Preliminary Drainage Report
Final Drainage Report
for

Estates at Rolling Hills Ranch Filing 1

at

Meridian Ranch

MERIDIAN RANCH
A GOLF & RECREATIONAL COMMUNITY

EL PASO COUNTY, COLORADO

December 2019

Prepared For:

GTL DEVELOPMENT, INC.
P.O. Box 80036
San Diego, CA 92138

Prepared By:
Tech Contractors
11886 Stapleton Drive
Falcon, CO 80831
719.495.7444

PCD Project No. PUDSP197
SF1919

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

Rolling Hills Ranch at Meridian Ranch PUD
Preliminary Drainage Report

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EXECUTIVE SUMMARY

The purpose of the following Preliminary Drainage Report/Final Drainage Report (PDR/FDR) is to present the changes to the drainage patterns as a result the Estates at Rolling Hills Ranch Filing 1 at Meridian Ranch (Rolling Hills Ranch Estates) development. 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) as amended by the El Paso County Engineering Criteria Manual (ECM).

This report based on the current version of the Meridian Ranch Sketch Plan amendment as adopted by the El Paso County Board of Commissioners on March 13, 2018. Hydrologic calculations 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, interim and future conditions for the 2-yr, 5-yr, 10-yr, 25-yr, 50-yr, and 100-yr design storm frequencies. The interim and the future conditions include detention facilities sized and modeled such that *"frequent and infrequent inflows are released at rates approximating undeveloped conditions"*

Rolling Hills Ranch Estates encompasses 29± acres and is located in Sections 19 and 20, Township 12 South, Range 64 West of the 6th Principal Meridian. It is approximately 12 miles northeast of the city of Colorado Springs, 2.5 miles north of the unincorporated town of Falcon, and immediately north of the Woodmen Hills development.

Rolling Hills Ranch is located within Gieck Ranch Drainage Basin. The Gieck Ranch Basin has been studied, but has not received final approval from El Paso County. The developer has agreed to meet the requirements of the studied Gieck Ranch Basin but as yet to be approved Drainage Basin Study.

Based on the aforementioned design parameters the development of the project will not adversely affect downstream properties.

INTRODUCTION

Purpose

The purpose of the following Preliminary Drainage Report/Final Drainage Report (PDR/FDR) is to present proposed changes to the drainage patterns as a result of the development of Rolling Hills Ranch Estates. The report outlines the proposed drainage mitigation based on calculated developed flows in excess of allowable exiting runoff discharge.

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 all off-site tributary drainage areas.
- Calculations for design peak flows within the proposed project area for all 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 those portions of the City of Colorado Springs Drainage Criteria Manual, Volume 1 (DCM-1) ((2014 version) adopted by Resolution 15-042 of the El Paso County Board of County Commissioners as amended by the El Paso County Engineering Criteria Manual (ECM).

Background

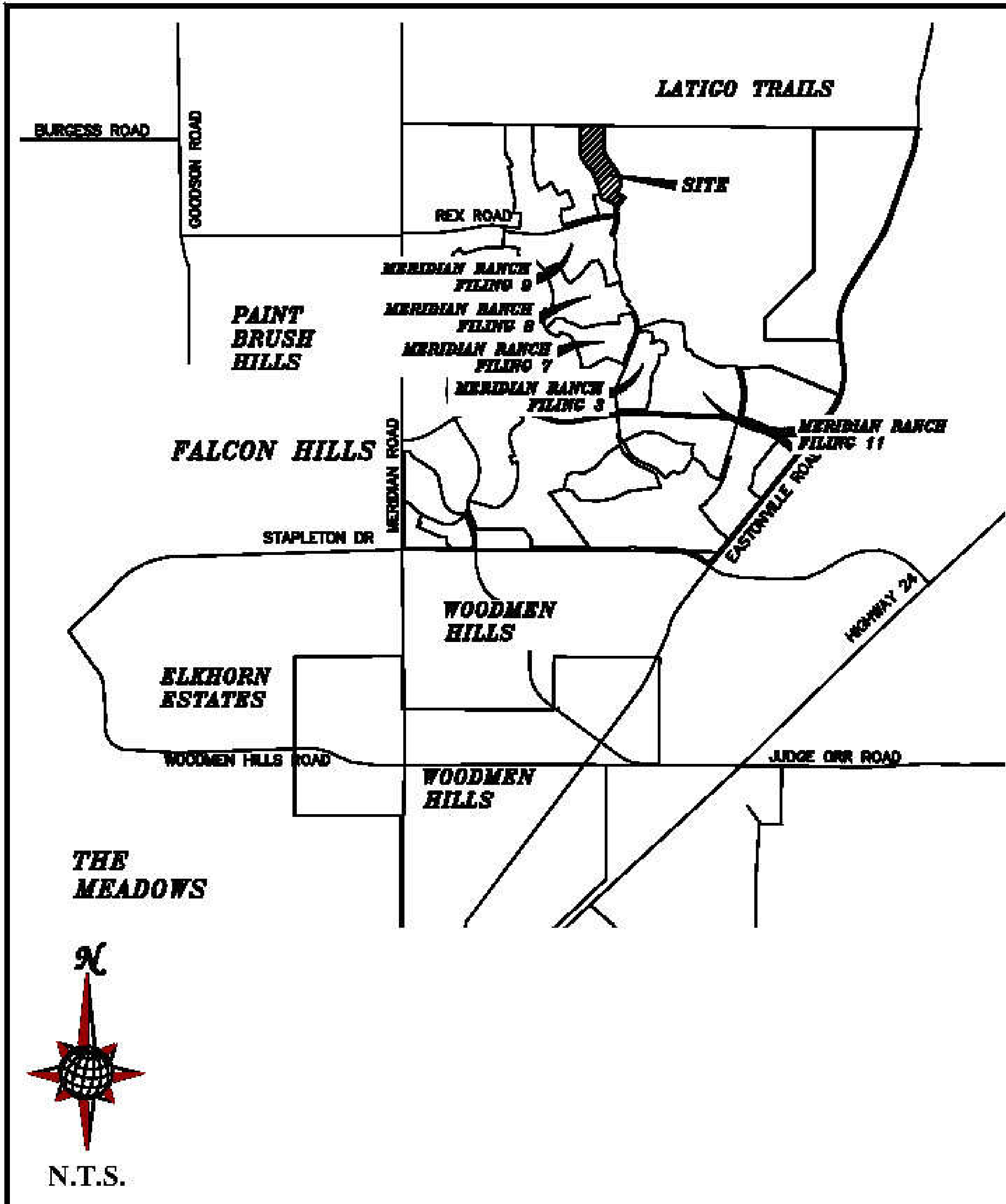
On November 16, 2000 the El Paso County Board of County Commissioners approved the rezoning of the Meridian Ranch project (PUD-00-010) from A-35 to PUD with several conditions. Condition number seven stated in part that "drainage plans shall release and/or retain at approximately eight percent (80%) of historic rates." At the time of the initial approvals there were no drainage improvements downstream of the Meridian Ranch project and the existing natural channels were shallow and undefined. There are no facilities located downstream of the Rolling Hills Ranch at Meridian Ranch PUD that will be adversely impacted by this development.

No development has occurred downstream of this project except for limited portions of the Falcon Regional Park. The Meridian Ranch MDDP and this report indicate the Eastonville Road culvert crossing located downstream of this project does not provide enough capacity for the historic flow rates. It is anticipated that this culvert will be upgraded at the time of the Eastonville Road construction.

The hydrologic calculations show the developed design discharge of the 100-yr storm event towards the Falcon Regional Park to be below historic flow rates during the interim period and at full buildout for the full spectrum of design storms.

Rolling Hills Ranch Estates

Figure 1: Vicinity Map



ESTATES FILING 1 AT ROLLING HILLS RANCH VICINITY MAP	TECH CONTRACTORS 11886 STAPLETON DR FALCON, CO 80831 TELEPHONE: 719.495.7444
FIGURE 1	

EXISTING CONDITIONS

General Location

Rolling Hills Ranch Estates project encompasses 29± acres and is located in Sections 19 and 20, Township 12 South, Range 64 West of the 6th Principal Meridian. It is approximately 12 miles northeast of the city of Colorado Springs, 2.5 miles north of the unincorporated town of Falcon, and immediately north of the Woodmen Hills development.

Land Use

Historically, ranching dominated the area surrounding Meridian Ranch; however, currently urbanization has occurred in the general vicinity. Most notably, urbanization is occurring to the north with Latigo Trails, to the south in the Woodmen Hills Subdivision, to the east in Four Way Ranch, to the west in the Falcon Hills subdivision, and to the northwest in the Paint Brush Hills subdivision.

Climate

Mild summers and winter, 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 maximum temperature higher than 98 F and a minimum temperature lower than –16 F. Precipitation averages 15.73" annually, with 80% of this occurring during the months of April through September. The average annual Class A pan evaporation is 45 inches. (Soil Survey of El Paso County Area, Colorado).

Topography and Floodplains

The topography of the site is typical of a high desert, short prairie grass with relatively flat slopes generally ranging from 2% to 4%. The project site drains generally from the northwest to southeast and is tributary to the Black Squirrel Creek.

The Flood Insurance Rate Maps (FIRM No. 08041C0552G dated 12/07/2018) indicates that the project is outside of any designated flood plain. Please see Figure 2: Rolling Hills Ranch Estates Federal Emergency Management Agency (FEMA) Floodplain Map.

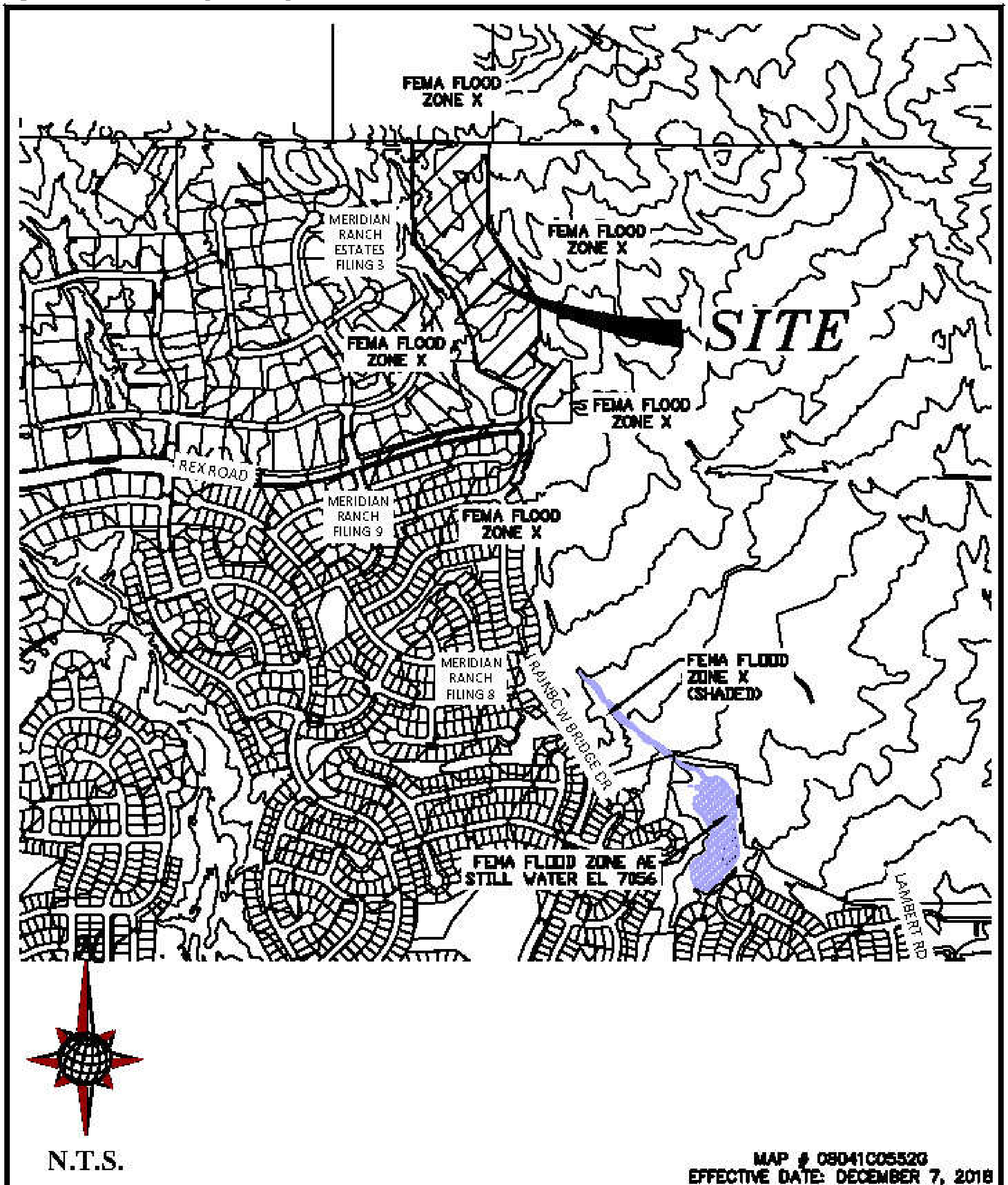
Geology

The National Resources Conservation Service (NRCS) soil survey records indicate that the service area is predominately covered by soils classified in the Stapleton series. This series is categorized as a Hydrological Soil Group B.

The Stapleton (83) sandy loam is a deep, non-calcareous, well-drained soil formed in alluvium derived from arkosic bedrock on uplands. Permeability of this soil is rapid. Available water capacity is moderate, surface runoff is slow, and the hazard of erosion and soil blowing is moderate. The Stapleton series is categorized as a Hydrological Soil Group B.

This soil is suited to habitat for open land and rangeland wildlife. The main limitation of this soil for urban development is frost-action potential.

Figure 2: FEMA Floodplain Map



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FLOODPLAIN MAP

FIGURE 2

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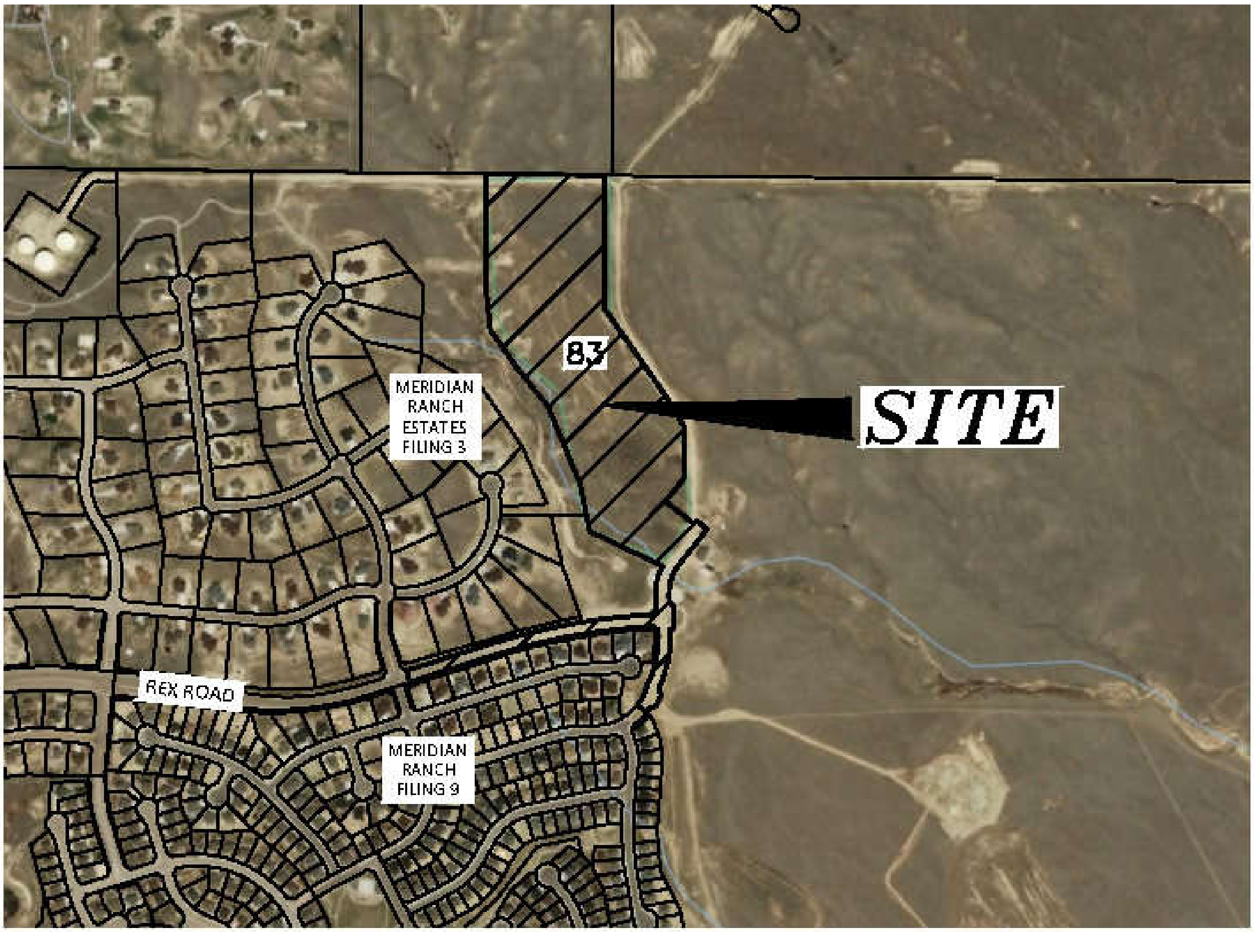
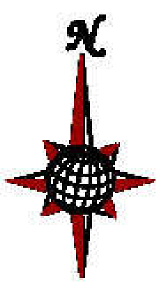
FALCON, CO 80831
TELEPHONE: 719.495.7444

Figure 3: Soils Map





N.T.S.

ESTATES FILING 1 AT
ROLLING HILLS RANCH
SOILS MAP

FIGURE 3

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11886 STAPLETON DR
FALCON, CO 80831
TELEPHONE: 719.495.7444

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.

Note: (#) indicates Soil Conservation Survey soil classification number. See Figure 3 Rolling Hills Ranch Estates – Soils Map.

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 citing improvements in a manner that provides an opportunity to lay the banks of excavations back at a 1:1 slope during construction, the problems associated with sloughing soils can be minimized.

DRAINAGE BASINS AND SUB-BASINS

The site is near the top of the Gieck Ranch Drainage Basin and accepts flow from areas north of the project site within portions of the adjacent Antlers Ridge and Latigo developments.

Three different scenarios were analyzed for the drainage conditions for the project.

The first scenario analyzes the historic conditions for Meridian Ranch. This condition has all of Meridian Ranch in the pre-development state; where the entirety of Meridian Ranch is modeled in its undeveloped, undisturbed condition, alternatively called the historic condition.

The second scenario is the interim conditions scenario and it consists of the current existing conditions for all tributary areas whether developed or undeveloped/historic with the addition of Rolling Hills Ranch Estates in the proposed developed condition. The current existing conditions assume all approved projects tributary to the Rolling Hills Ranch Estates are at full buildout. This condition was analyzed to ensure the full spectrum of historic flow rates exiting the Meridian Ranch development are maintained after the development of Rolling Hills Ranch Estates is completed.

The interim scenario was analyzed to ensure that the historic flow rates that leave the site upstream of and adjacent to the Falcon Regional Park are maintained.

The final scenario analyzes the future build out conditions for the entirety of Meridian Ranch to ensure the storm drain and future detention facilities located at the discharge point downstream of this project are able to properly attenuate the full spectrum of developed peak flow rates to historic peak flow rates as the storm water exits the Meridian Ranch project onto the adjacent Falcon Regional Park.

DRAINAGE DESIGN CRITERIA

SCS Hydrograph Procedure

The US Army Corp of Engineers HEC-HMS computer program was used to model the Soil Conservation Service (SCS) Hydrograph procedure 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 6-10 of the City of Colorado Springs DCM for Antecedent Runoff Condition II (ARC II), the following CN values were used for the given conditions.

Table 1: 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
Graded	67
Golf Course	62
Latigo Undeveloped	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. See the table for all the design storm events in Appendix A. 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.

Full Spectrum Design

The City of Colorado Springs adopted a new Drainage Criteria Manual (DCM) in 2014 which incorporated the use of *Full Spectrum Design* for storm drainage analysis for projects located within the city limits. El Paso County adopted portions of the City's 2014 DCM by resolution in January 2015; the County resolution adopted Chapter 6 (Hydrology) and Section 3.2.1 of Chapter 13 (Full Spectrum Detention) for projects outside of the City of Colorado Springs establishing a 1 year review period to analyze the impacts of the Full Spectrum Design on the storm drainage analysis of projects. This report has incorporated the use of full spectrum in the analysis using the SCS Method to determine the size requirements for the detention pond during the interim and future conditions.

The idea behind full spectrum detention is to release the developed runoff flow rates that will approximate those of the pre-developed condition. The future design of Pond G and the outlet control structure will meet or exceed the intent and spirit of the concept.

Table 2: Detention Pond Summary:

EXISTING POND F				
	PEAK INFLOW	PEAK OUTFLOW	PEAK STORAGE	PEAK ELEVATION
	CFS	CFS	AC-FT	FT
INTERIM CONDITIONS				
2-YEAR STORM	4.9	2.4	1.0	7130.2
5-YEAR STORM	22	8.4	1.9	7131.3
10-YEAR STORM	54	17	3.5	7132.8
25-YEAR STORM	123	63	5.4	7134.2
50-YEAR STORM	199	125	6.8	7135.0
100-YEAR STORM	293	179	8.9	7136.0
FUTURE CONDITIONS				
2-YEAR STORM	5.0	2.4	1.0	7130.2
5-YEAR STORM	22	8.5	1.9	7131.3
10-YEAR STORM	54	17	3.5	7132.8
25-YEAR STORM	123	64	5.4	7134.2
50-YEAR STORM	200	125	6.8	7135.0
100-YEAR STORM	293	179	8.9	7136.0

FUTURE POND G				
	PEAK INFLOW	PEAK OUTFLOW	PEAK STORAGE	PEAK ELEVATION
	CFS	CFS	AC-FT	FT
INTERIM CONDITIONS				
NOT APPLICABLE				
FUTURE CONDITIONS				
2-YEAR STORM	28	5.2	5.4	7026.8
5-YEAR STORM	79	22	8.3	7027.4
10-YEAR STORM	146	57	11.1	7027.9
25-YEAR STORM	288	173	15.8	7028.7
50-YEAR STORM	459	338	20.1	7029.5
100-YEAR STORM	691	480	25.5	7030.3

DRAINAGE CALCULATIONS

SCS General Overview

The project is located within the Gieck Ranch Drainage Basin; storm water runoff will be conveyed across the site overland and within proposed storm drain networks to the existing Pond F detention facility.

The existing Pond F detention facility has been adequately sized such that the developed flows detained and released will approximate the historic flow rates for the various design storm events for both the interim condition and in the future as the storm flow exits Meridian Ranch onto the Falcon Regional Park. There is no development located downstream of the proposed project and with the release rates from Meridian Ranch at less than historic release rates it is generally accepted that the development of the proposed project will not adversely affect the downstream properties.

