EPC STORMWATER REVIEW COMMENTS ARE SHOWN IN ORANGE BOXES WITH BLACK TEXT

Falcon Highlands Filing No. 3

Preliminary Drainage Report

Owner/Developer
Challenger Homes
8605 Explorer Drive Ste. 250
Colorado Springs, CO 80920
(719) 598-5192
Contact: Jim Byers

Engineer
Atwell, LLC
143 Union Blvd., Suite 700
Lakewood, CO 80228
303-462-1100
Contact: Richard Lyon, PE

Atwell Project Number
21005234

PCD-ENGINEERING REVIEW COMMENTS IN BLUE BOXES WITH BLUE TEXT

Cursory review.

Submitted by: Atwell, LLC

March 24, 2022

PUDSP-22-005

~~**SKP-21-004**~~

Engineer's Statement:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the City/County for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

Richard D. Lyon, PE 53921 Date Seal:

Developer's Statement:

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

Business Name: Challenger Homes

By:

Title:

Address:

El Paso County Approval:

Filed in accordance with 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.

~~Jennifer Irvine /~~ County Engineer, Director Date

Conditions:

Table of Contents

INTRODUCTION

This Preliminary Drainage Report (PDR) has been completed for Challenger Homes in order to present an effective storm water management plan for the Falcon Highlands Filing No. 3 development, hereinafter referred to as the Site. This report is intended to guide the development of the site and recommend general drainage concepts that can be implemented as development progresses. Included within this report is a proposed drainage plan for the Site along with reference information for drainage basins and storm water conveyance facilities.

The Site was most recently studied at the Final Drainage Report (FDR) level in the *Falcon Highlands Filing No. 2 & 3 Final Drainage Report* by Terra Nova Engineering, Inc., latest revision August 2010 for the development of Filing No. 2. It was reassessed for the new site plan layout in the most recent Master Development Drainage Report (MDDP) by Atwell, LLC. dated March of 2022, which is pending County approval. The PDR follows the concepts discussed in the 2022 MDDP and provides more design details for public and private storm infrastructure including the subdivision's public storm sewer systems and water quality and full-spectrum detention facilities.

The entire site for Falcon High as part of the Sketch Plan Amendment for Falcon Highlands Filing No. 3 (SKP-21-4) and will include a total of approximately 380 sing 224 units from the previously approved reports of 156 units which had more quarter-acre and half-acre lots. In addition to greater lot density, roadway alignments have changed to accommodate the new lot layouts with approximately 2.75 miles of right-of-way improvements for paved roadways, curb and gutter, and attached sidewalks with 12.2 acres of open space interior to the subdivision not including tracts for drainage easements, with a dedicated park area central to the subdivision. This compares to the previously approved plans which had approximately 2.5 miles of right-of-way improvements and 7.0 acres of open space interior to the subdivision not including tracts for drainage easements, with no designated park areas. The drainage exhibits and calculations within the appendix present Filing No. 2 and other off-site basins consistent with that of previous reports. The total acreage of Filing No. 2 and 3 is approximately 257.7 acres and a portion of Filing No. 1 area totaling 10.6 acre was included for consistency in presenting tributary areas to existing detention ponds with that of previous studies.

Proposed herein is a network of storm infrastructure, ponds and channels that will meet the relevant criteria for storm water quality and detention, but also allow for aesthetically pleasing landscape and enjoyable green spaces within the PUD community.

GENERAL LOCATION AND DESCRIPTION

The Site is located within Section 12, Township 13 South, Range 65 West of the Sixth Principal Meridian, County of El Paso, State of Colorado. The Site is bounded by Tamlin Road to the south and east, Birch Hollow Way to the north and Bridal Vail Way to the west for the northern portion of the Site and Antelope Meadow Circle to the north for the western end of the Site. The Site, or Filing No. 3 specifically, is directly adjacent and south of Falcon Highlands Filing No. 2 and adjacent to the east and north of Banning Lewis Ranch subdivisions. The overall area consists of

approximately 125.6 acres that is proposed to be developed into approximately 380 single-family residential units including 24 nearly half-acre lots, 243 one-eighth acre lots, 113 smaller (one-twelfth acre) lots. In addition to the single-family residential units and lots, there is proposed development for approximately 37 acres of open space, a well site, and associated roadways and landscaping. Of these 37 acres, approximately 12.2 acres is interior to the development which includes a park area of 3.53 acres. An off-site lift station property subject to potential upgrades to serve the development exists to the south-central area of the Site.

The filing is initially planned to be built in two phases and two subsequent future phases pending a second well for water supply. This phasing will allow the Metro District time to plan and accommodate for the approximately 55 water service taps in the initial Phase 1 of the development based on the current available water. Phase 2 is for the additional 191 taps following the new well connection. Two future phases that include the remaining lots are included within this study to encompass the development of the entire Filing No. 3 as well as off-site, upstream Filing No. 2.

A map displaying the location and delineation of the Falcon Highlands Filings 1, 2, and 3 is shown below.

SOILS AND EXISTING SITE CONDITIONS

The majority of the Site is currently undeveloped. Of the development within the Site, there are existing dirt roadways and sanitary sewer infrastructure installed per the Construction Drawings for Falcon Highlands Filing No. 2 prepared by Terra Nova Engineering, most recent revised date of September 7, 2010. The ALTA survey conducted by Atwell, LLC., shows the existing conditions of Filing No. 3 and adjacent development of Filing No. 2. The Site is nearly 100% existing natural grass vegetation typical of the eastern plains with sparse vegetative cover at its outer limits to the south and southeast. There is an existing regional drainage pond referred to as Pond WU, east of the Site within Falcon Highlands Filing No. 2 dedicated to water quality and detention for storm water runoff from Falcon Highlands Filing No. 1, 2, and a small portion (Basin D) of Filing No. 3. There are two existing water quality and detention ponds to the south of the Site that were constructed for the development of Filing No. 2 that were designed for future development of Filing No. 3. The on-site slopes range from 0 percent to 10 percent and generally sheet flows from west to east. An Existing Conditions Drainage Map is included in Appendix G showing the delineated drainage basins.

The west boundary of the Site has existing electric power lines and natural gas main within an existing utility easement. There are existing sanitary sewer and storm lines within existing dedicated easements within the western part of the Site that connect to Filing No. 2 to service sanitary sewer to the lift station and storm water daylighting within the Filing No. 3 property. The south side of the Site has a 12" water main and a fiber optic line within what is considered future Tamlin Road right of way.

9 The Site is made up of mostly loamy sand soils with 100 percent of the soils being Hydrologic Soil Group A. The on-site soils are specified as Blakeland loamy sand (8), Blakeland Complex (8), and Columbine (19) as mapped by the Soil Conservation Service (SCS). The Natural Resources Conservation Service of the United State Department of Agriculture Web Soil Survey has been included in Appendix B for reference.

The western two thirds of the Site are contained within the Sand Creek Basin, the rest within the Falcon Basin. The delineations is shown on the Drainage Maps within Appendix G.

Per previous drainage studies for the Site and the environmental study for Filing No. 1, there is a high ground water table that should be addressed with the final soils reports for this development. It is recommended that subsurface drains be installed for proposed structures. No basements or crawlspaces are proposed in the southwest area of the Site due to the high ground water table and any proposed garden level or walkout lots on the preliminary grading plans are to be assessed in further in the final subsurface investigation report.

Drainage improvements for the Site will include storm sewer infrastructure to capture runoff before street capacities are exceeded and at sump locations as well as channels and swales for potential overflow areas. The existing detention and water quality ponds south of the Site are assessed in this report at a preliminary stage to determine if any required retrofitting of the storm infrastructure within the existing ponds is to be constructed according to engineered construction

drawings and a Final Drainage Report for Filing No. 3. This infrastructure includes general earthwork efforts, concrete trickle channels, micropools and outlet structures with orifice plates sized for new runoff calculations, Water Quality Capture Volumes (WQCV), Excess Urban Runoff Volumes (EURV), and 100-year detention with the allowable release rates.

FLOODPLAIN

According to the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map No. 08041C0561G and 08041C0545G dated December 7, 2018, the vast majority of the Site lies within Zone X, which is designated as "Areas determined to be outside the 0.2% annual chance flood hazard area", a portion of the site to the east that is proposed open space is located within a Zone A, which is designated as "Areas determined to be within the 0.2% annual chance flood hazard area". The Zone A designation to the east of Tamlin Road is comprised of an Unnamed Tributary that drains to the Black Squirrel Creek No. 2. The FEMA FIRM, Community Panels Nos. 08041 C 0561 G and 08041 C 0545 G (effective December 7,2018) are included in Appendix C for reference.

El Paso County is involved with the Colorado Hazard Mapping Program (CHAMP) because the CWCB delegates its authority to the County to enforce the regulatory floodplain. El Paso County is part of the NFIP (National Flood Insurance Program) which provides assistance to property owners affected by flooding. Inclusion into this program requires that the County enforce floodplain regulations and any changes made to the regulatory maps. Failure to implement these changes could result in the County losing its NFIP status as such a Preliminary FEMA FIRM panel is also included in Appendix C that was remapped as part of CHAMP.

This is not consistent with proposed diversions.

The site falls within the Sand Creek Drainage Basin as well as partially within the Falcon Drainage Basin. The Drainage Basin Planning Studies for the respective basins do not show or mention any existing or future plans within The Site. Drainage from the site will outflow per existing conditions.

DRAINAGE DESIGN CRITERIA

Address the wetlands mitigation area, its status and maintenance

The El Paso County Drainage Criteria Manual (EPC DCM) and El Paso County Engineering Criteria Manual (EPC ECM) were used in conjunction with the Mile High Flood District (MHFD) Criteria Manual. The rational method was used for drainage basin less than 100-acres. The 5-year design frequency was used for the minor storm and a 100-year design frequency was used for the major storm in calculating onsite storm facility hydraulics. The one-hour point rainfall depth used for the 5-year storm was 1.50 inches and 2.52 inches for the 100-year event. The City of Colorado Springs IDF Curve (Figure 6-5 of the Drainage Criteria Manual Volume 1) was used for calculating rainfall intensity.

EXISTING ONSITE AND OFFSITE DRAINAGE BASINS

(County Project SF-05-003)

The Site has been assessed previously via the *Falcon Highlands Phase 2, Filing No. 2 & 3 Master Development Drainage Plan and Preliminary Drainage Report* developed by Terra Nova Engineering, Inc. latest revision September 2005 as well as a Final Drainage Report for Filing No.

2010 report was never approved. Remove reference.

2 & 3 by Terra Nova Engineering, Inc. dated August 2010. Additionally, the site has been assessed in the *Falcon Highlands Filing No. 3 Master Development Drainage Plan* developed by Atwell, LLC dated March of 2022, pending County approval.

The developments of Falcon Highlands Filing Nos. 1 & 2 remained consistent with their respective Master Development Drainage Plans and Final Drainage Reports and therefore offsite drainage basin descriptions and delineations provided in this report are based on those previous County approved reports. Relevant excerpts from these reports are included in Appendix F including hydrology tabulations and drainage maps in which pipe runs were utilized to determine offsite drainage contributions to Filing No. 3 storm water facilities.

All off-site drainage basin runoff data and calculations have been updated for current codes and standards consistent with the EPC DCM. Part of the Site lies within the Sand Creek Basin and the other part within the Falcon Basin. Therefore, the *Sand Creek Drainage Basin Study* and the *Falcon Basin Drainage Basin Planning Study* were both referenced as well as the El Paso County Master Plan approved in May of 2021. Previous studies show the delineation between the two basins and this delineation is shown on the Drainage Basin Maps in Appendix G.

The site has been broken down into eight major off-site basins upstream of Filing No. 3, within the existing development of Filing No. 2 and relatively small portions of Filing No. 1. The off-site basins match the naming convention of the previous 2010 Final Drainage Report for Filing No. 2 and 3 to be consistent and for ease of comparison between this report and previous reports. An Existing Conditions Drainage Map is in Appendix G.

Off-Site Basins (Filing No. 2):

OS-1 (6.38 ac, Q_5 = 10.7 cfs, Q_{100} = 21.7 cfs) is an off-site basin located on the northwestern part of Falcon Highlands Filing No. 2 and consists of the rear yard areas of PUD residential zoned lots. The historic drainage pattern sheet flows southwesterly where it is captured by basin OS-5 at **Design Point 7**.

State what pond this basin ends up in

OS-2 (3.12 ac, Q_5 = 7.8 cfs, Q_{100} = 13.6 cfs) is an off-site sub-basin within the developed area of Filing No. 1 for quarter-acre lots and is an off-site basin that was included in the MDDP for Filing No. 2. The basin's runoff sheet flows due south in Filing No. 2 and is captured by the roadways and storm system in Filing No. 2 that runs through Filing No. 3, and ultimately outfalls into the existing Pond 1. The basin flows to OS-5 at **Design Point 8**.

OS-3 (1.14 ac, Q_5 = 3.4 cfs, Q_{100} = 6.0 cfs) is an off-site basin within Filing No. 1 that includes the developed right-of-way of Rolling Thunder Way. This sub-basin was included in the previous MDDP as an off-site basin and represents a portion of the landscaped right-of-way on the south side of Rolling Thunder Way that sheet flows due south into the developed areas of Filing No. 2 at **Design Point 9** and ultimately into the public storm system shared with Filing No. 3, outfalling to existing Detention Pond 2.

OS-4 (13.09 ac, Q_5 = 12.3 cfs, Q_{100} = 26.3 cfs) is an off-site basin located on the southwestern part of Falcon Highlands Filing No. 2 and consists of mostly Tract A and portions of PUD residential zoned lots rear yard areas. The historic drainage pattern sheet flows south where it is captured by basin A at **Design Point 10**.

State if this basin reaches any of the ponds or goes off-site

OS-5 (59.62 ac, Q_5 = 80.1 cfs, Q_{100} = 160.7 cfs) is an off-site basin that stretches from the eastern border of basin OS-4 to the eastern edge of Bridal Vail Way within Filing No. 2. The basin is zoned as PUD residential lots of about quarter-acre size. Runoff is carried in the public rights-of-way where the flow travels south through a series of public curb and gutters, sump inlets and storm infrastructure within Filing No. 2. The flow outfalls into the existing Pond 1 through the public 60" RCP storm pipe that runs through Filing No. 3, the pipe run at **Design Point 11**.

Make note that this is pip
flow. Is there any surface
flow from this basin that
enters the site?

OS-6 (35.75 ac, Q_5 = 31.9 cfs, Q_{100} = 58.4 cfs) is off-site basin located between Bric
and Antelope Meadows Circle within Filing 2. This basin includes PUD residential
half-acre size and contains drainage tracts. The basin is captured by a series of public curb and
gutter systems in the rights-of-way where inlets and various size RCPs convey storm water to the end of the cul-de-sac of Wagon Track Drive where the public storm system of Filing No. 2 (**Design Point 12)** connects and daylights to Filing No. 3 within future Antelope Meadows Circle right-of-way.

Note that flows continue thru Filing 3 via an existing diversion ditch to Pond 2.

OS-7 (6.47 ac, Q_5 = 5.2 cfs, Q_{100} = 18.3 cfs) is the off-site basin located within Filing 2, just north of Basin D of Filing 3. The basin includes PUD residential zoned lots of half-acre size with right of way. The basin runoff is captured in the public right-of-way curb and gutter where it travels south and is released at the road end at **Deign Point 13** where it continues south through Antelope Meadows Circle and then due east through Filing 3's Basin D in the existing access path where it outfalls to Pond WU.

OS-8 (13.79 ac, Q_5 = 4.6 cfs, Q_{100} = 31.1 cfs) is an off-site basin located east of Basin D. The basin consists of native grasses and an existing Regional Pond WU. Runoff within the basin flows into the Pond WU (**Design Point 4**) and drains to the northwest side of Highway 24 via the existing private 42" and three 60" RCP outlet pipes to the low point in the offsite grasslined swale at **Design Point 6**.

On-site Basins (Filing No. 3, Undeveloped):

The site has been broken down into seven major on-site basins upstream within the limits of Filing No. 3. A drainage map is in the appendix.

Basin A (3.74 ac, Q_5 = 1.2 cfs, Q_{100} = 7.7 cfs) is the basin located southwest of Antelope Meadow Circle, just below basin OS-4, west of Basin B. The majority of the basin is comprised of Tract A and consists of some rear yard runoff from the PUD lots at the western edge of Basin B. The storm water runoff sheet flows south and off-site at **Design Point 1** with the combined flow of OS-4, and per existing drainage patterns is not tributary to on-site detention ponds.

Basin B (38.93 ac, Q_5 = 10.2 cfs, Q_{100} = 68.6 cfs) is located south of Antelope Meadow Circle, adjacent to basin A. The site is covered in native grasses with limited grading work from a previous development. Runoff from the site sheet flows southwesterly overland to existing Pond 1 **(Design Point 2**). The private 42" RCP outlet pipe from the outlet structure of the pond daylights at the grassland swale south of the abandoned future Tamlin Road right-of-way at **Design Point 5**.

Basin C (57.81 ac, Q_5 = 16.3 cfs, Q_{100} = 109.7 cfs) is located adjacent to Basin B and covered in native grasses and weeds. The site has limited grading due to work from a previous development that did not finish. Runoff from the site sheet flows southwesterly overland to an existing diversion ditch that spans from an existing public 24" RCP storm sewer main that daylights within Filing No. 3 south of Wagon Track Way. The diversion ditch flows directly to existing Pond 2 (**Design Point 3**). The private 42" RCP outlet pipe from the outlet structure of the pond daylights at the grassland swale south of the project site at **Design Point 6**.

Basin D (10.54 ac, Q_5 = 3.3 cfs, Q_{100} = 22.4 cfs) is located to the northeast of the Filing and consists of undeveloped area with native grasses. The basin's runoff drains directly to existing Pond WU (**Design Point 4**).

Flows don't match hydrology spreadsheet

Basin E (3.14 ac, Q_5 = 1.1 cfs, Q_{100} = 7.5 cfs) is the undeveloped, natural landscaped area between Tamlin Road and the existing Pond 1. Runoff from Basin E is directed by a ditch section to a low point between the future Tamlin Road and Highway 24 (**Design Point 5**). This drainage concept and its associated storm infrastructure is presented in the previous master plan and is to remain as the intended plan. The 2010 FDR suggested that an inline grate inlet be installed but there is no evidence that this was installed. The existing drainage pattern consists of pooling within the local low point of the ditch that surcharges and is directed south through the grassland swale.

2010 report was not approved. References should us 2005 report. Change for all references through out report.

Basin F (3.67 ac, Q between Tamlin Road and the existing Detenti d to the low point in the downstream grasslin **gn Point 6**). This drainage concept and its associated storm infrastructure is presented in the previous master plan and is to remain as the intended plan. The 2010 FDR suggested that a 4'x4' area inlet be constructed but there is no evidence that this was installed. The existing drainage pattern consists of pooling within the local low point of the ditch that surcharges and is directed south through the grassland swale.

Basin G (8.84 ac, Q_5 = 6.8 cfs, Q_{100} = 16.0 cfs) is the area east of Basin C that is not to be disturbed and remain as open, natural landscape. The runoff from Basin G is collected in a local topographic low point and when overtopping the low point, the runoff continues southeast to the low point in the grasslined swale along Highway 24, **Design Point 6**.

PROPOSED DRAINAGE BASINS

This report has been prepared in accordance with the EPC DCM and the MHFD Criteria Manual. The 5-year storm was used as the minor storm event, while the 100-year storm was used as the major event. The one-hour point rainfall depth used for the 5-year storm was 1.50 inches and 2.52 inches for the 100-year event.

For all the basins which do not differ from the existing conditions, they can just be listed & write up can be deleted (Basins OS-1, OS-2 ,OS-3, OS-4, OS-6, OS-7, OS-8, A, & G)

Preliminary grading design of the site has been completed to include right of way design and assignment of lot type A, B, Transition (T), and Walkout (WO). The assigned lots drain per a typical lot template into roadways where sump inlets are located to convey stormwater though the public storm system and outfall to their respective ponds.

The overarching premise of the drainage design is to route overland flow from residential lots and units to adjacent rights-of-way where public storm infrastructure will be installed and ultimately convey the storm water to respective ponds to provide water quality treatment as well as flow attenuation and detention. Previous studies designed Ponds 1 and 2 in order to provide full spectrum detention and water quality for Filing Nos. 2 and 3. The analysis within this report provides more defined pond sizing requirements due to the change in layout for Filing No. 3 as well as preliminary locations and sizes for inlets, pipes, culverts, and swales. This idea is intended to be followed for the entirety of the developed site. Basins which are not along the main drainageways within the proposed developed areas or which are expected to flow offsite have been analyzed. There are no engineered channels that exit the Site.

There is a proposed grass-lined, natural swale to convey stormwater from the rear of B-lot sites and cul-de-sacs that are the downstream area of roadways within Basin C to existing Pond 2. The design of this swale is to be included in the Final Drainage Report, but preliminary calculations and design have been done for the PDR to accurately assess the width and depth of the drainageway for the minor and major storm events including freeboard requirements. All Pond outlets daylight to south of the future Tamlin Road right-of-way via existing public RCP culvert pipes, but are not directed to any formal channels or drainageways.

The existing Ponds will be analyzed as part of this PDR to ensure that the design meets the standards set forward in the El Paso County Engineering Criteria Manual as well as the Mile-High Flood Control Criteria Manual. The existing pond's detention volume capacity will be confirmed as adequate and infrastructure will be retrofitted as required.

As with the existing conditions, the fourteen existing major drainage basins have been delineated into seven major basins based on preliminary grading of the Site – basins A through G within the limits of Filing No. 3 and basins OS-1 through OS-8 for off-site basins consistent with the existing conditions for the developed areas of Filing No. 2 and relatively small developed area of Filing No. 1. Of the major basins within the Site, basins A, E, F, and G are consistent with previous reports for Filing Nos. 2 and 3 as these basins are not to be altered during the development of Filing No. 3. Basins B, C, and D are the basins in which development of Filing No. 3 is to occur. Sub-basin analysis within these major basins is provided as a part of the hydrology calculations in order to plan for storm infrastructure and channels on the Site.

The rational method was used to estimate runoff rates for the proposed development and are in accordance to EPC DCM and any references within the County criteria to the City of Colorado Springs Drainage Criteria Manuals, Volumes 1, 2, and 3. These calculations can be found in Appendix D.

OS-1 (6.38 ac, Q_5 = 10.7 cfs, Q_{100} = 21.7 cfs) is an off-site basin located on the northwestern part of Falcon Highlands Filing No. 2 and consists of the rear yard areas of PUD residential zoned lots. The historic drainage pattern sheet flows southwesterly where it is captured by basin OS-5 at **Design Point 7**.

OS-2 (3.12 ac, Q_5 = 7.8 cfs, Q_{100} = 13.6 cfs) is an off-site sub-basin within the developed area of Filing No. 1 for quarter-acre lots and is an off-site basin that was included in the MDDP for Filing No. 2. The basin's runoff sheet flows due south in Filing No. 2 and is captured by the roadways and storm system in Filing No. 2 that runs through Filing No. 3, and ultimately outfalls into the existing Pond 1. The basin flows to OS-5 at **Design Point 8**.

OS-3 (1.14 ac, Q_5 = 3.4 cfs, Q_{100} = 6.0 cfs) is an off-site basin within Filing No. 1 that includes the developed right-of-way of Rolling Thunder Way. This sub-basin was included in the previous MDDP as an off-site basin and represents a portion of the landscaped right-of-way on the south side of Rolling Thunder Way that sheet flows due south into the developed areas of Filing No. 2 at **Design Point 9** and ultimately into the public storm system shared with Filing No. 3, outfalling to existing Detention Pond 2.

OS-4 (13.09 ac, Q_5 = 12.3 cfs, Q_{100} = 26.3 cfs) is an off-site basin located on the southwestern part of Falcon Highlands Filing No. 2 and consists of mostly Tract A and portions of PUD residential zoned lots rear yard areas. The historic drainage pattern sheet flows south where it is captured by basin A at **Design Point 10**.

Have write ups for OS-5 & OS5.1 thru OS-5.3 by themselves

OS-5 (62.20 ac, Q_5 = 86.4 cfs, Q_{100} = 173.7 cfs) is an off-site basin that stretches from the eastern border of basin OS-4 to the eastern edge of Bridal Vail Way within Filing No. 2. The basin is zoned as PUD residential lots of about quarter-acre size. Runoff is carried in the public rights-of-way where the flow travels south through a series of public curb and gutters, sump inlets and storm infrastructure within Filing No. 2. The flow outfalls into the existing Pond 1 through the public 60" RCP storm pipe that runs through Filing No. 3, the pipe run at **Design Point 11**.

OS-6 (35.75 ac, Q_5 = 31.9 cfs, Q_{100} = 58.4 cfs) is off-site basin located between Bridal Vail Way and Antelope Meadows Circle within Filing 2. This basin includes PUD residential zoned lots of half-acre size and contains drainage tracts. The basin is captured by a series of public curb and gutter systems in the rights-of-way where inlets and various size RCPs convey storm water to the end of the cul-de-sac of Wagon Track Drive where the public storm system of Filing No. 2 (**Design Point 12)** connects and daylights to Filing No. 3 within future Antelope Meadows Circle right-of-way.

OS-7 (6.47 ac, Q_5 = 5.2 cfs, Q_{100} = 18.3 cfs) is the off-site basin located within Filing 2, just north of Basin D of Filing 3. The basin includes PUD residential zoned lots of half-acre size with right of way. The basin runoff is captured in the public right-of-way curb and gutter where it travels south and is released at the road end at **Deign Point 13** where it continues south through Antelope Meadows Circle and then due east through Filing 3's Basin D in the existing access path where it outfalls to Pond WU.

OS-8 (13.79 ac, Q_5 = 4.6 cfs, Q_{100} = 31.1 cfs) is an off-site basin located east of Basin D. The basin consists of native grasses and an existing Regional Pond WU. Runoff within the basin flows into the Pond WU (**Design Point 4**) and drains to the northwest side of Highway 24 via the existing private 42" and three 60" RCP outlet pipes to the low point in the offsite grasslined swale at **Design Point 6**.

Explain in the narrative how WQ is being addressed for this basin. Possible exclusions include I.7.1.B.7 (land disturbance to undeveloped land that will remain undeveloped) and/or I.7.1.C.1 (which allows for 20% not to exceed 1 acre of the applicable development site area to not be captured), or consider using runoff reduction for WQ

Basin A (3.74 ac, Q_5 = 1.1 cfs, Q_{100} = 7.7 cfs) is the western most basin of the site and consists of the open space Tract A and some small portions of the rear lots of the one-eighth acre single family lots. The runoff from Basin A sheet flows west off site and onto the adjacent open space. Runoff reductions via grass buffers and natural landscape to Design Point 1 allow for no detention of this basin as no downstream conditions will be affected, however the basin is included in the effective imperviousness calculations and is accounted for in the assessment of existing Pond 1. An area of discharge from the Site to the west property is the west end of Antelope Meadows Circle where it will dead end. It is recommended that temporary control measures such as straw bales or sediment control logs be installed at this dead end for energy dissipation and to disperse any channelized flow from the curb and gutter.

Basin B (33.8 ac, Q_5 = 44.5 cfs, Q_{100} = 109.9 cfs) is the southwestern portion of Filing No. 3 consisting of the area south of Antelope Meadows Circle and west of Basin C. Basin B is laid out with several 50' public right of way roadways with curb and gutter, detached pedestrian sidewalk, and landscape areas. The PUD residential developments within Basin B are shown as 123 lots, varying from 50'x110' to 60'x110'. The roadways consist of low points at the southeastern and southwestern edges and a high point central to the basin with a drainage Tract that flows north to south. The general drainage pattern is due south to the existing Pond 1. Within the roadways is a public storm system and a series of public sump inlets at the low points to capture surface runoff and convey storm water to forebays within the existing Pond 1 (Design Point 2). A relatively small portion of the northern half-acre lots east of Bridal Vail Way are included in Basin B where a low point in the western cul-de-sac is to have a sump inlet for surface runoff collection that connects to the existing Pond 1 storm system.

Basin B was delineated into several smaller basins to assess roadway capacities and proposed public storm sewer inlet locations. These smaller basins are described below.

Basin B1 (5.30 ac, Q_5 = 7.9 cfs, Q_{100} = 17.3 cfs) is the west side of Basin B that consists of the north half of the 50' right of way of **ELEANORA TRAIL** and the west side of 50' public right of way of **LANNER LANE** and PUD residential lots where runoff flows south to a low point at the road curve. The runoff is collected in a Public 10' CDOT Type R Curb Sump Inlet, **Design Point 2.1**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 1.

Basin B2 (4.06 ac, Q_5 = 6.4 cfs, Q_{100} = 14.1 cfs) is located between **ELEANORA TRAIL** and **RYLAND WAY** and collects runoff from half of the public right of way along sections of

ELEANORA TRAIL, **LANNER LAND** and **RYLAND WAY** and the PUD residential lots and flows to a low point at the intersection of **LANNER LANE** and **RYLAND WAY**. The runoff is collected in a Public 10' CDOT Type R Curb Sump Inlet, **Design Point 2.2**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 1.

Basin B3 (4.41 ac, Q_5 = 6.9 cfs, Q_{100} = 15.2 cfs) is located between **RYLAND WAY** and **ALMUR TRAIL** and collects runoff from half of sections of **RYLAND WAY**, **ALMUR TRAIL** and **LANNER LANE** and the PUD residential lots. Runoff flows to a low point within **ALMUR TRAIL**. The runoff is collected in a Public 10' CDOT Type R Curb Sump Inlet, **Design Point 2.3**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 1.

Basin B4 (8.65 ac, Q_5 = 2.7 cfs, Q_{100} = 17.8 cfs) is the area located along the southern edge of the project and adjacent to the Pond 1. It consists of the back half of PUD residential lots along **ALMUR TRAIL**. Runoff will sheet flow south into Pond 1, **Design Point 2**.

Basin B5 (1.01 ac, Q_5 = 2.4 cfs, Q_{100} = 5.2 cfs) consists of the south half of a section of **ALMUR TRAIL** and the north half of the adjacent PUD residential lots. Runoff from the area will be directed by curb and gutter to the inlet at the intersection of **ALMUR TRAIL** and **SCOOTY LANE**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 2.5**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 1.

Basin B6 (0.50 ac, Q_5 = 0.9 cfs, Q_{100} = 2.0) is located at the northwest of the intersection of **ALMUT TRAIL** and **SCOOTY LANE** and includes half of the 50' right of way of **ALMUR TRAIL** and the adjacent PUD residential lots. The runoff is collected at the intersection of **ALMUT TRAIL** and **SCOOTY LANE** in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 2.6**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 1.

Basin B7 (0.90 ac, Q_5 = 2.1 cfs, Q_{100} = 4.6 cfs) is located at the southwest of the intersection of **RYLAND WAY** and **SCOOTY LANE**. Runoff flow will be collected for half of the 50' right of way and the PUD residential lots at a low point along **SCOOTY LANE**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 2.7**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location

until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 1.

Basin B8 (1.75 ac, Q_5 = 2.9 cfs, Q_{100} = 6.5 cfs) is located at the eastern end between **ELEANORA TRAIL** and **RYLAND WAY** and collects runoff from half of both streets and the PUD residential lot at a low point near the intersection of **RYLAND WAY** and **SCOOTY LANE**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 2.8**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 1.

Basin B9 (2.28 ac, Q_5 = 3.8 cfs, Q_{100} = 8.3 cfs) consists of the north/east half of **ELEANORA TRAIL** and **SCOOTY LANE** right of way and residential lots. The runoff is collected at a low point along **SCOOTY LANE** in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 2.9**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 1.

Basin B10 (2.07 ac, Q_5 = 3.5 cfs, Q_{100} = 7.7 cfs) includes the southeast end of **SCOOTY LANE** at the intersection of **ALMUR TRAIL** and **SCOOTY LANE**. Runoff from the east half of the right of way and the PUD residential lots will be collected at a low point along **ALMUR TRAIL**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 2.10**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 1.

