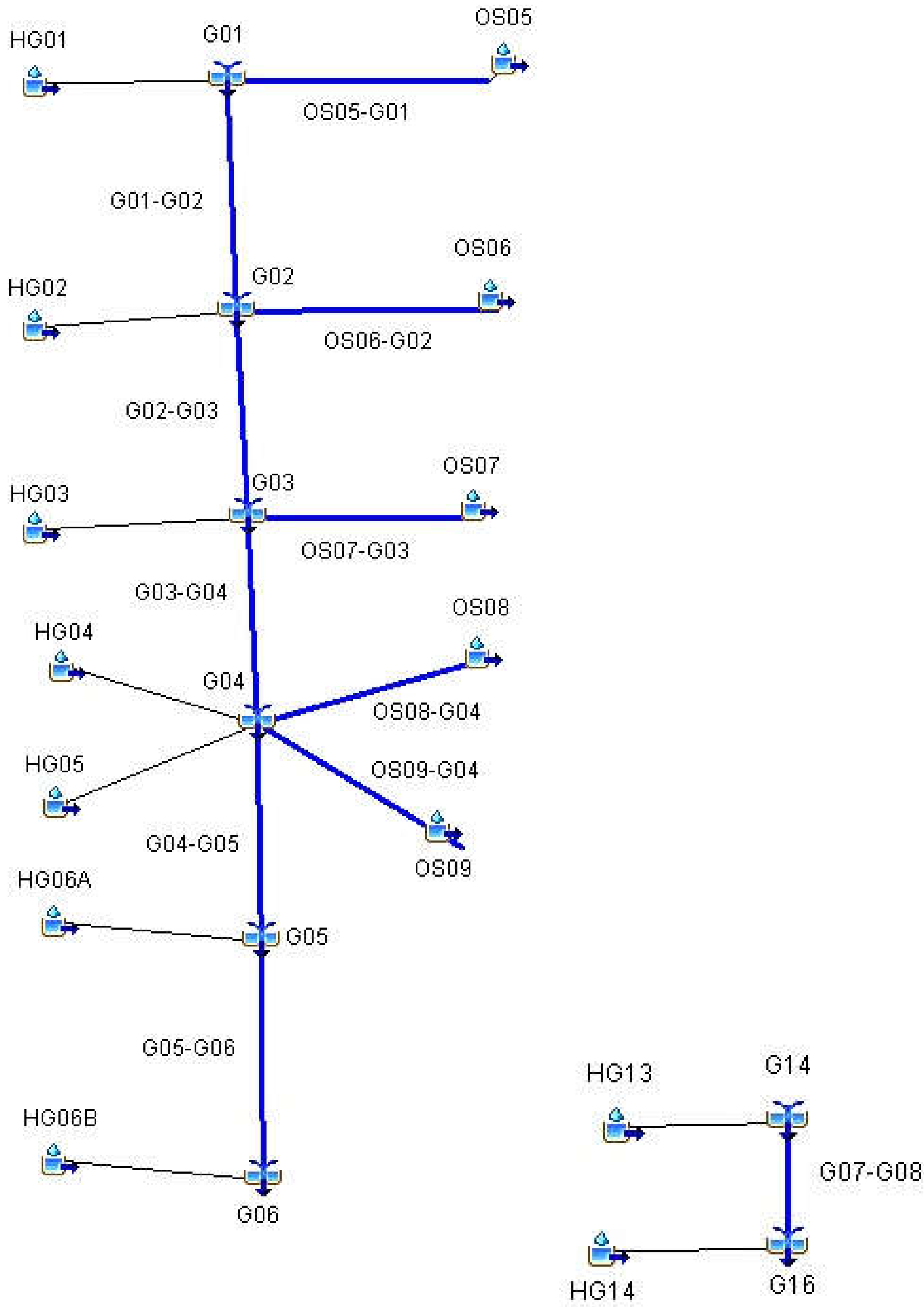
Input Data
Meridian Ranch 2021 MDDP Amendment

BASIN	AREA		CURVE NO.	LAG TIME (min)
	(acre)	(mi²)		
HISTORIC				
OS05	37	0.0578	61.0	15.2
OS06	84	0.1313	61.0	18.7
OS07	21	0.0328	63.1	15.4
OS08	26	0.0406	65.7	15.9
OS09	98	0.1527	65.0	29.5
HG01	35	0.0547	61.0	19.6
HG02	58	0.0906	61.0	25.4
HG03	117	0.1828	61.1	33.8
HG04	57	0.0891	61.0	30.7
HG05	72	0.1125	61.0	31.8
HG06A	88	0.1375	61.0	43.2
HG06B	66	0.1031	61.0	49.5
HG07	63	0.0984	61.0	28.3
HG08	85	0.1328	61.0	22.9
HG09	114	0.1781	61.0	35.6
HG10	88	0.1375	61.0	61.4
HG11	131	0.2047	61.0	40.4
HG12	83	0.1297	61.0	32.0
HG13	54	0.0844	63.1	21.2
HG14	147	0.2297	61.0	45.1
HG15	164	0.2563	61.0	65.1
HG18	21	0.0328	61.0	14.1
HG19	3	0.0047	61.0	6.1
HG20	1	0.0016	61.0	6.9
HG21	14	0.0219	61.0	13.8

BASIN	AREA		CURVE NO.	LAG TIME (min)
	(acre)	(mi²)		
FUTURE				
OS05	37	0.0578	61.0	15.2
OS06	84	0.1313	61.0	18.7
OS07ab	11	0.0170	63.1	13.9
OS07c	10	0.0156	63.1	10.9
OS08	25	0.0394	65.7	15.9
OS09	98	0.1527	65.0	29.5
FG01	34	0.0538	66.4	33.8
FG02	25	0.0391	64.6	16.1
FG03	13	0.0203	68.0	11.6
FG04	11	0.0172	68.0	7.6
FG05	37	0.0580	70.1	28.4
FG06	43	0.0675	66.1	18.4
FG21a	6	0.0095	62.6	21.4
FG21b	10	0.0150	73.1	12.7
FG22	90	0.1409	68.8	20.3
FG23a	14	0.0216	68.6	18.0
FG23b	16	0.0247	61.8	16.5
FG23c	7	0.0113	66.0	14.0
FG24	88	0.1372	72.9	24.0
FG25	70	0.1086	74.1	23.8
FG26	62	0.0970	76.5	26.9
FG27	40	0.0623	83.7	24.0
FG28	11	0.0166	63.7	14.8
FG29	64	0.0997	62.0	19.1
FG32	26	0.0402	80.0	12.1
FG34	33	0.0516	64.1	17.1
FG35	17	0.0263	63.0	22.9
FG36	18	0.0273	64.4	25.7
FG37	53	0.0828	64.5	20.4

Appendix B - HEC-HMS Results

HISTORIC SCS (100-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q100 (CFS)	TIME OF PEAK	TOTAL VOLUME Q100 (AC. FT.)
OS06	0.1313	80	01Jul2015, 12:12	9.3
OS06-G02	0.1313	77	01Jul2015, 12:24	9.2
OS05	0.0578	39	01Jul2015, 12:12	4.1
OS05-G01	0.0578	38	01Jul2015, 12:12	4.1
HG01	0.0547	32	01Jul2015, 12:12	3.9
G01	0.1125	70	01Jul2015, 12:12	7.9
G01-G02	0.1125	68	01Jul2015, 12:24	7.8
HG02	0.0906	45	01Jul2015, 12:24	6.4
G02	0.3344	191	01Jul2015, 12:24	23
G02-G03	0.3344	190	01Jul2015, 12:30	23
HG03	0.1828	77	01Jul2015, 12:30	13
OS07	0.0328	25	01Jul2015, 12:12	2.6
OS07-G03	0.0328	24	01Jul2015, 12:30	2.5
G03	0.5500	291	01Jul2015, 12:30	38
G03-G04	0.5500	281	01Jul2015, 12:30	38
OS09	0.1547	91	01Jul2015, 12:24	13
OS09-G04	0.1547	90	01Jul2015, 12:30	13
HG04	0.0891	40	01Jul2015, 12:30	6.3
HG05	0.1125	49	01Jul2015, 12:30	7.9
OS08	0.0406	35	01Jul2015, 12:12	3.6
OS08-G04	0.0406	34	01Jul2015, 12:30	3.5
G04	0.9469	493	01Jul2015, 12:30	69
G04-G05	0.9469	488	01Jul2015, 12:36	68
HG06A	0.1375	49	01Jul2015, 12:42	9.6
G05	1.0844	536	01Jul2015, 12:36	78
G05-G06	1.0844	520	01Jul2015, 12:36	78
HG06B	0.1031	33	01Jul2015, 12:48	7.2
G06	1.1875	551	01Jul2015, 12:42	85
HG14	0.2297	79	01Jul2015, 12:42	16
HG13	0.0844	54	01Jul2015, 12:18	6.6
G14	0.0844	54	01Jul2015, 12:18	6.6
G14-G16	0.0844	53	01Jul2015, 12:18	6.6
G16	0.3141	117	01Jul2015, 12:30	23


HG01
G01
OS05
OS05-G01
G01-G02
OS06
G02
HG02
OS06-G02
G02-G03
OS07
G03
HG03
OS07-G03
G03-G04
OS08
HG04
G04
OS08-G04
HG05
OS09-G04
G04-G05
OS09
HG06A
G05
G05-G06
HG13
G14
HG06B
G07-G08
G06
HG14
G16

