Preliminary Drainage Report

for

# Rolling Hills Ranch North

**at**

## Meridian Ranch

MERIDIAN RANCH

A GOLF & RECREATIONAL COMMUNITY

EL PASO COUNTY, COLORADO

February 2024

Prepared For:

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

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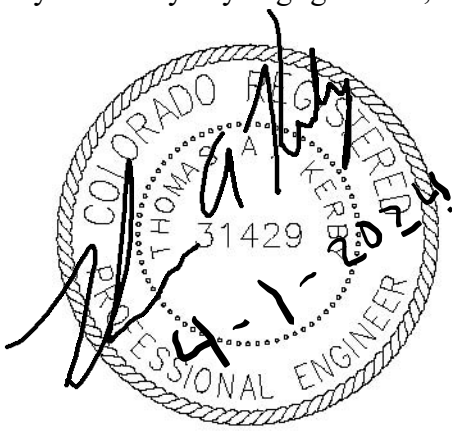
PCD Project No. PUDSP235

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

**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.

_____ April 2, 2024

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.

_____ _____

Joshua Palmer, P.E. Date
County Engineer / ECM Administrator

# Rolling Hills Ranch North PUD
# Preliminary Drainage Report

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## ***EXECUTIVE SUMMARY***

The purpose of the following Preliminary Drainage Report (PDR) is to present the changes to the drainage patterns as a result the Rolling Hills Ranch North Preliminary Plan (RHRN). 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 Meridian Ranch 2021 Sketch Plan Amendment as adopted by the El Paso County Board of Commissioners on August 24, 2021 by Resolution 21-332. 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 and future conditions for the 2-yr, 5-yr, 10-yr, 50-yr, and 100-yr design storm frequencies. The future conditions include detention facilities sized and modeled such that *"frequent and infrequent inflows are released at rates approximating undeveloped conditions"*

RHRN encompasses 149± acres and is located in Section 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 North 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) is to present proposed changes to the drainage patterns as a result of the development of RHRN. 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).

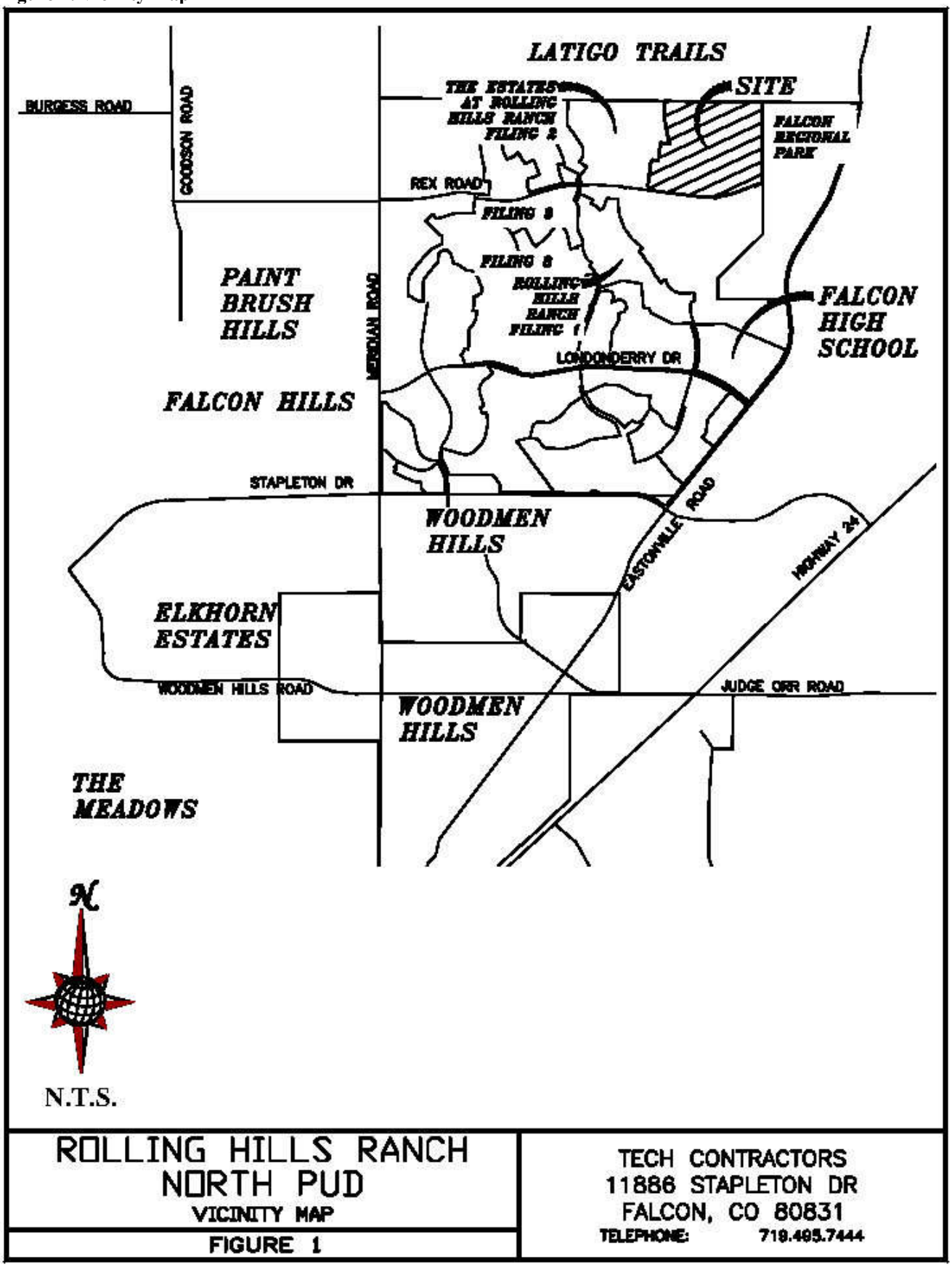
### *Background*

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 eighty 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.

The Sketch Plan Amendment (SKP-17-001) was processed and approved in 2018 by the El Paso County Board of County Commissioners by resolution 18-104 for Meridian Ranch. The resolution eliminated the required restriction of 80% of historic peak flow rates mentioned above. The detention pond proposed with this project will release at historic or less peak flow rates as per the current El Paso County stormwater requirements.

No development has occurred downstream of this project except for portions of the Falcon Regional Park providing sports fields, trails, dog park and associated parking and the Sanctuary Filing 1 subdivision. 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 replaced with the Eastonville Road construction proposed by El Paso County.

**Figure 1: Vicinity Map**



Current calculations show the current design discharge of the existing Pond G to the Falcon Regional Park to be below historic flow rates at full build out for the full spectrum of design storms.

## ***EXISTING CONDITIONS***

### *General Location*

Rolling Hills Ranch North PUD project encompasses 149± acres and is located in Section 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 and west are completed subdivisions within the Meridian Ranch development, and east are located the future developments of 4 Way Ranch and Grandview Reserve. There are no existing utilities found on the project site.

### *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 (approximately 60% vegetative cover) 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. There are no trees or brush located on the project site.

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 North PUD 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.

**Figure 2: FEMA Floodplain Map**

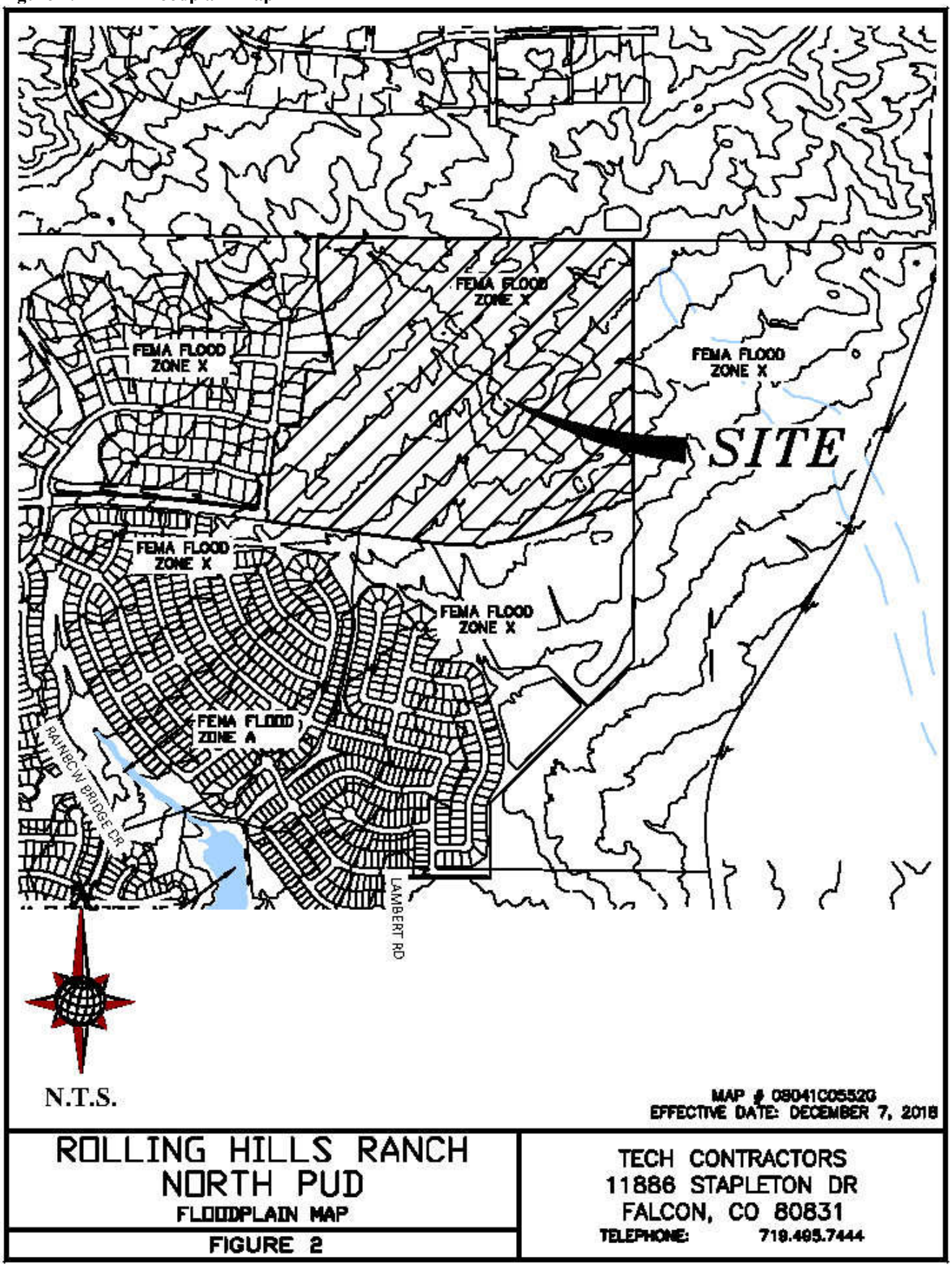


**Figure 3: Soils Map**

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.

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.

The Columbine (19) gravelly sandy loam is a deep, well-drained to excessively drained soil formed in coarse textured material on alluvial terraces, fans and flood plains. Permeability of this soil is very rapid. Available water capacity is low to moderate, surface runoff is slow, and the hazard of erosion is slight to moderate. The Columbine series is categorized as a Hydrological Soil Group A.

This soil is used mainly for grazing livestock, for wildlife habitat and for home sites. The main limitation of this soil for urban development is a hazard of flooding in some areas.
Note: (#) indicates Soil Conservation Survey soil classification number. See Figure 3 Rolling Hills Ranch North PUD – 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 Latigo Trails development.

Two 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 analyzes the build out conditions for the entirety of the project 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.

The interim scenario was not analyzed as this project completes the development within Meridian Ranch.

## ***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. The SCS hydrology calculations can be found in Appendix A.

**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 one-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 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 existing 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:**

| POND G | | | | |
|---|---|---|---|---|
| | PEAK INFLOW | PEAK OUTFLOW | PEAK STORAGE | PEAK ELEVATION |
| | CFS | CFS | AC-FT | FT |
| FUTURE CONDITIONS | | | | |
| 2-YEAR STORM | 45 | 5.2 | 5.5 | 7026.8 |
| 5-YEAR STORM | 101 | 19 | 8.8 | 7027.5 |
| 10-YEAR STORM | 183 | 51 | 11.3 | 7027.9 |
| 50-YEAR STORM | 477 | 289 | 19.9 | 7029.4 |
| 100-YEAR STORM | 653 | 444 | 24.5 | 7030.1 |

## ***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 Pond G detention facility.

The Pond G 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 the future as the storm flow exits Meridian Ranch onto the Falcon Regional Park.

Figure 4: Meridian Ranch SCS Calculations – Historic Conditions Map and Figure 5: Meridian Ranch SCS Calculations – Future Conditions Map depict the historic and future general drainage patterns for Rolling Hills Ranch North.

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

### *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 4 - 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 Q10 (CFS) | PEAK DISCHARGE Q5 (CFS) | PEAK DISCHARGE Q2 (CFS) |
| OS06 | 0.1313 | 80 | 52 | 12 | 3.8 | 0.5 |
| OS06-G02 | 0.1313 | 77 | 52 | 11 | 3.7 | 0.5 |
| OS05 | 0.0578 | 39 | 26 | 5.6 | 1.8 | 0.2 |
| OS05-G01 | 0.0578 | 38 | 25 | 5.5 | 1.7 | 0.2 |
| HG01 | 0.0547 | 32 | 21 | 4.7 | 1.5 | 0.2 |

| HISTORIC SCS (Full Spectrum) | | | | | | |
|---|---|---|---|---|---|---|
| HYDROLOGIC ELEMENT | DRAINAGE AREA (SQ. MI.) | PEAK DISCHARGE Q100 (CFS) | PEAK DISCHARGE Q50 (CFS) | PEAK DISCHARGE Q10 (CFS) | PEAK DISCHARGE Q5 (CFS) | PEAK DISCHARGE Q2 (CFS) |
| G01 | 0.1125 | 70 | 46 | 10 | 3.2 | 0.5 |
| G01-G02 | 0.1125 | 68 | 46 | 9.9 | 3.2 | 0.5 |
| HG02 | 0.0906 | 45 | 30 | 6.7 | 2.3 | 0.4 |
| G02 | 0.3344 | 191 | 127 | 27 | 9.0 | 1.3 |
| G02-G03 | 0.3344 | 190 | 125 | 27 | 9.0 | 1.3 |
| HG03 | 0.1828 | 77 | 51 | 12 | 4.3 | 0.7 |
| OS07 | 0.0328 | 25 | 17 | 4.5 | 1.7 | 0.3 |
| OS07-G03 | 0.0328 | 24 | 17 | 4.3 | 1.7 | 0.3 |
| G03 | 0.5500 | 291 | 192 | 42 | 15 | 2.3 |
| G03-G04 | 0.5500 | 281 | 189 | 42 | 14 | 2.3 |
| OS09 | 0.1547 | 91 | 63 | 19 | 8.3 | 1.9 |
| OS09-G04 | 0.1547 | 90 | 62 | 18 | 8.3 | 1.9 |
| HG04 | 0.0891 | 40 | 26 | 5.9 | 2.1 | 0.3 |
| HG05 | 0.1125 | 49 | 32 | 7.4 | 2.6 | 0.4 |
| OS08 | 0.0406 | 35 | 25 | 7.7 | 3.4 | 0.7 |
| OS08-G04 | 0.0406 | 34 | 24 | 7.4 | 3.4 | 0.7 |
| G04 | 0.9469 | 493 | 332 | 76 | 28 | 4.7 |
| G04-G05 | 0.9469 | 488 | 318 | 76 | 27 | 4.7 |
| HG06A | 0.1375 | 49 | 32 | 7.6 | 2.9 | 0.5 |
| G05 | 1.0844 | 536 | 350 | 84 | 30 | 5.2 |
| G05-G06 | 1.0844 | 520 | 348 | 83 | 30 | 5.2 |
| HG06B | 0.1031 | 33 | 22 | 5.3 | 2.0 | 0.4 |
| G06 | 1.1875 | 551 | 369 | 88 | 32 | 5.5 |
| HG14 | 0.2297 | 79 | 52 | 12 | 4.7 | 0.8 |
| HG13 | 0.0844 | 54 | 37 | 9.5 | 3.8 | 0.7 |
| G07 | 0.0844 | 54 | 37 | 9.5 | 3.8 | 0.7 |
| G07-G08 | 0.0844 | 53 | 36 | 9.4 | 3.7 | 0.6 |
| G16 | 0.3141 | 117 | 77 | 19 | 7.4 | 1.4 |

## 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 5 - Meridian Ranch SCS Calculations – Future Basins Map

**Table 4: Future Drainage Basins-SCS**

| FUTURE SCS (Full Spectrum) | | | | | | |
|---|---|---|---|---|---|---|
| | DRAINAGE AREA (SQ. MI.) | PEAK DISCHARGE Q100 (CFS) | PEAK DISCHARGE Q50 (CFS) | PEAK DISCHARGE Q10 (CFS) | PEAK DISCHARGE Q5 (CFS) | PEAK DISCHARGE Q2 (CFS) |
| OS06 | 0.1313 | 80 | 52 | 12 | 3.8 | 0.52 |
| G1a | 0.1313 | 80 | 52 | 12 | 3.8 | 0.52 |
| G1a-G2 | 0.1313 | 79 | 52 | 11 | 3.7 | 0.52 |
| OS05 | 0.0578 | 39 | 26 | 5.6 | 1.8 | 0.23 |
| OS05-G1 | 0.0578 | 39 | 25 | 5.5 | 1.7 | 0.23 |
| FG01 | 0.0538 | 31 | 22 | 7.0 | 3.4 | 0.92 |
| FG01-G1 | 0.0538 | 31 | 22 | 7.0 | 3.4 | 0.92 |
| G1 | 0.1116 | 61 | 41 | 11 | 4.9 | 1.1 |
| G1-G2 | 0.1116 | 61 | 41 | 11 | 4.8 | 1.1 |
| FG02 | 0.0391 | 32 | 22 | 6.4 | 2.7 | 0.48 |
| G2 | 0.2820 | 167 | 112 | 27 | 10 | 1.9 |
| G2-G3 | 0.2820 | 162 | 109 | 27 | 10 | 1.9 |

| FUTURE SCS (Full Spectrum) | | | | | | |
|---|---|---|---|---|---|---|
| | DRAINAGE AREA (SQ. MI.) | PEAK DISCHARGE Q100 (CFS) | PEAK DISCHARGE Q50 (CFS) | PEAK DISCHARGE Q10 (CFS) | PEAK DISCHARGE Q5 (CFS) | PEAK DISCHARGE Q2 (CFS) |
| FG03 | 0.0203 | 24 | 17 | 5.9 | 3.0 | 0.84 |
| FG04 | 0.0172 | 22 | 16 | 5.8 | 3.1 | 0.90 |
| G3 | 0.3195 | 184 | 122 | 31 | 12 | 2.4 |
| FG06 | 0.0675 | 56 | 40 | 12 | 5.8 | 1.3 |
| FG05 | 0.0580 | 45 | 33 | 12 | 6.7 | 2.4 |
| OS07ab | 0.0170 | 12 | 7.9 | 1.8 | 0.5 | 0.07 |
| OS07ab-POND F | 0.0170 | 12 | 7.6 | 1.7 | 0.5 | 0.07 |
| POND F IN | 0.4620 | 292 | 199 | 53 | 23 | 5.0 |
| POND F | 0.4620 | 177 | 121 | 16 | 8.0 | 2.1 |
| POND F-G7 | 0.4620 | 177 | 120 | 16 | 8.0 | 2.1 |
| OS07c | 0.0296 | 19 | 12 | 2.7 | 0.9 | 0.12 |
| OS07c-G4 | 0.0296 | 18 | 12 | 2.7 | 0.9 | 0.12 |
| FG21a | 0.0095 | 5.9 | 4.0 | 1.0 | 0.4 | 0.06 |
| G4 | 0.0391 | 24 | 16 | 3.5 | 1.2 | 0.17 |
| G4-G7 | 0.0391 | 23 | 16 | 3.5 | 1.2 | 0.17 |
| FG21b | 0.0150 | 21 | 16 | 6.5 | 3.9 | 1.7 |
| G7 | 0.5161 | 194 | 131 | 18 | 8.9 | 2.3 |
| G7-G8 | 0.5161 | 194 | 130 | 18 | 8.9 | 2.3 |
| FG22 | 0.1354 | 121 | 88 | 32 | 17 | 5.4 |
| OS08a | 0.0251 | 16 | 11 | 2.3 | 0.7 | 0.10 |
| OS08-G8 | 0.0251 | 16 | 10 | 2.3 | 0.7 | 0.10 |
| FG23a | 0.0216 | 21 | 15 | 5.2 | 2.7 | 0.84 |
| OS07d | 0.0034 | 2.5 | 1.6 | 0.36 | 0.11 | 0.01 |
| OS07d-G8 | 0.0034 | 2.4 | 1.6 | 0.35 | 0.11 | 0.01 |
| G8 | 0.7016 | 276 | 176 | 46 | 24 | 7.7 |
| G8-G10 | 0.7016 | 275 | 175 | 45 | 24 | 7.6 |
| FG24b | 0.0589 | 52 | 39 | 16 | 10 | 4.3 |
| FG24a | 0.0348 | 24 | 16 | 4.5 | 2.0 | 0.37 |
| OS08b | 0.0165 | 9.5 | 6.3 | 1.4 | 0.5 | 0.07 |
| OS08b-G9a | 0.0165 | 9.4 | 6.0 | 1.4 | 0.5 | 0.07 |
| OS09a | 0.0093 | 5.3 | 3.5 | 0.76 | 0.25 | 0.04 |
| OS09a-G9a | 0.0093 | 5.2 | 3.4 | 0.75 | 0.25 | 0.04 |
| G9a | 0.1195 | 87 | 61 | 21 | 12 | 4.7 |
| G9a-G9b | 0.1195 | 85 | 60 | 20 | 12 | 4.6 |
| FG24c | 0.0291 | 40 | 30 | 13 | 8.4 | 4.0 |
| FG24d | 0.0262 | 39 | 30 | 14 | 8.7 | 4.4 |
| G9b | 0.1748 | 137 | 101 | 40 | 23 | 10.1 |
| REX RD WQCV | 0.1748 | 136 | 100 | 40 | 23 | 9.7 |
| G9b-G10 | 0.1748 | 135 | 99 | 39 | 23 | 9.6 |
| FG23b | 0.0236 | 17 | 11 | 2.7 | 0.9 | 0.13 |
| G10 | 0.9000 | 391 | 243 | 84 | 45 | 16 |
| G10-G11 | 0.9000 | 389 | 243 | 82 | 44 | 16 |
| FG23c | 0.0109 | 9.2 | 6.5 | 1.9 | 0.8 | 0.16 |
| G11 | 0.9109 | 393 | 247 | 83 | 44 | 16 |
| FG25 | 0.1084 | 111 | 84 | 36 | 22 | 9.9 |
| FG28 | 0.0184 | 15 | 10 | 3.0 | 1.2 | 0.19 |
| POND G IN-WEST | 1.0377 | 485 | 333 | 116 | 61 | 22 |
| FG27 | 0.0679 | 98 | 79 | 42 | 30 | 18 |
| FG26 | 0.0567 | 58 | 44 | 19 | 12 | 5.6 |
| G13 | 0.0567 | 58 | 44 | 19 | 12 | 5.6 |
| G13-POND G | 0.0567 | 57 | 43 | 19 | 12 | 5.6 |
| POND G IN-EAST | 0.1246 | 153 | 121 | 60 | 41 | 23 |
| POND G | 1.1623 | 444 | 289 | 51 | 19 | 5.2 |
| G12 | 1.1623 | 444 | 289 | 51 | 19 | 5.2 |
| G12-G06 | 1.1623 | 444 | 287 | 50 | 19 | 5.2 |
| FG29 | 0.0983 | 60 | 39 | 8.9 | 2.9 | 0.42 |
| FG32 | 0.0406 | 17 | 11 | 2.6 | 0.9 | 0.15 |
| FG32-G06 | 0.0406 | 17 | 11 | 2.6 | 0.9 | 0.15 |
| G06 | 1.3012 | 475 | 307 | 54 | 21 | 5.5 |

| FUTURE SCS (Full Spectrum) | | | | | | |
|---|---|---|---|---|---|---|
| | DRAINAGE AREA (SQ. MI.) | PEAK DISCHARGE Q100 (CFS) | PEAK DISCHARGE Q50 (CFS) | PEAK DISCHARGE Q10 (CFS) | PEAK DISCHARGE Q5 (CFS) | PEAK DISCHARGE Q2 (CFS) |
| OS09b | 0.0435 | 19 | 12 | 2.8 | 1.0 | 0.17 |
| OS09b-G14 | 0.0435 | 18 | 12 | 2.8 | 1.0 | 0.17 |
| FG34 | 0.0275 | 18 | 12 | 3.1 | 1.3 | 0.22 |
| G14 | 0.0710 | 32 | 21 | 5.0 | 1.9 | 0.34 |
| G14-G15 | 0.0710 | 32 | 21 | 4.9 | 1.9 | 0.34 |
| FG35 | 0.0292 | 25 | 18 | 5.5 | 2.4 | 0.46 |
| G15 | 0.1002 | 45 | 29 | 7.1 | 2.8 | 0.57 |
| G15-G16 | 0.1002 | 44 | 29 | 7.0 | 2.8 | 0.57 |
| FG37 | 0.0754 | 46 | 31 | 7.3 | 2.7 | 0.43 |
| FG36 | 0.0295 | 19 | 13 | 3.9 | 1.8 | 0.38 |
| G15a | 0.0295 | 19 | 13 | 3.9 | 1.8 | 0.38 |
| G15a-G16 | 0.0295 | 19 | 13 | 3.8 | 1.7 | 0.38 |
| G16 | 0.2051 | 103 | 67 | 16 | 6.5 | 1.2 |

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 the Rolling Hills Ranch North PUD has been designed. The storm drainage facilities have been designed such that minor storms 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 rational hydrology calculations can be found in Appendix B.

The site is located within the Gieck Ranch Drainage Basin. The storm drain runoff will be collected by a series of inlets and storm drain pipe then conveyed through the project and discharge into an existing natural drainage course continuing into existing Pond G that is properly sized to safely convey the storm water flows away from the project without damaging adjacent property.

### *Rational Narrative*

The following is a detailed narrative of the storm drainage system located in Rolling Hills Ranch North PUD. These storm drainage systems meet the requirements of as found in the El Paso County Engineering Criteria Manual I.7 New Development Stormwater Management (ECM) for storm water quality and discharge. The discharge from Storm Systems A & C is routed through a water quality structure located north of Rex Road (identified as DP3 on rational map) prior to being discharged into a natural drainage course upstream of a Regional Detention Facility (Pond G). Storm System B discharges directly into Pond G after being routed through the Sanctuary Filing 1 subdivision. Areas adjacent to the Falcon Regional Park will bypass Pond G while meeting stormwater quality requirements see narrative below, calculations will be provided at Final Drainage Report. Please refer to Figure 6 – Rolling Hills Ranch North Rational Drainage Maps.

Storm Drain System A

- Basin A01 (5.4 acres, $Q_5$= 4.7 CFS, $Q_{100}$ = 15 CFS) contains lots along Galeros Drive and Toroweap Way. The surface runoff will sheet flow off of the lots and be directed to the streets and directed to a forced sump inlet located at I01. All of the 5-year flow ($Q_5$= 4.7 CFS), and most of the 100-year flow ($Q_{100}$ = 14 CFS) is captured and conveyed downstream via an 18" RCP to manholes J01, J02, and J03 where it will be combined with flow captured by inlet I02. The remaining flow ($Q_{100}$ = 1.2 CFS) continuing downstream to Inlet I08.

- Basin A02 (3.0 acres, $Q_5$= 3.8 CFS, $Q_{100}$ = 11 CFS) contains lots along Galeros Drive, Bright Angel Dr. and Esplanade Dr. The surface runoff will sheet flow off of the lots and be directed to the streets and directed to a forced sump inlet located at I02. All of the 5-year flow ($Q_5$= 3.8 CFS), and most of the 100-year flow ($Q_{100}$ = 9.9 CFS) is captured and conveyed downstream via an 18" RCP to manhole J03 where it will be combined with flow captured by inlet I01. The remaining flow ($Q_{100}$ = 0.6 CFS) continuing downstream to Inlet I06.

- The pipe flow from inlets I01 & I02 combine at manhole J03 for a total flow of $Q_5$= 7.6 CFS and $Q_{100}$ = 21 CFS and conveyed downstream to manhole J08 via a 24" RCP.

- Basin OS1 (4.1 acres, $Q_5$= 3.0 CFS, $Q_{100}$ = 11 CFS) contains rear portions of the lots on the east side of existing Estate Ridge Dr located within the Estates at Rolling Hills Ranch Filing 2. The surface runoff will sheet flow off of the open space and be directed toward Basin A03.

- Basin A03 (3.2 acres, $Q_5$= 2.8 CFS, $Q_{100}$ = 8.8 CFS) contains lots along the west side of Galeros Drive. The surface runoff will combine with the flow from OS1 and sheet flow off of the lots and be directed to the street for a total flow of ($Q_5$= 5.4 CFS, $Q_{100}$ = 18 CFS) and conveyed to a flow-by inlet located at I03. Most of the flow ($Q_5$= 4.5 CFS, $Q_{100}$ = 13 CFS) is captured and conveyed downstream via an 18" RCP to manholes J04 and J05 where it will be combined with flow captured by inlet I04. The remaining surface flow ($Q_5$= 0.9 CFS, $Q_{100}$ = 5.9 CFS) continues downstream to Inlet I04

- Basin A04 (3.4 acres, $Q_5$= 3.1 CFS, $Q_{100}$ = 10 CFS) contains lots along Bright Angel Dr. and Esplanade Dr. The surface runoff will sheet flow off of the lots and be directed to the streets and directed to a forced sump inlet located at I04. The flow will combine with the flow-by from inlet I03 for a total flow of $Q_5$= 3.5 CFS and $Q_{100}$ = 14 CFS. All of the flow is captured and conveyed downstream via an 18" RCP to manhole J05 where it will be combined with flow captured by inlet I03.

- The pipe flow from inlets I03 & I04 combine at manhole J05 for a total flow of $Q_5$= 7.8 CFS and $Q_{100}$ = 26 CFS and conveyed downstream to manhole J06 via a 24" RCP.

- Basin OS2 (5.3 acres, $Q_5$= 6.4 CFS, $Q_{100}$ = 16 CFS) contains lots on the east side of along the east side of existing Estate Ridge Dr located within the Estates at Rolling

Hills Ranch Filing 2. The surface runoff will sheet flow off of the lots onto to the streets and directed to an existing flow-by inlet located at the northeast corner of Estate Ridge Dr. and Sunrise Ridge Dr. Most of the flow ($Q_5$= 5.2 CFS, $Q_{100}$ = 11 CFS) is captured and conveyed downstream via an existing 18" RCP to an existing manhole constructed with the Estates at Rolling Hills Ranch Filing 2. The captured flows are slightly higher than the original approved FDR for the Estates at Rolling Hills Ranch Filing 2, however the increase within the main storm drain as it continues southerly along Estate Ridge Dr is an insignificant increase of less than 1% of the total 100-year flow rate. The slight increase will have no adverse impact to the existing storm drain system. The remaining surface flow ($Q_5$= 1.2 CFS, $Q_{100}$ = 4.7 CFS) continues downstream to Inlet I05.

- Basin A05 (5.8 acres, $Q_5$= 5.4 CFS, $Q_{100}$ = 16 CFS) contains lots along Sunrise Ridge Dr., Bright Angel Dr., and Esplanade Dr. The surface runoff will sheet flow off of the lots and be directed to the streets and directed to a forced sump inlet located at I05. The flow will combine with the flow-by from inlet ExI01 for a total flow of $Q_5$= 5.4 CFS and $Q_{100}$ = 17 CFS. All of the 5-year flow ($Q_5$= 5.4 CFS), and almost all of the 100-year flow ($Q_{100}$ = 17 CFS) is captured and conveyed downstream via a 24" RCP to manhole J06 where it will be combined with flow from manhole J05. The remaining flow ($Q_{100}$ = 0.2 CFS) continues downstream to Inlet I06.

- The pipe flow from inlet I05 and manhole J05 combine at manhole J06 for a total flow of $Q_5$= 12 CFS and $Q_{100}$ = 40 CFS and conveyed downstream to manholes J07A, J07B & J09 via a 30" RCP.

- Basin A06 (4.1 acres, $Q_5$= 4.8 CFS, $Q_{100}$ = 13 CFS) contains lots along Sunrise Ridge Dr., Galeros Dr., Bright Angel Dr., and Esplanade Dr. The surface runoff will sheet flow off of the lots and be directed to the streets and directed to a forced sump inlet located at I06. The flow will combine with the flow-by from inlets I02 & I05 for a total flow of $Q_5$= 4.8 CFS and $Q_{100}$ = 14 CFS. All of the 5-year flow ($Q_5$= 4.8 CFS), and most of the 100-year flow ($Q_{100}$ = 9.9 CFS) is captured and conveyed downstream via an 18" RCP to manhole J08 where it will be combined with flow from manhole J03. The remaining flow ($Q_{100}$ = 4.0 CFS) continues downstream to Inlet I08.

- The pipe flow from inlet I06 and manhole J03 combine at manhole J08 for a total flow of $Q_5$= 12 CFS and $Q_{100}$ = 30 CFS and conveyed downstream to manhole J09 via a 30" RCP.

- The pipe flow from manholes J07B & J08 combine at manhole J09 for a total flow of $Q_5$= 22 CFS and $Q_{100}$ = 63 CFS and conveyed downstream to manholes J11 via a 42" RCP.

- Basin A07 (3.6 acres, $Q_5$= 4.4 CFS, $Q_{100}$ = 11 CFS) contains lots along the east side of Cardenas Drive. The surface runoff will sheet flow off of the lots to the street and conveyed to a forced sump inlet located at I07. All of the 5-year flow ($Q_5$= 4.4 CFS), and most of the 100-year flow ($Q_{100}$ = 9.9 CFS) is captured and conveyed downstream

via an 18" RCP to manholes J10 & J11. The remaining surface flow ($Q_{100}$ = 1.2 CFS) continues downstream to Inlet I08

- Basin OS04 (39 acres, $Q_5$= 11 CFS, $Q_{100}$ = 64 CFS) contains open space within Rolling Hills Ranch North PUD and historic flow rates from Latigo Trails north of the project. The surface runoff will sheet flow off toward an open channel and directed to an end section located at DP2 upstream of I08 and Sunrise Ridge Dr. The developed flow within the open channel leading to DP2 was analyzed and constructed with the early grading operations for this project.

- Basin A08 (5.7 acres, $Q_5$= 5.5 CFS, $Q_{100}$ = 15 CFS) contains lots along Sunrise Ridge Dr. and Galeros Dr. and Cardenas Dr. The surface runoff will sheet flow off of the lots to the streets and directed to a sump inlet located at I08. The flow will combine with the flow-by from inlets I01, I06, & I07 for a total flow at the inlet of $Q_5$= 5.5 CFS and $Q_{100}$ = 19 CFS. All of the 5-year flow ($Q_5$= 5.5 CFS), and most of the 100-year flow ($Q_{100}$ = 17 CFS) is captured, combined with upstream offsite Basin OS04. The total flow ($Q_5$= 16 CFS, $Q_{100}$ = 75 CFS) conveyed to manhole J11 via a proposed 48" RCP where it will be combined with flow from manholes J09 &J10. The remaining surface flow ($Q_{100}$ = 8.7 CFS) crosses the centerline to Inlet I09.

- The pipe flow from inlet I08 and manholes J09 & J10 combine at manhole J11 for a total flow of $Q_5$= 38 CFS and $Q_{100}$ = 139 CFS and conveyed downstream to inlet I09 via a 48" RCP.

- Basin A09 (0.24 acres, $Q_5$= 1.0 CFS, $Q_{100}$ = 1.8 CFS) contains area along the south side of Sunrise Ridge Dr. The surface runoff will sheet flow on to the streets and directed to a sump inlet located at I09. The flow will combine with the flow-by from inlet I08 for a total flow at the inlet of $Q_5$= 1.0 CFS and $Q_{100}$ = 3.1 CFS. All of the flow is captured, combined with upstream flow from manhole J11. The total flow ($Q_5$= 39 CFS, $Q_{100}$ = 141 CFS) is conveyed to end section ES01 via a proposed 48" RCP where it will be discharged to a natural drainage course and directed downstream toward Rex Rd. to exit the site.

Storm Drain System B

- Basin B01 (6.4 acres, $Q_5$= 7.3 CFS, $Q_{100}$ = 19 CFS) contains lots fronting on Chalk Cliffs Dr., Lava Falls Dr. and Shelter Creek Dr. The surface runoff will sheet flow off lots to the streets and be directed to a forced sump inlet located at I10 All of the 5-year flow ($Q_5$= 7.3 CFS), and most of the 100-year flow ($Q_{100}$ = 14 CFS) is captured and conveyed downstream via a 24" RCP to manholes J12 & J13 where it will be combined with flow from inlet I11. The remaining flow ($Q_{100}$ = 5.1 CFS) continues downstream to Inlet I11.

- Basin B02 (6.2 acres, $Q_5$= 7.5 CFS, $Q_{100}$ = 19 CFS) contains lots fronting along Sunset Ridge Dr., Lava Falls Dr., and Shelter Creek Dr. 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 forced sump inlet located at I11. The flow will combine with the flow-

by from inlet I10 for a total flow at the inlet of $Q_5$= 7.5 CFS and $Q_{100}$ = 22 CFS. All of the 5-year flow is captured by the inlet ($Q_5$= 7.5 CFS) and most of the 100-yr storm flow is captured ($Q_{100}$ = 17 CFS) with the remaining flow ($Q_{100}$ = 4.5 CFS) continuing downstream to Inlet I12. The captured flow is conveyed downstream via an 18" RCP to manhole J13.

- The pipe flow from inlets I10 & I11 combine at manhole J13 for a total flow of $Q_5$= 14 CFS and $Q_{100}$ = 30 CFS and conveyed downstream to manhole J14 via a 30" RCP.

- Basin B03 (4.6 acres, $Q_5$= 5.6 CFS, $Q_{100}$ = 14 CFS) contains lots fronting along Sunset Ridge Dr., Crystal Falls Dr., and Shelter Creek Dr. 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 forced sump inlet located at I12. The flow will combine with the flow-by from inlet I11 for a total flow at the inlet of $Q_5$= 5.6 CFS and $Q_{100}$ = 16 CFS. All of the flow is captured by the inlet. The captured flow is conveyed downstream via an 18" RCP to manhole J14.