Figure 5: Meridian Ranch SCS Calculations – Historic Conditions Map, Figure 6: Meridian Ranch SCS Calculations – Interim Conditions Map and Figure 7: Meridian Ranch SCS Calculations – Future Conditions Map depict the historic, interim and future general drainage patterns for Rolling Hills Ranch Estates.

The purpose of this report is to show that the development of Rolling Hills Ranch Estates will not adversely impact the existing drainage facilities adjacent to and downstream of the developed area and the existing Pond F is properly sized for the anticipated future development of Rolling Hills Ranch.

SCS Calculations

Historic Drainage - SCS Calculation Method

Following is a tabulation of the surface drainage characteristics under Existing Conditions using the SCS calculation method. Please refer to Figure 5 - Meridian Ranch SCS Calculations - Historic Basin Map.

Table 3: Historic Drainage Basins – SCS

HISTORIC SCS (Full Spectrum)							
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q25 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS06	0.1313	81	53	31	12	3.9	0.5
OS06-G02	0.1313	79	52	31	12	3.8	0.5
OS05	0.0578	40	26	16	5.9	1.8	0.2
OS05-G01	0.0578	38	26	16	5.7	1.8	0.2
HG01	0.0547	33	21	13	4.8	1.6	0.2
G01	0.1125	71	47	28	10	3.3	0.5
G01-G02	0.1125	70	47	27	10	3.3	0.5
HG02	0.0906	46	30	18	6.9	2.4	0.4
G02	0.3344	194	129	76	28	9.4	1.4
G02-G03	0.3344	192	127	75	28	9.3	1.4
HG03	0.1828	79	51	31	12	4.4	0.8
OS07	0.0328	25	17	11	4.6	1.7	0.3
OS07-G03	0.0328	24	17	9.9	4.4	1.7	0.3
G03	0.55	295	195	115	44	15	2.4
G03-G04	0.55	286	192	113	43	15	2.4
OS09	0.1547	92	64	41	19	8.5	2.0
OS09-G04	0.1547	91	63	41	19	8.5	2.0
HG04	0.0891	40	27	16	6.1	2.2	0.4
HG05	0.1125	50	33	19	7.6	2.7	0.5
OS08	0.0406	36	25	17	7.9	3.5	0.8
OS08-G04	0.0406	34	24	15	7.6	3.5	0.8
G04	0.9469	502	336	200	78	28	4.9
G04-G05	0.9469	496	322	193	78	28	4.9
HG06A	0.1375	50	33	20	7.8	2.9	0.5
G05	1.0844	544	355	212	86	31	5.4
G05-G06	1.0844	530	353	211	86	31	5.4
HG06B	0.1031	34	22	13	5.4	2.1	0.4
G06	1.1875	561	375	225	91	33	5.8
HG14	0.2297	81	53	32	13	4.8	0.9
HG13	0.0844	55	37	23	9.8	3.9	0.7
G07	0.0844	55	37	23	9.8	3.9	0.7
G07-G08	0.0844	54	37	23	9.7	3.8	0.7
G08	0.3141	119	78	48	20	7.6	1.5

See approved Meridian Ranch MDDP (EPC File SKP171) dated January 2018 for complete hydrologic calculations and maps.

Interim Drainage - SCS Calculation Method

Following is a tabulation of the surface drainage characteristics for the interim conditions using the SCS calculation method. Please refer to Figure 5 - Meridian Ranch SCS Calculations – Interim Basins Map

Table 4: Interim Drainage Basins-SCS

INTERIM SCS (Full Spectrum)							
	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q25 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS06	0.1313	80	52	30	12	3.8	0.5
G1a	0.1313	80	52	30	12	3.8	0.5
G1a-G2	0.1313	79	52	30	11	3.6	0.5
OS05	0.0578	39	26	15	5.6	1.8	0.2
OS05-G1	0.0578	39	25	15	5.5	1.7	0.2
FG01	0.0538	31	22	14	7.0	3.4	0.9
FG01-G1	0.0538	31	22	14	7.0	3.4	0.9
G1	0.1116	61	41	25	11	4.9	1.1
G1-G2	0.1116	61	41	25	11	4.8	1.1
FG02	0.0391	32	22	14	6.4	2.7	0.5
G2	0.2820	167	112	67	27	10	1.9
G2-G3	0.2820	163	109	66	27	10	1.9
FG03	0.0203	24	17	12	5.9	0.8	0.8
FG04	0.0172	22	16	11	5.8	3.1	0.9
G3	0.3195	185	123	74	31	11	2.4
G3-POND F	0.3195	183	121	74	31	11	2.4
FG06	0.0673	56	39	25	12	5.7	1.3
FG05	0.0580	45	33	23	12	6.7	2.4
OS07a	0.0170	14	9.2	5.7	2.5	0.9	0.1
OS07a-POND F	0.0170	13	9.0	5.7	2.4	0.9	0.1
POND F IN	0.4618	293	199	123	54	22	4.9
POND F	0.4618	179	125	63	17	8.4	2.4
POND F-G7	0.4618	179	124	63	17	8.4	2.4
FG22	0.0714	46	31	19	7.9	3.1	0.5
OS07b	0.0156	15	10	6.2	2.6	1.0	0.1
OS07b-G7	0.0156	13	9.2	5.4	2.3	0.9	0.1
G7	0.5488	209	143	72	20	9.7	2.8
G7-G8	0.5488	207	141	72	20	9.7	2.8
FG24	0.0819	42	27	16	6.1	2.1	0.3
G8	0.6307	238	158	79	23	11	3.0
G8-G10	0.6307	236	157	79	23	11	3.0
FG27	0.2011	69	45	27	11	4.1	0.7
OS09	0.1527	90	62	39	18	8.2	1.9
OS09-G10	0.1527	89	62	39	18	8.2	1.9
OS08	0.0394	34	24	16	7.5	3.3	0.7
OS08-G8	0.0394	34	23	15	7.1	3.3	0.7
G10	1.0239	414	272	142	54	21	5.0
G10-G11	1.0239	411	269	141	54	21	5.0
FG25	0.1523	63	41	24	10	3.4	0.6
G12	1.1762	473	308	160	62	24	5.5
G12-G06	1.1762	470	307	160	62	24	5.5
FG29	0.0934	56	36	21	8.1	2.6	0.4
FG32	0.0402	27	18	11	4.0	1.3	0.2
FG32-G06	0.0402	27	18	10	3.9	1.2	0.2
G06	1.3098	504	327	171	68	27	6.0

Future Drainage - SCS Calculation Method

Following is a tabulation of the surface drainage characteristics for the future conditions using the SCS calculation method. Please refer to Figure 6 - Meridian Ranch SCS Calculations – Future Basins Map

Table 5: Future Drainage Basins-SCS

FUTURE SCS (Full Spectrum)							
	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q25 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS06	0.1313	80	52	30	12	3.8	0.5
G1a	0.1313	80	52	30	12	3.8	0.5
G1a-G2	0.1313	79	52	30	11	3.6	0.5
OS05	0.0578	39	26	15	5.6	1.8	0.2
OS05-G1	0.0578	39	25	15	5.5	1.7	0.2
FG01	0.0538	31	22	14	7.0	3.4	0.9
FG01-G1	0.0538	31	22	14	7.0	3.4	0.9
G1	0.1116	61	41	25	11	4.9	1.1
G1-G2	0.1116	61	41	25	11	4.8	1.1
FG02	0.0391	32	22	14	6.4	2.7	0.5
G2	0.2820	167	112	67	27	10	1.9
G2-G3	0.2820	163	109	66	27	10	1.9
FG03	0.0203	24	17	12	5.9	0.8	0.8
FG04	0.0172	22	16	11	5.8	3.1	0.9
G3	0.3195	185	123	74	31	11	2.4
G3-POND F	0.3195	183	121	74	31	11	2.4
FG06	0.0675	56	40	26	12	5.8	1.3
FG05	0.0580	45	33	23	12	6.7	2.4
OS07a	0.0170	14	9.2	5.7	2.5	0.9	0.1
OS07a-POND F	0.0170	13	9.0	5.7	2.4	0.9	0.1
POND F IN	0.4620	293	200	123	54	22	5.0
POND F	0.4620	179	125	64	17	8.5	2.4
POND F-G7	0.4620	179	124	63	17	8.5	2.4
FG21b	0.0170	26	20	16	10.2	7.0	4.0
FG21a	0.0072	6.1	4.1	2.4	0.9	0.3	0.0
FG21a-G7	0.0072	5.8	3.4	2.2	0.8	0.3	0.0
G7	0.4862	188	130	67	18	9.2	4.0
G7-G8	0.4862	188	130	67	18	9.2	3.9
FG22	0.1380	102	73	47	24	12	3.3
OS08	0.0406	35	25	16	7.7	3.4	0.7
OS08-G8	0.0406	34	24	15	7.5	3.4	0.7
FG23a	0.0216	21	15	10	5.2	2.7	0.8
OS07b	0.0156	15	10	6.2	2.6	1.0	0.1
OS07b-G7	0.0156	14	9.7	6.0	2.4	0.9	0.1
G8	0.7020	297	192	97	48	25	7.9
G8-G10	0.7020	294	191	96	47	24	7.9
OS09	0.1527	90	62	39	18	8.2	1.9
OS09-G10	0.1527	88	62	39	18	8.2	1.9
FG24	0.1373	105	76	50	26	13	4.0
G9	0.2900	180	125	81	38	17	4.4
G9-G10	0.2900	178	125	79	37	17	4.4
FG23b	0.0286	23	16	10	5	2.0	0.4
G10	1.0206	484	313	176	80	39	12
G10-G11	1.0206	480	311	174	80	39	12
FG23c	0.0122	12	8.7	5.7	3.0	1.5	0
G11	1.0328	485	314	177	81	40	12
FG25	0.1086	85	64	46	27	17	8
FG26	0.0863	78	58	40	22	12	5
FG26-POND G	0.0863	77	57	39	22	12	4
FG27	0.0500	52	40	29	17	11	5
FG28	0.0245	18	13	8.5	4.1	2.0	0.5
POND G IN	1.3022	691	459	288	146	79	28.47
POND G	1.3022	480	338	173	57	22	5.17

FUTURE SCS (Full Spectrum)							
	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q25 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
G12	1.3022	480	338	173	57	22	5.17
G12-G06	1.3022	479	337	173	57	22	5.17
FG29	0.0997	60	39	23	9	2.8	0.4
FG32	0.0402	72	57	44	29	20	11
FG32-G06	0.0402	69	54	41	27	18	11
G06	1.4421	508	357	183	61	24	11
FG34	0.0600	34	23	13	5.5	2.0	0.3
G14	0.0600	34	23	13	5.5	2.0	0.3
G14-G15	0.0600	34	22	13	5.4	2.0	0.3
FG35	0.0344	20	13	8.3	3.5	1.5	0.3
G15	0.0944	53	36	21	8.7	3.3	0.6
G15-G08	0.0944	52	35	21	8.7	3.3	0.6
FG37	0.0797	41	27	16	6.0	2.0	0.3
G08	0.2022	106	69	41	16	5.8	1.0

See approved Meridian Ranch MDDP (EPC File SKP171) dated January 2018 for complete hydrologic calculations and maps.

Rational Calculations

The Rational Hydrologic Calculation Method was used to estimate the total runoff from the 5-year and the 100-year design storm and thus establish the storm drainage system design. Using the rational calculation methodology outlined in the Hydrology Section (Ch 6) of the COSDCM coupled with the El Paso County EPCDCM an effective storm drainage design for Rolling Hills Ranch Estates has been designed. The storm drainage facilities have been designed such that the minor storm will be captured by the inlets and conveyed by the storm drain pipes such that the street flow does not overtop the curbs. The storm drainage facility has been designed such that the major storm will be captured by the inlets and conveyed by the storm drain pipes such that the street flow does not exceed the right-of-way widths for residential streets and the hydraulic grade line will be less than one foot below the surface.

The site is located within the Gieck Ranch Drainage Basin; the project will discharge the collected surface flow from the project into an existing natural drainage course or into existing downstream facilities properly sized to safely convey the storm water flows away from the project without damaging adjacent property.

The storm drain runoff will be collected by a series of inlets and storm drain pipe then conveyed through the project and discharged either into the existing Pond F or into a future engineered rip-rap lined channel that will eventually discharge into the future Pond G.

Please update the last sentence as basins A04 and A05 will discharge into the pond instead of the rip-rap channel.

Rational Narrative

The following is a detailed narrative of the storm drainage system located in Rolling Hills Ranch Estates.

- Basin OS7a (2.3 acres, Q_5= 0.8 CFS, Q_{100} = 4.4 CFS) contains off-site area north of Meridian Ranch within the Antler Ridge subdivision entering the project on the north side via an existing 18" RCP culvert at Design Point 1a. The surface runoff is concentrated within an existing swale, directed southerly onto Meridian Ranch and indicate the culvert size. 24" is shown on the drainage plan.

The calculations show 5.3cfs and 32 cfs. Please verify and update the other flows listed in your narrative as they do not appear to match the latest calculations.

drainage basin A01. The surface runoff is conveyed southerly via an existing swale toward a proposed end section to be located in Basin A01.

- Basin OS7b (8.4 acres, Q_5= 3.2 CFS, Q_{100} = 17 CFS) contains off-site area north of Meridian Ranch within the Antler Ridge subdivision entering the project on the north side via an existing culvert at Design Point 1b. The surface runoff is concentrated within an existing swale, directed southerly onto Meridian Ranch and drainage basin A01. The surface runoff is conveyed southerly via an existing swale toward a proposed end section to be located in Basin A01.

- Basin A01 (12 acres, Q_5= 3.3 CFS, Q_{100} = 22 CFS) contains the undeveloped rear portions of the lots on the east side of proposed Palmer Peak Lane. The surface runoff will sheet flow off of the rear portions of the lots and directed to the existing swale carrying the flow from Antler Ridge located to the north then to a 36" RCP end section (ES1). All of the flow (Q_5= 6.4 CFS, Q_{100} = 38 CFS) is captured and conveyed downstream via a 36" RCP to Inlet 01.

- Basin A02 (4.3 acres, Q_5= 2.0 CFS, Q_{100} = 6.5 CFS) contains lots fronting along the east side of Palmer Peak Lane, the surface runoff will sheet flow off of the residential lots and be directed to the street, where the flow will be directed downstream to a proposed 10' Type R sump inlet located at I01. All of the flow is captured by this inlet, combined with the upstream flow from ES1 for a total flow of 10 CFS for the 5 year storm event and 48 CFS for the 100-year storm event. The total flow is conveyed downstream via a 36" RCP to Inlet 02.

- Basin A03 (3.1 acres, Q_5= 4.2 CFS, Q_{100} = 11 CFS) contains fronting along the west side of Palmer Peak Lane, the surface runoff will sheet flow off of the residential lots and be directed to the street, where the flow will be directed downstream to a proposed 10' Type R sump inlet located at I02. All of the flow is captured by this inlet and the combined flow (Q_5= 13 CFS, 56 CFS) is conveyed downstream via a 36" RCP to the existing detention facility Pond F.

- Existing Pond F was designed and constructed with this area anticipated to drain and be detained within it. Pond F contains a water quality component. The development of the Estates at Rolling Hills Ranch Filing 1 will complete the development of areas tributary to Pond F.

- Basin A04 (3.8 acres, Q_5= 4.4 CFS, Q_{100} = 12 CFS) contains land along the north side of Rex Road, the rear portion of two lots within the Estates Filing 3 and land along the west side of Sunrise Ridge Road within the Estates at Rolling Hills Ranch Filing 1. The surface runoff will sheet flow off toward the streets and be conveyed to a proposed 10' Type R sump inlet located at I03. All of the flow (Q_5= 4.4 CFS, Q_{100} = 12 CFS) is captured and conveyed downstream via an 18" RCP to Inlet 04.

- Basin A05 (0.6 acres, Q_5= 1.1 CFS, Q_{100} = 2.3 CFS) contains land within the right-of-way along the east side of Sunrise Ridge Road within the Estates at Rolling Hills

Basins A04 and A05 runoff shall be conveyed to the detention pond as previously discussed and as shown on the CD's. Please revise the narrative for these basins accordingly.

What about the west side that will also be developed. Where will that runoff be conveyed to?

DP2 is shown on the drainage plan. Revise accordingly.

Ranch Filing 1. The surface runoff will sheet flow onto the street and be directed to a 10' Type R sump inlet located at I04. All of the flow is captured by this inlet and the combined flow (Q_5= 5.5 CFS, 14 CFS) is discharged at the Pond F outlet structure via an 18" RCP where it combines with the Pond F discharge (Q_5= 8.1 CFS, 177 CFS) for a total flow of 8.3 CFS for the five-year storm and 179 CFS for the one-hundred-year storm event.

- Basin A06 (0.5 acres, Q_5= 1.3 CFS, Q_{100} = 2.6 CFS) contains land within the right-of-way along the east side of Sunrise Ridge Road south of Rex Road. The surface runoff will sheet flow onto the street and be directed to DP1 where the flow will leave the project and travel overland across undeveloped areas. In the future the surface flow will combine with surface flow from Rolling Hills Ranch Filing 1 and continue along the street in a curb and gutter to a future inlet to be constructed as a part of that project.
- Additional grading operations are proposed northeast of the existing Meridian Service Metropolitan District filter and booster pump building. The top of a small knoll will be taken as a borrow site for the grading within the subdivision. The resulting grade will allow the runoff to sheet flow southeasterly in its historic direction toward undisturbed ground with a final destination of the existing sandy arroyo.

Per ECM appendix I, 100% of the applicable development site shall be captured. Up to 20 percent, not to exceed 1 acre may be excluded per Appendix I.7.1.C.1. If that is your intention for not providing water quality for this portion of the development then please state it in the narrative.

Please state that this is undeveloped land that will remain undeveloped.

DETENTION PONDS

Existing Pond F Detention Storage Criteria

Existing Detention Pond F is located northwest of the future intersection of Rex Rd and the future extension of Sunrise Ridge Dr., and was constructed as a part of the Meridian Ranch Estates Filing 2 grading improvements; the pond is owned and maintained by the Meridian Service Metropolitan District (MSMD). It has been in operation since 2013 with no reported issues. A maintenance agreement between the Meridian Service Metropolitan District and El Paso County has been recorded as a part of the Meridian Ranch Filing 3 Final Plat process.

The SCS calculation method was used to determine inflow and outflow from the detention pond to ensure the developed runoff does not overcharge the pond and the discharges do not adversely impact drainage patterns downstream. Existing Pond F and the Future Pond G will work in series such that the peak flow rates from the Meridian Ranch development do not adversely affect the drainage patterns downstream of Meridian Ranch and Eastonville Road. Storm drainage runoff will enter the pond from upstream development via existing pipe networks and overland from existing rear lots adjacent to the pond. The ultimate future build-out design of the tributary areas was analyzed to insure the sizing of the pond would be adequate after development of Meridian Ranch is complete. This SCS calculation can be found in the appendix.

An analysis of the SCS calculations show the development of the Estates at Rolling Hills Ranch Filing 1 and the discharge flow rates from Pond F do not adversely impact the downstream drainage patterns. No additional improvements or modifications are necessary to this pond as a result of the full buildout of the Estates at Rolling Hills Ranch Filing 1. Table 6 provides summary data for the various design storms for the completed development for all areas tributary to Pond F. The development of the Estates at Rolling Hills Ranch Filing 1 will complete the entire developed areas tributary to Pond F.

A water quality capture volume (WQCV) was added to the required storage volume for the final build out condition. The purpose of the WQCV is to allow particulates to settle out and accumulate over time to improve water quality and to maintain full volume for detention during the life of the facility for a major storm event. The WQCV of 0.3 ac-ft. was added to the detention of the minor storm and half (0.15 ac-ft.) was added to the detention volume of the major storm. This was accomplished with respect to the HEC-HMS computer run by providing a starting detention volume of 0.3 ft. for the 10-year, 5-year and 2-year storm events and 0.15 ft. for the 25-year, 50-year, and 100-year storm events. The resulting storage elevations remain well below the emergency spillway elevation. See Appendix B for more information.

The WQCV was calculated by using the equations found in Volume 2, of the Drainage Criteria Manual (DCM). The release rate from the WQCV is generally very small, which helps 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 settlement to occur. This greatly improves the quality of runoff, leaving the facility and reduces the potential for erosion. The positive impact on water quality is expected to be significant, particularly during the construction phase of the development.

Table 6: Existing Pond F Summary Data

EXISTING POND F				
	PEAK INFLOW	PEAK OUTFLOW	PEAK STORAGE	PEAK ELEVATION
	CFS	CFS	AC-FT	FT
INTERIM CONDITIONS				
2-YEAR STORM	4.9	2.4	1.0	7130.2
5-YEAR STORM	22	8.4	1.9	7131.3
10-YEAR STORM	54	17	3.5	7132.8
25-YEAR STORM	123	63	5.4	7134.2
50-YEAR STORM	199	125	6.8	7135.0
100-YEAR STORM	293	179	8.9	7136.0
FUTURE CONDITIONS				
2-YEAR STORM	5.0	2.4	1.0	7130.2
5-YEAR STORM	22	8.5	1.9	7131.3
10-YEAR STORM	54	17	3.5	7132.8
25-YEAR STORM	123	64	5.4	7134.2
50-YEAR STORM	200	125	6.8	7135.0
100-YEAR STORM	293	179	8.9	7136.0

Future Pond G Detention Storage Criteria

The Future Detention Pond G is to be constructed with grading operations associated with the Rolling Hills Ranch in anticipation of the future development of the Rolling Hills Ranch in accordance with the approved Sketch Plan. The pond will be located within the Gieck Ranch Drainage Basin in the eastern portion of Rolling Hills Ranch adjacent to the Falcon Regional

Park. The pond will be owned and maintained by the Meridian Service Metropolitan District (MSMD) and a maintenance agreement between the Meridian Service Metropolitan District and El Paso County will be recorded with the Rolling Hills Ranch Filing 1 final plat.

Table 7: Pond G Summary Data

FUTURE POND G				
	PEAK INFLOW	PEAK OUTFLOW	PEAK STORAGE	PEAK ELEVATION
	CFS	CFS	AC-FT	FT
INTERIM CONDITIONS				
NOT APPLICABLE				
FUTURE CONDITIONS				
2-YEAR STORM	28	5.2	5.4	7026.8
5-YEAR STORM	79	22	8.3	7027.4
10-YEAR STORM	146	57	11.1	7027.9
25-YEAR STORM	288	173	15.8	7028.7
50-YEAR STORM	459	338	20.1	7029.5
100-YEAR STORM	691	480	25.5	7030.3

The Future Pond G and the existing Pond F will work in series such that the peak flow rates from the Meridian Ranch development do not adversely affect the drainage patterns downstream of the Meridian Ranch project. A permanent concrete control structure will handle full build out of the tributary area and reduce the developed flows to approximate the historic peak flow rates for the full spectrum of design storms.

The proposed concrete control structure the outlet of Pond G will attenuate the peak developed flow rates to approximately historic peak rates for the full spectrum of design storms as per the requirements set forth in Resolution 15-042 adopted by the Board of County Commissioners, County of El Paso. The control structure consists of a water quality control standpipe, a rectangular slotted orifice located on the front and a grated top to reduce the developed peak flow rates. Table 8 provides summary data for the various design storms for the completed development for all areas tributary to Pond G including Rolling Hills Ranch Estates.