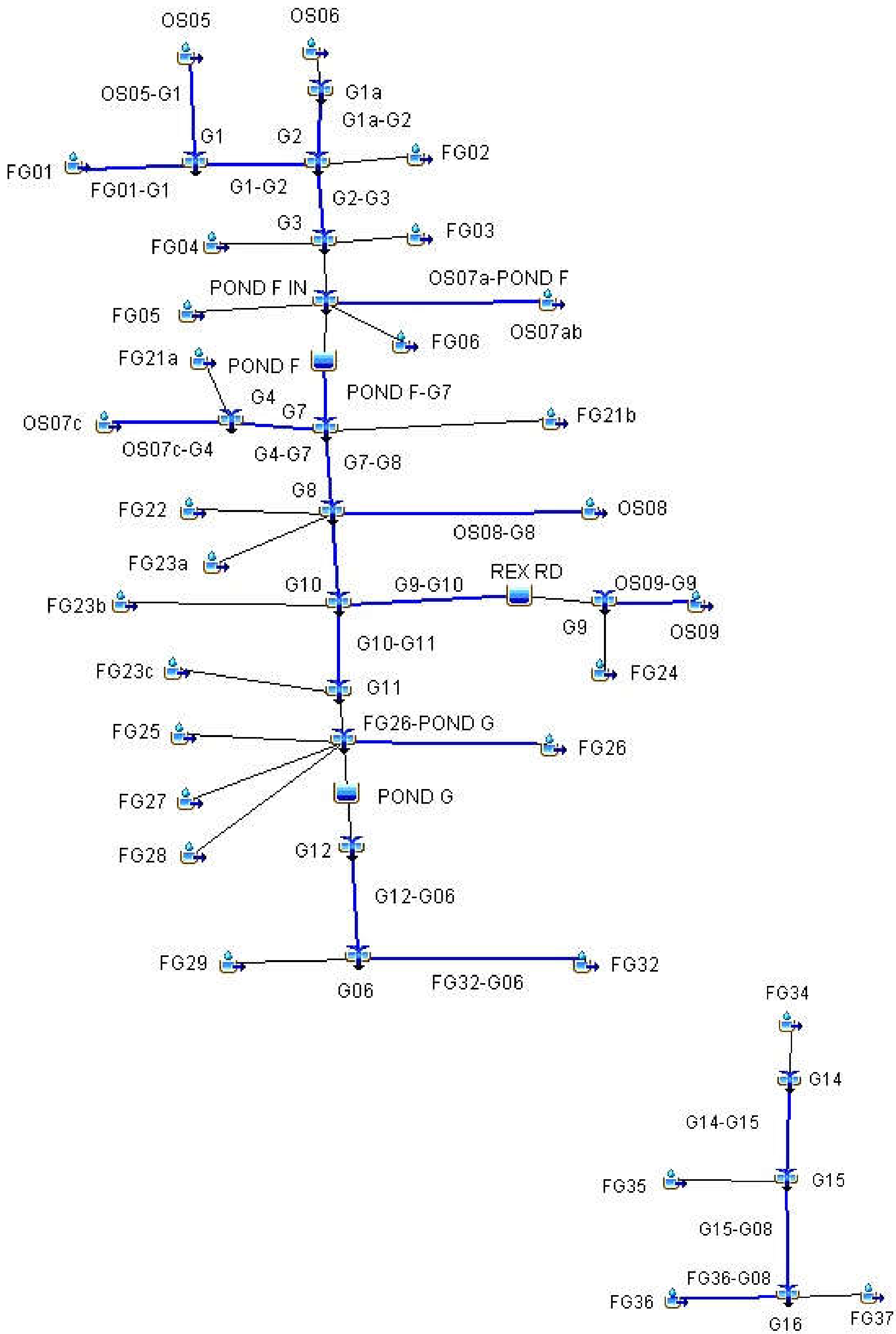
HISTORIC SCS (50-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q50 (CFS)	TIME OF PEAK	TOTAL VOLUME Q50 (AC. FT.)
OS06	0.1313	52	01Jul2015, 12:12	6.5
OS06-G02	0.1313	52	01Jul2015, 12:24	6.4
OS05	0.0578	26	01Jul2015, 12:12	2.9
OS05-G01	0.0578	25	01Jul2015, 12:18	2.9
HG01	0.0547	21	01Jul2015, 12:18	2.7
G01	0.1125	46	01Jul2015, 12:18	5.6
G01-G02	0.1125	46	01Jul2015, 12:24	5.5
HG02	0.0906	30	01Jul2015, 12:24	4.5
G02	0.3344	127	01Jul2015, 12:24	16
G02-G03	0.3344	125	01Jul2015, 12:30	16
HG03	0.1828	51	01Jul2015, 12:30	9.1
OS07	0.0328	17	01Jul2015, 12:12	1.9
OS07-G03	0.0328	17	01Jul2015, 12:30	1.8
G03	0.5500	192	01Jul2015, 12:30	27
G03-G04	0.5500	189	01Jul2015, 12:36	27
OS09	0.1547	63	01Jul2015, 12:24	9.6
OS09-G04	0.1547	62	01Jul2015, 12:36	9.4
HG04	0.0891	26	01Jul2015, 12:30	4.4
HG05	0.1125	32	01Jul2015, 12:30	5.6
OS08	0.0406	25	01Jul2015, 12:12	2.6
OS08-G04	0.0406	24	01Jul2015, 12:36	2.5
G04	0.9469	332	01Jul2015, 12:36	49
G04-G05	0.9469	318	01Jul2015, 12:42	48
HG06A	0.1375	32	01Jul2015, 12:42	6.7
G05	1.0844	350	01Jul2015, 12:42	55
G05-G06	1.0844	348	01Jul2015, 12:42	55
HG06B	0.1031	22	01Jul2015, 12:54	5.0
G06	1.1875	369	01Jul2015, 12:42	60
HG14	0.2297	52	01Jul2015, 12:48	11
HG13	0.0844	37	01Jul2015, 12:18	4.7
G14	0.0844	37	01Jul2015, 12:18	4.7
G14-G16	0.0844	36	01Jul2015, 12:24	4.7
G16	0.3141	77	01Jul2015, 12:30	16

HISTORIC SCS (10-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q10 (CFS)	TIME OF PEAK	TOTAL VOLUME Q10 (AC. FT.)
OS06	0.1313	12	01Jul2015, 12:18	2.2
OS06-G02	0.1313	11	01Jul2015, 12:30	2.1
OS05	0.0578	5.6	01Jul2015, 12:12	1.0
OS05-G01	0.0578	5.5	01Jul2015, 12:24	0.9
HG01	0.0547	4.7	01Jul2015, 12:18	0.9
G01	0.1125	10	01Jul2015, 12:24	1.9
G01-G02	0.1125	10	01Jul2015, 12:36	1.8
HG02	0.0906	6.7	01Jul2015, 12:30	1.5
G02	0.3344	27	01Jul2015, 12:36	5.4
G02-G03	0.3344	27	01Jul2015, 12:48	5.3
HG03	0.1828	12	01Jul2015, 12:42	3.0
OS07	0.0328	4.5	01Jul2015, 12:12	0.7
OS07-G03	0.0328	4.3	01Jul2015, 12:48	0.7
G03	0.5500	42	01Jul2015, 12:48	8.9
G03-G04	0.5500	42	01Jul2015, 12:54	8.8
OS09	0.1547	19	01Jul2015, 12:30	3.6
OS09-G04	0.1547	18	01Jul2015, 12:42	3.5
HG04	0.0891	5.9	01Jul2015, 12:36	1.5
HG05	0.1125	7.4	01Jul2015, 12:36	1.8
OS08	0.0406	7.7	01Jul2015, 12:12	1.0
OS08-G04	0.0406	7.4	01Jul2015, 12:48	1.0
G04	0.9469	76	01Jul2015, 12:54	17
G04-G05	0.9469	76	01Jul2015, 12:54	16
HG06A	0.1375	7.6	01Jul2015, 12:54	2.2
G05	1.0844	84	01Jul2015, 12:54	19
G05-G06	1.0844	83	01Jul2015, 13:00	19
HG06B	0.1031	5.3	01Jul2015, 13:00	1.7
G06	1.1875	88	01Jul2015, 13:00	20
HG14	0.2297	12	01Jul2015, 12:54	3.7
HG13	0.0844	9.5	01Jul2015, 12:18	1.7
G14	0.0844	9.5	01Jul2015, 12:18	1.7
G14-G16	0.0844	9.4	01Jul2015, 12:30	1.7
G16	0.3141	19	01Jul2015, 12:36	5.4

HISTORIC SCS (5-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q5 (CFS)	TIME OF PEAK	TOTAL VOLUME Q5 (AC. FT.)
OS06	0.1313	3.8	01Jul2015, 12:24	1.1
OS06-G02	0.1313	3.7	01Jul2015, 12:42	1.1
OS05	0.0578	1.8	01Jul2015, 12:18	0.5
OS05-G01	0.0578	1.7	01Jul2015, 12:30	0.5
HG01	0.0547	1.5	01Jul2015, 12:24	0.5
G01	0.1125	3.2	01Jul2015, 12:30	1.0
G01-G02	0.1125	3.2	01Jul2015, 12:48	0.9
HG02	0.0906	2.3	01Jul2015, 12:36	0.8
G02	0.3344	9.0	01Jul2015, 12:42	2.8
G02-G03	0.3344	9.0	01Jul2015, 13:00	2.7
HG03	0.1828	4.3	01Jul2015, 12:48	1.6
OS07	0.0328	1.7	01Jul2015, 12:18	0.4
OS07-G03	0.0328	1.7	01Jul2015, 13:00	0.4
G03	0.5500	15	01Jul2015, 13:00	4.6
G03-G04	0.5500	14	01Jul2015, 13:12	4.5
OS09	0.1547	8.3	01Jul2015, 12:36	2.1
OS09-G04	0.1547	8.3	01Jul2015, 12:48	2.0
HG04	0.0891	2.1	01Jul2015, 12:42	0.8
HG05	0.1125	2.6	01Jul2015, 12:42	0.9
OS08	0.0406	3.4	01Jul2015, 12:12	0.6
OS08-G04	0.0406	3.4	01Jul2015, 13:00	0.6
G04	0.9469	28	01Jul2015, 13:12	8.7
G04-G05	0.9469	27	01Jul2015, 13:18	8.6
HG06A	0.1375	2.9	01Jul2015, 13:00	1.1
G05	1.0844	30	01Jul2015, 13:18	9.8
G05-G06	1.0844	30	01Jul2015, 13:24	9.6
HG06B	0.1031	2.0	01Jul2015, 13:12	0.9
G06	1.1875	32	01Jul2015, 13:24	10
HG14	0.2297	4.7	01Jul2015, 13:06	1.9
HG13	0.0844	3.8	01Jul2015, 12:24	0.9
G14	0.0844	3.8	01Jul2015, 12:24	0.9
G14-G16	0.0844	3.7	01Jul2015, 12:36	0.9
G16	0.3141	7.4	01Jul2015, 12:54	2.8

HISTORIC SCS (2-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q2 (CFS)	TIME OF PEAK	TOTAL VOLUME Q2 (AC. FT.)
OS06	0.1313	0.5	01Jul2015, 13:30	0.3
OS06-G02	0.1313	0.5	01Jul2015, 14:00	0.3
OS05	0.0578	0.2	01Jul2015, 13:24	0.2
OS05-G01	0.0578	0.2	01Jul2015, 13:42	0.2
HG01	0.0547	0.2	01Jul2015, 13:36	0.1
G01	0.1125	0.5	01Jul2015, 13:36	0.3
G01-G02	0.1125	0.5	01Jul2015, 14:06	0.3
HG02	0.0906	0.4	01Jul2015, 13:42	0.2
G02	0.3344	1.3	01Jul2015, 14:00	0.8
G02-G03	0.3344	1.3	01Jul2015, 14:30	0.8
HG03	0.1828	0.7	01Jul2015, 13:54	0.5
OS07	0.0328	0.3	01Jul2015, 12:54	0.1
OS07-G03	0.0328	0.3	01Jul2015, 14:12	0.1
G03	0.5500	2.3	01Jul2015, 14:24	1.4
G03-G04	0.5500	2.3	01Jul2015, 14:42	1.3
OS09	0.1547	1.9	01Jul2015, 12:54	0.8
OS09-G04	0.1547	1.9	01Jul2015, 13:18	0.8
HG04	0.0891	0.3	01Jul2015, 13:48	0.2
HG05	0.1125	0.4	01Jul2015, 13:54	0.3
OS08	0.0406	0.7	01Jul2015, 12:24	0.2
OS08-G04	0.0406	0.7	01Jul2015, 13:36	0.2
G04	0.9469	4.7	01Jul2015, 14:36	2.8
G04-G05	0.9469	4.7	01Jul2015, 14:48	2.8
HG06A	0.1375	0.5	01Jul2015, 14:12	0.3
G05	1.0844	5.2	01Jul2015, 14:48	3.1
G05-G06	1.0844	5.2	01Jul2015, 15:00	3.0
HG06B	0.1031	0.4	01Jul2015, 14:24	0.3
G06	1.1875	5.5	01Jul2015, 15:00	3.3
HG14	0.2297	0.8	01Jul2015, 14:18	0.6
HG13	0.0844	0.7	01Jul2015, 13:00	0.3
G14	0.0844	0.7	01Jul2015, 13:00	0.3
G14-G16	0.0844	0.6	01Jul2015, 13:18	0.3
G16	0.3141	1.4	01Jul2015, 13:54	0.9