Basin B11 (0.31 ac, Q_5 = 0.7 cfs, Q_{100} = 1.4 cfs) is located along **APLOMADO TRAIL** and collects runoff from half of the public right of way and the front half residential lots. Flow in directed south to a low point at the intersection of **ALMUR TRAIL** and **APLOMADO TRAIL**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 2.11**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 1.

Basin B12 (0.56 ac, Q_5 = 0.9 cfs, Q_{100} = 1.9 cfs) is located along **APLOMADO TRAIL** and collects runoff from half of the public right of way and the front half residential lots. Flow in directed south to a low point within **APLOMADO TRAIL**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 2.12**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location until overtopping

the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 1.

Basin B13 (1.18 ac, Q_5 = 2.0 cfs, Q_{100} = 4.4 cfs) is located along **APLOMADO TRAIL** and collects runoff from half of the public right of way and the front half residential lots. Flow in directed south to a low point within **APLOMADO TRAIL**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 2.13**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 1.

Flows don't match hydrology spreadsheet

Basin B14 (0.28 ac, Q_5 = 0.3 cfs, Q_{100} = 0.9 cfs) is located along **APLOMADO TRAIL** and collects runoff from half of the public right of way and the front half residential lots. Flow in directed south to a low point within **APLOMADO TRAIL**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 2.14**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 1.

Flows don't match hydrology spreadsheet

Basin B15 (0.30 ac, Q_5 = 0.4 cfs, Q_{100} = 1.0 cfs) is located along **APLOMADO TRAIL** and collects runoff from half of the public right of way and the front half residential lots. Flow in directed south to a low point within **APLOMADO TRAIL**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 2.15**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 1.

Flows don't match hydrology spreadsheet

Basin B16 (0.28 ac, Q_5 = 0.4 cfs, Q_{100} = 1.2 cfs) is located along **APLOMADO TRAIL** and **ALMUR TRAIL** and collects runoff from half of the public right of way and the PUD residential lots for that area. Flow in directed south to a low point at the intersection of **ALMUR TRAIL** and **APLOMADO TRAIL**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 2.16**. Storm infrastructure will direct flow to outfall in Pond 1. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to fl[illegible]am Tract that is connected to Pond 1.

Area doesn't match hydrology spreadsheet

Basin C (52.3 ac, Q_5 = 79.3 cfs, Q_{100} = 204.7 cfs) is the more central to east basin within Filing No. 3 that is tributary to Pond 2. The basin includes the majority of the half-acre PUD residential lots in the northern area south of Filing No. 2 and east of Bridal Vail Way, and stretches south to the very south and east edges of the Filing with the exception of Pond WU areas and Basin D.

Basin C areas south of Antelope Meadows Circle consists of approximately 248 lots with some lots of 35'x110' and others of 50'x110' and 60'x110' in size. A public storm system is to be designed within the roadways to convey storm water from the off-site Basin OS-5 and Basin OS-6 within Filing No. 2 and the runoff from the entire Basin C areas. The storm system is to outfall into the existing Pond 2 (Design Point 3).

Area & Flows don't match hydrology spreadsheet

Basin C1 (9.83 ac, Q_5 = 7.0 cfs, Q_{100} = 24.5 cfs) is the northern most portion of Basin C with PUD residential lots, the east half of the 50' public right of way for **SAHALEE TRAIL** and the north half of the 50' right of way of **FOX KESTREL COURT.** The runoff is collected within **SAHALEE TRAIL** in a Public 10' CDOT Type R Curb Sump Inlet, **Design Point 3.1**. Storm infrastructure will direct flow to outfall in Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C2 (3.67 ac, Q_5 = 3.0 cfs, Q_{100} = 10.6 cfs) is the north-western portion of Basin C with PUD residential lots and the west half of the 50' public right of way for **FOX KESTREL COURT** and **SAHALEE TRAIL**. The runoff is collected within **SAHALEE TRAIL** in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.2**. Storm infrastructure will direct flow to outfall in Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C3 (3.81 ac, Q_5 = 3.1 cfs, Q_{100} = 10.7 cfs) is located between **FOX KESTREL COURT** and Antelope Meadow Circle, on the east side of **SAHALEE TRAIL** consisting of PUD residential lots and the 50' public right of way **FOX KESTREL COURT** and **SAHALEE TRAIL.** The runoff is collected at the intersection of **SAHALEE TRAIL** and Antilope Meadows Cir. in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.3**. Storm infrastructure will direct flow to outfall in Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C4 (1.95 ac, Q_5 = 1.7 cfs, Q_{100} = 5.8 cfs) is located between **FOX KESTREL COURT** and Antelope Meadow Circle, on the west side of **SAHALEE TRAIL** consisting of PUD residential lots and the 50' public right of way **FOX KESTREL COURT** and **SAHALEE TRAIL.** The runoff is collected at the intersection of **SAHALEE TRAIL** and Antilope Meadows Cir. in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.4**. Storm infrastructure will direct flow to outfall in Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C5 (0.41 ac, Q_5 = 1.9 cfs, Q_{100} = 3.4 cfs) is located on Antelope Meadows Circle, on the east side of the intersection with **SAHALEE TRAIL** and consists of the 50' public right of way Antelope Meadows Circle**.** The runoff is collected at the intersection in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.5**. Storm infrastructure will direct flow to outfall in Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C6 (0.37 ac, Q_5 = 1.7 cfs, Q_{100} = 3.1 cfs) is located on Antelope Meadows Circle, on the west side of the intersection with **SAHALEE TRAIL** and consists of the 50' public right of way Antelope Meadows Circle**.** The runoff is collected at the intersection in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.6**. Storm infrastructure will direct flow to outfall in Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C7 (2.05 ac, Q_5 = 3.4 cfs, Q_{100} = 7.4 cfs) is a centrally located portion of Basin C with PUD residential lots and the 50'public right of way of **APLOMADO TRAIL** and **SAHALEE TRAIL,** The runoff is collected at the intersection of **SAHALLE TRAIL** and **APLOMADO TRAIL** in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.7**. Storm infrastructure will direct flow to outfall in Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Flow doesn't match hydrology spreadsheet

Basin C8 (1.43 ac, Q_5 = 2.4 cfs, Q_{100} = 3.4 cfs) is a centrally located portion of Basin C with PUD residential lots and the 50'public right of way of **APLOMADO TRAIL** and **SAHALEE TRAIL**. The runoff is collected at the intersection of **SAHALEE TRAIL** and **APLOMADO TRAIL** in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.8**. Storm infrastructure will direct flow to outfall in Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C9 (2.96 ac, Q_5 = 5.1 cfs, Q_{100} = 11.3 cfs) is a centrally located portion of Basin C with PUD residential lots and the 50'public right of way of **SAHALEE TRAIL** and **APLOMADO TRAIL**. The runoff is collected at a low point on **SAHALEE TRAIL** in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.9**. Storm infrastructure will direct flow to outfall in Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C10 (1.72 ac, Q_5 = 1.5 cfs, Q_{100} = 4.8 cfs) is a centrally located portion of Basin C with PUD residential lots, the open space and the 50'public right of way of **SAHALEE TRAIL, APLOMADO TRAIL** and **ALMUR TRAIL**. The runoff is collected at a low point on **APLOMADO TRAIL** in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.10**. Storm infrastructure will direct flow to outfall in Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C11 (4.21 ac, Q_5 = 4.9 cfs, Q_{100} = 16.3 cfs) is located in the southern portion of Basin C with PUD residential lots, the open space and the 50' public right of way of **ALMUR TRAIL**. The runoff is collected at a low point on **ALMUR TRAIL** in a Public 10' CDOT Type R Curb Sump Inlet, **Design Point 3.11**. Storm infrastructure will direct flow to outfall in Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C12 (0.41 ac, Q_5 = 1.9 cfs, Q_{100} = 3.4 cfs) is located in the southwest portion of Basin C and is made up of the 50' public right of way of **ALMUR TRAIL**. The runoff is collected at a low point on **ALMUR TRAIL** in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.12**. Storm infrastructure will direct flow to outfall in Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C13 (5.93 ac, Q_5 = 7.1 cfs, Q_{100} = 18.6 cfs) is located at the southern boundary of the Site. It consists of the PUD residential lots along **ALMUR TRAIL** and **SAHALEE TRAIL**. Runoff will sheet flow south into Pond 1, **Design Point 3.13**.

Basin C14 (2.96 ac, Q_5 = 4.9 cfs, Q_{100} = 10.7 cfs) is located between **APLOMADO TRAIL** and **SPOTTED KESTREL WAY** and drains to a low point at the intersection of **GREY FALCON LANE** and **SPOTTED KESTREL WAY**. It collects runoff from PUD residential lots and the 50' public right of way of **APLOMADO TRAIL**, **DUNFORD LANE**, **GREY FALCON LANE**, and **SPOTTED KESTREL WAY**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.14**. Storm infrastructure will direct flow to outfall in Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C15 (1.42 ac, Q_5 = 2.2 cfs, Q_{100} = 4.8 cfs) is the southern portion of Basin C with PUD residential lots and the 50' public right of way of **DUNFORD LANE**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.15**. Storm infrastructure will direct flow

to outfall into a swale along the southern Site boundary. The swale will release into Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C16 (5.71 ac, Q_5 = 6.0 cfs, Q_{100} = 17.9 cfs) is the southern most portion of basin C with PUD residential. The runoff sheet flows into a storm drainage swale along the site boundary and flows from there into Pond 2, **Design Point 3.16**. Storm infrastructure will direct flow to outfall into a swale along the southern Site boundary. The swale will release into Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C17 (2.05 ac, Q_5 = 6.5 cfs, Q_{100} 12.4 cfs) is located along the north-eastern portion of basin C with the right of way of Antelope Meadow Circle. The runoff flows to a low point towards the center of the right of way of Antelope Meadow Circle. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.17**. Storm infrastructure will direct flow to outfall into a swale along the southern Site boundary. The swale will release into Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C18 (0.76 ac, Q_5 = 3.2 cfs, Q_{100} = 5.7cfs) is located along the north-eastern portion of basin C with the right of way of Antelope Meadow Circle. The runoff flows to a low point towards the center of the right of way of Antelope Meadow Circle. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.18**. Storm infrastructure will direct flow to outfall into a swale along the southern Site boundary. The swale will release into Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C19 (0.74 ac, Q_5 = 1.3 cfs, Q_{100} = 2.8 cfs) is located at the intersection of **APLOMADO TRAIL** and **NANKEEN COURT**. The runoff flows to a low in **APLOMADO TRAIL**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.19**. Storm infrastructure will direct flow to outfall into a swale along the southern Site boundary. The swale will release into Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C20 (1.51 ac, Q_5 = 2.7 cfs, Q_{100} = 6.0 cfs) is located at the intersection of **APLOMADO TRAIL** and **NANKEEN COURT**. The runoff flows to a low in **APLOMADO TRAIL**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.20**. Storm

infrastructure will direct flow to outfall into a swale along the southern Site boundary. The swale will release into Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2.

Basin C21 (3.52 ac, Q_5 = 5.9 cfs, Q_{100} = 12.9 cfs) is the north-east portion of Basin C with PUD residential lots and the 50' public right of way. Flow is collected in the curb and gutter of **NANKEEN COURT** and released into an inlet at the cul-de-sac. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.21**. Storm infrastructure will direct flow to outfall into a swale along the southern Site boundary. The swale will release into Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2. The runoff is then released into a stormwater swale along the south side of the project. The swale releases into Pond 2.

Basin C22 (2.29 ac, Q_5 = 3.9 cfs, Q_{100} = 8.6 cfs) is the north-east portion of Basin C with PUD residential lots and the 50' public right of way. Flow is collected in the curb and gutter of **BANDED FALCON WAY** and released into an inlet at the cul-de-sac. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 3.22**. Storm infrastructure will direct flow to outfall into a swale along the southern Site boundary. The swale will release into Pond 2. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond 2. The swale releases into Pond 2.

Basin D (10.53 ac, Q_5 = 16.5 cfs, Q_{100} = 37.6 cfs) is the northeast area of the Filing for one-eighth acre PUD residential lots at the extension of Birch Hollow Way. The basin is tributary to existing Pond WU which is an existing and recently improved pond under the jurisdiction of El Paso County. The basin drains directly to the existing pond (Design Point 4) via overland flow.

Basin D1 (1.57 ac, Q_5 = 2.7 cfs, Q_{100} = 5.9 cfs) is between Antelope Meadow Circle and **APLOMADO TRAIL** of basin D with PUD residential lots and the public right of way of **APLOMADO TRAIL** and **BIRCH HOLLOW WAY**. The runoff flows to a low point within **APLOMADO TRAIL** with a sump inlet. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 4.1**. Storm infrastructure will direct flow to outfall in Pond WU. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond WU. The inlet then outflows into Pond WU.

Basin D2 (0.13 ac, Q_5 = 0.3 cfs, Q_{100} = 0.7 cfs) is a centrally located portion of basin D with the 50'public right of way of **APLOMADO TRAIL**. The runoff is captured in curb and gutter and

flows into an inlet on **APLOMADO TRAIL**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 4.2**. Storm infrastructure will direct flow to outfall in Pond WU. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond WU. The inlet then outflows into Pond WU.

Basin D3 (1.47 ac, Q_5 = 2.6 cfs, Q_{100} = 5.6 cfs) is the southern portion of basin D with PUD residential lots and the 50'public right of way of **BRAHMINY COURT**. The runoff is captured in curb and gutter and flows into an inlet on **BRAHMINY COURT**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 4.3**. Storm infrastructure will direct flow to outfall in Pond WU. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond WU. The inlet then outflows into Pond WU.

Basin D4 (1.87 ac, Q_5 = 3.1 cfs, Q_{100} = 6.9 cfs) is a centrally located portion of basin D with PUD residential lots and the 50'public right of way of **APLOMADO TRAIL, BIRCH HOLLOW WAY,** and **PIED HARRIER LOOP**. The runoff is captured in curb and gutter and flows into an inlet on **PIED HARRIER LOOP**. The runoff is collected in a Public 5' CDOT Type R Curb Sump Inlet, **Design Point 4.4**. Storm infrastructure will direct flow to outfall in Pond WU. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond WU. The inlet then outflows into Pond WU.

Basin D5 (3.90 ac, Q_5 = 6.2 cfs, Q_{100} = 13.7 cfs) is a centrally located portion of basin D with PUD residential lots and the 50'public right of way of **APLOMADO TRAIL, BIRCH HOLLOW WAY** and **PIED HARRIER LOOP**. The runoff is captured in curb and gutter and flows into an inlet on **PIED HARRIER LOOP**. The runoff is collected in a Public 10' CDOT Type R Curb Sump Inlet, **Design Point 4.5**. Storm infrastructure will direct flow to outfall in Pond WU. The emergency overflow would result in pooling at the sump location until overtopping the nearest high point in the roadway located to the south. The storm water would overtop prior to exceeding the roadway capacity and continue to flow due south to the downstream Tract that is connected to Pond WU. The inlet then outflows into Pond WU.

Basin D6 (1.59 ac, Q_5 = 1.6 cfs, Q_{100} = 4.9 cfs) is located along the northeast corner of the site and consists of the back half of PUD residual lots along **PIED HARRIER LOOP**. Runoff from the lots sheet flow southeast into Pond WU, **Design Point 4.6**.

Basin E (1.77 ac, Q_5 = 0.6 cfs, Q_{100} = 4.3 cfs) is the undeveloped, natural landscaped area between Tamlin Road and existing Detention Pond 1. Runoff from Basin E is directed by a ditch section to a low point where an inline inlet will capture flow and direct it south offsite along with the allowable release rate of the existing pond. This drainage concept and its associated storm

Explain in the narrative how WQ is being addressed for this basin. Possible exclusions include I.7.1.B.7 (land disturbance to undeveloped land that will remain undeveloped) and/or I.7.1.C.1 (which allows for 20% not to exceed 1 acre of the applicable development site area to not be captured).

infrastructure is presented in the previous master plan and is to remain as the intended plan. The flow directed offsite is accounted for in existing Pond 1. The basin drains to **Design Point 5** and is directed offsite at the southwest corner of the Filing.

Basin F (6.06 ac, Q_5 = 2.3 cfs, Q_{100} = 15.6 cfs) is the area south of Basin C that is not to be disturbed and remain as open, natural landscape. The runoff from Basin F sheet flows downstream and is undetained. There is no increase runoff and the drainage pattern remains that of its existing flow path in the channel south to the box culverts at Highway 24. The flow directed offsite is accounted for in existing Pond 1. The basin drains to **Design Point 6** and is directed offsite through Tract K.

Basin G (8.84 ac, Q_5 = 6.8 cfs, Q_{100} = 16.0 cfs) is an open, undeveloped area east of Basin C within Tract Z that is to remain undisturbed. The basin drains southeast to the ditch between dedicated future Tamlin Road and Highway 24. The basin drains to **Design Point 7** which and is directed offsite due southwest.

Existing Pond 1: The existing Detention Pond 1 (Design Point 2) was designed as a 17 acre-foot for water quality and detention basin for the 100-year storm event according to the 2010 FDR. The basins that are tributary to Pond 1 are Offsite Basins OS-1, OS-2, and OS-5 and On-site Basin B. The undetained storm water runoff from Basin A is accounted for within the pond as disturbance will occur within that basin.

Is OS-4 also part of the over detention?

Existing Pond 1 was sized using Haestad's Pondpack program in the previous study by Terra Nova, dated September of 2010. The pond will need to have more detail taken into account at the time of the Final Drainage Report when runoff calculations are finalized and the required pond volumes for WQCV (Water Quality Capture Volume), EURV (Excess Urban Runoff Volume), and 100-year detention and release rates are determined. The Existing Pond has been assessed for as-built conditions to determine if earthwork for volume adjustments is required and if retrofitting of existing pond infrastructure is required including the outlet structure, orifice plate, micropool, and spillway. The pond has sufficient volume to meet full-spectrum detention requirements. The required WQCV, EURV, and 100-year detention volumes are listed in a table in the next section of this report. It is determined that the existing outlet structure and orifice plate and restrictor plate are no longer valid for the new layout in Filing 3 and required release rate for the combined tributary area flow. A new outlet structure with orifice plate will be required to be designed and constructed as a part of the Final Drainage Report. In addition to the new outlet structure with micropool, a concrete trickle channel at the bottom of the pond with a minimum slope of 0.5 percent reaching forebays for inlet pipes is to be constructed. Maintenance paths were found to be too steep in existing pathways and a new maintenance path is to be constructed that meets County criteria.

An existing 42" RCP outlet pipe from the existing outlet structure discharges flow from existing Pond 1 due south under the future dedicated right-of-way of Tamlin Road (that has been abandoned) onto the adjacent undeveloped Banning Lewis Ranch property. Rip rap protection was to be constructed at the end of the outlet pipe at the time of final construction and is to be inspected for the Final Drainage Report as-built conditions. According to the previous study from 2010, "the

Include a statement if the pond spreadsheets in the appendix are using previous or proposed outlet configuration. Also include discussion for all 3 ponds on contributing areas, % impervious, and release rates on previous vs. proposed scenarios. Need to show that proposed release rates do not exceed previously approved rates.

released runoff drains south across a defined broad open grassland swale to Highway 24. A 72' wide emergency spillway set at 6817.00 will pass the complete 100-year developed flow safely over the proposed riprap lined weir." Downstream drainage patterns mentioned in the previous report are to be assessed in the Final Drainage Report. The previous FDR and Construction Drawings detailed an outlet structure and orifice plates to meet the required release rates of 40 hours for WQCV, approximately 68 hours for EURV, and 72 hours for the 100-year storm event. It is anticipated that new outlet structures with orifice plate, a micropool, and trickle channel will be required to be designed in order to satisfy release rate requirements for the proposed developed conditions. Some earthwork may be required to provide permanent stabilization of more defined contouring within the pond to ensure that runoff reaches the outlet structure.

Preliminary calculations for the adjusted site layout can be found in Appendix E of this report including effective imperviousness calculations using the UD-BMP IRF calculator and WQCV, EURV, and 100-year detention calculations using the UD-Detention spreadsheet by the Mile High Flood District.

Existing Pond 2: The existing Detention Pond 2 (Design Point 3) was designed as a 7 acre-foot pond for water quality and detention basin for the 100-year storm event according to the 2010 FDR. The basins that are tributary to the existing pond are Offsite Basins OS-3 and OS-6 and On-site Basin C.

Existing Pond 2 was sized using Haestad's Pondpack program in the previous study by Terra Nova, dated September of 2010. The pond will need to have more detail taken into account at the time of the Final Drainage Report when runoff calculations are finalized and the required pond volumes for WQCV, EURV, and 100-year detention and release rates are determined. The Existing Pond has been assessed for as-built conditions to determine if earthwork for volume adjustments is required and if retrofitting of existing pond infrastructure is required including the outlet structure, orifice plate, micropool, and spillway. The pond has sufficient volume to meet full-spectrum detention requirements. The required WQCV, EURV, and 100-year detention volumes are listed in a table in the next section of this report. It is determined that the existing outlet structure and orifice plate and restrictor plate are no longer valid for the new layout in Filing 3 and required release rate for the combined tributary area flow. A new outlet structure with orifice plate will be required to be designed and constructed as a part of the Final Drainage Report. In addition to the new outlet structure with micropool, a concrete trickle channel at the bottom of the pond with a minimum slope of 0.5 percent reaching forebays for inlet pipes is to be constructed. There was a lack of a distinct main outlet structure and any future forebays. A new maintenance path is to County criteria.

48" per FDR Map provided in Appendix F

The 2010 FDR proposed an 42" RCP outlet pipe from the existing outlet structure to discharge flow from existing Pond 2 due south under the future dedicated right-of-way of Tamlin Road onto the adjacent undeveloped Banning Lewis Ranch property. It was proposed that rip rap protection will need to be provided at the end of the outlet pipe at the time of final construction and this is to be verified for the Final Drainage Report. From here the runoff drains south to an existing channel and then is directed to an existing Highway 24 culvert. These proposed offsite improvements are

Does not match with information shown on drawings in Appendix F

to be assessed further in the Final Drainage Report. Current survey field data suggests that these improvements were not constructed as a part of Filing No. 2 and are to be verified in further studies. According to the 2010 study, "a 50' wide emergency spillway set at 6817.50 will pass the complete 100-year developed flow." Impervious factors and extended detention basin calculations for this pond can be found in Appendix E of this report. The previous FDR and Construction Drawings detailed an outlet structure and orifice plates to meet the required release rates of 40 hours for WQCV, approximately 68 hours for EURV, and 72 hours for the 100-year storm event. It is anticipated that new outlet structures with orifice plate, a micropool, and trickle channel will be required to be designed in order to satisfy release rate requirements for the proposed developed conditions. Some earthwork may be required to provide permanent stabilization of more defined contouring within the pond to ensure that runoff reaches the outlet structure.

Existing Pond WU: The existing Detention Pond WU is a recently improved storm water quality and detention facility that is owned and maintained by El Paso County. The previous MDDP called for developed flow conditions to drain to this existing facility and it was accounted for in the recent improvements by Galloway and Company. The new layout has more density and effective imperviousness in Basin D of Filing No. 3 but the developed conditions will route Offsite Basin OS-7 due south in Antelope Meadows Circle instead of turning into Filing No. 3 at Basin D to drain directly to Pond WU. As a result, there is less runoff to Pond WU in the proposed plan, therefore there is no increase to water quality capture volume or 100-year detention volume from the previous study or from recent improvements.

See other comments

It may be warranted that pond infrastructure will need to be constructed within Pond WU to meet current criteria, particularly a concrete trickle channel. There is no evidence of an existing concrete trickle channel on site, nor was one designed as a part of the Construction Drawings and Grading Plans by Galloway and Company.

Due to the revised layout and grading of the site, approximately 31 acres of area that was tributary to the Falcon Basin will now be tributary to the Sand Creek Basin. This cross-basin transfer should not cause any downstream problems as detention of the additional runoff and release rates conforming to drainage standards will be implemented. Show this area on map or include an exhibit

The Developed Condition's runoff flows are kept at or below historic flows by way of detention within existing Pond WU, existing Detention Pond 1, and existing Detention Pond 2; all of which are designed for water quality capture and to release storm water at rates conforming to the El Paso County Drainage Criteria Manual. It is anticipated that there will be no negative affects to downstream areas due to developed drainage conditions

STORM WATER CONVEYANCE AND STORAGE FACILITIES

The proposed on-site conveyance facilities will consist of a combination of storm pipe, swales/channels, curb/gutter, and inlets. Proposed drainage patterns will generally follow the historic drainage patterns outlined in the previous sections of this report, including previous master plans and reports for upstream filings. Within the proposed roadway network, stormwater runoff

will be conveyed overland via surface flow of streets in the curb and gutter until street capacities have been exceeded or where storm sewer inlets have been designed. Interior lot flows are through side yard grasslined swales contributing to water quality prior to overland flow onto adjacent roadways and into the public storm systems. At sump locations, inlets will be sized to collect 100-year flows. Runoff entering the inlets will be conveyed within the public storm sewer system to the existing detention and water quality ponds. The general onsite drainage paths and patterns were previously discussed in the Proposed Drainage Basins section of this report.

The existing pond outfalls are routed to the Sand Creek Basin. These outfalls have been preliminarily sized based on standard pond release rates required by the MHFD criteria. Release rates will be further evaluated during the preliminary and final drainage studies. The sizing of the facilities have been assessed for their as-built conditions.

Detention and Water Quality Ponds for the Site have been preliminarily designed based on previous MDDP and FDR studies for off-site basins and for Filing No. 3 with the methods outlined in the MHFD Urban Storm Drainage Criteria Manual Volumes 1, 2 and 3 along with the MHFD MHFD-Detention_v4.00. The ponds are designed to detain the EURV and the 100-year Detention Volume.

The existing ponds have outlet structures but do not have micropools, a concrete trickle channel or forebays meeting County criteria. The 5-year release rate is controlled by an orifice plate designed to meet the MHFD release rate criteria when designed in 2010. The 100-year storage volume is routed through a grate and restricted by a plate that was sized to limit the release rate to the allowable release rate. A new outlet structure with orifice plate that meets current criteria for WQCV, EURV, and 100-year is to be designed as a part of the Final Drainage Report.

The existing ponds have been previously designed using the runoff data from the Final Drainage Reports from Filing No. 1 and Filing No. 2 as well as assumed runoff data for Filing No. 3 via the most recent FDR in August of 2010 for the development of Filing No. 2. While the ponds are adequately sized for the new, denser lot layout of Filing No. 3, the pond infrastructure is inadequate and not up to current standards.

This report provides more concise drainage calculations for Filing No. 3, consistent with the new layout and grading concept and thus for the tributary areas to Ponds 1 and 2. The MHFD UD-Detention calculator was used to determine existing Pond 1 and Pond 2's required WQCV, EURV, the 100-year detention volumes. The ponds are to be designed and updated to function as full-spectrum detention facilities.

Include discussion on the swales, whose designs are included in the appendix. Show and label them on drainage map.

and trickle channels and micropools?

A summary of the required pond volumes is presented in the table below.

Extended Detention Pond Volumes				
	Zone 1 (WQCV)	**Zone 2 (EURV - Zone 1)**	**Zone 3 (100-Year - Zones 1 & 2)**	**Total Volume Required**
Pond 1	1.918 ac-ft	4.118 ac-ft	3.822 ac-ft	9.859 ac-ft
Pond 2	1.410 ac-ft	2.270 ac-ft	2.858 ac-ft	6.538 ac-ft

This MDDP consists of the most up to date calculations for percent imperviousness for the tributary areas to existing Ponds 1 and 2 and therefore has new, adjusted volume requirements compared to that of previous reports.

The existing Pond 1 was calculated to require 9.859 ac-ft and was sized for a 17 ac-ft pond using Haestad's Pondpack Program and HEC modeling according to the 2010 report. The as-built conditions for the constructed pond have the spillway weir at an elevation of 6416.5 and top of pond berm at 6817, yielding a total pond size of approximately 15.89 ac-ft. A Final Drainage Report for Filing No. 3 will require analysis of Pond 1's infrastructure to adjust to final hydrology and hydraulic conditions tributary to the pond for the new, more dense site layout. Based on the calculations and as-built conditions for this Preliminary Drainage Report, the pond has sufficient volume for full spectrum detention.

Our calculations require 6.538 ac-ft within existing Pond 2 and the original report sized the pond for 9.43 ac-ft according to the Haestad's Pondpack Program and HEC modeling. The as-built conditions for the constructed pond have the spillway weir at an elevation of 6816.5 and top of pond berm at 6817.5 yielding a total pond size of approximately 10.51 ac-ft. A Final Drainage Report for Filing No. 3 will require analysis of Pond 2's size and infrastructure to adjust to final hydrology and hydraulic conditions tributary to the pond. Based on the calculations and as-built conditions for this Preliminary Drainage Report, the pond has sufficient volume for full spectrum detention.

A Final Drainage Report for Filing No. 3 will require analysis of both existing ponds for size and infrastructure to adjust to final hydrology and hydraulic conditions tributary to the respective facilities. Pond sizing looks to be sufficient but it is anticipated that the WQCV, EURV, and 100-year volumes now differ from the original 2010 design and new pond infrastructure will be required in order to meet release rate criteria at approximately 40 hours for WQCV, 68 hours for EURV, and 72 hours for the 100-year detention outflow times.

Existing Regional Detention Pond WU was designed and built as a part of Filing No. 2 and more recently retrofit with outlet structures and pipes. The pond accounted for the future development within Basin D of Filing No. 3 according to the previous MDDP and FDR. Total runoff from Basin D has a denser layout for this report, however, offsite Basin OS-7 will not be tributary to Pond 2 resulting in an overall decrease in runoff volume tributary to Pond WU. No further assessment of volume for Pond WU is necessary.

If this is diverted to Sand Creek a deviation is required.

Include 4-step process

WATER QUALITY ENHANCEMENT BEST MANAGEMENT PRACTICES

The existing detention ponds discussed in the previous section are to have new infrastructure constructed in order to meet MHFD Urban Storm Drainage Criteria Manual Volumes 1, 2 and 3 as well as the El Paso County and City of Colorado Springs Drainage Criteria Manuals. The ponds are currently designed to provide WQCV and detain the EURV and the 100-year Detention Volumes but are to have retrofit of storm infrastructure including the outlet structure and orifice plate in order to meet release rate criteria. Runoff from the upstream tributary areas will be conveyed to the ponds via storm sewer and designed channels as emergency overflow routes directed to the ponds for water quality capture and treatment.

Non-structural Best Management Practices that will be incorporated into the project are anticipated to include grass swales. Water quality is provided via side yard grass swales between lots in developed areas throughout the subdivision. It is provided for basins that drain directly offsite and are not tributary to the ponds by way of grass-lined swales, and by having minimal grading with no developed imperviousness in these areas as either open space or permanently seeded and landscaped rear yard areas.

Structural Best Management Practices that are incorporated in the Site design include storm infrastructure within the extended detention basins such as outlet structures and spillways.

MAINTENANCE

Maintenance of Detention Ponds 1 and 2 shall be by the Falcon Highlands Metro District along with the outlet works for the pond. Public Pond WU will be maintained by El Paso County along with the channel on the east side of the property. The proposed storm sewer system in the internal streets will be owned and maintained by El Paso County once approved.

FLOODPLAIN MODIFICATIONS

A portion of the Site within Flood Zone AE is delineated as Basin G and previously discussed in this report. Basin G is an open natural landscaped area not to be disturbed therefore there will be no modifications to the 100-year floodplain, nor will the development be impacted by said floodplain.

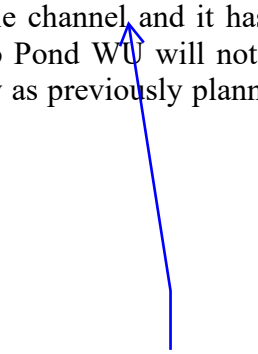
Channel needs to be maintained by the metro district

Provide a water quality plan showing which development areas drain to which PBMPs/SCMs

Provide discussion on maintenance access and aspects of the preliminary design. Show all access roads/paths for permanent BMPs, swales and channels on the drainage plans. Reference ECM 3.3.3.K.