- The pipe flow from inlet I12 and manhole J13 combine for a total flow of $Q_5$= 19 CFS and $Q_{100}$ = 44 CFS and conveyed downstream to manhole J15 via a 30" RCP.

- Basin B04 (9.5 acres, $Q_5$= 10 CFS, $Q_{100}$ = 26 CFS) contains lots fronting along House Rock Dr., Crystal Falls Dr., and Shelter Creek Dr. 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 forced sump inlet located at I13. All of the 5-year flow is captured by this inlet ($Q_5$= 10 CFS) and most of the 100-yr storm flow is captured ($Q_{100}$ = 17 CFS) with the remaining flow ($Q_{100}$ = 9.0 CFS) continuing downstream to Inlet EI02. The captured flow is conveyed downstream via a 24" RCP to manhole J15.

- The pipe flow from inlet I13 and manhole J14 combine for a total flow of $Q_5$= 29 CFS and $Q_{100}$ = 60 CFS and conveyed downstream to manhole EJ01 via a 36" RCP.

- Basin B05 (3.0 acres, $Q_5$= 3.6 CFS, $Q_{100}$ = 9.2 CFS) contains lots fronting along the House Rock Dr. 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 an existing inlet located at EI02. The flow will combine with the flow-by from inlet I13 for a total flow at the inlet of $Q_5$= 3.6 CFS and $Q_{100}$ = 17 CFS. All of the flow is captured by the inlet. The captured flow is conveyed downstream via an 18" RCP to manhole EJ01.

- Basin B06 (6.6 acres, $Q_5$= 6.5 CFS, $Q_{100}$ = 16 CFS) contains lots fronting along Chalk Cliffs Dr. and Shelter Creek Dr. 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 sump inlet located at EI03. All of the flow is captured by the inlet. The captured flow is conveyed downstream via an 18" RCP to manhole EJ01.

- The total pipe flow conveyed to manhole EJ01 is $Q_5$= 38 CFS, $Q_{100}$ = 90 CFS and is conveyed via a 42" RCP downstream through the Sanctuary Filing 1 subdivision and

ultimately to the existing Detention Pond G. The approved Final Drainage Report for the Sanctuary Filing 1 shows the design flows at Rex Road within the stormdrain pipe to be $Q_5$= 38 CFS, $Q_{100}$ = 93 CFS. The proposed flows with this PUD are less than or equal to the flows shown in the approved FDR for the Sanctuary Filing 1, therefore this project has no adverse impacts to the existing downstream stormdrain system.

Storm Drain System C

- Basin C01 (7.1 acres, $Q_5$= 7.3 CFS, $Q_{100}$ = 20 CFS) contains lots fronting on Sunrise Ridge Dr., Redwall Dr., Temple Butte Dr. Bright Angel Dr., and Horn Hill Dr. The surface runoff will sheet flow off lots to the streets and be directed to a forced sump inlet located at I18. All of the 5-year flow ($Q_5$= 7.3 CFS), and most of the 100-year flow ($Q_{100}$ = 14 CFS) is captured and conveyed downstream via an 18" RCP to manholes J21, J22, J23, & J24 where it will be combined with flow from inlet I19. The remaining flow ($Q_{100}$ = 6.9 CFS) continues downstream to Inlet I19.

- Basin C02 (7.1 acres, $Q_5$= 7.4 CFS, $Q_{100}$ = 21 CFS) contains lots fronting along Sunrise Ridge Dr., Tapeats Dr., Bright Angel Dr., and Horn Hill Dr. 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 sump inlet located at I19. The flow will combine with the flow-by from inlet I18 for a total flow at the inlet of $Q_5$= 7.4 CFS and $Q_{100}$ = 23 CFS. All of the 5-year flow is captured by the inlet ($Q_5$= 7.4 CFS) and most of the 100-yr storm flow is captured ($Q_{100}$ = 17 CFS) with the remaining flow ($Q_{100}$ = 6.4 CFS) crossing the centerline to Inlet I20. The captured flow is conveyed downstream via an 24" RCP to manhole J24.

- The pipe flow from inlets I19 and manhole 23 combine at manhole J24 for a total flow of $Q_5$= 14 CFS and $Q_{100}$ = 29 CFS and conveyed downstream to sump inlet I20 via a 30" RCP.

- Basin C03 (4.4 acres, $Q_5$= 4.1 CFS, $Q_{100}$ = 11 CFS) contains lots fronting along Redwall Dr., Galeros Dr., and Horn Hill Dr. 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 sump inlet located at I20. The flow will combine with the flow-by from inlet I19 for a total flow at the inlet of $Q_5$= 4.1 CFS and $Q_{100}$ = 17 CFS. All of the flow is captured by the inlet. The captured flow is combined with the flow from manhole J24 ($Q_5$= 18 CFS, $Q_{100}$ = 46 CFS) and is conveyed downstream via a 30" RCP to end section ES02

- Basin OS05 (6.6 acres, $Q_5$= 4.4 CFS, $Q_{100}$ = 17 CFS) contains the rear portions of lots bounded by along Sunrise Ridge Dr., Galeros Dr., House Rock Dr., and Rex Rd. The surface runoff will sheet flow off of the residential lots and opens space and be directed to an open channel. The rational calculation yield flows from the combined runoff from ES01 and ES02 for a total flow of $Q_5$= 64 CFS and $Q_{100}$ = 202 CFS. The developed flow within the open channel leading to DP2 was analyzed and constructed with the early grading operations for this project. The flow is captured by a water quality pond (DP3) constructed with the Rolling Hills Ranch North grading operations and then

conveyed downstream via a 54" RCP ($Q_5$= 31 CFS, $Q_{100}$ = 159 CFS, (SCS method)) where it will be discharged to a natural drainage course and directed downstream to the existing Detention Pond G. Existing Pond G was designed and constructed with this area anticipated to drain and be detained within it. Pond G also contains a water quality component.

Northeast Tract A RHRN Filing 2 (FG34)

Offsite areas and northeast portions of Rolling Hills Ranch North Filing 2 will route around and bypass the project discharging directly onto the adjacent Falcon Regional Park toward the east.

The historic basin HG13 (see Figure 4) drains toward design point G7 located near the easterly boundary of the project. The basin area of 54 acres generated runoff rates of $Q_5$= 12 CFS and $Q_{100}$ = 78 CFS from the undeveloped historic condition.

The tributary area toward the same design point, now designated as G14 (see Figure 5), has been reduced as a result of the development within Latigo Trails and this project. The total tributary area of 45 acres will generate runoff rates of $Q_5$= 12 CFS and $Q_{100}$ = 65 CFS as a result of this development. The post developed flow rates approximate or are less than the historic flow rates for the design storm intervals.

The channel between design points DP1 and G14 was designed and constructed with the plans for the Rolling Hills Ranch North and Sanctuary Early Grading Permit and accounted for the final developed condition and has sufficient size to safely convey design flow rates.

Runoff Reduction

Areas along the eastern tier of lots adjacent to the open space Tract A within the future Rolling Hills Ranch North Filing 2 and immediately adjacent to the regional park will rely on runoff reduction via sheet flow discharge off the rear of the lots. The stormwater flow will be directed southeasterly through the regional park toward Rex Rd. See Appendix D for calculations and exhibits depicting these areas.

- Area A – The runoff from the impervious areas from lots 128 – 135 of Rolling Hills Ranch North Filing 1 will be directed to the rear yards discharging to Tract B RHRN Filing 1 as sheet flow. The runoff will then be directed to a low point near the rear of lot 134 then continue easterly through the regional park.
- Area B – The runoff from the impervious areas from lot 127 of Rolling Hills Ranch North Filing 1 and lots 140 – 144 of Rolling Hills Ranch North Filing 2 will be directed to the rear yards discharging to Tract A of RHRN Filing 2 as sheet flow. The runoff will then be directed to a low point near the rear of lot 127 of RHRN Filing 1 then continue easterly through the regional park.
- Area C – The runoff from the impervious areas from lots 130 – 139 of Rolling Hills Ranch North Filing 2 will be directed to the rear yards discharging to Tract A of RHRN Filing 2 as sheet flow. The runoff will then continue to sheet flow across the tract to an adjacent drainage swale then continue easterly through the regional park.

- Area D – The runoff from the impervious areas from lots 104 – 116 of Rolling Hills Ranch North Filing 2 will be directed to the rear yards discharging to Tract A of RHRN Filing 2 as sheet flow. Some runoff will gather in a natural swale and flow easterly across Tract A. The runoff from other lots will gather within a constructed swale along the rear of lots 117 to 129 across Tract A. The total flow from this area (FG34) continue downstream within a constructed drainage swale exit the site and continue easterly through the regional park.

## ***DETENTION POND***

### *Existing Pond G Detention Storage Criteria*

Existing Detention Pond G was constructed with the grading operations associated with the Rolling Hills Ranch Rough Grading Permit (EPC# CON2024) in anticipation of the future development of the final phases of the Meridian Ranch Development in accordance with the approved Sketch Plan. The pond is located within the Gieck Ranch Drainage Basin in the eastern portion of Rolling Hills Ranch adjacent to the Falcon Regional Park and the Sanctuary Filing 1. The pond is owned and maintained by the Meridian Service Metropolitan District (MSMD) and a maintenance agreement between the MSMD and El Paso County was recorded with the Rolling Hills Ranch Filing 1 final plat and is functioning as intended. There have no reported issues associated with the facility.

Existing Pond G works 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 handles the full build out of the Meridian Ranch tributary areas and reduces the developed flows to approximately the historic peak flow rates for the full spectrum of design storms. No modifications are necessary for this project.

The existing concrete control structure the outlet of Pond G attenuates 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 feature, a rectangular slotted orifice located on the front and a grated top to reduce the developed peak flow rates. Table 2 (pg. 8) provides summary data for the various design storms of the development for all areas tributary to Pond G including Rolling Hills Ranch North PUD. Pond G was designed and constructed to receive and discharge the anticipated future developed flows and therefore there are no proposed changes to the existing pond or outlet structure.

### *Downstream Analysis*

The outlet (DP G12) for the Existing Detention Pond G is located west of the Falcon Regional Park, upstream of Eastonville Rd (DP G06). At full buildout the discharge from Pond G will be 443 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 536 CFS. The calculated 100-year developed flow rate will be 83% of the historic flow rate. The developed peak flow rate for the full spectrum of design storms are calculated to be below or near that of the corresponding historic peak flow rates. See Table 5 for a complete comparative list of the peak flow rates for the key design points impacted by

the development of Rolling Hills Ranch North PUD. Rolling Hills Ranch North will complete the development of Meridian Ranch and full buildout will be achieved.

**Table 5: 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 $Q_{10}$ (CFS) | PEAK DISCHARGE $Q_5$ (CFS) | PEAK DISCHARGE $Q_2$ (CFS) |
| G12 - POND G OUTLET REGIONAL PARK (G05 - HISTORIC) | Historic | 536 | 350 | 84 | 30 | 5.2 |
| | Future | 444 | 289 | 51 | 19 | 5.2 |
| | % of Historic | 83% | 83% | 60% | 65% | 100% |
| G06 - EASTONVILLE ROAD[1] | Historic | 551 | 369 | 88 | 32 | 5.5 |
| | Future | 475 | 307 | 53.8 | 21 | 5.5 |
| | % of Historic | 86% | 83% | 61% | 65% | 100% |

[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 148.87 acres of residential development of which 78.16 acres are residential development and 24.25 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 | 46.46 | 3% | 1.39 |
| Right-of-way | 24.25 | 90% | 21.82 |
| Residential Lots | 78.16 | 40% (441 Lots) | 31.26 |
| Total | 148.87 | | 54.47 = 36.80% imperv. |

GIECK RANCH FEES:

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

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

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## ***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:

**Step 1: Employ Runoff Reduction Practices**

This development incorporates wider rights-of-way than other developments, thus increasing the amount of pervious 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 forty acres of open space, accounting for over 31% 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**

Some of the storm drains within the project will discharge into an existing natural drainage course that bisects the project creating the opportunity for the storm drainage to infiltrate and to reduce the velocity of the concentrated flow traveling through the project.

**Step 3: Provide Water Quality Capture Volume (WQCV)**

The existing extended detention Pond G with water quality capture volume is located to the south of the project that was designed to accommodate the runoff from this development. The areas east of the drainage course that bisects the project discharge directly to the pond. Existing Detention Pond G was constructed with grading operations associated with the Rolling Hills Ranch Rough Grading Permit (EPC# CON2024) in anticipation of the future development of the final phases of the Meridian Ranch Development in accordance with the approved Sketch Plan. No modifications are necessary for this project.

An existing water quality facility is also located within the project area adjacent to Rex Rd (DP3) and designed to accommodate the volume and settle the suspended solids found in the stormwater prior to being discharged downstream of Rex Rd. The areas adjacent to and west of the drainage course that bisects the project have water quality treatment at this facility. Existing water quality facility was constructed with grading operations associated with the for Rolling Hills Ranch North and Sanctuary Rough Grading Permit at Meridian Ranch (EPC# CON2237) in anticipation of the future development of the final phases of the Meridian Ranch Development in accordance with the approved Sketch Plan. No modifications are necessary for this project.

Areas along the eastern tier of lots adjacent to the open space Tract A within the future Rolling Hills Ranch North Filing 2 and immediately adjacent to the regional park will rely on runoff reduction via sheet flow discharge off the rear of the lots. The stormwater flow will be directed southeasterly through the regional park toward Rex Rd. See Appendix D for calculations and exhibits

All existing detention and water quality facilities are operating as intended and there have been no known reported issues.

See the Water Quality Site Map (Figure 7) in Appendix F for more information on the tributary areas.

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

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

***Detention Pond***

The existing detention pond G will act as the primary water quality control for the areas within the eastern portions of the project. 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.

### *Water Quality Facility*

The water quality facility is located near the south boundary of the project at Rex Rd (DP3). Runoff will be collected by the proposed storm drainage system and diverted the water quality facility in order to allow for suspended solids to settle from the stormwater prior to being discharge downstream of Rex Rd.

### *Silt Fence*

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

### *Erosion Bales*

Erosion bales will be placed ten (10) feet from the inlets of all culverts during construction to reduce the accumulation of sediment within culverts. 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 2021. Prepared by Tech Contractors.

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

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

10. Final Drainage Report for Rolling Hills Ranch Standalone Grading at Meridian Ranch. March 2020. Prepared by Tech Contractors.

11. Final Drainage Report for the Sanctuary Filing 1 at Meridian Ranch. August 2022. Prepared by Tech Contractors.

# Appendices

# Appendix A - HEC-HMS Data

# Input Data

Rolling Hills Ranch North PDR

| BASIN | AREA | | CURVE NO. | LAG TIME (min) |
|---|---|---|---|---|
| | (acre) | ($mi^2$) | | |
| 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 | 43.0 |
| HG14 | 147 | 0.2297 | 61.0 | 45.1 |
| HG15 | 164 | 0.2563 | 61.0 | 65.1 |
| HG18 | 21 | 0.0328 | 61.0 | 14.1 |
| HG19 | 3 | 0.0047 | 61.0 | 6.1 |
| HG20 | 1 | 0.0016 | 61.0 | 6.9 |
| HG21 | 14 | 0.0219 | 61.0 | 13.8 |

| BASIN | AREA | | CURVE NO. | LAG TIME (min) |
|---|---|---|---|---|
| | (acre) | ($mi^2$) | | |
| FUTURE | | | | |
| OS05 | 37 | 0.0578 | 61.0 | 15.2 |
| OS06 | 84 | 0.1313 | 61.0 | 18.7 |
| OS07ab | 11 | 0.0170 | 61.0 | 13.9 |
| OS07c | 19 | 0.0296 | 61.0 | 17.4 |
| OS07d | 2 | 0.0034 | 61.0 | 13.1 |
| OS08a | 16 | 0.0251 | 61.0 | 16.7 |
| OS08b | 11 | 0.0165 | 61.0 | 20.3 |
| OS09a | 6 | 0.0093 | 61.0 | 20.9 |
| OS09b | 28 | 0.0435 | 61.0 | 32.9 |
| FG01 | 34 | 0.0538 | 66.4 | 33.8 |
| FG02 | 25 | 0.0391 | 64.6 | 16.1 |
| FG03 | 13 | 0.0203 | 68.0 | 11.6 |
| FG04 | 11 | 0.0172 | 68.0 | 7.6 |
| FG05 | 37 | 0.0580 | 70.1 | 28.4 |
| FG06 | 43 | 0.0675 | 66.1 | 18.4 |
| FG21a | 6 | 0.0095 | 62.6 | 21.4 |
| FG21b | 10 | 0.0150 | 73.1 | 12.7 |
| FG22 | 87 | 0.1354 | 69.0 | 20.3 |
| FG23a | 14 | 0.0216 | 68.6 | 18.0 |
| FG23b | 15 | 0.0236 | 61.8 | 15.0 |
| FG23c | 7 | 0.0109 | 65.2 | 16.1 |
| FG24a | 22 | 0.0348 | 64.3 | 21.9 |
| FG24b | 38 | 0.0589 | 73.4 | 28.8 |
| FG24c | 19 | 0.0291 | 75.0 | 14.7 |
| FG24d | 17 | 0.0262 | 76.4 | 13.9 |
| FG25 | 69 | 0.1084 | 74.1 | 23.8 |
| FG26 | 36 | 0.0567 | 75.0 | 25.5 |
| FG27 | 43 | 0.0679 | 83.3 | 22.1 |
| FG28 | 12 | 0.0184 | 64.1 | 14.8 |
| FG29 | 63 | 0.0983 | 61.2 | 19.1 |
| FG32 | 26 | 0.0406 | 61.0 | 33.0 |
| FG34 | 18 | 0.0275 | 63.3 | 22.1 |
| FG35 | 19 | 0.0292 | 65.3 | 15.0 |
| FG36 | 19 | 0.0295 | 65.1 | 25.8 |
| FG37 | 48 | 0.0754 | 62.1 | 21.0 |

## COMPOSITE 'C' FACTORS

PROJECT: **Rolling Hills Ranch North PDR** Date 2/5/2024

| BASIN DESIGNATION | AREA (AC.) | | | | | | | | | | | | | | AREA ($MI^2$) | COMPOSITE 'C' FACTOR | PERCENT IMPERV. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UNDEV | LATIGO UNDEV. | 2.5 AC | 1 DU/AC | 2 DU/AC | 3 DU/AC | 4 DU/AC | 5 DU/AC | 8 DU/AC or more | STREETS | SCHOOL, CLUB HSE, REC CTR | OPEN SPACE PARKS | COMM. | TOTAL | | | |
| **HISTORIC** | | | | | | | | | | | | | | | | | |
| **OS05** | 37.0 | | | | | | | | | | | | | 37 | 0.0578 | **61.0** | **0.0%** |
| **OS06** | 84.0 | | | | | | | | | | | | | 84 | 0.1313 | **61.0** | **0.0%** |
| **OS07** | 12.3 | | 8.7 | | | | | | | | | | | 21 | 0.0328 | **63.1** | **4.6%** |
| **OS08** | 1.8 | | 24.2 | | | | | | | | | | | 26 | 0.0406 | **65.7** | **10.2%** |
| **OS09** | | 97.7 | | | | | | | | | | | | 98 | 0.1527 | **65.0** | **0.0%** |
| **HG01** | 35.0 | | | | | | | | | | | | | 35 | 0.0547 | **61.0** | **0.0%** |
| **HG02** | 58.0 | | | | | | | | | | | | | 58 | 0.0906 | **61.0** | **0.0%** |
| **HG03** | 114.7 | 2.3 | | | | | | | | | | | | 117 | 0.1828 | **61.1** | **0.0%** |
| **HG04** | 57.0 | | | | | | | | | | | | | 57 | 0.0891 | **61.0** | **0.0%** |
| **HG05** | 72.0 | | | | | | | | | | | | | 72 | 0.1125 | **61.0** | **0.0%** |
| **HG06A** | 88.0 | | | | | | | | | | | | | 88 | 0.1375 | **61.0** | **0.0%** |
| **HG06B** | 66.0 | | | | | | | | | | | | | 66 | 0.1031 | **61.0** | **0.0%** |
| **HG13** | 31.7 | | 22.3 | | | | | | | | | | | 54 | 0.0844 | **63.1** | **4.5%** |
| **HG14** | 147.0 | | | | | | | | | | | | | 147 | 0.2297 | **61.0** | **0.0%** |

## COMPOSITE 'C' FACTORS

| PROJECT: | Rolling Hills Ranch North PDR | | | | | | | | | | | | | | Date | 8/22/2023 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BASIN DESIGNATION | AREA (AC.) | | | | | | | | | | | | | | AREA ($MI^2$) | COMPOSITE 'C' FACTOR | PERCENT IMPERV. |
| | UNDEV | LATIGO UNDEV. | 2.5 AC | 1 DU/AC | 2 DU/AC | 3 DU/AC | 4 DU/AC | 5 DU/AC | 8 DU/AC or more | STREETS | SCHOOL, CLUB HSE, REC CTR | OPEN SPACE PARKS | COMM. | TOTAL | | | |
| **FUTURE** | | | | | | | | | | | | | | | | | |
| **OS05** | 37 | | | | | | | | | | | | | 37 | 0.0578 | **61.0** | **0.0%** |
| **OS06** | 84 | | | | | | | | | | | | | 84 | 0.1313 | **61.0** | **0.0%** |
| **OS07ab** | 11 | | | | | | | | | | | | | 11 | 0.0170 | **61.0** | **0.0%** |
| **OS07c** | 19 | | | | | | | | | | | | | 19 | 0.0296 | **61.0** | **0.0%** |
| **OS07d** | 2.2 | | | | | | | | | | | | | 2.2 | 0.0034 | **61.0** | **0.0%** |
| **OS08a** | 16 | | | | | | | | | | | | | 16 | 0.0251 | **61.0** | **0.0%** |
| **OS08b** | 11 | | | | | | | | | | | | | 11 | 0.0165 | **61.0** | **0.0%** |
| **OS09a** | 5.9 | | | | | | | | | | | | | 5.9 | 0.0093 | **61.0** | **0.0%** |
| **OS09b** | 28 | | | | | | | | | | | | | 28 | 0.0435 | **61.0** | **0.0%** |
| **FG01** | 13 | | | 19 | | | | | | | | | 2.1 | 34 | 0.0538 | **66.4** | **16.9%** |
| **FG02** | 12 | | | 13 | | | | | | | | | | 25 | 0.0391 | **64.6** | **10.4%** |
| **FG03** | | | | 13 | | | | | | | | | | 13 | 0.0203 | **68.0** | **20.0%** |
| **FG04** | | | | 11 | | | | | | | | | | 11 | 0.0172 | **68.0** | **20.0%** |
| **FG05** | 1.5 | | | 33 | | | | | | 3.0 | | | | 37 | 0.0580 | **70.1** | **25.7%** |
| **FG06** | 15 | | | 27 | | | | | | 0.9 | | 0.5 | | 43 | 0.0675 | **66.1** | **14.4%** |
| **FG21a** | 4.7 | | | 1.4 | | | | | | | | | | 6.1 | 0.0095 | **62.6** | **4.6%** |
| **FG21b** | | | | | 3.8 | | | | | | | 2.5 | 3.3 | 9.6 | 0.0150 | **73.1** | **43.1%** |
| **FG22** | 17 | | | 16 | 48 | | | | | 2.1 | | 0.9 | 3.3 | 87 | 0.1354 | **69.0** | **23.4%** |
| **FG23a** | 3.1 | | | | 2.8 | 5.0 | | | | 0.6 | | 2.3 | | 14 | 0.0216 | **68.6** | **20.6%** |
| **FG23b** | 14 | | | | | | 0.9 | | | | | | | 15 | 0.0236 | **61.8** | **2.4%** |
| **FG23c** | 4.9 | | | | | | 2.1 | | | | | | | 7.0 | 0.0109 | **65.2** | **12.0%** |
| **FG24a** | 18 | | | | | | 2.3 | 2.4 | | | | | | 22 | 0.0348 | **64.3** | **8.8%** |
| **FG24b** | 0.2 | | | 4.1 | 2.7 | 11.3 | 14 | 5.7 | | | | 0.1 | | 38 | 0.0589 | **73.4** | **34.0%** |
| **FG24c** | | | | | | | 19 | | | | | | | 19 | 0.0291 | **75.0** | **40.0%** |
| **FG24d** | 5.5 | | | | | | 5.7 | | | 4.8 | | 0.8 | | 17 | 0.0262 | **76.4** | **42.3%** |
| **FG25** | | | | | | 9.3 | 57 | 0.9 | | | | 2.6 | | 69 | 0.1084 | **74.1** | **37.3%** |
| **FG26** | | | | | | | | 36 | | 0.4 | | 0.5 | | 36 | 0.0570 | **78.0** | **43.1%** |
| **FG27** | 2.5 | | | | | | | 1.7 | 35 | 2.8 | | 1.7 | | 43 | 0.0679 | **83.3** | **56.2%** |
| **FG28** | | | | | | | 1.7 | | 0.1 | | | 10 | | 12 | 0.0184 | **64.1** | **8.0%** |
| **FG29** | 62 | | | | | | 0.7 | | | | | | | 63 | 0.0983 | **61.2** | **0.4%** |
| **FG32** | | | | | | | | | | | 26 | | | 26 | 0.0402 | **80.0** | **52.0%** |
| **FG34** | 16 | | | | | | | 1.8 | | | | | | 18 | 0.0275 | **62.7** | **4.4%** |
| **FG35** | 15 | | | | | | | 1.2 | | 2.2 | | | | 19 | 0.0293 | **66.4** | **14.3%** |
| **FG36** | 16 | | | | | | | | | 3.2 | | | | 19 | 0.0299 | **67.3** | **16.9%** |
| **FG37** | 48 | | | | | | | | | | | | | 48 | 0.0746 | **61.0** | **0.0%** |

## LAG TIME

SCS Calculations

PROJECT: **Rolling Hills Ranch North PDR** DATE: 2/5/2024

| SUBBASIN DATA | | | INITIAL/OVERLAND TIME ($T_i$) | | | | | | TRAVEL TIME ($T_t$) | | | | | TOTAL | FINAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BASIN DESIGNATION | $P_2$ | AREA (SQ MI) | LENGTH (FT) | ΔH | SLOPE % | OVERLAND CONVEYANCE TYPE | n | $T_i$ (Min.)* | LENGTH (FT) | ΔH | TRAVEL CONVEYANCE TYPE | VEL. (FPS) | $T_t$ (Min.)** | $T_i+T_t$ (Min.) | $T_{lag}$ (min) |
| **HISTORIC** | | | | | | | | | | | | | | | |
| **OS05** | 1.88 | 0.058 | 200 | 10 | 5.0% | GP | 0.15 | 15.4 | 2100 | 115 | G | 3.5 | 10.0 | 25.4 | **15.2** |
| **OS06** | 1.88 | 0.131 | 200 | 9 | 4.5% | GP | 0.15 | 16.1 | 2840 | 125 | G | 3.1 | 15.0 | 31.1 | **18.7** |
| **OS07** | 1.88 | 0.033 | 200 | 6 | 3.0% | GP | 0.15 | 18.9 | 1080 | 35 | G | 2.7 | 6.7 | 25.6 | **15.4** |
| **OS08** | 1.88 | 0.041 | 300 | 26 | 8.7% | GP | 0.15 | 17.1 | 1535 | 50 | G | 2.7 | 9.5 | 26.6 | **15.9** |
| **OS09** | 1.88 | 0.153 | 200 | 4 | 2.0% | GP | 0.15 | 22.3 | 3525 | 75 | G | 2.2 | 26.9 | 49.1 | **29.5** |
| **HG01** | 1.88 | 0.055 | 300 | 11.0 | 3.7% | GP | 0.15 | 24.2 | 1495 | 56 | G | 2.9 | 8.6 | 32.7 | **19.6** |
| **HG02** | 1.88 | 0.091 | 300 | 10.0 | 3.3% | GP | 0.15 | 25.1 | 2755 | 87 | G | 2.7 | 17.2 | 42.3 | **25.4** |
| **HG03** | 1.88 | 0.183 | 300 | 8.0 | 2.7% | GP | 0.15 | 27.4 | 4270 | 115 | G | 2.5 | 28.9 | 56.3 | **33.8** |
| **HG04** | 1.88 | 0.089 | 300 | 8.0 | 2.7% | GP | 0.15 | 27.4 | 4205 | 120 | N | 3.0 | 23.7 | 51.1 | **30.7** |
| **HG05** | 1.88 | 0.113 | 300 | 9.0 | 3.0% | GP | 0.15 | 26.2 | 4085 | 117 | G | 2.5 | 26.8 | 53.0 | **31.8** |
| **HG06A** | 1.88 | 0.138 | 725 | 20.0 | 2.8% | GP | 0.15 | 54.8 | 2750 | 64 | N | 2.7 | 17.2 | 72.0 | **43.2** |
| **HG06B** | 1.88 | 0.103 | 955 | 27.0 | 2.8% | GP | 0.15 | 67.7 | 1750 | 22 | N | 2.0 | 14.9 | 82.6 | **49.5** |
| **HG07** | 1.88 | 0.098 | 540 | 38.0 | 7.0% | GP | 0.15 | 29.8 | 2550 | 68 | G | 2.4 | 17.4 | 47.1 | **28.3** |
| **HG08** | 1.88 | 0.133 | 315 | 24.0 | 7.6% | GP | 0.15 | 18.7 | 2800 | 72 | G | 2.4 | 19.4 | 38.1 | **22.9** |
| **HG09** | 1.88 | 0.178 | 415 | 20.0 | 4.8% | GP | 0.15 | 28.1 | 4240 | 96 | G | 2.3 | 31.3 | 59.4 | **35.6** |
| **HG10** | 1.88 | 0.138 | 1015 | 30.0 | 3.0% | GP | 0.15 | 69.8 | 4190 | 86 | G | 2.1 | 32.5 | 102.3 | **61.4** |
| **HG11** | 1.88 | 0.205 | 415 | 22.0 | 5.3% | GP | 0.15 | 27.0 | 5718 | 142 | G | 2.4 | 40.3 | 67.3 | **40.4** |
| **HG12** | 1.88 | 0.130 | 316 | 20.0 | 6.3% | GP | 0.15 | 20.2 | 4870 | 130 | G | 2.5 | 33.1 | 53.4 | **32.0** |
| **HG13** | 1.88 | 0.084 | 745 | 27.0 | 3.6% | GP | 0.15 | 50.2 | 3225 | 90 | G | 2.5 | 21.5 | 71.7 | **43.0** |
| **HG14** | 1.88 | 0.230 | 550 | 14.0 | 2.5% | GP | 0.15 | 45.4 | 3650 | 68 | G | 2.0 | 29.7 | 75.1 | **45.1** |
| **HG15** | 1.88 | 0.256 | 710 | 16.0 | 2.3% | GP | 0.15 | 58.5 | 7310 | 142 | N | 2.4 | 50.0 | 108.4 | **65.1** |
| **HG18** | 1.88 | 0.033 | 300 | 54.0 | 18.0% | GP | 0.15 | 12.8 | 1380 | 28 | G | 2.1 | 10.8 | 23.5 | **14.1** |
| **HG19** | 1.88 | 0.005 | 140 | 16.0 | 11.4% | GP | 0.15 | 8.3 | 330 | 14 | G | 3.1 | 1.8 | 10.1 | **6.1** |
| **HG20** | 1.88 | 0.002 | 150 | 12.0 | 8.0% | GP | 0.15 | 10.2 | 220 | 8 | G | 2.9 | 1.3 | 11.4 | **6.9** |
| **HG21** | 1.88 | 0.022 | 170 | 6.0 | 3.5% | GP | 0.15 | 15.6 | 1250 | 44 | G | 2.8 | 7.4 | 23.0 | **13.8** |
| **FUTURE** | | | | | | | | | | | | | | | |
| **OS05** | 1.88 | 0.058 | FROM APPROVED MERIDIAN RANCH FILING MDDP, JAN 2018 | | | | | | | | | | | 25.4 | **15.2** |
| **OS06** | 1.88 | 0.131 | | | | | | | | | | | | 31.1 | **18.7** |
| **OS07ab** | 1.88 | 0.017 | 285 | 19.0 | 6.7% | GP | 0.15 | 18.3 | 950 | 45 | G | 3.3 | 4.8 | 23.1 | **13.9** |
| **OS07c** | 1.88 | 0.030 | 270 | 18.0 | 6.7% | GP | 0.15 | 17.5 | 1620 | 40 | G | 2.4 | 11.5 | 28.9 | **17.4** |
| **OS07d** | 1.88 | 0.003 | 250 | 10.0 | 4.0% | GP | 0.15 | 20.2 | 185 | 2 | N | 1.8 | 1.7 | 21.9 | **13.1** |
| **OS08a** | 1.88 | 0.025 | 275 | 11.0 | 4.0% | GP | 0.15 | 21.8 | 1000 | 24 | N | 2.7 | 6.1 | 27.9 | **16.7** |
| **OS08b** | 1.88 | 0.017 | 420 | 20.0 | 4.8% | GP | 0.15 | 28.5 | 830 | 18 | N | 2.6 | 5.4 | 33.8 | **20.3** |
| **OS09a** | 1.88 | 0.009 | 455 | 18.0 | 4.0% | GP | 0.15 | 32.7 | 385 | 12 | N | 3.1 | 2.1 | 34.8 | **20.9** |
| **OS09b** | 1.88 | 0.043 | 495 | 28.0 | 5.7% | GD | 0.24 | 44.2 | 1725 | 41 | N | 2.7 | 10.7 | 54.8 | **32.9** |
| **FG01** | 1.88 | 0.054 | FROM APPROVED MERIDIAN RANCH FILING MDDP, JAN 2018 | | | | | | | | | | | 56.4 | **33.8** |
| **FG02** | 1.88 | 0.039 | | | | | | | | | | | | 26.9 | **16.1** |
| **FG03** | 1.88 | 0.020 | | | | | | | | | | | | 19.3 | **11.6** |
| **FG04** | 1.88 | 0.017 | | | | | | | | | | | | 12.6 | **7.6** |
| **FG05** | 1.88 | 0.058 | 300 | 8.0 | 2.7% | GP | 0.15 | 27.4 | 3690 | 88 | P | 3.1 | 19.9 | 47.4 | **28.4** |
| **FG06** | 1.88 | 0.068 | 220 | 20.0 | 9.1% | GP | 0.15 | 13.1 | 2250 | 46 | G | 2.1 | 17.5 | 30.6 | **18.4** |
| **FG21a** | 1.88 | 0.010 | FROM APPROVED ESTATES AT ROLLING HILLS RANCH GRADING FDR, MAR 2020 | | | | | | | | | | | 35.6 | **21.4** |
| **FG21b** | 1.88 | 0.015 | 145 | 6.0 | 4.1% | GP | 0.15 | 12.9 | 1255 | 36 | G | 2.5 | 8.2 | 21.1 | **12.7** |
| **FG22** | 1.88 | 0.135 | FROM RATIONAL CALCULATIONS ESTATES AT ROLLING HILLS RANCH FILING 2 | | | | | | | | | | | 33.9 | **20.3** |
| **FG23a** | 1.88 | 0.022 | 185 | 9.0 | 4.9% | GD | 0.24 | 21.3 | 1685 | 45 | P | 3.3 | 8.6 | 29.9 | **18.0** |
| **FG23b** | 1.88 | 0.024 | 180 | 13.0 | 7.2% | GP | 0.15 | 12.2 | 1795 | 32 | N | 2.3 | 12.8 | 25.0 | **15.0** |
| **FG23c** | 1.88 | 0.011 | 200 | 11.0 | 5.5% | GD | 0.24 | 21.6 | 770 | 15 | N | 2.4 | 5.3 | 26.9 | **16.1** |
| **FG24a** | 1.88 | 0.035 | 350 | 22.0 | 6.3% | GP | 0.15 | 22.0 | 2355 | 57 | N | 2.7 | 14.4 | 36.4 | **21.9** |
| **FG24b** | 1.88 | 0.059 | 325 | 16.0 | 4.9% | GD | 0.24 | 33.3 | 2350 | 42 | P | 2.7 | 14.7 | 48.1 | **28.8** |
| **FG24c** | 1.88 | 0.029 | 70 | 3.0 | 4.3% | GD | 0.24 | 10.3 | 2075 | 31 | P | 2.4 | 14.1 | 24.5 | **14.7** |
| **FG24d** | 1.88 | 0.026 | 50 | 1.0 | 2.0% | GD | 0.24 | 10.7 | 2065 | 39 | P | 2.7 | 12.5 | 23.2 | **13.9** |
| **FG25** | 1.88 | 0.108 | FROM RATIONAL CALCULATIONS ROLLING HILLS RANCH FILING 3 | | | | | | | | | | | 39.7 | **23.8** |
| **FG26** | 1.88 | 0.057 | 145 | 2.0 | 1.4% | GD | 0.24 | 29.1 | 2430 | 55 | P | 3.0 | 13.5 | 42.5 | **25.5** |
| **FG27** | 1.88 | 0.068 | 100 | 4.0 | 4.0% | GD | 0.24 | 14.1 | 2935 | 34 | P | 2.2 | 22.7 | 36.8 | **22.1** |
| **FG28** | 1.88 | 0.018 | 100 | 2.0 | 2.0% | GD | 0.24 | 18.6 | 340 | 6 | L | 0.9 | 6.1 | 24.7 | **14.8** |
| **FG29** | 1.88 | 0.098 | 255 | 14.0 | 5.5% | GP | 0.15 | 18.0 | 1890 | 32 | N | 2.3 | 13.8 | 31.9 | **19.1** |
| **FG32** | 1.88 | 0.041 | 280 | 4.0 | 1.4% | GD | 0.24 | 48.5 | 1345 | 40 | P | 3.4 | 6.5 | 55.0 | **33.0** |
| **FG34** | 1.88 | 0.027 | 305 | 22.0 | 7.2% | GP | 0.15 | 18.7 | 2850 | 64 | N | 2.6 | 18.1 | 36.8 | **22.1** |
| **FG35** | 1.88 | 0.029 | 165 | 7.0 | 4.2% | GP | 0.15 | 14.1 | 1450 | 32 | G | 2.2 | 10.8 | 25.0 | **15.0** |
| **FG36** | 1.88 | 0.030 | 305 | 7.0 | 2.3% | GP | 0.15 | 29.5 | 1770 | 38 | G | 2.2 | 13.4 | 42.9 | **25.8** |
| **FG37** | 1.88 | 0.075 | 305 | 15.0 | 4.9% | GP | 0.15 | 21.8 | 1780 | 40 | G | 2.2 | 13.2 | 35.0 | **21.0** |

| TYPE OF SURFACE | | n |
|---|---|---|
| SMOOTH SURFACES (conc, asph, gravel, bare soil, etc) | S | 0.0110 |
| FALLOW (no cover) | F | 0.0500 |
| CULTIVATED SOILS (<20% cover) | CL | 0.0600 |
| CULTIVATED SOILS (>20% cover) | CG | 0.1700 |
| GRASS (Short prairie grass) | GP | 0.1500 |
| GRASS (Dense grass) | GD | 0.2400 |
| GRASS (Bermuda grass) | GB | 0.4100 |
| RANGE (Natural) | R | 0.1300 |
| WOODS (Light Underbrush) | WL | 0.4000 |
| WOODS (Dense Underbrush) | WD | 0.8000 |