FUTURE SCS (100-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	TIME OF PEAK	TOTAL VOLUME Q100 (AC. FT.)
OS06	0.1313	80	01Jul2015, 12:12	9.3
G1a	0.1313	80	01Jul2015, 12:12	9.3
G1a-G2	0.1313	79	01Jul2015, 12:18	9.2
OS05	0.0578	39	01Jul2015, 12:12	4.1
OS05-G1	0.0578	39	01Jul2015, 12:12	4.1
FG01	0.0538	31	01Jul2015, 12:30	4.9
FG01-G1	0.0538	31	01Jul2015, 12:30	4.9
G1	0.1116	61	01Jul2015, 12:18	9.0
G1-G2	0.1116	61	01Jul2015, 12:18	9.0
FG02	0.0391	32	01Jul2015, 12:12	3.3
G2	0.2820	167	01Jul2015, 12:18	21
G2-G3	0.2820	164	01Jul2015, 12:18	21
FG03	0.0203	24	01Jul2015, 12:06	2.0
FG04	0.0172	22	01Jul2015, 12:00	1.7
G3	0.3195	185	01Jul2015, 12:18	25
FG06	0.0675	56	01Jul2015, 12:12	6.1
FG05	0.0580	45	01Jul2015, 12:24	6.1
OS07ab	0.0170	14	01Jul2015, 12:06	1.3
OS07a-POND F	0.0170	13	01Jul2015, 12:18	1.3
POND F IN	0.4620	295	01Jul2015, 12:18	39
POND F	0.4620	178	01Jul2015, 12:42	36
POND F-G7	0.4620	178	01Jul2015, 12:42	36
OS07c	0.0156	15	01Jul2015, 12:06	1.2
OS07c-G4	0.0156	14	01Jul2015, 12:12	1.2
FG21a	0.0095	6	01Jul2015, 12:18	0.7
G4	0.0251	20	01Jul2015, 12:12	1.9
G4-G7	0.0251	18	01Jul2015, 12:24	1.9
FG21b	0.0150	21	01Jul2015, 12:06	1.8
G7	0.5021	192	01Jul2015, 12:42	40
G7-G8	0.5021	191	01Jul2015, 12:42	39
FG22	0.1409	125	01Jul2015, 12:12	14
OS08	0.0394	34	01Jul2015, 12:12	3.5
OS08-G8	0.0394	33	01Jul2015, 12:12	3.5
FG23a	0.0216	21	01Jul2015, 12:12	2.2
G8	0.7040	285	01Jul2015, 12:30	59
G8-G10	0.7040	284	01Jul2015, 12:36	59
OS09	0.1527	90	01Jul2015, 12:24	13
OS09-G9	0.1527	89	01Jul2015, 12:36	13
FG24	0.1372	134	01Jul2015, 12:18	16
G9	0.2899	200	01Jul2015, 12:24	29
REX RD	0.2899	179	01Jul2015, 12:36	28
G9-G10	0.2899	179	01Jul2015, 12:36	28
FG23b	0.0247	17	01Jul2015, 12:12	1.8
G10	1.0186	470	01Jul2015, 12:36	88
G10-G11	1.0186	466	01Jul2015, 12:36	88
FG23c	0.0113	11	01Jul2015, 12:06	1.0


OS05
OS06
G1a
OS05-G1
G1a-G2
G1
G2
FG02
FG01
FG01-G1
G1-G2
G2-G3
G3
FG03
FG04
OS07a-POND F
POND F IN
FG05
OS07ab
FG06
FG21a
POND F
G4
POND F-G7
G7
FG21b
OS07c
OS07c-G4
G4-G7
G7-G8
G8
FG22
OS08
OS08-G8
FG23a
REX RD
G10
G9-G10
OS09-G9
FG23b
G9
OS09
G10-G11
FG23c
FG24
G11
FG26-POND G
FG25
FG26
FG27
POND G
G12
FG28
G12-G06
FG29
FG32
G06
FG32-G06
FG34
G14
G14-G15
FG35
G15
G15-G08
FG36-G08
FG36
G16
FG37

FUTURE SCS (100-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	TIME OF PEAK	TOTAL VOLUME Q100 (AC. FT.)
G11	1.0299	470	01Jul2015, 12:36	89
FG25	0.1086	112	01Jul2015, 12:18	13
FG26	0.0970	101	01Jul2015, 12:18	13
FG26-POND G	0.0970	100	01Jul2015, 12:24	13
FG27	0.0614	82	01Jul2015, 12:18	9.9
FG28	0.0166	13	01Jul2015, 12:12	1.3
POND G IN	1.3135	697	01Jul2015, 12:30	126
POND G	1.3135	487	01Jul2015, 13:00	117
G12	1.3135	487	01Jul2015, 13:00	117
G12-G06	1.3135	487	01Jul2015, 13:00	116
FG29	0.0997	64	01Jul2015, 12:12	7.4
FG32	0.0402	72	01Jul2015, 12:06	6.1
FG32-G06	0.0402	69	01Jul2015, 12:06	6.1
G06	1.4534	514	01Jul2015, 13:00	129
FG37	0.0828	58	01Jul2015, 12:18	6.9
FG34	0.0516	40	01Jul2015, 12:12	4.3
G14	0.0516	40	01Jul2015, 12:12	4.3
G14-G15	0.0516	39	01Jul2015, 12:18	4.2
FG35	0.0263	15	01Jul2015, 12:24	2.1
G15	0.0779	54	01Jul2015, 12:18	6.3
G15-G08	0.0779	52	01Jul2015, 12:24	6.2
FG36	0.0273	17	01Jul2015, 12:18	2.3
FG36-G08	0.0273	17	01Jul2015, 12:30	2.3
G16	0.1880	124	01Jul2015, 12:18	15.4

FUTURE SCS (50-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q50 (CFS)	TIME OF PEAK	TOTAL VOLUME Q50 (AC. FT.)
OS06	0.1313	52	01Jul2015, 12:12	6.5
G1a	0.1313	52	01Jul2015, 12:12	6.5
G1a-G2	0.1313	52	01Jul2015, 12:18	6.5
OS05	0.0578	26	01Jul2015, 12:12	2.9
OS05-G1	0.0578	25	01Jul2015, 12:12	2.9
FG01	0.0538	22	01Jul2015, 12:30	3.6
FG01-G1	0.0538	22	01Jul2015, 12:30	3.6
G1	0.1116	41	01Jul2015, 12:18	6.4
G1-G2	0.1116	41	01Jul2015, 12:18	6.4
FG02	0.0391	22	01Jul2015, 12:12	2.4
G2	0.2820	112	01Jul2015, 12:18	15
G2-G3	0.2820	109	01Jul2015, 12:24	15
FG03	0.0203	17	01Jul2015, 12:06	1.5
FG04	0.0172	16	01Jul2015, 12:00	1.3
G3	0.3195	123	01Jul2015, 12:18	18
FG06	0.0675	40	01Jul2015, 12:12	4.4
FG05	0.0580	33	01Jul2015, 12:24	4.6
OS07ab	0.0170	9.2	01Jul2015, 12:12	1.0
OS07a-POND F	0.0170	9.1	01Jul2015, 12:18	0.9
POND F IN	0.4620	202	01Jul2015, 12:18	28
POND F	0.4620	122	01Jul2015, 12:42	26
POND F-G7	0.4620	121	01Jul2015, 12:48	26
OS07c	0.0156	10	01Jul2015, 12:06	0.9
OS07c-G4	0.0156	9.5	01Jul2015, 12:12	0.9
FG21a	0.0095	4.0	01Jul2015, 12:18	0.5
G4	0.0251	13	01Jul2015, 12:12	1.4
G4-G7	0.0251	13	01Jul2015, 12:24	1.4
FG21b	0.0150	16	01Jul2015, 12:06	1.4
G7	0.5021	130	01Jul2015, 12:48	28
G7-G8	0.5021	130	01Jul2015, 12:48	28
FG22	0.1409	90	01Jul2015, 12:12	11
OS08	0.0394	24	01Jul2015, 12:12	2.5
OS08-G8	0.0394	23	01Jul2015, 12:12	2.5
FG23a	0.0216	15	01Jul2015, 12:12	1.6
G8	0.7040	181	01Jul2015, 12:42	43
G8-G10	0.7040	181	01Jul2015, 12:48	42
OS09	0.1527	62	01Jul2015, 12:24	9.4
OS09-G9	0.1527	62	01Jul2015, 12:36	9.3
FG24	0.1372	100	01Jul2015, 12:18	12
G9	0.2899	141	01Jul2015, 12:24	22
REX RD	0.2899	120	01Jul2015, 12:42	20
G9-G10	0.2899	119.8	01Jul2015, 12:42	20
FG23b	0.0247	11	01Jul2015, 12:12	1.3
G10	1.0186	302	01Jul2015, 12:42	64
G10-G11	1.0186	300	01Jul2015, 12:48	64
FG23c	0.0113	7.4	01Jul2015, 12:06	0.7

FUTURE SCS (50-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q50 (CFS)	TIME OF PEAK	TOTAL VOLUME Q50 (AC. FT.)
G11	1.0299	302	01Jul2015, 12:48	64.5
FG25	0.1086	85	01Jul2015, 12:18	10
FG26	0.0970	77	01Jul2015, 12:18	10
FG26-POND G	0.0970	77	01Jul2015, 12:24	10
FG27	0.0614	65	01Jul2015, 12:18	7.9
FG28	0.0166	9.2	01Jul2015, 12:12	1.0
POND G IN	1.3135	449	01Jul2015, 12:30	94
POND G	1.3135	342	01Jul2015, 13:00	85
G12	1.3135	342	01Jul2015, 13:00	85
G12-G06	1.3135	342	01Jul2015, 13:06	84
FG29	0.0997	42	01Jul2015, 12:12	5.3
FG32	0.0402	57	01Jul2015, 12:06	4.8
FG32-G06	0.0402	54	01Jul2015, 12:06	4.8
G06	1.4534	360	01Jul2015, 13:06	94
FG37	0.0828	41	01Jul2015, 12:18	5.0
FG34	0.0516	28	01Jul2015, 12:12	3.1
G14	0.0516	28	01Jul2015, 12:12	3.1
G14-G15	0.0516	27	01Jul2015, 12:18	3.0
FG35	0.0263	10	01Jul2015, 12:24	1.5
G15	0.0779	37	01Jul2015, 12:18	4.5
G15-G08	0.0779	36	01Jul2015, 12:24	4.5
FG36	0.0273	12	01Jul2015, 12:24	1.6
FG36-G08	0.0273	11	01Jul2015, 12:30	1.6
G16	0.1880	83	01Jul2015, 12:24	11