CONCLUSION

This Preliminary Drainage Plan report covers the proposed storm water management plan for the Falcon Highlands Filing No. 3 development. Detailed design will be required to develop individual portions of the site, but this document will provide guidance so that the drainage infrastructure constructed throughout the Falcon Highlands Filing No. 3 development will function efficiently and effectively. A Final Drainage Report will address a more detailed stormwater management design with final inlet and pipe sizing with locations and elevations as well as design details for existing pond infrastructure. This report follows all standard criteria set forth by the El Paso County Drainage Criteria Manual, El Paso County Engineering Criteria Manual, the City of Colorado Springs Drainage Criteria Manuals Volumes 1, 2, and 3, and the Mile High Flood District Urban Storm Drainage Criteria Manual, with no requested variances. Downstream drainage facilities will not be negatively affected, as existing drainage patterns and allowable release rates are planned to be maintained. The Drainage Basin Planning Studies for both Sand Creek and Falcon have no existing or future plans within The Site. Furthermore, Pond WU will remain undisturbed with the exception of the installation of a concrete trickle channel and it has been concluded that the proposed Filing No. 3 Basin D that is tributary to Pond WU will not cause negative impacts to the design and construction of the existing facility as previously planned for offsite drainage will be routed to Pond 2.



Add: EPC DCM Update - January 2015
and: City DCM Volume 2 - November 2002

Update - October 14, 2020

REFERENCES

1) Urban Storm Drainage Criteria Manuals; Mile High Flood District; latest edition

2) El Paso County Engineering Criteria Manual (ECM), latest revision 6 dated December 13, 2016

October 1991

3) El Paso County Drainage Criteria Manual (DCM), latest revision October 31, 2018

4) City of Colorado Springs Drainage Criteria Manuals, Volumes 1, 2, and 3, latest revision May 2014

5) Flood Insurance Rate Map of El Paso County Colorado, Federal Emergency Management Agency, Flood Insurance Rate Map No. 08041C0561G and 08041C0545G dated December 7, 2018.

6) Hydrologic Soil Group – El Paso County, Colorado, Web Soil Survey, National Cooperative Soils Survey, May 21, 2021

7) *Falcon Highlands Filing No. 2 & 3 Final Drainage Report* by Terra Nova Engineering, Inc., latest revision August 2010.

8) *Falcon Highlands Phase 2, Filing No. 2 & 3 Master Development Drainage Plan and Preliminary Drainage Report* by Terra Nova Engineering, Inc. latest revision September 2005

9) URS Section for Regional Detention Pond WU, developed by Galloway & Company

10) Sand Creek DBPS, developed by Stantec, HDR, and Dewberry dated January 2021

11) Falcon DBPS, developed by Matrix Design Group dated September 2015

Provide excerpts

(not adopted by El Paso County)

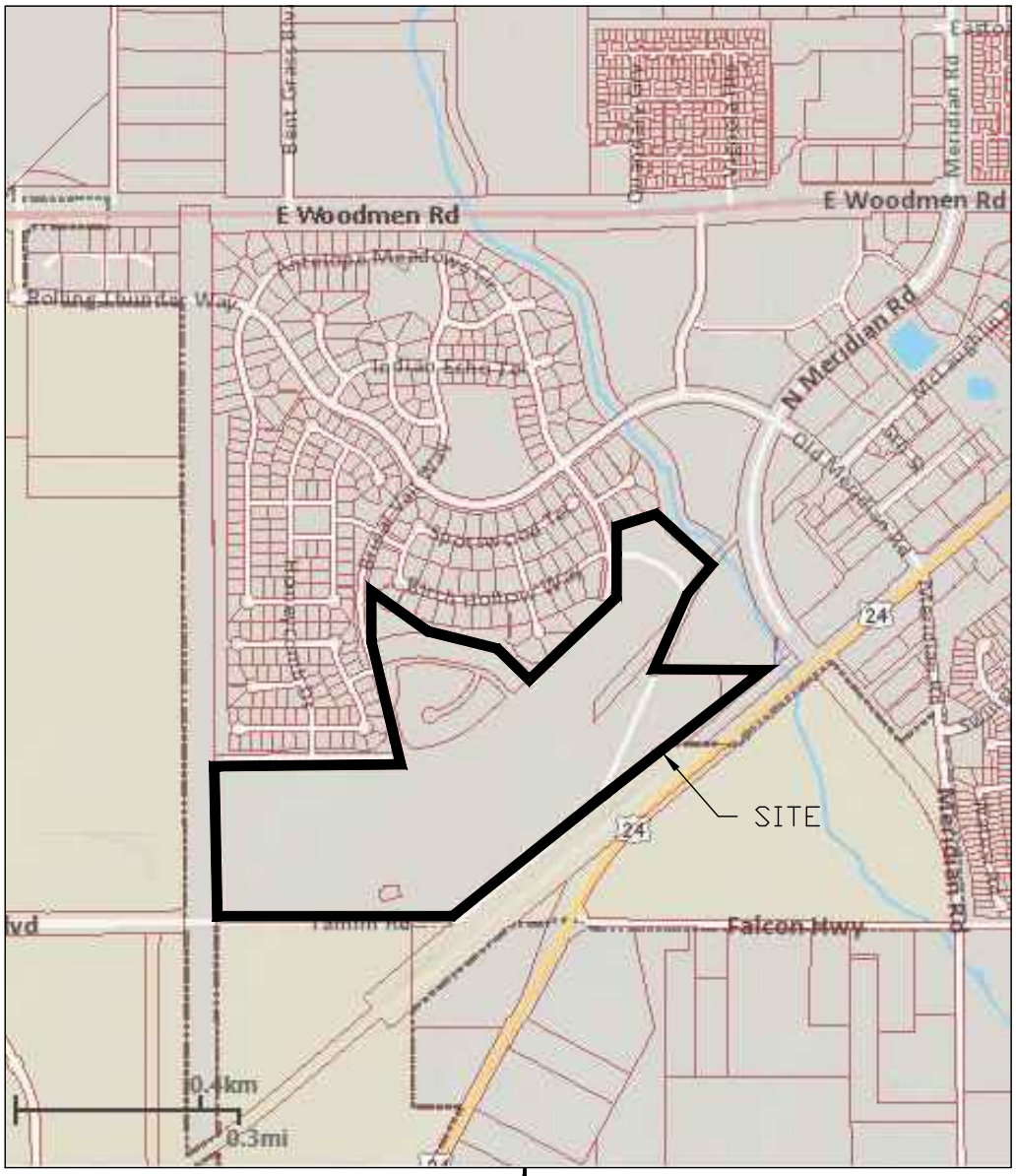
Add: Bent Grass Residential Subdivision Filing No. 2 (SF-19-014) Final Drainage Report - March 2020

APPENDIX A

VICINITY MAP

Falcon Highlands - Filing No. 3

A PART OF SECTION 12, TOWNSHIP 13 SOUTH, RANGE 65 WEST
OF THE SIXTH PRINCIPAL MERIDIAN,
COUNTY OF EL PASO,
STATE OF COLORADO



PROJECT NO.: 21000656
DATE: 01/28/2022

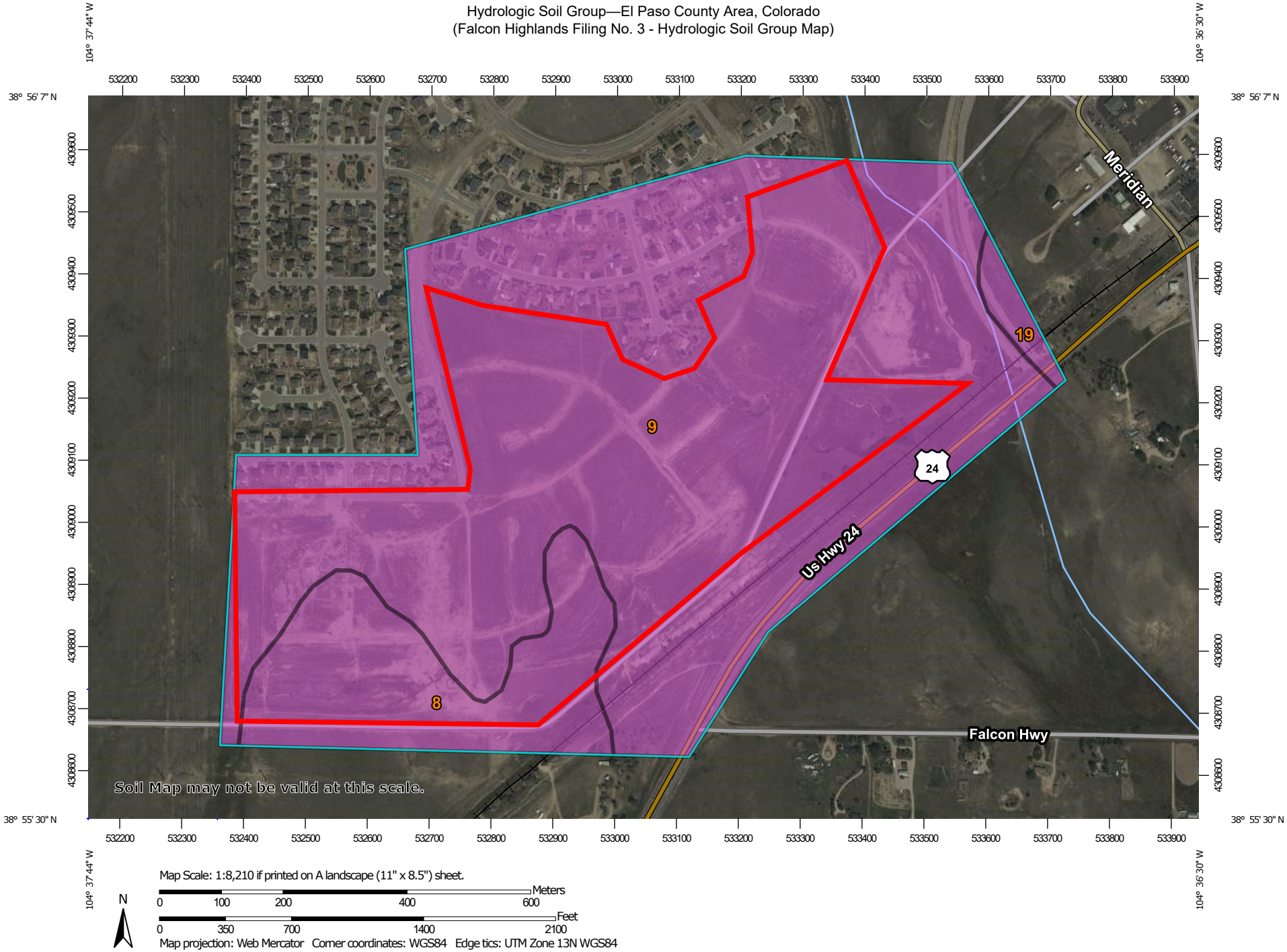
SCALE: 1" = 0.3mi

ATWELL
866.850.4200 www.atwell-group.com
6200 S. SYRACUSE WAY, SUITE470
GREENWOOD VILLAGE, CO 80111
303.825.7100
CONTACT: DANIEL RYON
DRYON@ATWELL-GROUP.COM

APPENDIX B

SOILS SURVEY

Hydrologic Soil Group—El Paso County Area, Colorado
(Falcon Highlands Filing No. 3 - Hydrologic Soil Group Map)



Map Scale: 1:8,210 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 18, Jun 5, 2020

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

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

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	31.0	14.2%
9	Blakeland-Fluvaquentic Haplaquolls	A	184.2	84.5%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	A	2.8	1.3%
Totals for Area of Interest			**218.0**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX C

FEMA FIRMETTE

National Flood Hazard Layer FIRMette

FEMA

104°37'40"W 38°56'3"N

104°37'3"W 38°55'35"N

0 250 500 1,000 1,500 2,000 Feet 1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/21/2021 at 11:21 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at http://www.ngs.noaa.gov/.

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, City of Fountain, Bureau of Land Management, National Oceanic and Atmospheric Administration, United States Geological Survey, and Anderson Consulting Engineers, Inc. These data are current as of 2006.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

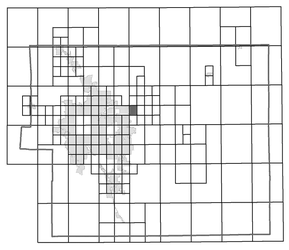
Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

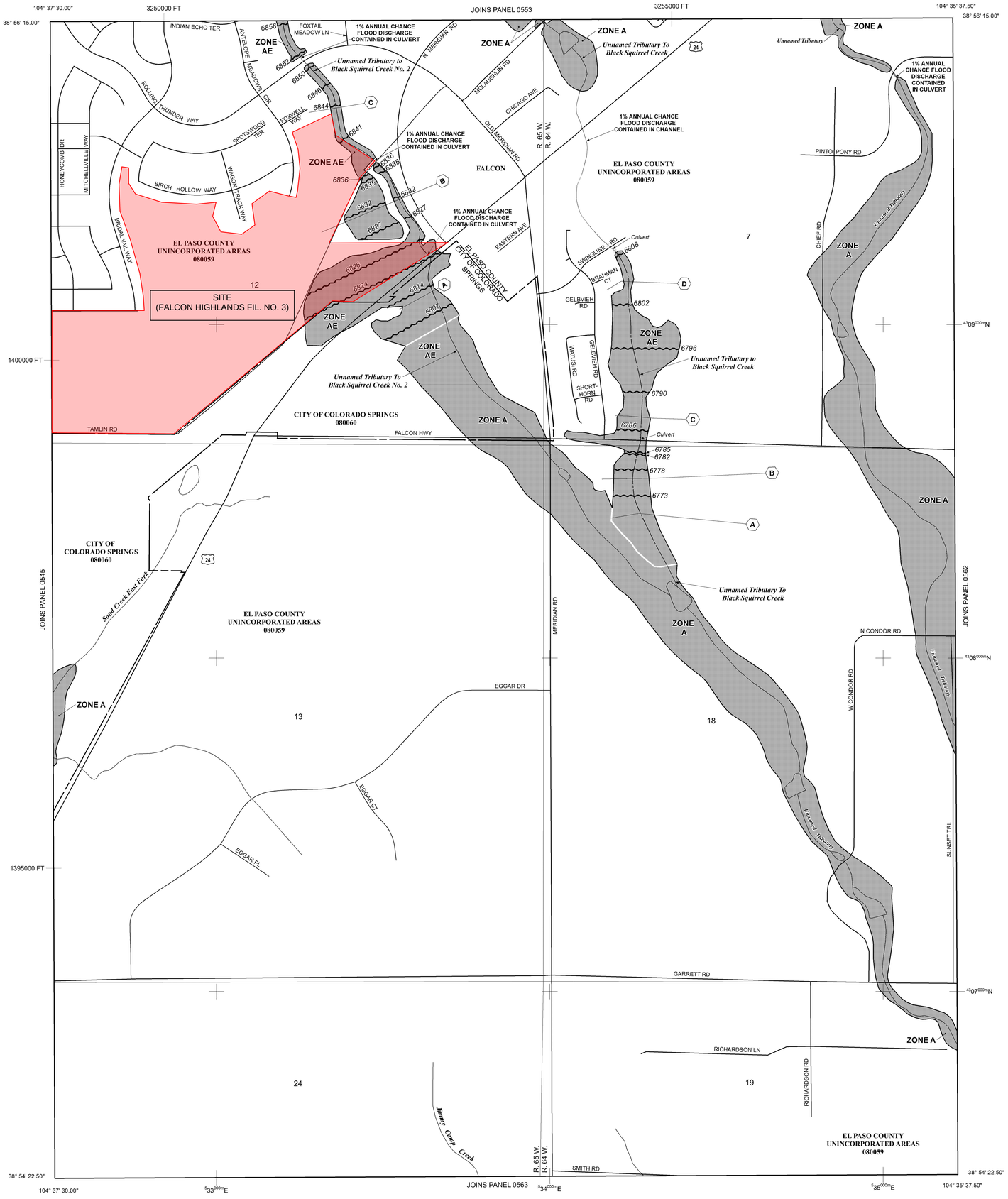
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

Panel Location Map



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 13 SOUTH, RANGE 64 WEST, AND TOWNSHIP 13 SOUTH, RANGE 65 WEST.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.
ZONE AE Base Flood Elevations determined.
ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR Special Flood Hazard Area Formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D Boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A — Cross section line
- 23 — 23 — Transect line
- 97° 07' 30.00" / 32° 22' 30.00" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4275000mN — 1000-meter Universal Transverse Mercator grid ticks, zone 13
- 6000000 FT — 5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0561G

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

PANEL 561 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0561	G
EL PASO COUNTY	080059	0561	G

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

MAP NUMBER
08041C0561G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

APPENDIX D

HYDROLOGICAL CALCULATIONS

LAND USE OR SURFACE CHARACTERISTICS	PERCENT IMPERVIOUS	"C" FREQUENCY			
		10		100	
		A&B*	C&D*	A&B*	C&D*
Business					
Commercial Areas	95	0.90	0.90	0.90	0.90
Neighborhood Areas	70	0.75	0.75	0.80	0.80
Residential					
⅛ Acre or less	65	0.60	0.70	0.70	0.80
¼ Acre	40	0.50	0.60	0.60	0.70
⅓ Acre	30	0.40	0.50	0.55	0.60
½ Acre	25	0.35	0.45	0.45	0.55
1 Acre	20	0.30	0.40	0.40	0.50
Industrial					
Light Areas	80	0.70	0.70	0.80	0.80
Heavy Areas	90	0.80	0.80	0.90	0.90
Parks and Cemeteries	7	0.30	0.35	0.55	0.60
Playgrounds	13	0.30	0.35	0.60	0.65
Railroad Yard Areas	40	0.50	0.55	0.60	0.65

LAND USE OR SURFACE CHARACTERISTICS	PERCENT IMPERVIOUS	"C" FREQUENCY			
		10		100	
		A&B*	C&D*	A&B*	C&D*
Undeveloped Areas					
Historic Flow Analysis-Greenbelts, Agricultural	2	0.15	0.25	0.20	0.30
Pasture/Meadow	0	0.25	0.30	0.35	0.45
Forest	0	0.10	0.15	0.15	0.20
Exposed Rock	100	0.90	0.90	0.95	0.95
Offsite Flow Analysis (when land use not defined)	45	0.55	0.60	0.65	0.70
Streets					
Paved	100	0.90	0.90	0.95	0.95
Gravel	80	0.80	0.80	0.85	0.85
Drive and Walks	100	0.90	0.90	0.95	0.95
Roofs	90	0.90	0.90	0.95	0.95
Lawns	0	0.25	0.30	0.35	0.45
*Hydrologic Soil Group					

RUNOFF COEFFICIENTS AND IMPERVIOUSNESS
Falcon Highlands Filing No. 3 - EXISTING CONDITIONS
El Paso County, Colorado

Basin No	Hydrologic Grouping	Total Area	1/8 Acre or Less			Paved			Drive and Walks			Lawns			1/2 Acre			1/4 Acre			Historic Flow Analysis -- Greenbelts, Agriculture			Runoff Coefficient		Imperviousness
			65%			100%			100%			0%			25%			40%			2%					
		(AC)	C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)	5-Year	100-Year	(%)
A	A	3.74	0.45	0.59	0.00	0.90	0.96	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.50	0.00	0.09	0.36	3.74	0.09	0.36	2.0%
B	A	38.93	0.45	0.59	0.00	0.90	0.96	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.50	0.00	0.09	0.36	38.93	0.09	0.36	2.0%
C	A	57.81	0.45	0.59	0.00	0.90	0.96	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.50	0.00	0.09	0.36	57.81	0.09	0.36	2.0%
D	A	10.54	0.45	0.59	0.00	0.90	0.96	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.50	0.00	0.09	0.36	10.54	0.09	0.36	2.0%
E	A	3.14	0.45	0.59	0.00	0.90	0.96	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.50	0.00	0.09	0.36	3.14	0.09	0.36	2.0%
F	A	3.67	0.45	0.59	0.00	0.90	0.96	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.50	0.00	0.09	0.36	3.67	0.09	0.36	2.0%
G	A	8.84	0.45	0.59	0.00	0.90	0.96	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.50	0.00	0.09	0.36	8.84	0.09	0.36	2.0%
OS-1	A	6.38	0.45	0.59	1.00	0.90	0.96	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.50	3.77	0.09	0.36	1.61	0.27	0.48	34.3%
OS-2	A	3.12	0.45	0.59	0.00	0.90	0.96	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.50	3.12	0.09	0.36	0.00	0.30	0.50	40.0%
OS-3	A	1.14	0.45	0.59	0.00	0.90	0.96	0.00	0.90	0.96	1.14	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.50	0.00	0.09	0.36	0.00	0.90	0.96	100.0%
OS-4	A	13.09	0.45	0.59	0.00	0.90	0.96	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.50	7.50	0.09	0.36	5.59	0.34	0.44	23.8%
OS-5	A	59.62	0.45	0.59	0.00	0.90	0.96	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.50	59.62	0.09	0.36	0.00	0.30	0.50	40.0%
OS-6	A	35.75	0.45	0.59	0.00	0.90	0.96	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	35.75	0.30	0.50	0.00	0.09	0.36	0.00	0.22	0.46	25.0%
OS-7	A	6.47	0.45	0.59	0.00	0.90	0.96	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	6.47	0.30	0.50	0.00	0.09	0.36	0.00	0.22	0.46	25.0%
OS-8	A	13.79	0.45	0.59	0.00	0.90	0.96	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.50	0.00	0.09	0.36	13.79	0.09	0.36	2.0%
TOTAL		**266.0**			**1.0**			**0.0**			**1.1**			**0.0**			**42.2**			**74.0**			**133.9**			**16.8%**

Per Colorado Springs DCM Ch 6 Section 3.2.1, Overland flow should not exceed 300' for non-urban & 100' for urban areas. Please revise lengths accordingly

TIME OF CONCENTRATION

Falcon Highlands Filing No. 3 - EXISTING CONDITIONS

El Paso County, Colorado

DATE: 3/18/2022
CALCULATED BY: AMC/ARP

PROJECT: 21000656
DESIGN STORM: 5 Year

			INITIAL/OVERLAND TIME (t_i)			TRAVEL TIME (t_t)					t_c CHECK (URBANIZED BASINS)			FINAL t_c
TRIBUTARY BASINS	AREA Ac (2)	C5 (3)	LENGTH Ft (4)	SLOPE % (5)	t_i Min. (6)	LENGTH Ft. (7)	SLOPE % (8)	Conveyance Coefficient	VEL fps (9)	t_t Min. (10)	COMP. t_c (11)	TOTAL LENGTH (12)	(L/180)+10 Min. (13)	Min. (14)
A	3.74	0.09	202	1.00	25.92	910	1.00	15	1.50	10.11	36.03	1112	16.18	16.18
B	38.93	0.09	1256	1.00	64.63	979	1.00	15	1.50	10.88	75.50	2235	22.42	22.42
C	57.81	0.09	1104	2.00	48.20	571	1.00	15	1.50	6.34	54.55	1675	19.31	19.31
D	10.54	0.09	540	1.00	42.38	360	1.00	15	1.50	4.00	46.38	900	15.00	15.00
E	3.14	0.09	90	6.00	9.58	1080	1.00	15	1.50	12.00	21.58	1170	16.50	16.50
F	3.67	0.09	125	3.00	14.19	630	1.60	15	1.90	5.53	19.72	755	14.19	14.19
G	8.84	0.09	200	3.00	17.95	360	1.10	15	1.57	3.81	21.76	560	13.11	13.11
OS-1	6.38	0.27	25	2.00	5.96	650	2.00	20	2.83	3.83	9.79	675	13.75	9.79
OS-2	3.12	0.30	50	2.00	8.13	2180	1.00	20	2.00	18.17	26.29	2230	22.39	22.39
OS-3	1.14	0.90	20	2.00	1.28	1190	2.00	20	2.83	7.01	8.30	1210	16.72	8.30
OS-4	13.09	0.34	80	2.00	9.76	2300	2.00	20	2.83	13.55	23.32	2380	23.22	23.22
OS-5	59.62	0.32	100	2.00	11.23	608	2.00	20	2.83	3.58	14.81	708	13.93	13.93
OS-6	35.75	0.22	100	2.00	12.64	0	0.60	20	1.55	0.00	12.64	100	10.56	10.56
OS-7	6.47	0.22	350	2.00	23.65	300	0.60	15	1.16	4.30	27.95	650	13.61	13.61
OS-8	13.79	0.09	550	2.00	34.02	0	0.60	15	1.16	0.00	34.02	550	13.06	13.06

0.30 per runoff coefficient spreadsheet

5-YEAR RUNOFF CALCULATIONS
Falcon Highlands Filing No. 3 - EXISTING CONDITIONS
El Paso County, Colorado

DATE: 3/18/2022
CALCULATED BY: RDL

PROJECT: 21000656
DESIGN STORM: 5-Year

		FLOW TO INLETS								Minimum	Maximum	Under	INLETS								Carry-Over
Sub-Basin	Design Point	Area (acres)	C	C x A	Tc (min)	Intensity (in/hr)	Qd = CIA (cfs)	Qco (cfs)	Qt (cfs)	Street Slope (%)	Street/Paseo Capacity (cfs)	Capacity?	Inlet	Type	Condition	Slope at Inlet (%)	Inlet Capacity (cfs)	R	Intercepted (cfs)	Carry-Over (cfs)	to Sub-basin/ Design Point (DP)
A	1	3.74	0.09	0.34	16.18	3.41	1.15	0.00	**1.15**	-	-	-	-	-	-	-	-	-	-	-	-
B	2	38.93	0.09	3.50	22.42	2.92	10.22	0.00	**10.22**	-	-	-	-	-	-	-	-	-	-	-	-
C	3	57.81	0.09	5.20	19.31	3.14	16.35	0.00	**16.35**	-	-	-	-	-	-	-	-	-	-	-	-
D	4	10.54	0.09	0.95	15.00	3.52	3.34	0.00	**3.34**	-	-	-	-	-	-	-	-	-	-	-	-
E	5	3.14	0.09	0.28	16.50	3.38	0.95	0.00	**0.95**	-	-	-	-	-	-	-	-	-	-	-	-
F	6	3.67	0.09	0.33	14.19	3.60	1.19	0.00	**1.19**	-	-	-	-	-	-	-	-	-	-	-	-
G	6	8.84	0.09	0.80			6.80	0.00	**6.80**	-	-	-	-	-	-	-	-	-	-	-	-
OS-1	7	6.38	0.27	1.73			10.70	0.00	**10.70**	-	-	-	-	-	-	-	-	-	-	-	-
OS-2	8	3.12	0.30	0.94			7.80	0.00	**7.80**	-	-	-	-	-	-	-	-	-	-	-	-
OS-3	9	1.14	0.90	1.03			3.40	0.00	**3.40**	-	-	-	-	-	-	-	-	-	-	-	-
OS-4	10	13.09	0.34	4.45			12.30	0.00	**12.30**	-	-	-	-	-	-	-	-	-	-	-	-
OS-5	11	59.62	0.32	18.97			80.10	0.00	**80.10**	-	-	-	-	-	-	-	-	-	-	-	-
OS-6	12	35.75	0.22	7.87			31.90	0.00	**31.90**	-	-	-	-	-	-	-	-	-	-	-	-
OS-7	13	6.47	0.22	1.42	13.61	3.67	5.22	0.00	**5.22**	-	-	-	-	-	-	-	-	-	-	-	-
OS-8	4	13.79	0.09	1.24	13.06	3.73	4.63	0.00	**4.63**	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
***DATA IN RED REPRESENTS VALUES PER PREVIOUS DRAINAGE REPORTS FOR SUBDIVISION**

100-YEAR RUNOFF CALCULATIONS
Falcon Highlands Filing No. 3 - EXISTING CONDITIONS
El Paso County, Colorado

DATE: 3/18/2022
CALCULATED BY: RDL

PROJECT: 21000656
DESIGN STORM: 100-Year

		FLOW TO INLETS								Minimum	Maximum	Under	INLETS								Carry-Over
Sub-Basin	Design Point	Area (acres)	C	C x A	Tc (min)	Intensity (in/hr)	Qd = CIA (cfs)	Qco (cfs)	Qt (cfs)	Street Slope (%)	Street/Paseo Capacity (cfs)	Capacity?	Inlet	Type	Condition	Slope at Inlet (%)	Inlet Capacity (cfs)	R	Intercepted (cfs)	Carry-Over (cfs)	to Sub-basin/ Design Point (DP)
A	1	3.74	0.36	1.35	16.18	5.72	7.70	0.00	**7.70**	-	-	-	-	-	-	-	-	-	-	-	-
B	2	38.93	0.36	14.01	22.42	4.90	68.65	0.00	**68.65**	-	-	-	-	-	-	-	-	-	-	-	-
C	3	57.81	0.36	20.81	19.31	5.27	109.77	0.00	**109.77**	-	-	-	-	-	-	-	-	-	-	-	-
D	4	10.54	0.36	3.79	15.00	5.91	22.42	0.00	**22.42**	-	-	-	-	-	-	-	-	-	-	-	-
E	5	3.14	0.36	1.13	16.50	5.67	6.41	0.00	**6.41**	-	-	-	-	-	-	-	-	-	-	-	-
F	6	3.67	0.36	1.32	14.19	6.05	7.99	0.00	**7.99**	-	-	-	-	-	-	-	-	-	-	-	-
G	6	8.84	0.36	3.18			16.00	0.00	**16.00**	-	-	-	-	-	-	-	-	-	-	-	-
OS-1	7	6.38	0.48	3.05			21.70	0.00	**21.70**	-	-	-	-	-	-	-	-	-	-	-	-
OS-2	8	3.12	0.50	1.56			13.60	0.00	**13.60**	-	-	-	-	-	-	-	-	-	-	-	-
OS-3	9	1.14	0.96	1.09			6.00	0.00	**6.00**	-	-	-	-	-	-	-	-	-	-	-	-
OS-4	10	13.09	0.44	5.76			26.30	0.00	**26.30**	-	-	-	-	-	-	-	-	-	-	-	-
OS-5	11	59.62	0.53	31.62			160.70	0.00	**160.70**	-	-	-	-	-	-	-	-	-	-	-	-
OS-6	12	35.75	0.46	16.45			58.40	0.00	**58.40**	-	-	-	-	-	-	-	-	-	-	-	-
OS-7	13	6.47	0.46	2.98	13.61	6.16	18.32	0.00	**18.32**	-	-	-	-	-	-	-	-	-	-	-	-
OS-8	4	13.79	0.36	4.96	13.06	6.26	31.08	0.00	**31.08**	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
***DATA IN RED REPRESENTS VALUES PER PREVIOUS DRAINAGE REPORTS FOR SUBDIVISION**

EXISTING CONDITIONS DRAINAGE BASIN SUMMARY

Basin	Design Point	Area (acres)	C_5	C_{100}	Q_5 (cfs)	Q_{100} (cfs)
A	1	3.74	0.09	0.36	1.15	7.70
B	2	38.93	0.09	0.36	10.22	68.65
C	3	57.81	0.09	0.36	16.35	109.77
D	4	10.54	0.09	0.36	3.34	22.42
E	5	3.14	0.09	0.36	1.12	7.50
F	6	3.67	0.09	0.36	1.19	7.99
G	6	8.84	0.09	0.36	6.80	16.00
OS-1	7	6.38	0.27	0.48	10.70	21.70
OS-2	8	3.12	0.30	0.50	7.80	13.60
OS-3	9	1.14	0.90	0.96	3.40	6.00
OS-4	10	13.09	0.34	0.44	12.30	26.30
OS-5	11	59.62	0.32	0.53	80.10	160.70
OS-6	12	35.75	0.22	0.46	31.90	58.40
OS-7	13	6.47	0.22	0.46	5.22	18.32
OS-8	4	13.79	0.09	0.36	4.63	31.08
TOTAL		**266.0**			**196.2**	**576.1**

Flows
hydrol

Coefficients do not match Coefficient spreadsheet

EXISTING CONDITIONS DESIGN POINT SUMMARY (CUMULATIVE FLOW)