Notes: * $T_i = 0.42\,(n \bullet L)^{0.8}/(P_2)^{0.5} \bullet S^{0.4}$ (min)

** $T_t = L/60 \bullet V$(min)

| TYPE OF SURFACE | |
|---|---|
| HEAVY MEADOW | H |
| TILLAGE/FIELD | T |
| RIPRAP (not buried) | R |
| SHORT PASTURE AND LAWNS | L |
| NEARLY BARE GROUND | B |
| GRASSED WATERWAY | G |
| NATURAL SANDY CHANNEL | N |
| PAVED AREAS | P |

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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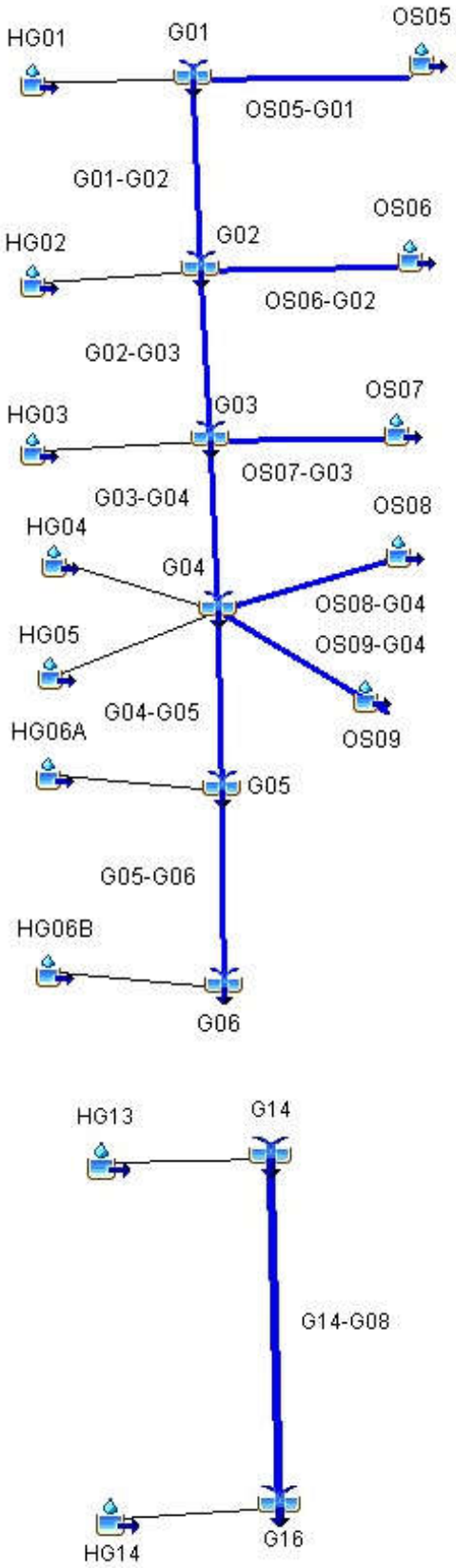
# HISTORIC CONDITIONS



| HISTORIC SCS (100-YEAR) | | | | |
|---|---|---|---|---|
| HYDROLOGIC ELEMENT | DRAINAGE AREA (SQ. MI.) | DISCHARGE PEAK Q100 (CFS) | TIME OF PEAK | TOTAL VOLUME Q100 (AC. FT.) |
| OS06 | 0.1313 | 80 | 01Jul2015, 12:12 | 9.3 |
| OS06-G02 | 0.1313 | 77 | 01Jul2015, 12:24 | 9.2 |
| OS05 | 0.0578 | 39 | 01Jul2015, 12:12 | 4.1 |
| OS05-G01 | 0.0578 | 38 | 01Jul2015, 12:12 | 4.1 |
| HG01 | 0.0547 | 32 | 01Jul2015, 12:12 | 3.9 |
| G01 | 0.1125 | 70 | 01Jul2015, 12:12 | 7.9 |
| G01-G02 | 0.1125 | 68 | 01Jul2015, 12:24 | 7.8 |
| HG02 | 0.0906 | 45 | 01Jul2015, 12:24 | 6.4 |
| G02 | 0.3344 | 191 | 01Jul2015, 12:24 | 23 |
| G02-G03 | 0.3344 | 190 | 01Jul2015, 12:30 | 23 |
| HG03 | 0.1828 | 77 | 01Jul2015, 12:30 | 13 |
| OS07 | 0.0328 | 25 | 01Jul2015, 12:12 | 2.6 |
| OS07-G03 | 0.0328 | 24 | 01Jul2015, 12:30 | 2.5 |
| G03 | 0.5500 | 291 | 01Jul2015, 12:30 | 38 |
| G03-G04 | 0.5500 | 281 | 01Jul2015, 12:30 | 38 |
| OS09 | 0.1547 | 91 | 01Jul2015, 12:24 | 13 |
| OS09-G04 | 0.1547 | 90 | 01Jul2015, 12:30 | 13 |
| HG04 | 0.0891 | 40 | 01Jul2015, 12:30 | 6.3 |
| HG05 | 0.1125 | 49 | 01Jul2015, 12:30 | 7.9 |
| OS08 | 0.0406 | 35 | 01Jul2015, 12:12 | 3.6 |
| OS08-G04 | 0.0406 | 34 | 01Jul2015, 12:30 | 3.5 |
| G04 | 0.9469 | 493 | 01Jul2015, 12:30 | 69 |
| G04-G05 | 0.9469 | 488 | 01Jul2015, 12:36 | 68 |
| HG06A | 0.1375 | 49 | 01Jul2015, 12:42 | 9.6 |
| G05 | 1.0844 | 536 | 01Jul2015, 12:36 | 78 |
| G05-G06 | 1.0844 | 520 | 01Jul2015, 12:36 | 78 |
| HG06B | 0.1031 | 33 | 01Jul2015, 12:48 | 7.2 |
| G06 | 1.1875 | 551 | 01Jul2015, 12:42 | 85 |
| | | | | |
| HG14 | 0.2297 | 79 | 01Jul2015, 12:42 | 16 |
| HG13 | 0.0844 | 54 | 01Jul2015, 12:18 | 6.6 |
| G07 | 0.0844 | 54 | 01Jul2015, 12:18 | 6.6 |
| G07-G08 | 0.0844 | 53 | 01Jul2015, 12:18 | 6.6 |
| G16 | 0.3141 | 117 | 01Jul2015, 12:30 | 23 |
| | | | | |

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 | 52 | 01Jul2015, 12:12 | 6.5 |
| OS06-G02 | 0.1313 | 52 | 01Jul2015, 12:24 | 6.4 |
| OS05 | 0.0578 | 26 | 01Jul2015, 12:12 | 2.9 |
| OS05-G01 | 0.0578 | 25 | 01Jul2015, 12:18 | 2.9 |
| HG01 | 0.0547 | 21 | 01Jul2015, 12:18 | 2.7 |
| G01 | 0.1125 | 46 | 01Jul2015, 12:18 | 5.6 |
| G01-G02 | 0.1125 | 46 | 01Jul2015, 12:24 | 5.5 |
| HG02 | 0.0906 | 30 | 01Jul2015, 12:24 | 4.5 |
| G02 | 0.3344 | 127 | 01Jul2015, 12:24 | 16 |
| G02-G03 | 0.3344 | 125 | 01Jul2015, 12:30 | 16 |
| HG03 | 0.1828 | 51 | 01Jul2015, 12:30 | 9.1 |
| OS07 | 0.0328 | 17 | 01Jul2015, 12:12 | 1.9 |
| OS07-G03 | 0.0328 | 17 | 01Jul2015, 12:30 | 1.8 |
| G03 | 0.5500 | 192 | 01Jul2015, 12:30 | 27 |
| G03-G04 | 0.5500 | 189 | 01Jul2015, 12:36 | 27 |
| OS09 | 0.1547 | 63 | 01Jul2015, 12:24 | 9.6 |
| OS09-G04 | 0.1547 | 62 | 01Jul2015, 12:36 | 9.4 |
| HG04 | 0.0891 | 26 | 01Jul2015, 12:30 | 4.4 |
| HG05 | 0.1125 | 32 | 01Jul2015, 12:30 | 5.6 |
| OS08 | 0.0406 | 25 | 01Jul2015, 12:12 | 2.6 |
| OS08-G04 | 0.0406 | 24 | 01Jul2015, 12:36 | 2.5 |
| G04 | 0.9469 | 332 | 01Jul2015, 12:36 | 49 |
| G04-G05 | 0.9469 | 318 | 01Jul2015, 12:42 | 48 |
| HG06A | 0.1375 | 32 | 01Jul2015, 12:42 | 6.7 |
| G05 | 1.0844 | 350 | 01Jul2015, 12:42 | 55 |
| G05-G06 | 1.0844 | 348 | 01Jul2015, 12:42 | 55 |
| HG06B | 0.1031 | 22 | 01Jul2015, 12:54 | 5.0 |
| G06 | 1.1875 | 369 | 01Jul2015, 12:42 | 60 |
| | | | | |
| HG14 | 0.2297 | 52 | 01Jul2015, 12:48 | 11 |
| HG13 | 0.0844 | 37 | 01Jul2015, 12:18 | 4.7 |
| G07 | 0.0844 | 37 | 01Jul2015, 12:18 | 4.7 |
| G07-G08 | 0.0844 | 36 | 01Jul2015, 12:24 | 4.7 |
| G16 | 0.3141 | 77 | 01Jul2015, 12:30 | 16 |
| | | | | |

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 | 11 | 01Jul2015, 12:30 | 2.1 |
| OS05 | 0.0578 | 5.6 | 01Jul2015, 12:12 | 1.0 |
| OS05-G01 | 0.0578 | 5.5 | 01Jul2015, 12:24 | 0.94 |
| HG01 | 0.0547 | 4.7 | 01Jul2015, 12:18 | 0.90 |
| G01 | 0.1125 | 10 | 01Jul2015, 12:24 | 1.9 |
| G01-G02 | 0.1125 | 10 | 01Jul2015, 12:36 | 1.8 |
| HG02 | 0.0906 | 6.7 | 01Jul2015, 12:30 | 1.5 |
| G02 | 0.3344 | 27 | 01Jul2015, 12:36 | 5.4 |
| G02-G03 | 0.3344 | 27 | 01Jul2015, 12:48 | 5.3 |
| HG03 | 0.1828 | 12 | 01Jul2015, 12:42 | 3.0 |
| OS07 | 0.0328 | 4.5 | 01Jul2015, 12:12 | 0.66 |
| OS07-G03 | 0.0328 | 4.3 | 01Jul2015, 12:48 | 0.66 |
| G03 | 0.5500 | 42 | 01Jul2015, 12:48 | 8.9 |
| G03-G04 | 0.5500 | 42 | 01Jul2015, 12:54 | 8.8 |
| OS09 | 0.1547 | 19 | 01Jul2015, 12:30 | 3.6 |
| OS09-G04 | 0.1547 | 18 | 01Jul2015, 12:42 | 3.5 |
| HG04 | 0.0891 | 5.9 | 01Jul2015, 12:36 | 1.5 |
| HG05 | 0.1125 | 7.4 | 01Jul2015, 12:36 | 1.8 |
| OS08 | 0.0406 | 7.7 | 01Jul2015, 12:12 | 1.0 |
| OS08-G04 | 0.0406 | 7.4 | 01Jul2015, 12:48 | 1.0 |
| G04 | 0.9469 | 76 | 01Jul2015, 12:54 | 17 |
| G04-G05 | 0.9469 | 76 | 01Jul2015, 12:54 | 16 |
| HG06A | 0.1375 | 7.6 | 01Jul2015, 12:54 | 2.2 |
| G05 | 1.0844 | 84 | 01Jul2015, 12:54 | 19 |
| G05-G06 | 1.0844 | 83 | 01Jul2015, 13:00 | 19 |
| HG06B | 0.1031 | 5.3 | 01Jul2015, 13:00 | 1.7 |
| G06 | 1.1875 | 88 | 01Jul2015, 13:00 | 20 |
| | | | | |
| HG14 | 0.2297 | 12 | 01Jul2015, 12:54 | 3.7 |
| HG13 | 0.0844 | 9.5 | 01Jul2015, 12:18 | 1.7 |
| G07 | 0.0844 | 9.5 | 01Jul2015, 12:18 | 1.7 |
| G07-G08 | 0.0844 | 9.4 | 01Jul2015, 12:30 | 1.7 |
| G16 | 0.3141 | 19 | 01Jul2015, 12:36 | 5.4 |
| | | | | |

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 | 3.8 | 01Jul2015, 12:24 | 1.1 |
| OS06-G02 | 0.1313 | 3.7 | 01Jul2015, 12:42 | 1.1 |
| OS05 | 0.0578 | 1.8 | 01Jul2015, 12:18 | 0.49 |
| OS05-G01 | 0.0578 | 1.7 | 01Jul2015, 12:30 | 0.48 |
| HG01 | 0.0547 | 1.5 | 01Jul2015, 12:24 | 0.46 |
| G01 | 0.1125 | 3.2 | 01Jul2015, 12:30 | 1.0 |
| G01-G02 | 0.1125 | 3.2 | 01Jul2015, 12:48 | 0.92 |
| HG02 | 0.0906 | 2.3 | 01Jul2015, 12:36 | 0.8 |
| G02 | 0.3344 | 9.0 | 01Jul2015, 12:42 | 2.8 |
| G02-G03 | 0.3344 | 9.0 | 01Jul2015, 13:00 | 2.7 |
| HG03 | 0.1828 | 4.3 | 01Jul2015, 12:48 | 1.6 |
| OS07 | 0.0328 | 1.7 | 01Jul2015, 12:18 | 0.36 |
| OS07-G03 | 0.0328 | 1.7 | 01Jul2015, 13:00 | 0.35 |
| G03 | 0.5500 | 15 | 01Jul2015, 13:00 | 4.6 |
| G03-G04 | 0.5500 | 14 | 01Jul2015, 13:12 | 4.5 |
| OS09 | 0.1547 | 8.3 | 01Jul2015, 12:36 | 2.1 |
| OS09-G04 | 0.1547 | 8.3 | 01Jul2015, 12:48 | 2.0 |
| HG04 | 0.0891 | 2.1 | 01Jul2015, 12:42 | 0.75 |
| HG05 | 0.1125 | 2.6 | 01Jul2015, 12:42 | 0.94 |
| OS08 | 0.0406 | 3.4 | 01Jul2015, 12:12 | 0.58 |
| OS08-G04 | 0.0406 | 3.4 | 01Jul2015, 13:00 | 0.58 |
| G04 | 0.9469 | 28 | 01Jul2015, 13:12 | 8.7 |
| G04-G05 | 0.9469 | 27 | 01Jul2015, 13:18 | 8.6 |
| HG06A | 0.1375 | 2.9 | 01Jul2015, 13:00 | 1.1 |
| G05 | 1.0844 | 30 | 01Jul2015, 13:18 | 9.8 |
| G05-G06 | 1.0844 | 30 | 01Jul2015, 13:24 | 9.6 |
| HG06B | 0.1031 | 2.0 | 01Jul2015, 13:12 | 0.85 |
| G06 | 1.1875 | 32 | 01Jul2015, 13:24 | 10 |
| | | | | |
| HG14 | 0.2297 | 4.7 | 01Jul2015, 13:06 | 1.9 |
| HG13 | 0.0844 | 3.8 | 01Jul2015, 12:24 | 0.92 |
| G07 | 0.0844 | 3.8 | 01Jul2015, 12:24 | 0.92 |
| G07-G08 | 0.0844 | 3.7 | 01Jul2015, 12:36 | 0.90 |
| G16 | 0.3141 | 7.4 | 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 | 0.52 | 01Jul2015, 13:30 | 0.34 |
| OS06-G02 | 0.1313 | 0.52 | 01Jul2015, 14:00 | 0.32 |
| OS05 | 0.0578 | 0.23 | 01Jul2015, 13:24 | 0.15 |
| OS05-G01 | 0.0578 | 0.23 | 01Jul2015, 13:42 | 0.15 |
| HG01 | 0.0547 | 0.22 | 01Jul2015, 13:36 | 0.14 |
| G01 | 0.1125 | 0.45 | 01Jul2015, 13:36 | 0.29 |
| G01-G02 | 0.1125 | 0.45 | 01Jul2015, 14:06 | 0.27 |
| HG02 | 0.0906 | 0.36 | 01Jul2015, 13:42 | 0.23 |
| G02 | 0.3344 | 1.3 | 01Jul2015, 14:00 | 0.83 |
| G02-G03 | 0.3344 | 1.3 | 01Jul2015, 14:30 | 0.77 |
| HG03 | 0.1828 | 0.72 | 01Jul2015, 13:54 | 0.48 |
| OS07 | 0.0328 | 0.26 | 01Jul2015, 12:54 | 0.13 |
| OS07-G03 | 0.0328 | 0.26 | 01Jul2015, 14:12 | 0.11 |
| G03 | 0.5500 | 2.3 | 01Jul2015, 14:24 | 1.4 |
| G03-G04 | 0.5500 | 2.3 | 01Jul2015, 14:42 | 1.3 |
| OS09 | 0.1547 | 1.9 | 01Jul2015, 12:54 | 0.81 |
| OS09-G04 | 0.1547 | 1.9 | 01Jul2015, 13:18 | 0.78 |
| HG04 | 0.0891 | 0.34 | 01Jul2015, 13:48 | 0.23 |
| HG05 | 0.1125 | 0.43 | 01Jul2015, 13:54 | 0.29 |
| OS08 | 0.0406 | 0.72 | 01Jul2015, 12:24 | 0.24 |
| OS08-G04 | 0.0406 | 0.72 | 01Jul2015, 13:36 | 0.23 |
| G04 | 0.9469 | 4.7 | 01Jul2015, 14:36 | 2.8 |
| G04-G05 | 0.9469 | 4.7 | 01Jul2015, 14:48 | 2.8 |
| HG06A | 0.1375 | 0.51 | 01Jul2015, 14:12 | 0.34 |
| G05 | 1.0844 | 5.2 | 01Jul2015, 14:48 | 3.1 |
| G05-G06 | 1.0844 | 5.2 | 01Jul2015, 15:00 | 3.0 |
| HG06B | 0.1031 | 0.37 | 01Jul2015, 14:24 | 0.26 |
| G06 | 1.1875 | 5.5 | 01Jul2015, 15:00 | 3.3 |
| | | | | |
| HG14 | 0.2297 | 0.84 | 01Jul2015, 14:18 | 0.57 |
| HG13 | 0.0844 | 0.65 | 01Jul2015, 13:00 | 0.33 |
| G07 | 0.0844 | 0.65 | 01Jul2015, 13:00 | 0.33 |
| G07-G08 | 0.0844 | 0.64 | 01Jul2015, 13:18 | 0.32 |
| G16 | 0.3141 | 1.4 | 01Jul2015, 13:54 | 0.89 |
| | | | | |

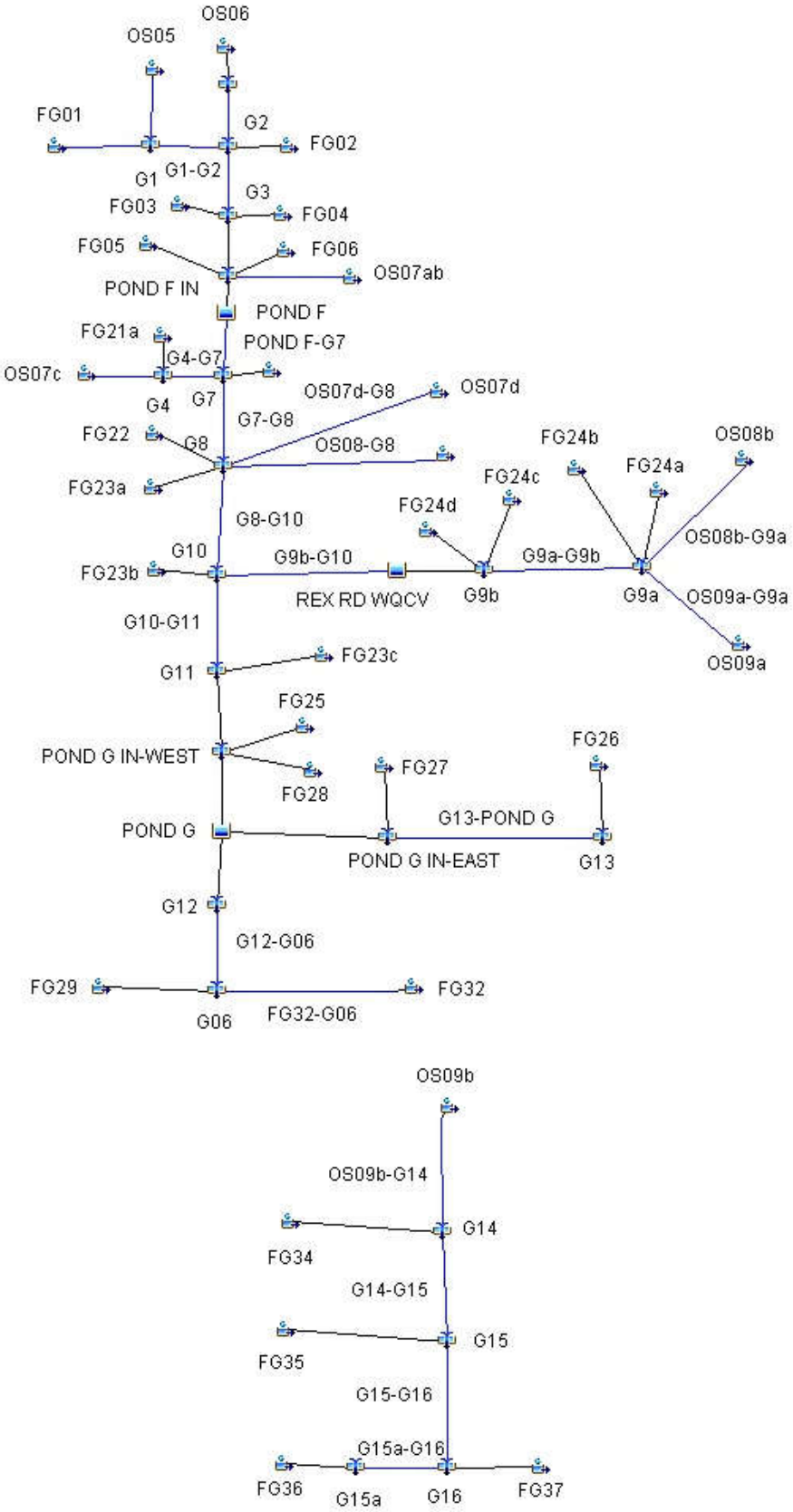
| FUTURE SCS (100-YEAR) | | | | |
|---|---|---|---|---|
| HYDROLOGIC ELEMENT | DRAINAGE AREA (SQ. MI.) | PEAK DISCHARGE Q100 (CFS) | TIME OF PEAK | TOTAL VOLUME Q100 (AC. FT.) |
| OS06 | 0.1313 | 80 | 01Jul2015, 12:12 | 9.3 |
| G1a | 0.1313 | 80 | 01Jul2015, 12:12 | 9.3 |
| G1a-G2 | 0.1313 | 79 | 01Jul2015, 12:18 | 9.2 |
| OS05 | 0.0578 | 39 | 01Jul2015, 12:12 | 4.1 |
| OS05-G1 | 0.0578 | 39 | 01Jul2015, 12:12 | 4.1 |
| FG01 | 0.0538 | 31 | 01Jul2015, 12:30 | 4.9 |
| FG01-G1 | 0.0538 | 31 | 01Jul2015, 12:30 | 4.9 |
| G1 | 0.1116 | 61 | 01Jul2015, 12:18 | 9.0 |
| G1-G2 | 0.1116 | 61 | 01Jul2015, 12:18 | 9.0 |
| FG02 | 0.0391 | 32 | 01Jul2015, 12:12 | 3.3 |
| G2 | 0.2820 | 167 | 01Jul2015, 12:18 | 21 |
| G2-G3 | 0.2820 | 162 | 01Jul2015, 12:18 | 21 |
| FG03 | 0.0203 | 24 | 01Jul2015, 12:06 | 2.0 |
| FG04 | 0.0172 | 22 | 01Jul2015, 12:00 | 1.7 |
| G3 | 0.3195 | 184 | 01Jul2015, 12:18 | 25 |
| FG06 | 0.0675 | 56 | 01Jul2015, 12:12 | 6.1 |
| FG05 | 0.0580 | 45 | 01Jul2015, 12:24 | 6.1 |
| OS07ab | 0.0170 | 12 | 01Jul2015, 12:06 | 1.2 |
| OS07ab-POND F | 0.0170 | 12 | 01Jul2015, 12:18 | 1.2 |
| POND F IN | 0.4620 | 292 | 01Jul2015, 12:18 | 38 |
| POND F | 0.4620 | 177 | 01Jul2015, 12:42 | 36 |
| POND F-G7 | 0.4620 | 177 | 01Jul2015, 12:42 | 36 |
| OS07c | 0.0296 | 19 | 01Jul2015, 12:12 | 2.1 |
| OS07c-G4 | 0.0296 | 18 | 01Jul2015, 12:18 | 2.1 |
| FG21a | 0.0095 | 5.9 | 01Jul2015, 12:18 | 0.7 |
| G4 | 0.0391 | 24 | 01Jul2015, 12:18 | 2.8 |
| G4-G7 | 0.0391 | 23 | 01Jul2015, 12:18 | 2.8 |
| FG21b | 0.0150 | 21 | 01Jul2015, 12:06 | 1.8 |
| G7 | 0.5161 | 194 | 01Jul2015, 12:42 | 40 |
| G7-G8 | 0.5161 | 194 | 01Jul2015, 12:42 | 40 |
| FG22 | 0.1354 | 121 | 01Jul2015, 12:12 | 14 |
| OS08a | 0.0251 | 16 | 01Jul2015, 12:12 | 1.8 |
| OS08-G8 | 0.0251 | 16 | 01Jul2015, 12:18 | 1.8 |
| FG23a | 0.0216 | 21 | 01Jul2015, 12:12 | 2.2 |
| OS07d | 0.0034 | 2.5 | 01Jul2015, 12:06 | 0.2 |
| OS07d-G8 | 0.0034 | 2.4 | 01Jul2015, 12:12 | 0.2 |
| G8 | 0.7016 | 276 | 01Jul2015, 12:30 | 58 |
| G8-G10 | 0.7016 | 275 | 01Jul2015, 12:36 | 58 |
| FG24b | 0.0589 | 52 | 01Jul2015, 12:24 | 7.1 |
| FG24a | 0.0348 | 24 | 01Jul2015, 12:18 | 2.9 |
| OS08b | 0.0165 | 9.5 | 01Jul2015, 12:18 | 1.2 |
| OS08b-G9a | 0.0165 | 9.4 | 01Jul2015, 12:30 | 1.1 |
| OS09a | 0.0093 | 5.3 | 01Jul2015, 12:18 | 0.7 |
| OS09a-G9a | 0.0093 | 5.2 | 01Jul2015, 12:30 | 0.6 |
| G9a | 0.1195 | 87 | 01Jul2015, 12:24 | 12 |

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.) |
| G9a-G9b | 0.1195 | 85 | 01Jul2015, 12:24 | 12 |
| FG24c | 0.0291 | 40 | 01Jul2015, 12:06 | 3.7 |
| FG24d | 0.0262 | 39 | 01Jul2015, 12:06 | 3.5 |
| G9b | 0.1748 | 137 | 01Jul2015, 12:12 | 19 |
| REX RD WQCV | 0.1748 | 136 | 01Jul2015, 12:18 | 19 |
| G9b-G10 | 0.1748 | 135 | 01Jul2015, 12:18 | 19 |
| FG23b | 0.0236 | 17 | 01Jul2015, 12:12 | 1.7 |
| G10 | 0.9000 | 391 | 01Jul2015, 12:30 | 78 |
| G10-G11 | 0.9000 | 389 | 01Jul2015, 12:36 | 78 |
| FG23c | 0.0109 | 9.2 | 01Jul2015, 12:12 | 0.94 |
| G11 | 0.9109 | 393 | 01Jul2015, 12:36 | 79 |
| FG25 | 0.1084 | 111 | 01Jul2015, 12:18 | 13 |
| FG28 | 0.0184 | 15 | 01Jul2015, 12:12 | 1.5 |
| POND G IN-WEST | 1.0377 | 485 | 01Jul2015, 12:30 | 94 |
| FG27 | 0.0679 | 98 | 01Jul2015, 12:12 | 11 |
| FG26 | 0.0567 | 58 | 01Jul2015, 12:18 | 7.2 |
| G13 | 0.0567 | 58 | 01Jul2015, 12:18 | 7.2 |
| G13-POND G | 0.0567 | 57 | 01Jul2015, 12:24 | 7.2 |
| POND G IN-EAST | 0.1246 | 153 | 01Jul2015, 12:18 | 19 |
| POND G | 1.1623 | 444 | 01Jul2015, 12:54 | 102 |
| G12 | 1.1623 | 444 | 01Jul2015, 12:54 | 102 |
| G12-G06 | 1.1623 | 444 | 01Jul2015, 12:54 | 102 |
| FG29 | 0.0983 | 60 | 01Jul2015, 12:12 | 7.0 |
| FG32 | 0.0406 | 17 | 01Jul2015, 12:30 | 2.9 |
| FG32-G06 | 0.0406 | 17 | 01Jul2015, 12:30 | 2.8 |
| G06 | 1.3012 | 475 | 01Jul2015, 12:48 | 111 |
| | | | | |
| OS09b | 0.0435 | 19 | 01Jul2015, 12:30 | 3.1 |
| OS09b-G14 | 0.0435 | 18 | 01Jul2015, 12:36 | 3.0 |
| FG34 | 0.0275 | 18 | 01Jul2015, 12:18 | 2.2 |
| G14 | 0.0710 | 32 | 01Jul2015, 12:24 | 5.2 |
| G14-G15 | 0.0710 | 32 | 01Jul2015, 12:30 | 5.1 |
| FG35 | 0.0292 | 25 | 01Jul2015, 12:12 | 2.5 |
| G15 | 0.1002 | 45 | 01Jul2015, 12:24 | 7.7 |
| G15-G16 | 0.1002 | 44 | 01Jul2015, 12:30 | 7.6 |
| FG37 | 0.0754 | 46 | 01Jul2015, 12:18 | 5.6 |
| FG36 | 0.0295 | 19 | 01Jul2015, 12:18 | 2.5 |
| G15a | 0.0295 | 19 | 01Jul2015, 12:18 | 2.5 |
| G15a-G16 | 0.0295 | 19 | 01Jul2015, 12:24 | 2.5 |
| G16 | 0.2051 | 103 | 01Jul2015, 12:24 | 16 |

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

# 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 |
| G2-G3 | 0.2820 | 109 | 01Jul2015, 12:24 | 15 |
| FG03 | 0.0203 | 17 | 01Jul2015, 12:06 | 1.5 |
| FG04 | 0.0172 | 16 | 01Jul2015, 12:00 | 1.3 |
| G3 | 0.3195 | 122 | 01Jul2015, 12:18 | 18 |
| FG06 | 0.0675 | 40 | 01Jul2015, 12:12 | 4.4 |
| FG05 | 0.0580 | 33 | 01Jul2015, 12:24 | 4.6 |
| OS07ab | 0.0170 | 7.9 | 01Jul2015, 12:12 | 0.9 |
| OS07ab-POND F | 0.0170 | 7.6 | 01Jul2015, 12:24 | 0.8 |
| POND F IN | 0.4620 | 199 | 01Jul2015, 12:18 | 28 |
| POND F | 0.4620 | 121 | 01Jul2015, 12:42 | 26 |
| POND F-G7 | 0.4620 | 120 | 01Jul2015, 12:48 | 26 |
| OS07c | 0.0296 | 12 | 01Jul2015, 12:12 | 1.5 |
| OS07c-G4 | 0.0296 | 12 | 01Jul2015, 12:18 | 1.5 |
| FG21a | 0.0095 | 4.0 | 01Jul2015, 12:18 | 0.5 |
| G4 | 0.0391 | 16 | 01Jul2015, 12:18 | 2.0 |
| G4-G7 | 0.0391 | 16 | 01Jul2015, 12:24 | 2.0 |
| FG21b | 0.0150 | 16 | 01Jul2015, 12:06 | 1.4 |
| G7 | 0.5161 | 131 | 01Jul2015, 12:48 | 29 |
| G7-G8 | 0.5161 | 130 | 01Jul2015, 12:48 | 29 |
| FG22 | 0.1354 | 88 | 01Jul2015, 12:12 | 10 |
| OS08a | 0.0251 | 11 | 01Jul2015, 12:12 | 1.3 |
| OS08-G8 | 0.0251 | 10 | 01Jul2015, 12:18 | 1.2 |
| FG23a | 0.0216 | 15 | 01Jul2015, 12:12 | 1.6 |
| OS07d | 0.0034 | 1.6 | 01Jul2015, 12:06 | 0.2 |
| OS07d-G8 | 0.0034 | 1.6 | 01Jul2015, 12:18 | 0.2 |
| G8 | 0.7016 | 176 | 01Jul2015, 12:42 | 42 |
| G8-G10 | 0.7016 | 175 | 01Jul2015, 12:48 | 42 |
| FG24b | 0.0589 | 39 | 01Jul2015, 12:24 | 5.4 |
| FG24a | 0.0348 | 16 | 01Jul2015, 12:18 | 2.1 |
| OS08b | 0.0165 | 6.3 | 01Jul2015, 12:18 | 0.8 |
| OS08b-G9a | 0.0165 | 6.0 | 01Jul2015, 12:36 | 0.8 |
| OS09a | 0.0093 | 3.5 | 01Jul2015, 12:18 | 0.5 |
| OS09a-G9a | 0.0093 | 3.4 | 01Jul2015, 12:30 | 0.5 |
| G9a | 0.1195 | 61 | 01Jul2015, 12:24 | 8.7 |

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.) |
| G9a-G9b | 0.1195 | 60 | 01Jul2015, 12:30 | 8.7 |
| FG24c | 0.0291 | 30 | 01Jul2015, 12:06 | 2.9 |
| FG24d | 0.0262 | 30 | 01Jul2015, 12:06 | 2.7 |
| G9b | 0.1748 | 101 | 01Jul2015, 12:12 | 14 |
| REX RD WQCV | 0.1748 | 100 | 01Jul2015, 12:18 | 14 |
| G9b-G10 | 0.1748 | 99 | 01Jul2015, 12:18 | 14 |
| FG23b | 0.0236 | 11 | 01Jul2015, 12:12 | 1.2 |
| G10 | 0.9000 | 243 | 01Jul2015, 12:24 | 57 |
| G10-G11 | 0.9000 | 243 | 01Jul2015, 12:24 | 57 |
| FG23c | 0.0109 | 6.5 | 01Jul2015, 12:12 | 0.7 |
| G11 | 0.9109 | 247 | 01Jul2015, 12:24 | 57 |
| FG25 | 0.1084 | 84 | 01Jul2015, 12:18 | 10 |
| FG28 | 0.0184 | 10 | 01Jul2015, 12:12 | 1.1 |
| POND G IN-WEST | 1.0377 | 333 | 01Jul2015, 12:24 | 69 |
| FG27 | 0.0679 | 79 | 01Jul2015, 12:12 | 9.1 |
| FG26 | 0.0567 | 44 | 01Jul2015, 12:18 | 5.6 |
| G13 | 0.0567 | 44 | 01Jul2015, 12:18 | 5.6 |
| G13-POND G | 0.0567 | 43 | 01Jul2015, 12:24 | 5.5 |
| POND G IN-EAST | 0.1246 | 121 | 01Jul2015, 12:18 | 15 |
| POND G | 1.1623 | 289 | 01Jul2015, 13:00 | 74 |
| G12 | 1.1623 | 289 | 01Jul2015, 13:00 | 74 |
| G12-G06 | 1.1623 | 287 | 01Jul2015, 13:00 | 73 |
| FG29 | 0.0983 | 39 | 01Jul2015, 12:18 | 5.0 |
| FG32 | 0.0406 | 11 | 01Jul2015, 12:30 | 2.0 |
| FG32-G06 | 0.0406 | 11 | 01Jul2015, 12:36 | 2.0 |
| G06 | 1.3012 | 307 | 01Jul2015, 13:00 | 80 |
| | | | | |
| OS09b | 0.0435 | 12 | 01Jul2015, 12:30 | 2.2 |
| OS09b-G14 | 0.0435 | 12 | 01Jul2015, 12:36 | 2.1 |
| FG34 | 0.0275 | 12 | 01Jul2015, 12:18 | 1.6 |
| G14 | 0.0710 | 21 | 01Jul2015, 12:24 | 3.7 |
| G14-G15 | 0.0710 | 21 | 01Jul2015, 12:36 | 3.6 |
| FG35 | 0.0292 | 18 | 01Jul2015, 12:12 | 1.9 |
| G15 | 0.1002 | 29 | 01Jul2015, 12:30 | 5.5 |
| G15-G16 | 0.1002 | 29 | 01Jul2015, 12:36 | 5.4 |
| FG37 | 0.0754 | 31 | 01Jul2015, 12:18 | 4.0 |
| FG36 | 0.0295 | 13 | 01Jul2015, 12:24 | 1.8 |
| G15a | 0.0295 | 13 | 01Jul2015, 12:24 | 1.8 |
| G15a-G16 | 0.0295 | 13 | 01Jul2015, 12:30 | 1.8 |
| G16 | 0.2051 | 67 | 01Jul2015, 12:24 | 11 |