FUTURE SCS (10-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q10 (CFS)	TIME OF PEAK	TOTAL VOLUME Q10 (AC. FT.)
OS06	0.1313	12	01Jul2015, 12:18	2.2
G1a	0.1313	12	01Jul2015, 12:18	2.2
G1a-G2	0.1313	11	01Jul2015, 12:24	2.1
OS05	0.0578	5.6	01Jul2015, 12:12	1.0
OS05-G1	0.0578	5.5	01Jul2015, 12:18	1.0
FG01	0.0538	7.0	01Jul2015, 12:36	1.4
FG01-G1	0.0538	7.0	01Jul2015, 12:36	1.4
G1	0.1116	11	01Jul2015, 12:24	2.3
G1-G2	0.1116	11	01Jul2015, 12:30	2.3
FG02	0.0391	6.4	01Jul2015, 12:12	0.9
G2	0.2820	27	01Jul2015, 12:24	5.4
G2-G3	0.2820	27	01Jul2015, 12:30	5.3
FG03	0.0203	5.9	01Jul2015, 12:06	0.6
FG04	0.0172	5.8	01Jul2015, 12:06	0.5
G3	0.3195	31	01Jul2015, 12:30	6.4
FG06	0.0675	12	01Jul2015, 12:18	1.7
FG05	0.0580	12	01Jul2015, 12:24	2.0
OS07ab	0.0170	2.5	01Jul2015, 12:12	0.3
OS07a-POND F	0.0170	2.3	01Jul2015, 12:24	0.3
POND F IN	0.4620	56	01Jul2015, 12:24	10
POND F	0.4620	16	01Jul2015, 13:48	9.1
POND F-G7	0.4620	16	01Jul2015, 13:54	9.0
OS07c	0.0156	2.6	01Jul2015, 12:06	0.3
OS07c-G4	0.0156	2.5	01Jul2015, 12:18	0.3
FG21a	0.0095	1.0	01Jul2015, 12:24	0.2
G4	0.0251	3.5	01Jul2015, 12:18	0.5
G4-G7	0.0251	3.3	01Jul2015, 12:36	0.5
FG21b	0.0150	6.5	01Jul2015, 12:06	0.6
G7	0.5021	18	01Jul2015, 13:36	10
G7-G8	0.5021	18	01Jul2015, 13:42	10
FG22	0.1409	32	01Jul2015, 12:18	4.4
OS08	0.0394	7.5	01Jul2015, 12:12	1.0
OS08-G8	0.0394	7.3	01Jul2015, 12:18	1.0
FG23a	0.0216	5.2	01Jul2015, 12:12	0.7
G8	0.7040	51	01Jul2015, 12:18	16
G8-G10	0.7040	50	01Jul2015, 12:24	16
OS09	0.1527	18	01Jul2015, 12:30	3.5
OS09-G9	0.1527	18	01Jul2015, 12:48	3.4
FG24	0.1372	41	01Jul2015, 12:18	5.6
G9	0.2899	44	01Jul2015, 12:36	9.0
REX RD	0.2899	32	01Jul2015, 13:00	7.8
G9-G10	0.2899	32	01Jul2015, 13:00	7.8
FG23b	0.0247	2.6	01Jul2015, 12:18	0.4
G10	1.0186	66	01Jul2015, 13:00	24
G10-G11	1.0186	66	01Jul2015, 13:00	24
FG23c	0.0113	2.4	01Jul2015, 12:12	0.3

FUTURE SCS (10-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q10 (CFS)	TIME OF PEAK	TOTAL VOLUME Q10 (AC. FT.)
G11	1.0299	66	01Jul2015, 13:00	24
FG25	0.1086	36	01Jul2015, 12:18	4.7
FG26	0.0970	35	01Jul2015, 12:24	4.9
FG26-POND G	0.0970	35	01Jul2015, 12:24	4.8
FG27	0.0614	34	01Jul2015, 12:18	4.1
FG28	0.0166	2.6	01Jul2015, 12:12	0.4
POND G IN	1.3135	152	01Jul2015, 12:30	38
POND G	1.3135	62	01Jul2015, 14:00	31
G12	1.3135	62	01Jul2015, 14:00	31
G12-G06	1.3135	62	01Jul2015, 14:06	30
FG29	0.0997	10	01Jul2015, 12:18	1.8
FG32	0.0402	29	01Jul2015, 12:06	2.5
FG32-G06	0.0402	27	01Jul2015, 12:06	2.4
G06	1.4534	66	01Jul2015, 14:00	34
FG37	0.0828	12	01Jul2015, 12:18	1.9
FG34	0.0516	7.5	01Jul2015, 12:12	1.1
G14	0.0516	7.5	01Jul2015, 12:12	1.1
G14-G15	0.0516	7.5	01Jul2015, 12:24	1.1
FG35	0.0263	2.7	01Jul2015, 12:30	0.5
G15	0.0779	10	01Jul2015, 12:24	1.6
G15-G08	0.0779	10	01Jul2015, 12:30	1.6
FG36	0.0273	3.3	01Jul2015, 12:24	0.6
FG36-G08	0.0273	3.3	01Jul2015, 12:36	0.6
G16	0.1880	23	01Jul2015, 12:30	4.1

FUTURE SCS (5-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q5 (CFS)	TIME OF PEAK	TOTAL VOLUME Q5 (AC. FT.)
OS06	0.1313	3.8	01Jul2015, 12:24	1.1
G1a	0.1313	3.8	01Jul2015, 12:24	1.1
G1a-G2	0.1313	3.7	01Jul2015, 12:30	1.1
OS05	0.0578	1.8	01Jul2015, 12:18	0.5
OS05-G1	0.0578	1.7	01Jul2015, 12:24	0.5
FG01	0.0538	3.4	01Jul2015, 12:36	0.8
FG01-G1	0.0538	3.4	01Jul2015, 12:36	0.8
G1	0.1116	4.9	01Jul2015, 12:36	1.3
G1-G2	0.1116	4.8	01Jul2015, 12:36	1.3
FG02	0.0391	2.7	01Jul2015, 12:18	0.5
G2	0.2820	10	01Jul2015, 12:30	2.9
G2-G3	0.2820	10	01Jul2015, 12:42	2.9
FG03	0.0203	3.0	01Jul2015, 12:06	0.4
FG04	0.0172	3.1	01Jul2015, 12:06	0.3
G3	0.3195	12	01Jul2015, 12:36	3.5
FG06	0.0675	5.8	01Jul2015, 12:18	1.0
FG05	0.0580	6.7	01Jul2015, 12:30	1.2
OS07ab	0.0170	0.9	01Jul2015, 12:12	0.2
OS07a-POND F	0.0170	0.9	01Jul2015, 12:36	0.2
POND F IN	0.4620	23	01Jul2015, 12:30	5.9
POND F	0.4620	8.1	01Jul2015, 14:12	4.9
POND F-G7	0.4620	8.1	01Jul2015, 14:24	4.8
OS07c	0.0156	1.0	01Jul2015, 12:12	0.2
OS07c-G4	0.0156	0.9	01Jul2015, 12:24	0.2
FG21a	0.0095	0.4	01Jul2015, 12:24	0.1
G4	0.0251	1.3	01Jul2015, 12:24	0.3
G4-G7	0.0251	1.2	01Jul2015, 12:42	0.3
FG21b	0.0150	3.9	01Jul2015, 12:06	0.4
G7	0.5021	8.9	01Jul2015, 14:12	5.5
G7-G8	0.5021	8.9	01Jul2015, 14:18	5.4
FG22	0.1409	17	01Jul2015, 12:18	2.7
OS08	0.0394	3.3	01Jul2015, 12:12	0.6
OS08-G8	0.0394	3.3	01Jul2015, 12:18	0.6
FG23a	0.0216	2.7	01Jul2015, 12:18	0.4
G8	0.7040	27	01Jul2015, 12:18	9.1
G8-G10	0.7040	26	01Jul2015, 12:30	8.8
OS09	0.1527	8.2	01Jul2015, 12:36	2.0
OS09-G9	0.1527	8.2	01Jul2015, 12:54	2.0
FG24	0.1372	24	01Jul2015, 12:24	3.6
G9	0.2899	24	01Jul2015, 12:24	5.6
REX RD	0.2899	13	01Jul2015, 13:24	4.5
G9-G10	0.2899	13	01Jul2015, 13:24	4.5
FG23b	0.0247	0.9	01Jul2015, 12:18	0.2
G10	1.0186	28	01Jul2015, 12:30	13.6
G10-G11	1.0186	28	01Jul2015, 12:36	13.5
FG23c	0.0113	1.1	01Jul2015, 12:12	0.2

FUTURE SCS (5-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q5 (CFS)	TIME OF PEAK	TOTAL VOLUME Q5 (AC. FT.)
G11	1.0299	28	01Jul2015, 12:36	13.6
FG25	0.1086	22	01Jul2015, 12:18	3.1
FG26	0.0970	23	01Jul2015, 12:24	3.3
FG26-POND G	0.0970	22	01Jul2015, 12:24	3.3
FG27	0.0614	24	01Jul2015, 12:18	3.0
FG28	0.0166	1.0	01Jul2015, 12:12	0.2
POND G IN	1.3135	81	01Jul2015, 12:36	23.2
POND G	1.3135	25	01Jul2015, 15:18	16.3
G12	1.3135	25	01Jul2015, 15:18	16.3
G12-G06	1.3135	25	01Jul2015, 15:30	15.9
FG29	0.0997	3.6	01Jul2015, 12:24	1.0
FG32	0.0402	20	01Jul2015, 12:06	1.7
FG32-G06	0.0402	18	01Jul2015, 12:12	1.7
G06	1.4534	27	01Jul2015, 15:24	18.6
FG37	0.0828	5.0	01Jul2015, 12:24	1.1
FG34	0.0516	3.2	01Jul2015, 12:18	0.6
G14	0.0516	3.2	01Jul2015, 12:18	0.6
G14-G15	0.0516	3.1	01Jul2015, 12:30	0.6
FG35	0.0263	1.1	01Jul2015, 12:30	0.3
G15	0.0779	4.2	01Jul2015, 12:30	0.9
G15-G08	0.0779	4.1	01Jul2015, 12:36	0.9
FG36	0.0273	1.4	01Jul2015, 12:30	0.3
FG36-G08	0.0273	1.4	01Jul2015, 12:42	0.3
G16	0.1880	9.4	01Jul2015, 12:36	2.3