Design Point	Contributing Basins	Q_5 (cfs)	Q_{100} (cfs)
1	A, ~~OS-4~~ DP-10	13.4	34.0
2	B, (DP-11	98.1	242.9
3	C, DP-12 6	51.6	174.2
4	D, DP-13 OS-8	13.2	71.8
5	~~B,~~ E, (DP-2 5	99.2	250.4
6	~~C,~~ ~~D,~~ G, (DP-3 5, DP-4 3	64.8	246.0
7	OS-1	10.7	21.7
8	OS-2	7.8	13.6
9	OS-3	3.4	6.0
10	OS-4	12.3	26.3
11	DP-8 ~~OS-2,~~ OS-5	87.9	174.3
12	DP-9 ~~OS-3,~~ OS-6	35.3	64.4
13	OS-7	5.2	18.3

Missing Basin F

RUNOFF COEFFICIENTS AND IMPERVIOUSNESS
Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS
El Paso County, Colorado
3/23/2022

Basin No	Hydrologic Grouping	Total Area	1/8 Acre or Less 65%			Drive and Walks 100%			Lawns 0%			1/2 Acre 25%			1/4 Acre 40%			Historic Flow Analysis -- Greenbelts, Agriculture 2%			Runoff Coefficient		Imperviousness
		(AC)	C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)	5-Year	100-Year	(%)
B1	A	5.30	0.45	0.59	5.30	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
B2	A	4.06	0.45	0.59	4.06	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
B3	A	4.41	0.45	0.59	4.41	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
B4	A	8.65	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	8.65	0.09	0.36	2.0%
B5	A	1.01	0.45	0.59	1.01	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
B6	A	0.50	0.45	0.59	0.50	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
B7	A	0.90	0.45	0.59	0.90	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
B8	A	1.75	0.45	0.59	1.75	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
B9	A	2.28	0.45	0.59	2.28	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
B10	A	2.07	0.45	0.59	2.07	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
B11	A	0.31	0.45	0.59	0.31	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
B12	A	0.56	0.45	0.59	0.56	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
B13	A	1.18	0.45	0.59	1.18	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
B14	A	0.28	0.45	0.59	0.28	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
B15	A	0.30	0.45	0.59	0.30	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
B16	A	0.28	0.45	0.59	0.28	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
C1	A	9.40	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	5.61	0.30	0.5	0.00	0.09	0.36	3.79	0.17	0.42	15.7%
C2	A	3.67	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	3.67	0.30	0.5	0.00	0.09	0.36	0.00	0.22	0.46	25.0%
C3	A	3.81	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	3.81	0.30	0.5	0.00	0.09	0.36	0.00	0.22	0.46	25.0%
C4	A	1.95	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	1.95	0.30	0.5	0.00	0.09	0.36	0.00	0.22	0.46	25.0%
C5	A	0.41	0.45	0.59	0.00	0.90	0.96	0.41	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.90	0.96	100.0%
C6	A	0.37	0.45	0.59	0.00	0.90	0.96	0.37	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.90	0.96	100.0%
C7	A	2.05	0.45	0.59	2.05	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
C8	A	1.43	0.45	0.59	1.43	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
C9	A	2.96	0.45	0.59	2.96	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
C10	A	1.72	0.45	0.59	0.68	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	1.04	0.23	0.45	26.9%
C11	A	4.21	0.45	0.59	1.56	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	2.65	0.22	0.45	25.3%
C12	A	0.41	0.45	0.59	0.00	0.90	0.96	0.41	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.90	0.96	100.0%
C13	A	5.93	0.45	0.59	3.85	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	2.08	0.32	0.51	42.9%
C14	A	2.96	0.45	0.59	2.96	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
C15	A	1.42	0.45	0.59	1.42	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
C16	A	5.71	0.45	0.59	2.80	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	2.91	0.27	0.47	32.9%
C17	A	2.05	0.45	0.59	0.82	0.90	0.96	1.23	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.72	0.81	86.0%
C18	A	0.76	0.45	0.59	0.00	0.90	0.96	0.76	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.90	0.96	100.0%
C19	A	0.74	0.45	0.59	0.74	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
C20	A	1.51	0.45	0.59	1.51	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
C21	A	3.52	0.45	0.59	3.52	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
C22	A	2.29	0.45	0.59	2.29	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%

D1	A	1.57	0.45	0.59	1.57	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
D2	A	0.13	0.45	0.59	0.13	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
D3	A	1.47	0.45	0.59	1.47	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
D4	A	1.87	0.45	0.59	1.87	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
D5	A	3.90	0.45	0.59	3.90	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
D6	A	1.59	0.45	0.59	0.77	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.82	0.26	0.47	32.5%
OS-5.1	A	0.79	0.45	0.59	0.79	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.45	0.59	65.0%
OS-5.2	A	1.18	0.45	0.59	0.79	0.90	0.96	0.39	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.60	0.71	76.6%
OS-5.3	A	0.61	0.45	0.59	0.41	0.90	0.96	0.20	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.60	0.71	76.5%
A	A	3.74	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	3.74	0.09	0.36	2.0%
E	A	1.77	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	1.77	0.09	0.36	2.0%
F	A	6.06	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	6.91	0.10	0.41	2.3%
G	A	8.84	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	8.84	0.09	0.36	2.0%
OS-1	A	6.38	0.45	0.59	1.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	3.77	0.09	0.36	1.61	0.27	0.48	34.3%
OS-2	A	3.12	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	3.12	0.09	0.36	0.00	0.30	0.50	40.0%
OS-3	A	1.14	0.45	0.59	0.00	0.90	0.96	1.14	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.90	0.96	100.0%
OS-4	A	13.09	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	7.50	0.09	0.36	5.59	0.21	0.44	23.8%
OS-5	A	59.62	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	59.62	0.09	0.36	0.00	0.30	0.50	40.0%
OS-6	A	35.75	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	35.75	0.30	0.5	0.00	0.09	0.36	0.00	0.22	0.46	25.0%
OS-7	A	6.47	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	6.47	0.30	0.5	0.00	0.09	0.36	0.00	0.22	0.46	25.0%
OS-8	A	13.79	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0	0.30	0.5	0.00	0.09	0.36	13.79	0.09	0.36	2.0%
TOTAL		**266.0**			**66.5**			**4.9**			**0.0**			**57.3**			**74.0**			**64.2**			**35.1%**

0.34

Move to previous sheet or add column labels to this sheet.

Per Colorado Springs DCM Ch 6 Section 3.2.1, Overland flow should not exceed 300' for non-urban & 100' for urban areas. Please revise lengths accordingly

TIME OF CONCENTRATION

Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS

El Paso County, Colorado

DATE: 3/23/2022
CALCULATED BY: SLP

PROJECT: 21005234
DESIGN STORM: 5 Year

			INITIAL/OVERLAND TIME (t_i)			TRAVEL TIME (t_t)					t_c CHECK (URBANIZED BASINS)			FINAL t_c
TRIBUTARY BASINS	AREA Ac (2)	C5 (3)	LENGTH Ft (4)	SLOPE % (5)	t_i Min. (6)	LENGTH Ft. (7)	SLOPE % (8)	Conveyance Coefficient	VEL fps (9)	t_t Min. (10)	COMP. t_c (11)	TOTAL LENGTH (12)	(L/180)+10 Min. (13)	Min. (14)
B1	5.30	0.45	300	1.70	17.06	1020	1.00	20	2.00	8.50	25.56	1320	17.33	17.33
B2	4.06	0.45	151	1.75	11.99	790	1.00	20	2.00	6.58	18.57	941	15.23	15.23
B3	4.41	0.45	151	1.30	13.23	790	1.00	20	2.00	6.58	19.81	941	15.23	15.23
B4	8.65	0.09	300	1.10	30.61	830	1.00	20	2.00	6.92	37.53	1130	16.28	16.28
B5	1.01	0.45	110	0.00	0.00	586	1.00	20	2.00	4.88	4.88	696	13.87	5.00
B6	0.50	0.45	138	1.00	13.79	56	1.00	20	2.00	0.47	14.25	194	11.08	11.08
B7	0.90	0.45	153	0.00	0.00	269	1.00	20	2.00	2.24	2.24	422	12.34	5.00
B8	1.75	0.45	149	1.00	14.33	412	1.00	20	2.00	3.43	17.76	561	13.12	13.12
B9	2.28	0.45	283	1.10	19.13	334	1.00	20	2.00	2.78	21.91	617	13.43	13.43
B10	2.07	0.45	300	2.20	15.67	235	1.00	20	2.00	1.96	17.63	535	12.97	12.97
B11	0.31	0.45	66	2.50	7.05	163	0.00	20	0.00	0.00	7.05	229	11.27	7.05
B12	0.56	0.45	120	2.50	9.50	138	1.00	20	2.00	1.15	10.65	258	11.43	10.65
B13	1.18	0.45	118	2.50	9.42	122	1.00	20	2.00	1.02	10.44	240	11.33	10.44
B14	0.28	0.45	110	2.50	9.10	0	0.00	20	0.00	0.00	9.10	110	10.61	9.10
B15	0.30	0.45	143	1.20	13.21	0	0.00	20	0.00	0.00	13.21	143	10.79	10.79
B16	0.28	0.45	144	1.20	13.26	0	0.00	20	0.00	0.00	13.26	144	10.80	10.80
C1	9.40	0.17	300	1.90	23.59	887	1.00	20	2.00	7.39	30.98	1187	16.59	16.59
C2	3.67	0.22	300	1.30	25.24	247	1.00	20	2.00	2.06	27.30	547	13.04	13.04
C3	3.81	0.22	300	0.90	28.49	387	1.20	20	2.19	2.94	31.44	687	13.82	13.82
C4	1.95	0.22	295	1.70	22.91	64	1.00	20	2.00	0.53	23.44	359	11.99	11.99
C5	0.41	0.90	0	0.00	0.00	625	1.00	20	2.00	5.21	5.21	625	13.47	5.21
C6	0.37	0.90	0	0.00	0.00	355	1.00	20	2.00	2.96	2.96	355	11.97	5.00
C7	2.05	0.45	220	2.70	12.54	475	1.00	20	2.00	3.96	16.50	695	13.86	13.86
C8	1.43	0.45	112	2.50	9.18	417	1.00	20	2.00	3.48	12.65	529	12.94	12.65
C9	2.96	0.45	215	2.50	12.72	173	1.00	20	2.00	1.44	14.16	388	12.16	12.16
C10	1.72	0.23	177	2.50	15.40	386	1.00	20	2.00	3.22	18.62	563	13.13	13.13
C11	4.21	0.22	0	0.00	0.00	472	1.00	20	2.00	3.93	3.93	472	12.62	5.00
C12	0.41	0.90	171	3.00	3.29	0	0.00	20	0.00	0.00	3.29	171	10.95	5.00
C13	5.93	0.32	167	2.50	13.39	477	1.00	20	2.00	3.98	17.36	644	13.58	13.58
C14	2.96	0.45	135	2.40	10.21	558	1.00	20	2.00	4.65	14.86	693	13.85	13.85
C15	1.42	0.45	76	2.40	7.66	1083	1.00	20	2.00	9.03	16.69	1159	16.44	16.44
C16	5.71	0.27	240	2.50	17.23	0	0.00	20	0.00	0.00	17.23	240	11.33	11.33
C17	2.05	0.72	0	0.00	0.00	981	1.00	20	2.00	8.18	8.18	981	15.45	8.18
C18	0.76	0.90	0	0.00	0.00	818	0.90	20	1.90	7.19	7.19	818	14.54	7.19
C19	0.74	0.45	188	2.50	11.89	208	1.00	20	2.00	1.73	13.63	396	12.20	12.20
C20	1.51	0.45	0	0.00	0.00	1013	1.10	15	1.57	10.73	10.73	1013	15.63	10.73
C21	3.52	0.45	300	1.50	17.78	279	1.00	20	2.00	2.33	20.11	579	13.22	13.22
C22	2.29	0.45	300	1.40	18.19	190	1.00	20	2.00	1.58	19.77	490	12.72	12.72
D1	1.57	0.45	164	2.40	11.26	322	1.50	20	2.45	2.19	13.45	486	12.70	12.70
D2	0.13	0.45	0	0.00	0.00	197	1.00	20	2.00	1.64	1.64	197	11.09	5.00
D3	1.47	0.45	260	0.90	19.59	86	1.30	20	2.28	0.63	20.22	346	11.92	11.92
D4	1.87	0.45	296	2.50	14.92	263	1.10	20	2.10	2.09	17.01	559	13.11	13.11
D5	3.90	0.45	194	2.50	12.08	650	1.75	15	1.98	5.46	17.54	844	14.69	14.69
D6	1.59	0.26	300	4.10	16.40	54	0.00	20	0.00	0.00	16.40	354	11.97	11.97
OS-5.1	0.79	0.45	78	2.00	8.25	118	1.00	20	2.00	0.98	9.23	196	11.09	9.23
OS-5.2	1.18	0.60	76	2.00	6.28	189	1.00	15	1.50	2.10	8.38	265	11.47	8.38
OS-5.3	0.61	0.60	74	2.00	6.21	64	1.00	20	2.00	0.53	6.74	138	10.77	6.74
A	3.74	0.09	202	1.00	25.92	910	1.00	15	1.50	10.11	36.03	1112	16.18	16.18
E	1.77	0.09	149	0.20	37.86	0	0.00	20	0.00	0.00	37.86	149	10.83	10.83
F	6.06	0.10	300	1.10	30.23	235	1.10	20	2.10	1.87	32.09	535	12.97	12.97
G	8.84	0.09	300	1.40	28.27	239	1.40	20	2.37	1.68	29.95	539	12.99	12.99
OS-1	6.38	0.27	25	2.00	5.96	650	2.00	20	2.83	3.83	9.79	675	13.75	9.79
OS-2	3.12	0.30	50	2.00	8.13	2180	1.00	20	2.00	18.17	26.29	2230	22.39	22.39
OS-3	1.14	0.90	20	2.00	1.28	1190	2.00	20	2.83	7.01	8.30	1210	16.72	8.30
OS-4	13.09	0.21	80	2.00	11.43	2300	2.00	20	2.83	13.55	24.98	2380	23.22	23.22
OS-5	59.62	0.30	100	2.00	11.49	608	2.00	20	2.83	3.58	15.07	708	13.93	13.93
OS-6	35.75	0.22	100	2.00	12.64	0	0.60	20	1.55	0.00	12.64	100	10.56	10.56
OS-7	6.47	0.22	350	2.00	23.65	300	0.60	20	1.55	3.23	26.87	650	13.61	13.61
OS-8	13.79	0.09	550	2.00	34.02	0	0.60	20	1.55	0.00	34.02	550	13.06	13.06

5-YEAR RUNOFF CALCULATIONS
Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS
El Paso County, Colorado

Not all inlets are sumps. Please verify and design at-grade inlets with appropriate equations.

DATE: 3/23/2022
CALCULATED BY: SLP

PROJECT: 21005234
DESIGN STORM: 5 Year

		FLOW TO INLETS								Minimum	Maximum	Under	INLETS								Carry-Over
Sub-Basin	Design Point	Area (acres)	C	C x A	Tc (min)	Intensity (in/hr)	Qd = CIA (cfs)	Qco (cfs)	Qt (cfs)	Street Slope (%)	Street/Paseo Capacity (cfs)	Capacity?	Inlet	Type	Condition	Slope at Inlet (%)	Inlet Capacity (cfs)	R	Intercepted (cfs)	Carry-Over (cfs)	to Sub-basin/ Design Point (DP)
B1	2.1	5.30	0.45	2.39	17.33	3.30	7.88	0.00	**7.88**	1.02	8.20	Y	10'	CDOT TYPE R	SUMP	-	16.50	-	7.88	0.00	2.4
B2	2.2	4.06	0.45	1.83	15.23	3.50	6.39	0.00	**6.39**	1.02	8.20	Y	10'	CDOT TYPE R	SUMP	-	16.50	-	6.39	0.00	2.3
B3	2.3	4.41	0.45	1.98	15.23	3.50	6.94	0.00	**6.94**	1.02	8.20	Y	10'	CDOT TYPE R	SUMP	-	16.50	-	6.94	0.00	2.1
B4	2.4	8.65	0.09	0.78	16.28	3.40	2.65	0.00	**2.65**	1.00	8.20	-	-	-	-	-	-	-	-	-	-
B5	2.5	1.01	0.45	0.45	5.00	5.17	2.35	0.00	**2.35**	1.10	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	2.35	0.00	2.4
B6	2.6	0.50	0.45	0.23	11.08	3.98	0.89	0.00	**0.89**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP		10.43		0.89	0.00	2.10
B7	2.7	0.90	0.45	0.41	5.00	5.17	2.09	0.00	**2.09**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	2.09	0.00	2.6
B8	2.8	1.75	0.45	0.79	13.12	3.72	2.93	0.00	**2.93**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	2.93	0.00	2.7
B9	2.9	2.28	0.45	1.03	13.43	3.69	3.78	0.00	**3.78**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	3.78	0.00	2.10
B10	2.10	2.07	0.45	0.93	12.97	3.74	3.48	0.00	**3.48**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	3.48	0.00	2.4
B11	2.11	0.31	0.45	0.14	7.05	4.65	0.65	0.00	**0.65**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	0.65	0.00	2.10
B12	2.12	0.56	0.45	0.25	16.59	3.37	0.85	0.00	**0.85**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	0.85	0.00	2.11
B13	2.13	1.18	0.45	0.53	13.04	3.73	1.98	0.00	**1.98**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	1.98	0.00	2.12
B14	2.14	0.28	0.45	0.13	13.82	3.64	0.46	0.00	**0.46**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	0.46	0.00	2.15
B15	2.15	0.30	0.45	0.14	11.99	3.86	0.52	0.00	**0.52**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	0.52	0.00	2.16
B16	2.16	0.28	0.45	0.13	5.21	5.11	0.64	0.00	**0.64**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	0.64	0.00	2.10
C1	3.1	9.40	0.17	1.58	16.59	3.37	5.31	0.00	**5.31**	1.00	8.20	Y	10'	CDOT TYPE R	SUMP	-	16.50	-	5.31	0.00	3.3
C2	3.2	3.67	0.22	0.81	13.04	3.73	3.01	0.00	**3.01**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	3.01	0.00	3.4
C3	3.3	3.81	0.22	0.84	13.82	3.64	3.05	0.00	**3.05**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	3.05	0.00	3.7
C4	3.4	1.95	0.22	0.43	11.99	3.86	1.65	0.00	**1.65**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	1.65	0.00	3.7
C5	3.5	0.41	0.90	0.37	5.21	5.11	1.88	0.00	**1.88**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	1.88	0.00	3.7
C6	3.6	0.37	0.90	0.33	5.00	5.17	1.72	0.00	**1.72**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	1.72	0.00	3.8
C7	3.7	2.05	0.45	0.92	13.86	3.64	3.36	0.00	**3.36**	1.29	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	3.36	0.00	3.9
C8	3.8	1.43	0.45	0.64	12.65	3.78	2.43	0.00	**2.43**	1.08	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	2.43	0.00	3.12
1.29	3.9	2.96	0.45	1.33	12.16	3.84	5.11	0.00	**5.11**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	5.11	0.00	3.13
C10	3.10	1.72	0.23	0.40	13.13	3.72	1.49	0.00	**1.49**	1.17	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	1.49	0.00	3.12
C11	3.11	4.21	0.22	0.94	5.00	5.17	4.86	0.00	**4.86**	1.00	8.20	Y	10'	CDOT TYPE R	SUMP	-	16.50	-	4.86	0.00	3.13
C12	3.12	0.41	0.90	0.37	5.00	5.17	1.91	0.00	**1.91**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	1.91	0.00	3.13
C13	3.13	5.93	0.32	1.92	13.58	3.67	7.05	0.00	**7.05**	1.17	8.20	-	-	-	-	-	-	-	-	-	-
C14	3.14	2.96	0.45	1.33	13.85	3.64	4.85	0.00	**4.85**	1.29	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	4.85	0.00	3.15
C15	3.15	1.42	0.45	0.64	16.44	3.38	2.16	0.00	**2.16**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	2.16	0.00	3.13
C16	3.16	5.71	0.27	1.52	11.33	3.94	6.00	0.00	**6.00**	1.00	8.20	Y	10'	CDOT TYPE R	SUMP	-	16.50	-	6.00	0.00	3.13
C17	3.17	2.05	0.72	1.48	8.18	4.43	6.54	0.00	**6.54**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	6.54	0.00	3.19
C18	3.18	0.76	0.90	0.68	7.19	4.62	3.16	0.00	**3.16**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	3.16	0.00	3.20
C19	3.19	0.74	0.45	0.33	12.20	3.83	1.28	0.00	**1.28**	1.34	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	1.28	0.00	3.21
C20	3.20	1.51	0.45	0.68	10.73	4.02	2.73	0.00	**2.73**	1.34	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	2.73	0.00	3.21
C21	3.21	3.52	0.45	1.58	13.22	3.71	5.88	0.00	**5.88**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	5.88	0.00	3.13
C22	3.22	2.29	0.45	1.03	12.72	3.77	3.88	0.00	**3.88**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	3.88	0.00	3.13

C-9

Drainage map does not show inlet.

5-YEAR RUNOFF CALCULATIONS

Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS

El Paso County, Colorado

DATE: 3/23/2022
CALCULATED BY: SLP

PROJECT: 21005234
DESIGN STORM: 5 Year

		FLOW TO INLETS								Minimum	Maximum	Under	INLETS								Carry-Over
Sub-Basin	Design Point	Area (acres)	C	C x A	Tc (min)	Intensity (in/hr)	Qd = CIA (cfs)	Qco (cfs)	Qt (cfs)	Street Slope (%)	Street/Paseo Capacity (cfs)	Capacity?	Inlet	Type	Condition	Slope at Inlet (%)	Inlet Capacity (cfs)	R	Intercepted (cfs)	Carry-Over (cfs)	to Sub-basin/ Design Point (DP)
D1	4.1	1.57	0.45	0.71	12.70	3.77	2.66	0.00	**2.66**	1.30	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	2.66	0.00	4.4
D2	4.2	0.13	0.45	0.06	5.00	5.17	0.30	0.00	**0.30**	1.14	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	0.30	0.00	4.5
D3	4.3	1.47	0.45	0.66	11.92	3.87	2.56	0.00	**2.56**	0.87	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	2.56	0.00	4.6
D4	4.4	1.87	0.45	0.84	13.11	3.72	3.13	0.00	**3.13**	1.69	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	3.13	0.00	4.5
D5	4.5	3.90	0.45	1.76	14.69	3.55	6.23	0.00	**6.23**	1.39	8.20	Y	10'	CDOT TYPE R	SUMP	-	16.50	-	6.23	0.00	4.6
D6	4.6	1.59	0.26	0.42	11.97	3.86	1.62	0.00	**1.62**	1.00	8.20	Y	5'	CDOT TYPE R	SUMP	-	10.43	-	1.62	0.00	-
OS-5.1	OS.2	0.79	0.45	0.35	9.23	4.25	1.50	0.00	**1.50**	-	-	-	-	-	-	-	-	-	-	-	-
OS-5.2	OS.3	1.18	0.60	0.71	8.38	4.39	3.10	0.00	**3.10**	-	-	-	-	-	-	-	-	-	-	-	-
OS-5.3	OS.4	0.61	0.60	0.36	6.74	4.72	1.72	0.00	**1.72**	-	-	-	-	-	-	-	-	-	-	-	-
A	1	3.74	0.09	0.34	16.18	3.41	1.15	0.00	**1.15**												
E	5	1.77	0.09	0.16	10.83	4.01	0.64	0.00	**0.64**	-	-	-	-	-	-	-	-	-	-	-	-
F	6	6.06	0.10	0.62	12.97	3.74	2.33	0.00	**2.33**	-	-	-	-	-	-	-	-	-	-	-	-
G	6	8.84	0.09	0.80			6.80	0.00	**6.80**	-	-	-	-	-	-	-	-	-	-	-	-
OS-1	7	6.38	0.27	1.73			10.70	0.00	**10.70**	-	-	-	-	-	-	-	-	-	-	-	-
OS-2	8	3.12	0.30	0.94			7.80	0.00	**7.80**	-	-	-	-	-	-	-	-	-	-	-	-
OS-3	9	1.14	0.90	1.03			3.40	0.00	**3.40**	-	-	-	-	-	-	-	-	-	-	-	-
OS-4	10	13.09	0.21	2.75			12.30	0.00	**12.30**	-	-	-	-	-	-	-	-	-	-	-	-
OS-5	11	59.62	0.30	17.89			80.10	0.00	**80.10**	-	-	-	-	-	-	-	-	-	-	-	-
OS-6	12	35.75	0.22	7.87			31.90	0.00	**31.90**	-	-	-	-	-	-	-	-	-	-	-	-
OS-7	13	6.47	0.22	1.42	13.61	3.67	5.22	0.00	**5.22**	-	-	-	-	-	-	-	-	-	-	-	-
OS-8	4	13.79	0.09	1.24	13.06	3.73	4.63	0.00	**4.63**	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

***DATA IN RED REPRESENTS VALUES PER PREVIOUS DRAINAGE REPORTS FOR FILING NOS. 1 AND 2**

Relabel as OS.1, OS.2 & OS.3

100-YEAR RUNOFF CALCULATIONS
Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS
El Paso County, Colorado

DATE: 3/23/2022
CALCULATED BY: SLP

PROJECT: 21005234
DESIGN STORM: 100-Year

		FLOW TO INLETS								Minimum	Maximum	Under	INLETS								Carry-Over
Sub-Basin	Design Point	Area (acres)	C	C x A	Tc (min)	Intensity (in/hr)	Qd = CIA (cfs)	Qco (cfs)	Qt (cfs)	Street Slope (%)	Street/Paseo Capacity (cfs)	Capacity?	Inlet	Type	Condition	Slope at Inlet (%)	Inlet Capacity (cfs)	R	Intercepted (cfs)	Carry-Over (cfs)	to Sub-basin/ Design Point (DP)
B1	2.1	5.30	0.59	3.13	17.33	5.55	17.34	0.00	**17.34**	1.02	36.50	Y	10'	CDOT TYPE R	SUMP	-	23.26	-	17.34	0.00	2.4
B2	2.2	4.06	0.59	2.40	15.23	5.87	14.07	0.00	**14.07**	1.02	36.50	Y	10'	CDOT TYPE R	SUMP	-	23.26	-	14.07	0.00	2.3
B3	2.3	4.41	0.59	2.60	15.23	5.87	15.28	0.00	**15.28**	1.02	36.50	Y	10'	CDOT TYPE R	SUMP	-	23.26	-	15.28	0.00	2.1
B4	2.4	8.65	0.36	3.11	16.28	5.70	17.76	0.00	**17.76**	1.00	36.50	-	-	-	-	-	-	-	-	-	-
B5	2.5	1.01	0.59	0.60	5.00	8.68	5.17	0.00	**5.17**	1.10	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	5.17	0.00	2.4
B6	2.6	0.50	0.59	0.30	11.08	6.67	1.97	0.00	**1.97**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	1.97	0.00	2.10
B7	2.7	0.90	0.59	0.53	5.00	8.68	4.61	0.00	**4.61**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	4.61	0.00	2.6
B8	2.8	1.75	0.59	1.03	13.12	6.25	6.45	0.00	**6.45**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	6.45	0.00	2.7
B9	2.9	2.28	0.59	1.35	13.43	6.19	8.33	0.00	**8.33**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	8.33	0.00	2.10
B10	2.10	2.07	0.59	1.22	12.97	6.28	7.67	0.00	**7.67**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	7.67	0.00	2.4
B11	2.11	0.31	0.59	0.18	7.05	7.81	1.43	0.00	**1.43**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	1.43	0.00	2.10
B12	2.12	0.56	0.59	0.33	16.59	5.66	1.87	0.00	**1.87**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	1.87	0.00	2.11
B13	2.13	1.18	0.59	0.70	13.04	6.26	4.36	0.00	**4.36**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	4.36	0.00	2.12
B14	2.14	0.28	0.59	0.17	13.82	6.12	1.01	0.00	**1.01**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	1.01	0.00	2.15
B15	2.15	0.30	0.59	0.18	11.99	6.47	1.15	0.00	**1.15**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	1.15	0.00	2.16
B16	2.16	0.28	0.59	0.17	5.21	8.58	1.42	0.00	**1.42**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	1.42	0.00	2.10
C1	3.1	9.40	0.42	3.95	16.59	5.66	22.31	0.00	**22.31**	1.00	36.50	Y	10'	CDOT TYPE R	SUMP	-	23.26	-	22.31	0.00	3.3
C2	3.2	3.67	0.46	1.69	13.04	6.26	10.57	0.00	**10.57**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	10.57	0.00	3.4
C3	3.3	3.81	0.46	1.75	13.82	6.12	10.72	0.00	**10.72**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	10.72	0.00	3.7
C4	3.4	1.95	0.46	0.90	11.99	6.47	5.81	0.00	**5.81**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	5.81	0.00	3.7
C5	3.5	0.41	0.96	0.39	5.21	8.58	3.38	0.00	**3.38**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	3.38	0.00	3.7
C6	3.6	0.37	0.96	0.36	5.00	8.68	3.08	0.00	**3.08**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	3.08	0.00	3.8
C7	3.7	2.05	0.59	1.21	13.86	6.11	7.39	0.00	**7.39**	1.29	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	7.39	0.00	3.9
C8	3.8	1.43	0.59	0.84	12.65	6.34	5.35	0.00	**5.35**	1.08	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	5.35	0.00	3.12
C9	3.9	2.96	0.59	1.75	12.16	6.44	11.25	0.00	**11.25**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	11.25	0.00	3.13
C10	3.10	1.72	0.45	0.78	13.13	6.25	4.84	0.00	**4.84**	1.17	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	4.84	0.00	3.12
C11	3.11	4.21	0.45	1.87	5.00	8.68	16.27	0.00	**16.27**	1.00	36.50	Y	10'	CDOT TYPE R	SUMP	-	23.26	-	16.27	0.00	3.13
C12	3.12	0.41	0.96	0.39	5.00	8.68	3.42	0.00	**3.42**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	3.42	0.00	3.13
C13	3.13	5.93	0.51	3.02	13.58	6.16	18.61	0.00	**18.61**	1.17	36.50	-	-	-	-	-	-	-	-	-	-
C14	3.14	2.96	0.59	1.75	13.85	6.11	10.67	0.00	**10.67**	1.29	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	10.67	0.00	3.15
C15	3.15	1.42	0.59	0.84	16.44	5.68	4.76	0.00	**4.76**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	4.76	0.00	3.13
C16	3.16	5.71	0.47	2.70	11.33	6.62	17.86	0.00	**17.86**	1.00	36.50	Y	10'	CDOT TYPE R	SUMP	-	23.26	-	17.86	0.00	3.13
C17	3.17	2.05	0.81	1.66	8.18	7.44	12.39	0.00	**12.39**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	12.39	0.00	3.19
C18	3.18	0.76	0.96	0.73	7.19	7.77	5.67	0.00	**5.67**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	5.67	0.00	3.20
C19	3.19	0.74	0.59	0.44	12.20	6.43	2.81	0.00	**2.81**	1.34	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	2.81	0.00	3.21
C20	3.20	1.51	0.59	0.89	10.73	6.75	6.02	0.00	**6.02**	1.34	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	6.02	0.00	3.21
C21	3.21	3.52	0.59	2.08	13.22	6.23	12.94	0.00	**12.94**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	12.94	0.00	3.13
C22	3.22	2.29	0.59	1.35	12.72	6.33	8.55	0.00	**8.55**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	8.55	0.00	3.13

Refer to comments on 5-year runoff spreadsheet

Need spreadsheet/table showing how basins are combined at design points.