Downstream Analysis

The developed flow from this project will discharge at the westerly boundary of the Falcon Regional Park (G12), upstream of Eastonville Rd (DP G06). The discharge at this location during the interim period will be 473 CFS during the 100-yr storm event into an existing natural drainage course that traverses the regional park. The 100-year historical peak flow rate at the western boundary of the regional park is 544 CFS. The calculated 100-year developed flow rate will be 87% of the historic flow rate. See Table 9 for a complete comparative list of the peak flow rates for the key design points impacted by the development of the Estates at Rolling Hills Ranch Filing 1.

Table 8: Key Design Point Comparison – Interim SCS Model

MERIDIAN RANCH DISCHARGE KEY DESIGN POINTS (INTERIM)						
		PEAK DISCHARGE Q_{100} (CFS)	PEAK DISCHARGE Q_{50} (CFS)	PEAK DISCHARGE Q_{25} (CFS)	PEAK DISCHARGE Q_{10} (CFS)	PEAK DISCHARGE Q_5 (CFS)
G12 - DISCHARGE POINT AT REGIONAL PARK (G05 - HISTORIC)	Historic	544	355	212	86	31
	Interim	473	308	160	62	24
	% of Historic	87%	87%	76%	72%	79%
G06 - EASTONVILLE ROAD[1]	Historic	561	375	225	91	33
	Interim	504	327	171	68	27
	% of Historic	90%	87%	76%	74%	82%

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

The outlet (DP G12) for the Future Pond G will be located west of the Falcon Regional Park, upstream of Eastonville Rd (DP G06). At full buildout the discharge from Pond G will be 478 CFS during the 100-yr storm event into an existing natural drainage course that traverses the regional park. The 100-year historical peak flow rate at the western boundary of the regional park is 544 CFS. The calculated 100-year developed flow rate will be 88% of the historic flow rate. The developed peak flow rate for the full spectrum of design storms are calculated to be below that of the corresponding historic peak flow rates. See Table 9 for a complete comparative list of the peak flow rates for the key design points impacted by the development of Rolling Hills Ranch.

Table 9: Key Design Point Comparison – Future SCS Model

MERIDIAN RANCH DISCHARGE KEY DESIGN POINTS (FUTURE)						
		PEAK DISCHARGE Q_{100} (CFS)	PEAK DISCHARGE Q_{50} (CFS)	PEAK DISCHARGE Q_{25} (CFS)	PEAK DISCHARGE Q_{10} (CFS)	PEAK DISCHARGE Q_5 (CFS)
G12 - POND G OUTLET REGIONAL PARK (G05 - HISTORIC)	Historic	544	355	212	86	31
	Future	480	338	173	57	22
	% of Historic	88%	95%	82%	66%	71%
G06 - EASTONVILLE ROAD[1]	Historic	561	375	225	91	33
	Future	508	357	183	61.2	24
	% of Historic	91%	95%	82%	67%	73%

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

DRAINAGE FEES

The proposed development falls in the Gieck Ranch Drainage Basin. The entire development occupies 28.9 acres of residential development of which 18.3 acres are residential development and 5.4 acres are designated as right-of-way, the remainder is open space.

The following is the imperviousness calculation:

	Acres	Assumed Imperviousness	Impervious Acres
Open Space	5.2	3%	0.16
Right-of-way	5.4	90%	4.86
Residential Lots	18.3	20% (16 Lots)	3.66
Total	28.9		8.68=30.03% imperv

GIECK RANCH FEES:

Drainage Fees: There are no drainage fees for this basin.

Bridge Fees: There are no bridge fees for this basin.

CONCLUSION

The rational and SCS based hydrologic calculation methods were used to estimate the historic and developed runoff values to determine the impact of this project on surrounding property. The resulting calculations were used to estimate the hydraulic impact on the existing and proposed facilities. Finally, the model storms were analyzed to simulate the impacts of storm events of various return periods on the existing detention pond and downstream facilities. Based on the aforementioned design parameters the development of the project will not adversely affect downstream properties.

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 temporary sediment 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.

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:

Do you mean "decrease" the amount of impervious?

Step 1: Employ Runoff Reduction Practices

This development incorporates wider rights-of-way than other developments, thus increasing the amount of impervious area within the right-of-way. With the rights-of-way within Meridian Ranch at 60 ft. instead of the normal 50 ft., the amount of pervious area per lineal foot is tripled from 5' wide to 15' wide.

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 sideyards 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 rip-rap 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 detention ponds will act as the primary water quality control for the areas within the project boundaries. Runoff will be collected by the proposed storm drainage system and 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, Revised March 17, 1997.

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

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

10. Revision to Master Development Drainage Plan Meridian Ranch. July 2015. Prepared by Tech Contractors.

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

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

13. "Urban Storm Drainage Criteria Manual" September 1969, Revised January 2016.

Appendices

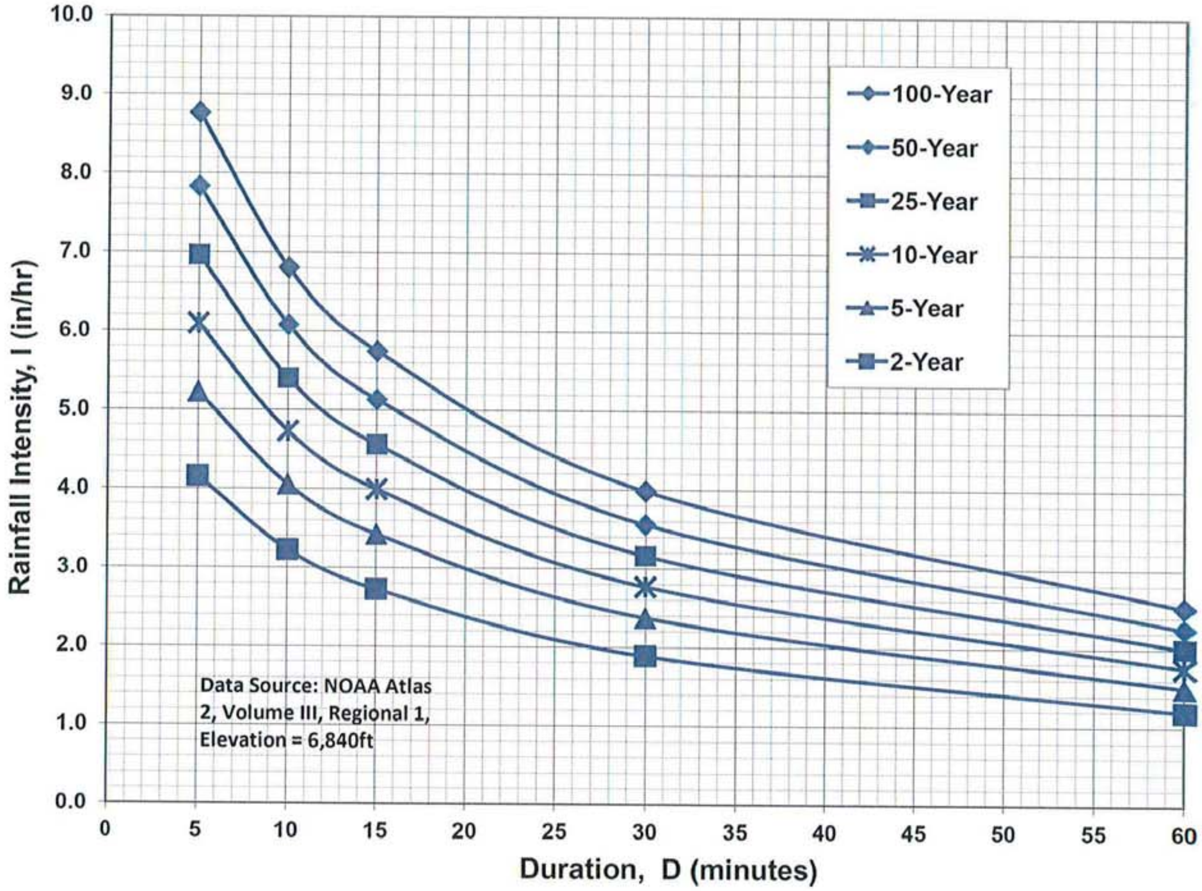
Appendix A – Rational Calculations

Table 6-6. Runoff Coefficients for Rational Method

(Source: UDFCD 2001)

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

Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



IDF Equations

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

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

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

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

$$I_{5} = -1.50 \ln(D) + 7.583$$

$$I_{2} = -1.19 \ln(D) + 6.035$$

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

COMPOSITE 'C' FACTORS

PROJECT: **Estates at Rolling Hills Filing 1** 12/13/2019

BASIN DESIGNATION	AREA (AC.)						COMPOSITE FACTOR		Percent Impervious
	UNDEV	2.5 AC	1 DU/AC	STREETS	OPEN SPACE PARKS/GC	TOTAL	5-year	100-year	
OS7a	1.4	1.0				2.3	**0.12**	**0.38**	**4.6%**
OS7b	4.9	3.5				8.4	**0.12**	**0.38**	**4.6%**
A01	12.0					12.0	**0.09**	**0.36**	**0.0%**
A02			3.5	0.8		4.3	**0.34**	**0.54**	**35.6%**
A03			2.3	0.8		3.1	**0.39**	**0.58**	**41.3%**
A04			2.4	0.75	0.69	3.8	**0.35**	**0.54**	**32.6%**
A05				0.2	0.3	0.6	**0.51**	**0.64**	**42.3%**
A06				0.3	0.2	0.5	**0.59**	**0.70**	**54.1%**

TIME OF CONCENTRATION

PROJECT: **Estates at Rolling Hills Filing 1** DATE: 12/13/2019

SUBBASIN DATA			INIT./OVERLAND TIME (T_i)				TRAVEL TIME (T_t)							TOTAL	Tc Check (Urbanized Basins)		FINAL T_c
BASIN DESIGNATION	C_5	AREA (AC)	LENGTH (FT)	ΔH	SLOPE %	Ti (Min.)*	LENGTH (FT)	ΔH	SLOPE %	CONVEYANCE TYPE	CONVEYANCE COEF.	VEL. (FPS)	Tt (Min.)**	Ti+Tt (Min.)	L (FT)	Tc = (L/180) + 10	(min)
OS7a	0.12	2.3	215	5.0	2.3%	19.9	380	26	6.8%	G	15	3.9	1.6	21.5			**21.5**
OS7b	0.12	8.4	245	19.0	7.8%	14.2	950	45	4.7%	G	15	3.3	4.8	19.1			**19.1**
A01	0.09	12.0	220	20.0	9.1%	13.2	1680	34	2.0%	G	15	2.1	13.1	26.3			**26.3**
A02	0.34	4.3	96	4.0	4.2%	8.5	1432	44	3.1%	P	20	3.5	6.8	15.3	1528.00	18.5	**15.3**
A03	0.39	3.1	96	4.0	4.2%	8.0	1450	44	3.0%	P	20	3.5	6.9	14.9	1546.00	18.6	**14.9**
A04	0.35	3.8	165	8.0	4.8%	10.5	1015	20	2.0%	P	20	2.8	6.0	16.5	1180.00	16.6	**16.5**
A05	0.51	0.6	20	0.4	2.0%	5.0	577	3	0.5%	P	20	1.4	6.7	11.7	597.00	13.3	**11.7**
A06	0.59	0.5	35	0.7	2.0%	5.0	365	7	1.9%	P	20	2.8	2.2	7.2	400.00	12.2	**7.2**

Notes:

$$* Ti = \frac{* Ti = 0.395\,(1.1\text{-}C5)L^{0.5}}{S^{0.33}}$$

$V = C_V S_W^{0.5}$ ** Tt = L x V

TYPE OF SURFACE		C_V
HEAVY MEADOW	H	2.5
TILLAGE/FIELD	T	5
RIPRAP (not buried)	R	6.5
SHORT PASTURE AND LAWNS	L	7
NEARLY BARE GROUND	B	10
GRASSED WATERWAY	G	15

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STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)
SURFACE ROUTING

PROJECT: **Estates at Rolling Hills Filing 1** Date: 12/13/2019

DESIGN POINT	DIRECT RUNOFF											TOTAL RUNOFF							OVERLAND TRAVEL TIME						
	BASIN	AREA (AC)	Tc (Min.)	I (in./ hr.)		COEFF. ©		CA		Q		Sum Tc (min.)	I (in./ hr.)		CA		Q		DESTINATION DP	CONVEYANCE TYPE	COEFFICIENT C_V	SLOPE %	VEL. (FPS)	LENGTH (FT)	
				(5 YR)	(100 YR)	(5 YR)	(100 YR)	(5 YR)	(100 YR)	(5 YR)	(100 YR)		(5 YR)	(100 YR)	(5 YR)	(100 YR)	**(5 YR)**	**(100 YR)**							
	DEVELOPED																								
DP1a	OS7a	2.3	21.5	2.98	5.00	0.12	0.38	0.28	0.88	0.8	4						**0.8**	**4.4**	ES1	G	15.0	2.02%	2.1	1690	1
DP1b	OS7b	8.4	19.1	3.16	5.31	0.12	0.38	1.00	3.18	3.2	17						**3.2**	**17**	ES1	G	15.0	1.90%	2.1	1560	1
ES1	A01	12.0	26.3	2.68	4.50	0.09	0.36	1.08	4.32	2.9	19	34.7	2.26	3.79	2.36	8.38	**5.3**	**32**							
I01	A02	4.3	15.3	3.49	5.86	0.34	0.54	1.45	2.33	5.1	14						**5.1**	**14**							
I02	A03	3.1	14.9	3.53	5.93	0.39	0.58	1.19	1.78	4.2	11						**4.2**	**11**							
I03	A04	3.8	16.5	3.38	5.67	0.35	0.54	1.31	2.04	4.4	12						**4.4**	**12**							
I04	A05	0.6	11.7	3.90	6.54	0.51	0.64	0.29	0.36	1.1	2.3						**1.1**	**2.3**							
DP2	A06	0.5	7.2	4.62	7.76	0.59	0.70	0.28	0.33	1.3	2.6						**1.3**	**2.6**							

STORM DRAINAGE SYSTEM DESIGN
INLET CALCULATIONS

PROJECT: **Estates at Rolling Hills Filing 1** Date: 12/13/2019

DP	BASIN	Inlet size L(i)	Proposed or Existing	INLET TYPE	CROSS SLOPE	STREET SLOPE	T_c	Q_{Total}		$Q_{Capture}$				$Q_{Flow\text{-}by}$				DEPTH (max)		SPREAD	
								Q_5 (cfs)	Q_{100} (cfs)	Q_5 (cfs)	Q_{100} (cfs)	$CA_{eqv.}$ (5-yr)	$CA_{eqv.}$ (100-yr)	Q_5 (cfs)	Q_{100} (cfs)	$CA_{eqv.}$ (5-yr)	$CA_{eqv.}$ (100-yr)	Q_5 (ft)	Q_{100} (ft)	Q_5 (ft)	Q_{100} (ft)
I01	A02	10	PROP	SUMP	2.0%		15.3	5.1	14	5.1	14	1.45	2.33	-	-	-	-	0.50	0.70		
I02	A03	10	PROP	SUMP	2.0%		14.9	4.2	11	4.2	11	1.19	1.78	-	-	-	-	0.50	0.70		
I03	A04	10	PROP	SUMP	2.0%		16.5	4.4	12	4.4	12	1.31	2.04	-	-	-	-	0.50	0.70		
I04	A05	10	PROP	SUMP	2.0%		11.7	1.1	2.3	1.1	2.3	0.29	0.36	-	-	-	-	0.50	0.70		

[1] Forced sump at intersection

Calculation sheet has been cut-off. Please fix.

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)
PIPE ROUTING

PROJECT: **Estates at Rolling Hills Filing 1** Date: 12/13/20

UPSTREAM DESIGN POINT	UPSTREAM BASIN	INLET FLOW							SYSTEM FLOW							TRAVEL TIME					
			I (in./ hr.)		CA		Q			I (in./ hr.)		CA		Q							
		Tc (Min.)	(5 YR)	(100 YR)	(5 YR)	(100 YR)	(5 YR)	(100 YR)	Sum Tc (min.)	(5 YR)	(100 YR)	(5 YR)	(100 YR)	**(5 YR)**	**(100 YR)**	PIPE DIA	ROUGHNESS (n)	DESTINATION DP	SLOPE %	LENGTH (FT)	VEL. (FPS) (Estimate)*
ES1	A01	34.7	2.26	3.79	2.36	8.38	5.3	32						**5.3**	**32**	36	0.013	I01	3.07%	240	17
I01	A02	15.3	3.49	5.86	1.45	2.33	5.1	14	35.0	2.25	3.78	3.81	10.70	**9**	**40**	36	0.013	I02	0.98%	42	9
I02	A03	14.9	3.53	5.93	1.19	1.78	4.2	11	35.0	2.25	3.77	5.00	12.49	**11**	**47**	36	0.013	J01	1.05%	227	10
J01									35.4	2.23	3.74	5.00	12.49	**11**	**47**	36	0.013	OS1	1.53%	51	12
I04	A05	11.7	3.90	6.54	0.29	0.36	1.1	2.3						**1.1**	**2.3**	18	0.013	J04	3.38%	65	11
I03	A04	16.5	3.38	5.67	1.31	2.04	4.4	12	16.5	3.38	5.67	1.60	2.39	**5.4**	**14**	18	0.013	J03	0.57%	35	4

* Velocity estimated for calculation of travel time. Refer to Hydraulics for calculated velocity.

STORM DRAINAGE SYSTEM DESIGN
HYDRAULICS

PROJECT: **Estates at Rolling Hills Filing 1** Date: 12/13/2019

Label	Upstrm Node	Dnstrm Node	Intlet CA (acres)	Inlet Tc (min)	Inlet Flow (ft³/s)	System CA (acres)	System Flow Time (min)	System Intensity (in/hr)	Length (ft)	Section Size (in)	Slope (%)	Capacity (Full Flow) (ft³/s)	System Flow (ft³/s)	Velocity (Ave) (ft/s)	Elevation Ground (Upstrm) (ft)	Hydraulic Grade Line (Upstrm) (ft)	Invert (Upstrm) (ft)	Elevation Ground (Dnstrm) (ft)	Hydraulic Grade Line (Dnstrm) (ft)	Invert (Dnstrm) (ft)
P01	ES1	I01	8.38	34.7	32	8.38	34.7	3.80	244.7	36	3.07%	117	32	14	7143.00	7140.8	7139.00	7136.99	7133.6	7131.50
P02	I01	I02	2.33	15.3	14	10.71	35.0	3.78	41.9	36	0.95%	65	41	9.7	7136.99	7133.6	7131.50	7136.91	7133.3	7131.10
P03	I02	J01	1.78	14.9	11	12.49	35.1	3.77	224.2	36	1.05%	68	48	10	7136.91	7133.3	7131.10	7137.50	7131.5	7128.75
P04	J01	OS1				12.49	35.4	3.75	49.1	36	1.53%	82	47	12	7137.50	7131.0	7128.75	7134.00	7129.8	7128.00
P05	I04	I03	0.36	16.5	2.1	0.36	16.5	5.67	35.3	18	1.13%	11	2.1	4.8	7135.40	7132.7	7131.40	7135.40	7132.7	7131.00
P06	I03	OS2	2.04	11.7	13	2.40	16.6	5.65	70.8	18	1.41%	13	14	7.7	7135.40	7132.7	7131.00	7134.00	7131.5	7130.00

Please update the calculations accordingly as flow at this inlet (design point I03) will now discharge to the existing pond.

Appendix B - HEC-HMS Data

Input Data

Estates at Rolling Hills Filing 1

BASIN	AREA (acre)	AREA (mi²)	CURVE NO.	LAG TIME (min)
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 (acre)	AREA (mi²)	CURVE NO.	LAG TIME (min)
INTERIM				
OS05	37	0.0578	61.0	15.2
OS06	84	0.1313	61.0	18.7
OS07a	11	0.0170	63.1	13.9
OS07b	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	64.4	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	0.0673	66.0	18.4
FG22	46	0.0714	62.9	20.9
FG24	52	0.0819	61.0	24.9
FG25	98	0.1523	61.0	34.4
FG27	129	0.2011	61.0	45.9
FG29	60	0.0934	61.0	19.1
FG32	26	0.0402	61.0	14.9

BASIN	AREA (acre)	AREA (mi²)	CURVE NO.	LAG TIME (min)
FUTURE				
OS05	37	0.0578	61.0	15.2
OS06	84	0.1313	61.0	18.7
OS07a	11	0.0170	63.1	13.9
OS07b	10	0.0156	63.1	10.9
OS08	26	0.0406	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	5	0.0072	61.0	10.1
FG21b	11	0.0170	79.9	16.3
FG22	88	0.1380	67.3	24.8
FG23a	14	0.0216	68.6	18.0
FG23b	18	0.0286	64.7	16.5
FG23c	8	0.0122	67.3	14.0
FG24	88	0.1373	68.1	24.9
FG25	70	0.1086	74.1	36.6
FG26	55	0.0863	70.7	23.1
FG27	32	0.0500	74.7	23.9
FG28	16	0.0245	66.6	23.0
FG29	64	0.0997	61.0	19.1
FG32	26	0.0402	80.0	12.1