FUTURE SCS (2-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q2 (CFS)	TIME OF PEAK	TOTAL VOLUME Q2 (AC. FT.)
OS06	0.1313	0.5	01Jul2015, 13:30	0.3
G1a	0.1313	0.5	01Jul2015, 13:30	0.3
G1a-G2	0.1313	0.5	01Jul2015, 13:48	0.3
OS05	0.0578	0.2	01Jul2015, 13:24	0.2
OS05-G1	0.0578	0.2	01Jul2015, 13:30	0.2
FG01	0.0538	0.9	01Jul2015, 12:48	0.4
FG01-G1	0.0538	0.9	01Jul2015, 12:48	0.4
G1	0.1116	1.1	01Jul2015, 12:54	0.5
G1-G2	0.1116	1.1	01Jul2015, 13:00	0.5
FG02	0.0391	0.5	01Jul2015, 12:30	0.2
G2	0.2820	1.9	01Jul2015, 13:18	1.0
G2-G3	0.2820	1.9	01Jul2015, 13:30	1.0
FG03	0.0203	0.8	01Jul2015, 12:12	0.2
FG04	0.0172	0.9	01Jul2015, 12:06	0.1
G3	0.3195	2.4	01Jul2015, 13:24	1.3
FG06	0.0675	1.3	01Jul2015, 12:24	0.4
FG05	0.0580	2.4	01Jul2015, 12:30	0.6
OS07ab	0.0170	0.1	01Jul2015, 12:48	0.1
OS07a-POND F	0.0170	0.1	01Jul2015, 13:24	0.1
POND F IN	0.4620	5.1	01Jul2015, 12:42	2.4
POND F	0.4620	2.1	01Jul2015, 17:48	1.6
POND F-G7	0.4620	2.1	01Jul2015, 18:00	1.5
OS07c	0.0156	0.1	01Jul2015, 12:48	0.1
OS07c-G4	0.0156	0.1	01Jul2015, 13:06	0.1
FG21a	0.0095	0.1	01Jul2015, 13:06	0.0
G4	0.0251	0.2	01Jul2015, 13:06	0.1
G4-G7	0.0251	0.2	01Jul2015, 13:42	0.1
FG21b	0.0150	1.7	01Jul2015, 12:12	0.2
G7	0.5021	2.3	01Jul2015, 17:42	1.8
G7-G8	0.5021	2.3	01Jul2015, 17:48	1.8
FG22	0.1409	5.4	01Jul2015, 12:24	1.3
OS08	0.0394	0.7	01Jul2015, 12:24	0.2
OS08-G8	0.0394	0.7	01Jul2015, 12:30	0.2
FG23a	0.0216	0.8	01Jul2015, 12:18	0.2
G8	0.7040	8.3	01Jul2015, 12:24	3.5
G8-G10	0.7040	8.1	01Jul2015, 12:42	3.3
OS09	0.1527	1.9	01Jul2015, 12:54	0.8
OS09-G9	0.1527	1.9	01Jul2015, 13:24	0.8
FG24	0.1372	10	01Jul2015, 12:24	1.9
G9	0.2899	10	01Jul2015, 12:24	2.7
REX RD	0.2899	2.6	01Jul2015, 15:30	1.8
G9-G10	0.2899	2.6	01Jul2015, 15:30	1.8
FG23b	0.0247	0.1	01Jul2015, 13:06	0.1
G10	1.0186	8.5	01Jul2015, 12:42	5.2
G10-G11	1.0186	8.2	01Jul2015, 12:48	5.1
FG23c	0.0113	0.2	01Jul2015, 12:18	0.1

FUTURE SCS (2-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q2 (CFS)	TIME OF PEAK	TOTAL VOLUME Q2 (AC. FT.)
G11	1.0299	8.3	01Jul2015, 12:48	5.1
FG25	0.1086	9.9	01Jul2015, 12:24	1.7
FG26	0.0970	11	01Jul2015, 12:24	1.9
FG26-POND G	0.0970	11	01Jul2015, 12:30	1.9
FG27	0.0614	14	01Jul2015, 12:18	1.8
FG28	0.0166	0.2	01Jul2015, 12:42	0.1
POND G IN	1.3135	35	01Jul2015, 12:24	11
POND G	1.3135	5.6	02Jul2015, 00:00	4.8
G12	1.3135	5.6	02Jul2015, 00:00	4.8
G12-G06	1.3135	5.6	02Jul2015, 00:00	4.6
FG29	0.0997	0.6	01Jul2015, 13:12	0.3
FG32	0.0402	11	01Jul2015, 12:06	1.0
FG32-G06	0.0402	11	01Jul2015, 12:12	1.0
G06	1.4534	11	01Jul2015, 12:12	5.9
FG37	0.0828	0.9	01Jul2015, 12:42	0.4
FG34	0.0516	0.5	01Jul2015, 12:42	0.2
G14	0.0516	0.5	01Jul2015, 12:42	0.2
G14-G15	0.0516	0.5	01Jul2015, 13:06	0.2
FG35	0.0263	0.2	01Jul2015, 13:06	0.1
G15	0.0779	0.8	01Jul2015, 13:06	0.3
G15-G08	0.0779	0.8	01Jul2015, 13:18	0.3
FG36	0.0273	0.3	01Jul2015, 12:54	0.1
FG36-G08	0.0273	0.3	01Jul2015, 13:12	0.1
G16	0.1880	1.9	01Jul2015, 13:12	0.9

Appendix C - Detention Pond Information

EXISTING DETENTION PONDS
FINAL FUTURE CONDITION
Simulation Run: MDDP-100 Reservoir: POND F

Start of Run:	01Jul2015, 00:00	Basin Model:	Future SCS
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 100YR
Compute Time:	22Mar2021 12:55:15	Control Specifications:	24 HR-2 MIN.

Volume Units: AC-FT

Computed Results:

Peak Inflow:	295 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:18
Peak Outflow:	178(CFS)	Date/Time of Peak Outflow:	01Jul2015, 12:42
Total Inflow :	38.5 (AC-FT)	Peak Storage:	8.9 (AC-FT)
Total Outflow:	36.1 (AC-FT)	Peak Elevation:	7136.0 (FT)

Simulation Run: MDDP-100 Reservoir: POND G

Start of Run:	01Jul2015, 00:00	Basin Model:	Future SCS
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 100YR
Compute Time:	22Mar2021 12:55:15	Control Specifications:	24 HR-2 MIN.

Volume Units: AC-FT

Computed Results:

Peak Inflow:	697 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:30
Peak Outflow:	487(CFS)	Date/Time of Peak Outflow:	01Jul2015, 13:00
Total Inflow :	126.4 (AC-FT)	Peak Storage:	26.5 (AC-FT)
Total Outflow:	116.7 (AC-FT)	Peak Elevation:	7030.5 (FT)

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Proposed Detention Pond F-FUTURE CONDITIONS

Geick Basin - El Paso County, Colorado

Data for spillway and embankment:

embankment length =	285
embankment elev =	7138.5
spillway length =	87
spillway elevation =	7137.5
100 year storage elev.=	7136.0
100 year storage vol.=	8.9
100 year discharge=	178
5 year storage elev.=	7131.2
5 year storage vol.=	1.9
5 year discharge=	8.1
WQCV storage elev.=	7129.1
WQCV storage vol.=	0.3

Data for outlet pipe and grate:

Type		H or V	Dimensions Width (ft.)	X Height (ft.)	Dia.(in)		(sqft)		
Rectangular	Orifice 1:	V	0.0131	1.25		Area =	0.016	Elev to cl =	7128.45
Rectangular	Orifice 2:	V	4	0.5		Area =	2.000	Elev to cl =	7130.75
Circular	Orifice 3:	H			8	Area =	0.349	Elev to cl =	7129.20
None Selected	Orifice 4:					Area =	0.000	Elev to cl =	

Stand Pipe Dimensions

Rec Grate		6	x	3	Elev =	7133
Circ. Grate			dia.		Elev =	7133

50 year storage elev.=	7134.9
50 year storage vol.=	6.7
50 year discharge=	122
10 year storage elev.=	7132.6
10 year storage vol.=	3.4
10 year discharge=	16
2 year storage elev.=	7130.1
2 year storage vol.=	0.9
2 year discharge=	2.1

Outlet Culvert Dimensions

	Width (ft.)		Height (ft.)	Dia. (ft.)	Type
Outlet Culvert		x		4	**Circular**
Area	12.6		TOP		
Outlet I. E.	7126.6		7131.0		
Wall Thick.	5	in.			

STAGE		STORAGE				DISCHARGE										
ELEV	HEIGHT	AREA		VOLUME		TOP OF	SPILLWAY	ORIFICE (max outflow)				GRATE (max outflow)	PIPE		REALIZED CULVERT	TOTAL
		sqft	acre	acft	cum acft	BANK		1	2	3	4	**Rectangular**	1	2	OUTFLOW	FLOW
7127.7	0	0	0.00	0.00	0.000			-	-	-	-	-				-
7128	0.3	2170	0.05	0.01	0.007	-	-	0.0	-	-	-	-	11		0.0	0.003
7129	1.3	17730	0.41	0.23	0.236	-	-	0.1	-	-	-	-	31		0.1	0.050
7130	2.3	33290	0.76	0.59	0.822	-	-	0.1	-	1.5	-	-	57		1.6	1.60
7131	3.3	39060	0.90	0.83	1.652	-	-	0.1	4.2	2.3	-	-	117		6.6	6.62
7132	4.3	44830	1.03	0.96	2.615	-	-	0.1	10.8	2.8	-	-	117		14	14
7133	5.3	55137.5	1.27	1.15	3.762	-	-	0.2	14.4	3.3	-	-	142		18	18
7134	6.3	65445	1.50	1.38	5.146	-	-	0.2	17.4	3.7	-	36	162		57	57
7135	7.3	79535	1.83	1.66	6.811	-	-	0.2	19.9	4.0	-	102	175		126	126
7136	8.3	93625	2.15	1.99	8.798	-	-	0.2	22.1	4.4	-	150	187		177	177
7137	9.3	111620	2.56	2.36	11.154	-	-	0.2	24.1	4.7	-	173	200		200	200
7138	10.3	129615	2.98	2.77	13.923	-	92.3	0.2	25.9	5.0	-	194	211		211	303
7138.5	10.8					-	261.0	0.3	26.8	5.1	-	203	211		-	261

Notes:
1) Top-of-bank and spillway flows are weir equations from section 11.3.1 in the DCM. Q=CLH^1.5 (C=3.0)
2) Orifice flows are also from section 11.3.1. Q=CA(2gH)^.5 (C=.6)
3) Grate flows are determined from equations 7-2 and 7-3. Weir Flow Q=(3PH^1.5)/F, Orifice Flow Q=4.815*AH^0.5)
4) Pipe flows use the lesser of: 1) Inlet control equations 27 & 28, page 146 of HDS No. 5 - or - 2) Allowable Pipe Flow equation on page 11-9 of the DCM. Use Table 9, page 147-148, HDS No. 5 for formulas 26 & 27.

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Proposed Detention Pond G-FINAL FUTURE DESIGN (G12)

Gieck Basin - El Paso County, Colorado

Data for spillway and embankment:

embankment length =	500
embankment elev =	7033.5
spillway length =	130
spillway elevation =	7031.5
100 year storage elev.=	7030.5
100 year storage vol.=	26.5
100 year discharge=	487
5 year storage elev.=	7027.5
5 year storage vol.=	8.7
5 year discharge=	25
WQCV storage elev.=	7025.2
WQCV storage vol.=	0.9
1/2 WQCV storage elev.=	7024.9
1/2 WQCV storage vol.=	0.45

Data for outlet pipe and grate:

Type		H or V	Dimensions Width (ft.)	X Height (ft.)	Dia.(in)		(sqft)		
Circular	Orifice 1a:	V			1.75	Area =	0.017	Elev to cl =	7023.37
Circular	Orifice 1b:	V			1.75	Area =	0.017	Elev to cl =	7024.04
Circular	Orifice 1c:	V			1.75	Area =	0.017	Elev to cl =	7024.71
Rectangular	Orifice 2:	V	8.5	1.1		Area =	9.350	Elev to cl =	7027.55
Rectangular	Orifice 3:	V	2	0.43		Area =	0.860	Elev to cl =	7025.34
Rectangular	Orifice 4:	V	4	0.6		Area =	2.400	Elev to cl =	7027.80
Rectangular	Orifice 5:	V	8.5	1.1		Area =	9.350	Elev to cl =	7027.55

Stand Pipe Dimensions

Rec Grate	20	x	8	Elev =	7028.10
Circ. Grate		dia.		Elev =	7028.10

Outlet Culvert Dimensions

	Width (ft.)		Height (ft.)	Dia. (ft.)	Type
Outlet Culvert	10	x	4		**Rectangular**
Area	40.0		TOP		
Outlet I. E.	7022.5		7027.50		
Wall Thick.	12	in.			