Include summary table for basins & design points, as provided under existing conditions

100-YEAR RUNOFF CALCULATIONS
Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS
El Paso County, Colorado

DATE: 3/23/2022
CALCULATED BY: SLP

PROJECT: 21005234
DESIGN STORM: 100-Year

		FLOW TO INLETS								Minimum	Maximum	Under	INLETS								Carry-Over
Sub-Basin	Design Point	Area (acres)	C	C x A	Tc (min)	Intensity (in/hr)	Qd = CIA (cfs)	Qco (cfs)	Qt (cfs)	Street Slope (%)	Street/Paseo Capacity (cfs)	Capacity?	Inlet	Type	Condition	Slope at Inlet (%)	Inlet Capacity (cfs)	R	Intercepted (cfs)	Carry-Over (cfs)	to Sub-basin/ Design Point (DP)
D1	4.1	1.57	0.59	0.93	12.70	6.33	5.86	0.00	**5.86**	1.30	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	5.86	0.00	4.4
D2	4.2	0.13	0.59	0.08	5.00	8.68	0.67	0.00	**0.67**	1.14	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	0.67	0.00	4.5
D3	4.3	1.47	0.59	0.87	11.92	6.49	5.63	0.00	**5.63**	0.87	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	5.63	0.00	4.6
D4	4.4	1.87	0.59	1.10	13.11	6.25	6.90	0.00	**6.90**	1.69	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	6.90	0.00	4.5
D5	4.5	3.90	0.59	2.30	14.69	5.96	13.72	0.00	**13.72**	1.39	36.50	Y	10'	CDOT TYPE R	SUMP	-	23.26	-	13.72	0.00	4.6
D6	4.6	1.59	0.47	0.75	11.97	6.48	4.86	0.00	**4.86**	1.00	36.50	Y	5'	CDOT TYPE R	SUMP	-	14.71	-	4.86	0.00	-
OS-5.1	OS.2	0.79	0.59	0.46	9.23	7.13	3.31	0.00	**3.31**	-	-	-	-	-	-	-	-	-	-	-	-
OS-5.2	OS.3	1.18	0.71	0.84	8.38	7.38	6.20	0.00	**6.20**	-	-	-	-	-	-	-	-	-	-	-	-
OS-5.3	OS.4	0.61	0.71	0.43	6.74	7.93	3.44	0.00	**3.44**	-	-	-	-	-	-	-	-	-	-	-	-
A	OS.5	3.74	0.36	1.35	16.18	5.72	7.70	0.00	**7.70**	-	-	-	-	-	-	-	-	-	-	-	-
E	5.1	1.77	0.36	0.64	10.83	6.73	4.29	0.00	**4.29**	-	-	-	-	-	-	-	-	-	-	-	-
F	6.1	6.06	0.41	2.49	12.97	6.28	15.61	0.00	**15.61**	-	-	-	-	-	-	-	-	-	-	-	-
G	7.1	8.84	0.36	3.18			16.00	0.00	**16.00**	-	-	-	-	-	-	-	-	-	-	-	-
OS-1	7.2	6.38	0.48	3.05			21.70	0.00	**21.70**	-	-	-	-	-	-	-	-	-	-	-	-
OS-2	7.3	3.12	0.50	1.56			13.60	0.00	**13.60**	-	-	-	-	-	-	-	-	-	-	-	-
OS-3	7.4	1.14	0.96	1.09			6.00	0.00	**6.00**	-	-	-	-	-	-	-	-	-	-	-	-
OS-4	7.5	13.09	0.44	5.76			26.30	0.00	**26.30**	-	-	-	-	-	-	-	-	-	-	-	-
OS-5	7.6	59.62	0.50	29.81			160.70	0.00	**160.70**	-	-	-	-	-	-	-	-	-	-	-	-
OS-6	7.7	35.75	0.46	16.45			58.40	0.00	**58.40**	-	-	-	-	-	-	-	-	-	-	-	-
OS-7	7.8	6.47	0.46	2.98	13.61	6.16	18.32	0.00	**18.32**	-	-	-	-	-	-	-	-	-	-	-	-
OS-8	7.9	13.79	0.36	4.96	13.06	6.26	31.08	0.00	**31.08**	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
***DATA IN RED REPRESENTS VALUES PER PREVIOUS DRAINAGE REPORTS FOR FILING NOS. 1 AND 2**

Not all inlets are sumps. Please update to at-grade inlets where needed. Also provide street capacity analysis. Recommend using MHFD inlet spreadsheets, as they would provide this with inlet calculations. If spreadsheet is not used, provide separate analysis for street capacity. Also need to determine location of any cross pans.

DESIGN POINT 2.1

Q_5	=	7.9	cfs
Q_{100}	=	17.3	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

3, for all inlets

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	9.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	10	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	8	LF CO SPGS D-10-R

DESIGN POINT 2.2

Q_5	=	6.4	cfs
Q_{100}	=	14.1	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	6.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	10	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	8	LF CO SPGS D-10-R

DESIGN POINT 2.3

Q_5 = 6.9 cfs

Q_{100} = 15.3 cfs

$d_{max,5}$ = 0.50 ft

$d_{max,100}$ = 0.67 ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W = 2 ft

a = 4 inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR) = 4.0 LF INLET REQUIRED

MAJOR STORM EVENT (100-YR) = 7.0 LF INLET REQUIRED

PROPOSED INLET SIZE = 10 LF CDOT TYPE R CURB INLET

-OR-

PROPOSED INLET SIZE = 12 LF CO SPGS D-10-R

DESIGN POINT 2.5

Q_5 = 2.4 cfs

Q_{100} = 5.2 cfs

$d_{max,5}$ = 0.50 ft

$d_{max,100}$ = 0.67 ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W = 2 ft

a = 4 inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR) = 4.0 LF INLET REQUIRED

MAJOR STORM EVENT (100-YR) = 4.0 LF INLET REQUIRED

PROPOSED INLET SIZE = 5 LF CDOT TYPE R CURB INLET

-OR-

PROPOSED INLET SIZE = 4 LF CO SPGS D-10-R

DESIGN POINT 2.6

Q_5 = 0.9 cfs

Q_{100} = 2.0 cfs

$d_{max,5}$ = 0.50 ft

$d_{max,100}$ = 0.67 ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W = 2 ft

a = 4 inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR) = 4.0 LF INLET REQUIRED

MAJOR STORM EVENT (100-YR) = 4.0 LF INLET REQUIRED

PROPOSED INLET SIZE = 5 LF CDOT TYPE R CURB INLET

-OR-

PROPOSED INLET SIZE = 4 LF CO SPGS D-10-R

DESIGN POINT 2.7

Q_5 = 2.1 cfs

Q_{100} = 4.6 cfs

$d_{max,5}$ = 0.50 ft

$d_{max,100}$ = 0.67 ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W = 2 ft

a = 4 inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR) = 4.0 LF INLET REQUIRED

MAJOR STORM EVENT (100-YR) = 4.0 LF INLET REQUIRED

PROPOSED INLET SIZE = 5 LF CDOT TYPE R CURB INLET

-OR-

PROPOSED INLET SIZE = 4 LF CO SPGS D-10-R

DESIGN POINT 2.8

Q_5 = 2.9 cfs

Q_{100} = 6.5 cfs

$d_{max,5}$ = 0.50 ft

$d_{max,100}$ = 0.67 ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W = 2 ft

a = 4 inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR) = 4.0 LF INLET REQUIRED

MAJOR STORM EVENT (100-YR) = 4.0 LF INLET REQUIRED

PROPOSED INLET SIZE = 5 LF CDOT TYPE R CURB INLET

-OR-

PROPOSED INLET SIZE = 4 LF CO SPGS D-10-R

DESIGN POINT 2.9

Q_5 = 3.8 cfs

Q_{100} = 8.3 cfs

$d_{max,5}$ = 0.50 ft

$d_{max,100}$ = 0.67 ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W = 2 ft

a = 4 inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR) = 4.0 LF INLET REQUIRED

MAJOR STORM EVENT (100-YR) = 4.0 LF INLET REQUIRED

PROPOSED INLET SIZE = 5 LF CDOT TYPE R CURB INLET

-OR-

PROPOSED INLET SIZE = 4 LF CO SPGS D-10-R

DESIGN POINT 2.10

Q_5 = 3.5 cfs

Q_{100} = 7.7 cfs

$d_{max,5}$ = 0.50 ft

$d_{max,100}$ = 0.67 ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W = 2 ft

a = 4 inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR) = 4.0 LF INLET REQUIRED

MAJOR STORM EVENT (100-YR) = 4.0 LF INLET REQUIRED

PROPOSED INLET SIZE = 5 LF CDOT TYPE R CURB INLET

-OR-

PROPOSED INLET SIZE = 4 LF CO SPGS D-10-R

DESIGN POINT 2.11

Q_5 = 0.7 cfs

Q_{100} = 1.4 cfs

$d_{max,5}$ = 0.50 ft

$d_{max,100}$ = 0.67 ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W = 2 ft

a = 4 inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR) = 4.0 LF INLET REQUIRED

MAJOR STORM EVENT (100-YR) = 4.0 LF INLET REQUIRED

PROPOSED INLET SIZE = 5 LF CDOT TYPE R CURB INLET

-OR-

PROPOSED INLET SIZE = 4 LF CO SPGS D-10-R

DESIGN POINT 2.12

Q_5 = 0.9 cfs

Q_{100} = 1.9 cfs

$d_{max,5}$ = 0.50 ft

$d_{max,100}$ = 0.67 ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W = 2 ft

a = 4 inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR) = 4.0 LF INLET REQUIRED

MAJOR STORM EVENT (100-YR) = 4.0 LF INLET REQUIRED

PROPOSED INLET SIZE = 5 LF CDOT TYPE R CURB INLET

-OR-

PROPOSED INLET SIZE = 4 LF CO SPGS D-10-R

DESIGN POINT 2.13

Q_5 = 2.0 cfs

Q_{100} = 4.4 cfs

$d_{max,5}$ = 0.50 ft

$d_{max,100}$ = 0.67 ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W = 2 ft

a = 4 inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR) = 4.0 LF INLET REQUIRED

MAJOR STORM EVENT (100-YR) = 4.0 LF INLET REQUIRED

PROPOSED INLET SIZE = 5 LF CDOT TYPE R CURB INLET

-OR-

PROPOSED INLET SIZE = 4 LF CO SPGS D-10-R

DESIGN POINT 2.14

Q_5 = 0.5 cfs
Q_{100} = 1.0 cfs

$d_{max,5}$ = 0.50 ft
$d_{max,100}$ = 0.67 ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:
W = 2 ft
a = 4 inches

CLOGGING FACTOR = 1.25

RESULTS:
MINOR STORM EVENT (5-YR) = 4.0 LF INLET REQUIRED
MAJOR STORM EVENT (100-YR) = 4.0 LF INLET REQUIRED

PROPOSED INLET SIZE = 5 LF CDOT TYPE R CURB INLET
-OR-
PROPOSED INLET SIZE = 4 LF CO SPGS D-10-R

DESIGN POINT 2.15

Q_5 = 0.5 cfs
Q_{100} = 1.2 cfs

$d_{max,5}$ = 0.50 ft
$d_{max,100}$ = 0.67 ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:
W = 2 ft
a = 4 inches

CLOGGING FACTOR = 1.25

RESULTS:
MINOR STORM EVENT (5-YR) = 4.0 LF INLET REQUIRED
MAJOR STORM EVENT (100-YR) = 4.0 LF INLET REQUIRED

PROPOSED INLET SIZE = 5 LF CDOT TYPE R CURB INLET
-OR-
PROPOSED INLET SIZE = 4 LF CO SPGS D-10-R

DESIGN POINT 2.16

Q_5	=	0.6	cfs
Q_{100}	=	1.4	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.1

Q_5	=	5.3	cfs
Q_{100}	=	22.3	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

Size does not match spreadsheet or map

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	9.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	14.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	10	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	16	LF CO SPGS D-10-R

DESIGN POINT 3.2

Q_5	=	3.0	cfs
Q_{100}	=	10.6	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.3

Q_5	=	3.1	cfs
Q_{100}	=	10.7	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.4

Q_5	=	1.7	cfs
Q_{100}	=	5.8	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.5

Q_5	=	1.9	cfs
Q_{100}	=	3.4	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.6

Q_5	=	1.7	cfs
Q_{100}	=	3.1	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.7

Q_5	=	3.4	cfs
Q_{100}	=	7.4	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.8

Q_5	=	2.4	cfs
Q_{100}	=	5.4	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.9

Q_5	=	5.1	cfs
Q_{100}	=	11.3	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.10

Q_5	=	1.5	cfs
Q_{100}	=	4.8	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.11

Q_5 = 4.9 cfs

Q_{100} = 16.3 cfs

$d_{max,5}$ = 0.50 ft

$d_{max,100}$ = 0.67 ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W = 2 ft

a = 4 inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	8.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	10	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	8	LF CO SPGS D-10-R

DESIGN POINT 3.12

Q_5 = 1.9 cfs

Q_{100} = 3.4 cfs

$d_{max,5}$ = 0.50 ft

$d_{max,100}$ = 0.67 ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W = 2 ft

a = 4 inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.14

Q_5	=	4.9	cfs
Q_{100}	=	10.7	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.15

Q_5	=	2.2	cfs
Q_{100}	=	4.8	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.16

Q_5	=	6.0	cfs
Q_{100}	=	17.9	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

This inlet is shown at back of lots per drainage map. Would need to be an area inlet, not a Type R inlet. Please revise accordingly.

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	9.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	10	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	12	LF CO SPGS D-10-R

DESIGN POINT 3.17

Q_5	=	6.5	cfs
Q_{100}	=	12.4	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	5.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	8	LF CO SPGS D-10-R

DESIGN POINT 3.18

Q_5	=	3.2	cfs
Q_{100}	=	5.7	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.19

Q_5	=	1.3	cfs
Q_{100}	=	2.8	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.20

Q_5	=	2.7	cfs
Q_{100}	=	6.0	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.21

Q_5	=	5.9	cfs
Q_{100}	=	12.9	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	5.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 3.22

Q_5	=	3.9	cfs
Q_{100}	=	8.6	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 4.1

Q_5	=	2.7	cfs
Q_{100}	=	5.9	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 4.2

Q_5	=	0.3	cfs
Q_{100}	=	0.7	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 4.3

Q_5	=	2.6	cfs
Q_{100}	=	5.6	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 4.4

Q_5	=	3.1	cfs
Q_{100}	=	6.9	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

DESIGN POINT 4.5

Q_5	=	6.2	cfs
Q_{100}	=	13.7	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	6.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	10	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	8	LF CO SPGS D-10-R

DESIGN POINT 4.6

Q_5	=	1.6	cfs
Q_{100}	=	4.9	cfs
$d_{max,5}$	=	0.50	ft
$d_{max,100}$	=	0.67	ft

This inlet is shown at back of lots per drainage map. Would need to be an area inlet, not a Type R inlet. Please revise accordingly.

$Q_i = 1.7(L_i+1.8(W))(d_{max,i}+a/12)^{1.85}$

GUTTER INFO:

W	=	2	ft
a	=	4	inches

CLOGGING FACTOR = 1.25

RESULTS:

MINOR STORM EVENT (5-YR)	=	4.0	LF INLET REQUIRED
MAJOR STORM EVENT (100-YR)	=	4.0	LF INLET REQUIRED
PROPOSED INLET SIZE	=	5	LF CDOT TYPE R CURB INLET
-OR-			
PROPOSED INLET SIZE	=	4	LF CO SPGS D-10-R

Need design calculations for OS.1, OS.2 & OS.3

APPENDIX E

HYDRAULIC CALCULATIONS

Site-Level Low Impact Development (LID) Design Effective Impervious Calculator

LID Credit by Impervious Reduction Factor (IRF) Method

UD-BMP (Version 3.06, November 2016)

User Input

Calculated cells

***Design Storm: 1-Hour Rain Depth	WQCV Event	0.60	inches
***Minor Storm: 1-Hour Rain Depth	10-Year Event	1.19	inches
***Major Storm: 1-Hour Rain Depth	100-Year Event	2.52	inches
Optional User Defined Storm	CUHP		
(CUHP) NOAA 1 Hour Rainfall Depth and Frequency for User Defined Storm	100-Year Event		
Max Intensity for Optional User Defined Storm	0		

Designer: Richard Lyon, PE
Company: Atwell, LLC
Date: March 23, 2022
Project: Falcon Highlands - Pond 1 Tributary Basins
Location: El Paso County

13.09 ac per hydrology spreadsheets

SITE INFORMATION (USER-INPUT)

Sub-basin Identifier	A	B	OS-1	OS-2	OS-4	OS-5								
Receiving Pervious Area Soil Type	Sand	Sand	Sand	Sand	Sand	Sand								
Total Area (ac., Sum of DCIA, UIA, RPA, & SPA)	3.740	33.840	6.380	3.120	9.530	62.200								
Directly Connected Impervious Area (DCIA, acres)	0.000	0.000	0.000	0.000	0.000	0.000								
Unconnected Impervious Area (UIA, acres)	0.551	21.996	2.158	1.248	3.000	24.880								
Receiving Pervious Area (RPA, acres)	0.000	11.844	4.222	1.872	0.000	37.320								
Separate Pervious Area (SPA, acres)	3.189	0.000	0.000	0.000	6.530	0.000								
RPA Treatment Type: Conveyance (C), Volume (V), or Permeable Pavement (PP)	V	V	V	V	V	V								

CALCULATED RESULTS (OUTPUT)

Total Calculated Area (ac, check against input)	3.740	33.840	6.380	3.120	9.530	62.200								
Directly Connected Impervious Area (DCIA, %)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%								
Unconnected Impervious Area (UIA, %)	14.7%	65.0%	33.8%	40.0%	31.5%	40.0%								
Receiving Pervious Area (RPA, %)	0.0%	35.0%	66.2%	60.0%	0.0%	60.0%								
Separate Pervious Area (SPA, %)	85.3%	0.0%	0.0%	0.0%	68.5%	0.0%								
A_R (RPA / UIA)	0.000	0.538	1.956	1.500	0.000	1.500								
I_a Check	1.000	0.650	0.340	0.400	1.000	0.400								
f / I for WQCV Event:	9.8	9.8	9.8	9.8	9.8	9.8								
f / I for 10-Year Event:	0.6	0.6	0.6	0.6	0.6	0.6								
f / I for 100-Year Event:	0.6	0.6	0.6	0.6	0.6	0.6								
f / I for Optional User Defined Storm CUHP:														
IRF for WQCV Event:	0.00	0.00	0.00	0.00	0.00	0.00								
IRF for 10-Year Event:	1.00	0.87	0.78	0.81	1.00	0.81								
IRF for 100-Year Event:	1.00	0.89	0.80	0.83	1.00	0.83								
IRF for Optional User Defined Storm CUHP:														
Total Site Imperviousness: I_{total}	14.7%	65.0%	33.8%	40.0%	31.5%	40.0%								
Effective Imperviousness for WQCV Event:	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%								
Effective Imperviousness for 10-Year Event:	14.7%	56.7%	26.4%	32.4%	31.5%	32.4%								
Effective Imperviousness for 100-Year Event:	14.7%	57.6%	26.9%	33.0%	31.5%	33.0%								
Effective Imperviousness for Optional User Defined Storm CUHP:														

LID / EFFECTIVE IMPERVIOUSNESS CREDITS

WQCV Event CREDIT: Reduce Detention By:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-Year Event CREDIT**: Reduce Detention By:	0.0%	13.2%	23.3%	19.9%	0.0%	19.9%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
100-Year Event CREDIT**: Reduce Detention By:	0.0%	11.0%	21.1%	17.7%	0.0%	17.7%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
User Defined CUHP CREDIT: Reduce Detention By:														

Total Site Imperviousness:	**45.3%**
Total Site Effective Imperviousness for WQCV Event:	**0.0%**
Total Site Effective Imperviousness for 10-Year Event:	**38.4%**
Total Site Effective Imperviousness for 100-Year Event:	**39.0%**
Total Site Effective Imperviousness for Optional User Defined Storm CUHP:	

Notes:

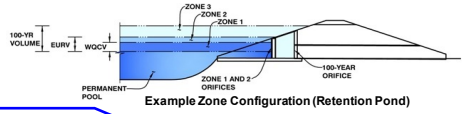
* Use Green-Ampt average infiltration rate values from Table 3-3.
** Flood control detention volume credits based on empirical equations from Storage Chapter of USDCM.
*** Method assumes that 1-hour rainfall depth is equivalent to 1-hour intensity for calculation purposed

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

Project: FALCON HIGHLANDS FILING NO. 3

Basin ID: DETENTION POND 1 (BASINS A, B, OS-1, OS-2, OS-4, OS-5)



Example Zone Configuration (Retention Pond)

Total area is 122.37 ac

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	118.81	acres
Watershed Length =	3,600	ft
Watershed Length to Centroid =	800	ft
Watershed Slope =	0.010	ft/ft
Watershed Imperviousness =	45.30%	percent
Percentage Hydrologic Soil Group A =	100.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

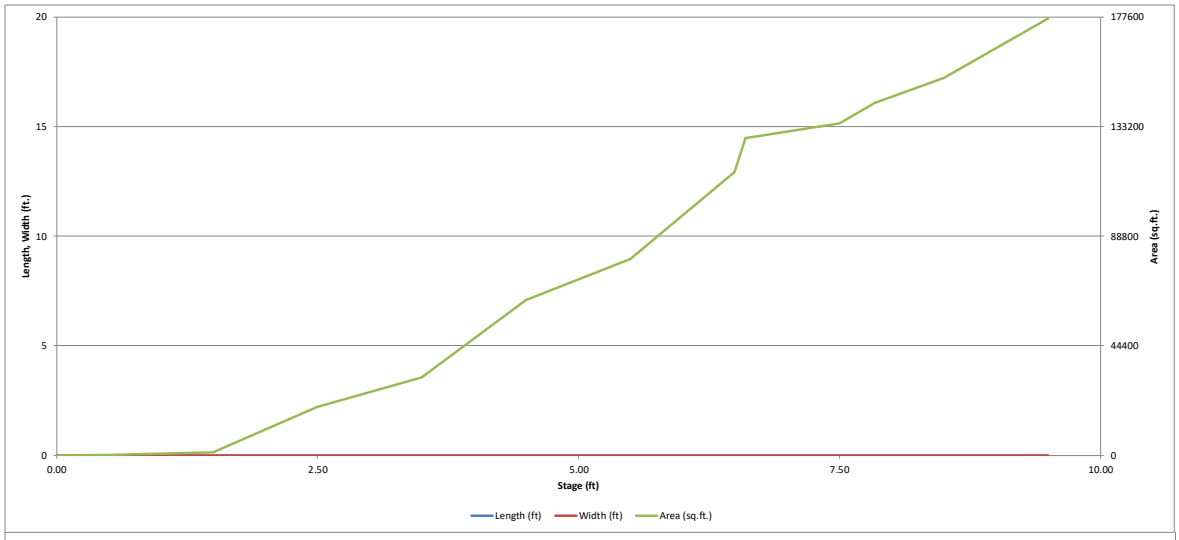
			Optional User Overrides
Water Quality Capture Volume (WQCV) =	1.918	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	6.037	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	4.553	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	6.084	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 1.75 in.) =	7.306	acre-feet	1.75 inches
25-yr Runoff Volume (P1 = 2 in.) =	9.390	acre-feet	2.00 inches
50-yr Runoff Volume (P1 = 2.25 in.) =	11.421	acre-feet	2.25 inches
100-yr Runoff Volume (P1 = 2.52 in.) =	14.043	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 3.14 in.) =	19.706	acre-feet	inches
Approximate 2-yr Detention Volume =	3.865	acre-feet	
Approximate 5-yr Detention Volume =	5.101	acre-feet	
Approximate 10-yr Detention Volume =	6.254	acre-feet	
Approximate 25-yr Detention Volume =	7.698	acre-feet	
Approximate 50-yr Detention Volume =	8.641	acre-feet	
Approximate 100-yr Detention Volume =	9.859	acre-feet	

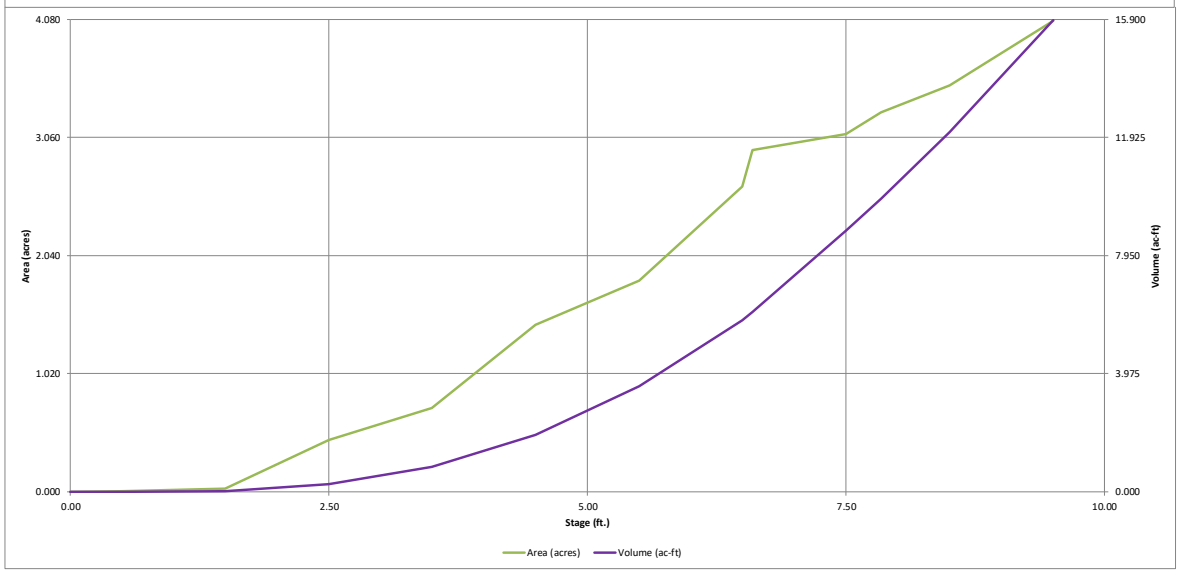
Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	1.918	acre-feet
Zone 2 Volume (EURV - Zone 1) =	4.118	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	3.822	acre-feet
Total Detention Basin Volume =	9.859	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	user	acre-feet

Depth Increment = 0.50 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
6808	--	0.50	--	--	--	130	0.003	32	0.001
6809	--	1.50	--	--	--	1,115	0.026	655	0.015
6810	--	2.50	--	--	--	19,471	0.447	10,948	0.251
6811	--	3.50	--	--	--	31,417	0.721	36,392	0.835
WQCV: 6812	--	4.50	--	--	--	62,850	1.443	83,525	1.917
6813	--	5.50	--	--	--	79,388	1.822	154,644	3.550
6814	--	6.50	--	--	--	114,850	2.637	251,763	5.780
EURV: 6814.10	--	6.60	--	--	--	128,500	2.950	263,931	6.059
6815	--	7.50	--	--	--	134,572	3.089	382,313	8.777
100-YR: 6815.34	--	7.84	--	--	--	142,800	3.278	429,466	9.859
6816	--	8.50	--	--	--	152,970	3.512	527,070	12.100
TOP: 6817	--	9.50	--	--	--	177,276	4.070	692,193	15.891


20
15
10
5
0
Length, Width (ft.)
177600
133200
88800
44400
0
Area (sq.ft.)
0.00
2.50
5.00
7.50
10.00
Stage (ft)
Length (ft)
Width (ft)
Area (sq.ft.)


4.080
3.060
2.040
1.020
0.000
Area (acres)
15.900
11.925
7.950
3.975
0.000
Volume (ac-ft)
0.00
2.50
5.00
7.50
10.00
Stage (ft.)
Area (acres)
Volume (ac-ft)

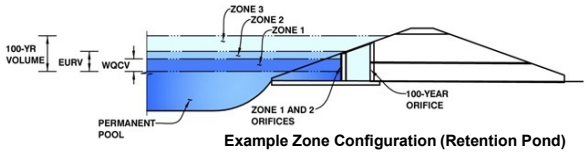
Indicate if outlet configuration is for existing or proposed conditions.

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Project: **FALCON HIGHLANDS FILING NO. 3**

Basin ID: **DETENTION POND 1 (BASINS A, B, OS-1, OS-2, OS-4, OS-5)**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	4.51	1.918	Orifice Plate
Zone 2 (EURV)	6.60	4.118	Orifice Plate
Zone 3 (100-year)	7.84	3.822	Weir&Pipe (Restrict)
Total (all zones)		9.859	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

			Calculated Parameters for Underdrain		
Underdrain Orifice Invert Depth =		ft (distance below the filtration media surface)	Underdrain Orifice Area =		ft^2
Underdrain Orifice Diameter =		inches	Underdrain Orifice Centroid =		feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

			Calculated Parameters for Plate		
Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	3.50	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	inches	Elliptical Slot Area =	N/A	ft^2

Second row of holes should not be at 0.00. Please provide a stage. Per details in Appendix F, single row of holes

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (opt	…nal)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.00				
Orifice Area (sq. inches)	4.50	4.50				

	Row 9 (optional)	Row 10 (optional)	Row 11 (opt	…nal)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)						
Orifice Area (sq. inches)						

User Input: Vertical Orifice (Circular or Rectangular)

				Calculated Parameters for Vertical Orifice		
	Not Selected	Not Selected		Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A feet
Vertical Orifice Diameter =	N/A	N/A	inches			

Per details in Appendix F, outlet has 2 grates.