NOAA Atlas 14, Volume 8, Version 2
Location name: Peyton, Colorado, USA*
Latitude: 38.9783°, Longitude: -104.5842°
Elevation: 7054.14 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.239 (0.190-0.301)	0.291 (0.232-0.367)	0.381 (0.302-0.482)	0.460 (0.363-0.585)	0.576 (0.442-0.764)	0.670 (0.501-0.899)	0.770 (0.556-1.06)	0.875 (0.606-1.23)	1.02 (0.680-1.48)	1.14 (0.737-1.66)
10-min	0.349 (0.278-0.441)	0.426 (0.339-0.538)	0.558 (0.443-0.706)	0.674 (0.532-0.857)	0.843 (0.647-1.12)	0.982 (0.734-1.32)	1.13 (0.814-1.55)	1.28 (0.888-1.80)	1.50 (0.996-2.16)	1.67 (1.08-2.44)
15-min	0.426 (0.340-0.538)	0.519 (0.413-0.656)	0.680 (0.540-0.861)	0.822 (0.648-1.04)	1.03 (0.789-1.36)	1.20 (0.895-1.61)	1.37 (0.993-1.89)	1.56 (1.08-2.20)	1.82 (1.22-2.64)	2.03 (1.31-2.97)
30-min	0.608 (0.485-0.768)	0.741 (0.590-0.936)	0.969 (0.769-1.23)	1.17 (0.923-1.49)	1.46 (1.12-1.94)	1.70 (1.27-2.28)	1.95 (1.41-2.68)	2.21 (1.53-3.12)	2.58 (1.72-3.73)	2.87 (1.86-4.20)
60-min	0.778 (0.620-0.982)	0.934 (0.744-1.18)	1.21 (0.962-1.54)	1.47 (1.16-1.86)	1.84 (1.42-2.46)	2.16 (1.62-2.91)	2.50 (1.81-3.44)	2.87 (1.99-4.05)	3.38 (2.26-4.91)	3.80 (2.46-5.56)
2-hr	0.948 (0.762-1.19)	1.13 (0.905-1.41)	1.46 (1.16-1.83)	1.76 (1.40-2.22)	2.23 (1.73-2.96)	2.62 (1.99-3.51)	3.05 (2.23-4.18)	3.52 (2.47-4.95)	4.19 (2.82-6.04)	4.73 (3.09-6.87)
3-hr	1.04 (0.839-1.29)	1.22 (0.986-1.52)	1.57 (1.26-1.96)	1.90 (1.51-2.38)	2.41 (1.90-3.21)	2.86 (2.18-3.83)	3.35 (2.47-4.59)	3.90 (2.75-5.47)	4.68 (3.18-6.75)	5.33 (3.50-7.71)
6-hr	1.21 (0.980-1.49)	1.40 (1.14-1.73)	1.78 (1.44-2.21)	2.16 (1.74-2.68)	2.76 (2.19-3.65)	3.29 (2.53-4.38)	3.88 (2.88-5.28)	4.53 (3.23-6.34)	5.49 (3.76-7.88)	6.29 (4.17-9.04)
12-hr	1.39 (1.14-1.70)	1.62 (1.33-1.98)	2.06 (1.68-2.53)	2.48 (2.02-3.06)	3.16 (2.53-4.14)	3.76 (2.92-4.96)	4.42 (3.31-5.97)	5.15 (3.70-7.14)	6.22 (4.30-8.85)	7.10 (4.75-10.1)
24-hr	1.61 (1.33-1.95)	1.88 (1.55-2.29)	2.39 (1.97-2.92)	2.88 (2.35-3.52)	3.63 (2.91-4.69)	4.27 (3.34-5.58)	4.98 (3.75-6.66)	5.75 (4.17-7.90)	6.87 (4.78-9.70)	7.79 (5.25-11.1)
2-day	1.86 (1.55-2.24)	2.19 (1.83-2.64)	2.79 (2.31-3.36)	3.33 (2.75-4.04)	4.15 (3.35-5.30)	4.85 (3.81-6.25)	5.59 (4.25-7.39)	6.40 (4.67-8.70)	7.55 (5.30-10.6)	8.49 (5.77-12.0)
3-day	2.04 (1.71-2.45)	2.41 (2.01-2.88)	3.05 (2.54-3.66)	3.63 (3.01-4.38)	4.51 (3.65-5.71)	5.24 (4.14-6.72)	6.03 (4.59-7.92)	6.87 (5.03-9.29)	8.07 (5.69-11.2)	9.04 (6.18-12.7)
4-day	2.20 (1.85-2.62)	2.58 (2.16-3.08)	3.25 (2.72-3.89)	3.86 (3.21-4.63)	4.77 (3.87-6.01)	5.53 (4.38-7.06)	6.34 (4.85-8.31)	7.22 (5.31-9.73)	8.46 (5.98-11.7)	9.46 (6.50-13.2)
7-day	2.60 (2.20-3.08)	3.00 (2.54-3.56)	3.71 (3.13-4.41)	4.36 (3.65-5.20)	5.33 (4.36-6.67)	6.14 (4.89-7.78)	7.00 (5.40-9.11)	7.93 (5.87-10.6)	9.26 (6.59-12.8)	10.3 (7.14-14.4)
10-day	2.96 (2.51-3.48)	3.39 (2.88-4.00)	4.16 (3.52-4.92)	4.85 (4.08-5.76)	5.88 (4.82-7.31)	6.73 (5.38-8.48)	7.63 (5.91-9.88)	8.61 (6.39-11.5)	9.97 (7.13-13.7)	11.1 (7.70-15.4)
20-day	3.95 (3.38-4.61)	4.55 (3.89-5.32)	5.57 (4.75-6.52)	6.44 (5.46-7.58)	7.68 (6.32-9.39)	8.67 (6.97-10.8)	9.69 (7.54-12.4)	10.8 (8.04-14.1)	12.2 (8.79-16.6)	13.3 (9.36-18.4)
30-day	4.75 (4.09-5.51)	5.49 (4.72-6.38)	6.70 (5.74-7.81)	7.72 (6.58-9.04)	9.12 (7.52-11.1)	10.2 (8.24-12.6)	11.3 (8.83-14.3)	12.4 (9.32-16.2)	13.9 (10.1-18.7)	15.0 (10.6-20.6)
45-day	5.73 (4.96-6.62)	6.62 (5.72-7.65)	8.05 (6.93-9.33)	9.21 (7.89-10.7)	10.8 (8.91-12.9)	12.0 (9.68-14.6)	13.1 (10.3-16.5)	14.3 (10.7-18.5)	15.8 (11.4-21.1)	16.9 (12.0-23.0)
60-day	6.56 (5.70-7.55)	7.55 (6.55-8.69)	9.12 (7.88-10.5)	10.4 (8.92-12.0)	12.1 (9.98-14.4)	13.3 (10.8-16.1)	14.5 (11.4-18.1)	15.6 (11.8-20.2)	17.1 (12.5-22.8)	18.2 (12.9-24.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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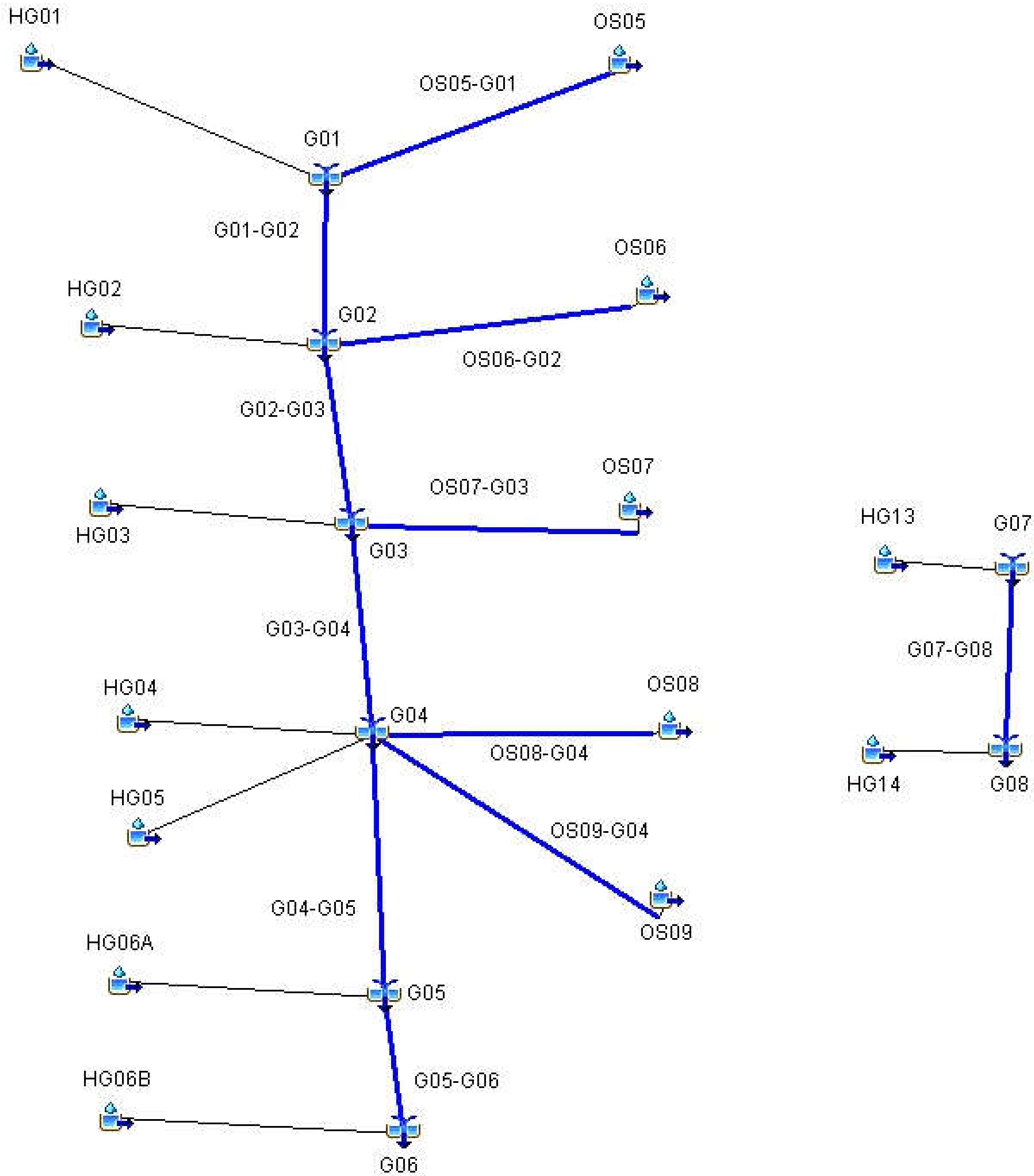
HISTORIC SCS (100-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q100 (CFS)	TIME OF PEAK	TOTAL VOLUME Q100 (AC. FT.)
OS06	0.1313	81	01Jul2015, 12:12	9.4
OS06-G02	0.1313	79	01Jul2015, 12:24	9.3
OS05	0.0578	40	01Jul2015, 12:12	4.2
OS05-G01	0.0578	38	01Jul2015, 12:12	4.1
HG01	0.0547	33	01Jul2015, 12:12	3.9
G01	0.1125	71	01Jul2015, 12:12	8.0
G01-G02	0.1125	70	01Jul2015, 12:24	7.9
HG02	0.0906	46	01Jul2015, 12:24	6.5
G02	0.3344	194	01Jul2015, 12:24	23.7
G02-G03	0.3344	192	01Jul2015, 12:30	23.4
HG03	0.1828	79	01Jul2015, 12:30	13.1
OS07	0.0328	25	01Jul2015, 12:12	2.6
OS07-G03	0.0328	24	01Jul2015, 12:30	2.5
G03	0.5500	295	01Jul2015, 12:30	38.9
G03-G04	0.5500	286	01Jul2015, 12:30	38.6
OS09	0.1547	92	01Jul2015, 12:24	13.3
OS09-G04	0.1547	91	01Jul2015, 12:30	13.2
HG04	0.0891	40	01Jul2015, 12:30	6.3
HG05	0.1125	50	01Jul2015, 12:30	8.0
OS08	0.0406	36	01Jul2015, 12:12	3.6
OS08-G04	0.0406	34	01Jul2015, 12:30	3.5
G04	0.9469	502	01Jul2015, 12:30	69.6
G04-G05	0.9469	496	01Jul2015, 12:36	69.3
HG06A	0.1375	50	01Jul2015, 12:42	9.7
G05	1.0844	544	01Jul2015, 12:36	79.1
G05-G06	1.0844	530	01Jul2015, 12:36	78.6
HG06B	0.1031	34	01Jul2015, 12:48	7.3
G06	1.1875	561	01Jul2015, 12:36	85.9
HG14	0.2297	81	01Jul2015, 12:42	16.2
HG13	0.0844	55	01Jul2015, 12:18	6.7
G07	0.0844	55	01Jul2015, 12:18	6.7
G07-G08	0.0844	54	01Jul2015, 12:18	6.6
G08	0.3141	119	01Jul2015, 12:30	22.9

Highlighted green rows reference key design points (Typical all charts this section)

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	53	01Jul2015, 12:12	6.6
OS06-G02	0.1313	52	01Jul2015, 12:24	6.5
OS05	0.0578	26	01Jul2015, 12:12	2.9
OS05-G01	0.0578	26	01Jul2015, 12:18	2.9
HG01	0.0547	21	01Jul2015, 12:18	2.8
G01	0.1125	47	01Jul2015, 12:18	5.6
G01-G02	0.1125	47	01Jul2015, 12:24	5.5
HG02	0.0906	30	01Jul2015, 12:24	4.5
G02	0.3344	129	01Jul2015, 12:24	16.6
G02-G03	0.3344	127	01Jul2015, 12:30	16.3
HG03	0.1828	51	01Jul2015, 12:30	9.2
OS07	0.0328	17	01Jul2015, 12:12	1.9
OS07-G03	0.0328	17	01Jul2015, 12:30	1.8
G03	0.5500	195	01Jul2015, 12:30	27.3
G03-G04	0.5500	192	01Jul2015, 12:36	27.0
OS09	0.1547	64	01Jul2015, 12:24	9.7
OS09-G04	0.1547	63	01Jul2015, 12:36	9.5
HG04	0.0891	27	01Jul2015, 12:30	4.5
HG05	0.1125	33	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	336	01Jul2015, 12:36	49.1
G04-G05	0.9469	322	01Jul2015, 12:42	48.9
HG06A	0.1375	33	01Jul2015, 12:42	6.8
G05	1.0844	355	01Jul2015, 12:42	55.7
G05-G06	1.0844	353	01Jul2015, 12:42	55.3
HG06B	0.1031	22	01Jul2015, 12:54	5.1
G06	1.1875	375	01Jul2015, 12:42	60.4
HG14	0.2297	53	01Jul2015, 12:48	11.4
HG13	0.0844	37	01Jul2015, 12:18	4.8
G07	0.0844	37	01Jul2015, 12:18	4.8
G07-G08	0.0844	37	01Jul2015, 12:24	4.7
G08	0.3141	78	01Jul2015, 12:30	16.1

Highlighted green rows reference key design points (Typical all charts this section)


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

HISTORIC SCS (25-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q25 (CFS)	TIME OF PEAK	TOTAL VOLUME Q25 (AC. FT.)
OS06	0.1313	31	01Jul2015, 12:18	4.4
OS06-G02	0.1313	31	01Jul2015, 12:24	4.3
OS05	0.0578	16	01Jul2015, 12:12	1.9
OS05-G01	0.0578	16	01Jul2015, 12:18	1.9
HG01	0.0547	13	01Jul2015, 12:18	1.8
G01	0.1125	28	01Jul2015, 12:18	3.7
G01-G02	0.1125	27	01Jul2015, 12:24	3.7
HG02	0.0906	18	01Jul2015, 12:24	3.0
G02	0.3344	76	01Jul2015, 12:24	11.0
G02-G03	0.3344	75	01Jul2015, 12:36	10.7
HG03	0.1828	31	01Jul2015, 12:36	6.1
OS07	0.0328	11	01Jul2015, 12:12	1.3
OS07-G03	0.0328	9.9	01Jul2015, 12:36	1.2
G03	0.5500	115	01Jul2015, 12:36	18.0
G03-G04	0.5500	113	01Jul2015, 12:42	17.8
OS09	0.1547	41	01Jul2015, 12:30	6.7
OS09-G04	0.1547	41	01Jul2015, 12:36	6.5
HG04	0.0891	16	01Jul2015, 12:30	2.9
HG05	0.1125	19	01Jul2015, 12:30	3.7
OS08	0.0406	17	01Jul2015, 12:12	1.8
OS08-G04	0.0406	15	01Jul2015, 12:42	1.8
G04	0.9469	200	01Jul2015, 12:42	32.8
G04-G05	0.9469	193	01Jul2015, 12:42	32.6
HG06A	0.1375	20	01Jul2015, 12:48	4.5
G05	1.0844	212	01Jul2015, 12:42	37.1
G05-G06	1.0844	211	01Jul2015, 12:48	36.8
HG06B	0.1031	13	01Jul2015, 12:54	3.4
G06	1.1875	225	01Jul2015, 12:48	40.2
HG14	0.2297	32	01Jul2015, 12:48	7.5
HG13	0.0844	23	01Jul2015, 12:18	3.2
G07	0.0844	23	01Jul2015, 12:18	3.2
G07-G08	0.0844	23	01Jul2015, 12:24	3.2
G08	0.3141	48	01Jul2015, 12:36	10.7

Highlighted green rows reference key design points (Typical all charts this section)

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	12	01Jul2015, 12:30	2.2
OS05	0.0578	5.9	01Jul2015, 12:12	1.0
OS05-G01	0.0578	5.7	01Jul2015, 12:24	1.0
HG01	0.0547	4.8	01Jul2015, 12:18	0.9
G01	0.1125	10	01Jul2015, 12:18	1.9
G01-G02	0.1125	10	01Jul2015, 12:36	1.8
HG02	0.0906	6.9	01Jul2015, 12:30	1.5
G02	0.3344	28	01Jul2015, 12:30	5.5
G02-G03	0.3344	28	01Jul2015, 12:48	5.4
HG03	0.1828	12	01Jul2015, 12:36	3.1
OS07	0.0328	4.6	01Jul2015, 12:12	0.7
OS07-G03	0.0328	4.4	01Jul2015, 12:42	0.7
G03	0.5500	44	01Jul2015, 12:48	9.1
G03-G04	0.5500	43	01Jul2015, 12:54	9.0
OS09	0.1547	19	01Jul2015, 12:30	3.7
OS09-G04	0.1547	19	01Jul2015, 12:42	3.6
HG04	0.0891	6.1	01Jul2015, 12:36	1.5
HG05	0.1125	7.6	01Jul2015, 12:36	1.9
OS08	0.0406	7.9	01Jul2015, 12:12	1.0
OS08-G04	0.0406	7.6	01Jul2015, 12:48	1.0
G04	0.9469	78	01Jul2015, 12:48	17.0
G04-G05	0.9469	78	01Jul2015, 12:54	16.8
HG06A	0.1375	7.8	01Jul2015, 12:54	2.3
G05	1.0844	86	01Jul2015, 12:54	19.1
G05-G06	1.0844	86	01Jul2015, 13:00	18.9
HG06B	0.1031	5.4	01Jul2015, 13:00	1.7
G06	1.1875	91	01Jul2015, 13:00	20.6
HG14	0.2297	12.8	01Jul2015, 12:54	3.8
HG13	0.0844	9.8	01Jul2015, 12:18	1.7
G07	0.0844	9.8	01Jul2015, 12:18	1.7
G07-G08	0.0844	9.7	01Jul2015, 12:30	1.7
G08	0.3141	19.7	01Jul2015, 12:36	5.5

Highlighted green rows reference key design points (Typical all charts this section)

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	3.9	01Jul2015, 12:24	1.1
OS06-G02	0.1313	3.8	01Jul2015, 12:42	1.1
OS05	0.0578	1.8	01Jul2015, 12:18	0.5
OS05-G01	0.0578	1.8	01Jul2015, 12:30	0.5
HG01	0.0547	1.6	01Jul2015, 12:24	0.5
G01	0.1125	3.3	01Jul2015, 12:30	1.0
G01-G02	0.1125	3.3	01Jul2015, 12:42	0.9
HG02	0.0906	2.4	01Jul2015, 12:36	0.8
G02	0.3344	9.4	01Jul2015, 12:42	2.8
G02-G03	0.3344	9.3	01Jul2015, 13:00	2.7
HG03	0.1828	4.4	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	4.7
G03-G04	0.5500	15	01Jul2015, 13:12	4.5
OS09	0.1547	8.5	01Jul2015, 12:36	2.1
OS09-G04	0.1547	8.5	01Jul2015, 12:48	2.0
HG04	0.0891	2.2	01Jul2015, 12:42	0.8
HG05	0.1125	2.7	01Jul2015, 12:42	1.0
OS08	0.0406	3.5	01Jul2015, 12:12	0.6
OS08-G04	0.0406	3.5	01Jul2015, 13:00	0.6
G04	0.9469	28	01Jul2015, 13:12	8.9
G04-G05	0.9469	28	01Jul2015, 13:18	8.8
HG06A	0.1375	2.9	01Jul2015, 13:00	1.2
G05	1.0844	31	01Jul2015, 13:18	9.9
G05-G06	1.0844	31	01Jul2015, 13:24	9.8
HG06B	0.1031	2.1	01Jul2015, 13:12	0.9
G06	1.1875	33	01Jul2015, 13:24	10.6
HG14	0.2297	4.8	01Jul2015, 13:06	1.9
HG13	0.0844	3.9	01Jul2015, 12:24	0.9
G07	0.0844	3.9	01Jul2015, 12:24	0.9
G07-G08	0.0844	3.8	01Jul2015, 12:36	0.9
G08	0.3141	7.6	01Jul2015, 12:54	2.8

Highlighted green rows reference key design points (Typical all charts this section)