50 year storage vol.=	20.7
50 year storage elev.=	7029.6
50 year discharge=	342
10 year storage vol.=	11.5
10 year storage elev.=	7028.0
10 year discharge=	62
2 year storage vol.=	5.9
2 year storage elev.=	7026.9
2 year discharge=	5.6

STAGE		STORAGE				DISCHARGE													
ELEV	HEIGHT	AREA		VOLUME		TOP OF	SPILLWAY	ORIFICE						(max outflow)	GRATE (max outflow)	PIPE		REALIZED CULVERT	TOTAL
		sqft	acre	acft	cum acft	BANK		1a	1b	1c	2	3	4	5	**Rectangular**	1	2	OUTFLOW	FLOW
7023.3	0	0	0.00	0.0	0.00			-	-	-	-	-	-	-	-	12		-	-
7024	0.7	2232	0.05	0.0	0.02	-	-	0.06	0.01	-	-	-	-	-	-	51		0.1	0.07
7025	1.7	39917	0.92	0.5	0.50	-	-	0.10	0.08	0.04	-	-	-	-	-	111		0.2	0.22
7026	2.7	126469	2.90	1.9	2.41	-	-	0.13	0.11	0.09	-	3.4	-	-	-	184		3.7	3.7
7026.5	3.2	166675	3.83	3.6	4.06	-	-	0.14	0.13	0.11	-	4.5	-	-	-	224		4.8	4.8
7027	3.7	206880	4.75	2.1	6.20	-	-	0.15	0.14	0.12	-	5.3	-	-	-	268		5.8	5.8
7027.5	4.2	232032	5.33	4.6	8.64	-	-	0.16	0.15	0.13	9.0	6.1	-	9.0	-	304		25	25
7028	4.7	257183	5.90	5.3	11.5	-	-	0.17	0.16	0.15	25.5	6.8	4.2	25.5	-	337		62	62
7028.5	5.2	264196	6.07	5.7	14.3	-	-	0.18	0.17	0.16	43.9	7.4	9.7	43.9	27	373		133	133
7029	5.7	271209	6.23	6.1	17.6	-	-	0.19	0.18	0.17	54.2	7.9	12.7	54.2	92	406		222	222
7029.5	6.2	276106	6.34	11.7	20.3	-	-	0.21	0.19	0.18	62.9	8.5	15.1	62.9	179	436		329	329
7030	6.7	281003	6.45	9.4	23.7	-	-	0.21	0.20	0.19	70.5	8.9	17.1	70.5	283	464		450	450
7030.5	7.2	286003	6.57	6.5	26.8	-	-	0.21	0.20	0.19	77.3	9.4	19.0	77.3	402	491		491	491
7031	7.7	291002	6.68	6.6	30.3	-	-	0.22	0.21	0.20	83.6	9.9	20.7	83.6	533	516		516	516
7031.5	8.2	296443	6.81	6.7	33.4	-	-	0.23	0.22	0.21	89.5	10.3	22.2	89.5	677	540		540	540
7032	8.7	301883	6.93	3.4	36.9	137.9	137.9	0.24	0.23	0.22	95.0	10.7	23.7	95.0	832	563		563	701
7032.5	9.2	309236	7.10	7.0	40.4	390.0	390.0	0.24	0.23	0.22	100.2	11.1	25.1	100.2	997	586		586	976
7033	9.7	316589	7.27	3.6	44.0	716.5	716.5	0.25	0.24	0.23	105.1	11.5	26.4	105.1	1,171	607		607	1,323

Notes:
1) Top-of-bank and spillway flows are weir equations from section 11.3.1 in the DCM. Q=CLH^1.5 (C=3.0)
2) Orifice flows are also from section 11.3.1. Q=CA(2gH)^.5 (C=.6)
3) Grate flows are determined from equations 7-2 and 7-3. Weir Flow Q=(3PH^1.5)/F, Orifice Flow Q=4.815*AH^0.5)
4) Pipe flows use the lesser of: 1) Inlet control equations 27 & 28, page 146 of HDS No. 5 - or - 2) Allowable Pipe Flow equation on page 11-9 of the DCM. Use Table 9, page 147-148, HDS No. 5 for formulas 26 & 27.

Appendix D – Soils Resource Report

United States Department of Agriculture

NRCS

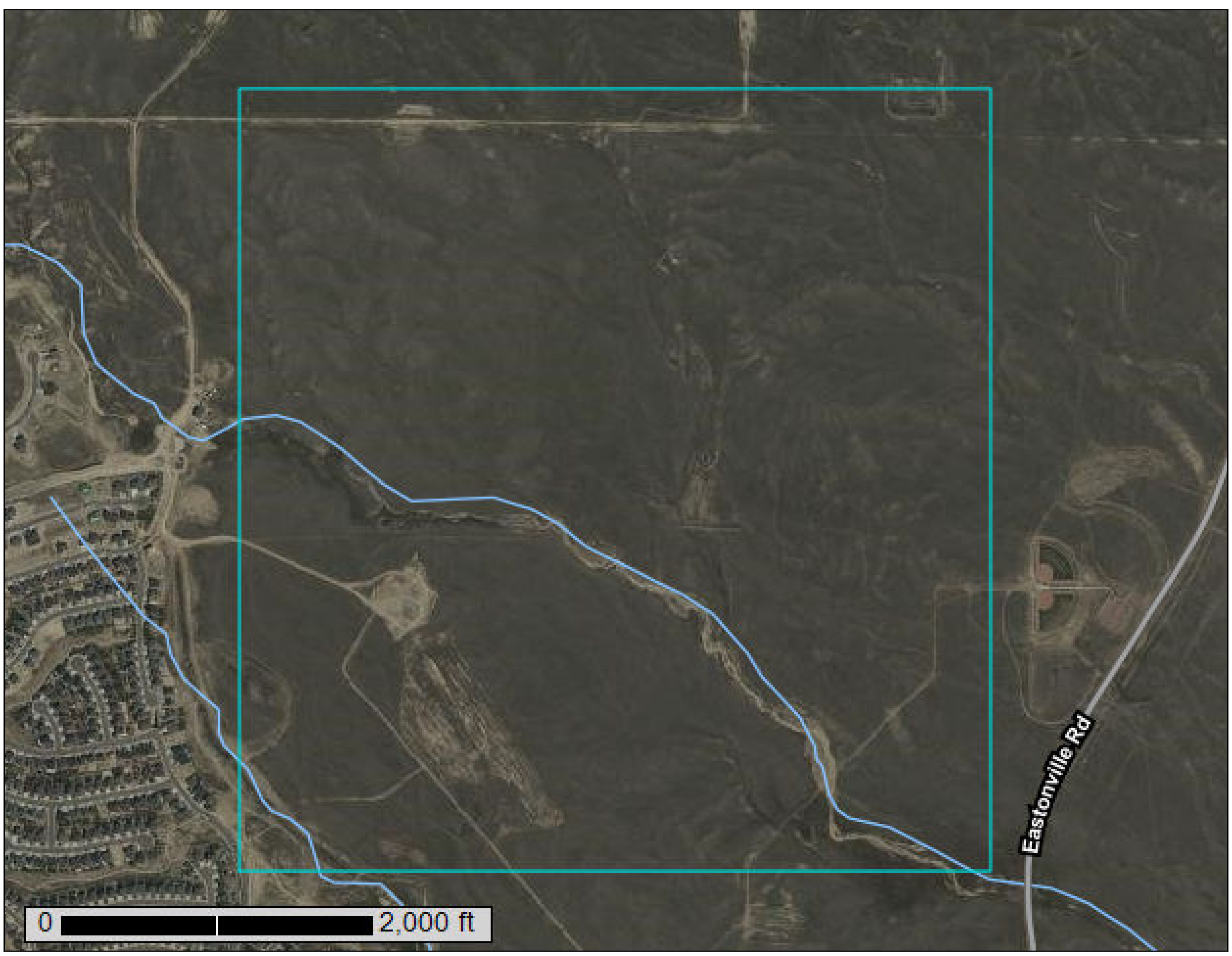
Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

El Paso County Area, Colorado

REVISED MDDP



March 26, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

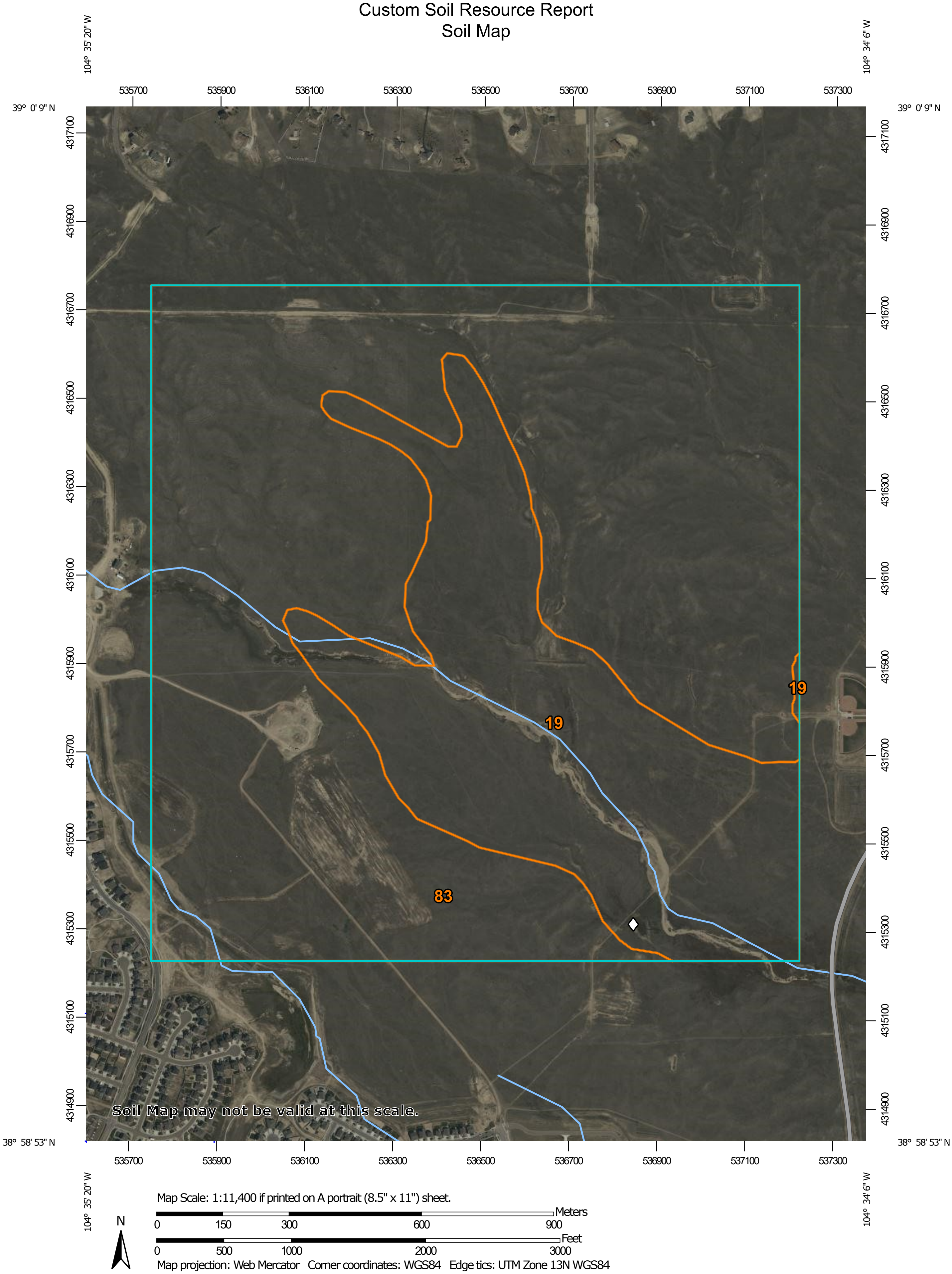
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