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoid

				Calculated Parameters for Overflow Weir		
	Zone 3 Weir	Not Selected		Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	5.00	N/A	ft (relative to basin bo	…, H_t =	5.00	N/A feet
Overflow Weir Front Edge Length =	4.67	N/A	feet	Overflow Weir Slope Length =	3.50	N/A feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	17.60	N/A
Horiz. Length of Weir Sides =	3.50	N/A	feet	Overflow Grate Open Area w/o Debris =	11.38	N/A ft^2
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	5.69	N/A ft^2
Debris Clogging % =	50%	N/A	%			

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

				Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate		
	Zone 3 Restrictor	Not Selected		Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.00	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	0.65	N/A ft^2
Outlet Pipe Diameter =	42.00	N/A	inches	Outlet Orifice Centroid =	0.25	N/A feet
Restrictor Plate Height Above Pipe Invert =	5.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	0.70	N/A radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

			Calculated Parameters for Spillway		
Spillway Invert Stage=	9.00	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	1.06	feet
Spillway Crest Length =	60.00	feet	Stage at Top of Freeboard =	11.06	feet
Spillway End Slopes =	5.00	H:V	Basin Area at Top of Freeboard =	4.07	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	15.89	acre-ft

Pond with above top (6817.5). I

Routed Hydrograph Results — *The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).*

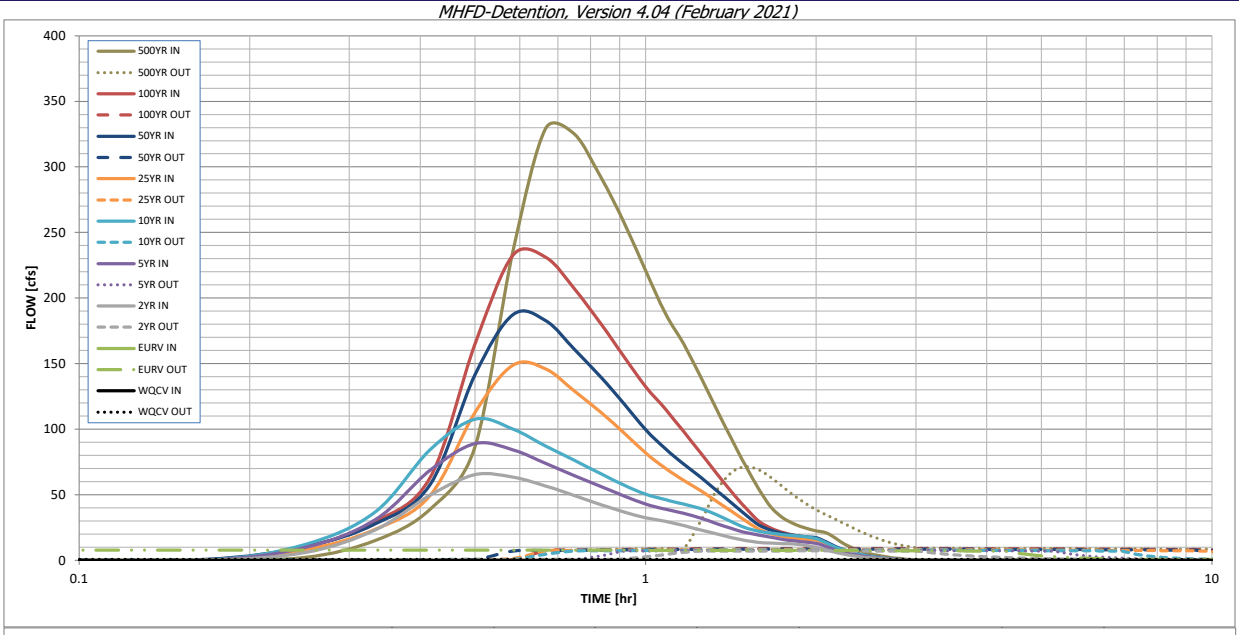
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft) =	1.918	6.037	4.553	6.084	7.306	9.390	11.421	14.043	19.706
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	4.553	6.084	7.306	9.390	11.421	14.043	19.706
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.9	1.8	2.6	23.0	45.8	76.4	138.4
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.02	0.02	0.19	0.39	0.64	1.16
Peak Inflow Q (cfs) =	N/A	N/A	65.3	89.0	107.6	148.9	187.4	232.9	329.5
Peak Outflow Q (cfs) =	0.6	7.8	7.2	7.6	7.9	8.3	8.6	9.0	71.3
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	4.2	3.1	0.4	0.2	0.1	0.5
Structure Controlling Flow =	Plate	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	0.62	0.57	0.6	0.6	0.7	0.7	0.7	0.7
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	40	59	59	60	61	63	64	65	64
Time to Drain 99% of Inflow Volume (hours) =	**42**	63	62	64	65	67	70	72	73
Maximum Ponding Depth (ft) =	4.51	6.60	5.62	6.22	6.64	7.31	7.92	8.67	9.48
Area at Maximum Ponding Depth (acres) =	1.45	2.95	1.91	2.40	2.95	3.06	3.31	3.61	4.06
Maximum Volume Stored (acre-ft) =	1.932	6.059	3.756	5.049	6.148	8.193	10.123	12.705	15.809

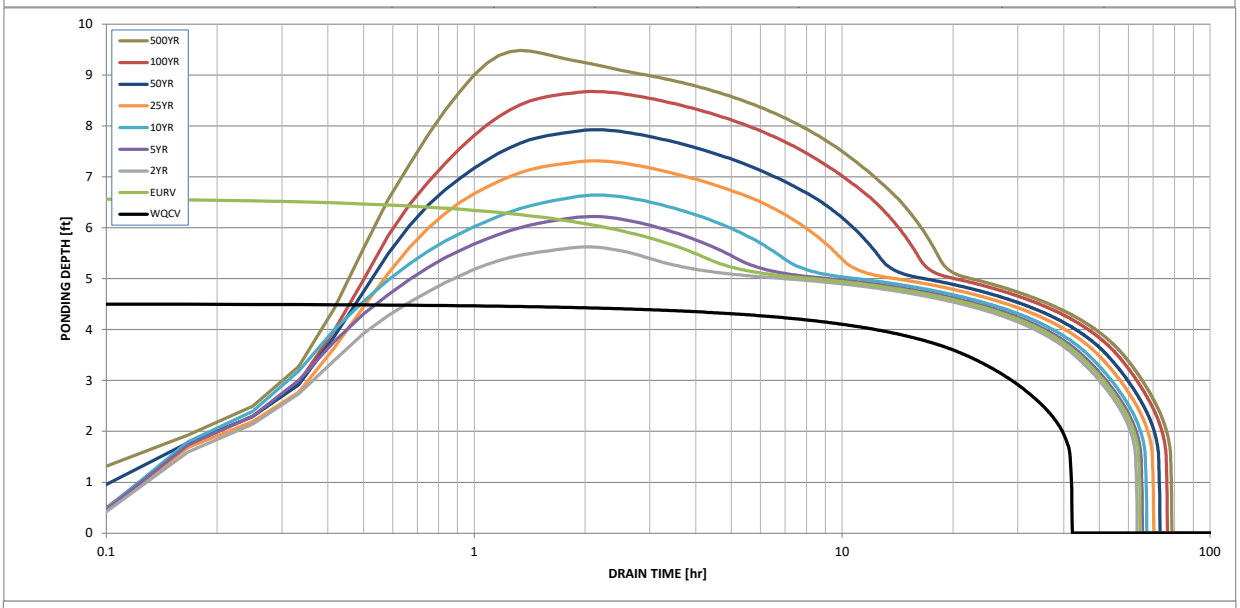
F sl w pa flo flo

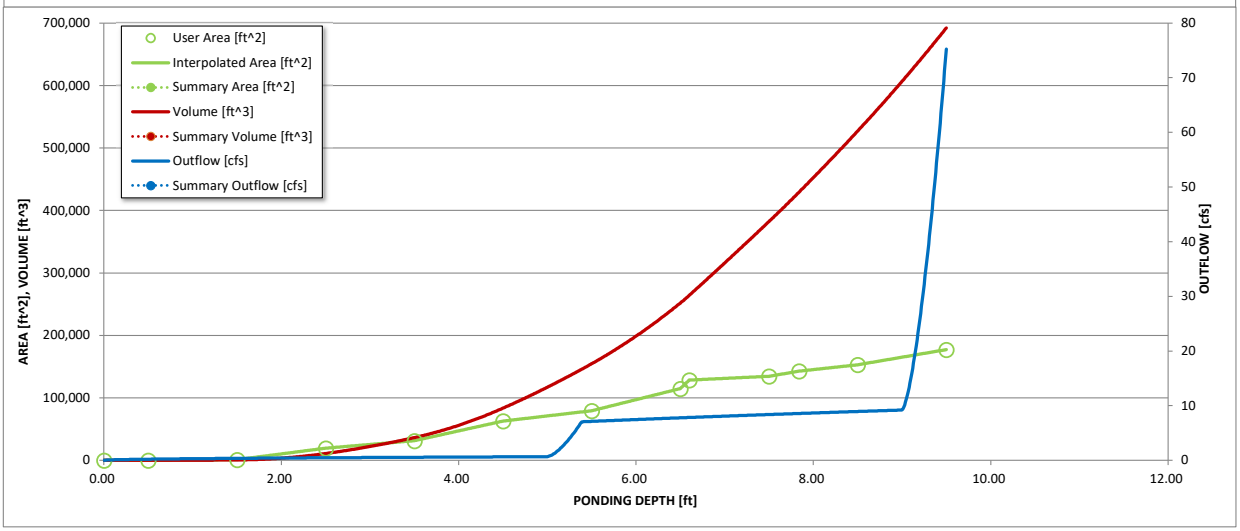
ratios need to be closer to 1

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)







DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.07	2.21
	0:15:00	0.00	0.00	5.95	9.67	12.05	8.15	10.44	10.03	15.19
	0:20:00	0.00	0.00	23.19	31.03	36.90	23.57	27.75	29.52	38.97
	0:25:00	0.00	0.00	49.83	68.69	84.39	49.55	57.89	63.26	86.52
	0:30:00	0.00	0.00	65.32	89.02	107.56	112.71	141.51	164.83	236.27
	0:35:00	0.00	0.00	63.42	84.28	100.07	148.95	187.38	232.86	329.50
	0:40:00	0.00	0.00	56.70	73.83	87.12	145.88	182.68	231.02	324.68
	0:45:00	0.00	0.00	49.31	64.40	76.06	128.74	160.51	206.75	292.19
	0:50:00	0.00	0.00	42.49	56.45	66.06	112.96	139.84	180.53	257.41
	0:55:00	0.00	0.00	36.88	49.02	57.22	97.10	119.28	155.09	221.02
	1:00:00	0.00	0.00	32.57	42.90	50.50	81.93	99.72	132.51	188.37
	1:05:00	0.00	0.00	29.70	38.94	46.26	70.31	85.13	115.48	165.22
	1:10:00	0.00	0.00	26.50	35.87	42.83	61.08	73.54	98.23	140.03
	1:15:00	0.00	0.00	23.18	32.28	39.44	53.16	63.48	82.05	115.56
	1:20:00	0.00	0.00	20.15	28.15	34.94	45.11	53.43	66.62	92.89
	1:25:00	0.00	0.00	17.39	24.30	29.57	37.50	43.98	52.50	72.40
	1:30:00	0.00	0.00	15.15	21.22	24.93	30.22	34.95	40.23	54.61
	1:35:00	0.00	0.00	13.78	19.37	22.22	23.90	27.11	30.06	40.28
	1:40:00	0.00	0.00	13.10	17.57	20.67	20.26	22.90	24.32	32.28
	1:45:00	0.00	0.00	12.75	15.95	19.61	18.18	20.49	21.17	27.66
	1:50:00	0.00	0.00	12.53	14.79	18.83	16.88	19.01	19.09	24.57
	1:55:00	0.00	0.00	11.38	13.91	18.00	15.97	17.96	17.69	22.48
	2:00:00	0.00	0.00	10.03	12.98	16.63	15.38	17.29	16.70	21.02
	2:05:00	0.00	0.00	8.04	10.51	13.38	12.57	14.11	13.39	16.72
	2:10:00	0.00	0.00	6.05	7.88	10.01	9.35	10.46	9.80	12.16
	2:15:00	0.00	0.00	4.57	5.93	7.48	6.98	7.80	7.32	9.06
	2:20:00	0.00	0.00	3.41	4.42	5.54	5.19	5.79	5.45	6.73
	2:25:00	0.00	0.00	2.52	3.25	4.06	3.81	4.25	4.02	4.96
	2:30:00	0.00	0.00	1.84	2.32	2.95	2.74	3.05	2.91	3.57
	2:35:00	0.00	0.00	1.31	1.64	2.12	1.98	2.20	2.09	2.57
	2:40:00	0.00	0.00	0.91	1.16	1.50	1.42	1.57	1.49	1.82
	2:45:00	0.00	0.00	0.58	0.78	0.99	0.95	1.05	0.99	1.20
	2:50:00	0.00	0.00	0.33	0.48	0.59	0.58	0.63	0.59	0.71
	2:55:00	0.00	0.00	0.16	0.25	0.29	0.29	0.31	0.29	0.34
	3:00:00	0.00	0.00	0.06	0.10	0.10	0.10	0.10	0.09	0.11
	3:05:00	0.00	0.00	0.01	0.02	0.01	0.01	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Worksheet Protected

Site-Level Low Impact Development (LID) Design Effective Impervious Calculator

LID Credit by Impervious Reduction Factor (IRF) Method

UD-BMP (Version 3.06, November 2016)

User Input

Calculated cells

***Design Storm: 1-Hour Rain Depth	WQCV Event	0.60	inches
***Minor Storm: 1-Hour Rain Depth	10-Year Event	1.19	inches
***Major Storm: 1-Hour Rain Depth	100-Year Event	2.52	inches
Optional User Defined Storm	CUHP		
(CUHP) NOAA 1 Hour Rainfall Depth and Frequency for User Defined Storm	100-Year Event		
Max Intensity for Optional User Defined Storm	0		

Designer: Richard Lyon, PE
Company: Atwell, LLC
Date: March 23, 2022
Project: Falcon Highlands - Pond 2 Tributary Basins
Location: El Paso County

Does Basins D & G go to pond 2?

SITE INFORMATION (USER-INPUT)

Sub-basin Identifier	C	OS-3	OS-6	OS-7										
Receiving Pervious Area Soil Type	Sand	Sand	Sand	Clay Loam										
Total Area (ac., Sum of DCIA, UIA, RPA, & SPA)	59.280	1.140	35.750	6.470										
Directly Connected Impervious Area (DCIA, acres)	0.000	0.000	0.000	0.000										
Unconnected Impervious Area (UIA, acres)	22.719	1.140	8.938	2.588										
Receiving Pervious Area (RPA, acres)	36.562	0.000	26.813	3.882										
Separate Pervious Area (SPA, acres)	0.000	0.000	0.000	0.000										
RPA Treatment Type: Conveyance (C), Volume (V), or Permeable Pavement (PP)	V	V	V	V										

CALCULATED RESULTS (OUTPUT)

Total Calculated Area (ac, check against input)	59.280	1.140	35.750	6.470										
Directly Connected Impervious Area (DCIA, %)	0.0%	0.0%	0.0%	0.0%										
Unconnected Impervious Area (UIA, %)	38.3%	100.0%	25.0%	40.0%										
Receiving Pervious Area (RPA, %)	61.7%	0.0%	75.0%	60.0%										
Separate Pervious Area (SPA, %)	0.0%	0.0%	0.0%	0.0%										
A_R (RPA / UIA)	1.609	0.000	3.000	1.500										
I_a Check	0.380	1.000	0.250	0.400										
f / I for WQCV Event:	9.8	9.8	9.8	0.4										
f / I for 10-Year Event:	0.6	0.6	0.6	0.3										
f / I for 100-Year Event:	0.6	0.6	0.6	0.1										
f / I for Optional User Defined Storm CUHP:														
IRF for WQCV Event:	0.00	0.00	0.00	0.00										
IRF for 10-Year Event:	0.80	1.00	0.73	0.93										
IRF for 100-Year Event:	0.82	1.00	0.75	0.98										
IRF for Optional User Defined Storm CUHP:														
Total Site Imperviousness: I_{total}	38.3%	100.0%	25.0%	40.0%										
Effective Imperviousness for WQCV Event:	0.0%	0.0%	0.0%	0.0%										
Effective Imperviousness for 10-Year Event:	30.7%	100.0%	18.4%	37.0%										
Effective Imperviousness for 100-Year Event:	31.3%	100.0%	18.7%	39.0%										
Effective Imperviousness for Optional User Defined Storm CUHP:														

LID / EFFECTIVE IMPERVIOUSNESS CREDITS

WQCV Event CREDIT: Reduce Detention By:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-Year Event CREDIT**: Reduce Detention By:	21.0%	0.0%	28.8%	7.9%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
100-Year Event CREDIT**: Reduce Detention By:	18.8%	0.0%	26.7%	2.5%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
User Defined CUHP CREDIT: Reduce Detention By:														

Total Site Imperviousness:	**34.5%**
Total Site Effective Imperviousness for WQCV Event:	**0.0%**
Total Site Effective Imperviousness for 10-Year Event:	**27.6%**
Total Site Effective Imperviousness for 100-Year Event:	**28.2%**
Total Site Effective Imperviousness for Optional User Defined Storm CUHP:	

Notes:

* Use Green-Ampt average infiltration rate values from Table 3-3.

** Flood control detention volume credits based on empirical equations from Storage Chapter of USDCM.

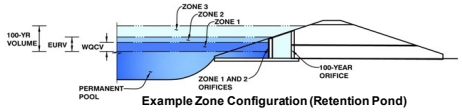
*** Method assumes that 1-hour rainfall depth is equivalent to 1-hour intensity for calculation purposed

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

Project: FALCON HIGHLANDS FILING NO. 3

Basin ID: DETENTION POND 2 (BASIN C, OS-3, OS-6, OS-7)



Example Zone Configuration (Retention Pond)

Can't drop to a lower surface area. Please check areas for stage 0.00 & 0.01

o Basins D & G lease to this pond?

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	102.64	acres
Watershed Length =	2,300	ft
Watershed Length to Centroid =	1,500	ft
Watershed Slope =	0.010	ft/ft
Watershed Imperviousness =	34.50%	percent
Percentage Hydrologic Soil Group A =	100.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	1.410	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	3.680	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	2.680	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	3.646	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 1.75 in.) =	4.429	acre-feet	1.75 inches
25-yr Runoff Volume (P1 = 2 in.) =	6.180	acre-feet	2.00 inches
50-yr Runoff Volume (P1 = 2.25 in.) =	7.831	acre-feet	2.25 inches
100-yr Runoff Volume (P1 = 2.52 in.) =	10.028	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 3.14 in.) =	14.743	acre-feet	inches
Approximate 2-yr Detention Volume =	2.328	acre-feet	
Approximate 5-yr Detention Volume =	3.094	acre-feet	
Approximate 10-yr Detention Volume =	3.843	acre-feet	
Approximate 25-yr Detention Volume =	4.812	acre-feet	
Approximate 50-yr Detention Volume =	5.501	acre-feet	
Approximate 100-yr Detention Volume =	6.538	acre-feet	

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	1.410	acre-feet
Zone 2 Volume (EURV - Zone 1) =	2.270	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	2.858	acre-feet
Total Detention Basin Volume =	6.538	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

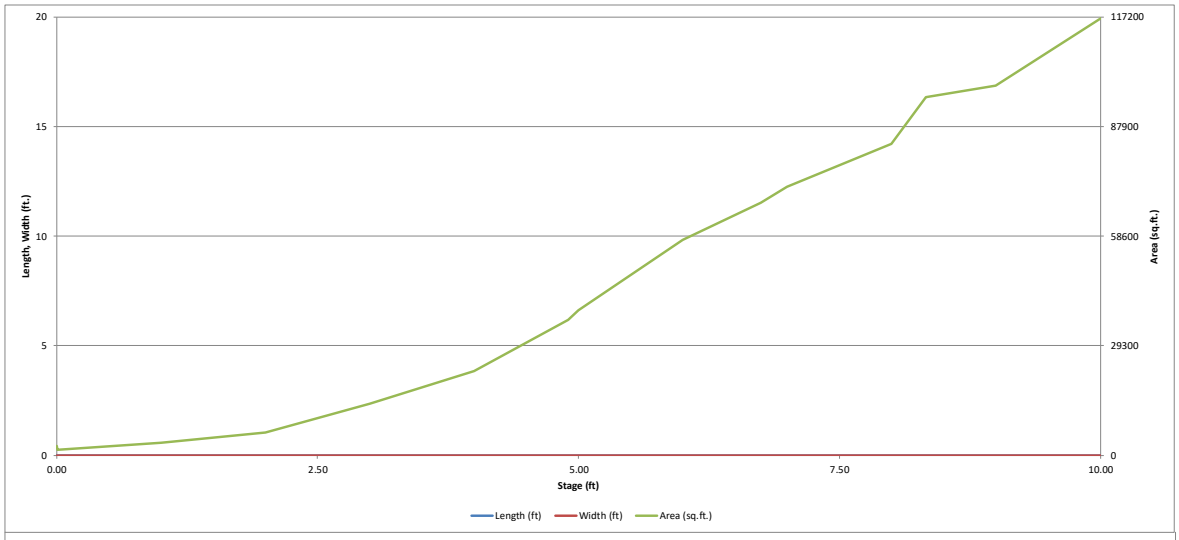
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

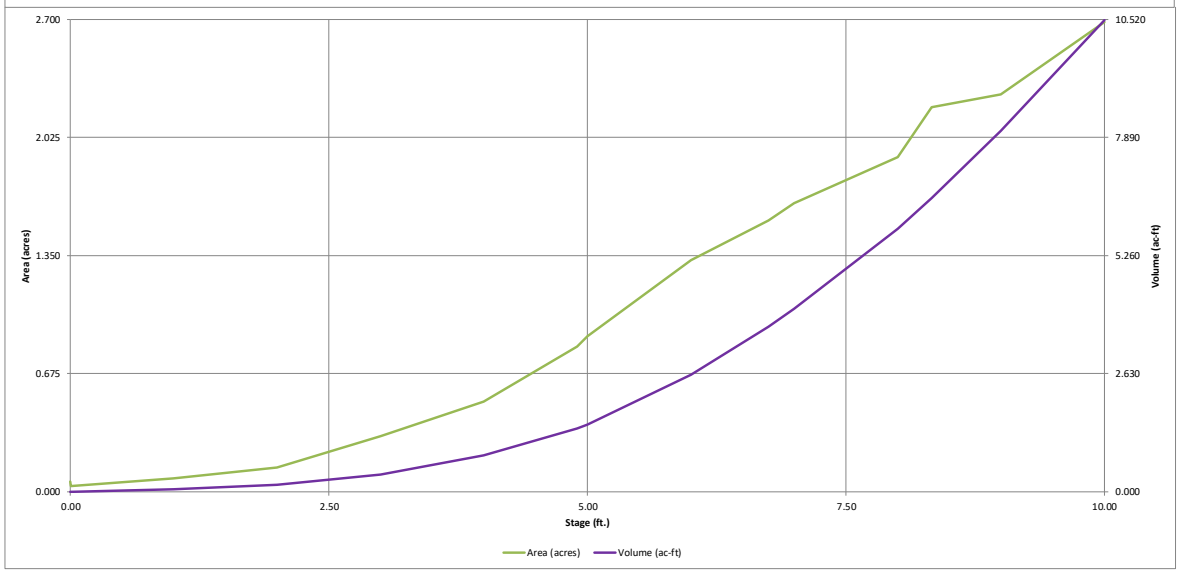
Depth Increment = 0.50 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	2,500	0.057		
6807.5	--	0.01	--	--	--	1,425	0.033	19	0.000
6808.5	--	1.00	--	--	--	3,320	0.076	2,368	0.054
6809.5	--	2.00	--	--	--	6,004	0.138	7,030	0.161
6810.5	--	3.00	--	--	--	13,803	0.317	16,934	0.389
6811.5	--	4.00	--	--	--	22,457	0.516	35,064	0.805
WQCV: 6812.4	--	4.90	--	--	--	36,100	0.829	61,414	1.410
6812.5	--	5.00	--	--	--	38,755	0.890	65,157	1.496
6813.5	--	6.00	--	--	--	57,667	1.324	113,368	2.603
EURV: 6814.25	--	6.75	--	--	--	67,500	1.550	160,306	3.680
6814.5	--	7.00	--	--	--	71,775	1.648	177,715	4.080
6815.5	--	8.00	--	--	--	83,300	1.912	255,252	5.860
100-YR: 6815.83	--	8.33	--	--	--	95,750	2.198	284,796	6.538
6816.5	--	9.00	--	--	--	98,912	2.271	350,007	8.035
TOP: 6817.5	--	10.00	--	--	--	116,945	2.685	457,936	10.513

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)





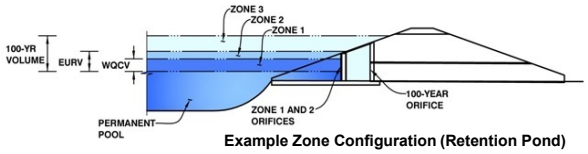
Indicate if outlet configuration is for existing or proposed conditions.

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Project: **FALCON HIGHLANDS FILING NO. 3**

Basin ID: **DETENTION POND 2 (BASIN C, OS-3, OS-6, OS-7)**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	4.90	1.410	Orifice Plate
Zone 2 (EURV)	6.75	2.270	Orifice Plate
Zone 3 (100-year)	8.33	2.858	Weir&Pipe (Restrict)
Total (all zones)		6.538	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

			Calculated Parameters for Underdrain		
Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/o

Parameters for Plate

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 f	-02	ft^2
Depth at top of Zone using Orifice Plate =	4.50	ft (relative to basin bottom at Stage = 0 f		feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches		feet
Orifice Plate: Orifice Area per Row =	1.91	sq. inches (diameter = 1-9/16 inches)		ft^2

Should not have multiple orifices at same stage levels. Per details in Appendix F, single row of holes

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.00	0.50	0.50				
Orifice Area (sq. inches)	1.91	1.91	1.91	1.91				

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected		Calculated Parameters for Vertical Orifice	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trap

Per details in Appendix F, outlet has 2 grates.

	Zone 3 Weir	Not Selected		Calculated Parameters for Overflow Weir	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	5.00	N/A	ft (relative to ba	Edge, H_t =	5.00	N/A	feet
Overflow Weir Front Edge Length =	4.67	N/A	feet	e Length =	3.50	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	fice Area =	57.10	N/A	
Horiz. Length of Weir Sides =	3.50	N/A	feet	Overflow Grate Open Area w/o Debris =	11.38	N/A	ft^2
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	5.69	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected		Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.00	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	0.20	N/A	ft^2
Outlet Pipe Diameter =	42.00	N/A	inches	Outlet Orifice Centroid =	0.11	N/A	feet
Restrictor Plate Height Above Pipe Invert =	2.25		inches	Half-Central Angle of Restrictor Plate on Pipe =	0.47	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

			Calculated Parameters for Spillway	
Spillway Invert Stage=	9.00	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.68 feet
Spillway Crest Length =	60.00	feet	Stage at Top of Freeboard =	10.68 feet
Spillway End Slopes =	5.00	H:V	Basin Area at Top of Freeboard =	2.68 acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	10.51 acre-ft

Pond w above t (6817.5

Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft) =	1.410	3.680	2.680	3.646	4.429	6.180	7.831	10.028	14.743
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	2.680	3.646	4.429	6.180	7.831	10.028	14.743
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.7	1.4	1.9	17.4	34.9	58.0	105.0
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.01	0.02	0.17	#REF!	0.56	1.02
Peak Inflow Q (cfs) =	N/A	N/A	30.1	41.5	50.7	79.8	104.6	136.1	200.3
Peak Outflow Q (cfs) =	0.6	2.5	2.3	2.4	2.5	2.7	2.8	24.5	91.6
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.8	1.3	0.2	#REF!	0.4	0.9
Structure Controlling Flow =	Plate	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Spillway	Spillway
Max Velocity through Grate 1 (fps) =	N/A	0.16	0.15	0.2	0.2	0.2	0.2	0.2	0.2
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	37	48	45	49	52	58	63	65	61
Time to Drain 99% of Inflow Volume (hours) =	**40**	52	49	53	56	63	69	72	70
Maximum Ponding Depth (ft) =	4.91	6.75	5.79	6.45	6.94	7.91	8.68	9.24	9.61
Area at Maximum Ponding Depth (acres) =	0.83	1.55	1.23	1.46	1.62	1.89	2.23	2.37	2.52
Maximum Volume Stored (acre-ft) =	1.418	3.680	2.334	3.214	3.965	5.689	7.292	8.592	9.472

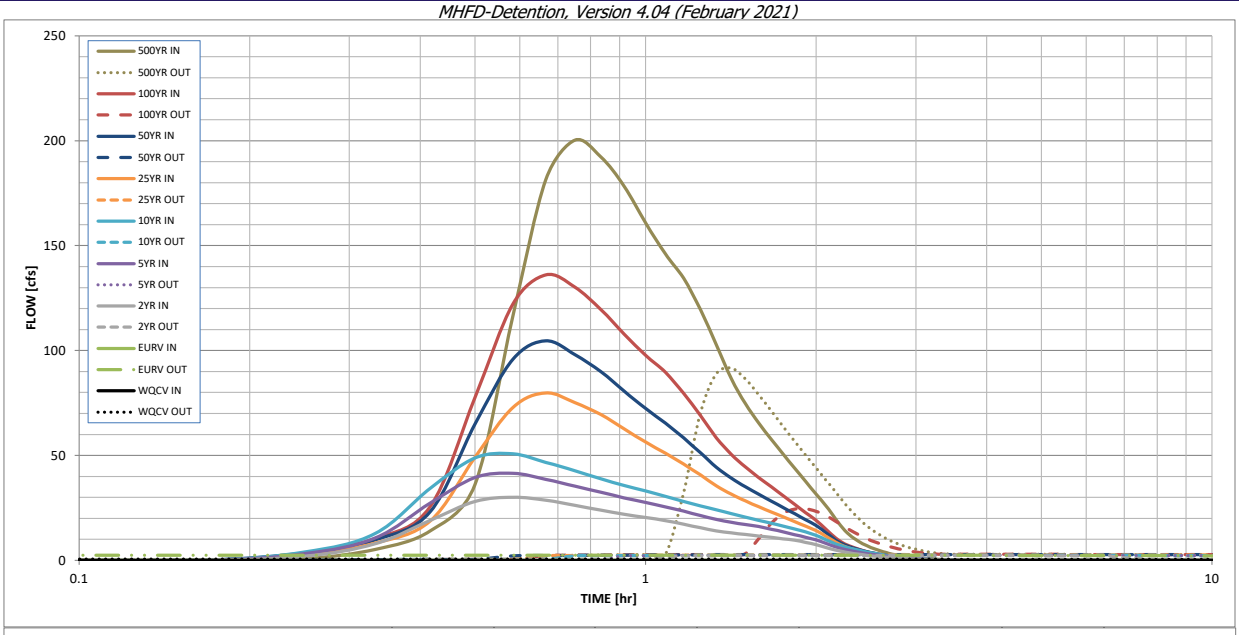
Flow show wate para flow flow

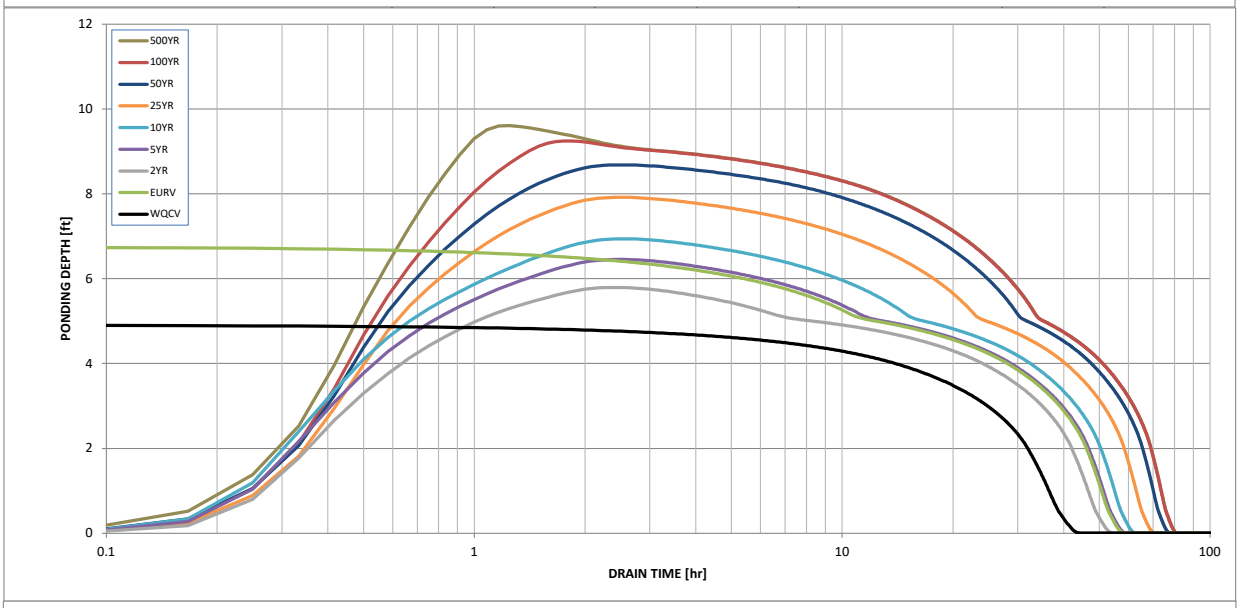
ratios need to be closer to 1

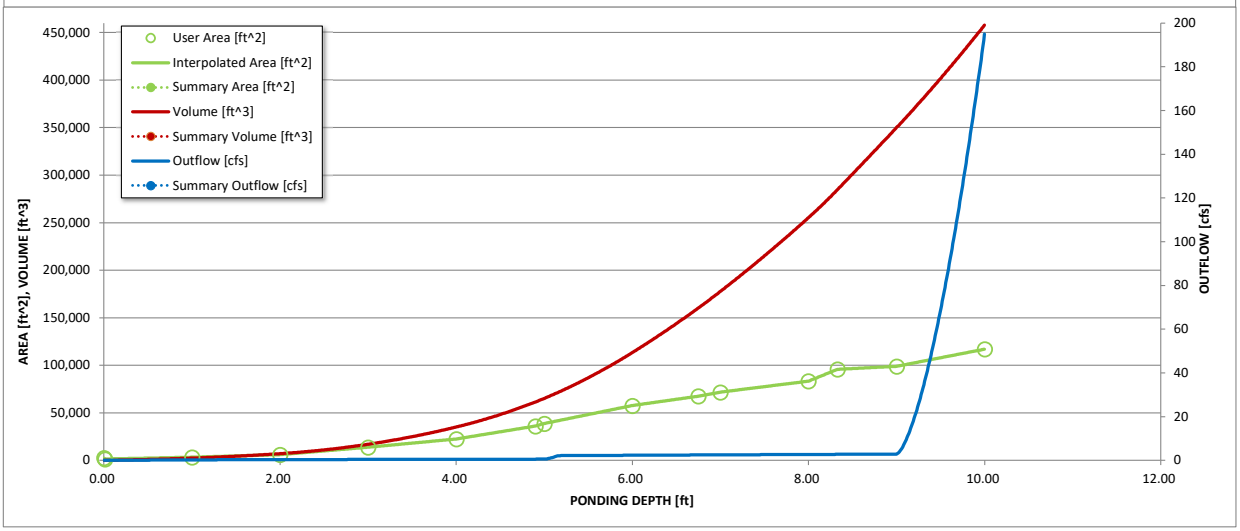
Flow is over spillway so 100-yr flow is con below spillway eleva