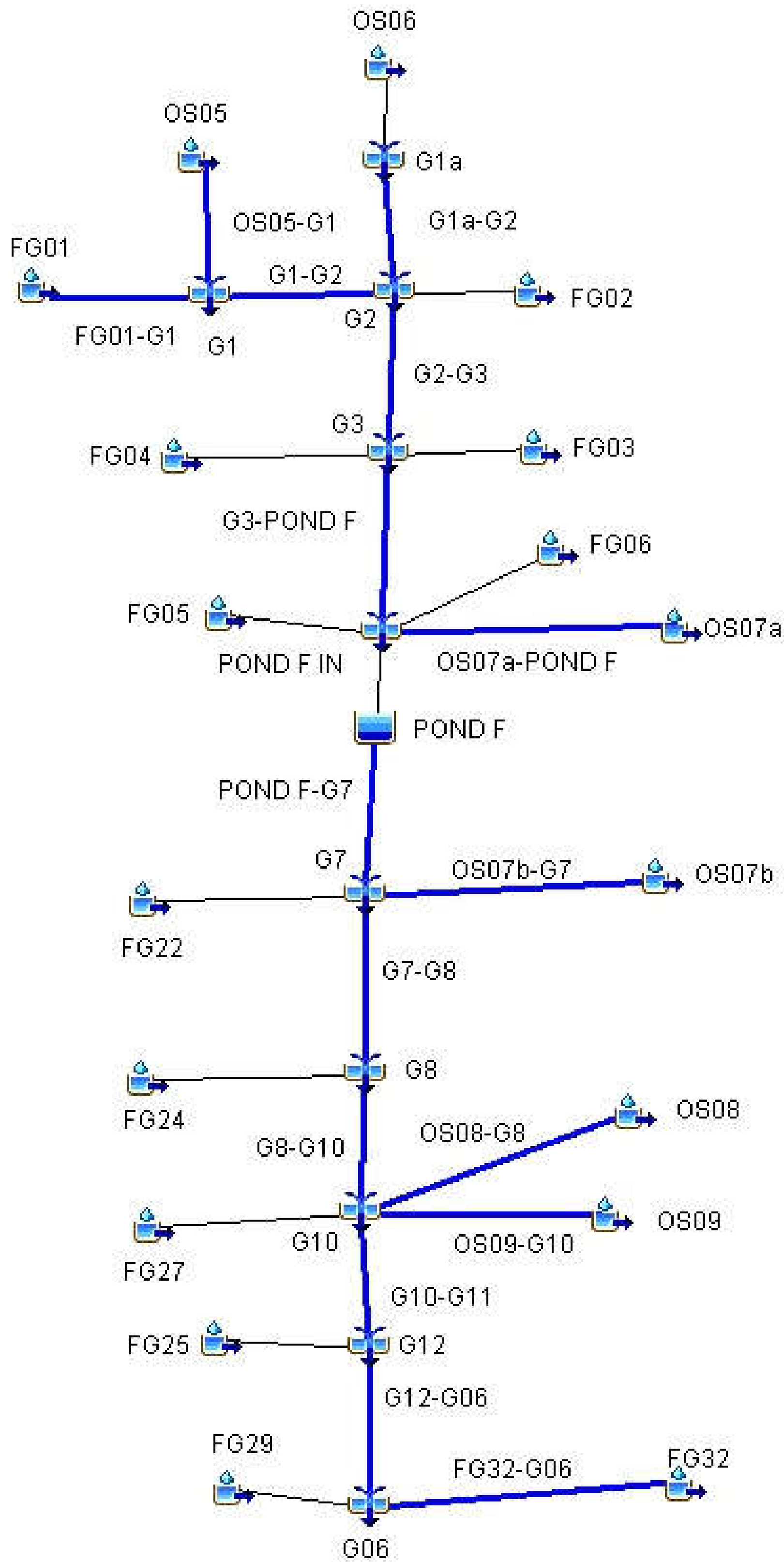
HISTORIC SCS (2-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	DISCHARGE PEAK Q2 (CFS)	TIME OF PEAK	TOTAL VOLUME Q2 (AC. FT.)
OS06	0.1313	0.5	01Jul2015, 13:30	0.4
OS06-G02	0.1313	0.5	01Jul2015, 14:00	0.3
OS05	0.0578	0.2	01Jul2015, 13:18	0.2
OS05-G01	0.0578	0.2	01Jul2015, 13:36	0.2
HG01	0.0547	0.2	01Jul2015, 13:30	0.1
G01	0.1125	0.5	01Jul2015, 13:36	0.3
G01-G02	0.1125	0.5	01Jul2015, 14:00	0.3
HG02	0.0906	0.4	01Jul2015, 13:42	0.2
G02	0.3344	1.4	01Jul2015, 13:54	0.9
G02-G03	0.3344	1.4	01Jul2015, 14:30	0.8
HG03	0.1828	0.8	01Jul2015, 13:48	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	2.4	01Jul2015, 14:18	1.4
G03-G04	0.5500	2.4	01Jul2015, 14:36	1.3
OS09	0.1547	2.0	01Jul2015, 12:54	0.8
OS09-G04	0.1547	2.0	01Jul2015, 13:18	0.8
HG04	0.0891	0.4	01Jul2015, 13:48	0.2
HG05	0.1125	0.5	01Jul2015, 13:48	0.3
OS08	0.0406	0.8	01Jul2015, 12:24	0.2
OS08-G04	0.0406	0.8	01Jul2015, 13:36	0.2
G04	0.9469	4.9	01Jul2015, 14:30	2.9
G04-G05	0.9469	4.9	01Jul2015, 14:42	2.8
HG06A	0.1375	0.5	01Jul2015, 14:12	0.4
G05	1.0844	5.4	01Jul2015, 14:42	3.2
G05-G06	1.0844	5.4	01Jul2015, 14:54	3.1
HG06B	0.1031	0.4	01Jul2015, 14:24	0.3
G06	1.1875	5.8	01Jul2015, 14:54	3.4
HG14	0.2297	0.9	01Jul2015, 14:18	0.6
HG13	0.0844	0.7	01Jul2015, 13:00	0.3
G07	0.0844	0.7	01Jul2015, 13:00	0.3
G07-G08	0.0844	0.7	01Jul2015, 13:18	0.3
G08	0.3141	1.5	01Jul2015, 13:54	0.9

Highlighted green rows reference key design points (Typical all charts this section)

INTERIM 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	21.5
G2-G3	0.2820	163	01Jul2015, 12:18	21.3
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	25.0
G3-POND F	0.3195	183	01Jul2015, 12:18	25.0
FG06	0.0673	56	01Jul2015, 12:12	6.0
FG05	0.0580	45	01Jul2015, 12:24	6.1
OS07a	0.0170	14	01Jul2015, 12:06	1.3
OS07a-POND F	0.0170	13	01Jul2015, 12:18	1.3
POND F IN	0.4618	293	01Jul2015, 12:18	38.5
POND F	0.4618	179	01Jul2015, 12:42	36.4
POND F-G7	0.4618	179	01Jul2015, 12:42	36.2
FG22	0.0714	46	01Jul2015, 12:18	5.5
OS07b	0.0156	15	01Jul2015, 12:06	1.2
OS07b-G7	0.0156	13	01Jul2015, 12:24	1.2
G7	0.5488	209	01Jul2015, 12:36	42.9
G7-G8	0.5488	207	01Jul2015, 12:42	42.8
FG24	0.0819	42	01Jul2015, 12:18	5.8
G8	0.6307	238	01Jul2015, 12:36	48.6
G8-G10	0.6307	236	01Jul2015, 12:42	48.3
FG27	0.2011	69	01Jul2015, 12:48	14.0
OS09	0.1527	90	01Jul2015, 12:24	13.0
OS09-G10	0.1527	89	01Jul2015, 12:36	12.8
OS08	0.0394	34	01Jul2015, 12:12	3.5
OS08-G8	0.0394	34	01Jul2015, 12:24	3.4
G10	1.0239	414	01Jul2015, 12:36	78.5
G10-G11	1.0239	411	01Jul2015, 12:36	78.4
FG25	0.1523	63	01Jul2015, 12:30	10.7
G12	1.1762	473	01Jul2015, 12:36	89.1
G12-G06	1.1762	470	01Jul2015, 12:42	88.5
FG29	0.0934	56	01Jul2015, 12:12	6.6
FG32	0.0402	27	01Jul2015, 12:12	2.9
FG32-G06	0.0402	27	01Jul2015, 12:12	2.8
G06	1.3098	504	01Jul2015, 12:42	98.0

Highlighted green rows reference key design points (Typical all charts this section)

GIECK INTERIM CONDITIONS



INTERIM 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	15.3
G2-G3	0.2820	109	01Jul2015, 12:24	15.2
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	17.9
G3-POND F	0.3195	121	01Jul2015, 12:18	17.9
FG06	0.0673	39	01Jul2015, 12:12	4.4
FG05	0.0580	33	01Jul2015, 12:24	4.6
OS07a	0.0170	9	01Jul2015, 12:12	1.0
OS07a-POND F	0.0170	9	01Jul2015, 12:18	0.9
POND F IN	0.4618	199	01Jul2015, 12:18	27.8
POND F	0.4618	125	01Jul2015, 12:42	26.2
POND F-G7	0.4618	124	01Jul2015, 12:48	26.0
FG22	0.0714	30.9	01Jul2015, 12:18	4.0
OS07b	0.0156	10	01Jul2015, 12:06	0.9
OS07b-G7	0.0156	9	01Jul2015, 12:24	0.9
G7	0.5488	143	01Jul2015, 12:42	30.8
G7-G8	0.5488	141	01Jul2015, 12:48	30.7
FG24	0.0819	27	01Jul2015, 12:24	4.1
G8	0.6307	158	01Jul2015, 12:42	34.7
G8-G10	0.6307	157	01Jul2015, 12:48	34.5
FG27	0.2011	45	01Jul2015, 12:48	9.8
OS09	0.1527	62	01Jul2015, 12:24	9.4
OS09-G10	0.1527	62	01Jul2015, 12:36	9.3
OS08	0.0394	24	01Jul2015, 12:12	2.5
OS08-G8	0.0394	23	01Jul2015, 12:24	2.5
G10	1.0239	272	01Jul2015, 12:42	56.1
G10-G11	1.0239	269.4	01Jul2015, 12:48	56.0
FG25	0.1523	41	01Jul2015, 12:36	7.5
G12	1.1762	308	01Jul2015, 12:42	63.6
G12-G06	1.1762	307	01Jul2015, 12:48	63.1
FG29	0.0934	36	01Jul2015, 12:18	4.7
FG32	0.0402	18	01Jul2015, 12:12	2.0
FG32-G06	0.0402	18	01Jul2015, 12:12	2.0
G06	1.3098	327	01Jul2015, 12:48	69.8

Highlighted green rows reference key design points (Typical all charts this section)

INTERIM SCS (25-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q25 (CFS)	TIME OF PEAK	TOTAL VOLUME Q25 (AC. FT.)
OS06	0.1313	30	01Jul2015, 12:18	4.3
G1a	0.1313	30	01Jul2015, 12:18	4.3
G1a-G2	0.1313	30	01Jul2015, 12:18	4.2
OS05	0.0578	15	01Jul2015, 12:12	1.9
OS05-G1	0.0578	15	01Jul2015, 12:12	1.9
FG01	0.0538	14	01Jul2015, 12:30	2.5
FG01-G1	0.0538	14	01Jul2015, 12:30	2.5
G1	0.1116	25	01Jul2015, 12:18	4.4
G1-G2	0.1116	25	01Jul2015, 12:24	4.3
FG02	0.0391	14	01Jul2015, 12:12	1.6
G2	0.2820	67	01Jul2015, 12:18	10.2
G2-G3	0.2820	66	01Jul2015, 12:24	10.1
FG03	0.0203	12	01Jul2015, 12:06	1.0
FG04	0.0172	11	01Jul2015, 12:00	0.9
G3	0.3195	74	01Jul2015, 12:24	12.0
G3-POND F	0.3195	74	01Jul2015, 12:24	12.0
FG06	0.0673	25	01Jul2015, 12:12	3.0
FG05	0.0580	23	01Jul2015, 12:24	3.3
OS07a	0.0170	6	01Jul2015, 12:12	0.6
OS07a-POND F	0.0170	6	01Jul2015, 12:24	0.6
POND F IN	0.4618	123	01Jul2015, 12:24	19.0
POND F	0.4618	63	01Jul2015, 12:54	17.6
POND F-G7	0.4618	63	01Jul2015, 13:00	17.5
FG22	0.0714	18.9	01Jul2015, 12:18	2.7
OS07b	0.0156	6	01Jul2015, 12:06	0.6
OS07b-G7	0.0156	5	01Jul2015, 12:30	0.6
G7	0.5488	72	01Jul2015, 13:00	20.7
G7-G8	0.5488	72	01Jul2015, 13:00	20.6
FG24	0.0819	16	01Jul2015, 12:24	2.7
G8	0.6307	79	01Jul2015, 13:00	23.3
G8-G10	0.6307	79	01Jul2015, 13:06	23.1
FG27	0.2011	27	01Jul2015, 12:48	6.4
OS09	0.1527	39	01Jul2015, 12:30	6.5
OS09-G10	0.1527	39	01Jul2015, 12:42	6.3
OS08	0.0394	16	01Jul2015, 12:12	1.8
OS08-G8	0.0394	15	01Jul2015, 12:30	1.7
G10	1.0239	142	01Jul2015, 12:54	37.5
G10-G11	1.0239	141.1	01Jul2015, 12:54	37.5
FG25	0.1523	24	01Jul2015, 12:36	4.9
G12	1.1762	160	01Jul2015, 12:54	42.4
G12-G06	1.1762	159.5	01Jul2015, 13:00	42.1
FG29	0.0934	21	01Jul2015, 12:18	3.1
FG32	0.0402	11	01Jul2015, 12:12	1.3
FG32-G06	0.0402	10	01Jul2015, 12:12	1.3
G06	1.3098	171	01Jul2015, 12:54	46.4

Highlighted green rows reference key design points (Typical all charts this section)

INTERIM 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	6	01Jul2015, 12:12	1.0
OS05-G1	0.0578	6	01Jul2015, 12:18	1.0
FG01	0.0538	7	01Jul2015, 12:36	1.4
FG01-G1	0.0538	7	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	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	6	01Jul2015, 12:06	0.6
FG04	0.0172	6	01Jul2015, 12:06	0.5
G3	0.3195	31	01Jul2015, 12:30	6.4
G3-POND F	0.3195	31	01Jul2015, 12:30	6.4
FG06	0.0673	12	01Jul2015, 12:18	1.7
FG05	0.0580	12	01Jul2015, 12:24	2.0
OS07a	0.0170	2	01Jul2015, 12:12	0.3
OS07a-POND F	0.0170	2	01Jul2015, 12:30	0.3
POND F IN	0.4618	54	01Jul2015, 12:30	10.4
POND F	0.4618	17	01Jul2015, 13:48	9.5
POND F-G7	0.4618	17	01Jul2015, 13:54	9.5
FG22	0.0714	8	01Jul2015, 12:18	1.4
OS07b	0.0156	2.6	01Jul2015, 12:06	0.3
OS07b-G7	0.0156	2	01Jul2015, 12:36	0.3
G7	0.5488	20	01Jul2015, 13:18	11.2
G7-G8	0.5488	19.9	01Jul2015, 13:24	11.1
FG24	0.0819	6	01Jul2015, 12:24	1.3
G8	0.6307	23	01Jul2015, 13:00	12.5
G8-G10	0.6307	23	01Jul2015, 13:06	12.4
FG27	0.2011	11	01Jul2015, 12:54	3.2
OS09	0.1527	18	01Jul2015, 12:30	3.5
OS09-G10	0.1527	17.9	01Jul2015, 12:42	3.4
OS08	0.0394	7.5	01Jul2015, 12:12	1.0
OS08-G8	0.0394	7	01Jul2015, 12:36	0.9
G10	1.0239	54	01Jul2015, 12:54	20.0
G10-G11	1.0239	53.5	01Jul2015, 12:54	19.9
FG25	0.1523	10	01Jul2015, 12:42	2.5
G12	1.1762	62	01Jul2015, 12:54	22.4
G12-G06	1.1762	61.9	01Jul2015, 13:00	22.2
FG29	0.0934	8	01Jul2015, 12:18	1.5
FG32	0.0402	4	01Jul2015, 12:12	0.7
FG32-G06	0.0402	4	01Jul2015, 12:18	0.7
G06	1.3098	68	01Jul2015, 12:54	24.4

Highlighted green rows reference key design points (Typical all charts this section)

INTERIM 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	3.6	01Jul2015, 12:36	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	0.8	01Jul2015, 12:12	0.2
FG04	0.0172	3.1	01Jul2015, 12:06	0.3
G3	0.3195	11	01Jul2015, 12:36	3.3
G3-POND F	0.3195	11	01Jul2015, 12:42	3.3
FG06	0.0673	5.7	01Jul2015, 12:18	1.0
FG05	0.0580	6.7	01Jul2015, 12:30	1.2
OS07a	0.0170	0.9	01Jul2015, 12:12	0.2
OS07a-POND F	0.0170	0.9	01Jul2015, 12:36	0.2
POND F IN	0.4618	22.2	01Jul2015, 12:36	5.7
POND F	0.4618	8.4	01Jul2015, 14:06	5.1
POND F-G7	0.4618	8.4	01Jul2015, 14:12	5.1
FG22	0.0714	3.1	01Jul2015, 12:24	0.8
OS07b	0.0156	1.0	01Jul2015, 12:12	0.2
OS07b-G7	0.0156	0.9	01Jul2015, 12:42	0.2
G7	0.5488	9.7	01Jul2015, 14:06	6.0
G7-G8	0.5488	9.7	01Jul2015, 14:06	6.0
FG24	0.0819	2.1	01Jul2015, 12:36	0.7
G8	0.6307	10.8	01Jul2015, 14:00	6.7
G8-G10	0.6307	10.8	01Jul2015, 14:06	6.6
FG27	0.2011	4.1	01Jul2015, 13:06	1.7
OS09	0.1527	8.2	01Jul2015, 12:36	2.0
OS09-G10	0.1527	8.2	01Jul2015, 12:54	2.0
OS08	0.0394	3.3	01Jul2015, 12:12	0.6
OS08-G8	0.0394	3	01Jul2015, 12:42	0.6
G10	1.0239	21	01Jul2015, 13:06	10.8
G10-G11	1.0239	21.0	01Jul2015, 13:12	10.7
FG25	0.1523	3	01Jul2015, 12:48	1.3
G12	1.1762	24	01Jul2015, 13:06	12.0
G12-G06	1.1762	24.2	01Jul2015, 13:18	11.8
FG29	0.0934	3	01Jul2015, 12:24	0.8
FG32	0.0402	1	01Jul2015, 12:18	0.3
FG32-G06	0.0402	1	01Jul2015, 12:24	0.3
G06	1.3098	27	01Jul2015, 13:12	13.0

Highlighted green rows reference key design points (Typical all charts this section)

INTERIM 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
G3-POND F	0.3195	2.4	01Jul2015, 13:30	1.3
FG06	0.0673	1.3	01Jul2015, 12:24	0.4
FG05	0.0580	2.4	01Jul2015, 12:30	0.6
OS07a	0.0170	0.1	01Jul2015, 12:48	0.1
OS07a-POND F	0.0170	0.1	01Jul2015, 13:30	0.1
POND F IN	0.4618	4.9	01Jul2015, 12:48	2.4
POND F	0.4618	2.4	01Jul2015, 15:54	2.0
POND F-G7	0.4618	2.4	01Jul2015, 16:06	2.0
FG22	0.0714	0.5	01Jul2015, 13:00	0.3
OS07b	0.0156	0.1	01Jul2015, 12:48	0.1
OS07b-G7	0.0156	0.1	01Jul2015, 13:42	0.1
G7	0.5488	2.8	01Jul2015, 16:12	2.3
G7-G8	0.5488	2.8	01Jul2015, 16:18	2.3
FG24	0.0819	0.3	01Jul2015, 13:42	0.2
G8	0.6307	3.0	01Jul2015, 16:30	2.5
G8-G10	0.6307	3.0	01Jul2015, 16:42	2.5
FG27	0.2011	0.7	01Jul2015, 14:18	0.5
OS09	0.1527	1.9	01Jul2015, 12:54	0.8
OS09-G10	0.1527	1.9	01Jul2015, 13:24	0.8
OS08	0.0394	0.7	01Jul2015, 12:24	0.2
OS08-G8	0.0394	0.7	01Jul2015, 13:00	0.2
G10	1.0239	5.0	01Jul2015, 14:54	4.0
G10-G11	1.0239	5.0	01Jul2015, 14:54	4.0
FG25	0.1523	0.6	01Jul2015, 14:00	0.4
G12	1.1762	5.5	01Jul2015, 14:12	4.3
G12-G06	1.1762	5.5	01Jul2015, 14:24	4.3
FG29	0.0934	0.4	01Jul2015, 13:36	0.2
FG32	0.0402	0.2	01Jul2015, 13:24	0.1
FG32-G06	0.0402	0.2	01Jul2015, 13:36	0.1
G06	1.3098	6.0	01Jul2015, 14:24	4.6

Highlighted green rows reference key design points (Typical all charts this section)

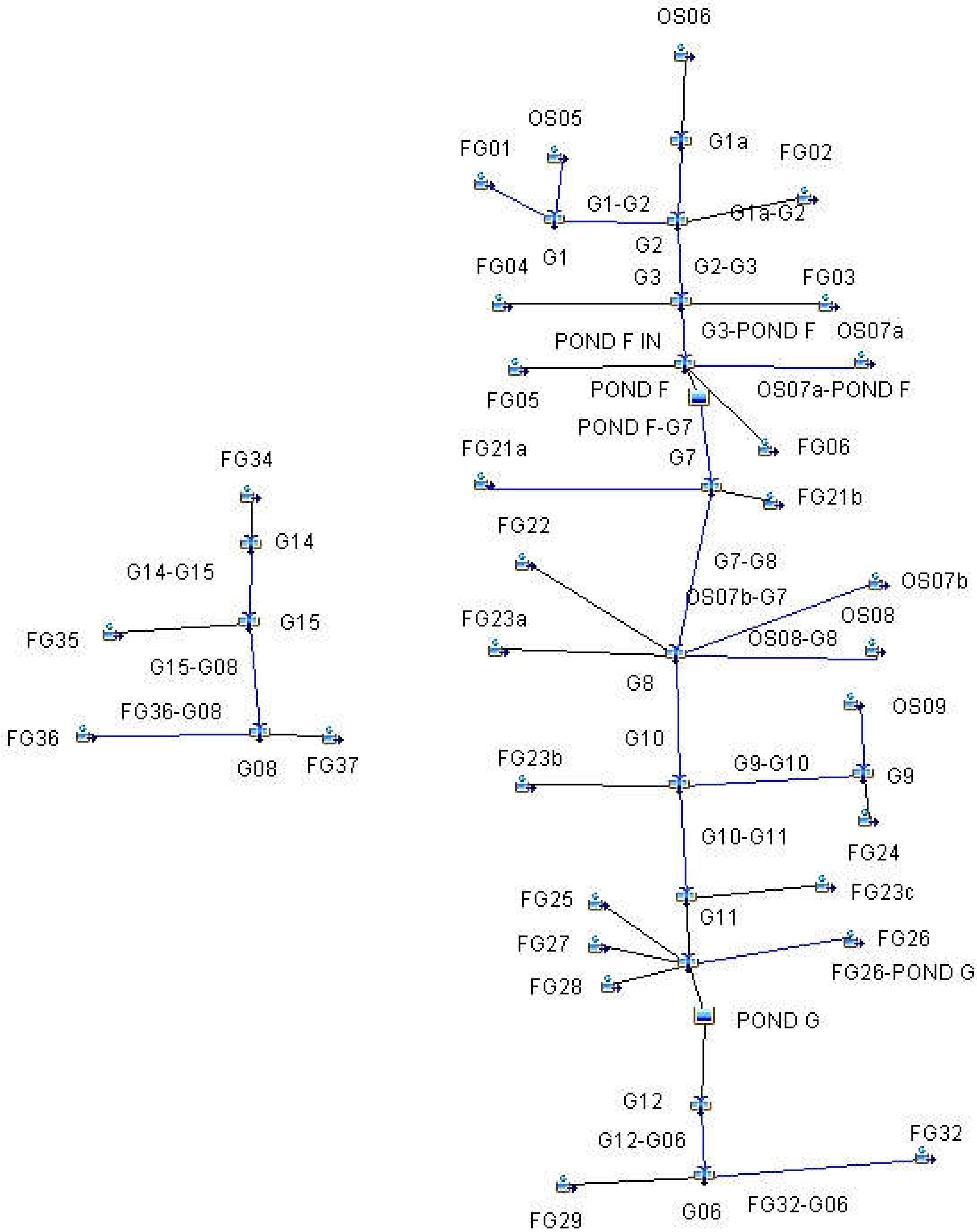
FUTURE SCS (100-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	TIME OF PEAK	TOTAL VOLUME Q100 (AC. FT.)
OS06	0.1313	80	01Jul2015, 12:12	9.3
G1a	0.1313	80	01Jul2015, 12:12	9.3
G1a-G2	0.1313	79	01Jul2015, 12:18	9.2
OS05	0.0578	39	01Jul2015, 12:12	4.1
OS05-G1	0.0578	39	01Jul2015, 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	21.5
G2-G3	0.2820	163	01Jul2015, 12:18	21.3
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	25.0
G3-POND F	0.3195	183	01Jul2015, 12:18	25.0
FG06	0.0675	56	01Jul2015, 12:12	6.1
FG05	0.0580	45	01Jul2015, 12:24	6.1
OS07a	0.0170	14	01Jul2015, 12:06	1.3
OS07a-POND F	0.0170	13	01Jul2015, 12:18	1.3
POND F IN	0.4620	293	01Jul2015, 12:18	38.5
POND F	0.4620	179	01Jul2015, 12:42	36.4
POND F-G7	0.4620	179	01Jul2015, 12:42	36.2
FG21b	0.0170	26	01Jul2015, 12:12	2.6
FG21a	0.0072	6	01Jul2015, 12:06	0.5
FG21a-G7	0.0072	6	01Jul2015, 12:18	0.5
G7	0.4862	188	01Jul2015, 12:42	39.3
G7-G8	0.4862	188	01Jul2015, 12:42	39.3
FG22	0.1380	102	01Jul2015, 12:18	13.0
OS08	0.0406	35	01Jul2015, 12:12	3.6
OS08-G8	0.0406	34	01Jul2015, 12:12	3.6
FG23a	0.0216	21	01Jul2015, 12:12	2.2
OS07b	0.0156	15	01Jul2015, 12:06	1.2
OS07b-G7	0.0156	14	01Jul2015, 12:12	1.2
G8	0.7020	297	01Jul2015, 12:30	59.3
G8-G10	0.7020	294	01Jul2015, 12:30	59.1
OS09	0.1527	90	01Jul2015, 12:24	13.0
OS09-G10	0.1527	88	01Jul2015, 12:36	12.8
FG24	0.1373	105	01Jul2015, 12:18	13.4
G9	0.2900	180	01Jul2015, 12:24	26.2
G9-G10	0.2900	178	01Jul2015, 12:30	26.2
FG23b	0.0286	23	01Jul2015, 12:12	2.4
G10	1.0206	484	01Jul2015, 12:30	87.7
G10-G11	1.0206	480	01Jul2015, 12:30	87.5
FG23c	0.0122	12	01Jul2015, 12:06	1.2