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 |
| FG06 | 0.0675 | 12 | 01Jul2015, 12:18 | 1.7 |
| FG05 | 0.0580 | 12 | 01Jul2015, 12:24 | 2.0 |
| OS07ab | 0.0170 | 1.8 | 01Jul2015, 12:12 | 0.3 |
| OS07ab-POND F | 0.0170 | 1.7 | 01Jul2015, 12:30 | 0.3 |
| POND F IN | 0.4620 | 53 | 01Jul2015, 12:30 | 10 |
| POND F | 0.4620 | 16 | 01Jul2015, 13:48 | 9.0 |
| POND F-G7 | 0.4620 | 16 | 01Jul2015, 13:54 | 8.9 |
| OS07c | 0.0296 | 2.7 | 01Jul2015, 12:18 | 0.5 |
| OS07c-G4 | 0.0296 | 2.7 | 01Jul2015, 12:30 | 0.5 |
| FG21a | 0.0095 | 1.0 | 01Jul2015, 12:24 | 0.2 |
| G4 | 0.0391 | 3.5 | 01Jul2015, 12:30 | 0.7 |
| G4-G7 | 0.0391 | 3.5 | 01Jul2015, 12:30 | 0.7 |
| FG21b | 0.0150 | 6.5 | 01Jul2015, 12:06 | 0.6 |
| G7 | 0.5161 | 18 | 01Jul2015, 13:36 | 10 |
| G7-G8 | 0.5161 | 18 | 01Jul2015, 13:42 | 10 |
| FG22 | 0.1354 | 32 | 01Jul2015, 12:18 | 4.3 |
| OS08a | 0.0251 | 2.3 | 01Jul2015, 12:18 | 0.4 |
| OS08-G8 | 0.0251 | 2.3 | 01Jul2015, 12:24 | 0.4 |
| FG23a | 0.0216 | 5.2 | 01Jul2015, 12:12 | 0.7 |
| OS07d | 0.0034 | 0.4 | 01Jul2015, 12:12 | 0.1 |
| OS07d-G8 | 0.0034 | 0.4 | 01Jul2015, 12:24 | 0.1 |
| G8 | 0.7016 | 46 | 01Jul2015, 12:18 | 16 |
| G8-G10 | 0.7016 | 45 | 01Jul2015, 12:24 | 15 |
| FG24b | 0.0589 | 16 | 01Jul2015, 12:24 | 2.5 |
| FG24a | 0.0348 | 4.5 | 01Jul2015, 12:18 | 0.8 |
| OS08b | 0.0165 | 1.4 | 01Jul2015, 12:18 | 0.3 |
| OS08b-G9a | 0.0165 | 1.4 | 01Jul2015, 12:42 | 0.3 |
| OS09a | 0.0093 | 0.8 | 01Jul2015, 12:24 | 0.2 |
| OS09a-G9a | 0.0093 | 0.8 | 01Jul2015, 12:42 | 0.2 |
| G9a | 0.1195 | 21 | 01Jul2015, 12:24 | 3.6 |

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.) |
| G9a-G9b | 0.1195 | 20 | 01Jul2015, 12:30 | 3.6 |
| FG24c | 0.0291 | 13 | 01Jul2015, 12:12 | 1.3 |
| FG24d | 0.0262 | 14 | 01Jul2015, 12:06 | 1.3 |
| G9b | 0.1748 | 40 | 01Jul2015, 12:12 | 6.3 |
| REX RD WQCV | 0.1748 | 40 | 01Jul2015, 12:18 | 6.1 |
| G9b-G10 | 0.1748 | 39 | 01Jul2015, 12:18 | 6.1 |
| FG23b | 0.0236 | 2.7 | 01Jul2015, 12:12 | 0.4 |
| G10 | 0.9000 | 84 | 01Jul2015, 12:24 | 22 |
| G10-G11 | 0.9000 | 82 | 01Jul2015, 12:30 | 22 |
| FG23c | 0.0109 | 1.9 | 01Jul2015, 12:12 | 0.3 |
| G11 | 0.9109 | 83 | 01Jul2015, 12:30 | 22 |
| FG25 | 0.1084 | 36 | 01Jul2015, 12:18 | 4.7 |
| FG28 | 0.0184 | 3.0 | 01Jul2015, 12:12 | 0.4 |
| POND G IN-WEST | 1.0377 | 116 | 01Jul2015, 12:30 | 27 |
| FG27 | 0.0679 | 42 | 01Jul2015, 12:18 | 4.9 |
| FG26 | 0.0567 | 19 | 01Jul2015, 12:18 | 2.6 |
| G13 | 0.0567 | 19 | 01Jul2015, 12:18 | 2.6 |
| G13-POND G | 0.0567 | 19 | 01Jul2015, 12:24 | 2.6 |
| POND G IN-EAST | 0.1246 | 60 | 01Jul2015, 12:18 | 7.5 |
| POND G | 1.1623 | 51 | 01Jul2015, 13:54 | 26 |
| G12 | 1.1623 | 51 | 01Jul2015, 13:54 | 26 |
| G12-G06 | 1.1623 | 50 | 01Jul2015, 14:00 | 26 |
| FG29 | 0.0983 | 8.9 | 01Jul2015, 12:18 | 1.7 |
| FG32 | 0.0406 | 2.6 | 01Jul2015, 12:36 | 0.66 |
| FG32-G06 | 0.0406 | 2.6 | 01Jul2015, 12:42 | 0.66 |
| G06 | 1.3012 | 54 | 01Jul2015, 13:54 | 28 |
| | | | | |
| OS09b | 0.0435 | 2.8 | 01Jul2015, 12:36 | 0.71 |
| OS09b-G14 | 0.0435 | 2.8 | 01Jul2015, 12:48 | 0.70 |
| FG34 | 0.0275 | 3.1 | 01Jul2015, 12:24 | 0.56 |
| G14 | 0.0710 | 5.0 | 01Jul2015, 12:30 | 1.3 |
| G14-G15 | 0.0710 | 4.9 | 01Jul2015, 12:48 | 1.2 |
| FG35 | 0.0292 | 5.5 | 01Jul2015, 12:12 | 0.70 |
| G15 | 0.1002 | 7.1 | 01Jul2015, 12:42 | 1.9 |
| G15-G16 | 0.1002 | 7.0 | 01Jul2015, 12:54 | 1.9 |
| FG37 | 0.0754 | 7.3 | 01Jul2015, 12:24 | 1.4 |
| FG36 | 0.0295 | 3.9 | 01Jul2015, 12:24 | 0.69 |
| G15a | 0.0295 | 3.9 | 01Jul2015, 12:24 | 0.69 |
| G15a-G16 | 0.0295 | 3.8 | 01Jul2015, 12:36 | 0.68 |
| G16 | 0.2051 | 16 | 01Jul2015, 12:24 | 4.0 |

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 | 3.7 | 01Jul2015, 12:36 | 1.1 |
| OS05 | 0.0578 | 1.8 | 01Jul2015, 12:18 | 0.49 |
| OS05-G1 | 0.0578 | 1.7 | 01Jul2015, 12:24 | 0.49 |
| FG01 | 0.0538 | 3.4 | 01Jul2015, 12:36 | 0.81 |
| FG01-G1 | 0.0538 | 3.4 | 01Jul2015, 12:36 | 0.81 |
| 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 | 0.50 |
| G2 | 0.2820 | 10 | 01Jul2015, 12:30 | 2.9 |
| G2-G3 | 0.2820 | 10 | 01Jul2015, 12:42 | 2.9 |
| FG03 | 0.0203 | 3.0 | 01Jul2015, 12:06 | 0.36 |
| FG04 | 0.0172 | 3.1 | 01Jul2015, 12:06 | 0.31 |
| G3 | 0.3195 | 12 | 01Jul2015, 12:42 | 3.5 |
| FG06 | 0.0675 | 5.8 | 01Jul2015, 12:18 | 1.0 |
| FG05 | 0.0580 | 6.7 | 01Jul2015, 12:30 | 1.2 |
| OS07ab | 0.0170 | 0.5 | 01Jul2015, 12:18 | 0.15 |
| OS07ab-POND F | 0.0170 | 0.5 | 01Jul2015, 12:42 | 0.14 |
| POND F IN | 0.4620 | 23 | 01Jul2015, 12:36 | 5.9 |
| POND F | 0.4620 | 8.0 | 01Jul2015, 14:18 | 4.8 |
| POND F-G7 | 0.4620 | 8.0 | 01Jul2015, 14:24 | 4.8 |
| OS07c | 0.0296 | 0.9 | 01Jul2015, 12:24 | 0.25 |
| OS07c-G4 | 0.0296 | 0.9 | 01Jul2015, 12:36 | 0.24 |
| FG21a | 0.0095 | 0.4 | 01Jul2015, 12:24 | 0.10 |
| G4 | 0.0391 | 1.2 | 01Jul2015, 12:36 | 0.34 |
| G4-G7 | 0.0391 | 1.2 | 01Jul2015, 12:42 | 0.34 |
| FG21b | 0.0150 | 3.9 | 01Jul2015, 12:06 | 0.40 |
| G7 | 0.5161 | 8.9 | 01Jul2015, 14:18 | 5.5 |
| G7-G8 | 0.5161 | 8.9 | 01Jul2015, 14:18 | 5.5 |
| FG22 | 0.1354 | 17 | 01Jul2015, 12:18 | 2.6 |
| OS08a | 0.0251 | 0.7 | 01Jul2015, 12:24 | 0.21 |
| OS08-G8 | 0.0251 | 0.7 | 01Jul2015, 12:30 | 0.21 |
| FG23a | 0.0216 | 2.7 | 01Jul2015, 12:18 | 0.40 |
| OS07d | 0.0034 | 0.1 | 01Jul2015, 12:18 | 0.03 |
| OS07d-G8 | 0.0034 | 0.1 | 01Jul2015, 12:30 | 0.03 |
| G8 | 0.7016 | 24 | 01Jul2015, 12:18 | 8.7 |
| G8-G10 | 0.7016 | 24 | 01Jul2015, 12:30 | 8.5 |
| FG24b | 0.0589 | 10 | 01Jul2015, 12:24 | 1.6 |
| FG24a | 0.0348 | 2.0 | 01Jul2015, 12:24 | 0.43 |
| OS08b | 0.0165 | 0.5 | 01Jul2015, 12:24 | 0.14 |
| OS08b-G9a | 0.0165 | 0.5 | 01Jul2015, 13:00 | 0.13 |
| OS09a | 0.0093 | 0.3 | 01Jul2015, 12:30 | 0.08 |
| OS09a-G9a | 0.0093 | 0.3 | 01Jul2015, 12:54 | 0.08 |
| G9a | 0.1195 | 12 | 01Jul2015, 12:24 | 2.2 |

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.) |
| G9a-G9b | 0.1195 | 12 | 01Jul2015, 12:30 | 2.2 |
| FG24c | 0.0291 | 8.4 | 01Jul2015, 12:12 | 0.90 |
| FG24d | 0.0262 | 8.7 | 01Jul2015, 12:06 | 0.89 |
| G9b | 0.1748 | 23 | 01Jul2015, 12:12 | 4.0 |
| REX RD WQCV | 0.1748 | 23 | 01Jul2015, 12:18 | 3.9 |
| G9b-G10 | 0.1748 | 23 | 01Jul2015, 12:18 | 3.9 |
| FG23b | 0.0236 | 0.91 | 01Jul2015, 12:18 | 0.22 |
| G10 | 0.9000 | 45 | 01Jul2015, 12:30 | 13 |
| G10-G11 | 0.9000 | 44 | 01Jul2015, 12:36 | 12 |
| FG23c | 0.0109 | 0.84 | 01Jul2015, 12:18 | 0.15 |
| G11 | 0.9109 | 44 | 01Jul2015, 12:36 | 13 |
| FG25 | 0.1084 | 22 | 01Jul2015, 12:18 | 3.1 |
| FG28 | 0.0184 | 1.2 | 01Jul2015, 12:12 | 0.22 |
| POND G IN-WEST | 1.0377 | 61 | 01Jul2015, 12:36 | 16 |
| FG27 | 0.0679 | 30 | 01Jul2015, 12:18 | 3.5 |
| FG26 | 0.0567 | 12 | 01Jul2015, 12:24 | 1.7 |
| G13 | 0.0567 | 12 | 01Jul2015, 12:24 | 1.7 |
| G13-POND G | 0.0567 | 12 | 01Jul2015, 12:24 | 1.7 |
| POND G IN-EAST | 0.1246 | 41 | 01Jul2015, 12:18 | 5.3 |
| POND G | 1.1623 | 19 | 01Jul2015, 15:42 | 14 |
| G12 | 1.1623 | 19 | 01Jul2015, 15:42 | 14 |
| G12-G06 | 1.1623 | 19 | 01Jul2015, 15:54 | 14 |
| FG29 | 0.0983 | 2.9 | 01Jul2015, 12:24 | 0.86 |
| FG32 | 0.0406 | 0.9 | 01Jul2015, 12:48 | 0.34 |
| FG32-G06 | 0.0406 | 0.9 | 01Jul2015, 12:54 | 0.34 |
| G06 | 1.3012 | 21 | 01Jul2015, 15:54 | 15 |
| | | | | |
| OS09b | 0.0435 | 1.0 | 01Jul2015, 12:48 | 0.36 |
| OS09b-G14 | 0.0435 | 1.0 | 01Jul2015, 13:00 | 0.36 |
| FG34 | 0.0275 | 1.3 | 01Jul2015, 12:24 | 0.31 |
| G14 | 0.0710 | 1.9 | 01Jul2015, 12:48 | 0.66 |
| G14-G15 | 0.0710 | 1.9 | 01Jul2015, 13:06 | 0.64 |
| FG35 | 0.0292 | 2.4 | 01Jul2015, 12:12 | 0.40 |
| G15 | 0.1002 | 2.8 | 01Jul2015, 12:54 | 1.04 |
| G15-G16 | 0.1002 | 2.8 | 01Jul2015, 13:12 | 1.02 |
| FG37 | 0.0754 | 2.7 | 01Jul2015, 12:24 | 0.73 |
| FG36 | 0.0295 | 1.8 | 01Jul2015, 12:30 | 0.40 |
| G15a | 0.0295 | 1.8 | 01Jul2015, 12:30 | 0.40 |
| G15a-G16 | 0.0295 | 1.7 | 01Jul2015, 12:42 | 0.39 |
| G16 | 0.2051 | 6.5 | 01Jul2015, 12:30 | 2.1 |

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.) |
| OS06 | 0.1313 | 0.5 | 01Jul2015, 13:30 | 0.34 |
| G1a | 0.1313 | 0.5 | 01Jul2015, 13:30 | 0.34 |
| G1a-G2 | 0.1313 | 0.5 | 01Jul2015, 13:48 | 0.33 |
| OS05 | 0.0578 | 0.2 | 01Jul2015, 13:24 | 0.15 |
| OS05-G1 | 0.0578 | 0.2 | 01Jul2015, 13:30 | 0.15 |
| FG01 | 0.0538 | 0.9 | 01Jul2015, 12:48 | 0.35 |
| FG01-G1 | 0.0538 | 0.9 | 01Jul2015, 12:48 | 0.35 |
| G1 | 0.1116 | 1.1 | 01Jul2015, 12:54 | 0.50 |
| G1-G2 | 0.1116 | 1.1 | 01Jul2015, 13:00 | 0.49 |
| FG02 | 0.0391 | 0.5 | 01Jul2015, 12:30 | 0.20 |
| G2 | 0.2820 | 1.9 | 01Jul2015, 13:18 | 1.0 |
| G2-G3 | 0.2820 | 1.9 | 01Jul2015, 13:30 | 0.99 |
| FG03 | 0.0203 | 0.8 | 01Jul2015, 12:12 | 0.16 |
| FG04 | 0.0172 | 0.9 | 01Jul2015, 12:06 | 0.14 |
| G3 | 0.3195 | 2.4 | 01Jul2015, 13:24 | 1.3 |
| FG06 | 0.0675 | 1.3 | 01Jul2015, 12:24 | 0.42 |
| FG05 | 0.0580 | 2.4 | 01Jul2015, 12:30 | 0.59 |
| OS07ab | 0.0170 | 0.1 | 01Jul2015, 13:18 | 0.04 |
| OS07ab-POND F | 0.0170 | 0.1 | 01Jul2015, 14:06 | 0.04 |
| POND F IN | 0.4620 | 5.0 | 01Jul2015, 12:48 | 2.4 |
| POND F | 0.4620 | 2.1 | 01Jul2015, 17:54 | 1.5 |
| POND F-G7 | 0.4620 | 2.1 | 01Jul2015, 18:06 | 1.5 |
| OS07c | 0.0296 | 0.1 | 01Jul2015, 13:30 | 0.08 |
| OS07c-G4 | 0.0296 | 0.1 | 01Jul2015, 13:54 | 0.07 |
| FG21a | 0.0095 | 0.1 | 01Jul2015, 13:06 | 0.03 |
| G4 | 0.0391 | 0.2 | 01Jul2015, 13:42 | 0.11 |
| G4-G7 | 0.0391 | 0.2 | 01Jul2015, 13:48 | 0.11 |
| FG21b | 0.0150 | 1.7 | 01Jul2015, 12:12 | 0.21 |
| G7 | 0.5161 | 2.3 | 01Jul2015, 17:48 | 1.8 |
| G7-G8 | 0.5161 | 2.3 | 01Jul2015, 17:54 | 1.8 |
| FG22 | 0.1354 | 5.4 | 01Jul2015, 12:24 | 1.2 |
| OS08a | 0.0251 | 0.1 | 01Jul2015, 13:30 | 0.07 |
| OS08-G8 | 0.0251 | 0.1 | 01Jul2015, 13:36 | 0.06 |
| FG23a | 0.0216 | 0.8 | 01Jul2015, 12:18 | 0.19 |
| OS07d | 0.0034 | 0.01 | 01Jul2015, 13:18 | 0.01 |
| OS07d-G8 | 0.0034 | 0.01 | 01Jul2015, 13:36 | 0.01 |
| G8 | 0.7016 | 7.7 | 01Jul2015, 12:18 | 3.3 |
| G8-G10 | 0.7016 | 7.6 | 01Jul2015, 12:42 | 3.1 |
| FG24b | 0.0589 | 4.3 | 01Jul2015, 12:30 | 0.85 |
| FG24a | 0.0348 | 0.4 | 01Jul2015, 12:48 | 0.17 |
| OS08b | 0.0165 | 0.1 | 01Jul2015, 13:36 | 0.04 |
| OS08b-G9a | 0.0165 | 0.1 | 01Jul2015, 14:24 | 0.04 |
| OS09a | 0.0093 | 0.04 | 01Jul2015, 13:36 | 0.02 |
| OS09a-G9a | 0.0093 | 0.04 | 01Jul2015, 14:24 | 0.02 |
| G9a | 0.1195 | 4.7 | 01Jul2015, 12:30 | 1.1 |

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.) |
| G9a-G9b | 0.1195 | 4.6 | 01Jul2015, 12:36 | 1.1 |
| FG24c | 0.0291 | 4.0 | 01Jul2015, 12:12 | 0.49 |
| FG24d | 0.0262 | 4.4 | 01Jul2015, 12:12 | 0.50 |
| G9b | 0.1748 | 10.1 | 01Jul2015, 12:18 | 2.1 |
| REX RD WQCV | 0.1748 | 9.7 | 01Jul2015, 12:24 | 1.9 |
| G9b-G10 | 0.1748 | 9.6 | 01Jul2015, 12:24 | 1.9 |
| FG23b | 0.0236 | 0.1 | 01Jul2015, 13:06 | 0.07 |
| G10 | 0.9000 | 16 | 01Jul2015, 12:42 | 5.1 |
| G10-G11 | 0.9000 | 16 | 01Jul2015, 12:48 | 5.1 |
| FG23c | 0.0109 | 0.2 | 01Jul2015, 12:24 | 0.06 |
| G11 | 0.9109 | 16 | 01Jul2015, 12:48 | 5.1 |
| FG25 | 0.1084 | 9.9 | 01Jul2015, 12:24 | 1.7 |
| FG28 | 0.0184 | 0.2 | 01Jul2015, 12:36 | 0.09 |
| POND G IN-WEST | 1.0377 | 22 | 01Jul2015, 12:48 | 6.9 |
| FG27 | 0.0679 | 18 | 01Jul2015, 12:18 | 2.2 |
| FG26 | 0.0567 | 5.6 | 01Jul2015, 12:24 | 0.95 |
| G13 | 0.0567 | 5.6 | 01Jul2015, 12:24 | 0.95 |
| G13-POND G | 0.0567 | 5.6 | 01Jul2015, 12:30 | 0.94 |
| POND G IN-EAST | 0.1246 | 23 | 01Jul2015, 12:18 | 3.2 |
| POND G | 1.1623 | 5.2 | 02Jul2015, 00:00 | 4.6 |
| G12 | 1.1623 | 5.2 | 02Jul2015, 00:00 | 4.6 |
| G12-G06 | 1.1623 | 5.2 | 02Jul2015, 00:00 | 4.4 |
| FG29 | 0.0983 | 0.4 | 01Jul2015, 13:30 | 0.27 |
| FG32 | 0.0406 | 0.2 | 01Jul2015, 13:54 | 0.10 |
| FG32-G06 | 0.0406 | 0.2 | 01Jul2015, 14:06 | 0.10 |
| G06 | 1.3012 | 5.5 | 01Jul2015, 23:48 | 4.8 |
| | | | | |
| OS09b | 0.0435 | 0.2 | 01Jul2015, 13:54 | 0.11 |
| OS09b-G14 | 0.0435 | 0.2 | 01Jul2015, 14:12 | 0.11 |
| FG34 | 0.0275 | 0.2 | 01Jul2015, 13:00 | 0.11 |
| G14 | 0.0710 | 0.3 | 01Jul2015, 13:48 | 0.22 |
| G14-G15 | 0.0710 | 0.3 | 01Jul2015, 14:12 | 0.20 |
| FG35 | 0.0292 | 0.5 | 01Jul2015, 12:24 | 0.16 |
| G15 | 0.1002 | 0.6 | 01Jul2015, 14:00 | 0.37 |
| G15-G16 | 0.1002 | 0.6 | 01Jul2015, 14:24 | 0.36 |
| FG37 | 0.0754 | 0.4 | 01Jul2015, 13:12 | 0.24 |
| FG36 | 0.0295 | 0.4 | 01Jul2015, 12:48 | 0.16 |
| G15a | 0.0295 | 0.4 | 01Jul2015, 12:48 | 0.16 |
| G15a-G16 | 0.0295 | 0.4 | 01Jul2015, 13:00 | 0.15 |
| G16 | 0.2051 | 1.2 | 01Jul2015, 13:00 | 0.75 |

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

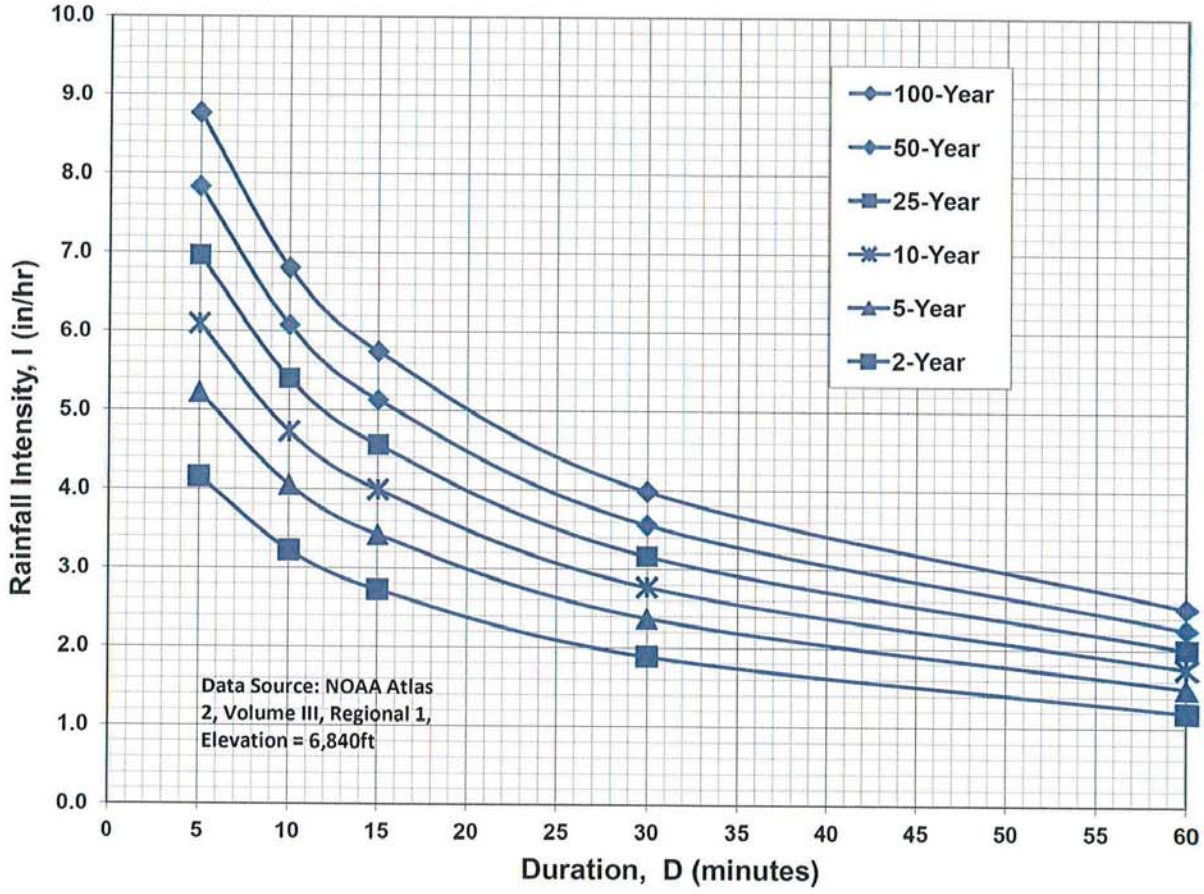
# Appendix B – Rational Calculations

## 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: **Rolling Hills Ranch North PDR** 2/5/2024

| BASIN DESIGNATION | AREA (AC.) | | | | | | | | | | COMPOSITE FACTOR | | Percent Impervious |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UNDEV | 1 DU/AC | 2 DU/AC | 3 DU/AC | 4 DU/AC | 5 DU/AC | STREETS | OPEN SPACE PARKS/GC LAWNS | COMM | TOTAL | 5-year | 100-year | |
| | | | | | | | | | | | | | |
| **OS1** | | 4.1 | | | | | | | | 4.1 | **0.20** | **0.44** | **20.0%** |
| **OS2** | 1.5 | 1.2 | 0.3 | | | | 0.5 | 0.7 | 1.3 | 5.3 | **0.39** | **0.57** | **37.6%** |
| **OS3** | 2.3 | | | | 2.8 | | 4.0 | 0.8 | | 9.9 | **0.49** | **0.65** | **51.9%** |
| **OS4** | 34 | | | | 2.3 | 2.4 | | | | 39 | **0.12** | **0.38** | **5.1%** |
| **OS5** | 4.0 | | | | 1.3 | 1.4 | | | | 6.6 | **0.18** | **0.42** | **16.7%** |
| | | | | | | | | | | | | | |
| **A01** | | | | 5.4 | | | | | | 5.4 | **0.25** | **0.47** | **30.0%** |
| **A02** | | | | | 3.0 | | | | | 3.0 | **0.30** | **0.50** | **40.0%** |
| **A03** | | | | 3.2 | | | | | | 3.2 | **0.25** | **0.47** | **30.0%** |
| **A04** | | | 0.4 | 2.9 | | | | | | 3.4 | **0.25** | **0.47** | **29.3%** |
| **A05** | | | 2.2 | | 3.5 | | | 0.1 | | 5.8 | **0.27** | **0.48** | **33.9%** |
| **A06** | | | | | 4.1 | | | | | 4.1 | **0.30** | **0.50** | **40.0%** |
| **A07** | | | | | | 3.6 | | | | 3.6 | **0.35** | **0.53** | **43.0%** |
| **A08** | 0.2 | | | | 3.4 | 2.1 | | | | 5.7 | **0.31** | **0.51** | **39.9%** |
| **A09** | | | | | | | 0.2 | | | 0.24 | **0.90** | **0.96** | **100.0%** |
| | | | | | | | | | | | | | |
| **B01** | | | | | | 6.4 | | | | 6.4 | **0.35** | **0.53** | **43.0%** |
| **B02** | | | | | | 6.2 | | | | 6.2 | **0.35** | **0.53** | **43.0%** |
| **B03** | | | | | | 4.6 | | | | 4.6 | **0.35** | **0.53** | **43.0%** |
| **B04** | | | | | | 9.5 | | | | 9.5 | **0.35** | **0.53** | **43.0%** |
| **B05** | | | | | | 3.0 | | | | 3.0 | **0.35** | **0.53** | **43.0%** |
| **B06** | | | | | | 6.6 | | | | 6.6 | **0.35** | **0.53** | **43.0%** |
| | | | | | | | | | | | | | |
| **C01** | | | | | 7.1 | | | | | 7.1 | **0.30** | **0.50** | **40.0%** |
| **C02** | | | | | 7.1 | | | | | 7.1 | **0.30** | **0.50** | **40.0%** |
| **C03** | | | | | 4.4 | | | | | 4.4 | **0.30** | **0.50** | **40.0%** |
| | | | | | | | | | | | | | |
| | | | | | | | | | | 153.9 | | **Composite:** | **30.2%** |
| **TOTAL** | 42.0 | 5.2 | 3.0 | 11.5 | 39.0 | 45.7 | 4.7 | 1.5 | 1.3 | 153.9 | **0.27** | **0.48** | **30.2%** |
| | | | | | | | | | | | | | |
| **OS9** | 27.8 | | | | | | | | | 27.8 | **0.09** | **0.36** | **0.0%** |
| **FG34a** | 5.0 | | | | | 1.2 | | | | 6.1 | **0.14** | **0.39** | **8.3%** |
| **FG34b** | 8.5 | | | | | 2.9 | | | | 11.4 | **0.16** | **0.40** | **11.0%** |
| | | | | | | | | | | | | | |
| **HG13** | 54.0 | | | | | | | | | 54.0 | **0.09** | **0.36** | **0.0%** |

## TIME OF CONCENTRATION

PROJECT: **Rolling Hills Ranch North PDR** DATE: 2/5/2024

| TIME OF CONCENTRATION | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUBBASIN DATA | | | INIT./OVERLAND TIME ($T_i$) | | | | TRAVEL TIME ($T_t$) | | | | | | | TOTAL | Tc Check (Urbanized Basins) | | FINAL |
| 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 | $T_c$ (min) |
| **OS1** | 0.20 | 4 | 335 | 16.0 | 4.8% | 17.9 | 230 | 4 | 1.7% | L | 7 | 0.9 | 4.2 | 22.1 | 565.00 | 13.1 | **13.1** |
| **OS2** | 0.39 | 5 | 405 | 16.0 | 4.0% | 16.6 | 1400 | 37 | 2.6% | P | 20 | 3.3 | 7.2 | 23.8 | 1805.00 | 20.0 | **20.0** |
| **OS3** | 0.49 | 10 | 50 | 1.0 | 2.0% | 6.3 | 2070 | 40 | 1.9% | P | 20 | 2.8 | 12.5 | 18.8 | 2120.00 | 21.8 | **18.8** |
| **OS4** | 0.12 | 39 | 420 | 20.0 | 4.8% | 21.9 | 3270 | 73 | 2.2% | G | 15 | 2.2 | 24.3 | 46.2 | 3690.00 | 30.5 | **30.5** |
| **OS5** | 0.18 | 7 | 195 | 11.0 | 5.6% | 13.2 | 615 | 26 | 4.2% | G | 15 | 3.1 | 3.3 | 16.5 | 810.00 | 14.5 | **14.5** |
| **A01** | 0.25 | 5 | 145 | 5.5 | 3.8% | 12.0 | 855 | 19.5 | 2.3% | P | 20 | 3.0 | 4.7 | 16.8 | 1000.00 | 15.6 | **15.6** |
| **A02** | 0.30 | 3 | 25 | 0.5 | 2.0% | 5.8 | 680 | 14.0 | 2.1% | P | 20 | 2.9 | 3.9 | 9.8 | 705.00 | 13.9 | **9.8** |
| **A03** | 0.25 | 3 | 150 | 8.0 | 5.3% | 10.9 | 705 | 16.5 | 2.3% | P | 20 | 3.1 | 3.8 | 14.8 | 855.00 | 14.8 | **14.8** |
| **A04** | 0.25 | 3 | 220 | 7.0 | 3.2% | 15.8 | 390 | 10.5 | 2.7% | P | 20 | 3.3 | 2.0 | 17.8 | 610.00 | 13.4 | **13.4** |
| **A05** | 0.27 | 6 | 330 | 10.0 | 3.0% | 19.1 | 675 | 16.0 | 2.4% | P | 20 | 3.1 | 3.7 | 22.8 | 1005.00 | 15.6 | **15.6** |
| **A06** | 0.30 | 4 | 25 | 0.5 | 2.0% | 5.8 | 830 | 12.0 | 1.4% | P | 20 | 2.4 | 5.8 | 11.6 | 855.00 | 14.8 | **11.6** |
| **A07** | 0.35 | 4 | 75 | 1.5 | 2.0% | 9.5 | 1095 | 26.0 | 2.4% | P | 20 | 3.1 | 5.9 | 15.4 | 1170.00 | 16.5 | **15.4** |
| **A08** | 0.31 | 6 | 145 | 4.0 | 2.8% | 12.4 | 1625 | 33.0 | 2.0% | P | 20 | 2.9 | 9.5 | 21.9 | 1770.00 | 19.8 | **19.8** |
| **A09** | 0.90 | 0 | 15 | 0.3 | 2.0% | 5.0 | 165 | 1.0 | 0.6% | P | 20 | 1.6 | 1.8 | 6.8 | 180.00 | 11.0 | **6.8** |
| **B01** | 0.35 | 6 | 140 | 3.5 | 2.5% | 12.0 | 1180 | 28.0 | 2.4% | P | 20 | 3.1 | 6.4 | 18.4 | 1320.00 | 17.3 | **17.3** |
| **B02** | 0.35 | 6 | 235 | 9.0 | 3.8% | 13.5 | 800 | 21.0 | 2.6% | P | 20 | 3.2 | 4.1 | 17.6 | 1035.00 | 15.8 | **15.8** |
| **B03** | 0.35 | 5 | 75 | 1.5 | 2.0% | 9.5 | 990 | 23.5 | 2.4% | P | 20 | 3.1 | 5.4 | 14.8 | 1065.00 | 15.9 | **14.8** |
| **B04** | 0.35 | 9 | 200 | 4.0 | 2.0% | 15.4 | 1540 | 30.0 | 1.9% | P | 20 | 2.8 | 9.2 | 24.6 | 1740.00 | 19.7 | **19.7** |
| **B05** | 0.35 | 3 | 45 | 1.0 | 2.2% | 7.1 | 1545 | 34.0 | 2.2% | P | 20 | 3.0 | 8.7 | 15.7 | 1590.00 | 18.8 | **15.7** |
| **B06** | 0.35 | 7 | 125 | 2.5 | 2.0% | 12.2 | 2430 | 54.0 | 2.2% | P | 20 | 3.0 | 13.6 | 25.8 | 2555.00 | 24.2 | **24.2** |
| **C01** | 0.30 | 7 | 75 | 1.5 | 2.0% | 10.1 | 960 | 17.0 | 1.8% | P | 20 | 2.7 | 6.0 | 16.1 | 1035.00 | 15.8 | **15.8** |
| **C02** | 0.30 | 7 | 225 | 6.0 | 2.7% | 15.9 | 760 | 10.0 | 1.3% | P | 20 | 2.3 | 5.5 | 21.4 | 985.00 | 15.5 | **15.5** |
| **C03** | 0.30 | 4 | 140 | 5.0 | 3.6% | 11.4 | 1740 | 25.5 | 1.5% | P | 20 | 2.4 | 12.0 | 23.3 | 1880.00 | 20.4 | **20.4** |

| TIME OF CONCENTRATION | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUBBASIN DATA | | | INIT./OVERLAND TIME ($T_i$) | | | | TRAVEL TIME ($T_t$) | | | | | | | TOTAL | Tc Check (Urbanized Basins) | | FINAL |
| 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) | $T_c$ (min) |
| **WQ-A** | 0.48 | 1.0 | 140 | 5.0 | 3.6% | 8.7 | 1740 | 25.5 | 1.5% | P | 20 | 2.4 | 12.0 | 20.7 | 1880.00 | 20.4 | **20.4** |
| **WQ-B** | 0.49 | 0.8 | 140 | 5.0 | 3.6% | 8.7 | 1740 | 25.5 | 1.5% | P | 20 | 2.4 | 12.0 | 20.7 | 1880.00 | 20.4 | **20.4** |
| **WQ-C** | 0.38 | 2.2 | 140 | 5.0 | 3.6% | 10.2 | 1740 | 25.5 | 1.5% | P | 20 | 2.4 | 12.0 | 22.2 | 1880.00 | 20.4 | **20.4** |
| | | | | | | | | | | | | | | | | | |
| **OS9** | 0.09 | 28 | | | | | | | | | | | | 26.9 | | | **26.9** |
| **FG34a** | 0.14 | 6.1 | 140 | 5.0 | 3.6% | 13.6 | 995 | 36.0 | 3.6% | L | 7 | 1.3 | 12.5 | 26.1 | 1135.00 | 16.3 | **16.3** |
| **FG34b** | 0.16 | 11 | 305 | 7.0 | 2.3% | 22.9 | 1670 | 36.0 | 2.2% | L | 7 | 1.0 | 27.1 | 50.0 | 1975.00 | 21.0 | **21.0** |
| | | | | | | | | | | | | | | | | | |
| **HG13** | 0.09 | 54 | 745 | 27.0 | 3.6% | 32.9 | 3225 | 90.0 | 2.8% | L | 7 | 1.2 | 46.0 | 78.9 | 3970.00 | 32.1 | **32.1** |
| | | | | | | | | | | | | | | | | | |

Notes:

* $T_i = \frac{0.395\,(1.1-C5)\sqrt{L}}{S^{0.33}}$

$V = C_V S_W^{0.5}$

** 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 |
| PAVED AREAS | P | 20 |

# STORM DRAINAGE SYSTEM DESIGN
## (RATIONAL METHOD PROCEDURE)
## SURFACE ROUTING

PROJECT: **Rolling Hills Ranch North PDR**

Date: 2/5/2024

| DESIGN POINT | BASIN | AREA (AC) | Tc (Min.) | DIRECT RUNOFF I (in./ hr.) (5 YR) | DIRECT RUNOFF I (in./ hr.) (100 YR) | DIRECT RUNOFF COEFF. © (5 YR) | DIRECT RUNOFF COEFF. © (100 YR) | DIRECT RUNOFF CA (5 YR) | DIRECT RUNOFF CA (100 YR) | DIRECT RUNOFF Q (5 YR) | DIRECT RUNOFF Q (100 YR) | TOTAL RUNOFF Sum Tc (min.) | TOTAL RUNOFF I (in./ hr.) (5 YR) | TOTAL RUNOFF I (in./ hr.) (100 YR) | TOTAL RUNOFF CA (5 YR) | TOTAL RUNOFF CA (100 YR) | TOTAL RUNOFF Q (5 YR) | TOTAL RUNOFF Q (100 YR) | OVERLAND TRAVEL TIME DESTINATION DP | CONVEYANCE TYPE | COEFFICIENT Cv | SLOPE % | VEL. (FPS) | LENGTH (FT) | TRAVEL TIME Tt |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEVELOPED | | | | | | | | | | | | | | | | | | | | | | | | | |
| I01 | A01 | 5.4 | 15.6 | 3.47 | 5.82 | 0.25 | 0.47 | 1.36 | 2.55 | 4.7 | 15 | | | | | | **4.7** | **15** | I08 | P | 20.0 | 1.74% | 2.6 | 1090 | 6.9 |
| I02 | A02 | 3.0 | 9.8 | 4.16 | 6.99 | 0.30 | 0.50 | 0.90 | 1.51 | 3.8 | 11 | | | | | | **3.8** | **11** | I05 | P | 20.0 | 1.50% | 2.4 | 335 | 2.3 |
| DP1 | OS1 | 4.1 | 13.1 | 3.72 | 6.24 | 0.20 | 0.44 | 0.81 | 1.79 | 3.0 | 11 | | | | | | **3.0** | **11** | I03 | P | 20.0 | 2.35% | 3.1 | 680 | 3.7 |
| I03 | A03 | 3.2 | 14.8 | 3.55 | 5.95 | 0.25 | 0.47 | 0.79 | 1.48 | 2.8 | 8.8 | 16.8 | 3.35 | 5.62 | 1.60 | 3.27 | **5.4** | **18** | 104 | P | 20.0 | 2.30% | 3.0 | 305 | 1.7 |
| I04 | A04 | 3.4 | 13.4 | 3.69 | 6.20 | 0.25 | 0.47 | 0.83 | 1.59 | 3.1 | 10 | 18.5 | 3.21 | 5.38 | 1.09 | 2.63 | **3.5** | **14** | I05 | P | 20.0 | 2.30% | 3.0 | 260 | 1.4 |
| EI01 | OS2 | 5.3 | 20.0 | 3.09 | 5.18 | 0.39 | 0.57 | 2.08 | 3.02 | 6.4 | 16 | | | | | | **6.4** | **16** | I05 | P | 20.0 | 2.04% | 2.9 | 735 | 4.3 |
| I05 | A05 | 5.8 | 15.6 | 3.46 | 5.81 | 0.27 | 0.48 | 1.56 | 2.81 | 5.4 | 16 | 24.3 | 2.80 | 4.69 | 1.94 | 3.71 | **5.4** | **17** | I06 | P | 20.0 | 1.22% | 2.2 | 615 | 4.6 |
| I06 | A06 | 4.1 | 11.6 | 3.91 | 6.56 | 0.30 | 0.50 | 1.23 | 2.04 | 4.8 | 13 | 12.0 | 3.85 | 6.46 | 1.23 | 2.16 | **4.8** | **14** | I08 | P | 20.0 | 1.00% | 2.0 | 220 | 1.8 |
| I07 | A07 | 3.6 | 15.4 | 3.48 | 5.85 | 0.35 | 0.53 | 1.25 | 1.90 | 4.4 | 11 | | | | | | **4.4** | **11** | I08 | P | 20.0 | 2.25% | 3.0 | 355 | 2.0 |
| DP2 | OS4 | 38.8 | 30.5 | 2.46 | 4.12 | 0.12 | 0.38 | 4.61 | 14.71 | 11.3 | 61 | | | | | | **11** | **61** | | | | | | | |
| I08 | A08 | 5.7 | 19.8 | 3.10 | 5.21 | 0.31 | 0.51 | 1.76 | 2.86 | 5.5 | 15 | 22.4 | 2.92 | 4.90 | 1.76 | 3.90 | **5.5** | **19** | I09 | P | 20.0 | 0.50% | 1.4 | 15 | 0.2 |
| I09 | A09 | 0.2 | 6.8 | 4.72 | 7.92 | 0.90 | 0.96 | 0.22 | 0.23 | 1.0 | 1.8 | 22.6 | 2.90 | 4.88 | 0.22 | 0.64 | **1.0** | **3.1** | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| I10 | B01 | 6.4 | 17.3 | 3.30 | 5.55 | 0.35 | 0.53 | 2.22 | 3.37 | 7.3 | 19 | | | | | | **7.3** | **19** | I11 | P | 20.0 | 0.92% | 1.9 | 325 | 2.8 |
| I11 | B02 | 6.2 | 15.8 | 3.45 | 5.79 | 0.35 | 0.53 | 2.18 | 3.30 | 7.5 | 19 | 20.2 | 3.08 | 5.17 | 2.18 | 4.22 | **7.5** | **22** | I12 | P | 20.0 | 1.27% | 2.3 | 315 | 2.3 |
| I12 | B03 | 4.6 | 14.8 | 3.54 | 5.94 | 0.35 | 0.53 | 1.59 | 2.42 | 5.6 | 14 | 22.5 | 2.91 | 4.89 | 1.59 | 3.29 | **5.6** | **16** | | | | | | | |
| I13 | B04 | 9.5 | 19.7 | 3.11 | 5.23 | 0.35 | 0.53 | 3.32 | 5.03 | 10 | 26 | | | | 3.32 | 5.03 | **10** | **26** | I14 | P | 20.0 | 1.29% | 2.3 | 155 | 1.1 |
| EI02 | B05 | 3.0 | 15.7 | 3.45 | 5.79 | 0.35 | 0.53 | 1.05 | 1.60 | 3.6 | 9.2 | 20.8 | 3.03 | 5.09 | 1.05 | 3.32 | **3.6** | **17** | | | | | | | |
| EI03 | B06 | 6.6 | 24.2 | 2.80 | 4.71 | 0.35 | 0.53 | 2.31 | 3.50 | 6.5 | 16 | | | | 2.31 | 3.50 | **6.5** | **16** | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| I18 | C01 | 7.1 | 15.8 | 3.45 | 5.79 | 0.30 | 0.50 | 2.12 | 3.54 | 7.3 | 20 | | | | | | **7.3** | **20** | ECB | G | 15.0 | 1.43% | 1.8 | 665 | 6.2 |
| I19 | C02 | 7.1 | 15.5 | 3.47 | 5.83 | 0.30 | 0.50 | 2.12 | 3.54 | 7.4 | 21 | 21.9 | 2.95 | 4.95 | 2.12 | 4.73 | **7.4** | **23** | I20 | P | 20.0 | 0.50% | 1.4 | 15 | 0.2 |
| I20 | C03 | 4.4 | 20.4 | 3.06 | 5.13 | 0.30 | 0.50 | 1.33 | 2.22 | 4.1 | 11 | 22.1 | 2.94 | 4.93 | 1.33 | 3.51 | **4.1** | **17** | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| EI04 | OS3 | 9.86 | 18.8 | 3.18 | 5.34 | 0.49 | 0.65 | 4.82 | 6.37 | 15.3 | 34 | | | | | | **15** | **34** | | | | | | | |
| ES01 | | | | | | | | | | | | 30.6 | 2.45 | 4.11 | 15.97 | 34.38 | **39** | **141** | DP3 | G | 15.0 | 3.75% | 2.9 | 640 | 3.7 |
| ES02 | | | | | | | | | | | | 22.1 | 2.94 | 4.93 | 6.01 | 9.30 | **18** | **46** | DP3 | G | 15.0 | 5.82% | 3.6 | 275 | 1.3 |
| DP3 | OS5 | 6.6 | 14.5 | 3.57 | 6.00 | 0.18 | 0.42 | 1.23 | 2.80 | 4.4 | 17 | 34.3 | 2.28 | 3.83 | 28.03 | 52.85 | **64** | **202** | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| DP1 | OS9 | 27.8 | 26.9 | 2.65 | 4.44 | 0.09 | 0.36 | 2.50 | 10.00 | 6.6 | 44 | | | | | | **6.6** | **44** | G14 | G | 15.0 | 2.11% | 2.2 | 950 | 7.3 |
| DP1 | FG34a | 6.1 | 16.3 | 3.40 | 5.70 | 0.14 | 0.39 | 0.86 | 2.42 | 2.9 | 14 | | | | | | **2.9** | **14** | G14 | G | 15.0 | 2.11% | 2.2 | 950 | 7.3 |
| G14 | FG34b | 11.4 | 21.0 | 3.02 | 5.07 | 0.16 | 0.40 | 1.79 | 4.62 | 5.4 | 23 | 34.1 | 2.29 | 3.84 | 5.16 | 17.03 | **12** | **65** | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| G7 | HG13 | 54.0 | 32.1 | 2.38 | 4.00 | 0.09 | 0.36 | 4.86 | 19.44 | 11.6 | 78 | | | | | | **12** | **78** | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |

## STORM DRAINAGE SYSTEM DESIGN
## INLET CALCULATIONS

PROJECT: **Rolling Hills Ranch North PDR**

Date: 2/5/2024

| | | | | | | | | $Q_{Total}$ | | $Q_{Capture}$ | | | | $Q_{Flow-by}$ | | | | DEPTH (max) | | SPREAD | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DP | BASIN | Inlet size L(i) | Proposed or Existing | INLET TYPE | CROSS SLOPE | STREET SLOPE | $T_c$ | $Q_5$ (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 | A01 | 15 | PR | SUMP[1] | 2.0% | | 15.6 | 4.7 | 15 | 4.7 | 14 | 1.36 | 2.336 | - | 1.2 | - | 0.21 | 0.47 | 0.47 | | |
| I02 | A02 | 10 | PR | SUMP[1] | 2.0% | | 9.8 | 3.8 | 11 | 3.8 | 9.9 | 0.90 | 1.422 | - | 0.6 | - | 0.09 | 0.47 | 0.47 | | |
| I03 | A03 | 20 | PR | FLOW-BY | 2.0% | 1.0% | 16.8 | 5.4 | 18 | 4.5 | 13 | 1.35 | 2.234 | 0.9 | 5.9 | 0.25 | 1.04 | 0.36 | 0.51 | 13.5 | 21.5 |
| I04 | A04 | 20 | PR | SUMP[1] | 2.0% | | 18.5 | 3.5 | 14 | 3.5 | 14 | 1.09 | 2.629 | - | - | - | - | 0.47 | 0.47 | | |
| EI01 | OS2 | 20 | PR | FLOW-BY | 2.0% | 1.0% | 20.0 | 6.4 | 16 | 5.2 | 11 | 1.69 | 2.119 | 1.2 | 4.7 | 0.38 | 0.90 | 0.37 | 0.49 | 14.5 | 20.2 |
| I05 | A05 | 20 | PR | SUMP[1] | 2.0% | | 24.3 | 5.4 | 17 | 5.4 | 17 | 1.94 | 3.676 | - | 0.2 | - | 0.03 | 0.47 | 0.47 | | |
| I06 | A06 | 10 | PR | SUMP[1] | 2.0% | | 12.0 | 4.8 | 14 | 4.8 | 9.9 | 1.25 | 1.538 | - | 4.0 | - | 0.62 | 0.47 | 0.47 | | |
| I07 | A07 | 10 | PR | SUMP[1] | 2.0% | | 15.4 | 4.4 | 11 | 4.4 | 9.9 | 1.25 | 1.700 | - | 1.2 | - | 0.20 | 0.47 | 0.47 | | |
| I08 | A08 | 15 | PR | SUMP | 2.0% | | 22.4 | 5.5 | 19 | 5.5 | 17 | 1.88 | 3.487 | - | 2.0 | - | 0.41 | 0.50 | 0.55 | | |
| I09 | A09 | 10 | PR | SUMP | 2.0% | | 22.6 | 1.0 | 3.1 | 1.0 | 3.1 | 0.35 | 0.644 | - | - | - | - | 0.50 | 0.70 | | |
| I10 | B01 | 15 | PR | SUMP[1] | 2.0% | | 17.3 | 7.3 | 19 | 7.3 | 14 | 2.22 | 2.451 | - | 5.1 | - | 0.92 | 0.47 | 0.47 | | |
| I11 | B02 | 20 | PR | SUMP[1] | 2.0% | | 20.2 | 7.5 | 22 | 7.5 | 17 | 2.44 | 3.339 | - | 4.5 | - | 0.88 | 0.47 | 0.47 | | |
| I12 | B03 | 20 | PR | SUMP[1] | 2.0% | | 22.5 | 5.6 | 16 | 5.6 | 16 | 1.94 | 3.292 | - | - | - | - | 0.47 | 0.47 | | |
| I13 | B04 | 20 | PR | SUMP[1] | 2.0% | | 19.7 | 10 | 26 | 10 | 17 | 3.32 | 3.300 | - | 9.0 | - | 1.73 | 0.47 | 0.47 | | |
| EI02 | B05 | 15 | EX | SUMP | 2.0% | | 20.8 | 3.6 | 17 | 3.6 | 17 | 1.20 | 3.323 | - | - | - | - | 0.50 | 0.55 | | |
| EI03 | B06 | 15 | EX | SUMP | 2.0% | | 24.2 | 6.5 | 16 | 6.5 | 16 | 2.31 | 3.500 | - | - | - | - | 0.50 | 0.70 | | |
| I18 | C01 | 15 | PR | SUMP[1] | 2.0% | | 15.8 | 7.3 | 20 | 7.3 | 14 | 2.12 | 2.349 | - | 6.9 | - | 1.19 | 0.47 | 0.47 | | |
| I19 | C02 | 15 | PR | SUMP | 2.0% | | 21.9 | 7.4 | 23 | 7.4 | 17 | 2.50 | 3.446 | - | 6.4 | - | 1.28 | 0.50 | 0.55 | | |
| I20 | C03 | 15 | PR | SUMP | 2.0% | | 22.1 | 4.1 | 17 | 4.1 | 17 | 1.39 | 3.508 | - | - | - | - | 0.50 | 0.70 | | |

[1] Forced sump at intersection

## STORM DRAINAGE SYSTEM DESIGN
### (RATIONAL METHOD PROCEDURE)
### PIPE ROUTING

PROJECT: **Rolling Hills Ranch North PDR** Date: 2/5/2024

| 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)* | TRAVEL TIME Tt |
| I01 | A01 | 15.6 | 3.47 | 5.82 | 1.36 | 2.34 | 4.7 | 14 | | | | | | **4.7** | **14** | 18 | 0.013 | J01 | 0.93% | 54 | 5.7 | 0.2 |
| J01 | | | | | | | | | 15.7 | 3.45 | 5.79 | 1.36 | 2.34 | **4.7** | **14** | 18 | 0.013 | J02 | 2.61% | 157 | 9.6 | 0.3 |
| J02 | | | | | | | | | 16.0 | 3.43 | 5.75 | 1.36 | 2.34 | **4.6** | **13** | 18 | 0.013 | J03 | 2.89% | 277 | 10 | 0.5 |
| I02 | A02 | 9.8 | 4.16 | 6.99 | 0.90 | 1.42 | 3.8 | 9.9 | | | | | | **3.8** | **9.9** | 18 | 0.013 | J03 | 1.92% | 26 | 8.3 | 0.1 |
| J03 | | | | | | | | | 16.4 | 3.38 | 5.68 | 2.26 | 3.76 | **7.6** | **21** | 24 | 0.013 | J08 | 1.42% | 353 | 8.6 | 0.7 |
| I03 | A03 | 16.8 | 3.35 | 5.62 | 1.35 | 2.23 | 4.5 | 13 | | | | | | **4.5** | **13** | 18 | 0.013 | J04 | 2.12% | 26 | 8.7 | 0.0 |
| J04 | | | | | | | | | 16.9 | 3.34 | 5.61 | 1.35 | 2.23 | **4.5** | **13** | 18 | 0.013 | J05 | 2.60% | 267 | 9.6 | 0.5 |
| I04 | A04 | 18.5 | 3.21 | 5.38 | 1.09 | 2.63 | 3.5 | 14 | | | | | | **3.5** | **14** | 18 | 0.013 | J05 | 1.92% | 26 | 8.3 | 0.1 |
| J05 | | | | | | | | | 18.6 | 3.20 | 5.37 | 2.44 | 4.86 | **7.8** | **26** | 24 | 0.013 | J06 | 2.07% | 275 | 10 | 0.4 |
| I05 | A05 | 24.3 | 2.80 | 4.69 | 1.94 | 3.68 | 5.4 | 17 | | | | | | **5.4** | **17** | 24 | 0.013 | J06 | 8.33% | 6 | 21 | 0.0 |
| J06 | | | | | | | | | 24.3 | 2.80 | 4.69 | 4.38 | 8.54 | **12** | **40** | 30 | 0.013 | J07 | 0.98% | 41 | 8.3 | 0.1 |
| J07A | | | | | | | | | 24.4 | 2.79 | 4.68 | 4.38 | 8.54 | **12** | **40** | 30 | 0.013 | J09 | 1.85% | 163 | 11.4 | 0.2 |
| J07B | | | | | | | | | 24.6 | 2.78 | 4.66 | 4.38 | 8.54 | **12** | **40** | 30 | 0.013 | J09 | 1.03% | 398 | 8.5 | 0.8 |
| I06 | A06 | 12.0 | 3.85 | 6.46 | 1.25 | 1.54 | 4.8 | 9.9 | | | | | | **4.8** | **9.9** | 24 | 0.013 | J08 | 8.33% | 6 | 21 | 0.0 |
| J08 | | | | | | | | | 17.1 | 3.32 | 5.58 | 3.51 | 5.30 | **12** | **30** | 30 | 0.013 | J09 | 1.54% | 26 | 10 | 0.0 |
| J09 | | | | | | | | | 25.4 | 2.73 | 4.58 | 7.88 | 13.83 | **22** | **63** | 42 | 0.013 | J11 | 0.72% | 221 | 8.9 | 0.4 |
| I07 | A07 | 15.4 | 3.48 | 5.85 | 1.25 | 1.70 | 4.4 | 9.9 | | | | | | **4.4** | **9.9** | 18 | 0.013 | J10 | 0.96% | 52 | 5.8 | 0.1 |
| J10 | | | | | | | | | 15.5 | 3.47 | 5.82 | 1.25 | 1.70 | **4.3** | **9.9** | 18 | 0.013 | J11 | 2.30% | 313 | 9.0 | 0.6 |
| DP2 | OS4 | 30.5 | 2.46 | 4.12 | 4.61 | 14.71 | 11 | 61 | | | | | | **11** | **61** | 48 | 0.013 | I08 | 1.03% | 52 | 12 | 0.1 |
| I08 | A08 | 22.4 | 2.92 | 4.90 | 1.88 | 3.49 | 5.5 | 17 | 30.6 | 2.45 | 4.12 | 6.48 | 18.20 | **16** | **75** | 48 | 0.013 | J11 | 1.58% | 6 | 14 | 0.0 |
| J11 | | | | | | | | | 30.6 | 2.45 | 4.12 | 15.62 | 33.73 | **38** | **139** | 48 | 0.013 | I09 | 1.13% | 26 | 12 | 0.0 |
| I09 | A09 | 22.6 | 2.90 | 4.88 | 0.35 | 0.64 | 1.0 | 3.1 | 30.6 | 2.45 | 4.11 | 15.97 | 34.38 | **39** | **141** | 48 | 0.013 | ES01 | 1.02% | 88 | 12 | 0.1 |
| | | | | | | | | | | | | | | | | | | | | | | |

| 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)* | TRAVEL TIME Tt |
| I10 | B01 | 17.3 | 3.30 | 5.55 | 2.22 | 2.45 | 7.3 | 14 | | | | | | **7.3** | **14** | 24 | 0.013 | J12 | 1.78% | 53 | 9.6 | 0.1 |
| J12 | | | | | | | | | 17.4 | 3.30 | 5.53 | 2.22 | 2.45 | **7.3** | **14** | 24 | 0.013 | J13 | 1.12% | 258 | 7.6 | 0.6 |
| I11 | B02 | 20.2 | 3.08 | 5.17 | 2.44 | 3.34 | 7.5 | 17 | | | | | | **7.5** | **17** | 18 | 0.013 | J13 | 1.00% | 25 | 6.0 | 0.1 |
| J13 | | | | | | | | | 20.2 | 3.07 | 5.16 | 4.66 | 5.79 | **14** | **30** | 30 | 0.013 | J14 | 1.36% | 295 | 9.8 | 0.5 |
| I12 | B03 | 22.5 | 2.91 | 4.89 | 1.94 | 3.29 | 5.6 | 16 | | | | | | **5.6** | **16** | 18 | 0.013 | J14 | 1.00% | 25 | 6.0 | 0.1 |
| J14 | | | | | | | | | 22.6 | 2.91 | 4.88 | 6.60 | 9.08 | **19** | **44** | 30 | 0.013 | J15 | 3.46% | 316 | 16 | 0.3 |
| I13 | B04 | 19.7 | 3.11 | 5.23 | 3.32 | 3.30 | 10.3 | 17 | | | | | | **10** | **17** | 24 | 0.013 | J15 | 1.00% | 26 | 7.2 | 0.1 |
| J15 | | | | | | | | | 22.9 | 2.89 | 4.85 | 9.92 | 12.38 | **29** | **60** | 36 | 0.013 | EJ01 | 1.61% | 165 | 12 | 0.2 |
| EI02 | B05 | 20.8 | 3.03 | 5.09 | 1.20 | 3.32 | 3.6 | 17 | | | | | | **3.6** | **17** | 18 | 0.013 | EJ01 | 4.28% | 5 | 12 | 0.0 |
| EI03 | B06 | 24.2 | 2.80 | 4.71 | 2.31 | 3.50 | 6.5 | 16 | | | | | | **6.5** | **16** | 18 | 0.013 | EJ01 | 0.81% | 25 | 5.4 | 0.1 |
| EJ01 | | | | | | | | | 24.3 | 2.80 | 4.70 | 13.43 | 19.20 | **38** | **90** | 42 | 0.013 | Sanctuary | 0.79% | 138 | 9.3 | 0.2 |
| | | | | | | | | | | | | | | | | | | | | | | |
| I18 | C01 | 15.8 | 3.45 | 5.79 | 2.12 | 2.35 | 7.3 | 14 | | | | | | **7.3** | **14** | 18 | 0.013 | J21 | 0.96% | 52 | 5.8 | 0.1 |
| J21 | | | | | | | | | 15.9 | 3.43 | 5.76 | 2.12 | 2.35 | **7.3** | **14** | 18 | 0.013 | J22 | 1.82% | 318 | 8.0 | 0.7 |
| J22 | | | | | | | | | 16.6 | 3.37 | 5.66 | 2.12 | 2.35 | **7.2** | **13** | 24 | 0.013 | J23 | 0.76% | 231 | 6.3 | 0.6 |
| J23 | | | | | | | | | 17.2 | 3.32 | 5.57 | 2.12 | 2.35 | **7.0** | **13** | 24 | 0.013 | J23 | 1.57% | 86 | 9.0 | 0.2 |
| I19 | C02 | 21.9 | 2.95 | 4.95 | 2.50 | 3.45 | 7.4 | 17 | | | | | | **7.4** | **17** | 24 | 0.013 | J23 | 8.33% | 6 | 21 | 0.0 |
| J24 | | | | | | | | | 21.9 | 2.95 | 4.95 | 4.62 | 5.80 | **14** | **29** | 30 | 0.013 | I20 | 1.92% | 26 | 12 | 0.0 |
| I20 | C03 | 22.1 | 2.94 | 4.93 | 1.39 | 3.51 | 4.1 | 17 | 22.1 | 2.94 | 4.93 | 6.01 | 9.30 | **18** | **46** | 30 | 0.013 | ES02 | 1.90% | 158 | 12 | 0.2 |
| | | | | | | | | | | | | | | | | | | | | | | |
| Ex05 | ExB09 | 21.7 | 2.96 | 4.97 | 1.38 | 3.50 | 4.1 | 17 | | | | | | **4.1** | **17** | 18 | 0.013 | ExJ09 | 4.26% | 25 | 12.3 | 0.0 |
| EI01 | OS2 | 20.0 | 3.09 | 5.18 | 1.69 | 2.12 | 5.2 | 11 | | | | | | **5.2** | **11** | 18 | 0.013 | ExJ09 | 1.01% | 45 | 6.0 | 0.1 |
| ExJ09 | | | | | | | | | 33.2 | 2.33 | 3.91 | 13.99 | 30.52 | **33** | **119** | 42 | 0.013 | ExJ11 | 2.61% | 157 | 16.9 | 0.2 |

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

# Appendix C - Detention Pond Information

# STAGE/STORAGE/DISCHARGE CURVES FOR DETENTION POND ANALYSIS

## Meridian Ranch Proposed Detention Pond G-FUTURE CONDITIONS (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.= | 7030.1 |
| 100 year storage vol.= | 24.5 |
| 100 year discharge= | 444 |
| 5 year storage elev.= | 7027.5 |
| 5 year storage vol.= | 8.8 |
| 5 year discharge= | 19 |
| WQCV storage elev.= | 7025.2 |
| WQCV storage vol.= | 0.9 |
| 1/2 WQCV storage elev.= | 7024.8 |
| 1/2 WQCV storage vol.= | 0.45 |

Data for outlet pipe and grate:

| Type | | H or V | Dimensions Width (ft.) | X Height (ft.) | | Dia.(in) | | (sqft) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Circular** | Orifice 1a: | V | | | | | 1.75 | Area = | 0.017 | Elev to cl = | 7023.50 |
| **Circular** | Orifice 1b: | V | | | | | 1.75 | Area = | 0.017 | Elev to cl = | 7024.10 |
| **Circular** | Orifice 1c: | V | | | | | 1.75 | Area = | 0.017 | Elev to cl = | 7024.80 |
| **Rectangular** | Orifice 2: | V | 8.6 | | | 1.04 | | Area = | 8.944 | Elev to cl = | 7027.62 |
| **Rectangular** | Orifice 3: | V | 2 | | | 0.43 | | Area = | 0.860 | Elev to cl = | 7025.44 |
| **Rectangular** | Orifice 4: | V | 4.1 | | | 0.64 | | Area = | 2.624 | Elev to cl = | 7027.82 |
| **Rectangular** | Orifice 5: | V | 8.6 | | | 1.04 | | Area = | 8.944 | Elev to cl = | 7027.62 |

Stand Pipe Dimensions

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rec Grate | | 20 | x | 8 | | | Elev = | 7028.14 |
| Circ. Grate | | | dia. | | | | Elev = | 7028.14 |

Outlet Culvert Dimensions

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

| | |
|---|---|
| 50 year storage vol.= | 19.9 |
| 50 year storage elev.= | 7029.4 |
| 50 year discharge= | 289 |
| 10 year storage vol.= | 11.3 |
| 10 year storage elev.= | 7027.9 |
| 10 year discharge= | 51 |
| 2 year storage vol.= | 5.5 |
| 2 year storage elev.= | 7026.8 |
| 2 year discharge= | 5.2 |

| STAGE | | STORAGE | | | | DISCHARGE | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ELEV | HEIGHT | AREA | | VOLUME | | TOP OF | SPILLWAY | ORIFICE | | | | | | (max outflow) | GRATE (max outflow) | PIPE | | REALIZED CULVERT | TOTAL |
| | | sqft | acre | acft | cum acft | BANK | | 1a | 1b | 1c | 2 | 3 | 4 | 5 | **Rectangular** | 1 | 2 | OUTFLOW | FLOW |
| 7023 | 0 | 0 | 0.00 | 0.0 | 0.000 | | | - | - | - | - | - | - | - | - | 10 | | - | - |
| 7024 | 1 | 2285 | 0.05 | 0.0 | 0.026 | - | - | 0.06 | - | - | - | - | - | - | - | 51 | | 0.1 | 0.06 |
| 7025 | 2 | 42192 | 0.97 | 0.5 | 0.537 | - | - | 0.10 | 0.08 | 0.04 | - | - | - | - | - | 111 | | 0.2 | 0.21 |
| 7026 | 3 | 127336 | 2.92 | 1.9 | 2.483 | - | - | 0.13 | 0.11 | 0.09 | - | 3.1 | - | - | - | 184 | | 3.4 | 3.44 |
| 7026.5 | 3.5 | 169390 | 3.89 | 3.6 | 4.180 | - | - | 0.14 | 0.12 | 0.10 | - | 4.3 | - | - | - | 224 | | 4.6 | 4.64 |
| 7027 | 4 | 211444 | 4.85 | 2.2 | 6.365 | - | - | 0.15 | 0.14 | 0.12 | - | 5.2 | - | - | - | 268 | | 5.6 | 5.59 |
| 7027.5 | 4.5 | 234356 | 5.38 | 4.6 | 8.814 | - | - | 0.16 | 0.15 | 0.13 | 6.5 | 6.0 | - | 6.5 | - | 304 | | 19 | 19.45 |
| 7028 | 5 | 257267 | 5.91 | 5.4 | 11.745 | - | - | 0.17 | 0.16 | 0.14 | 22.0 | 6.6 | 4.3 | 22.0 | - | 337 | | 56 | 55.51 |
| 7028.5 | 5.5 | 264583 | 6.07 | 5.7 | 14.541 | - | - | 0.18 | 0.17 | 0.15 | 40.4 | 7.2 | 10.4 | 40.4 | 23 | 373 | | 122 | 122.30 |
| 7029 | 6 | 271899 | 6.24 | 6.1 | 17.819 | - | - | 0.19 | 0.18 | 0.16 | 50.6 | 7.8 | 13.7 | 50.6 | 86 | 406 | | 209 | 209.39 |
| 7029.5 | 6.5 | 277060 | 6.36 | 11.7 | 20.555 | - | - | 0.21 | 0.19 | 0.17 | 59.0 | 8.3 | 16.4 | 59.0 | 171 | 436 | | 315 | 314.68 |
| 7030 | 7 | 282220 | 6.48 | 9.4 | 23.956 | - | - | 0.21 | 0.20 | 0.18 | 66.4 | 8.8 | 18.7 | 66.4 | 274 | 464 | | 435 | 434.93 |
| 7030.5 | 7.5 | 287904 | 6.61 | 6.5 | 27.039 | - | - | 0.21 | 0.20 | 0.19 | 73.1 | 9.3 | 20.7 | 73.1 | 392 | 491 | | 491 | 490.92 |
| 7031 | 8 | 293587 | 6.74 | 6.6 | 30.565 | - | - | 0.22 | 0.21 | 0.20 | 79.2 | 9.8 | 22.5 | 79.2 | 522 | 516 | | 516 | 516.22 |
| 7031.5 | 8.5 | 297735 | 6.84 | 6.7 | 33.762 | - | - | 0.23 | 0.22 | 0.21 | 84.8 | 10.2 | 24.2 | 84.8 | 665 | 540 | | 540 | 540.33 |
| 7032 | 9 | 301883 | 6.93 | 3.4 | 37.203 | 137.9 | 137.9 | 0.23 | 0.23 | 0.22 | 90.1 | 10.6 | 25.8 | 90.1 | 819 | 563 | | 563 | 701.30 |
| 7032.5 | 9.5 | 309236 | 7.10 | 7.0 | 40.729 | 390.0 | 390.0 | 0.24 | 0.23 | 0.22 | 95.1 | 11.0 | 27.3 | 95.1 | 983 | 586 | | 586 | 975.59 |
| 7033 | 10 | 316589 | 7.27 | 3.6 | 44.320 | 716.5 | 716.5 | 0.25 | 0.24 | 0.23 | 99.9 | 11.4 | 28.8 | 99.9 | 1,157 | 607 | | 607 | 1,323.43 |

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.

**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 |
| | | Control Specifications: | 24 HR-2 MIN. |
| | | Volume Units: | AC-FT |

Computed Results:

| | | | |
|---|---|---|---|
| Peak Inflow: | 625 (CFS) | Date/Time of Peak Inflow: | 01Jul2015, 12:24 |
| Peak Outflow: | 444 (CFS) | Date/Time of Peak Outflow: | 01Jul2015, 12:54 |
| Total Inflow: | 112.2 (AC-FT) | Peak Storage: | 24.5 (AC-FT) |
| Total Outflow: | 102.2 (AC-FT) | Peak Elevation: | 7030.1 (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 |
| | | Control Specifications: | 24 HR-2 MIN. |
| | | Volume Units: | AC-FT |

Computed Results:

| | | | |
|---|---|---|---|
| Peak Inflow: | 94 (CFS) | Date/Time of Peak Inflow: | 01Jul2015, 12:30 |
| Peak Outflow: | 19 (CFS) | Date/Time of Peak Outflow: | 01Jul2015, 15:48 |
| Total Inflow: | 21.2 (AC-FT) | Peak Storage: | 8.8 (AC-FT) |
| Total Outflow: | 14.0 (AC-FT) | Peak Elevation: | 7027.5 (FT) |

# Appendix D – Runoff Reduction

## Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018) **Sheet 1 of 1**

| | |
|---|---|
| **Designer:** | **Thomas A Kerby, PE** |
| **Company:** | **Tech Contractors** |
| **Date:** | **March 29, 2024** |
| **Project:** | **Rolling Hills Ranch North** |
| **Location:** | **Falcon, CO** |

### SITE INFORMATION (User Input in Blue Cells)

| | | |
|---|---|---|
| WQCV Rainfall Depth | 0.60 | inches |
| Depth of Average Runoff Producing Storm, $d_6$ = | 0.43 | inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3) |

| | |
|---|---|
| Area Type | UIA:RPA |
| Area ID | A |
| Downstream Design Point ID | A |
| Downstream BMP Type | None |
| DCIA (ft$^2$) | -- |
| UIA (ft$^2$) | 15,945 |
| RPA (ft$^2$) | 12,885 |
| SPA (ft$^2$) | -- |
| HSG A (%) | 0% |
| HSG B (%) | 100% |
| HSG C/D (%) | 0% |
| Average Slope of RPA (ft/ft) | 0.020 |
| UIA:RPA Interface Width (ft) | 86.00 |

### CALCULATED RUNOFF RESULTS

| | |
|---|---|
| Area ID | A |
| UIA:RPA Area (ft$^2$) | 28,830 |
| L / W Ratio | 3.90 |
| UIA / Area | 0.5531 |
| Runoff (in) | 0.00 |
| Runoff (ft$^3$) | 0 |
| Runoff Reduction (ft$^3$) | 664 |

### CALCULATED WQCV RESULTS

| | |
|---|---|
| Area ID | A |
| WQCV (ft$^3$) | 664 |
| WQCV Reduction (ft$^3$) | 664 |
| WQCV Reduction (%) | 100% |
| Untreated WQCV (ft$^3$) | 0 |

### CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

| | |
|---|---|
| Downstream Design Point ID | A |
| DCIA (ft$^2$) | 0 |
| UIA (ft$^2$) | 15,945 |
| RPA (ft$^2$) | 12,885 |
| SPA (ft$^2$) | 0 |
| Total Area (ft$^2$) | 28,830 |
| Total Impervious Area (ft$^2$) | 15,945 |
| WQCV (ft$^3$) | 664 |
| WQCV Reduction (ft$^3$) | 664 |
| WQCV Reduction (%) | 100% |
| Untreated WQCV (ft$^3$) | 0 |

### CALCULATED SITE RESULTS (sums results from all columns in worksheet)

| | |
|---|---|
| Total Area (ft$^2$) | 28,830 |
| Total Impervious Area (ft$^2$) | 15,945 |
| WQCV (ft$^3$) | 664 |
| WQCV Reduction (ft$^3$) | 664 |
| WQCV Reduction (%) | 100% |
| Untreated WQCV (ft$^3$) | 0 |