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)







DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.02	0.75
	0:15:00	0.00	0.00	1.94	3.15	3.96	2.70	3.51	3.35	5.22
	0:20:00	0.00	0.00	7.87	10.61	12.75	8.22	9.80	10.38	14.01
	0:25:00	0.00	0.00	19.11	27.37	34.36	18.69	23.14	25.57	36.08
	0:30:00	0.00	0.00	28.05	39.47	48.76	49.15	64.93	77.64	116.84
	0:35:00	0.00	0.00	30.10	41.51	50.73	72.95	95.92	122.35	181.31
	0:40:00	0.00	0.00	28.64	38.64	46.73	79.77	104.63	136.07	200.30
	0:45:00	0.00	0.00	26.21	35.32	42.70	75.17	98.06	130.20	192.30
	0:50:00	0.00	0.00	23.91	32.43	38.91	69.47	90.00	119.59	178.30
	0:55:00	0.00	0.00	21.96	29.81	35.69	62.63	80.60	107.79	160.82
	1:00:00	0.00	0.00	20.41	27.59	33.07	56.37	72.37	97.75	146.09
	1:05:00	0.00	0.00	18.98	25.50	30.57	51.09	65.40	89.64	134.51
	1:10:00	0.00	0.00	17.24	23.44	28.12	45.88	58.36	79.67	119.39
	1:15:00	0.00	0.00	15.48	21.35	25.95	40.65	51.25	68.98	102.82
	1:20:00	0.00	0.00	14.06	19.49	24.04	35.51	44.35	58.46	86.57
	1:25:00	0.00	0.00	13.07	18.16	22.29	31.50	39.21	50.55	74.77
	1:30:00	0.00	0.00	12.30	17.10	20.63	28.30	35.08	44.55	65.50
	1:35:00	0.00	0.00	11.60	16.11	19.09	25.55	31.52	39.54	57.67
	1:40:00	0.00	0.00	10.93	14.87	17.66	23.03	28.23	35.02	50.58
	1:45:00	0.00	0.00	10.26	13.54	16.27	20.70	25.18	30.76	43.97
	1:50:00	0.00	0.00	9.59	12.25	14.93	18.46	22.22	26.67	37.61
	1:55:00	0.00	0.00	8.59	11.01	13.51	16.27	19.34	22.75	31.58
	2:00:00	0.00	0.00	7.48	9.74	11.91	14.18	16.60	19.08	25.99
	2:05:00	0.00	0.00	6.14	8.05	9.79	11.44	13.14	14.76	19.67
	2:10:00	0.00	0.00	4.89	6.39	7.84	8.63	9.67	10.62	14.14
	2:15:00	0.00	0.00	3.94	5.17	6.40	6.55	7.35	7.86	10.49
	2:20:00	0.00	0.00	3.25	4.26	5.31	5.18	5.80	6.07	8.01
	2:25:00	0.00	0.00	2.68	3.51	4.38	4.15	4.64	4.72	6.13
	2:30:00	0.00	0.00	2.21	2.90	3.60	3.34	3.71	3.69	4.71
	2:35:00	0.00	0.00	1.81	2.37	2.94	2.68	2.98	2.86	3.59
	2:40:00	0.00	0.00	1.46	1.93	2.36	2.14	2.35	2.19	2.70
	2:45:00	0.00	0.00	1.18	1.54	1.89	1.68	1.85	1.69	2.06
	2:50:00	0.00	0.00	0.96	1.23	1.50	1.33	1.46	1.34	1.62
	2:55:00	0.00	0.00	0.77	0.98	1.19	1.06	1.16	1.07	1.30
	3:00:00	0.00	0.00	0.62	0.78	0.94	0.84	0.92	0.86	1.03
	3:05:00	0.00	0.00	0.48	0.60	0.73	0.66	0.71	0.66	0.79
	3:10:00	0.00	0.00	0.36	0.45	0.56	0.50	0.53	0.50	0.58
	3:15:00	0.00	0.00	0.26	0.33	0.40	0.36	0.38	0.35	0.41
	3:20:00	0.00	0.00	0.17	0.22	0.27	0.24	0.26	0.23	0.26
	3:25:00	0.00	0.00	0.11	0.15	0.17	0.15	0.15	0.14	0.15
	3:30:00	0.00	0.00	0.06	0.09	0.09	0.08	0.08	0.07	0.07
	3:35:00	0.00	0.00	0.02	0.04	0.04	0.03	0.03	0.02	0.02
	3:40:00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Falcon Highlands Grass Swale Section 1

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.033
Channel Slope	0.006 ft/ft
Normal Depth	24.0 in
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	1.00 ft

Per DCD Section 10.5.1 side slopes should be 4:1 or flatter

Results	
Discharge	49.66 cfs
Flow Area	14.0 ft²
Wetted Perimeter	13.6 ft
Hydraulic Radius	12.3 in
Top Width	13.00 ft
Critical Depth	19.3 in
Critical Slope	0.018 ft/ft
Velocity	3.55 ft/s
Velocity Head	0.20 ft
Specific Energy	2.20 ft
Froude Number	0.603
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	(N/A) ft/s
Upstream Velocity	(N/A) ft/s
Normal Depth	24.0 in
Critical Depth	19.3 in
Channel Slope	0.006 ft/ft
Critical Slope	0.018 ft/ft

Falcon Highland Grass Swale Section 2

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.033
Channel Slope	0.010 ft/ft
Normal Depth	24.0 in
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	1.50 ft

Per DCD Section 10.5.1 side slopes should be 4:1 or flatter

Results	
Discharge	70.22 cfs
Flow Area	15.0 ft²
Wetted Perimeter	14.1 ft
Hydraulic Radius	12.7 in
Top Width	13.50 ft
Critical Depth	21.5 in
Critical Slope	0.017 ft/ft
Velocity	4.68 ft/s
Velocity Head	0.34 ft
Specific Energy	2.34 ft
Froude Number	0.783
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	24.0 in
Critical Depth	21.5 in
Channel Slope	0.010 ft/ft
Critical Slope	0.017 ft/ft

Falcon Highlands Grass Swale Section 3

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data		
Roughness Coefficient	0.033	
Channel Slope	0.004	ft/ft
Normal Depth	24.0	in
Left Side Slope	3.000	H:V
Right Side Slope	3.000	H:V
Bottom Width	12.00	ft

Per DCD Section 10.5.1 side slopes should be 4:1 or flatter

Results		
Discharge	131.97	cfs
Flow Area	36.0	ft²
Wetted Perimeter	24.6	ft
Hydraulic Radius	17.5	in
Top Width	24.00	ft
Critical Depth	16.5	in
Critical Slope	0.016	ft/ft
Velocity	3.67	ft/s
Velocity Head	0.21	ft
Specific Energy	2.21	ft
Froude Number	0.528	
Flow Type	Subcritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	24.0	in
Critical Depth	16.5	in
Channel Slope	0.004	ft/ft
Critical Slope	0.016	ft/ft

APPENDIX F

REFERENCE CALCULATIONS AND MAPS

(SF-05-033)

FALCON HIGHLANDS FILING NO. 2
PDR BASINS
(Area Runoff Coefficient Summary)

		STREETS / DEVELOPED			*OVERLAND / UNDEVELOPED*			*COMPOSITE C*	
BASIN	**TOTAL AREA** *(Acres)*	**AREA** *(Acres)*	C_5	C_{100}	**AREA** *(Acres)*	C_5	C_{100}	C_5	C_{100}
A	13.09	4.67	0.50	0.60	8.41	0.25	0.35	0.34	0.44
B1.1	7.39	7.39	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B1.2	7.22	7.22	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B2	4.00	4.00	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B3	7.97	7.97	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B4.1	4.13	4.13	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B4.2	13.98	13.36	0.50	0.60	0.62	0.25	0.35	0.49	0.59
B5	11.63	11.63	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B6.1	5.44	5.44	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B6.2	3.23	2.73	0.50	0.60	0.50	0.25	0.35	0.46	0.56
B6.3	4.61	4.11	0.50	0.60	0.50	0.25	0.35	0.47	0.57
B6.4	1.39	1.39	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B7.1	4.36	4.36	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B7.2	3.80	3.04	0.50	0.60	0.76	0.25	0.35	0.45	0.55
B7.3	5.64	5.64	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B8	7.44	7.44	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B9.1	5.06	5.06	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B9.2	3.40	3.40	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B10.1	5.40	5.40	0.45	0.55	0.00	0.25	0.35	0.45	0.55
B10.2	1.04	1.04	0.45	0.55	0.00	0.25	0.35	0.45	0.55

2010 FDR TABULATIONS WERE USED TO QUANTIFY FILING NO. 2 OFFSITE RUNOFF AS DEVELOPED CONDITIONS FOR THE EXISTING CONDITIONS OF THIS REPORT.

THESE CALCULATION SHEETS ARE FROM THE 2010 FINAL DRAINAGE REPORT BY TERRA NOVA. THE TITLE SAYS "PDR BASINS" BUT THESE ARE FDR CALCULATIONS WITHIN THE FDR.

FALCON HIGHLANDS FILING NO. 2
PDR BASINS
(Area Runoff Coefficient Summary)

C1.1	7.80	7.04	0.45	0.55	0.75	0.25	0.35	0.43	0.53
C1.2	4.34	4.34	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C2.1	5.05	5.05	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C2.2	6.52	6.52	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C2.3	1.39	1.39	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C3	2.52	2.52	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C4	13.26	10.01	0.45	0.55	3.25	0.25	0.35	0.40	0.50
C5	8.68	7.47	0.45	0.55	1.21	0.25	0.35	0.42	0.52
C6	4.81	4.81	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C7	7.09	4.87	0.45	0.55	2.23	0.25	0.35	0.39	0.49
C8.1	8.70	8.70	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C8.2	3.45	3.45	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C9.1	6.29	6.29	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C9.2	3.14	3.14	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C10	3.67	3.67	0.45	0.55	0.00	0.25	0.35	0.45	0.55
D1.1	10.81	10.81	0.45	0.55	0.00	0.25	0.35	0.45	0.55
D1.2	1.19	1.19	0.45	0.55	0.00	0.25	0.35	0.45	0.55
D2	4.48	4.48	0.45	0.55	0.00	0.25	0.35	0.45	0.55
D3	14.62	14.62	0.90	0.95	0.00	0.25	0.35	0.90	0.95
E	1.95	0.00	0.50	0.60	1.95	0.25	0.35	0.25	0.35
F	6.51	0.00	0.50	0.60	6.51	0.25	0.35	0.25	0.35
G	8.84	0.00	0.50	0.60	8.84	0.25	0.35	0.25	0.35
OS-1	6.38	6.38	0.50	0.60	0.00	0.25	0.35	0.50	0.60
OS-2	3.12	3.12	0.90	0.95	0.00	0.25	0.35	0.90	0.95
OS-3	1.14	1.14	0.90	0.95	0.00	0.25	0.35	0.90	0.95

Calculated by: QNA

Date: 07/15/05

FALCON HIGHLANDS FILING NO. 2
PDR BASINS
(Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T_t	Tc USED	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	(min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (cfs)	Q_{100} (cfs)
		* For Calcs See Runoff Summary															
A	13.09	0.34	0.44	0.25	105	2.1	13.0	1625	1.5%	2.4	11.3	24.2	24.2	2.8	4.6	*12.3*	*26.3*
B1.1	7.39	0.50	0.60	0.25	170	3.4	16.5	1700	1.5%	2.4	11.8	28.3	28.3	2.6	4.2	*9.5*	*18.6*
B1.2	7.22	0.50	0.60	0.25	170	3.4	16.5	1400	2.0%	2.9	8.0	24.5	24.5	2.8	4.6	*10.0*	*19.7*
B2	4.00	0.50	0.60	0.25	200	4.0	17.9	333	0.9%	1.9	2.9	20.8	20.8	3.0	5.0	*6.0*	*11.9*
B3	7.97	0.50	0.60	0.25	135	2.7	14.7	885	0.9%	1.9	7.8	22.5	22.5	2.9	4.8	*11.5*	*22.8*
B4.1	4.13	0.50	0.60	0.25	165	3.3	16.2	1550	1.3%	2.2	11.7	28.0	28.0	2.6	4.2	*5.3*	*10.5*
B4.2	13.98	0.49	0.59	0.25	165	3.3	16.2	1551	1.3%	2.2	11.8	28.0	28.0	2.6	4.2	*17.6*	*34.7*
B5	11.63	0.50	0.60	0.25	210	4.2	18.3	1100	2.0%	2.9	6.3	24.6	24.6	2.8	4.5	*16.0*	*31.7*
B6.1	5.44	0.50	0.60	0.25	160	3.2	16.0	1180	0.7%	1.8	10.9	26.9	26.9	2.6	4.3	*7.1*	*14.1*
B6.2	3.23	0.46	0.56	0.25	140	2.8	15.0	850	0.7%	1.8	7.9	22.8	22.8	2.9	4.7	*4.3*	*8.6*
B6.3	4.61	0.47	0.57	0.25	60	1.2	9.8	1150	0.6%	1.6	12.0	21.8	21.8	2.9	4.9	*6.4*	*12.8*
B6.4	1.39	0.50	0.60	0.25	60	1.2	9.8	700	0.7%	1.8	6.5	16.3	16.3	3.3	5.7	*2.3*	*4.7*

OS-4

OS-5, PIPE RUN USED

FALCON HIGHLANDS FILING NO. 2
PDR BASINS
(Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T_t	Tc USED	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	(min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (cfs)	Q_{100} (cfs)
		* For Calcs See Runoff Summary															
B7.1	4.36	0.50	0.60	0.25	135	2.7	14.7	660	1.0%	2.0	5.5	20.2	20.2	3.0	5.1	6.6	13.2
B7.2	3.80	0.45	0.55	0.25	140	2.8	15.0	790	0.8%	1.9	6.9	21.9	21.9	2.9	4.8	5.0	10.1
B7.3	5.64	0.50	0.60	0.25	175	3.5	16.7	1165	0.9%	1.9	10.2	26.9	26.9	2.6	4.3	7.4	14.6
B8	7.44	0.50	0.60	0.25	265	7.0	18.8	860	0.9%	1.9	7.5	26.3	26.3	2.7	4.4	9.9	19.5
B9.1	5.06	0.50	0.60	0.25	112	5.0	10.3	2500	1.3%	2.2	18.9	29.2	29.2	2.5	4.1	6.4	12.5
B9.2	3.40	0.50	0.60	0.25	50	1.0	8.9	1610	1.4%	2.3	11.7	20.6	20.6	3.0	5.0	5.1	10.2
B10.1	5.40	0.45	0.55	0.25	250	5.0	20.0	405	0.5%	1.5	4.5	24.5	24.5	2.8	4.6	6.7	13.5
B10.2	1.04	0.45	0.55	0.25	50	1.0	8.9	525	0.5%	1.5	5.8	14.8	14.8	3.5	5.9	1.6	3.4
C1.1	7.80	0.43	0.53	0.25	180	3.6	17.0	1145	1.4%	2.3	8.3	25.3	25.3	2.7	4.5	9.1	18.5
C1.2	4.34	0.45	0.55	0.25	180	3.6	17.0	550	1.1%	2.1	4.4	21.3	21.3	3.0	4.9	5.8	11.7
C2.1	5.05	0.45	0.55	0.25	150	3.0	15.5	1485	1.1%	2.1	11.8	27.3	27.3	2.6	4.3	5.9	11.9
C2.2	6.52	0.45	0.55	0.25	190	3.8	17.4	780	1.0%	2.0	6.5	23.9	23.9	2.8	4.6	8.2	16.6
C2.3	1.39	0.45	0.55	0.25	50	2.0	7.1	900	1.6%	2.5	6.0	13.1	13.1	3.7	6.3	2.3	4.8
C3	2.52	0.45	0.55	0.25	190	4.0	17.1	140	1.6%	2.5	0.9	18.1	18.1	3.2	5.4	3.6	7.4

OS-5, PIPE RUN USED

OS-7, PIPE RUN USED

FALCON HIGHLANDS FILING NO. 2
PDR BASINS
(Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T_t	Tc USED	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	(min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (cfs)	Q_{100} (cfs)
		* For Calcs See Runoff Summary															
C4	13.26	0.40	0.50	0.25	250	4.0	21.5	1530	1.0%	2.0	12.8	34.3	34.3	2.3	3.7	12.3	24.8
C5	8.68	0.42	0.52	0.25	300	7.0	20.8	286	1.7%	2.6	1.8	22.6	22.6	2.9	4.8	10.5	21.6
C6	4.81	0.45	0.55	0.25	180	3.6	17.0	390	1.8%	2.8	2.3	19.3	19.3	3.1	5.2	6.7	13.7
C7	7.09	0.39	0.49	0.25	180	3.6	17.0	670	1.0%	2.0	5.6	22.5	22.5	2.9	4.8	7.9	16.5
C8.1	8.70	0.45	0.55	0.25	200	4.0	17.9	1170	1.0%	2.0	9.8	27.6	27.6	2.6	4.3	10.2	20.3
C8.2	3.45	0.45	0.55	0.25	170	3.4	16.5	645	1.2%	2.2	4.9	21.4	21.4	3.0	4.9	4.6	9.3
C9.1	6.29	0.45	0.55	0.25	165	3.3	16.2	530	1.0%	2.0	4.4	20.7	20.7	3.0	5.0	8.5	17.3
C9.2	3.14	0.45	0.55	0.25	180	3.6	17.0	540	1.0%	2.0	4.5	21.5	21.5	2.9	4.9	4.2	8.5
C10	3.67	0.45	0.55	0.25	185	10.0	12.4	100	2.0%	2.3	0.7	13.1	13.1	3.7	6.3	6.1	12.7
D1.1	10.81	0.45	0.55	0.25	200	4.0	17.9	1340	1.2%	2.2	10.2	28.0	28.0	2.6	4.2	12.5	25.1
D1.2	1.19	0.45	0.55	0.25	180	3.6	17.0	630	1.0%	2.0	5.3	22.2	22.2	2.9	4.8	1.5	3.1
D2	4.48	0.45	0.55	0.25	200	4.0	17.9	320	1.6%	2.5	2.1	20.0	20.0	3.0	5.1	6.1	12.5
D3	14.62	0.90	0.95	0.25	185	10.0	12.4	103	1.9%	2.9	0.6	13.0	13.0	3.7	6.3	48.4	87.6
E	1.95	0.25	0.35	0.25	90	5.0	8.6	1080	1.0%	2.0	9.0	17.6	17.6	3.2	5.4	1.6	3.7

OS-7, PIPE RUN USED

OS-7 AND OS-8 REVISED

BASIN E RECALCULATED

FALCON HIGHLANDS FILING NO. 2
PDR BASINS
(Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T_t	Tc USED	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5 * For Calcs See Runoff Summary	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	(min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (cfs)	Q_{100} (cfs)
BASIN F RECALCULATED																	
F	6.51	0.25	0.35	0.25	125	4.0	12.1	630	1.6%	2.5	4.2	16.3	16.3	3.3	5.7	*5.4*	*12.9*
G	8.84	0.25	0.35	0.25	200	5.0	16.6	360	1.1%	2.1	2.9	19.5	19.5	3.1	5.2	*6.8*	*16.0*
OS-1	6.38	0.50	0.60	0.25	100	2.0	12.6	608	2.0%	2.8	3.6	16.3	16.3	3.4	5.7	*10.7*	*21.7*
OS-2	3.12	0.90	0.95	0.25	100	2.0	12.6	1525	1.2%	2.2	11.6	24.2	24.2	2.8	4.6	*7.8*	*13.6*
OS-3	1.14	0.90	0.95	0.25	20	0.4	5.7	1190	0.6%	1.8	11.0	16.7	16.7	3.3	5.6	*3.4*	*6.0*

Calculated by: QNA
Date: 07/15/05

FALCON HIGHLANDS FILING NO. 2
PDR BASINS
(Surface Routing Summary)

Design Point(s)	*Contributing Basins*	*Equivalent* CA_5	*Equivalent* CA_{100}	*Maximum* T_C	*Intensity*		*Flow*	
					I_5	I_{100}	Q_5	Q_{100}
1	**B1.1 B1.2 & OS-1**	10.49	12.59	28.3	2.6	4.2	*26.9*	*52.8*
2	**B2 & DP1 F.B.**	6.51	8.39	28.3	2.6	4.2	*16.7*	*35.2*
3	**B3 AND DP2 F.B.**	6.03	8.31	28.3	2.6	4.2	*15.4*	*34.9*
4	**B4.1 & B4.2**	8.90	10.71	28.0	2.6	4.2	*22.9*	*45.2*
5	**B5, DP 4 F.B. & DP 13 F.B.**	8.38	11.47	28.0	2.6	4.2	*21.6*	*48.4*
*3 & 5**	**DP-3 & 5**	14.41	19.79	28.3	2.6	4.2	*36.9*	*82.9*
6	**B6.1, B6.2, B6.3, & B6.4**	7.08	8.55	26.9	2.6	4.3	*18.6*	*36.9*
7	**B7.1, B7.2 & B7.3**	6.71	8.09	26.9	2.6	4.3	*17.6*	*34.9*
8	**C1.1 & C1.2**	5.31	6.52	25.3	2.7	4.5	*14.4*	*29.2*
9	**C2.1 , C2.2 & C2.3**	5.83	7.13	27.3	2.6	4.3	*15.2*	*30.5*
10	**C3, DP8 & DP9 F.B.**	4.27	6.60	27.3	2.6	4.3	*11.1*	*28.3*
11	**C4**	5.32	6.64	34.3	2.3	3.7	*12.3*	*24.8*
12	**B10.1& B10.2**	2.90	3.54	24.5	2.8	4.6	*8.0*	*16.1*
13	**B9.1 & B9.2**	4.23	5.07	18.9	3.1	5.2	*13.2*	*26.6*
14	**C5**	3.66	4.53	22.6	2.9	4.8	*10.5*	*21.6*

FALCON HIGHLANDS FILING NO. 2
PDR BASINS
(Surface Routing Summary)

Design Point(s)	*Contributing Basins*	*Equivalent CA_5*	*Equivalent CA_{100}*	*Maximum T_C*	*Intensity*		*Flow*	
					I_5	I_{100}	Q_5	Q_{100}
15	**C6**	2.16	2.64	19.3	3.1	5.2	*6.7*	*13.7*
15A	**C7**	2.75	3.45	22.5	2.9	4.8	*7.9*	*16.5*
16	**C8.1 & C8.2**	5.47	6.69	27.6	2.6	4.3	*14.2*	*28.4*
17	**C9.1 & C9.2**	4.24	5.19	21.5	2.9	4.9	*12.5*	*25.4*
18	**D1.1 & D1.2**	5.40	6.60	28.0	2.6	4.2	*13.9*	*27.8*
19	**D2**	2.02	2.47	20.0	3.0	5.1	*6.1*	*12.5*
20	**E**	0.49	0.68	17.6	3.2	5.4	*1.6*	*3.7*
21	**F**	1.63	2.28	16.3	3.3	5.7	*5.4*	*12.9*
POND 1	**BASINS B1.1 THRU B10.2**	52.64	63.35	29.2	2.5	4.1	*132.5*	*260.7*
POND 2	**BASINS C1.1 THRU C10**	37.53	46.20	34.3	2.3	3.7	*86.5*	*172.7*

*Used to calculate the combined flow at DP-3 & DP-5 for split flow between inlets.

Calculated by: QNA
Date: 07/15/05
Checked by: _____

PIPE RUN 5 USED TO QUANTIFY OS-5 RUNOFF MINUS OS-1 AND OS-2 RUNOFF

PIPE RUN 7 USED TO QUANTIFY OS-6 RUNOFF MINUS OS-3

FALCON HIGHLANDS FILING NO. 2
PDR BASINS
(Pipe Routing Summary)

Pipe Routes	*Contributing Design Points*	*Equivalent CA_5*	*Equivalent CA_{100}*	*Maximum T_C*	*Intensity*		*Flow*	
					I_5	*I_{100}*	*Q_5*	*Q_{100}*
1	**DP-1 & DP-4**	13.43	14.99	28.3	2.6	4.2	*34.4*	*62.8*
2	**PR-1 & DP-2**	17.90	19.95	28.3	2.6	4.2	*45.8*	*83.7*
3	**PR-2, DP-3 & DP-5**	32.31	39.74	28.3	2.6	4.2	*82.7*	*166.6*
4	**DP-12 & DP-13 PICK UP**	6.21	7.01	24.5	2.8	4.6	*17.1*	*31.9*
5	**PR-3 & PR-4**	38.51	46.76	28.3	2.6	4.2	*98.6*	*196.0*
6	**DP-8 & DP-9**	9.24	8.44	27.3	2.6	4.3	*24.1*	*36.1*
7	**PR-6 & DP-10**	13.51	15.04	27.3	2.6	4.3	*35.3*	*64.4*
8	**PR-7 & DP-14**	17.17	19.57	27.3	2.6	4.3	*44.8*	*83.8*
9	**PR-8 & DP-15**	19.34	22.21	27.3	2.6	4.3	*50.5*	*95.1*
10	**PR-9 & DP-15A**	22.08	25.67	27.3	2.6	4.3	*57.6*	*109.9*
11	**DP-11, DP-16 & DP-17**	15.03	18.52	34.3	2.3	3.7	*34.6*	*69.2*
12	**DP-18**	5.40	6.60	28.03	2.6	4.2	*13.9*	*27.8*
13	**DP-19**	2.02	2.47	20.02	3.0	5.1	*6.1*	*12.5*

Calculated by: QNA
Date: 07/15/05
Checked by: _____

PIPE RUNS 12 AND 13 USED TO QUANTIFY POND WU TRIBUTARY AREA AND RUNOFF FOR COMPARISON TO 2022 MDDP

THE 2010 FDR UTILIZED THE MDDP MAJOR BASINS FOR FILING NO. 1 DEVELOPED CONDITIONS / FILING NO. 2 & 3 EXISTING CONDITIONS FOR THE FILING NO. 1 OFFSITE AREAS.

FALCON HIGHLANDS PHASE 2
FILING No. 2 and 3
MDDP MAJOR BASINS
(Area Runoff Coefficient Summary)

HISTORIC

		STREETS / DEVELOPED			*OVERLAND / UNDEVELOPED*			*COMPOSITE C*	
BASIN	**TOTAL AREA** *(Acres)*	**AREA** *(Acres)*	**C_5**	**C_{100}**	**AREA** *(Acres)*	**C_5**	**C_{100}**	**C_5**	**C_{100}**
EX-1	21 75	0 00	0 60	0 70	21 75	0 25	0 35	0 25	0 35
EX-2	64 61	0 00	0 60	0 70	64 61	0 25	0 35	0 25	0 35
EX-3	99 57	0 00	0 60	0 70	99 57	0 25	0 35	0 25	0 35
EX-4	71 71	0 00	0 60	0 70	71 71	0 25	0 35	0 25	0 35

EX-1 and EX-2 areas are part of Basin 78 from the Sand Creek DBPS and will use rational method to find the Historic Runoff
EX-3 is the area in Phase 2 that is tributary to Design Point 38 of the Sand Creek DBPS, and will use rational method to find the Historic Runoff
EX-4 is the area in Phase 2 that is tributary to Pond WU in the Falcon Basin DBPS

PROPOSED

		STREETS / DEVELOPED			*OVERLAND / UNDEVELOPED*			*COMPOSITE C*	
BASIN	**TOTAL AREA** *(Acres)*	**AREA** *(Acres)*	**C_5**	**C_{100}**	**AREA** *(Acres)*	**C_5**	**C_{100}**	**C_5**	**C_{100}**
A	14 81	6 21	0 50	0 60	8 60	0 25	0 35	0 35	0 45
B	105 45	101 13	0 50	0 60	4 32	0 25	0 35	0 49	0 59
C	88 47	77 31	0 45	0 55	11 16	0 25	0 35	0 42	0 52
D	27 78	27 00	0 45	0 55	0 78	0 25	0 35	0 44	0 54
E	2 20	0 00	0 50	0 60	2 20	0 25	0 35	0 25	0 35
F	6 34	0 00	0 50	0 60	6 34	0 25	0 35	0 25	0 35
G	12 61	0 00	0 50	0 60	12 61	0 25	0 35	0 25	0 35
OS-1	6 38	6 38	0 50	0 60	0 00	0 25	0 35	0 50	0 60
OS-2	3 12	3 12	0 90	0 95	0 00	0 25	0 35	0 90	0 95
OS-3	1 14	1 14	0 90	0 95	0 00	0 25	0 35	0 90	0 95

Calculated by QNA
Date 5/5/05

FALCON HIGHLANDS PHASE 2
FILING No. 2 and 3
MDDP MAJOR BASINS
(Area Drainage Summary)

HISTORIC

		WEIGHTED		*OVERLAND*				*STREET / CHANNEL FLOW*				T_t	Tc USED	*INTENSITY*		*TOTAL FLOWS*	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	(min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (cfs)	Q_{100} (cfs)
		* For Calcs See Runoff Summary															
EX-1	21 75	0 25	0 35	0 25	360	10 0	21 5	0	0 0%	0 0	0 0	21 5	21 5	2 9	4 9	*16 0*	*37 2*
EX-2	64 61	0 25	0 35	0 25	300	10 0	18 5	3750	1 5%	3 0	20 8	39 3	39 3	2 1	3 4	*34 4*	*77 6*
EX-3	99 57	0 25	0 35	0 25	300	8 0	19 9	2770	1 7%	3 2	14 4	34 3	34 3	2 3	3 7	*57 3*	*130 1*
EX-4	71 71	0 25	0 35	0 25	280	8 0	18 8	1900	1 3%	2 7	11 7	30 5	30 5	2 5	4 0	*44 0*	*100 6*

EX-1 and EX-2 area is planimetered from Sand Creek DBPS and will use rational method to find the Historic Runoff
EX-3 is the area in Phase 2 that is tributary to Design Point 38 of the Sand Creek DBPS
EX-4 is the area in Phase 2 that is tributary to Pond WU in the Falcon Basin DBPS

PROPOSED

		WEIGHTED		*OVERLAND*				*STREET / CHANNEL FLOW*				T_t	Tc USED	*INTENSITY*		*TOTAL FLOWS*	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	(min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (cfs)	Q_{100} (cfs)
		* For Calcs See Runoff Summary															
A	14 81	0 35	0 45	0 25	300	6 0	21 9	233	3 0%	3 3	1 2	23 1	23 1	2 8	4 7	*14 9*	*31 7*
B	105 45	0 49	0 59	0 25	170	3 4	16 5	3890	2 5%	3 1	20 9	37 4	37 4	2 2	3 5	*113 3*	*220 3*
C	88 47	0 42	0 52	0 25	110	4 0	10 9	3255	1 3%	2 2	24 7	35 5	35 5	2 3	3 7	*84 9*	*169 7*