Highlighted green rows reference key design points (Typical all charts this section)

FUTURE SCS (100-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	TIME OF PEAK	TOTAL VOLUME Q100 (AC. FT.)
G11	1.0328	485	01Jul2015, 12:30	88.7
FG25	0.1086	85	01Jul2015, 12:30	13.3
FG26	0.0863	78	01Jul2015, 12:18	9.4
FG26-POND G	0.0863	77	01Jul2015, 12:18	9.4
FG27	0.0500	52	01Jul2015, 12:18	6.3
FG28	0.0245	18	01Jul2015, 12:18	2.3
POND G IN	1.3022	691	01Jul2015, 12:30	119.9
POND G	1.3022	480	01Jul2015, 12:54	110.8
G12	1.3022	480	01Jul2015, 12:54	110.8
G12-G06	1.3022	479	01Jul2015, 13:00	110.1
FG29	0.0997	60	01Jul2015, 12:12	7.1
FG32	0.0402	72	01Jul2015, 12:06	6.1
FG32-G06	0.0402	69	01Jul2015, 12:06	6.1
G06	1.4421	508	01Jul2015, 12:54	123.2
FG34	0.0600	34	01Jul2015, 12:18	4.5
G14	0.0600	34	01Jul2015, 12:18	4.5
G14-G15	0.0600	34	01Jul2015, 12:24	4.4
FG35	0.0344	20	01Jul2015, 12:24	2.7
G15	0.0944	53	01Jul2015, 12:24	7.1
G15-G08	0.0944	52	01Jul2015, 12:24	7.1
FG37	0.0797	41	01Jul2015, 12:18	5.6
FG36	0.0281	14	01Jul2015, 12:18	2.0
FG36-G08	0.0281	14	01Jul2015, 12:24	2.0
G08	0.2022	106	01Jul2015, 12:24	14.7

Highlighted green rows reference key design points (Typical all charts this section)

GIECK FUTURE CONDITIONS



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	15.3
G2-G3	0.2820	109	01Jul2015, 12:24	15.2
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	17.9
G3-POND F	0.3195	121	01Jul2015, 12:18	17.9
FG06	0.0675	40	01Jul2015, 12:12	4.4
FG05	0.0580	33	01Jul2015, 12:24	4.6
OS07a	0.0170	9	01Jul2015, 12:12	1.0
OS07a-POND F	0.0170	9	01Jul2015, 12:18	0.9
POND F IN	0.4620	200	01Jul2015, 12:18	27.9
POND F	0.4620	125	01Jul2015, 12:42	26.2
POND F-G7	0.4620	124	01Jul2015, 12:48	26.0
FG21b	0.0170	20	01Jul2015, 12:12	2.0
FG21a	0.0072	4	01Jul2015, 12:06	0.4
FG21a-G7	0.0072	3	01Jul2015, 12:18	0.4
G7	0.4862	130	01Jul2015, 12:42	28.4
G7-G8	0.4862	130	01Jul2015, 12:48	28.4
FG22	0.1380	73	01Jul2015, 12:18	9.6
OS08	0.0406	25	01Jul2015, 12:12	2.6
OS08-G8	0.0406	24	01Jul2015, 12:12	2.6
FG23a	0.0216	15	01Jul2015, 12:12	1.6
OS07b	0.0156	10	01Jul2015, 12:06	0.9
OS07b-G7	0.0156	10	01Jul2015, 12:12	0.9
G8	0.7020	192	01Jul2015, 12:36	43.1
G8-G10	0.7020	191	01Jul2015, 12:42	42.9
OS09	0.1527	62	01Jul2015, 12:24	9.4
OS09-G10	0.1527	62	01Jul2015, 12:36	9.3
FG24	0.1373	76	01Jul2015, 12:18	9.9
G9	0.2900	125	01Jul2015, 12:30	19.2
G9-G10	0.2900	125.0	01Jul2015, 12:30	19.2
FG23b	0.0286	16	01Jul2015, 12:12	1.8
G10	1.0206	313	01Jul2015, 12:36	63.8
G10-G11	1.0206	311	01Jul2015, 12:36	63.6
FG23c	0.0122	9	01Jul2015, 12:06	0.9

Highlighted green rows reference key design points (Typical all charts this section)

FUTURE SCS (50-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q50 (CFS)	TIME OF PEAK	TOTAL VOLUME Q50 (AC. FT.)
G11	1.0328	314	01Jul2015, 12:36	64.5
FG25	0.1086	64	01Jul2015, 12:30	10.2
FG26	0.0863	58	01Jul2015, 12:18	7.1
FG26-POND G	0.0863	57	01Jul2015, 12:18	7.0
FG27	0.0500	40	01Jul2015, 12:18	4.8
FG28	0.0245	13	01Jul2015, 12:18	1.7
POND G IN	1.3022	459	01Jul2015, 12:30	88.2
POND G	1.3022	338	01Jul2015, 13:00	79.7
G12	1.3022	338	01Jul2015, 13:00	79.7
G12-G06	1.3022	337	01Jul2015, 13:00	79.2
FG29	0.0997	39	01Jul2015, 12:18	5.0
FG32	0.0402	57	01Jul2015, 12:06	4.8
FG32-G06	0.0402	54	01Jul2015, 12:06	4.8
G06	1.4421	357	01Jul2015, 13:00	88.9
FG34	0.0600	23	01Jul2015, 12:18	3.2
G14	0.0600	23	01Jul2015, 12:18	3.2
G14-G15	0.0600	22	01Jul2015, 12:24	3.1
FG35	0.0344	13.4	01Jul2015, 12:24	2.0
G15	0.0944	35.6	01Jul2015, 12:24	5.1
G15-G08	0.0944	35	01Jul2015, 12:30	5.0
FG37	0.0797	27	01Jul2015, 12:24	4.0
FG36	0.0281	9	01Jul2015, 12:24	1.4
FG36-G08	0.0281	9	01Jul2015, 12:30	1.4
G08	0.2022	69	01Jul2015, 12:24	10.4

Highlighted green rows reference key design points (Typical all charts this section)

FUTURE SCS (25-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q25 (CFS)	TIME OF PEAK	TOTAL VOLUME Q25 (AC. FT.)
OS06	0.1313	30	01Jul2015, 12:18	4.3
G1a	0.1313	30	01Jul2015, 12:18	4.3
G1a-G2	0.1313	30	01Jul2015, 12:18	4.2
OS05	0.0578	15	01Jul2015, 12:12	1.9
OS05-G1	0.0578	15	01Jul2015, 12:12	1.9
FG01	0.0538	14	01Jul2015, 12:30	2.5
FG01-G1	0.0538	14	01Jul2015, 12:30	2.5
G1	0.1116	25	01Jul2015, 12:18	4.4
G1-G2	0.1116	25	01Jul2015, 12:24	4.3
FG02	0.0391	14	01Jul2015, 12:12	1.6
G2	0.2820	67	01Jul2015, 12:18	10.2
G2-G3	0.2820	66	01Jul2015, 12:24	10.1
FG03	0.0203	12	01Jul2015, 12:06	1.0
FG04	0.0172	11	01Jul2015, 12:00	0.9
G3	0.3195	74	01Jul2015, 12:24	12.0
G3-POND F	0.3195	74	01Jul2015, 12:24	12.0
FG06	0.0675	26	01Jul2015, 12:12	3.1
FG05	0.0580	23	01Jul2015, 12:24	3.3
OS07a	0.0170	6	01Jul2015, 12:12	0.6
OS07a-POND F	0.0170	6	01Jul2015, 12:24	0.6
POND F IN	0.4620	123	01Jul2015, 12:24	19.0
POND F	0.4620	64	01Jul2015, 12:54	17.6
POND F-G7	0.4620	63	01Jul2015, 13:00	17.5
FG21b	0.0170	16	01Jul2015, 12:12	1.5
FG21a	0.0072	2	01Jul2015, 12:06	0.2
FG21a-G7	0.0072	2	01Jul2015, 12:24	0.2
G7	0.4862	67	01Jul2015, 13:00	19.3
G7-G8	0.4862	67	01Jul2015, 13:00	19.2
FG22	0.1380	47	01Jul2015, 12:18	6.7
OS08	0.0406	16	01Jul2015, 12:12	1.8
OS08-G8	0.0406	15	01Jul2015, 12:18	1.8
FG23a	0.0216	10	01Jul2015, 12:12	1.1
OS07b	0.0156	6	01Jul2015, 12:06	0.6
OS07b-G7	0.0156	6	01Jul2015, 12:12	0.6
G8	0.7020	97	01Jul2015, 12:54	29.5
G8-G10	0.7020	96	01Jul2015, 12:54	29.3
OS09	0.1527	39	01Jul2015, 12:30	6.5
OS09-G10	0.1527	39	01Jul2015, 12:36	6.3
FG24	0.1373	50	01Jul2015, 12:18	7.0
G9	0.2900	81	01Jul2015, 12:30	13.3
G9-G10	0.2900	79.0	01Jul2015, 12:30	13.3
FG23b	0.0286	10	01Jul2015, 12:12	1.2
G10	1.0206	176	01Jul2015, 12:30	43.8
G10-G11	1.0206	174	01Jul2015, 12:30	43.6
FG23c	0.0122	6	01Jul2015, 12:12	0.6

Highlighted green rows reference key design points (Typical all charts this section)

FUTURE SCS (25-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q25 (CFS)	TIME OF PEAK	TOTAL VOLUME Q25 (AC. FT.)
G11	1.0328	177	01Jul2015, 12:30	44.2
FG25	0.1086	45.9	01Jul2015, 12:30	7.5
FG26	0.0863	40	01Jul2015, 12:18	5.1
FG26-POND G	0.0863	39	01Jul2015, 12:18	5.1
FG27	0.0500	29	01Jul2015, 12:18	3.6
FG28	0.0245	8	01Jul2015, 12:18	1.1
POND G IN	1.3022	288	01Jul2015, 12:30	61.5
POND G	1.3022	173	01Jul2015, 13:12	53.5
G12	1.3022	173	01Jul2015, 13:12	53.5
G12-G06	1.3022	173	01Jul2015, 13:18	53.1
FG29	0.0997	23	01Jul2015, 12:18	3.3
FG32	0.0402	44	01Jul2015, 12:06	3.7
FG32-G06	0.0402	41	01Jul2015, 12:06	3.7
G06	1.4421	183	01Jul2015, 13:18	60.0
FG34	0.0600	13	01Jul2015, 12:24	2.1
G14	0.0600	13	01Jul2015, 12:24	2.1
G14-G15	0.0600	13	01Jul2015, 12:30	2.1
FG35	0.0344	8.3	01Jul2015, 12:24	1.3
G15	0.0944	21.3	01Jul2015, 12:30	3.4
G15-G08	0.0944	21	01Jul2015, 12:30	3.3
FG37	0.0797	16	01Jul2015, 12:24	2.6
FG36	0.0281	6	01Jul2015, 12:24	0.9
FG36-G08	0.0281	5	01Jul2015, 12:30	0.9
G08	0.2022	41	01Jul2015, 12:30	6.8

Highlighted green rows reference key design points (Typical all charts this section)

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
G3-POND F	0.3195	31	01Jul2015, 12:30	6.4
FG06	0.0675	12	01Jul2015, 12:18	1.7
FG05	0.0580	12.2	01Jul2015, 12:24	2.0
OS07a	0.0170	2	01Jul2015, 12:12	0.3
OS07a-POND F	0.0170	2	01Jul2015, 12:30	0.3
POND F IN	0.4620	54	01Jul2015, 12:30	10.4
POND F	0.4620	17.0	01Jul2015, 13:48	9.6
POND F-G7	0.4620	17.0	01Jul2015, 13:54	9.5
FG21b	0.0170	10.2	01Jul2015, 12:12	1.0
FG21a	0.0072	1	01Jul2015, 12:06	0.1
FG21a-G7	0.0072	1	01Jul2015, 12:30	0.1
G7	0.4862	18	01Jul2015, 13:36	10.6
G7-G8	0.4862	18.3	01Jul2015, 13:42	10.6
FG22	0.1380	24.0	01Jul2015, 12:24	3.8
OS08	0.0406	7.7	01Jul2015, 12:12	1.0
OS08-G8	0.0406	8	01Jul2015, 12:18	1.0
FG23a	0.0216	5	01Jul2015, 12:12	0.7
OS07b	0.0156	3	01Jul2015, 12:06	0.3
OS07b-G7	0.0156	2	01Jul2015, 12:18	0.3
G8	0.7020	48	01Jul2015, 12:18	16.4
G8-G10	0.7020	47	01Jul2015, 12:24	16.3
OS09	0.1527	18	01Jul2015, 12:30	3.5
OS09-G10	0.1527	18.1	01Jul2015, 12:42	3.5
FG24	0.1373	26	01Jul2015, 12:24	4.0
G9	0.2900	38	01Jul2015, 12:36	7.5
G9-G10	0.2900	36.8	01Jul2015, 12:36	7.5
FG23b	0.0286	5	01Jul2015, 12:12	0.7
G10	1.0206	80	01Jul2015, 12:30	24.4
G10-G11	1.0206	80	01Jul2015, 12:36	24.4
FG23c	0.0122	3	01Jul2015, 12:12	0.3

Highlighted green rows reference key design points (Typical all charts this section)

FUTURE SCS (10-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q10 (CFS)	TIME OF PEAK	TOTAL VOLUME Q10 (AC. FT.)
G11	1.0328	81	01Jul2015, 12:36	24.7
FG25	0.1086	27.1	01Jul2015, 12:36	4.7
FG26	0.0863	22	01Jul2015, 12:18	3.0
FG26-POND G	0.0863	22	01Jul2015, 12:24	3.0
FG27	0.0500	17	01Jul2015, 12:18	2.3
FG28	0.0245	4	01Jul2015, 12:18	0.7
POND G IN	1.3022	146	01Jul2015, 12:30	35.3
POND G	1.3022	57	01Jul2015, 13:54	28.8
G12	1.3022	57	01Jul2015, 13:54	28.8
G12-G06	1.3022	57	01Jul2015, 14:00	28.5
FG29	0.0997	9	01Jul2015, 12:18	1.6
FG32	0.0402	29	01Jul2015, 12:06	2.5
FG32-G06	0.0402	27	01Jul2015, 12:06	2.4
G06	1.4421	61	01Jul2015, 13:54	32.6
FG34	0.0600	5.5	01Jul2015, 12:24	1.1
G14	0.0600	5.5	01Jul2015, 12:24	1.1
G14-G15	0.0600	5.4	01Jul2015, 12:36	1.1
FG35	0.0344	3.5	01Jul2015, 12:30	0.7
G15	0.0944	8.7	01Jul2015, 12:36	1.8
G15-G08	0.0944	9	01Jul2015, 12:36	1.7
FG37	0.0797	6	01Jul2015, 12:24	1.3
FG36	0.0281	2	01Jul2015, 12:30	0.5
FG36-G08	0.0281	2	01Jul2015, 12:36	0.5
G08	0.2022	16	01Jul2015, 12:36	3.5

Highlighted green rows reference key design points (Typical all charts this section)

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	3.6	01Jul2015, 12:36	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	0.8	01Jul2015, 12:12	0.2
FG04	0.0172	3.1	01Jul2015, 12:06	0.3
G3	0.3195	11	01Jul2015, 12:36	3.3
G3-POND F	0.3195	11	01Jul2015, 12:42	3.3
FG06	0.0675	5.8	01Jul2015, 12:18	1.0
FG05	0.0580	6.7	01Jul2015, 12:30	1.2
OS07a	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	22.3	01Jul2015, 12:36	5.7
POND F	0.4620	8.5	01Jul2015, 14:06	5.2
POND F-G7	0.4620	8.5	01Jul2015, 14:12	5.1
FG21b	0.0170	7.0	01Jul2015, 12:12	0.7
FG21a	0.0072	0.3	01Jul2015, 12:12	0.1
FG21a-G7	0.0072	0.3	01Jul2015, 12:42	0.1
G7	0.4862	9	01Jul2015, 14:06	5.9
G7-G8	0.4862	9.2	01Jul2015, 14:12	5.9
FG22	0.1380	12.0	01Jul2015, 12:24	2.3
OS08	0.0406	3.4	01Jul2015, 12:12	0.6
OS08-G8	0.0406	3	01Jul2015, 12:18	0.6
FG23a	0.0216	3	01Jul2015, 12:18	0.4
OS07b	0.0156	1.0	01Jul2015, 12:12	0.2
OS07b-G7	0.0156	0.9	01Jul2015, 12:18	0.2
G8	0.7020	25	01Jul2015, 12:18	9.3
G8-G10	0.7020	24	01Jul2015, 12:24	9.3
OS09	0.1527	8	01Jul2015, 12:36	2.0
OS09-G10	0.1527	8.2	01Jul2015, 12:48	2.0
FG24	0.1373	13	01Jul2015, 12:24	2.5
G9	0.2900	17	01Jul2015, 12:48	4.4
G9-G10	0.2900	16.9	01Jul2015, 12:48	4.4
FG23b	0.0286	2	01Jul2015, 12:18	0.4
G10	1.0206	39	01Jul2015, 12:24	14.0
G10-G11	1.0206	38.9	01Jul2015, 12:30	13.9
FG23c	0.0122	1.5	01Jul2015, 12:12	0.2

Highlighted green rows reference key design points (Typical all charts this section)

FUTURE SCS (5-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q5 (CFS)	TIME OF PEAK	TOTAL VOLUME Q5 (AC. FT.)
G11	1.0328	39.7	01Jul2015, 12:30	14.1
FG25	0.1086	16.7	01Jul2015, 12:36	3.1
FG26	0.0863	12	01Jul2015, 12:24	1.9
FG26-POND G	0.0863	12	01Jul2015, 12:24	1.9
FG27	0.0500	11	01Jul2015, 12:18	1.5
FG28	0.0245	2	01Jul2015, 12:24	0.4
POND G IN	1.3022	79	01Jul2015, 12:30	21.0
POND G	1.3022	22	01Jul2015, 15:18	15.1
G12	1.3022	22	01Jul2015, 15:18	15.1
G12-G06	1.3022	22	01Jul2015, 15:24	14.9
FG29	0.0997	3	01Jul2015, 12:24	0.9
FG32	0.0402	20	01Jul2015, 12:06	1.7
FG32-G06	0.0402	18	01Jul2015, 12:12	1.7
G06	1.4421	24	01Jul2015, 15:18	17.5
FG34	0.0600	2.0	01Jul2015, 12:30	0.6
G14	0.0600	2.0	01Jul2015, 12:30	0.6
G14-G15	0.0600	2.0	01Jul2015, 12:42	0.6
FG35	0.0344	1.5	01Jul2015, 12:30	0.4
G15	0.0944	3.3	01Jul2015, 12:42	0.9
G15-G08	0.0944	3.3	01Jul2015, 12:48	0.9
FG37	0.0797	2.0	01Jul2015, 12:36	0.7
FG36	0.0281	0.7	01Jul2015, 12:36	0.2
FG36-G08	0.0281	0.7	01Jul2015, 12:48	0.2
G08	0.2022	5.8	01Jul2015, 12:48	1.8

Highlighted green rows reference key design points (Typical all charts this section)

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
G3-POND F	0.3195	2.4	01Jul2015, 13:30	1.3
FG06	0.0675	1.3	01Jul2015, 12:24	0.4
FG05	0.0580	2.4	01Jul2015, 12:30	0.6
OS07a	0.0170	0.1	01Jul2015, 12:48	0.1
OS07a-POND F	0.0170	0.1	01Jul2015, 13:30	0.1
POND F IN	0.4620	5.0	01Jul2015, 12:48	2.4
POND F	0.4620	2.4	01Jul2015, 15:48	2.0
POND F-G7	0.4620	2.4	01Jul2015, 16:00	2.0
FG21b	0.0170	4.0	01Jul2015, 12:12	0.4
FG21a	0.0072	0.0	01Jul2015, 13:06	0.0
FG21a-G7	0.0072	0.0	01Jul2015, 14:06	0.0
G7	0.4862	4.0	01Jul2015, 12:12	2.5
G7-G8	0.4862	3.9	01Jul2015, 12:12	2.5
FG22	0.1380	3.3	01Jul2015, 12:30	1.0
OS08	0.0406	0.7	01Jul2015, 12:24	0.2
OS08-G8	0.0406	0.7	01Jul2015, 12:30	0.2
FG23a	0.0216	0.8	01Jul2015, 12:18	0.2
OS07b	0.0156	0.1	01Jul2015, 12:48	0.1
OS07b-G7	0.0156	0.1	01Jul2015, 13:00	0.1
G8	0.7020	7.9	01Jul2015, 12:24	3.9
G8-G10	0.7020	7.9	01Jul2015, 12:30	3.9
OS09	0.1527	1.9	01Jul2015, 12:54	0.8
OS09-G10	0.1527	1.9	01Jul2015, 13:18	0.8
FG24	0.1373	4	01Jul2015, 12:30	1.1
G9	0.2900	4	01Jul2015, 13:12	1.9
G9-G10	0.2900	4.4	01Jul2015, 13:12	1.9
FG23b	0.0286	0	01Jul2015, 12:30	0.2
G10	1.0206	12.1	01Jul2015, 12:30	5.9
G10-G11	1.0206	12.1	01Jul2015, 12:36	5.9
FG23c	0.0122	0.4	01Jul2015, 12:18	0.1

Highlighted green rows reference key design points (Typical all charts this section)