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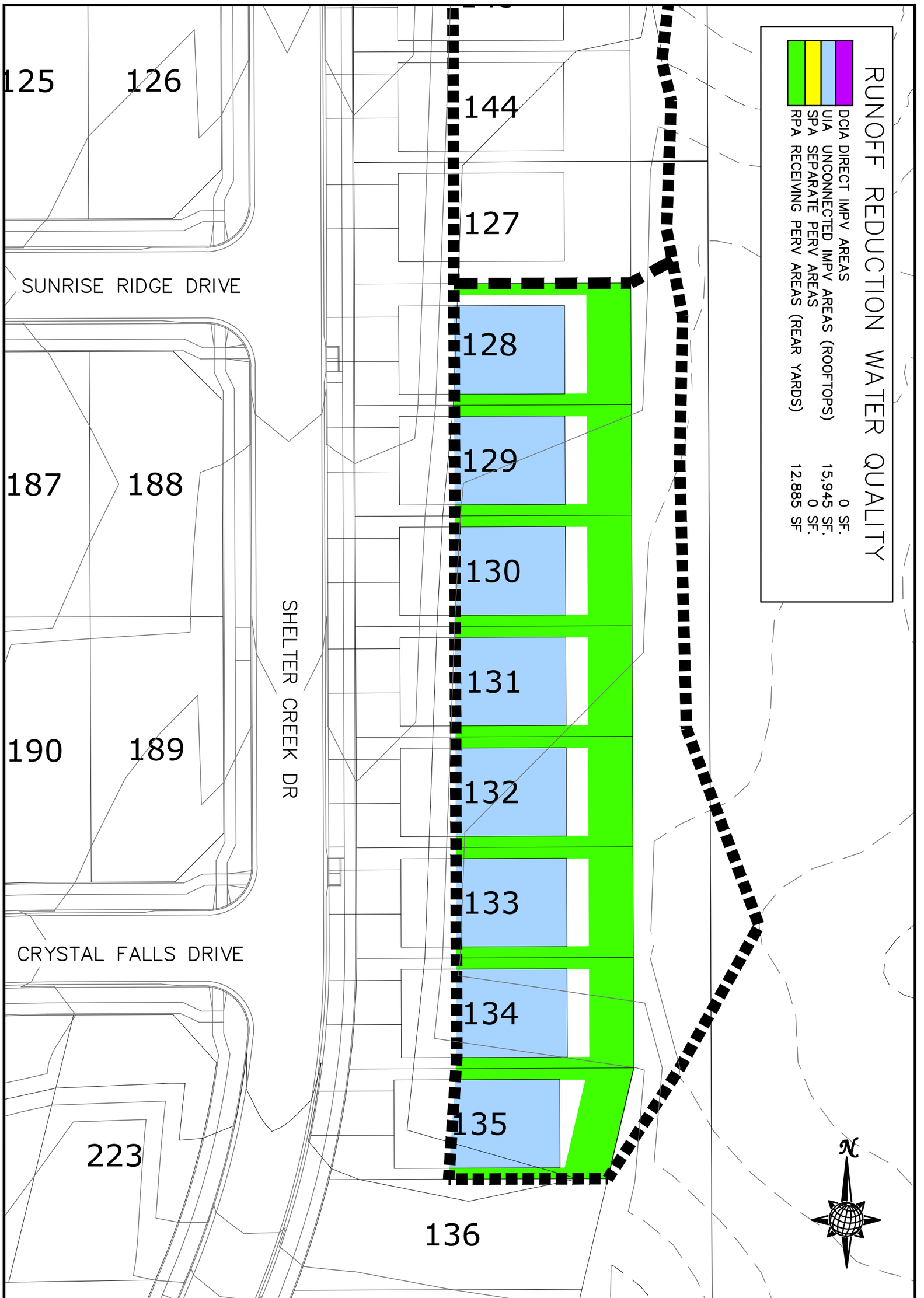


| | | | |
|---|---|---|---|
| Scale 1"=40' | Drawn by TAK | **RUNOFF REDUCTION** | TECH CONTRACTORS |
| | Checked by - | CATCHMENT AREA A | 11910 TOURMALINE, #130 |
| Sheet Number 1 | Date JAN 2024 | ROLLING HILLS RANCH NORTH PUD | FALCON, CO 80831 |
| | | | TELEPHONE 719.495.7444 |

## Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018) **Sheet 1 of 1**

| | |
|---|---|
| **Designer:** | **Thomas A Kerby, PE** |
| **Company:** | **Tech Contractors** |
| **Date:** | **March 29, 2024** |
| **Project:** | **Rolling Hills Ranch North** |
| **Location:** | **Falcon, CO** |

### SITE INFORMATION (User Input in Blue Cells)

| | | |
|---|---|---|
| WQCV Rainfall Depth | 0.60 | inches |
| Depth of Average Runoff Producing Storm, $d_6$ = | 0.43 | inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3) |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area Type | UIA:RPA | | | | | | | | | | | | |
| Area ID | B | | | | | | | | | | | | |
| Downstream Design Point ID | B | | | | | | | | | | | | |
| Downstream BMP Type | None | | | | | | | | | | | | |
| DCIA ($ft^2$) | -- | | | | | | | | | | | | |
| UIA ($ft^2$) | 12,000 | | | | | | | | | | | | |
| RPA ($ft^2$) | 9,700 | | | | | | | | | | | | |
| SPA ($ft^2$) | -- | | | | | | | | | | | | |
| HSG A (%) | 0% | | | | | | | | | | | | |
| HSG B (%) | 100% | | | | | | | | | | | | |
| HSG C/D (%) | 0% | | | | | | | | | | | | |
| Average Slope of RPA (ft/ft) | 0.020 | | | | | | | | | | | | |
| UIA:RPA Interface Width (ft) | 65.00 | | | | | | | | | | | | |

### CALCULATED RUNOFF RESULTS

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area ID | B | | | | | | | | | | | | |
| UIA:RPA Area ($ft^2$) | 21,700 | | | | | | | | | | | | |
| L / W Ratio | 5.14 | | | | | | | | | | | | |
| UIA / Area | 0.5530 | | | | | | | | | | | | |
| Runoff (in) | 0.00 | | | | | | | | | | | | |
| Runoff ($ft^3$) | 0 | | | | | | | | | | | | |
| Runoff Reduction ($ft^3$) | 500 | | | | | | | | | | | | |

### CALCULATED WQCV RESULTS

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area ID | B | | | | | | | | | | | | |
| WQCV ($ft^3$) | 500 | | | | | | | | | | | | |
| WQCV Reduction ($ft^3$) | 500 | | | | | | | | | | | | |
| WQCV Reduction (%) | 100% | | | | | | | | | | | | |
| Untreated WQCV ($ft^3$) | 0 | | | | | | | | | | | | |

### CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Downstream Design Point ID | B | | | | | | | | | | | | |
| DCIA ($ft^2$) | 0 | | | | | | | | | | | | |
| UIA ($ft^2$) | 12,000 | | | | | | | | | | | | |
| RPA ($ft^2$) | 9,700 | | | | | | | | | | | | |
| SPA ($ft^2$) | 0 | | | | | | | | | | | | |
| Total Area ($ft^2$) | 21,700 | | | | | | | | | | | | |
| Total Impervious Area ($ft^2$) | 12,000 | | | | | | | | | | | | |
| WQCV ($ft^3$) | 500 | | | | | | | | | | | | |
| WQCV Reduction ($ft^3$) | 500 | | | | | | | | | | | | |
| WQCV Reduction (%) | 100% | | | | | | | | | | | | |
| Untreated WQCV ($ft^3$) | 0 | | | | | | | | | | | | |

### CALCULATED SITE RESULTS (sums results from all columns in worksheet)

| | |
|---|---|
| Total Area ($ft^2$) | 21,700 |
| Total Impervious Area ($ft^2$) | 12,000 |
| WQCV ($ft^3$) | 500 |
| WQCV Reduction ($ft^3$) | 500 |
| WQCV Reduction (%) | 100% |
| Untreated WQCV ($ft^3$) | 0 |

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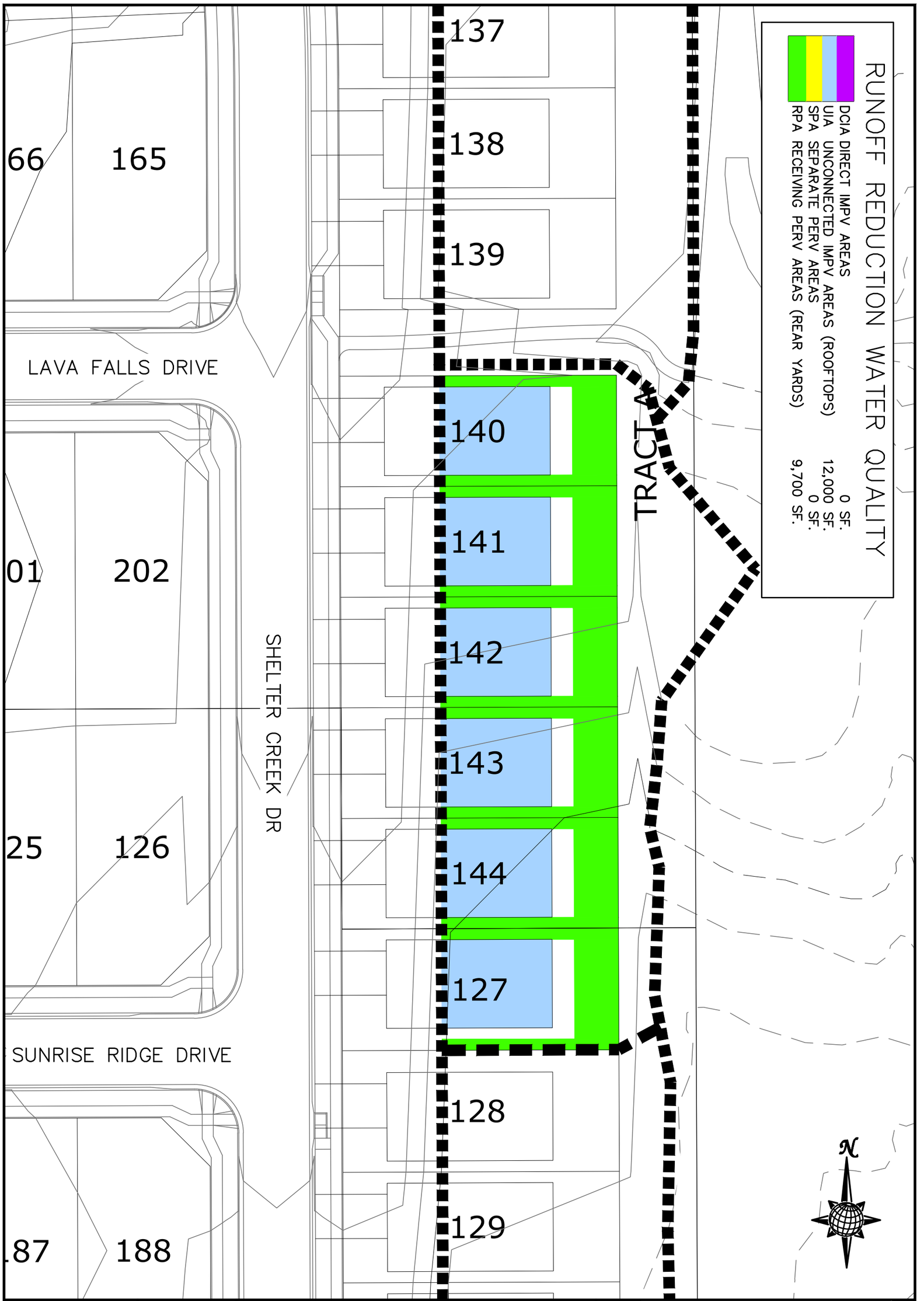



| | | | |
|---|---|---|---|
| Scale 1"=40' | Drawn by TAK | **RUNOFF REDUCTION** | TECH CONTRACTORS |
| | Checked by - | CATCHMENT AREA B | 11910 TOURMALINE, #130 |
| Sheet Number 2 | Date JAN 2024 | ROLLING HILLS RANCH NORTH PUD | FALCON, CO 80831 |
| | | | TELEPHONE 719.495.7444 |

## Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018) **Sheet 1 of 1**

| | |
|---|---|
| **Designer:** | **Thomas A Kerby, PE** |
| **Company:** | **Tech Contractors** |
| **Date:** | **March 29, 2024** |
| **Project:** | **Rolling Hills Ranch North** |
| **Location:** | **Falcon, CO** |

### SITE INFORMATION (User Input in Blue Cells)

| | | |
|---|---|---|
| WQCV Rainfall Depth | 0.60 | inches |
| Depth of Average Runoff Producing Storm, $d_6$ = | 0.43 | inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3) |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area Type | UIA:RPA | | | | | | | | | | | | |
| Area ID | C | | | | | | | | | | | | |
| Downstream Design Point ID | C | | | | | | | | | | | | |
| Downstream BMP Type | None | | | | | | | | | | | | |
| DCIA ($ft^2$) | -- | | | | | | | | | | | | |
| UIA ($ft^2$) | 20,000 | | | | | | | | | | | | |
| RPA ($ft^2$) | 19,310 | | | | | | | | | | | | |
| SPA ($ft^2$) | -- | | | | | | | | | | | | |
| HSG A (%) | 0% | | | | | | | | | | | | |
| HSG B (%) | 100% | | | | | | | | | | | | |
| HSG C/D (%) | 0% | | | | | | | | | | | | |
| Average Slope of RPA (ft/ft) | 0.020 | | | | | | | | | | | | |
| UIA:RPA Interface Width (ft) | 280.00 | | | | | | | | | | | | |

### CALCULATED RUNOFF RESULTS

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area ID | C | | | | | | | | | | | | |
| UIA:RPA Area ($ft^2$) | 39,310 | | | | | | | | | | | | |
| L / W Ratio | 0.50 | | | | | | | | | | | | |
| UIA / Area | 0.5088 | | | | | | | | | | | | |
| Runoff (in) | 0.00 | | | | | | | | | | | | |
| Runoff ($ft^3$) | 0 | | | | | | | | | | | | |
| Runoff Reduction ($ft^3$) | 833 | | | | | | | | | | | | |

### CALCULATED WQCV RESULTS

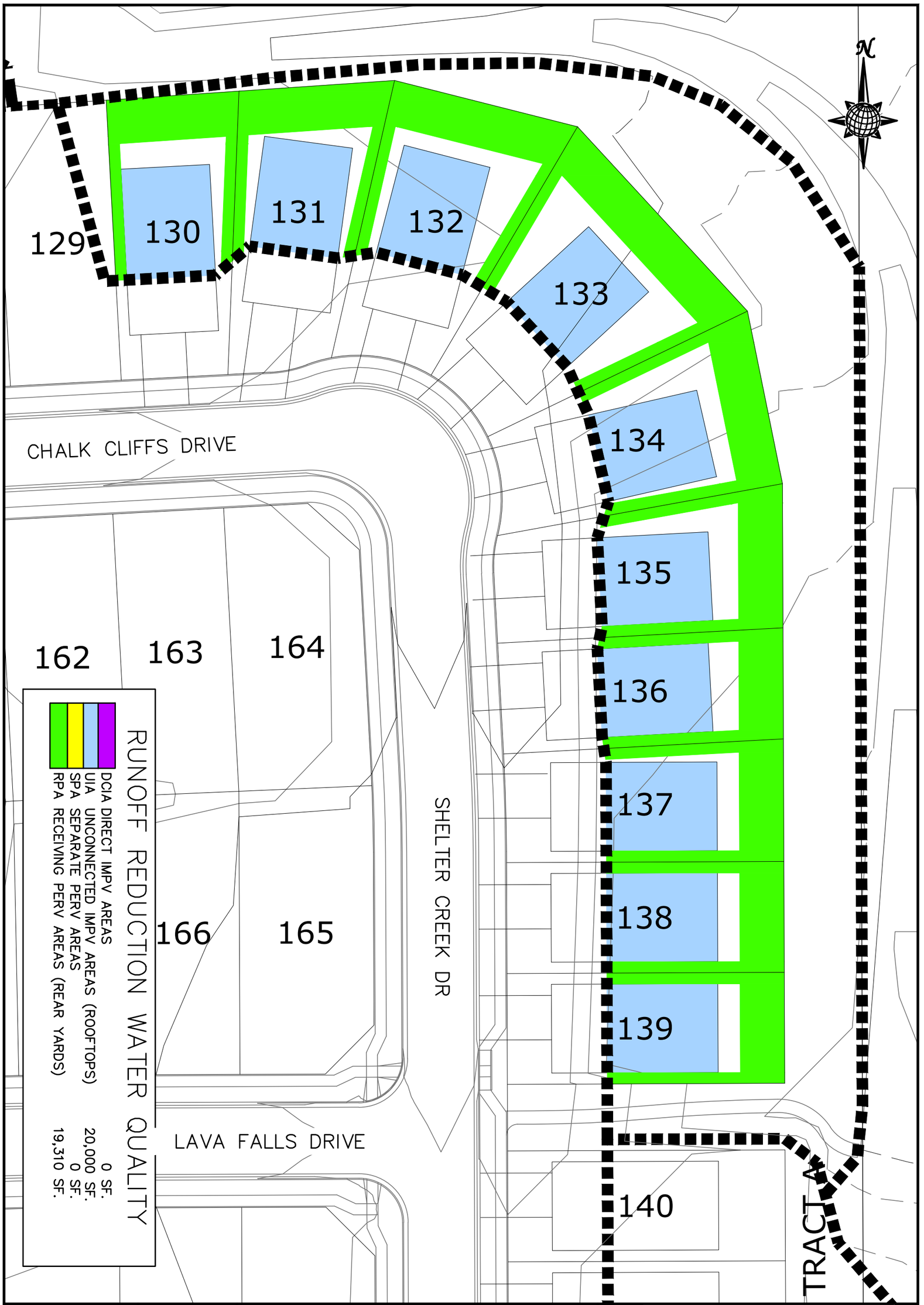
| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area ID | C | | | | | | | | | | | | |
| WQCV ($ft^3$) | 833 | | | | | | | | | | | | |
| WQCV Reduction ($ft^3$) | 833 | | | | | | | | | | | | |
| WQCV Reduction (%) | 100% | | | | | | | | | | | | |
| Untreated WQCV ($ft^3$) | 0 | | | | | | | | | | | | |

### CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Downstream Design Point ID | C | | | | | | | | | | | | |
| DCIA ($ft^2$) | 0 | | | | | | | | | | | | |
| UIA ($ft^2$) | 20,000 | | | | | | | | | | | | |
| RPA ($ft^2$) | 19,310 | | | | | | | | | | | | |
| SPA ($ft^2$) | 0 | | | | | | | | | | | | |
| Total Area ($ft^2$) | 39,310 | | | | | | | | | | | | |
| Total Impervious Area ($ft^2$) | 20,000 | | | | | | | | | | | | |
| WQCV ($ft^3$) | 833 | | | | | | | | | | | | |
| WQCV Reduction ($ft^3$) | 833 | | | | | | | | | | | | |
| WQCV Reduction (%) | 100% | | | | | | | | | | | | |
| Untreated WQCV ($ft^3$) | 0 | | | | | | | | | | | | |

### CALCULATED SITE RESULTS (sums results from all columns in worksheet)

| | |
|---|---|
| Total Area ($ft^2$) | 39,310 |
| Total Impervious Area ($ft^2$) | 20,000 |
| WQCV ($ft^3$) | 833 |
| WQCV Reduction ($ft^3$) | 833 |
| WQCV Reduction (%) | 100% |
| Untreated WQCV ($ft^3$) | 0 |




| | | | |
|---|---|---|---|
| Scale 1"=40' | Drawn by TAK | **RUNOFF REDUCTION** | TECH CONTRACTORS<br>11910 TOURMALINE, #130<br>FALCON, CO 80831 |
| | Checked by - | CATCHMENT AREA C | TELEPHONE 719.495.7444 |
| Sheet Number 3 | Date JAN 2024 | ROLLING HILLS RANCH NORTH PUD | |

## Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018) **Sheet 1 of 1**

| | |
|---|---|
| **Designer:** | **Thomas A Kerby, PE** |
| **Company:** | **Tech Contractors** |
| **Date:** | **March 29, 2024** |
| **Project:** | **Rolling Hills Ranch North** |
| **Location:** | **Falcon, CO** |

### SITE INFORMATION (User Input in Blue Cells)

| | | |
|---|---|---|
| WQCV Rainfall Depth | 0.60 | inches |
| Depth of Average Runoff Producing Storm, $d_6$ = | 0.43 | inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3) |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area Type | UIA:RPA | | | | | | | | | | | | |
| Area ID | D | | | | | | | | | | | | |
| Downstream Design Point ID | D | | | | | | | | | | | | |
| Downstream BMP Type | None | | | | | | | | | | | | |
| DCIA ($ft^2$) | -- | | | | | | | | | | | | |
| UIA ($ft^2$) | 23,665 | | | | | | | | | | | | |
| RPA ($ft^2$) | 21,510 | | | | | | | | | | | | |
| SPA ($ft^2$) | -- | | | | | | | | | | | | |
| HSG A (%) | 0% | | | | | | | | | | | | |
| HSG B (%) | 100% | | | | | | | | | | | | |
| HSG C/D (%) | 0% | | | | | | | | | | | | |
| Average Slope of RPA (ft/ft) | 0.020 | | | | | | | | | | | | |
| UIA:RPA Interface Width (ft) | 168.00 | | | | | | | | | | | | |

### CALCULATED RUNOFF RESULTS

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area ID | D | | | | | | | | | | | | |
| UIA:RPA Area ($ft^2$) | 45,175 | | | | | | | | | | | | |
| L / W Ratio | 1.60 | | | | | | | | | | | | |
| UIA / Area | 0.5239 | | | | | | | | | | | | |
| Runoff (in) | 0.00 | | | | | | | | | | | | |
| Runoff ($ft^3$) | 0 | | | | | | | | | | | | |
| Runoff Reduction ($ft^3$) | 986 | | | | | | | | | | | | |

### CALCULATED WQCV RESULTS

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area ID | D | | | | | | | | | | | | |
| WQCV ($ft^3$) | 986 | | | | | | | | | | | | |
| WQCV Reduction ($ft^3$) | 986 | | | | | | | | | | | | |
| WQCV Reduction (%) | 100% | | | | | | | | | | | | |
| Untreated WQCV ($ft^3$) | 0 | | | | | | | | | | | | |

### CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Downstream Design Point ID | D | | | | | | | | | | | | |
| DCIA ($ft^2$) | 0 | | | | | | | | | | | | |
| UIA ($ft^2$) | 23,665 | | | | | | | | | | | | |
| RPA ($ft^2$) | 21,510 | | | | | | | | | | | | |
| SPA ($ft^2$) | 0 | | | | | | | | | | | | |
| Total Area ($ft^2$) | 45,175 | | | | | | | | | | | | |
| Total Impervious Area ($ft^2$) | 23,665 | | | | | | | | | | | | |
| WQCV ($ft^3$) | 986 | | | | | | | | | | | | |
| WQCV Reduction ($ft^3$) | 986 | | | | | | | | | | | | |
| WQCV Reduction (%) | 100% | | | | | | | | | | | | |
| Untreated WQCV ($ft^3$) | 0 | | | | | | | | | | | | |

### CALCULATED SITE RESULTS (sums results from all columns in worksheet)

| | |
|---|---|
| Total Area ($ft^2$) | 45,175 |
| Total Impervious Area ($ft^2$) | 23,665 |
| WQCV ($ft^3$) | 986 |
| WQCV Reduction ($ft^3$) | 986 |
| WQCV Reduction (%) | 100% |
| Untreated WQCV ($ft^3$) | 0 |

# RUNOFF REDUCTION WATER QUALITY

| | | |
|---|---|---|
| DCIA | DIRECT IMPV AREAS | 0 SF. |
| UIA | UNCONNECTED IMPV AREAS (ROOFTOPS) | 23,665 SF. |
| SPA | SEPARATE PERV AREAS | 0 SF. |
| RPA | RECEIVING PERV AREAS (REAR YARDS) | 21,510 SF. |

FG34a
6.1

CHALK CLIFFS DRIVE

CARDENAS DRIVE

103 104 105 106 107 108 109 110 111 112 113 114 115 116 117

TECH CONTRACTORS
11910 TOURMALINE, #130
FALCON, CO 80831
TELEPHONE 719.495.7444

**RUNOFF REDUCTION**
CATCHMENT AREA D
ROLLING HILLS RANCH NORTH PUD

| | | |
|---|---|---|
| Drawn by TAK | Checked by - | Date JAN 2024 |
| Scale 1"=50' | Sheet Number 4 | |

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# Appendix E – Soil Resource Report

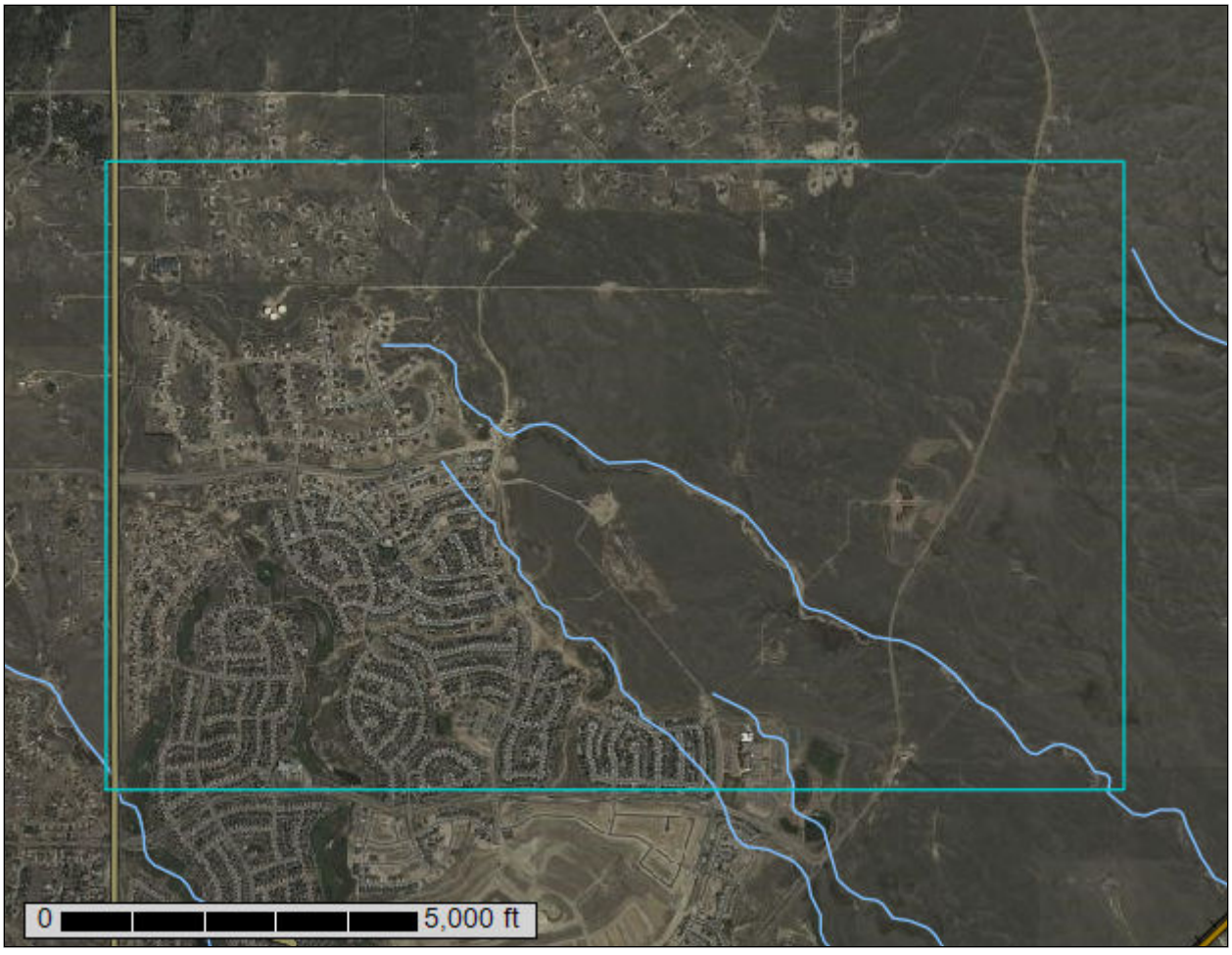
United States Department of Agriculture

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




March 10, 2022

# 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.

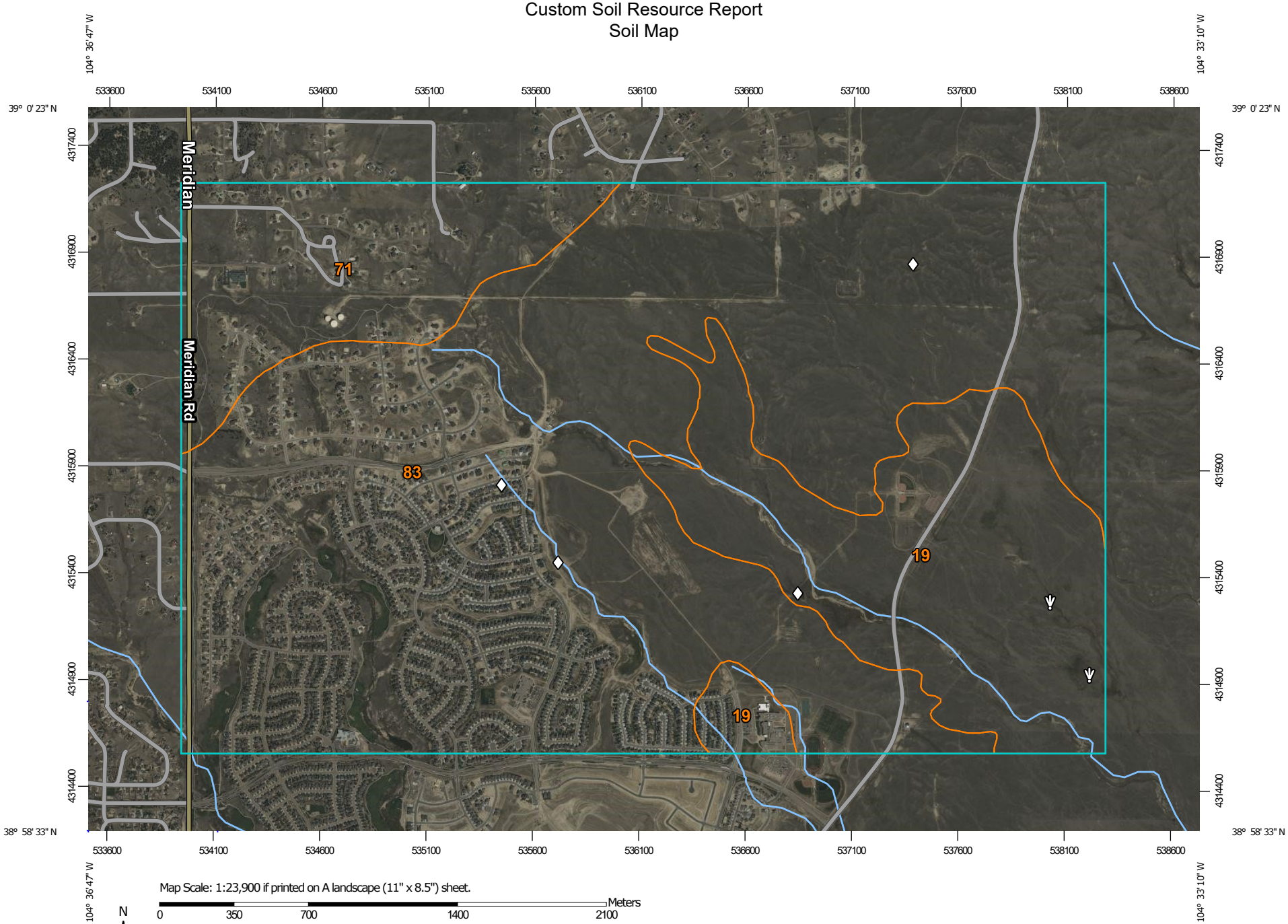
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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.

# Custom Soil Resource Report
## Soil Map



## 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.

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 19, Aug 31, 2021

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

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

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

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| 19 | Columbine gravelly sandy loam, 0 to 3 percent slopes | 575.5 | 20.0% |
| 71 | Pring coarse sandy loam, 3 to 8 percent slopes | 339.8 | 11.8% |
| 83 | Stapleton sandy loam, 3 to 8 percent slopes | 1,964.3 | 68.2% |
| **Totals for Area of Interest** | | **2,879.9** | **100.0%** |

# Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

# El Paso County Area, Colorado

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

### Map Unit Setting

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

### Map Unit Composition

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

### Description of Columbine

#### Setting

*Landform:* Flood plains, fan terraces, fans
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium

#### Typical profile

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

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Runoff class:* Very low
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Very low (about 2.5 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 4e
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* A
*Ecological site:* R049XY214CO - Gravelly Foothill
*Hydric soil rating:* No

### Minor Components

#### Fluvaquentic haplaquolls

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

**Other soils**

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

**Pleasant**

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

## 71—Pring coarse sandy loam, 3 to 8 percent slopes

**Map Unit Setting**

*National map unit symbol:* 369k
*Elevation:* 6,800 to 7,600 feet
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Pring and similar soils:* 85 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Pring**

**Setting**

*Landform:* Hills
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Arkosic alluvium derived from sedimentary rock

**Typical profile**

*A - 0 to 14 inches:* coarse sandy loam
*C - 14 to 60 inches:* gravelly sandy loam

**Properties and qualities**

*Slope:* 3 to 8 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* High (2.00 to 6.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Low (about 6.0 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 3e
*Hydrologic Soil Group:* B
*Ecological site:* R048AY222CO - Loamy Park
*Hydric soil rating:* No

**Minor Components**

**Pleasant**

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

**Other soils**

*Percent of map unit:*
*Hydric soil rating:* No

## 83—Stapleton sandy loam, 3 to 8 percent slopes

**Map Unit Setting**

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

**Map Unit Composition**

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

**Description of Stapleton**

**Setting**

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

**Typical profile**

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

**Properties and qualities**

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

*Available water supply, 0 to 60 inches:* Low (about 4.7 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 3e
*Hydrologic Soil Group:* B
*Ecological site:* R049XY214CO - Gravelly Foothill
*Hydric soil rating:* No

**Minor Components**

**Fluvaquentic haplaquolls**

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

**Other soils**

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

**Pleasant**

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

# References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

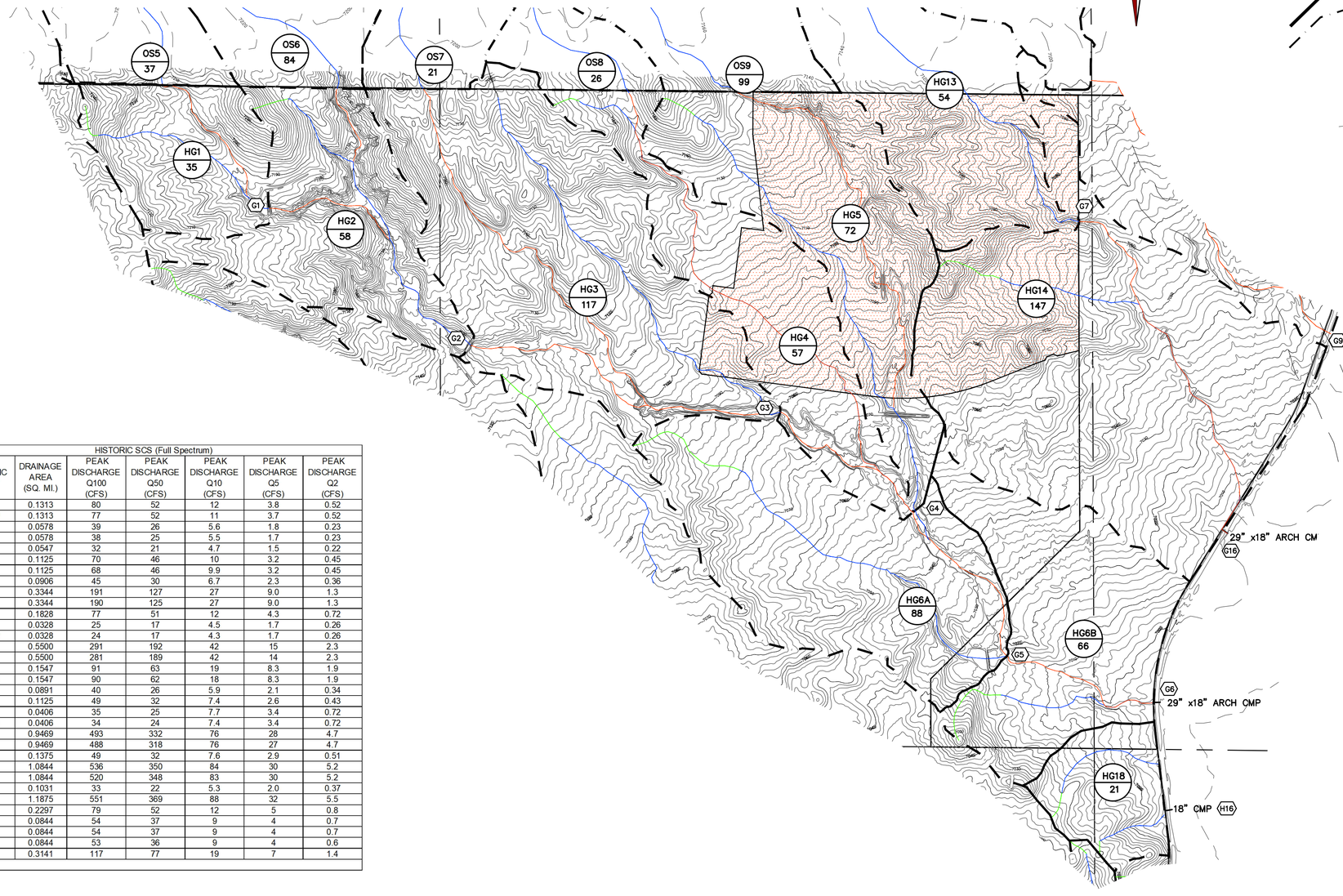
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

# Appendix F – Drainage Maps

# ROLLING HILLS RANCH NORTH - PUD




GRAPHIC SCALE

500 0 250 500 1000 2000

( IN FEET )

1 inch = 500 ft.