104° 35' 20" W
104° 34' 6" W
39° 0' 9" N
38° 58' 53" N
535700
535900
536100
536300
536500
536700
536900
537100
537300
4317100
4316900
4316700
4316500
4316300
4316100
4315900
4315700
4315500
4315300
4315100
4314900
19
19
83
Soil Map may not be valid at this scale.
Map Scale: 1:11,400 if printed on A portrait (8.5" x 11") sheet.
Meters
0 150 300 600 900
Feet
0 500 1000 2000 3000
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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 18, Jun 5, 2020

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	159.2	28.5%
83	Stapleton sandy loam, 3 to 8 percent slopes	399.1	71.5%
Totals for Area of Interest		**558.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

El Paso County Area, Colorado

19—Columbine gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 367p
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Columbine and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Columbine

Setting

Landform: Fans, flood plains, fan terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 14 inches: gravelly sandy loam
C - 14 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XB215CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Pleasant

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Other soils

Percent of map unit: 1 percent
Hydric soil rating: No

Fluvaquentic haplaquolls

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

83—Stapleton sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 369z
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Stapleton and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stapleton

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium derived from arkose

Typical profile

A - 0 to 11 inches: sandy loam
Bw - 11 to 17 inches: gravelly sandy loam
C - 17 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R049XB215CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Pleasant

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Other soils

Percent of map unit: 1 percent
Hydric soil rating: No

Fluvaquentic haplaquolls

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

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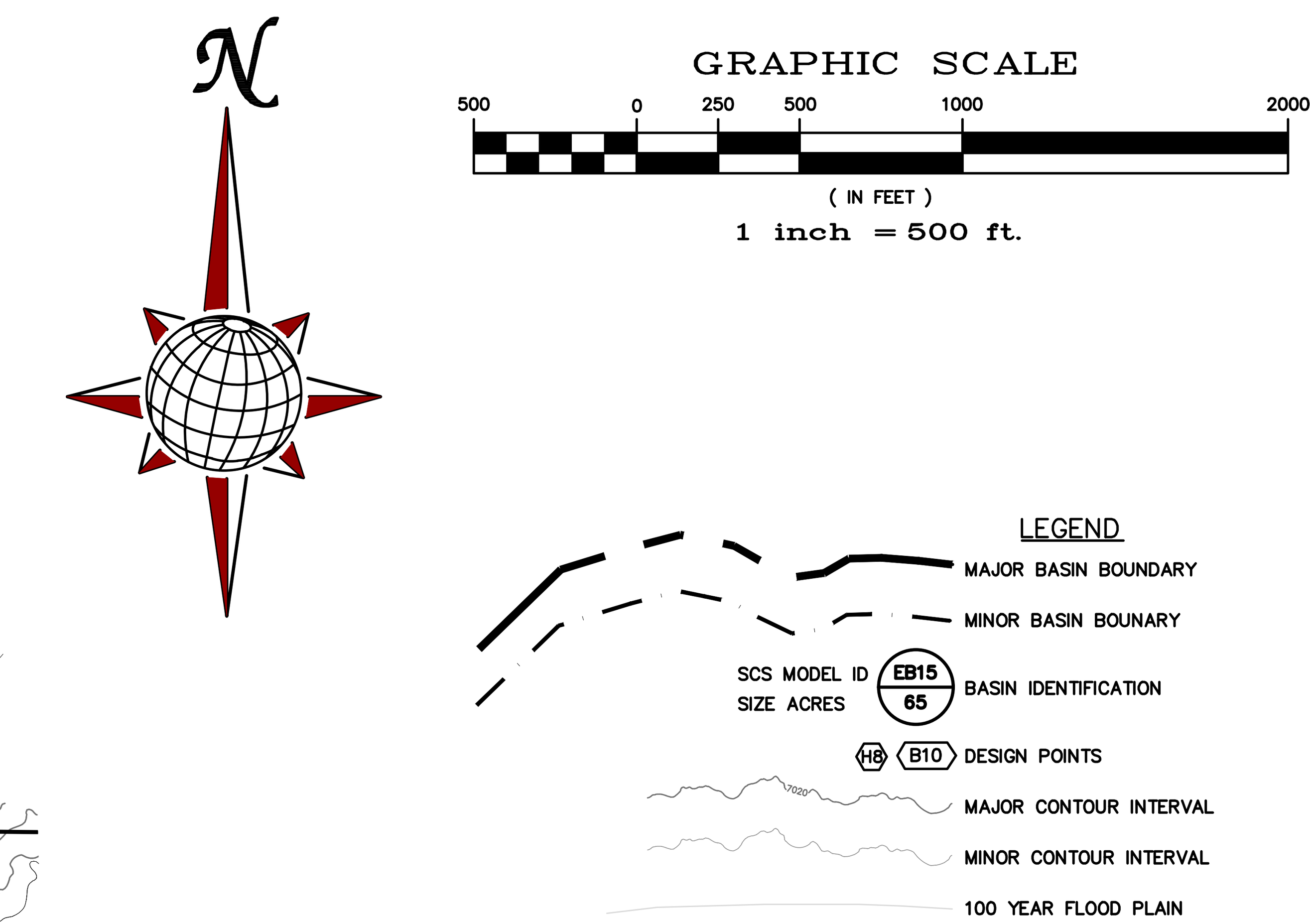
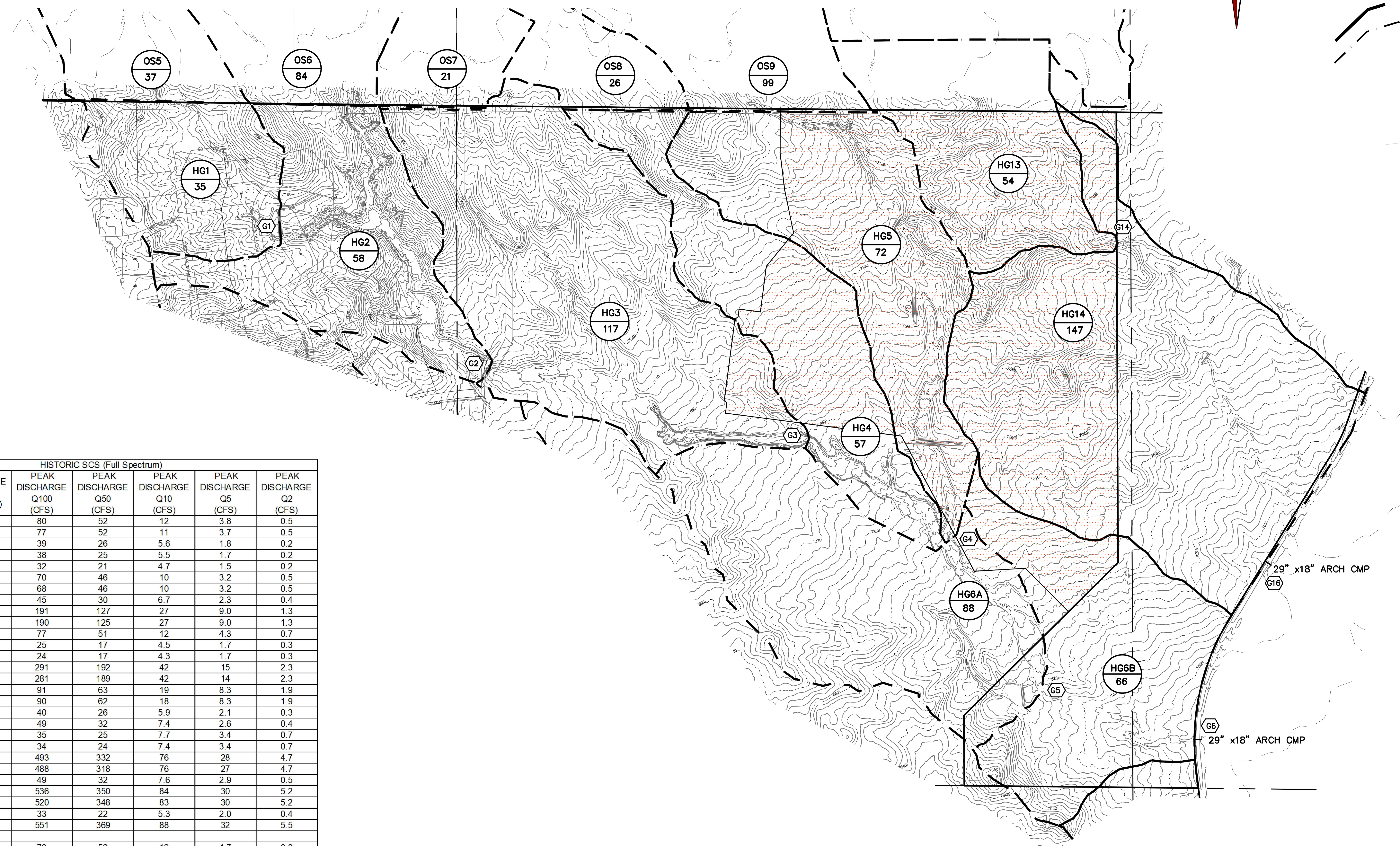
Appendix E – Drainage Maps