FUTURE SCS (2-YEAR)				
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q2 (CFS)	TIME OF PEAK	TOTAL VOLUME Q2 (AC. FT.)
G11	1.0328	12.3	01Jul2015, 12:36	6.0
FG25	0.1086	7.5	01Jul2015, 12:36	1.7
FG26	0.0863	5	01Jul2015, 12:24	1.0
FG26-POND G	0.0863	4.5	01Jul2015, 12:30	0.9
FG27	0.0500	5.0	01Jul2015, 12:24	0.8
FG28	0.0245	0.5	01Jul2015, 12:30	0.2
POND G IN	1.3022	28.5	01Jul2015, 12:30	9.5
POND G	1.3022	5	02Jul2015, 00:00	5.1
G12	1.3022	5	02Jul2015, 00:00	5.1
G12-G06	1.3022	5	02Jul2015, 00:00	5.0
FG29	0.0997	0.4	01Jul2015, 13:36	0.3
FG32	0.0402	11	01Jul2015, 12:06	1.0
FG32-G06	0.0402	11	01Jul2015, 12:12	1.0
G06	1.4421	11	01Jul2015, 12:12	6.3
FG34	0.0600	0.3	01Jul2015, 13:18	0.2
G14	0.0600	0.3	01Jul2015, 13:18	0.2
G14-G15	0.0600	0.3	01Jul2015, 13:48	0.2
FG35	0.0344	0.3	01Jul2015, 13:06	0.1
G15	0.0944	0.6	01Jul2015, 13:36	0.3
G15-G08	0.0944	0.6	01Jul2015, 13:48	0.3
FG37	0.0797	0.3	01Jul2015, 13:42	0.2
FG36	0.0281	0.1	01Jul2015, 13:42	0.1
FG36-G08	0.0281	0.1	01Jul2015, 14:00	0.1
G08	0.2022	1.0	01Jul2015, 13:48	0.6

Highlighted green rows reference key design points (Typical all charts this section)

Appendix C - Detention Pond Information

STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

Meridian Ranch Proposed Detention Pond F INTERIM-Final

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=	179
5 year storage elev.=	7131.3
5 year storage vol.=	1.9
5 year discharge=	8.4
WQCV storage elev.=	7129.1
WQCV storage vol.=	0.3
1/2 WQCV storage elev.=	7128.6
1/2 WQCV storage vol.=	0.15

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.=	7135.0
50 year discharge=	125
25 year storage elev.=	7134.2
25 year discharge=	63
10 year storage elev.=	7132.8
10 year discharge=	17
2 year storage elev.=	7130.2
2 year discharge=	2.4

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 OUTFLOW	TOTAL FLOW
		sqft	acre	acft	cum acft	BANK		1	2	3	4	**Rectangular**	1	2		
7127.7	0	0	0.00	0.00	0.00			-	-	-	-	-				
7128	0.3	2170	0.05	0.01	0.01	-	-	0.0	-	-	-	-	11		0.0	0.0
7129	1.3	17730	0.41	0.23	0.24	-	-	0.1	-	-	-	-	31		0.1	0.1
7130	2.3	33290	0.76	0.59	0.82	-	-	0.1	-	1.5	-	-	57		1.6	1.6
7131	3.3	39060	0.90	0.83	1.65	-	-	0.1	4.2	2.3	-	-	117		6.6	6.6
7132	4.3	44830	1.03	0.96	2.61	-	-	0.1	10.8	2.8	-	-	117		14	14
7133	5.3	55137.5	1.27	1.15	3.76	-	-	0.2	14.4	3.3	-	-	142		18	18
7134	6.3	65445	1.50	1.38	5.15	-	-	0.2	17.4	3.7	-	36	162		57	57
7135	7.3	79535	1.83	1.66	6.81	-	-	0.2	19.9	4.0	-	102	175		126	126
7136	8.3	93625	2.15	1.99	8.80	-	-	0.2	22.1	4.4	-	150	187		177	177
7137	9.3	111620	2.56	2.36	11.15	-	-	0.2	24.1	4.7	-	173	200		200	200
7138	10.3	129615	2.98	2.77	13.92	-	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 F-FUTURE Final

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=	179
5 year storage elev.=	7131.3
5 year storage vol.=	1.9
5 year discharge=	8.5
WQCV storage elev.=	7129.1
WQCV storage vol.=	0.3
1/2 WQCV storage elev.=	7128.6
1/2 WQCV storage vol.=	0.15

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.=	7135.0
50 year discharge=	125
25 year storage elev.=	7134.2
25 year discharge=	64
10 year storage elev.=	7132.8
10 year discharge=	17
2 year storage elev.=	7130.2
2 year discharge=	2.4

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 sqft	AREA acre	VOLUME acft	VOLUME cum acft	TOP OF BANK	SPILLWAY	ORIFICE (max outflow) 1	ORIFICE 2	ORIFICE 3	4	GRATE (max outflow) **Rectangular**	PIPE 1	PIPE 2	REALIZED CULVERT OUTFLOW	TOTAL FLOW
7127.7	0	0	0.00	0.00	0.00			-	-	-	-	-				
7128	0.3	2170	0.05	0.01	0.01	-	-	0.0	-	-	-	-	11		0.0	0.0
7129	1.3	17730	0.41	0.23	0.24	-	-	0.1	-	-	-	-	31		0.1	0.1
7130	2.3	33290	0.76	0.59	0.82	-	-	0.1	-	1.5	-	-	57		1.6	1.6
7131	3.3	39060	0.90	0.83	1.65	-	-	0.1	4.2	2.3	-	-	117		6.6	6.6
7132	4.3	44830	1.03	0.96	2.61	-	-	0.1	10.8	2.8	-	-	117		14	14
7133	5.3	55137.5	1.27	1.15	3.76	-	-	0.2	14.4	3.3	-	-	142		18	18
7134	6.3	65445	1.50	1.38	5.15	-	-	0.2	17.4	3.7	-	36	162		57	57
7135	7.3	79535	1.83	1.66	6.81	-	-	0.2	19.9	4.0	-	102	175		126	126
7136	8.3	93625	2.15	1.99	8.80	-	-	0.2	22.1	4.4	-	150	187		177	177
7137	9.3	111620	2.56	2.36	11.15	-	-	0.2	24.1	4.7	-	173	200		200	200
7138	10.3	129615	2.98	2.77	13.92	-	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.=	7030.3
100 year storage vol.=	25.5
100 year discharge=	480
5 year storage elev.=	7027.4
5 year storage vol.=	8.3
5 year discharge=	22
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)			
Rectangular	Orifice 1:	V	0.0263	1.90		Area =	0.050	Elev to cl =		7024.25
Rectangular	Orifice 2:	V	8.5	1.1		Area =	9.350	Elev to cl =		7027.55
Circular	Orifice 3:	H			12	Area =	0.785	Elev to cl =		7025.20
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 elev.=	7029.5
50 year discharge=	338
25 year storage elev.=	7028.7
25 year discharge=	173
10 year storage elev.=	7027.9
10 year discharge=	57
2 year storage elev.=	7026.8
2 year discharge=	5.2

STAGE		STORAGE				DISCHARGE											
ELEV	HEIGHT	AREA		VOLUME		TOP OF BANK	SPILLWAY	ORIFICE (max outflow)					GRATE (max outflow)	PIPE		REALIZED CULVERT OUTFLOW	TOTAL FLOW
		sqft	acre	acft	cum acft			1	2	3	4	5	**Rectangular**	1	2		
7023.3	0	0	0.00	0.0	0.00			-	-	-	-	-	-	12		-	-
7024	0.7	2232	0.05	0.0	0.02	-	-	0.0	-	-	-	-	-	51		0.0	0.05
7025	1.7	39917	0.92	0.5	0.50	-	-	0.2	-	-	-	-	-	111		0.2	0.17
7026	2.7	126469	2.90	1.9	2.41	-	-	0.3	-	3.4	-	-	-	184		3.7	3.7
7026.5	3.2	166675	3.83	3.6	4.06	-	-	0.4	-	4.3	-	-	-	224		4.7	4.7
7027	3.7	206880	4.75	2.1	6.20	-	-	0.4	-	5.1	-	-	-	268		5.5	5.5
7027.5	4.2	232032	5.33	4.6	8.64	-	-	0.4	9.0	5.7	-	9.0	-	304		24	24
7028	4.7	257183	5.90	5.3	11.5	-	-	0.5	25.5	6.3	4.2	25.5	-	337		62	62
7028.5	5.2	264196	6.07	5.7	14.3	-	-	0.5	43.9	6.9	9.7	43.9	27	373		132	132
7029	5.7	271209	6.23	6.1	17.6	-	-	0.5	54.2	7.4	12.7	54.2	92	406		221	221
7029.5	6.2	276106	6.34	11.7	20.3	-	-	0.6	70.5	7.8	17.1	70.5	179	436		345	345
7030	6.7	281003	6.45	9.4	23.7	-	-	0.6	77.3	8.3	19.0	77.3	283	464		464	464
7030.5	7.2	286003	6.57	6.5	26.8	-	-	0.6	77.3	8.7	19.0	77.3	402	491		491	491
7031	7.7	291002	6.68	6.6	30.3	-	-	0.6	83.6	9.1	20.7	83.6	533	516		516	516
7031.5	8.2	296443	6.81	6.7	33.4	-	-	0.6	89.5	9.5	22.2	89.5	677	540		540	540
7032	8.7	301883	6.93	3.4	36.9	137.9	137.9	0.7	95.0	9.9	23.7	95.0	832	563		563	701
7032.5	9.2	309236	7.10	7.0	40.4	390.0	390.0	0.7	100.2	10.2	25.1	100.2	997	586		586	976
7033	9.7	316589	7.27	3.6	44.0	716.5	716.5	0.7	105.1	10.6	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.

ROLLING HILLS RANCH ESTATES INTERIM CONDITION

Simulation Run: RH ESTATES FILING 1-100 YR Reservoir: POND F

Start of Run:	01Jul2015, 00:00	Basin Model:	WW Grading
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 100YR
Compute Time:		Control Specifications:	24 HR-2 MIN.
		Volume Units:	AC-FT

Computed Results:

Peak Inflow:	293(CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:18
Peak Outflow:	179 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 12:42
Total Inflow:	38.5 (AC-FT)	Peak Storage:	8.9 (AC-FT)
Total Outflow:	36.4 (AC-FT)	Peak Elevation:	7136.0 (FT)

Simulation Run: RH ESTATES FILING 1-005 YR Reservoir: POND F

Start of Run:	01Jul2015, 00:00	Basin Model:	WW Grading
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 005YR
Compute Time:		Control Specifications:	24 HR-2 MIN.
		Volume Units:	AC-FT

Computed Results:

Peak Inflow:	22 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:36
Peak Outflow:	8.4 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 14:24
Total Inflow:	5.7 (AC-FT)	Peak Storage:	1.9 (AC-FT)
Total Outflow:	5.1 (AC-FT)	Peak Elevation:	7131.3 (FT)

Simulation Run: F-100 YR 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:		Control Specifications:	24 HR-2 MIN.
		Volume Units:	AC-FT

Computed Results:

Peak Inflow:	293 CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:18
Peak Outflow:	179 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 12:42
Total Inflow:	38.5 (AC-FT)	Peak Storage:	8.9 (AC-FT)
Total Outflow:	36.4 (AC-FT)	Peak Elevation:	7136.0 (FT)

Simulation Run: F-005 YR Reservoir: POND F

Start of Run:	01Jul2015, 00:00	Basin Model:	Future SCS
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 005YR
Compute Time:		Control Specifications:	24 HR-2 MIN.
		Volume Units:	AC-FT

Computed Results:

Peak Inflow:	22 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:36
Peak Outflow:	8.5 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 14:18
Total Inflow:	5.7 (AC-FT)	Peak Storage:	1.9 (AC-FT)
Total Outflow:	5.2 (AC-FT)	Peak Elevation:	7131.3 (FT)

Simulation Run: F-100 YR 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:		Control Specifications:	24 HR-2 MIN.
		Volume Units:	AC-FT

Computed Results:

Peak Inflow:	691 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:06
Peak Outflow:	480 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 12:32
Total Inflow:	119.9 (AC-FT)	Peak Storage:	25.5 (AC-FT)
Total Outflow:	110.8 (AC-FT)	Peak Elevation:	7030.3 (FT)

Simulation Run: F-005 YR Reservoir: POND G

Start of Run:	01Jul2015, 00:00	Basin Model:	Future SCS
End of Run:	02Jul2015, 00:00	Meteorologic Model:	SCS TYPE IIA 005YR
Compute Time:		Control Specifications:	24 HR-2 MIN.
		Volume Units:	AC-FT

Computed Results:

Peak Inflow:	79 (CFS)	Date/Time of Peak Inflow:	01Jul2015, 12:30
Peak Outflow:	22 (CFS)	Date/Time of Peak Outflow:	01Jul2015, 15:24
Total Inflow:	21.0 (AC-FT)	Peak Storage:	8.3 (AC-FT)
Total Outflow:	15.1 (AC-FT)	Peak Elevation:	7027.4 (FT)

Appendix D – Drainage Swale Analysis

Worksheet for Trap Swale from DP1a

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030
Channel Slope	0.027 ft/ft
Left Side Slope	9.000 H:V
Right Side Slope	9.000 H:V
Bottom Width	6.00 ft
Discharge	4.40 cfs

Results

Normal Depth	2.6 in
Flow Area	1.7 ft²
Wetted Perimeter	10.0 ft
Hydraulic Radius	2.1 in
Top Width	9.93 ft
Critical Depth	2.7 in
Critical Slope	0.023 ft/ft
Velocity	2.53 ft/s
Velocity Head	0.10 ft
Specific Energy	0.32 ft
Froude Number	1.065
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.6 in
Critical Depth	2.7 in
Channel Slope	0.027 ft/ft
Critical Slope	0.023 ft/ft

Worksheet for Trap Swale from DP1b

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030
Channel Slope	0.027 ft/ft
Left Side Slope	9.000 H:V
Right Side Slope	14.000 H:V
Bottom Width	8.00 ft
Discharge	17.00 cfs

Results

Normal Depth	4.7 in
Flow Area	4.8 ft²
Wetted Perimeter	17.0 ft
Hydraulic Radius	3.4 in
Top Width	16.94 ft
Critical Depth	5.1 in
Critical Slope	0.020 ft/ft
Velocity	3.51 ft/s
Velocity Head	0.19 ft
Specific Energy	0.58 ft
Froude Number	1.156
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.7 in
Critical Depth	5.1 in
Channel Slope	0.027 ft/ft
Critical Slope	0.020 ft/ft

Worksheet for Trap Swale at rear lotline -North End

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030
Channel Slope	0.027 ft/ft
Left Side Slope	6.000 H:V
Right Side Slope	6.000 H:V
Bottom Width	1.00 ft
Discharge	29.00 cfs

Results

Normal Depth	10.9 in
Flow Area	5.8 ft²
Wetted Perimeter	12.0 ft
Hydraulic Radius	5.8 in
Top Width	11.85 ft
Critical Depth	12.0 in
Critical Slope	0.016 ft/ft
Velocity	4.99 ft/s
Velocity Head	0.39 ft
Specific Energy	1.29 ft
Froude Number	1.256
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	10.9 in
Critical Depth	12.0 in
Channel Slope	0.027 ft/ft
Critical Slope	0.016 ft/ft

Worksheet for Trap Swale at rear lotline -South End

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030
Channel Slope	0.027 ft/ft
Left Side Slope	6.000 H:V
Right Side Slope	6.000 H:V
Bottom Width	1.00 ft
Discharge	32.00 cfs

Results

Normal Depth	11.3 in
Flow Area	6.3 ft²
Wetted Perimeter	12.5 ft
Hydraulic Radius	6.0 in
Top Width	12.30 ft
Critical Depth	12.5 in
Critical Slope	0.016 ft/ft
Velocity	5.11 ft/s
Velocity Head	0.41 ft
Specific Energy	1.35 ft
Froude Number	1.263
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	11.3 in
Critical Depth	12.5 in
Channel Slope	0.027 ft/ft
Critical Slope	0.016 ft/ft

Appendix E – Soil 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

Estates at Rolling Hills Ranch Filing 1

July 19, 2019

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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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' 35" W
104° 35' 13" W
535250
535330
535410
535490
535570
535650
535730
38° 59' 56" N
38° 59' 33" N
4316730
4316650
4316570
4316490
4316410
4316330
4316250
4316170
4316090
83
Soil Map may not be valid at this scale.
Map Scale: 1:3,450 if printed on A portrait (8.5" x 11") sheet.
Meters
0 50 100 200 300
Feet
0 150 300 600 900
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 16, Sep 10, 2018

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

Date(s) aerial images were photographed: Sep 8, 2018—May 26, 2019

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
83	Stapleton sandy loam, 3 to 8 percent slopes	24.4	100.0%
Totals for Area of Interest		**24.4**	**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

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: 80 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
Natural 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 storage in profile: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Gravelly Foothill (R049BY214CO)
Hydric soil rating: No

Minor Components

Pleasant

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

Fluvaquentic haplaquolls

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

Other soils

Percent of map unit:
Hydric soil rating: No

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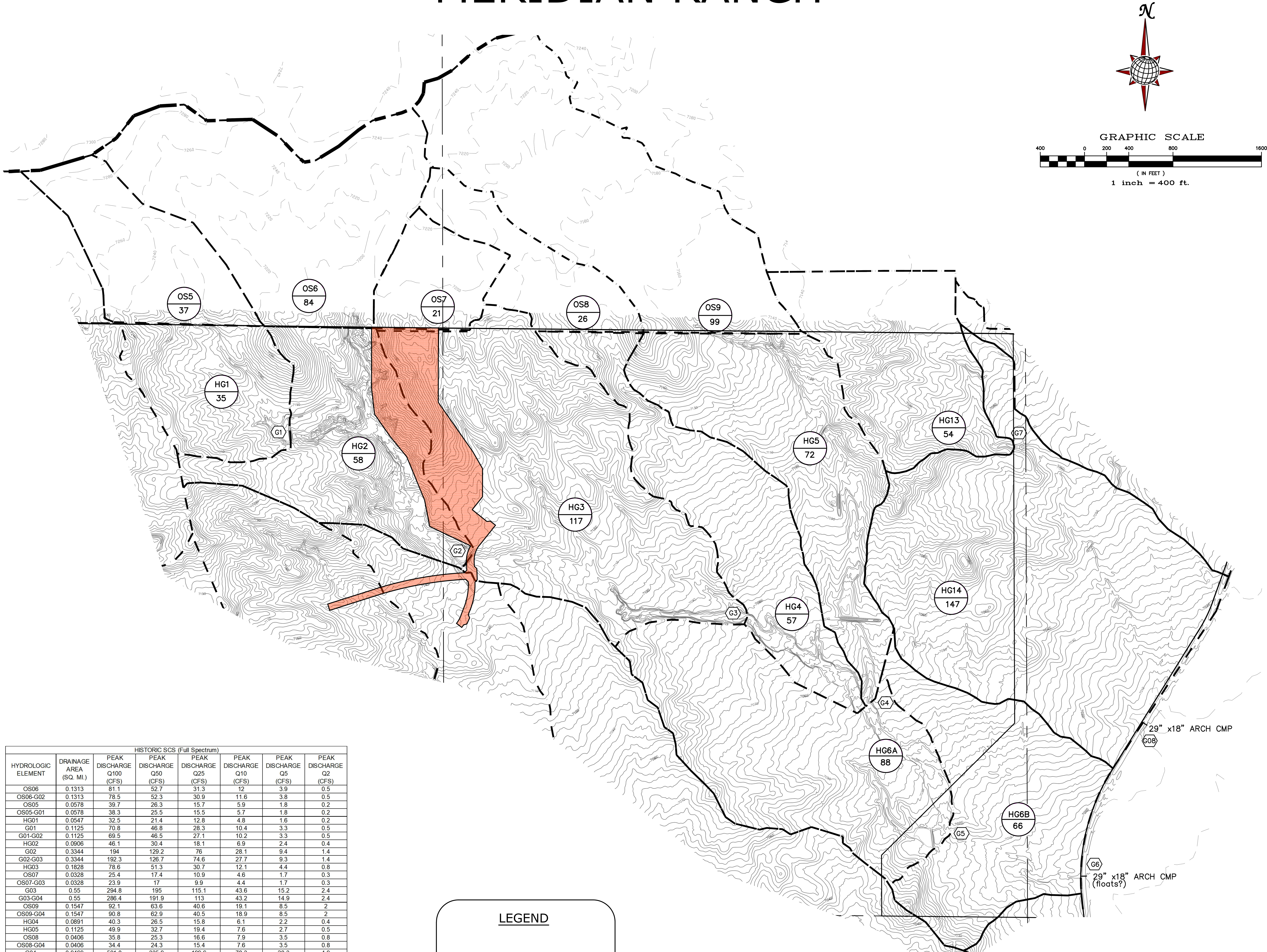
Appendix F – Drainage Maps

ESTATES AT ROLLING HILLS RANCH
FILING 1
MERIDIAN RANCH



HISTORIC SCS (Full Spectrum)							
HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q25 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS06	0.1313	81.1	52.7	31.3	12	3.9	0.5
OS06-G02	0.1313	78.5	52.3	30.9	11.6	3.8	0.5
OS05	0.0578	39.7	26.3	15.7	5.9	1.8	0.2
OS05-G01	0.0578	38.3	25.5	15.5	5.7	1.8	0.2
HG01	0.0547	32.5	21.4	12.8	4.8	1.6	0.2
G01	0.1125	70.8	46.8	28.3	10.4	3.3	0.5
G01-G02	0.1125	69.5	46.5	27.1	10.2	3.3	0.5
HG02	0.0906	46.1	30.4	18.1	6.9	2.4	0.4
G02	0.3344	194	129.2	76	28.1	9.4	1.4
G02-G03	0.3344	192.3	126.7	74.6	27.7	9.3	1.4
HG03	0.1828	78.6	51.3	30.7	12.1	4.4	0.8
OS07	0.0328	25.4	17.4	10.9	4.6	1.7	0.3
OS07-G03	0.0328	23.9	17	9.9	4.4	1.7	0.3
G03	0.55	294.8	195	115.1	43.6	15.2	2.4
G03-G04	0.55	286.4	191.9	113	43.2	14.9	2.4
OS09	0.1547	92.1	63.6	40.6	19.1	8.5	2
OS09-G04	0.1547	90.8	62.9	40.5	18.9	8.5	2
HG04	0.0891	40.3	26.5	15.8	6.1	2.2	0.4
HG05	0.1125	49.9	32.7	19.4	7.6	2.7	0.5
OS08	0.0406	35.8	25.3	16.6	7.9	3.5	0.8
OS08-G04	0.0406	34.4	24.3	15.4	7.6	3.5	0.8
G04	0.9469	501.8	335.9	199.6	78.3	28.3	4.9
G04-G05	0.9469	495.5	321.9	192.7	78.3	28	4.9
HG06A	0.1375	49.8	32.6	19.5	7.8	2.9	0.5
G05	1.0844	544.3	354.5	212	86.1	30.8	5.4
G05-G06	1.0844	529.5	353.4	211.3	85.6	30.5	5.4
HG06B	0.1031	34	22.3	13.4	5.4	2.1	0.4
G06	1.1875	560.5	374.8	224.5	91	32.5	5.8
HG14	0.2297	80.5	52.9	31.7	12.8	4.8	0.9
HG13	0.0844	54.9	37.3	23.2	9.8	3.9	0.7
G07	0.0844	54.9	37.3	23.2	9.8	3.9	0.7
G07-G08	0.0844	53.7	36.8	23.1	9.7	3.8	0.7
G08	0.3141	118.5	78.3	47.6	19.7	7.6	1.5