LEGEND

- MAJOR BASIN BOUNDARY
- MINOR BASIN BOUNARY
- SCS MODEL ID / SIZE ACRES — EB15 / 65 — BASIN IDENTIFICATION
- H8 B10 DESIGN POINTS
- MAJOR CONTOUR INTERVAL
- MINOR CONTOUR INTERVAL
- 100 YEAR FLOOD PLAIN
- INITIAL TIME
- TRAVEL TIME
- ROUTING

HISTORIC SCS (Full Spectrum)

| HYDROLOGIC ELEMENT | DRAINAGE AREA (SQ. MI.) | PEAK DISCHARGE Q100 (CFS) | PEAK DISCHARGE Q50 (CFS) | PEAK DISCHARGE Q10 (CFS) | PEAK DISCHARGE Q5 (CFS) | PEAK DISCHARGE Q2 (CFS) |
|---|---|---|---|---|---|---|
| OS06 | 0.1313 | 80 | 52 | 12 | 3.8 | 0.52 |
| OS06-G02 | 0.1313 | 77 | 52 | 11 | 3.7 | 0.52 |
| OS05 | 0.0578 | 39 | 26 | 5.6 | 1.8 | 0.23 |
| OS05-G01 | 0.0578 | 38 | 25 | 5.5 | 1.7 | 0.23 |
| HG01 | 0.0547 | 32 | 21 | 4.7 | 1.5 | 0.22 |
| G01 | 0.1125 | 70 | 46 | 10 | 3.2 | 0.45 |
| G01-G02 | 0.1125 | 68 | 46 | 9.9 | 3.2 | 0.45 |
| HG02 | 0.0906 | 45 | 30 | 6.7 | 2.3 | 0.36 |
| G02 | 0.3344 | 191 | 127 | 27 | 9.0 | 1.3 |
| G02-G03 | 0.3344 | 190 | 125 | 27 | 9.0 | 1.3 |
| HG03 | 0.1828 | 77 | 51 | 12 | 4.3 | 0.72 |
| OS07 | 0.0328 | 25 | 17 | 4.5 | 1.7 | 0.26 |
| OS07-G03 | 0.0328 | 24 | 17 | 4.3 | 1.7 | 0.26 |
| G03 | 0.5500 | 291 | 192 | 42 | 15 | 2.3 |
| G03-G04 | 0.5500 | 281 | 189 | 42 | 14 | 2.3 |
| OS09 | 0.1547 | 91 | 63 | 19 | 8.3 | 1.9 |
| OS09-G04 | 0.1547 | 90 | 62 | 18 | 8.3 | 1.9 |
| HG04 | 0.0891 | 40 | 26 | 5.9 | 2.1 | 0.34 |
| HG05 | 0.1125 | 49 | 32 | 7.4 | 2.6 | 0.43 |
| OS08 | 0.0406 | 35 | 25 | 7.7 | 3.4 | 0.72 |
| OS08-G04 | 0.0406 | 34 | 24 | 7.4 | 3.4 | 0.72 |
| G04 | 0.9469 | 493 | 332 | 76 | 28 | 4.7 |
| G04-G05 | 0.9469 | 488 | 318 | 76 | 27 | 4.7 |
| HG06A | 0.1375 | 49 | 32 | 7.6 | 2.9 | 0.51 |
| G05 | 1.0844 | 536 | 350 | 84 | 30 | 5.2 |
| G05-G06 | 1.0844 | 520 | 348 | 83 | 30 | 5.2 |
| HG06B | 0.1031 | 33 | 22 | 5.3 | 2.0 | 0.37 |
| G06 | 1.1875 | 551 | 369 | 88 | 32 | 5.5 |
| HG14 | 0.2297 | 79 | 52 | 12 | 5 | 0.8 |
| HG13 | 0.0844 | 54 | 37 | 9 | 4 | 0.7 |
| G07 | 0.0844 | 54 | 37 | 9 | 4 | 0.7 |
| G07-G08 | 0.0844 | 53 | 36 | 9 | 4 | 0.6 |
| G16 | 0.3141 | 117 | 77 | 19 | 7 | 1.4 |

# HISTORIC CONDITIONS - SCS MAP

FIGURE 4

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


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


MERIDIAN RANCH

HISTORIC CONDITIONS - SCS MAP
ROLLING HILLS RANCH NORTH
PUD - PDR

Drawn by TJK | Checked by RG | Date XXX 2023

Scale AS SHOWN

- of -


S:\OneDrive\Civil\Proj\Rolling Hills Ranch North Filing 1\DWG\PLAN SHEETS DRAINAGE MAPS-PDR\RHR NORTH PDR - SCS - HIST.dwg, 1/15/2024 1:51:23 PM

# ROLLING HILLS RANCH NORTH - PUD

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

FUTURE SCS (Full Spectrum)

| | DRAINAGE AREA (SQ. MI.) | PEAK DISCHARGE Q100 (CFS) | PEAK DISCHARGE Q50 (CFS) | PEAK DISCHARGE Q10 (CFS) | PEAK DISCHARGE Q5 (CFS) | PEAK DISCHARGE Q2 (CFS) |
|---|---|---|---|---|---|---|
| OS06 | 0.1313 | 80 | 52 | 12 | 3.8 | 0.5 |
| G1a | 0.1313 | 80 | 52 | 12 | 3.8 | 0.5 |
| G1a-G2 | 0.1313 | 79 | 52 | 11 | 3.7 | 0.5 |
| OS05 | 0.0578 | 39 | 26 | 5.6 | 1.8 | 0.2 |
| OS05-G1 | 0.0578 | 39 | 25 | 5.5 | 1.7 | 0.2 |
| FG01 | 0.0538 | 31 | 22 | 7.0 | 3.4 | 0.9 |
| FG01-G1 | 0.0538 | 31 | 22 | 7.0 | 3.4 | 0.9 |
| G1 | 0.1116 | 61 | 41 | 11 | 4.9 | 1.1 |
| G1-G2 | 0.1116 | 61 | 41 | 11 | 4.8 | 1.1 |
| FG02 | 0.0391 | 32 | 22 | 6.4 | 2.7 | 0.5 |
| G2 | 0.2820 | 167 | 112 | 27 | 10 | 1.9 |
| G2-G3 | 0.2820 | 162 | 109 | 27 | 10 | 1.9 |
| FG03 | 0.0203 | 24 | 17 | 5.9 | 3.0 | 0.8 |
| FG04 | 0.0172 | 22 | 16 | 5.8 | 3.1 | 0.9 |
| G3 | 0.3195 | 184 | 122 | 31 | 12 | 2.4 |
| FG06 | 0.0675 | 56 | 40 | 12 | 5.8 | 1.3 |
| FG05 | 0.0580 | 45 | 33 | 12 | 6.7 | 2.4 |
| OS07ab | 0.0170 | 12 | 7.9 | 1.8 | 0.5 | 0.07 |
| OS07ab-POND F | 0.0170 | 12 | 7.6 | 1.7 | 0.5 | 0.07 |
| POND F IN | 0.4620 | 292 | 199 | 53 | 23 | 5.0 |
| POND F | 0.4620 | 177 | 121 | 16 | 8.0 | 2.1 |
| POND F-G7 | 0.4620 | 177 | 120 | 16 | 8.0 | 2.1 |
| OS07c | 0.0296 | 19 | 12 | 2.7 | 0.9 | 0.12 |
| OS07c-G4 | 0.0296 | 18 | 12 | 2.7 | 0.9 | 0.12 |
| FG21a | 0.0095 | 5.9 | 4.0 | 1.0 | 0.4 | 0.06 |
| G4 | 0.0391 | 24 | 16 | 3.5 | 1.2 | 0.2 |
| G4-G7 | 0.0391 | 23 | 16 | 3.5 | 1.2 | 0.2 |
| FG21b | 0.0150 | 21 | 16 | 6.5 | 3.9 | 1.7 |
| G7 | 0.5161 | 194 | 131 | 18 | 8.9 | 2.3 |
| G7-G8 | 0.5161 | 194 | 130 | 18 | 8.9 | 2.3 |
| FG22 | 0.1354 | 121 | 88 | 32 | 17 | 5.4 |
| OS08a | 0.0251 | 16 | 11 | 2.3 | 0.7 | 0.10 |
| OS08-G8 | 0.0251 | 16 | 10 | 2.3 | 0.7 | 0.10 |
| FG23a | 0.0216 | 21 | 15 | 5.2 | 2.7 | 0.8 |
| OS07d | 0.0034 | 2.5 | 1.6 | 0.4 | 0.1 | 0.01 |
| OS07d-G8 | 0.0034 | 2.4 | 1.6 | 0.4 | 0.1 | 0.01 |
| G8 | 0.7016 | 276 | 176 | 46 | 24 | 7.7 |
| G8-G10 | 0.7016 | 275 | 175 | 45 | 24 | 7.6 |
| FG24b | 0.0589 | 52 | 39 | 16 | 10 | 4.3 |
| FG24a | 0.0348 | 24 | 16 | 4.5 | 2.0 | 0.4 |
| OS08b | 0.0165 | 9.5 | 6.3 | 1.4 | 0.5 | 0.07 |
| OS08b-G9a | 0.0165 | 9.4 | 6.0 | 1.4 | 0.5 | 0.07 |

| | DRAINAGE AREA (SQ. MI.) | PEAK DISCHARGE Q100 (CFS) | PEAK DISCHARGE Q50 (CFS) | PEAK DISCHARGE Q10 (CFS) | PEAK DISCHARGE Q5 (CFS) | PEAK DISCHARGE Q2 (CFS) |
|---|---|---|---|---|---|---|
| OS09a | 0.0093 | 5.3 | 3.5 | 0.8 | 0.3 | 0.04 |
| OS09a-G9a | 0.0093 | 5.2 | 3.4 | 0.8 | 0.3 | 0.04 |
| G9a | 0.1195 | 87 | 61 | 21 | 12 | 4.7 |
| G9a-G9b | 0.1195 | 85 | 60 | 20 | 12 | 4.6 |
| FG24c | 0.0291 | 40 | 30 | 13 | 8.4 | 4.0 |
| FG24d | 0.0262 | 39 | 30 | 14 | 8.7 | 4.4 |
| G9b | 0.1748 | 137 | 101 | 40 | 23 | 10 |
| REX RD WQCV | 0.1748 | 136 | 100 | 40 | 23 | 10 |
| G9b-G10 | 0.1748 | 135 | 99 | 39 | 23 | 10 |
| FG23b | 0.0236 | 17 | 11.4 | 2.7 | 0.9 | 0.13 |
| G10 | 0.9000 | 391 | 243 | 84 | 45 | 16 |
| G10-G11 | 0.9000 | 389 | 243 | 82 | 44 | 16 |
| FG23c | 0.0109 | 9 | 6.5 | 1.9 | 0.8 | 0.2 |
| G11 | 0.9109 | 393 | 247 | 83 | 44 | 16 |
| FG25 | 0.1084 | 111 | 84 | 36 | 22 | 9.9 |
| FG28 | 0.0184 | 15 | 10 | 3.0 | 1.2 | 0.2 |
| POND G IN-WEST | 1.0377 | 485 | 333 | 116 | 61 | 22 |
| FG27 | 0.0679 | 98 | 79 | 42 | 30 | 18 |
| FG26 | 0.0567 | 58 | 44 | 19 | 12 | 5.6 |
| G13 | 0.0567 | 58 | 44 | 19 | 12 | 5.6 |
| G13-POND G | 0.0567 | 57 | 43 | 19 | 12 | 5.6 |
| POND G IN-EAST | 0.1246 | 153 | 121 | 60 | 41 | 23 |
| POND G | 1.1623 | 444 | 289 | 51 | 19 | 5.2 |
| G12 | 1.1623 | 444 | 289 | 51 | 19 | 5.2 |
| G12-G06 | 1.1623 | 444 | 287 | 50 | 19 | 5.2 |
| FG29 | 0.0983 | 60 | 39 | 8.9 | 2.9 | 0.4 |
| FG32 | 0.0406 | 17 | 11 | 3 | 1 | 0.2 |
| FG32-G06 | 0.0406 | 17 | 11 | 3 | 1 | 0.2 |
| G06 | 1.3012 | 475 | 307 | 54 | 21 | 5.5 |
| OS09b | 0.0435 | 19 | 12 | 3 | 1 | 0.2 |
| OS09b-G14 | 0.0435 | 18 | 12 | 3 | 1 | 0.2 |
| FG34 | 0.0275 | 18 | 12 | 3 | 1 | 0.2 |
| G14 | 0.0710 | 32 | 21 | 5 | 2 | 0.3 |
| G14-G15 | 0.0710 | 32 | 21 | 5 | 2 | 0.3 |
| FG35 | 0.0292 | 25 | 18 | 5 | 2 | 0.5 |
| G15 | 0.1002 | 45 | 29 | 7 | 3 | 0.6 |
| G15-G16 | 0.1002 | 44 | 29 | 7 | 3 | 0.6 |
| FG37 | 0.0754 | 46 | 31 | 7 | 3 | 0.4 |
| FG36 | 0.0295 | 19 | 13 | 4 | 2 | 0.4 |
| G15a | 0.0295 | 19 | 13 | 4 | 2 | 0.4 |
| G15a-G16 | 0.0295 | 19 | 13 | 4 | 2 | 0.4 |
| G16 | 0.2051 | 103 | 67 | 16 | 7 | 1.2 |

# FUTURE CONDITIONS - SCS MAP

FIGURE 5

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


TECH CONTRACTORS
11910 TOURMALINE DR #130
FALCON, CO 80831
TELEPHONE: 719.495.7444


MERIDIAN RANCH

FUTURE CONDITIONS - SCS MAP
ROLLING HILLS RANCH NORTH
PUD - PDR

| Drawn by | Checked by | Date |
|---|---|---|
| TAK | . | XXX 2022 |

Scale: AS SHOWN

- of -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## GRAPHIC SCALE

100 0 50 100 200 400

( IN FEET )

1 inch = 100 ft.

BASIN DESIGNATION

G01 — 2.7 | 0.40 | 0.55

SUB-WATERSHED DESIGNATION

MINOR/MAJOR STORM COEFFICIENT

BASIN AREA IN ACRES

61 — DESIGN POINT DESIGNATION

MAJOR BASIN BOUNDARY

SUB-BASIN BOUNDARY

6130 — EXISTING CONTOUR

6130 — PROPOSED COUNTOUR

PROPOSED STORM SEWER

INITIAL OVERLAND TIME (TI)

TRAVEL TIME (Tt)

OVERLAND TIME (To)

**BENCH MARK:**

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

ELEVATION = 6874.00

**NOTE:**

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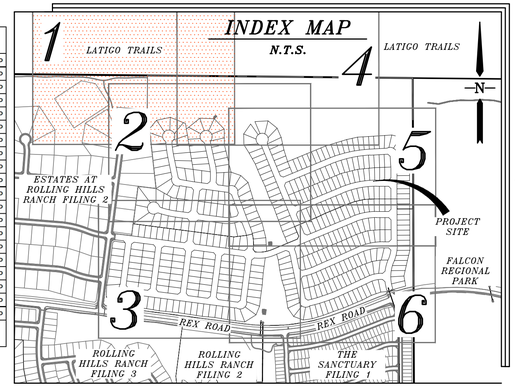
| UPSTREAM DP | DOWNSTREAM DP | BASIN | AREA (AC) | Q(5) (CFS) | Q(100) (CFS) | INLET | Q(5) (CFS) | Q(100) (CFS) |
|---|---|---|---|---|---|---|---|---|
| I01 | J01 | A01 | 5.4 | 4.7 | 15 | PR 15 ' SUMP | 4.7 | 14 |
| J01 | J02 | | | | | | 4.7 | 14 |
| J02 | J03 | | | | | | 4.6 | 13 |
| I02 | J03 | A02 | 3.0 | 3.8 | 11 | PR 10 ' SUMP | 3.8 | 9.9 |
| J03 | J08 | | | | | | 7.6 | 21 |
| I03 | J04 | A03 | 7.2 | 5.4 | 18 | PR 20 ' FLOW-BY | 4.5 | 13 |
| J04 | J05 | | | | | | 4.5 | 13 |
| I04 | J05 | A04 | 3.4 | 3.5 | 14 | PR 20 ' SUMP | 3.5 | 14 |
| J05 | J06 | | | | | | 7.8 | 26 |
| I05 | J06 | A05 | 11 | 5.4 | 17 | PR 20 ' SUMP | 5.4 | 17 |
| J06 | J07A | | | | | | 12 | 40 |
| J07A | J07B | | | | | | 12 | 40 |
| J07B | J09 | | | | | | 12 | 40 |
| I06 | J08 | A06 | 4.1 | 4.8 | 14 | PR 10 ' SUMP | 4.8 | 9.9 |
| J08 | J09 | | | | | | 12 | 30 |
| J09 | J11 | | | | | | 22 | 63 |
| I07 | J10 | A07 | 3.6 | 4.4 | 11 | PR 10 ' SUMP | 4.4 | 9.9 |
| J10 | J11 | | | | | | 4.3 | 9.9 |
| DP2 | I08 | OS04 | 38.8 | 11.3 | 61 | | 11 | 61 |
| I08 | J11 | A08 | 5.7 | 5.5 | 19 | PR 15 ' SUMP | 5.5 | 17 |
| J11 | I09 | | | | | | 38 | 139 |

| UPSTREAM DP | DOWNSTREAM DP | BASIN | AREA (AC) | Q(5) (CFS) | Q(100) (CFS) | INLET | Q(5) (CFS) | Q(100) (CFS) | PIPE |
|---|---|---|---|---|---|---|---|---|---|
| I09 | ES01 | A09 | 0.2 | 1.0 | 3 | PR 10 'SUMP | 39.1 | 141.4 | 48 " RCP |
| I10 | J12 | B01 | 6.4 | 7.3 | 19 | PR 15 'SUMP | 7.3 | 14 | 24 " RCP |
| J12 | J13 | | | | | | 7.33014 | 14 | 24 " RCP |
| I11 | J13 | B02 | 6.2 | 7.5 | 22 | PR 20 'SUMP | 7.5 | 17 | 18 " RCP |
| J13 | J14 | | | | | | 14.3329 | 30 | 30 " RCP |
| I12 | J14 | B03 | 4.6 | 5.6 | 16 | PR 20 'SUMP | 5.6 | 16 | 18 " RCP |
| J14 | J15 | | | | | | 19.2081 | 44 | 30 " RCP |
| I13 | J15 | B04 | 9.5 | 10.3 | 26 | PR 20 'SUMP | 10 | 17 | 24 " RCP |
| J15 | EJ01 | | | | | | 28.6422 | 60 | 36 " RCP |
| EI02 | EJ01 | B05 | 3.0 | 3.6 | 17 | EX 15 'SUMP | 3.6 | 17 | 18 " RCP |
| EI03 | EJ01 | B06 | 6.6 | 6.5 | 16 | EX 15 'SUMP | 6.5 | 16 | 18 " RCP |
| EJ01 | Sanctuary | | | | | | 37.5969 | 90 | 42 " RCP |
| I18 | J21 | C01 | 7.1 | 7.3 | 20 | PR 15 'SUMP | 7.3 | 14 | 18 " RCP |
| J21 | J22 | | | | | | 7.29312 | 14 | 18 " RCP |
| J22 | J23 | | | | | | 7.16369 | 13 | 24 " RCP |
| J23 | J24 | | | | | | 7.04812 | 13 | 24 " RCP |
| I19 | J24 | C02 | 7.1 | 7.4 | 23 | PR 15 'SUMP | 7.4 | 17 | 24 " RCP |
| J24 | I20 | | | | | | 13.6467 | 29 | 30 " RCP |
| I20 | ES02 | C03 | 4.4 | 4.1 | 17 | PR 15 'SUMP | 17.7 | 46 | 24 " RCP |
| DP3 | EX 54" RCP | OS05 | 6.6 | 64 | 202 | | 31 | 159 | 54 " RCP |



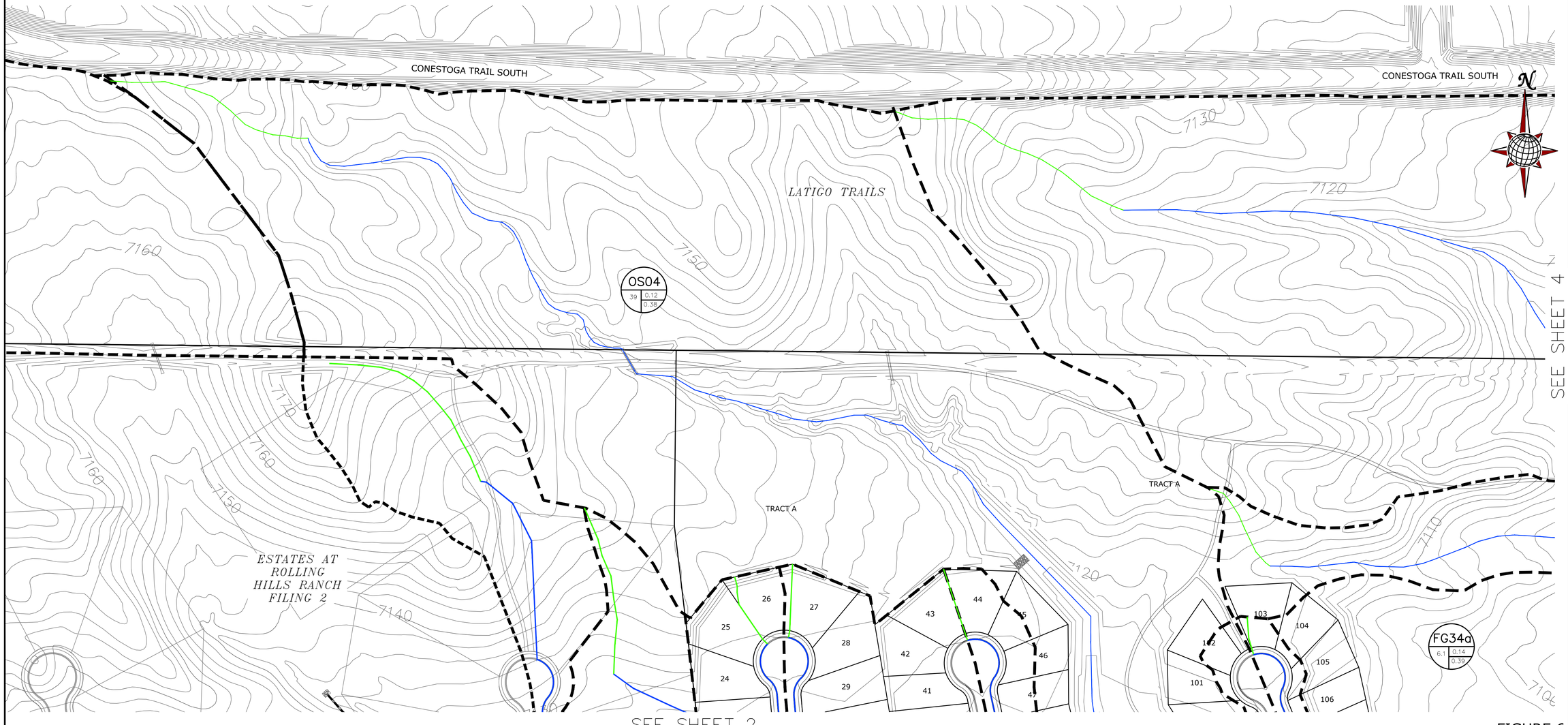




FIGURE 6

| 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
PRELIMINARY DRAINAGE REPORT
ROLLING HILLS RANCH NORTH
AT MERIDIAN RANCH

| Drawn by | Checked by | Date |
|---|---|---|
| TJK | - | SEPT 2023 |

| Scale | |
|---|---|
| 1" = 100' | 1 of 6 |

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NOTE:

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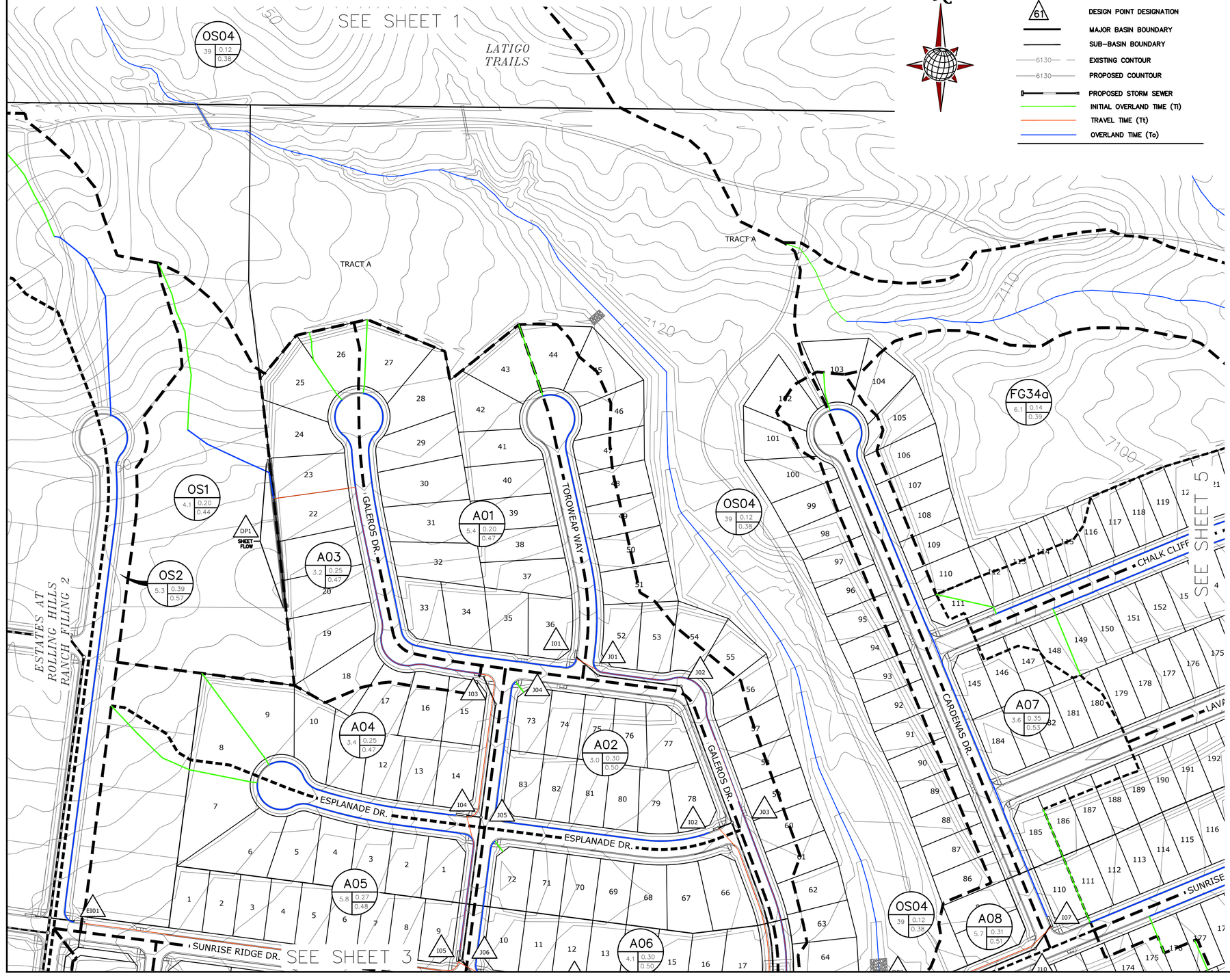
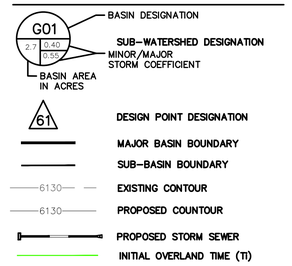
GRAPHIC SCALE

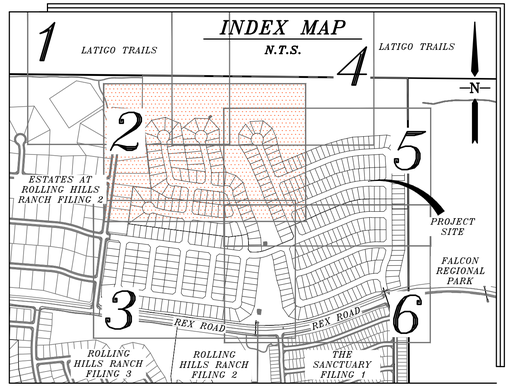
100 0 50 100 200 400

( IN FEET )

1 inch = 100 ft.






| UPSTREAM DP | DOWNSTREAM DP | BASIN | AREA (AC) | Q(5) (CFS) | Q(100) (CFS) | INLET | Q(5) (CFS) | Q(100) (CFS) | PIPE |
|---|---|---|---|---|---|---|---|---|---|
| J01 | J01 | A01 | 5.4 | 4.7 | 15 | PR 15 ' SUMP | 4.7 | 14 | 18 " RCP |
| J01 | J02 | | | | | | 4.7 | 14 | 18 " RCP |
| J02 | J03 | | | | | | 4.6 | 13 | 18 " RCP |
| J02 | J03 | A02 | 3.0 | 3.8 | 11 | PR 10 ' SUMP | 3.8 | 9.9 | 18 " RCP |
| J03 | J08 | | | | | | 7.6 | 21 | 24 " RCP |
| J03 | J04 | A03 | 7.2 | 5.4 | 18 | PR 20 ' FLOW-BY | 4.5 | 13 | 18 " RCP |
| J04 | J05 | | | | | | 4.5 | 13 | 18 " RCP |
| J04 | J05 | A04 | 3.4 | 3.5 | 14 | PR 20 ' SUMP | 3.5 | 14 | 18 " RCP |
| J05 | J06 | | | | | | 7.8 | 26 | 24 " RCP |
| J05 | J06 | A05 | 11 | 5.4 | 17 | PR 20 ' SUMP | 5.4 | 17 | 24 " RCP |
| J06 | J07A | | | | | | 12 | 40 | 30 " RCP |
| J07A | J07B | | | | | | 12 | 40 | 30 " RCP |
| J07B | J09 | | | | | | 12 | 40 | 30 " RCP |
| I06 | J08 | A06 | 4.1 | 4.8 | 14 | PR 10 ' SUMP | 4.8 | 9.9 | 24 " RCP |
| J08 | J09 | | | | | | 12 | 30 | 30 " RCP |
| J09 | J11 | | | | | | 22 | 63 | 42 " RCP |
| I07 | J10 | A07 | 3.6 | 4.4 | 11 | PR 10 ' SUMP | 4.4 | 9.9 | 18 " RCP |
| J10 | J11 | | | | | | 4.3 | 9.9 | 18 " RCP |
| DP2 | I08 | OS04 | 38.8 | 11 | 61 | | 11 | 61 | 48 " RCP |
| I08 | J11 | A08 | 5.7 | 5.5 | 19 | PR 15 ' SUMP | 5.5 | 17 | 48 " RCP |
| J11 | J09 | | | | | | 38 | 139 | 48 " RCP |
| I09 | ES01 | A09 | 0.2 | 1.0 | 3.1 | PR 10 ' SUMP | 39 | 141 | 48 " RCP |
| I10 | J12 | B01 | 6.4 | 7.3 | 19 | PR 15 ' SUMP | 7.3 | 14 | 24 " RCP |
| J12 | J13 | | | | | | 7.3 | 14 | 24 " RCP |
| I11 | J13 | B02 | 6.2 | 7.5 | 22 | PR 20 ' SUMP | 7.5 | 17 | 18 " RCP |
| J13 | J14 | | | | | | 14 | 30 | 30 " RCP |
| I12 | J14 | B03 | 4.6 | 5.6 | 16 | PR 20 ' SUMP | 5.6 | 16 | 18 " RCP |
| J14 | J15 | | | | | | 19 | 44 | 30 " RCP |
| I13 | J15 | B04 | 9.5 | 10 | 26 | PR 20 ' SUMP | 10 | 17 | 24 " RCP |
| J15 | EJ01 | | | | | | 29 | 60 | 36 " RCP |
| EI02 | EJ01 | B05 | 3.0 | 3.6 | 17 | EX 15 ' SUMP | 3.6 | 17 | 18 " RCP |
| EI03 | EJ01 | B06 | 6.6 | 6.5 | 16 | EX 15 ' SUMP | 6.5 | 16 | 18 " RCP |
| EJ01 | Sanctuary | | | | | | 38 | 90 | 42 " RCP |
| I18 | J21 | C01 | 7.1 | 7.3 | 20 | PR 15 ' SUMP | 7.3 | 14 | 18 " RCP |
| J21 | J22 | | | | | | 7.3 | 14 | 18 " RCP |
| J22 | J23 | | | | | | 7.2 | 13 | 24 " RCP |
| J23 | J24 | | | | | | 7.0 | 13 | 24 " RCP |
| I19 | J24 | C02 | 7.1 | 7.4 | 23 | PR 15 ' SUMP | 7.4 | 17 | 24 " RCP |
| J24 | I20 | | | | | | 14 | 29 | 30 " RCP |
| I20 | ES02 | C03 | 4.4 | 4.1 | 17 | PR 15 ' SUMP | 18 | 46 | 30 " RCP |
| DP3 | EX 54" RCP | OS05 | 6.6 | 64 | 202 | | 23 | 136 | 54 " RCP |

BENCH MARK:

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

ELEVATION = 6874.00

FIGURE 6

| 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
PRELIMINARY DRAINAGE REPORT
ROLLING HILLS RANCH NORTH
AT MERIDIAN RANCH

| Drawn by | Checked by | Date |
|---|---|---|
| TAK | - | SEPT 2023 |

| Scale | |
|---|---|
| 1" = 100' | 2 of 6 |

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NOTE:

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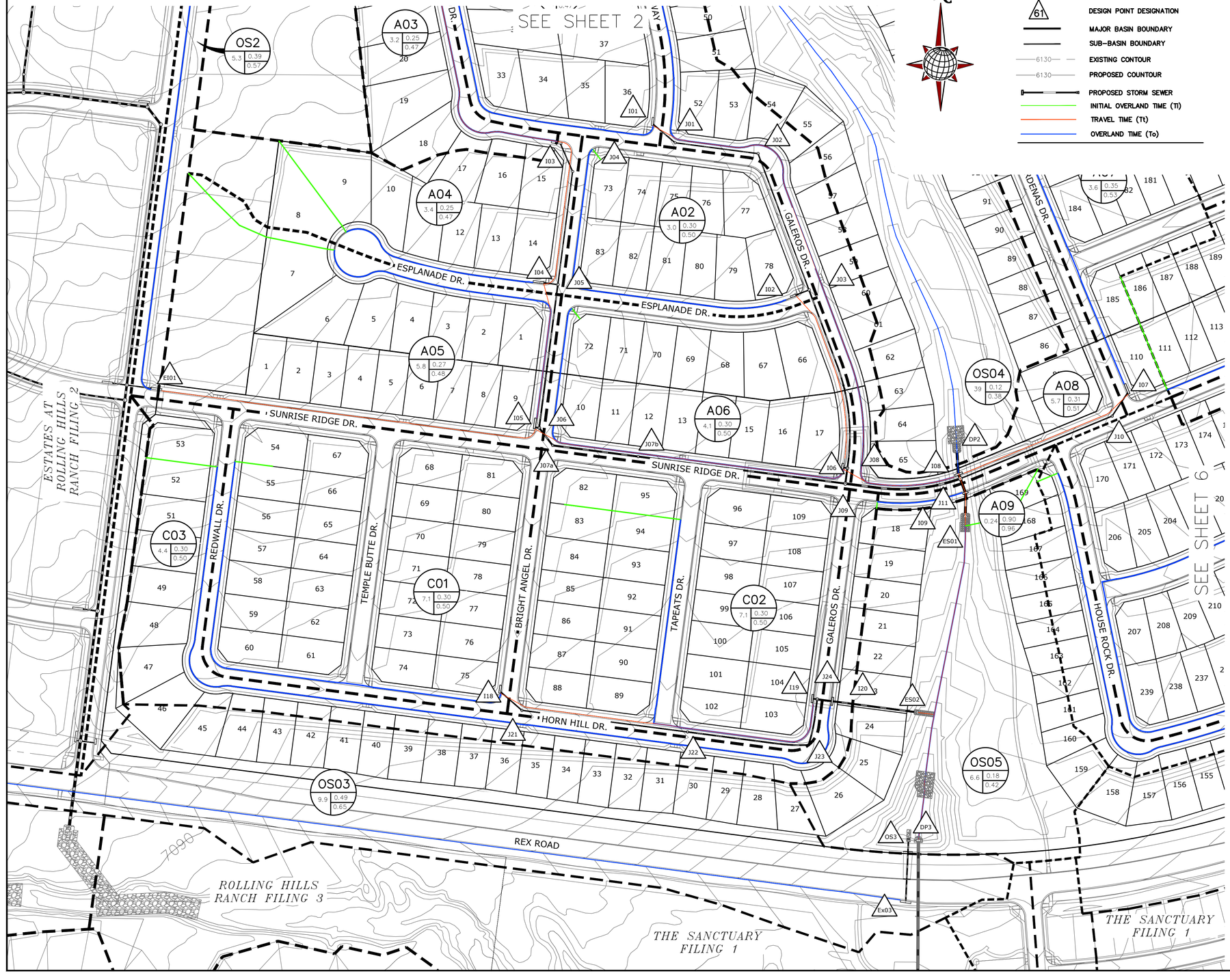
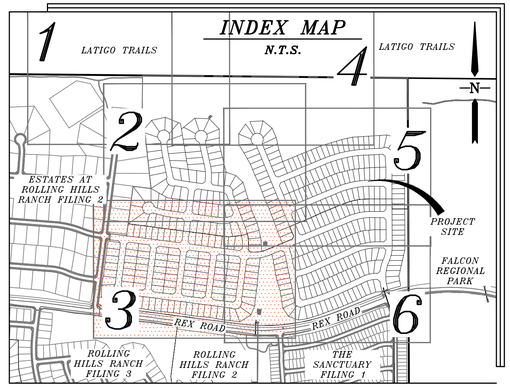
GRAPHIC SCALE

100 0 50 100 200 400

( IN FEET )

1 inch = 100 ft.






| UPSTREAM DP | DOWNSTREAM DP | BASIN | AREA (AC) | Q(5) (CFS) | Q(100) (CFS) | INLET | Q(5) (CFS) | Q(100) (CFS) | PIPE |
|---|---|---|---|---|---|---|---|---|---|
| I01 | J01 | A01 | 5.4 | 4.7 | 15 | PR 15 ' SUMP | 4.7 | 14 | 18 " RCP |
| J01 | J02 | | | | | | 4.7 | 14 | 18 " RCP |
| J02 | J03 | | | | | | 4.6 | 13 | 18 " RCP |
| I02 | J03 | A02 | 3.0 | 3.8 | 11 | PR 10 ' SUMP | 3.8 | 9.9 | 18 " RCP |
| J03 | J08 | | | | | | 7.6 | 21 | 24 " RCP |
| I03 | J04 | A03 | 7.2 | 5.4 | 18 | PR 20 ' FLOW-BY | 4.5 | 13 | 18 " RCP |
| J04 | J05 | | | | | | 4.5 | 13 | 18 " RCP |
| I04 | J05 | A04 | 3.4 | 3.5 | 14 | PR 20 ' SUMP | 3.5 | 14 | 18 " RCP |
| J05 | J06 | | | | | | 7.8 | 26 | 24 " RCP |
| I05 | J06 | A05 | 11 | 5.4 | 17 | PR 20 ' SUMP | 5.4 | 17 | 24 " RCP |
| J06 | J07A | | | | | | 12 | 40 | 30 " RCP |
| J07A | J07B | | | | | | 12 | 40 | 30 " RCP |
| J07B | J09 | | | | | | 12 | 40 | 30 " RCP |
| I06 | J08 | A06 | 4.1 | 4.8 | 14 | PR 10 ' SUMP | 4.8 | 9.9 | 24 " RCP |
| J08 | J09 | | | | | | 12 | 30 | 30 " RCP |
| J09 | J11 | | | | | | 22 | 63 | 42 " RCP |
| I07 | J10 | A07 | 3.6 | 4.4 | 11 | PR 10 ' SUMP | 4.4 | 9.9 | 18 " RCP |
| J10 | J11 | | | | | | 4.3 | 9.9 | 18 " RCP |
| DP2 | I08 | OS04 | 38.8 | 11 | 61 | | 11 | 61 | 48 " RCP |
| I08 | J11 | A08 | 5.7 | 5.5 | 19 | PR 15 ' SUMP | 5.5 | 17 | 48 " RCP |
| J11 | I09 | | | | | | 38 | 139 | 48 " RCP |
| I09 | ES01 | A09 | 0.2 | 1.0 | 3.1 | PR 10 ' SUMP | 39 | 141 | 48 " RCP |
| I10 | J12 | B01 | 6.4 | 7.3 | 19 | PR 15 ' SUMP | 7.3 | 14 | 24 " RCP |
| J12 | J13 | | | | | | 7.3 | 14 | 24 " RCP |
| I11 | J13 | B02 | 6.2 | 7.5 | 22 | PR 20 ' SUMP | 7.5 | 17 | 18 " RCP |
| J13 | J14 | | | | | | 14 | 30 | 30 " RCP |
| I12 | J14 | B03 | 4.6 | 5.6 | 16 | PR 20 ' SUMP | 5.6 | 16 | 18 " RCP |
| J14 | J15 | | | | | | 19 | 44 | 30 " RCP |
| I13 | J15 | B04 | 9.5 | 10 | 26 | PR 20 ' SUMP | 10 | 17 | 24 " RCP |
| J15 | EJ01 | | | | | | 29 | 60 | 36 " RCP |
| EI02 | EJ01 | B05 | 3.0 | 3.6 | 17 | EX 15 ' SUMP | 3.6 | 17 | 18 " RCP |
| EI03 | EJ01 | B06 | 6.6 | 6.5 | 16 | EX 15 ' SUMP | 6.5 | 16 | 18 " RCP |
| EJ01 | Sanctuary | | | | | | 38 | 90 | 42 " RCP |
| I18 | J21 | C01 | 7.1 | 7.3 | 20 | PR 15 ' SUMP | 7.3 | 14 | 18 " RCP |
| J21 | J22 | | | | | | 7.3 | 14 | 18 " RCP |
| J22 | J23 | | | | | | 7.2 | 13 | 24 " RCP |
| J23 | J24 | | | | | | 7.0 | 13 | 24 " RCP |
| I19 | J24 | C02 | 7.1 | 7.4 | 23 | PR 15 ' SUMP | 7.4 | 17 | 24 " RCP |
| J24 | I20 | | | | | | 14 | 29 | 30 " RCP |
| I20 | ES02 | C03 | 4.4 | 4.1 | 17 | PR 15 ' SUMP | 18 | 46 | 30 " RCP |
| DP3 | EX 54 " RCP | OS05 | 6.6 | 64 | 202 | | 31 | 159 | 54 " RCP |

BENCH MARK:

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

ELEVATION = 6874.00

FIGURE 6

| No. | Revisions | Date | Init. | Appr. | Date |
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TECH CONTRACTORS
11886 STAPLETON DRIVE
FALCON, CO 80831
TELEPHONE: 719.495.7444
FAX: 719.495.3349


MERIDIAN RANCH

RATIONAL DRAINAGE MAP
PRELIMINARY DRAINAGE REPORT
ROLLING HILLS RANCH NORTH
AT MERIDIAN RANCH

| Drawn by | Checked by | Date |
|---|---|---|
| TAK | - | SEPT 2023 |

| Scale | Sheet |
|---|---|
| 1" = 100' | 3 of 6 |


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## GRAPHIC SCALE

100 0 50 100 200 400

( IN FEET )

1 inch = 100 ft.