2021 MDDP REVISION





HISTORIC SCS (Full Spectrum)						
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS06	0.1313	80	52	12	3.8	0.5
OS06-G02	0.1313	77	52	11	3.7	0.5
OS05	0.0578	39	26	5.6	1.8	0.2
OS05-G01	0.0578	38	25	5.5	1.7	0.2
HG01	0.0547	32	21	4.7	1.5	0.2
G01	0.1125	70	46	10	3.2	0.5
G01-G02	0.1125	68	46	10	3.2	0.5
HG02	0.0906	45	30	6.7	2.3	0.4
G02	0.3344	191	127	27	9.0	1.3
G02-G03	0.3344	190	125	27	9.0	1.3
HG03	0.1828	77	51	12	4.3	0.7
OS07	0.0328	25	17	4.5	1.7	0.3
OS07-G03	0.0328	24	17	4.3	1.7	0.3
G03	0.5500	291	192	42	15	2.3
G03-G04	0.5500	281	189	42	14	2.3
OS09	0.1547	91	63	19	8.3	1.9
OS09-G04	0.1547	90	62	18	8.3	1.9
HG04	0.0891	40	26	5.9	2.1	0.3
HG05	0.1125	49	32	7.4	2.6	0.4
OS08	0.0406	35	25	7.7	3.4	0.7
OS08-G04	0.0406	34	24	7.4	3.4	0.7
G04	0.9469	493	332	76	28	4.7
G04-G05	0.9469	488	318	76	27	4.7
HG06A	0.1375	49	32	7.6	2.9	0.5
G05	1.0844	536	350	84	30	5.2
G05-G06	1.0844	520	348	83	30	5.2
HG06B	0.1031	33	22	5.3	2.0	0.4
G06	1.1875	551	369	88	32	5.5
HG14	0.2297	79	52	12	4.7	0.8
HG13	0.0844	54	37	9.5	3.8	0.7
G14	0.0844	54	37	9.5	3.8	0.7
G14-G16	0.0844	53	36	9.4	3.7	0.6
G16	0.3141	117	77	19	7.4	1.4

HISTORIC CONDITION - SCS MAP

FIGURE 4

No.	Revisions	Date	Init.	Appr.	Date
-	-	-			

TECH CONTRACTORS
11886 STAPLETON DRIVE
FALCON, CO 80831
TELEPHONE: 719.495.7444
FAX: 719.495.3349

MERIDIAN RANCH

HISTORIC CONDITIONS - SCS MAP
2021 SKETCH PLAN AMENDMENT
REVISED MDDP

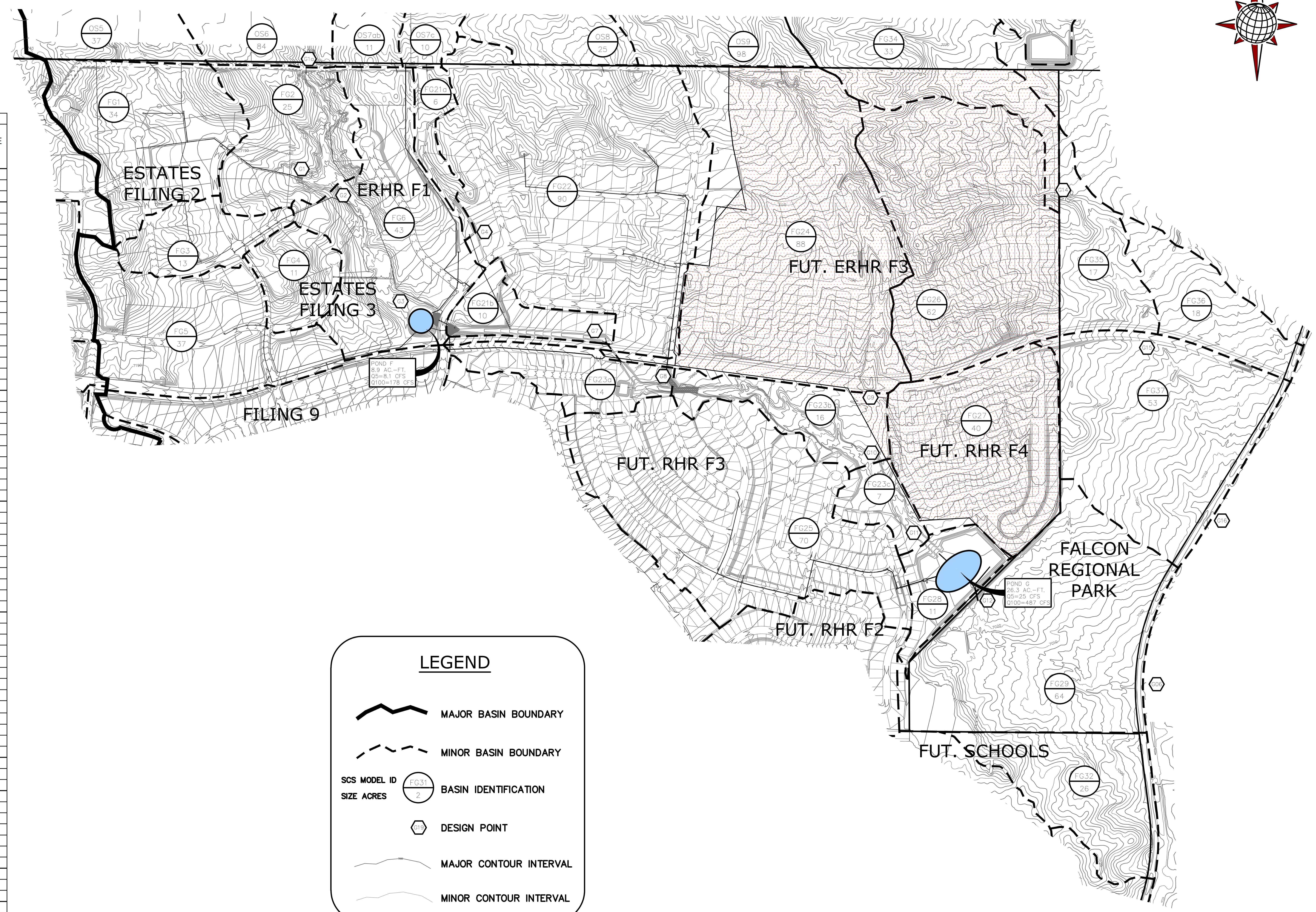
Drawn by T.W.K.
Checked by RG
Date MARCH 2021
Scale AS SHOWN
- of -

MERIDIAN RANCH 2021
MDDP AMENDMENT

GRAPHIC SCALE
500 0 250 500 1000 2000
(IN FEET)
1 inch = 500 ft.

N

FUTURE SCS (Full Spectrum)						
	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS06	0.1313	80	52	11.6	3.8	0.5
G1a	0.1313	80	52	11.6	3.8	0.5
G1a-G2	0.1313	79	52	11.5	3.7	0.5
OS05	0.0578	39	26	5.6	1.8	0.2
OS05-G1	0.0578	39	25	5.5	1.7	0.2
FG01	0.0538	31	22	7.0	3.4	0.9
FG01-G1	0.0538	31	22	7.0	3.4	0.9
G1	0.1116	61	41	11.0	4.9	1.1
G1-G2	0.1116	61	41	10.9	4.8	1.1
FG02	0.0391	32	22	6.4	2.7	0.5
G2	0.2820	167	112	27.3	10.3	1.9
G2-G3	0.2820	164	109	27.1	10.2	1.9
FG03	0.0203	24	17	5.9	3.0	0.8
FG04	0.0172	22	16	5.8	3.1	0.9
G3	0.3195	185	123	30.9	12.1	2.4
FG06	0.0675	56	40	12.2	5.8	1.3
FG05	0.0580	45	33	12.2	6.7	2.4
OS07ab	0.0170	14	9	2.5	0.9	0.1
OS07a-POND F	0.0170	13	9	2.3	0.9	0.1
POND F IN	0.4620	295	202	55.8	23.4	5.1
POND F	0.4620	178	122	16.4	8.1	2.1
POND F-G7	0.4620	178	121	16.4	8.1	2.1
OS07c	0.0156	15	10	2.6	1.0	0.1
OS07c-G4	0.0156	14	9	2.5	0.9	0.1
FG21a	0.0095	6	4	1.0	0.4	0.1
G4	0.0251	20	13	3.5	1.3	0.2
G4-G7	0.0251	18	13	3.3	1.2	0.2
FG21b	0.0150	21	16	6.5	3.9	1.7
G7	0.5021	192	130	18.0	8.9	2.3
G7-G8	0.5021	191	130	18.0	8.9	2.3
FG22	0.1409	125	90	32.4	17.1	5.4
OS08	0.0394	34	24	7.5	3.3	0.7
OS08-G8	0.0394	33	23	7.3	3.3	0.7
FG23a	0.0216	21	15	5.2	2.7	0.8
G8	0.7040	285	181	50.6	26.8	8.3
G8-G10	0.7040	284	181	49.7	26.2	8.1
OS09	0.1527	90	62	18.3	8.2	1.9
OS09-G9	0.1527	89	62	18.0	8.2	1.9
FG24	0.1372	134	100	41.1	24.2	10.4
G9	0.2899	200	141	44.2	24.2	10.4
G9-G10	0.2899	179	120	32.3	12.9	2.6
FG23b	0.0247	17	11	2.6	0.9	0.1
G10	1.0186	470	302	65.8	27.9	8.5
G10-G11	1.0186	466	300	65.8	27.7	8.2
FG23c	0.0113	11	7	2.4	1.1	0.2
G11	1.0299	470	302	66.4	28.3	8.3
FG25	0.1086	112	85	36.0	21.9	9.9
FG26	0.0970	101	77	35.2	22.7	11.3
FG26-POND G	0.0970	100	77	35.0	22.4	11.1
FG27	0.0614	82	65	33.8	23.7	14.0
FG28	0.0166	13	9	2.6	1.0	0.2
POND G IN	1.3135	697	449	151.5	81.3	34.8
POND G	1.3135	487	342	61.7	25.1	5.6
G12	1.3135	487	342	61.7	25.1	5.6
G12-G06	1.3135	487	342	61.6	25.1	5.6
FG29	0.0997	64	42	10.3	3.6	0.6
FG32	0.0402	72	57	28.7	19.8	11.1
FG32-G06	0.0402	69	54	26.6	18.2	10.5
G06	1.4534	514	360	66.1	27.0	10.6
FG37	0.0828	58	90	41.4	26.8	13.4
FG34	0.0516	40	86	40.6	26.5	13.1
G14	0.0516	40	67	30.9	20.1	10.2
G14-G15	0.0516	39	65	29.5	19.5	10.0
FG35	0.0263	15	36	14.3	8.3	3.2
G15	0.0779	54	36	14.0	8.0	3.2
G15-G08	0.0779	52	31	12.2	7.0	2.7
FG36	0.0273	17	215	94.1	58.8	28.7
FG36-G08	0.0273	17	77	32.4	19.8	8.6
G16	0.1880	124	59	28.1	18.6	9.8



*NOTE: PRELIMINARY STORAGE VOLUMES AND OUTFLOW QUANTITIES HAVE BEEN PROVIDED FOR EACH OF THE FUTURE DETENTION FACILITIES LOCATED WITHIN THE DEVELOPMENT. THE ACTUAL STORAGE VOLUMES AND DISCHARGE RATES WILL BE DETERMINED UPON A COMPLETE ANALYSIS FOR EACH DETENTION FACILITY PRIOR TO CONSTRUCTION. THE VALUES GIVEN FOR DISCHARGE AND VOLUME ARE ESTIMATES FOR PLANNING PURPOSES ONLY.

FUTURE CONDITIONS - SCS MAP

FIGURE 5

No. | Revisions | Date | Init. | Appr. | Date

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MERIDIAN RANCH

FUTURE CONDITIONS - SCS MAP
2021 SKETCH PLAN AMENDMENT
REVISED MDDP

Drawn by TAK
Checked by RG
Date MAR 2021
Scale AS SHOWN
- of -