LEGEND

MAJOR BASIN BOUNDARY
MINOR BASIN BOUNARY
SCS MODEL ID / SIZE ACRES — EB15 / 65 — BASIN IDENTIFICATION
H0 B10 DESIGN POINTS
MAJOR CONTOUR INTERVAL
MINOR CONTOUR INTERVAL
100 YEAR FLOOD PLAIN

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

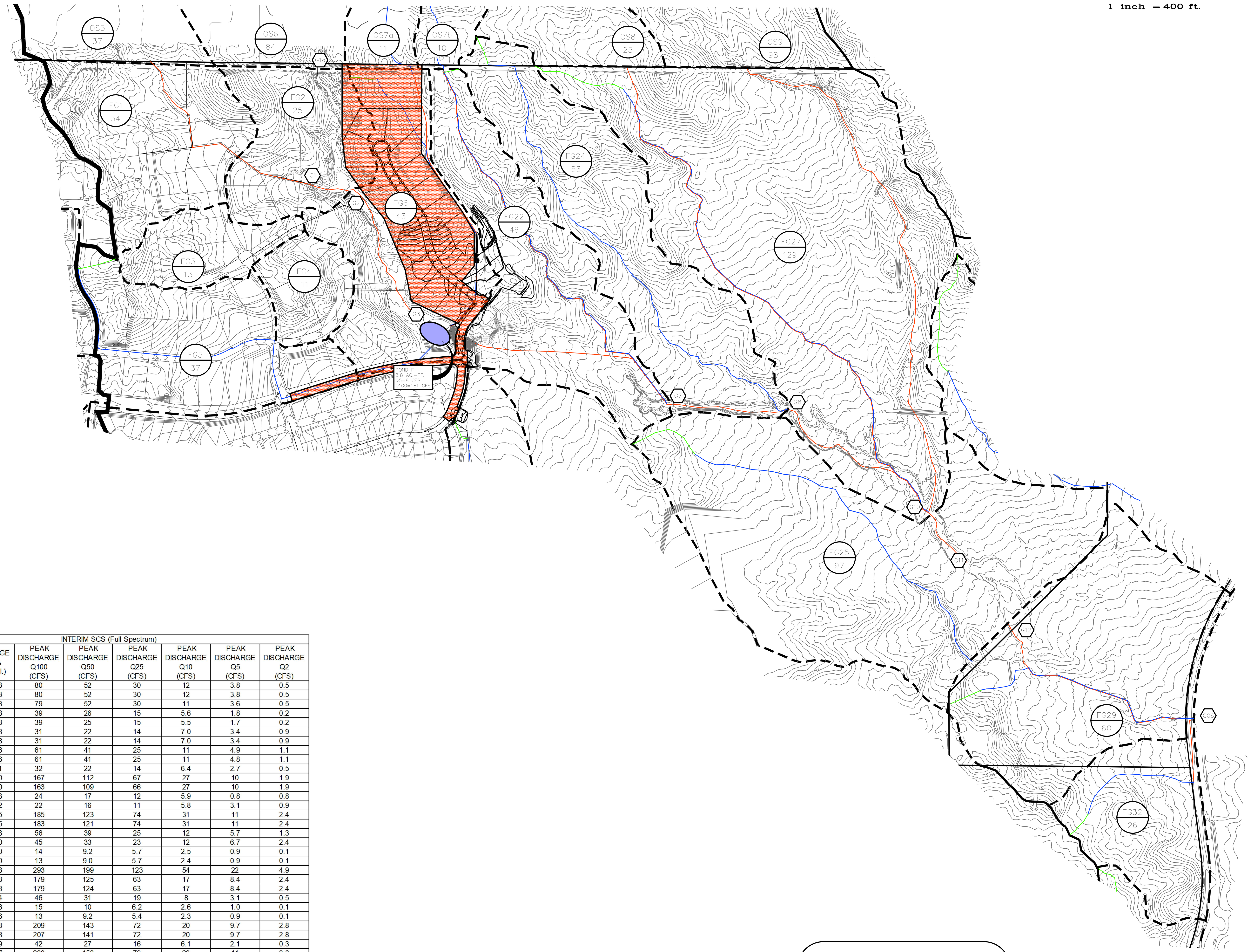
HISTORIC CONDITIONS - SCS MAP

DEC 2019

FIGURE 4

ESTATES AT ROLLING HILLS RANCH
FILING 1
MERIDIAN RANCH

GRAPHIC SCALE
400 0 200 400 800 1600
(IN FEET)
1 inch = 400 ft.



INTERIM SCS (Full Spectrum)							
	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q25 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS06	0.1313	80	52	30	12	3.8	0.5
G1a	0.1313	80	52	30	12	3.8	0.5
G1a-G2	0.1313	79	52	30	11	3.6	0.5
OS05	0.0578	39	26	15	5.6	1.8	0.2
OS05-G1	0.0578	39	25	15	5.5	1.7	0.2
FG01	0.0538	31	22	14	7.0	3.4	0.9
FG01-G1	0.0538	31	22	14	7.0	3.4	0.9
G1	0.1116	61	41	25	11	4.9	1.1
G1-G2	0.1116	61	41	25	11	4.8	1.1
FG02	0.0391	32	22	14	6.4	2.7	0.5
G2	0.2820	167	112	67	27	10	1.9
G2-G3	0.2820	163	109	66	27	10	1.9
FG03	0.0203	24	17	12	5.9	0.8	0.8
FG04	0.0172	22	16	11	5.8	3.1	0.9
G3	0.3195	185	123	74	31	11	2.4
G3-POND F	0.3195	183	121	74	31	11	2.4
FG06	0.0673	56	39	25	12	5.7	1.3
FG05	0.0580	45	33	23	12	6.7	2.4
OS07a	0.0170	14	9.2	5.7	2.5	0.9	0.1
OS07a-POND F	0.0170	13	9.0	5.7	2.4	0.9	0.1
POND F IN	0.4618	293	199	123	54	22	4.9
POND F	0.4618	179	125	63	17	8.4	2.4
POND F-G7	0.4618	179	124	63	17	8.4	2.4
FG22	0.0714	46	31	19	8	3.1	0.5
OS07b	0.0156	15	10	6.2	2.6	1.0	0.1
OS07b-G7	0.0156	13	9.2	5.4	2.3	0.9	0.1
G7	0.5488	209	143	72	20	9.7	2.8
G7-G8	0.5488	207	141	72	20	9.7	2.8
FG24	0.0819	42	27	16	6.1	2.1	0.3
G8	0.6307	238	158	79	23	11	3.0
G8-G10	0.6307	236	157	79	23	11	3.0
FG27	0.2011	69	45	27	11	4.1	0.7
OS09	0.1527	90	62	39	18	8.2	1.9
OS09-G10	0.1527	89	62	39	18	8.2	1.9
OS08	0.0394	34	24	16	7.5	3.3	0.7
OS08-G8	0.0394	34	23	15	7.1	3.3	0.7
G10	1.0239	414	272	142	54	21	5.0
G10-G11	1.0239	411	269	141	54	21	5.0
FG25	0.1523	63	41	24	10	3.4	0.6
G12	1.1762	473	308	160	62	24	5.5
G12-G06	1.1762	470	307	160	62	24	5.5
FG29	0.0934	56	36	21	8.1	2.6	0.4
FG32	0.0402	27	18	11	4.0	1.3	0.2
FG32-G06	0.0402	27	18	10	3.9	1.2	0.2
G06	1.3098	504	327	171	68	27	6.0

LEGEND

- MAJOR BASIN BOUNDARY
- MINOR BASIN BOUNDARY
- SCS MODEL ID / SIZE ACRES — BASIN IDENTIFICATION
- DESIGN POINT
- MAJOR CONTOUR INTERVAL
- MINOR CONTOUR INTERVAL
- INITIAL OVERLAND TIME (Ti)
- TRAVEL TIME (Tt)
- OVERLAND TIME (To)

TECH CONTRACTORS
11886 STAPLETON DR.
FALCON, CO 80831
TELEPHONE: 719.495.7444

INTERIM CONDITIONS - SCS MAP

AUG 2019

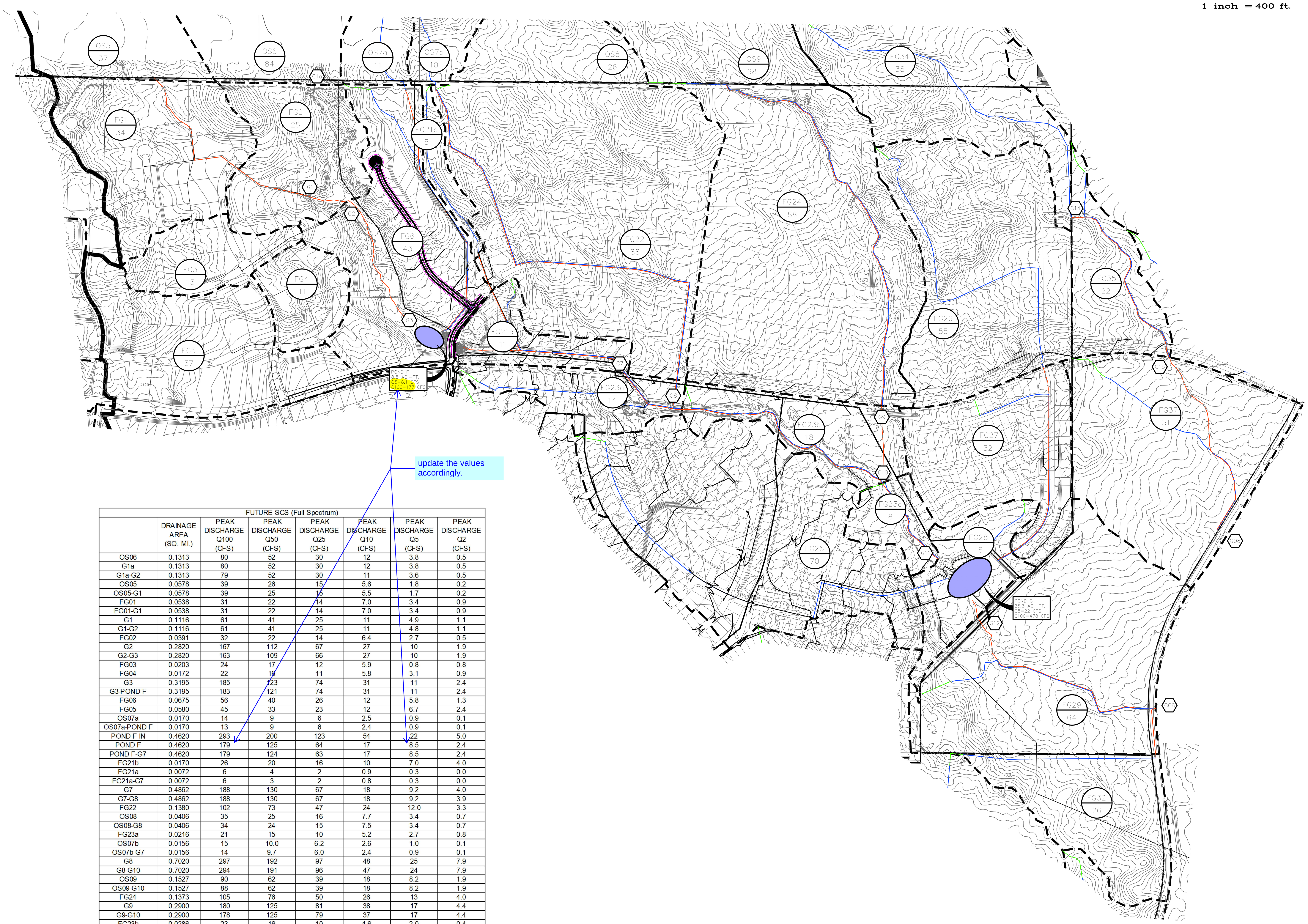
FIGURE 5

ESTATES AT ROLLING HILLS RANCH
FILING 1
MERIDIAN RANCH

GRAPHIC SCALE

400 0 200 400 800 1600

(IN FEET)
1 inch = 400 ft.



FUTURE SCS (Full Spectrum)							
	DRAINAGE AREA (SQ. MI.)	PEAK DISCHARGE Q100 (CFS)	PEAK DISCHARGE Q50 (CFS)	PEAK DISCHARGE Q25 (CFS)	PEAK DISCHARGE Q10 (CFS)	PEAK DISCHARGE Q5 (CFS)	PEAK DISCHARGE Q2 (CFS)
OS06	0.1313	80	52	30	12	3.8	0.5
G1a	0.1313	80	52	30	12	3.8	0.5
G1a-G2	0.1313	79	52	30	11	3.6	0.5
OS05	0.0578	39	26	15	5.6	1.8	0.2
OS05-G1	0.0578	39	25	15	5.5	1.7	0.2
FG01	0.0538	31	22	14	7.0	3.4	0.9
FG01-G1	0.0538	31	22	14	7.0	3.4	0.9
G1	0.1116	61	41	25	11	4.9	1.1
G1-G2	0.1116	61	41	25	11	4.8	1.1
FG02	0.0391	32	22	14	6.4	2.7	0.5
G2	0.2820	167	112	67	27	10	1.9
G2-G3	0.2820	163	109	66	27	10	1.9
FG03	0.0203	24	17	12	5.9	0.8	0.8
FG04	0.0172	22	16	11	5.8	3.1	0.9
G3	0.3195	185	123	74	31	11	2.4
G3-POND F	0.3195	183	121	74	31	11	2.4
FG06	0.0675	56	40	26	12	5.8	1.3
FG05	0.0580	45	33	23	12	6.7	2.4
OS07a	0.0170	14	9	6	2.5	0.9	0.1
OS07a-POND F	0.0170	13	9	6	2.4	0.9	0.1
POND F IN	0.4620	293	200	123	54	22	5.0
POND F	0.4620	179	125	64	17	8.5	2.4
POND F-G7	0.4620	179	124	63	17	8.5	2.4
FG21b	0.0170	26	20	16	10	7.0	4.0
FG21a	0.0072	6	4	2	0.9	0.3	0.0
FG21a-G7	0.0072	6	3	2	0.8	0.3	0.0
G7	0.4862	188	130	67	18	9.2	4.0
G7-G8	0.4862	188	130	67	18	9.2	3.9
FG22	0.1380	102	73	47	24	12.0	3.3
OS08	0.0406	35	25	16	7.7	3.4	0.7
OS08-G8	0.0406	34	24	15	7.5	3.4	0.7
FG23a	0.0216	21	15	10	5.2	2.7	0.8
OS07b	0.0156	15	10.0	6.2	2.6	1.0	0.1
OS07b-G7	0.0156	14	9.7	6.0	2.4	0.9	0.1
G8	0.7020	297	192	97	48	25	7.9
G8-G10	0.7020	294	191	96	47	24	7.9
OS09	0.1527	90	62	39	18	8.2	1.9
OS09-G10	0.1527	88	62	39	18	8.2	1.9
FG24	0.1373	105	76	50	26	13	4.0
G9	0.2900	180	125	81	38	17	4.4
G9-G10	0.2900	178	125	79	37	17	4.4
FG23b	0.0286	23	16	10	4.6	2.0	0.4
G10	1.0206	484	313	176	80	39	12
G10-G11	1.0206	480	311	174	80	39	12
FG23c	0.0122	12	8.7	5.7	3.0	1.5	0.4
G11	1.0328	485	314	177	81	40	12
FG25	0.1086	85	64	46	27	17	7.5
FG26	0.0863	78	58	40	22	12	4.6
FG26-POND G	0.0863	77	57	39	22	12	4.5
FG27	0.0500	52	40	29	17	11	5.0
FG28	0.0245	18	13	8.5	4.1	2.0	0.5
POND G IN	1.3022	691	459	288	146	79	28
POND G	1.3022	480	338	173	57	22	5.2
G12	1.3022	480	338	173	57	22	5.2
G12-G06	1.3022	479	337	173	57	22	5.2
FG29	0.0997	60	39	23	8.7	2.8	0.4
FG32	0.0402	72	57	44	29	20	11
FG32-G06	0.0402	69	54	41	27	18	11
G06	1.4421	508	357	183	61	24	11
FG34	0.0600	34	23	13	5.5	2.0	0.3
G14	0.0600	34	23	13	5.5	2.0	0.3
G14-G15	0.0600	34	22	13	5.4	2.0	0.3
FG35	0.0344	20	13	8.3	3.5	1.5	0.3
G15	0.0944	53	36	21	8.7	3.3	0.6
G15-G08	0.0944	52	35	21	8.7	3.3	0.6
FG37	0.0797	41	27	16	6.0	2.0	0.3
G08	0.2022	106	69	41	16	5.8	1.0

LEGEND

- MAJOR BASIN BOUNDARY
- MINOR BASIN BOUNDARY
- SCS MODEL ID / SIZE ACRES — BASIN IDENTIFICATION
- DESIGN POINT
- MAJOR CONTOUR INTERVAL
- MINOR CONTOUR INTERVAL
- INITIAL OVERLAND TIME (Ti)
- TRAVEL TIME (Tt)
- OVERLAND TIME (To)

FUTURE CONDITIONS - SCS MAP

TECH CONTRACTORS
11886 STAPLETON DR.
FALCON, CO 80831
TELEPHONE: 719.495.7444

AUG 2019

FIGURE 5

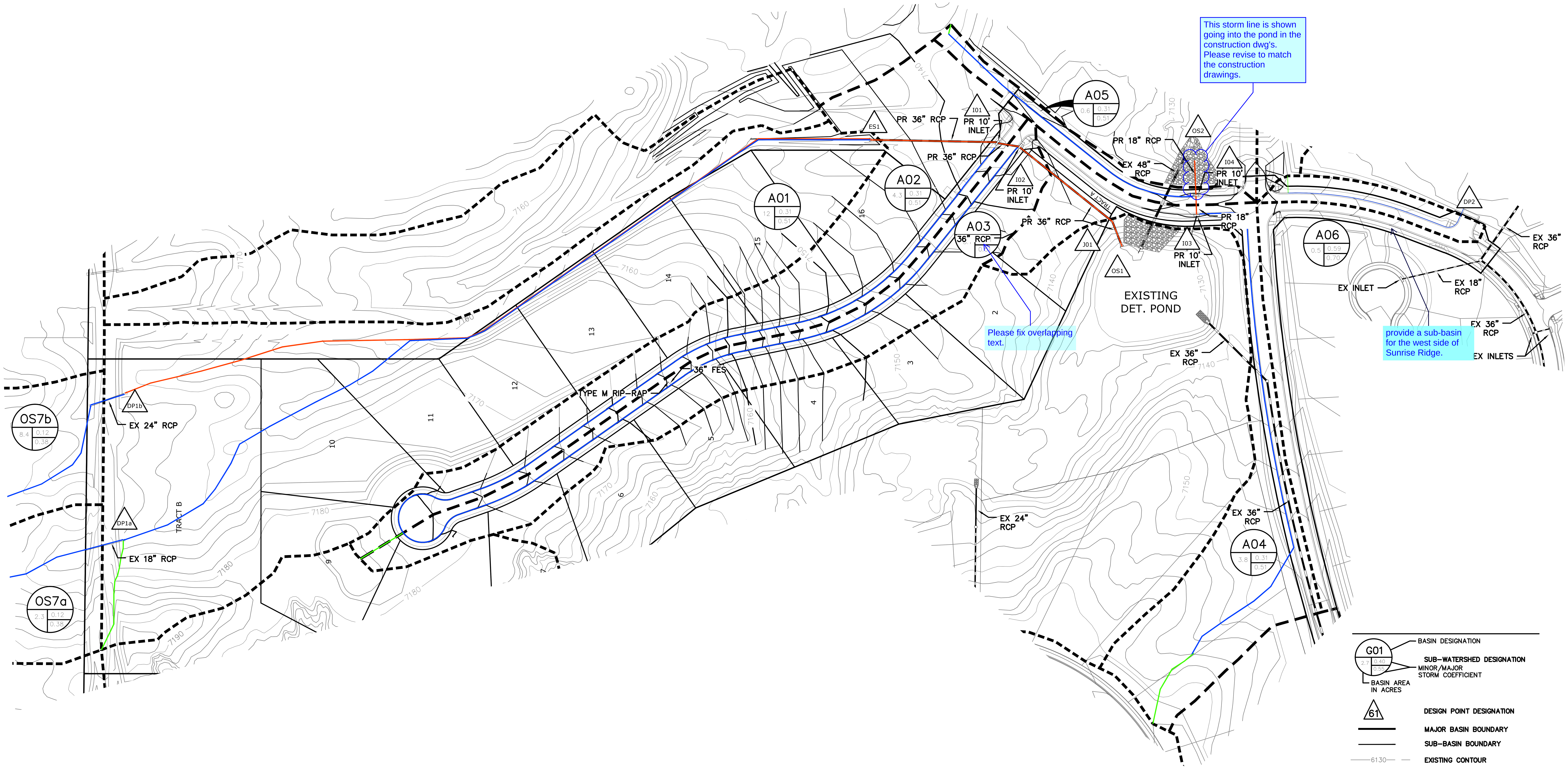
DP	BASIN	AREA (AC)	Q(5) (CFS)	Q(100) (CFS)	INLET	Q(5) (CFS)	Q(100) (CFS)	PIPE
DP1a	OS7a	2.33	0.8	4.4	EX 18 " CULVERT			
DP1b	OS7b	8.44	3.2	16.9	EX 24 " CULVERT			
ES1	A01	12.00	5.3	32	PR 36 " END SECTION	5.3	32	36 " RCP
I01	A02	4.30	5.1	14	PR 10 ' SUMP	9	40	36 " RCP
J01						11	47	36 " RCP
I02	A03	3.08	4.2	10.6	PR 10 ' SUMP	11	47	36 " RCP
I03	A04	3.79	4.4	12	PR 10 ' SUMP	4.4	12	18 " RCP
I04	A06	0.47	1.3	2.6	PR 10 ' SUMP	5.4	14	18 " RCP

This should be basin A05. Revise accordingly.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.



BASIN DESIGNATION
SUB-WATERSHED DESIGNATION
MINOR/MAJOR STORM COEFFICIENT
BASIN AREA IN ACRES

DESIGN POINT DESIGNATION
MAJOR BASIN BOUNDARY
SUB-BASIN BOUNDARY
EXISTING CONTOUR
PROPOSED COUNTOUR
PROPOSED STORM SEWER
INITIAL OVERLAND TIME (Ti)
TRAVEL TIME (Tt)
OVERLAND TIME (To)

NOTE:

COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GNERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

BENCH MARK:

INTERSECTION OF WOODMEN RD AND MERIDIAN ROAD AT SW CORNER (BRASS CAP W/ NO. GF-9)

ELEVATION = 6874.00

No.	Revisions	Date	Init.	Appr.	Date

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

MERIDIAN RANCH

RATIONAL DRAINAGE MAP
PDR/FDR DRAINAGE REPORT
ESTATES AT ROLLING HILLS RANCH FI

Drawn by TAK
Checked by -
Date AUG 2019
Scale 1" = 100'
1 of 1