G01 — BASIN DESIGNATION
2.7 | 0.40 | 0.55 — SUB-WATERSHED DESIGNATION / MINOR/MAJOR STORM COEFFICIENT
BASIN AREA IN ACRES

61 — DESIGN POINT DESIGNATION

MAJOR BASIN BOUNDARY

SUB-BASIN BOUNDARY

6130 — EXISTING CONTOUR

6130 — PROPOSED COUNTOUR

PROPOSED STORM SEWER

INITIAL OVERLAND TIME (Ti)

TRAVEL TIME (Tt)

OVERLAND TIME (To)

BENCH MARK:

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

ELEVATION = 6874.00

NOTE:

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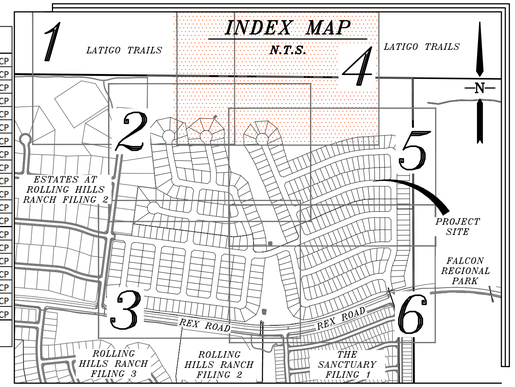
| UPSTREAM DP | DOWNSTREAM DP | BASIN | AREA (AC) | Q(5) (CFS) | Q(100) (CFS) | INLET | Q(5) (CFS) | Q(100) (CFS) |
|---|---|---|---|---|---|---|---|---|
| I01 | J01 | A01 | 5.4 | 4.7 | 15 | PR 15 ' SUMP | 4.7 | 14 |
| J01 | J02 | | | | | | 4.7 | 14 |
| J02 | J03 | | | | | | 4.6 | 13 |
| I02 | J03 | A02 | 3.0 | 3.8 | 11 | PR 10 ' SUMP | 3.8 | 9.9 |
| J03 | J08 | | | | | | 7.6 | 21 |
| I03 | J04 | A03 | 7.2 | 5.4 | 18 | PR 20 ' FLOW-BY | 4.5 | 13 |
| J04 | J05 | | | | | | 4.5 | 13 |
| I04 | J05 | A04 | 3.4 | 3.5 | 14 | PR 20 ' SUMP | 3.5 | 14 |
| J05 | J06 | | | | | | 7.8 | 26 |
| I05 | J06 | A05 | 11 | 5.4 | 17 | PR 20 ' SUMP | 5.4 | 17 |
| J06 | J07A | | | | | | 12 | 40 |
| J07A | J07B | | | | | | 12 | 40 |
| J07B | J09 | | | | | | 12 | 40 |
| I06 | J08 | A06 | 4.1 | 4.8 | 14 | PR 10 ' SUMP | 4.8 | 9.9 |
| J08 | J09 | | | | | | 12 | 30 |
| J09 | J11 | | | | | | 22 | 63 |
| I07 | J10 | A07 | 3.6 | 4.4 | 11 | PR 10 ' SUMP | 4.4 | 9.9 |
| J10 | J11 | | | | | | 4.3 | 9.9 |
| DP2 | I08 | OS04 | 38.8 | 11.3 | 61 | | 11 | 61 |
| I08 | J11 | A08 | 5.7 | 5.5 | 19 | PR 15 ' SUMP | 5.5 | 17 |
| J11 | I09 | | | | | | 38 | 139 |

| UPSTREAM DP | DOWNSTREAM DP | BASIN | AREA (AC) | Q(5) (CFS) | Q(100) (CFS) | INLET | Q(5) (CFS) | Q(100) (CFS) | PIPE |
|---|---|---|---|---|---|---|---|---|---|
| I09 | ES01 | A09 | 0.2 | 1.0 | 3 | PR 10 ' SUMP | 39.1 | 141.4 | 48 " RCP |
| I10 | J12 | B01 | 6.4 | 7.3 | 19 | PR 15 ' SUMP | 7.3 | 14 | 24 " RCP |
| J12 | J13 | | | | | | 7.33014 | 14 | 24 " RCP |
| I11 | J13 | B02 | 6.2 | 7.5 | 22 | PR 20 ' SUMP | 7.5 | 17 | 18 " RCP |
| J13 | J14 | | | | | | 14.3329 | 30 | 30 " RCP |
| I12 | J14 | B03 | 4.6 | 5.6 | 16 | PR 20 ' SUMP | 5.6 | 16 | 18 " RCP |
| J14 | J15 | | | | | | 19.2081 | 44 | 30 " RCP |
| I13 | J15 | B04 | 9.5 | 10.3 | 26 | PR 20 ' SUMP | 10 | 17 | 24 " RCP |
| J15 | EJ01 | | | | | | 28.6422 | 60 | 36 " RCP |
| EI02 | EJ01 | B05 | 3.0 | 3.6 | 17 | EX 15 ' SUMP | 3.6 | 17 | 18 " RCP |
| EI03 | EJ01 | B06 | 6.6 | 6.5 | 16 | EX 15 ' SUMP | 6.5 | 16 | 18 " RCP |
| EJ01 | Sanctuary | | | | | | 37.5969 | 90 | 42 " RCP |
| I18 | J21 | C01 | 7.1 | 7.3 | 20 | PR 15 ' SUMP | 7.3 | 14 | 18 " RCP |
| J21 | J22 | | | | | | 7.29312 | 14 | 18 " RCP |
| J22 | J23 | | | | | | 7.16369 | 13 | 24 " RCP |
| J23 | J24 | | | | | | 7.04812 | 13 | 24 " RCP |
| I19 | J24 | C02 | 7.1 | 7.4 | 23 | PR 15 ' SUMP | 7.4 | 17 | 24 " RCP |
| J24 | I20 | | | | | | 13.6467 | 29 | 30 " RCP |
| I20 | ES02 | C03 | 4.4 | 4.1 | 17 | PR 15 ' SUMP | 17.7 | 46 | 24 " RCP |
| DP3 | EX 54" RCP | OS05 | 6.6 | 64 | 202 | | 31 | 159 | 54 " RCP |



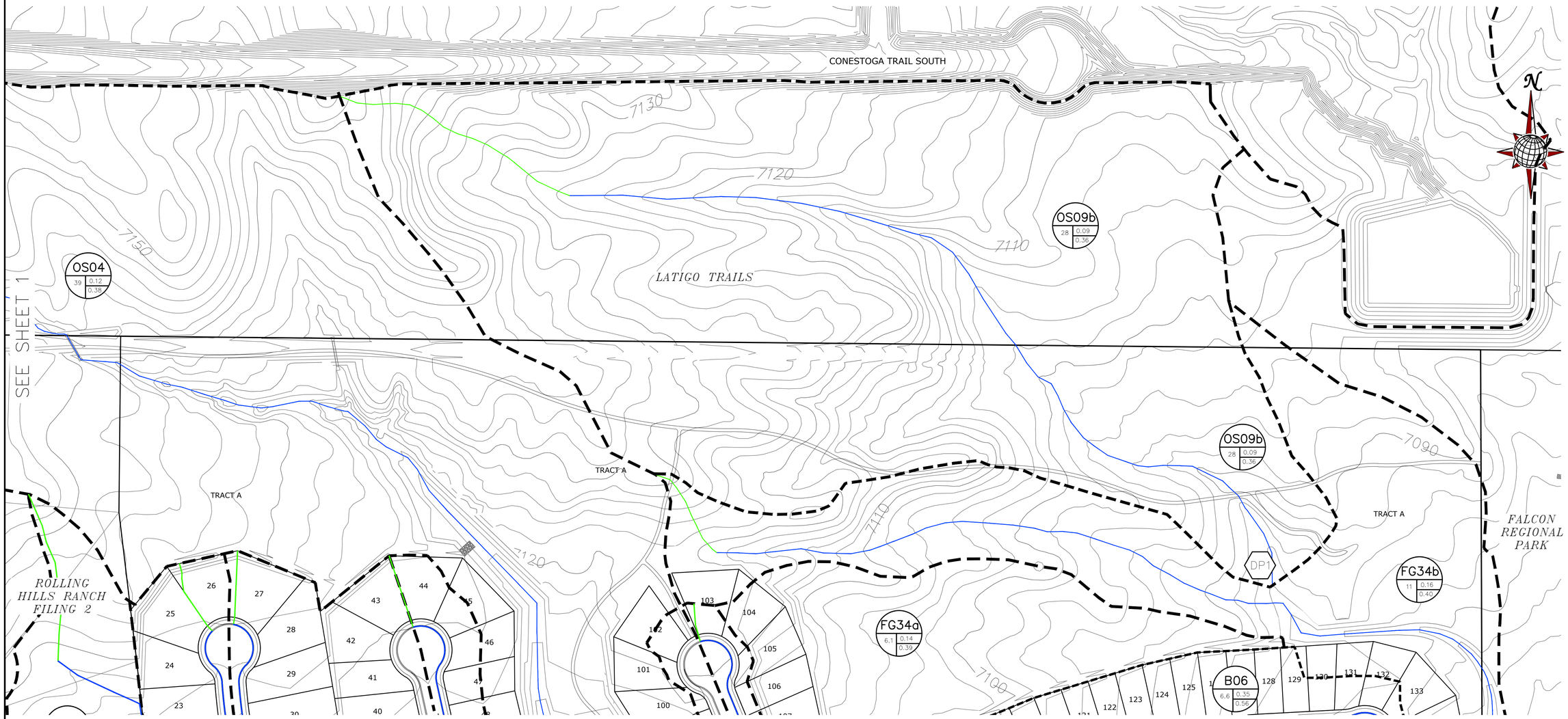




FIGURE 6

| No. | Revisions | Date | Init. | Appr. | Date |
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TECH CONTRACTORS
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MERIDIAN RANCH

RATIONAL DRAINAGE MAP
PRELIMINARY DRAINAGE REPORT
ROLLING HILLS RANCH NORTH
AT MERIDIAN RANCH

Drawn by TAK | Checked by - | Date SEPT 2023

Scale 1" = 100' | 4 of 6

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GRAPHIC SCALE

100 0 50 100 200 400

( IN FEET )

1 inch = 100 ft.

BENCH MARK:

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

ELEVATION = 6874.00

G01 (2.7 | 0.40 | 0.55) — BASIN DESIGNATION; SUB-WATERSHED DESIGNATION; MINOR/MAJOR STORM COEFFICIENT; BASIN AREA IN ACRES

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MAJOR BASIN BOUNDARY

SUB-BASIN BOUNDARY

6130 — EXISTING CONTOUR

6130 — PROPOSED COUNTOUR

PROPOSED STORM SEWER

INITIAL OVERLAND TIME (Ti)

TRAVEL TIME (Tt)

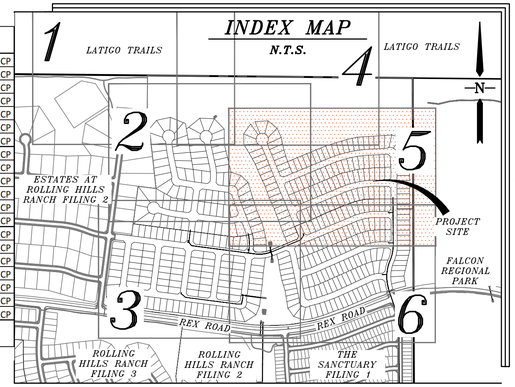
OVERLAND TIME (To)

| UPSTREAM DP | DOWNSTREAM DP | BASIN | AREA (AC) | Q(5) (CFS) | Q(100) (CFS) | INLET | Q(5) (CFS) | Q(100) (CFS) |
|---|---|---|---|---|---|---|---|---|
| I01 | J01 | A01 | 5.4 | 4.7 | 15 | PR 15 ' SUMP | 4.7 | 14 |
| J01 | J02 | | | | | | 4.7 | 14 |
| J02 | J03 | | | | | | 4.6 | 13 |
| I02 | J03 | A02 | 3.0 | 3.8 | 11 | PR 10 ' SUMP | 3.8 | 9.9 |
| J03 | J08 | | | | | | 7.6 | 21 |
| I03 | J04 | A03 | 7.2 | 5.4 | 18 | PR 20 ' FLOW-BY | 4.5 | 13 |
| J04 | J05 | | | | | | 4.5 | 13 |
| I04 | J05 | A04 | 3.4 | 3.5 | 14 | PR 20 ' SUMP | 3.5 | 14 |
| J05 | J06 | | | | | | 7.8 | 26 |
| I05 | J06 | A05 | 11 | 5.4 | 17 | PR 20 ' SUMP | 5.4 | 17 |
| J06 | J07A | | | | | | 12 | 40 |
| J07A | J07B | | | | | | 12 | 40 |
| J07B | J09 | | | | | | 12 | 40 |
| I06 | J08 | A06 | 4.1 | 4.8 | 14 | PR 10 ' SUMP | 4.8 | 9.9 |
| J08 | J09 | | | | | | 12 | 30 |
| J09 | J11 | | | | | | 22 | 63 |
| I07 | J10 | A07 | 3.6 | 4.4 | 11 | PR 10 ' SUMP | 4.4 | 9.9 |
| J10 | J11 | | | | | | 4.3 | 9.9 |
| DP2 | I08 | OS04 | 38.8 | 11.3 | 61 | | 11 | 61 |
| I08 | J11 | A08 | 5.7 | 5.5 | 19 | PR 15 ' SUMP | 5.5 | 17 |
| J11 | I09 | | | | | | 38 | 139 |

| UPSTREAM DP | DOWNSTREAM DP | BASIN | AREA (AC) | Q(5) (CFS) | Q(100) (CFS) | INLET | Q(5) (CFS) | Q(100) (CFS) | PIPE |
|---|---|---|---|---|---|---|---|---|---|
| I09 | ES01 | A09 | 0.2 | 1.0 | 3 | PR 10 ' SUMP | 39.1 | 141.4 | 48 " RCP |
| I10 | J12 | B01 | 6.4 | 7.3 | 19 | PR 15 ' SUMP | 7.3 | 14 | 24 " RCP |
| J12 | J13 | | | | | | 7.33014 | 14 | 24 " RCP |
| I11 | J13 | B02 | 6.2 | 7.5 | 22 | PR 20 ' SUMP | 7.5 | 17 | 18 " RCP |
| J13 | J14 | | | | | | 14.3329 | 30 | 30 " RCP |
| I12 | J14 | B03 | 4.6 | 5.6 | 16 | PR 20 ' SUMP | 5.6 | 16 | 18 " RCP |
| J14 | J15 | | | | | | 19.2081 | 44 | 30 " RCP |
| I13 | J15 | B04 | 9.5 | 10.3 | 26 | PR 20 ' SUMP | 10 | 17 | 24 " RCP |
| J15 | EJ01 | | | | | | 28.6422 | 60 | 36 " RCP |
| EI02 | EJ01 | B05 | 3.0 | 3.6 | 17 | EX 15 ' SUMP | 3.6 | 17 | 18 " RCP |
| EI03 | EJ01 | B06 | 6.6 | 6.5 | 16 | EX 15 ' SUMP | 6.5 | 16 | 18 " RCP |
| EJ01 | Sanctuary | | | | | | 37.5969 | 90 | 42 " RCP |
| I18 | J21 | C01 | 7.1 | 7.3 | 20 | PR 15 ' SUMP | 7.3 | 14 | 18 " RCP |
| J21 | J22 | | | | | | 7.29312 | 14 | 18 " RCP |
| J22 | J23 | | | | | | 7.16369 | 13 | 24 " RCP |
| J23 | J24 | | | | | | 7.04812 | 13 | 24 " RCP |
| I19 | J24 | C02 | 7.1 | 7.4 | 23 | PR 15 ' SUMP | 7.4 | 17 | 24 " RCP |
| J24 | I20 | | | | | | 13.6467 | 29 | 30 " RCP |
| I20 | ES02 | C03 | 4.4 | 4.1 | 17 | PR 15 ' SUMP | 17.7 | 46 | 24 " RCP |
| DP3 | EX 54" RCP | OS05 | 6.6 | 64 | 202 | | 31 | 159 | 54 " RCP |

INDEX MAP

N.T.S.

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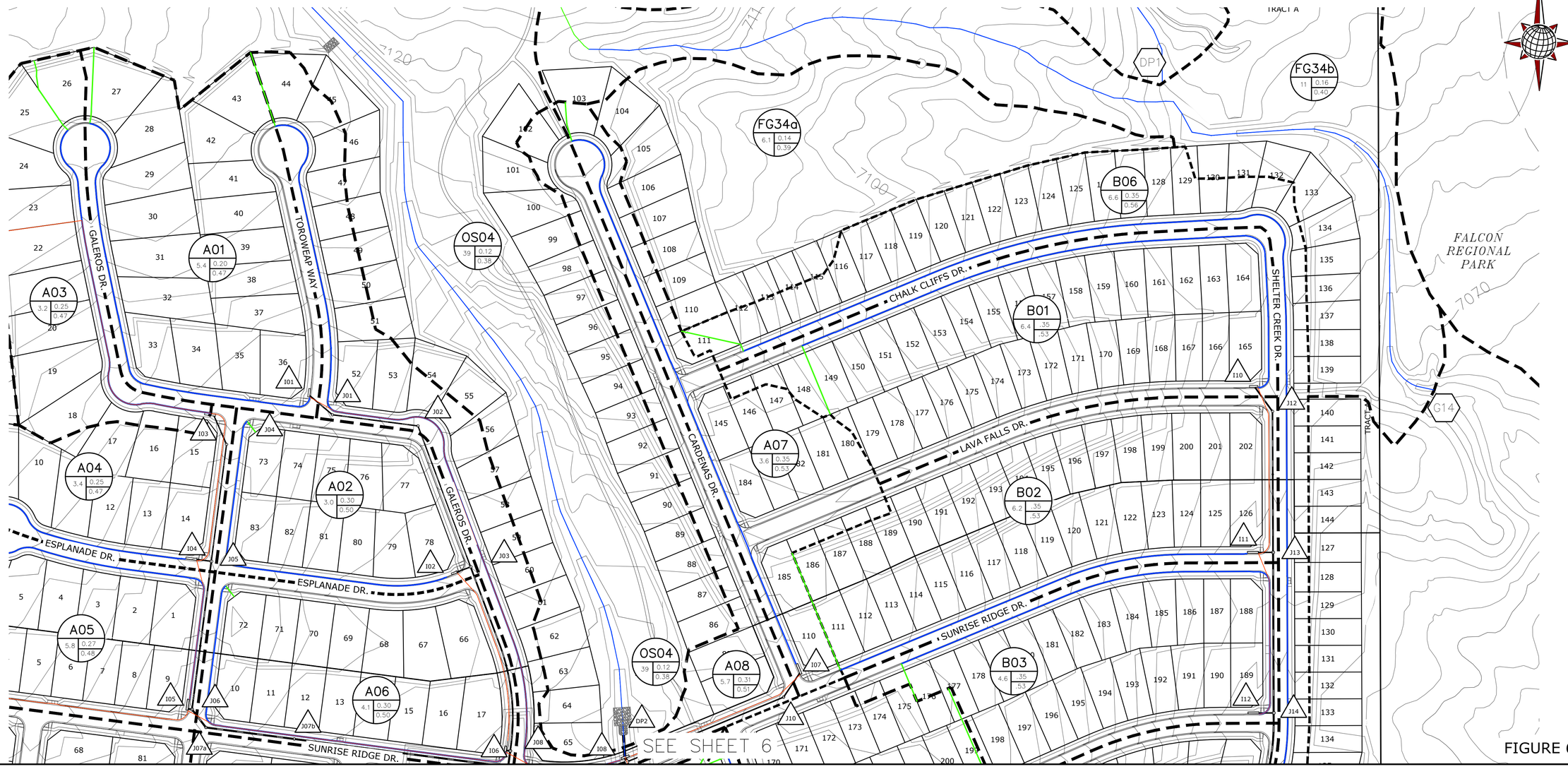
SEE SHEET 4




SEE SHEET 2

SEE SHEET 6

FIGURE 6

| No. | Revisions | Date | Init. | Appr. | Date |
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TECH CONTRACTORS
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FAX: 719.495.3349

MERIDIAN RANCH

RATIONAL DRAINAGE MAP
PRELIMINARY DRAINAGE REPORT
ROLLING HILLS RANCH NORTH
AT MERIDIAN RANCH

| Drawn by | Checked by | Date |
|---|---|---|
| TAK | - | SEPT 2023 |

Scale 1" = 100'

5 of 6

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GRAPHIC SCALE

100 0 50 100 200 400

( IN FEET )

1 inch = 100 ft.

BENCH MARK:

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

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TRAVEL TIME (Tt)

OVERLAND TIME (To)

| UPSTREAM DP | DOWNSTREAM DP | BASIN | AREA (AC) | Q(5) (CFS) | Q(100) (CFS) | INLET | Q(5) (CFS) | Q(100) (CFS) |
|---|---|---|---|---|---|---|---|---|
| I01 | J01 | A01 | 5.4 | 4.7 | 15 | PR 15 ' SUMP | 4.7 | 14 |
| J01 | J02 | | | | | | 4.7 | 14 |
| J02 | J03 | | | | | | 4.6 | 13 |
| I02 | J03 | A02 | 3.0 | 3.8 | 11 | PR 10 ' SUMP | 3.8 | 9.9 |
| J03 | J08 | | | | | | 7.6 | 21 |
| I03 | J04 | A03 | 7.2 | 5.4 | 18 | PR 20 ' FLOW-BY | 4.5 | 13 |
| J04 | J05 | | | | | | 4.5 | 13 |
| I04 | J05 | A04 | 3.4 | 3.5 | 14 | PR 20 ' SUMP | 3.5 | 14 |
| J05 | J06 | | | | | | 7.8 | 26 |
| I05 | J06 | A05 | 11 | 5.4 | 17 | PR 20 ' SUMP | 5.4 | 17 |
| J06 | J07A | | | | | | 12 | 40 |
| J07A | J07B | | | | | | 12 | 40 |
| J07B | J09 | | | | | | 12 | 40 |
| I06 | J08 | A06 | 4.1 | 4.8 | 14 | PR 10 ' SUMP | 4.8 | 9.9 |
| J08 | J09 | | | | | | 12 | 30 |
| J09 | J11 | | | | | | 22 | 63 |
| I07 | J10 | A07 | 3.6 | 4.4 | 11 | PR 10 ' SUMP | 4.4 | 9.9 |
| J10 | J11 | | | | | | 4.3 | 9.9 |
| DP2 | I08 | OS04 | 38.8 | 11.3 | 61 | | 11 | 61 |
| I08 | J11 | A08 | 5.7 | 5.5 | 19 | PR 15 ' SUMP | 5.5 | 17 |
| J11 | I09 | | | | | | 38 | 139 |

| UPSTREAM DP | DOWNSTREAM DP | BASIN | AREA (AC) | Q(5) (CFS) | Q(100) (CFS) | INLET | Q(5) (CFS) | Q(100) (CFS) | PIPE |
|---|---|---|---|---|---|---|---|---|---|
| I09 | ES01 | A09 | 0.2 | 1.0 | 3 | PR 10 ' SUMP | 39.1 | 141.4 | 48 " RCP |
| I10 | J12 | B01 | 6.4 | 7.3 | 19 | PR 15 ' SUMP | 7.3 | 14 | 24 " RCP |
| J12 | J13 | | | | | | 7.33014 | 14 | 24 " RCP |
| I11 | J13 | B02 | 6.2 | 7.5 | 22 | PR 20 ' SUMP | 7.5 | 17 | 18 " RCP |
| J13 | J14 | | | | | | 14.3329 | 30 | 30 " RCP |
| I12 | J14 | B03 | 4.6 | 5.6 | 16 | PR 20 ' SUMP | 5.6 | 16 | 18 " RCP |
| J14 | J15 | | | | | | 19.2081 | 44 | 30 " RCP |
| I13 | J15 | B04 | 9.5 | 10.3 | 26 | PR 20 ' SUMP | 10 | 17 | 24 " RCP |
| J15 | EJ01 | | | | | | 28.6422 | 60 | 36 " RCP |
| EI02 | EJ01 | B05 | 3.0 | 3.6 | 17 | EX 15 ' SUMP | 3.6 | 17 | 18 " RCP |
| EI03 | EJ01 | B06 | 6.6 | 6.5 | 16 | EX 15 ' SUMP | 6.5 | 16 | 18 " RCP |
| EJ01 | Sanctuary | | | | | | 37.5969 | 90 | 42 " RCP |
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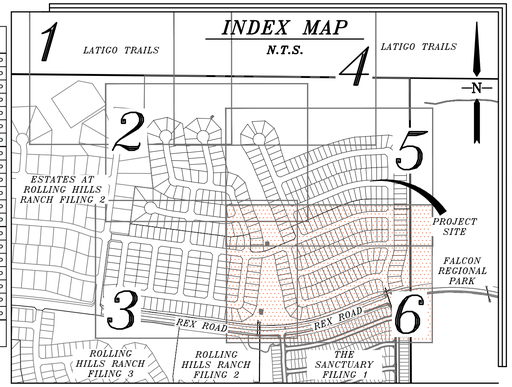
| J22 | J23 | | | | | | 7.16369 | 13 | 24 " RCP |
| J23 | J24 | | | | | | 7.04812 | 13 | 24 " RCP |
| I19 | J24 | C02 | 7.1 | 7.4 | 23 | PR 15 ' SUMP | 7.4 | 17 | 24 " RCP |
| J24 | I20 | | | | | | 13.6467 | 29 | 30 " RCP |
| I20 | ES02 | C03 | 4.4 | 4.1 | 17 | PR 15 ' SUMP | 17.7 | 46 | 24 " RCP |
| DP3 | EX 54" RCP | OS05 | 6.6 | 64 | 202 | | 31 | 159 | 54 " RCP |

INDEX MAP

N.T.S.

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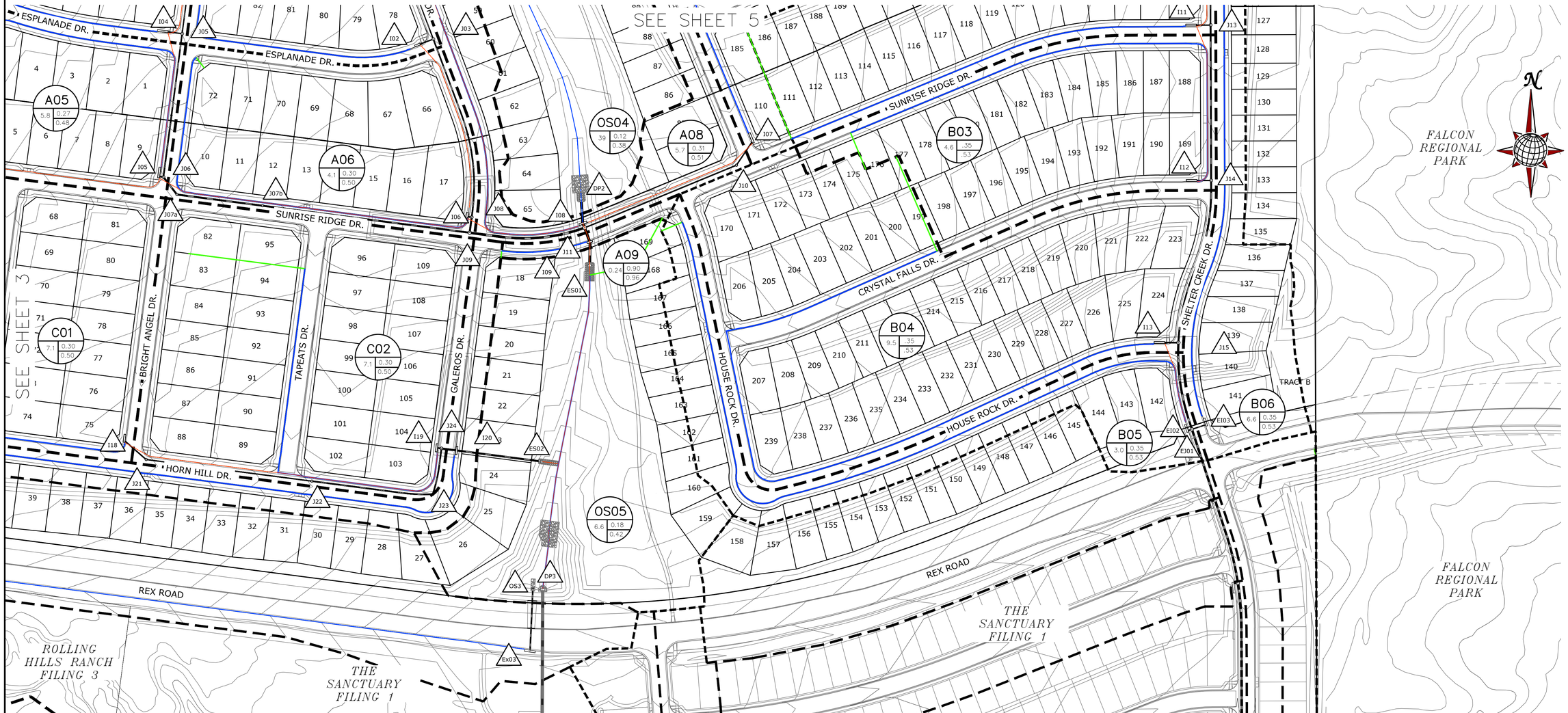


FIGURE 6

| No. | Revisions | Date | Init. | Appr. | Date |
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TECH CONTRACTORS
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FALCON, CO 80831
TELEPHONE: 719.495.7444
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MERIDIAN RANCH

RATIONAL DRAINAGE MAP
PRELIMINARY DRAINAGE REPORT
ROLLING HILLS RANCH NORTH
AT MERIDIAN RANCH

| Drawn by | Checked by | Date |
|---|---|---|
| TAK | - | SEPT 2023 |

Scale 1" = 100'

6 of 6

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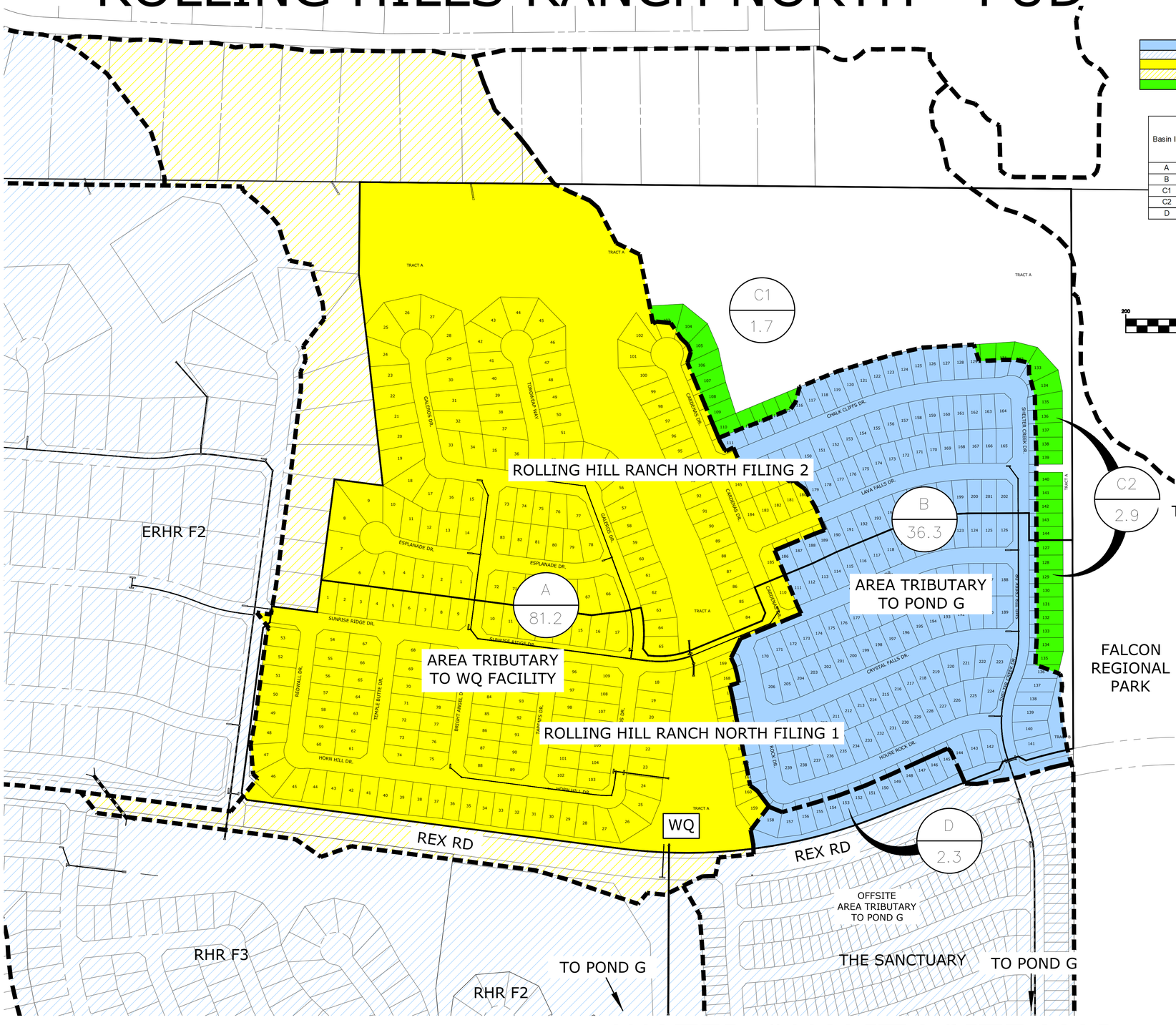
# ROLLING HILLS RANCH NORTH - PUD




## LEGEND

- AREA TRIBUTARY TO POND G
- OFFSITE AREA TRIBUTARY TO POND G
- AREA TRIBUTARY TO WATER QUALITY FACILITY
- OFFSITE AREA TRIBUTARY TO WATER QUALITY FACILITY
- AREAS SUBJECT TO RUNOFF REDUCTION

| Basin ID | Total Area (ac) | Area Tributary to Pond G (ac) | Area Tributary to WQ Facility (ac) | Disturbed Area Treated via Runoff Reduction |
|---|---|---|---|---|
| A | 81.2 | | 81.2 | |
| B | 36.3 | 36.3 | | |
| C1 | 1.7 | | | 1.7 |
| C2 | 2.9 | | | 2.9 |
| D | 2.3 | 2.3 | | |

GRAPHIC SCALE

200 0 50 100 200 400

( IN FEET )
1 INCH = 200 ft.

N

# WATER QUALITY SITE MAP

FIGURE 7

| No. | Revisions | Date | Init. | Appr. | Date |
|---|---|---|---|---|---|
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TECH CONTRACTORS
11910 TOURMALINE DR #130
FALCON, CO 80831
TELEPHONE: 719.495.7444


MERIDIAN RANCH

WATER QUALITY SITE MAP
ROLLING HILLS RANCH NORTH
PUD - PDR

Drawn by TAK
Checked by
Date JAN 2024

Scale AS SHOWN
- of -