FALCON HIGHLANDS PHASE 2
FILING No. 2 and 3
MDDP MAJOR BASINS
(Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T_t	Tc USED	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	(min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (cfs)	Q_{100} (cfs)
		* For Calcs See Runoff Summary															
D	27 78	0 44	0 54	0 25	180	3 6	17 0	1420	1 5%	2 4	9 9	26 8	26 8	2 6	4 3	32 5	65 4
E	2 20	0 25	0 35	0 25	90	5 0	8 6	1080	1 0%	2 0	9 0	17 6	17 6	3 2	5 4	1 8	4 2
F	6 34	0 25	0 35	0 25	125	4 0	12 1	630	1 6%	2 5	4 2	16 3	16 3	3 3	5 7	5 3	12 5
G	12 61	0 25	0 35	0 25	300	7 0	20 8	285	1 8%	2 6	1 8	22 6	22 6	2 9	4 8	9 0	21 0
OS-1	6 38	0 50	0 60	0 25	100	2 0	12 6	608	2 0%	2 8	3 6	16 3	16 3	3 4	5 7	10 7	21 7
OS-2	3 12	0 90	0 95	0 25	100	2 0	12 6	1525	1 2%	2 2	11 6	24 2	24 2	2 8	4 6	7 8	13 6
OS-3	1 14	0 90	0 95	0 25	20	0 4	5 7	1190	0 6%	1 8	11 0	16 7	16 7	3 3	5 6	3 4	6 0

Calculated by QNA
Date 5/5/05

FALCON HIGHLANDS PHASE 2
FILING No. 2 and 3
MDDP MAJOR BASINS
(Surface Routing Summary)

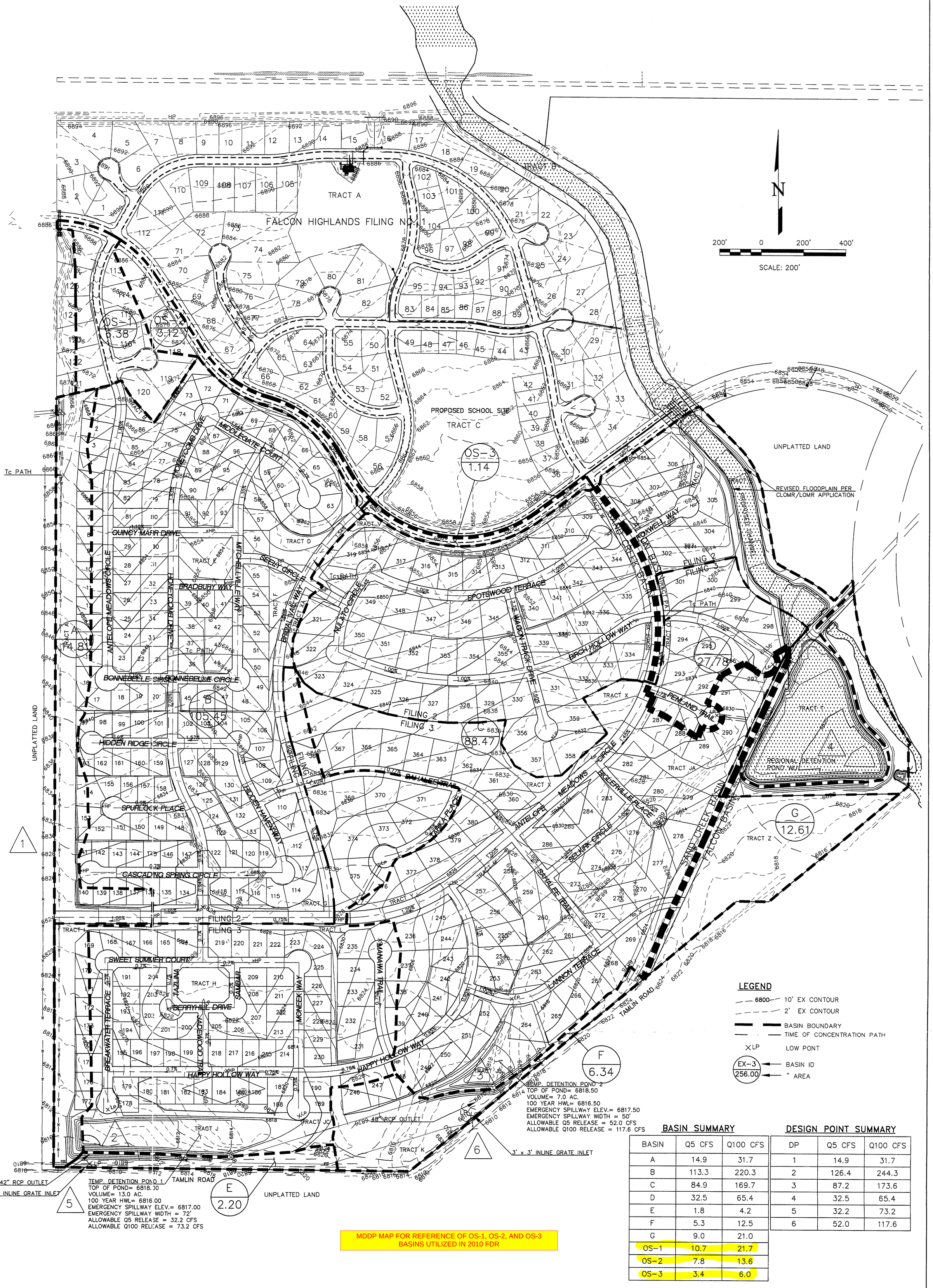
HISTORIC

Design Point(s)	*Contributing Basins*	*Equivalent CA_5*	*Equivalent CA_{100}*	*Maximum T_C*	*Intensity*		*Flow*	
					I_5	I_{100}	Q_5	Q_{100}
1	"EX-1"	5 44	7 61	21 5	2 9	4 9	*16 0*	*37 2*
2	"EX-2"	16 15	22 61	39 3	2 1	3 4	*34 4*	*77 6*
3	"EX-3"	24 89	34 85	34 3	2 3	3 7	*57 3*	*130 1*
4	"EX-4"	17 93	25 10	30 5	2 5	4 0	*44 0*	*100 6*

PROPOSED

Design Point(s)	*Contributing Basins*	*Equivalent CA_5*	*Equivalent CA_{100}*	*Maximum T_C*	*Intensity*		*Flow*	
					I_5	I_{100}	Q_5	Q_{100}
1	"A"	5 25	6 73	23 1	2 8	4 7	*14 9*	*31 7*
2	"B", "OS-1" & "OS-2",	57 64	68 98	37 4	2 2	3 5	*126 4*	*244 3*
3	"C", & "OS-3"	38 60	47 51	35 5	2 3	3 7	*87 2*	*173 6*
4	"D"	12 35	15 12	26 8	2 6	4 3	*32 5*	*65 4*

Calculated by QNA
Date 5/5/05
Checked by _____



BASIN SUMMARY

BASIN	Q5 CFS	Q100 CFS
A	14.9	31.7
B	113.3	220.3
C	84.9	169.7
D	32.5	65.4
E	1.8	4.2
F	5.3	12.5
G	9.0	21.0
OS-1	10.7	21.7
OS-2	7.8	13.6
OS-3	3.4	6.0

DESIGN POINT SUMMARY

DP	Q5 CFS	Q100 CFS
1	14.9	31.7
2	126.4	244.3
3	87.2	173.6
4	32.5	65.4
5	32.2	73.2
6	52.0	117.6

MDDP MAP FOR REFERENCE OF OS-1, OS-2, AND OS-3 BASINS UTILIZED IN 2010 FDR

DESIGNED BY QNA
DRAWN BY BEB
CHECKED BY
V-SCALE
H-SCALE 1"= 200'
JOB NO. 0429.00
DATE ISSUED 9/16/05
SHEET NO. 1 OF 1

FALCON HIGHLANDS PHASE 2

FILINGS NO. 2 & 3
DEVELOPED MDDP MAP
PROPOSED MAJOR BASINS

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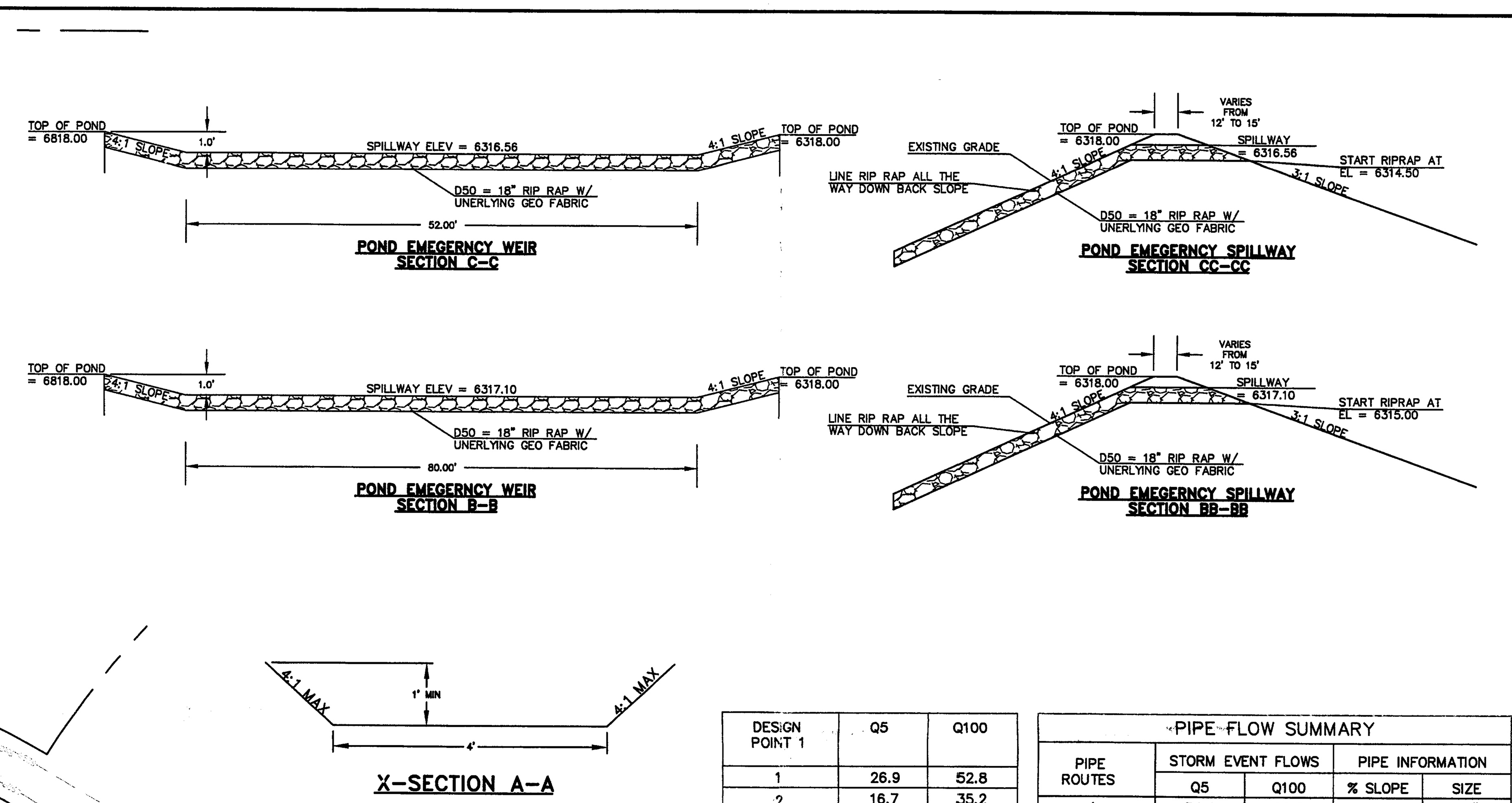
FALCON HIGHLANDS
ATTN: MR. MIKE SCOTT
25 N. TEJON, SUITE 300
COORADO SPRINGS, CO 80903
(719) 227-1022

REVISIONS

NO.	DESCRIPTION	DATE
1	PER COUNTY DP COMMENTS	5/05/05
2	PER COUNTY DP COMMENTS	9/16/05



DESIGN POINT 1	Q5	Q100
1	26.9	52.8
2	16.7	35.2
3	15.4	34.9
4	22.9	45.2
5	21.6	48.4
6	18.6	36.9
7	17.6	34.9
8	14.4	29.2
9	15.2	30.5
10	11.1	28.3
11	12.3	24.8
12	8.0	16.1
13	13.2	26.6
14	10.5	21.6
15	6.7	13.7
15A	7.9	16.5
16	14.2	28.4
17	12.5	25.4
18	13.9	27.8
19	6.1	12.5
20	1.8	4.3
21	5.4	12.9
POND 1	132.5	260.7
POND 1	86.5	172.7

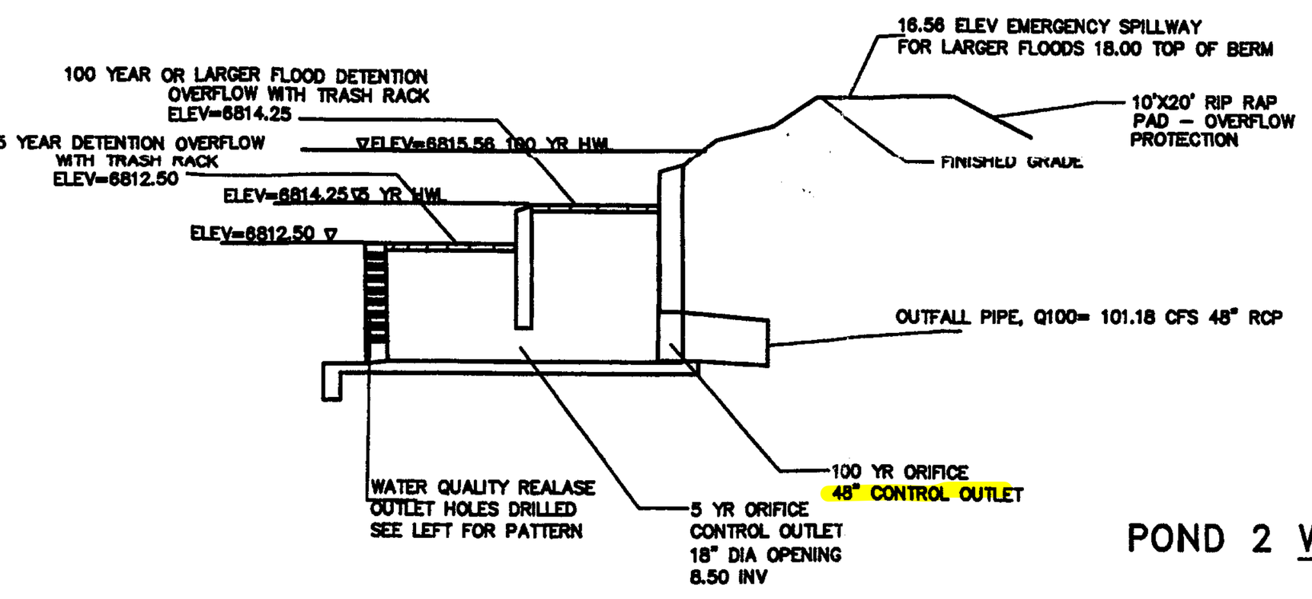
PIPE FLOW SUMMARY

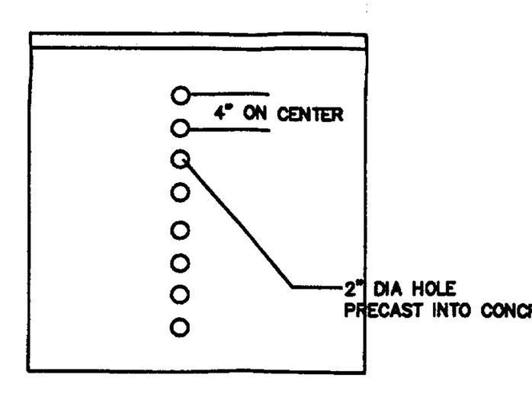
PIPE ROUTES	STORM EVENT FLOWS		PIPE INFORMATION	
	Q5	Q100	% SLOPE	SIZE
1	34.4	62.8	1.97	36"
2	45.8	83.7	0.90	42"
3	82.7	166.6	0.50	60"
4	17.1	31.9	0.50	36"
5	98.6	196.0	0.50	60"
6	24.1	36.1	0.90	30"
7	35.3	64.4	0.87	36"
8	44.8	83.8	0.60	42"
9	50.5	95.1	0.50	48"
10	57.6	109.9	0.50	54"
11	34.6	69.2	0.50	42"
12	13.9	27.8	0.62	30"
13	6.1	12.5	4.11	24"

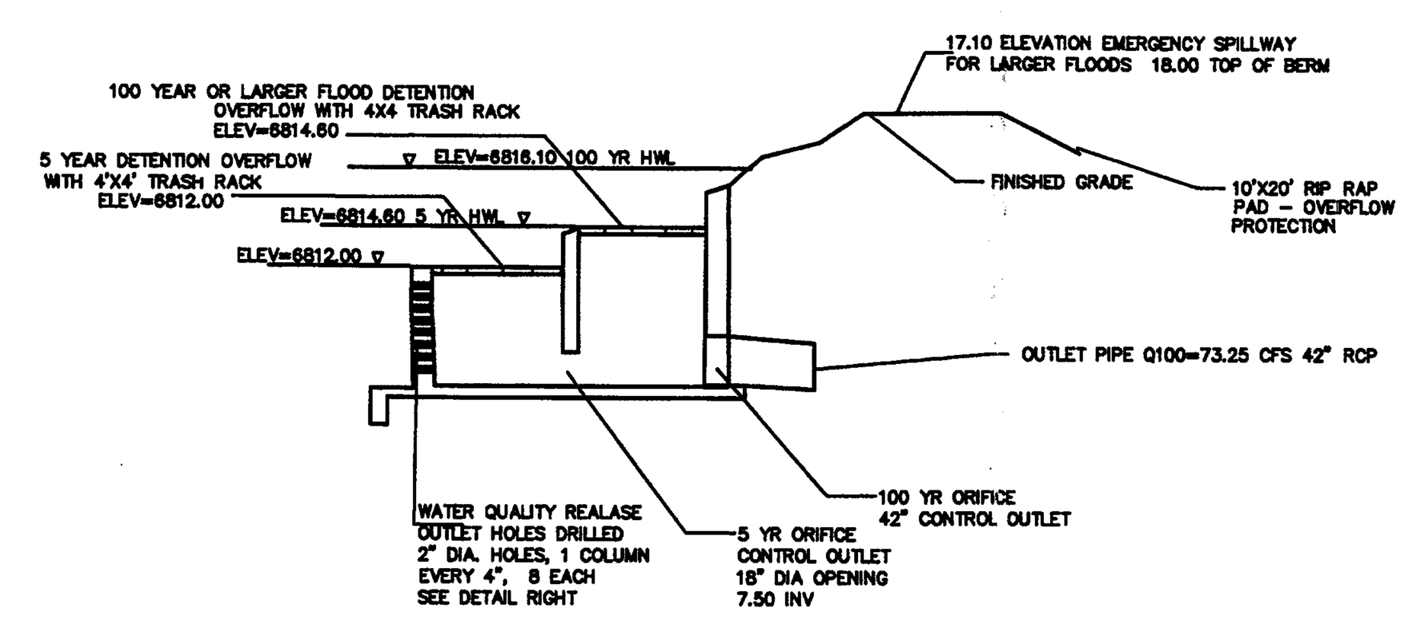
PIPE RUN 5 USED TO QUANTIFY OS-5 RUNOFF MINUS OS-1 AND OS-2 RUNOFF

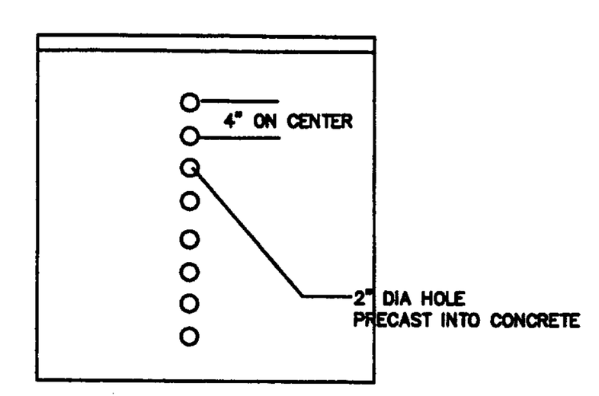
PIPE RUN 7 USED TO QUANTIFY OS-6 RUNOFF MINUS OS-3

PIPE RUNS 12 AND 13 USED TO QUANTIFY POND WU TRIBUTARY AREA AND RUNOFF FOR COMPARISON TO 2022 MDDP


POND 2 OUTLET DETAIL
SEE ALSO FIG. 2-A DROP BOX OUTLET OPTION IN DCM VOLUME 2
NOT TO SCALE


POND 2 WATER QUALITY HOLE PATTERN
NOT TO SCALE


POND 1 OUTLET DETAIL
SEE ALSO FIG. 2-A DROP BOX OUTLET OPTION IN DCM VOLUME 2
NOT TO SCALE


POND 1 WATER QUALITY HOLE PATTERN
NOT TO SCALE

LEGEND

- 6800 10' EX CONTOUR
- 2' EX CONTOUR
- 10' PROP. CONTOUR
- 2' PROP. CONTOUR
- BASIN BOUNDARY
- MAJOR BASIN BOUNDARYS PER MDDP
- XLP LOW POINT
- XHP HIGH POINT
- A / 1.2 BASIN ID
- DESIGN POINT ID
- PROPOSED FLOODPLAIN AREA
- EXISTING FLOODPLAIN AREA

SCALE: 200'

REVISIONS

NO.	DESCRIPTION	DATE
1	PER COUNTY/INHOUSE COMMENTS	10/16/05

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, TERRA NOVA ENGINEERING AND SURVEYING, INC. APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

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FALCON HIGHLANDS FILING 2 & 3

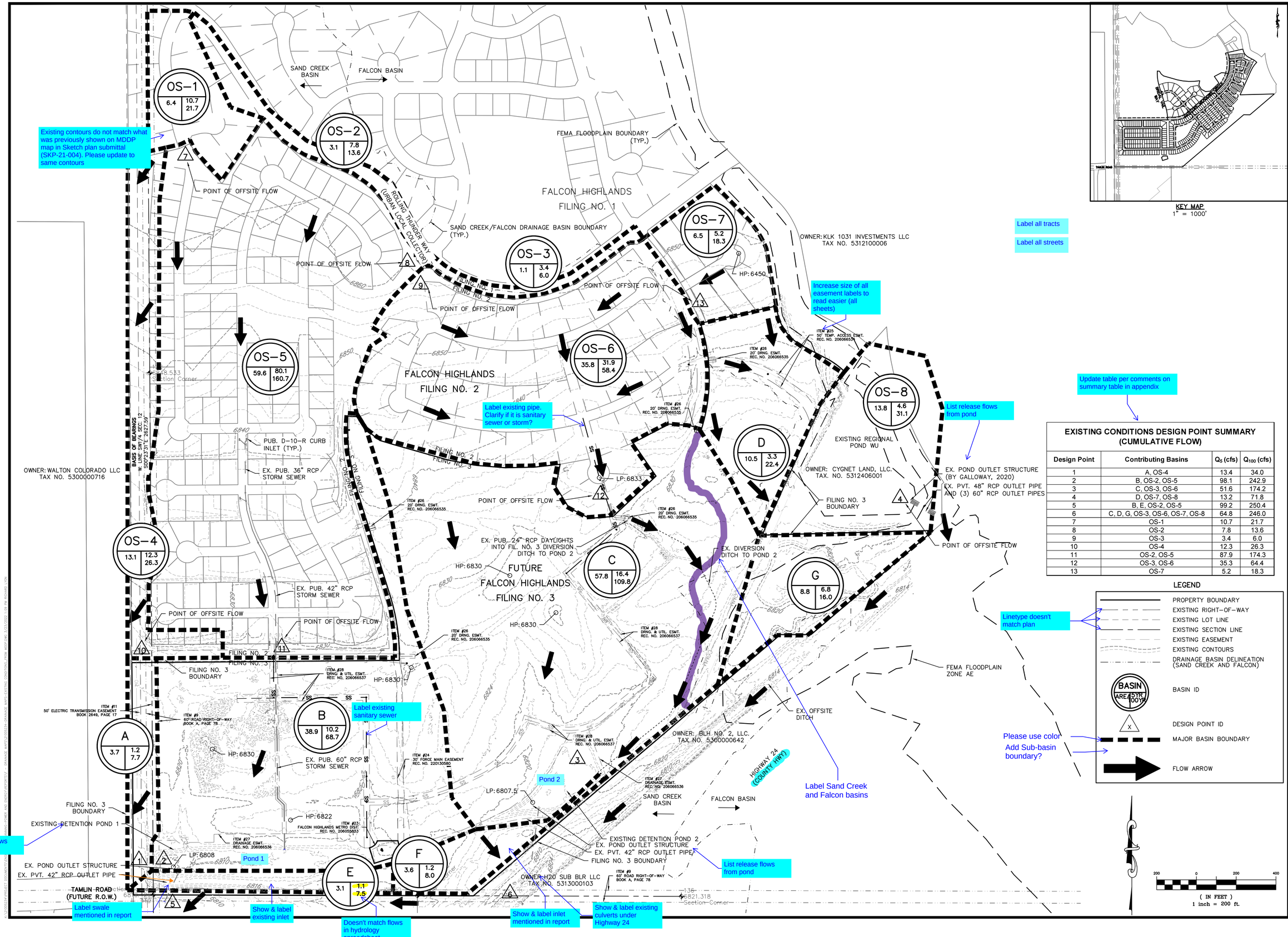
FINAL DRAINAGE MAP
PROPOSED DRAINAGE CONDITIONS

DESIGNED BY	QNA
DRAWN BY	QNA
CHECKED BY	
H-SCALE	1"=200'
V-SCALE	NA
JOB NO.	0429.00
DATE ISSUED	11/11/05
SHEET NO.	1 OF 1

APPENDIX G

DRAINAGE MAPS

143 Union Boulevard, Suite 700, Lakewood, CO 80228 Tel: 303.462.1100 Fax: 303.825.7110
www.atwell-group.com



KEY MAP
1" = 1000'

EXISTING CONDITIONS DESIGN POINT SUMMARY (CUMULATIVE FLOW)

Design Point	Contributing Basins	Q_5 (cfs)	Q_{100} (cfs)
1	A, OS-4	13.4	34.0
2	B, OS-2, OS-5	98.1	242.9
3	C, OS-3, OS-6	51.6	174.2
4	D, OS-7, OS-8	13.2	71.8
5	B, E, OS-2, OS-5	99.2	250.4
6	C, D, G, OS-3, OS-6, OS-7, OS-8	64.8	246.0
7	OS-1	10.7	21.7
8	OS-2	7.8	13.6
9	OS-3	3.4	6.0
10	OS-4	12.3	26.3
11	OS-2, OS-5	87.9	174.3
12	OS-3, OS-6	35.3	64.4
13	OS-7	5.2	18.3

LEGEND

- PROPERTY BOUNDARY
- EXISTING RIGHT-OF-WAY
- EXISTING LOT LINE
- EXISTING SECTION LINE
- EXISTING EASEMENT
- EXISTING CONTOURS
- DRAINAGE BASIN DELINEATION (SAND CREEK AND FALCON)
- BASIN ID (BASIN / AREA / 5YR / 100YR)
- DESIGN POINT ID (X)
- MAJOR BASIN BOUNDARY
- FLOW ARROW

Know what's below. Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE:
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JIM BYERS

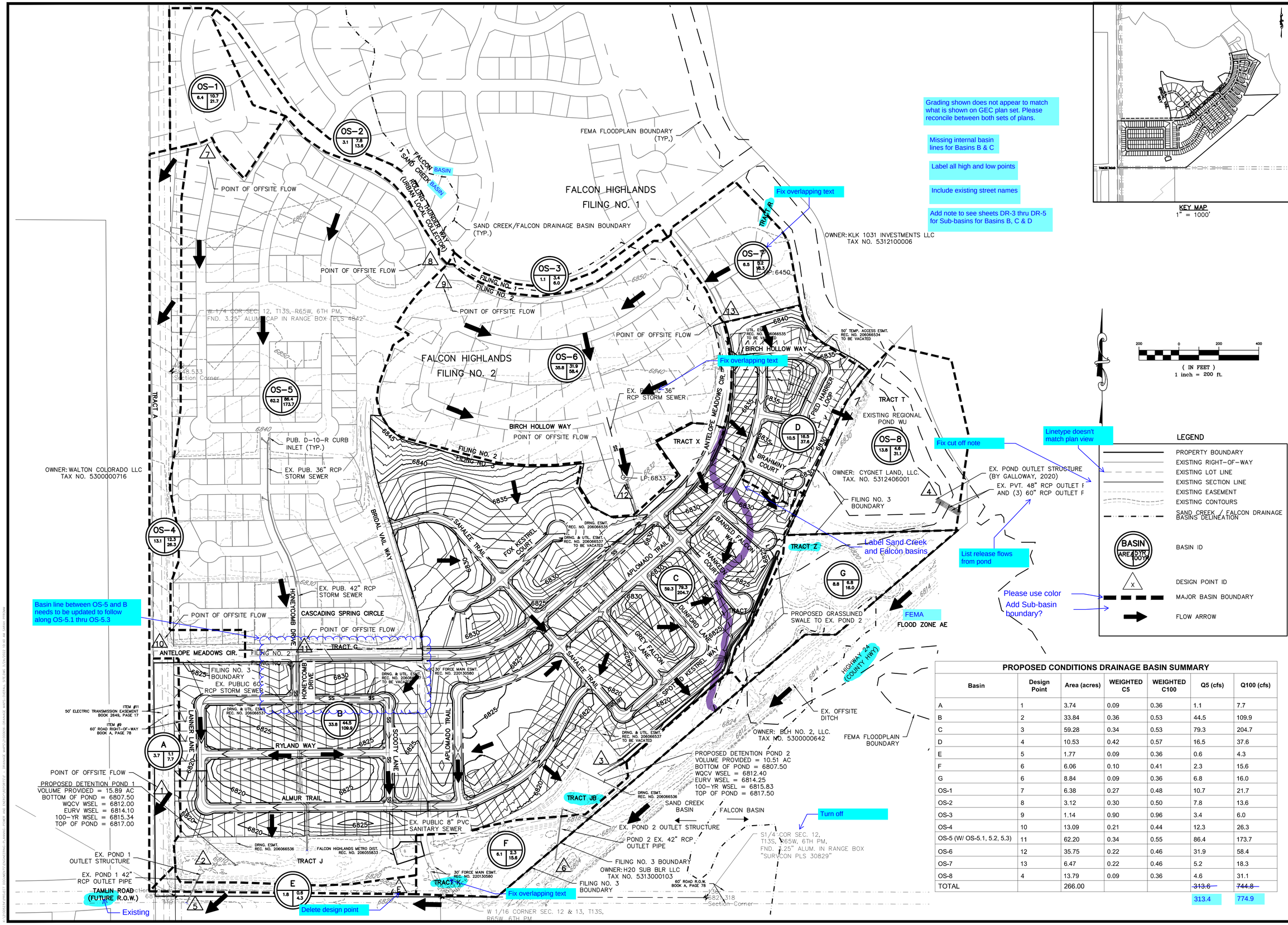
CLIENT
CHALLENGER HOMES
FALCON HIGHLANDS FILING NO. 3
EL PASO COUNTY, COLORADO
DRAINAGE MAP
EXISTING CONDITIONS

DATE 3/22/2022

	REVISIONS
A	1st SUBMITTAL TO JURISDICTION 02/11/2022

DR. SLP CH. RDL
P.M. RDL
JOB 21005234
SHEET NO. 1
EX-01

CAD FILE: 21005234-DRAINAGE MAPS-EXISTING CONDITIONS_FROM MDDP.DWG



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JIM BYERS

CLIENT
CHALLENGER HOMES
FALCON HIGHLANDS FILING NO. 3
EL PASO COUNTY, COLORADO
DRAINAGE MAP
MAJOR BASINS PROPOSED CONDITIONS

DATE 3/23/2022

A	1st SUBMITTAL TO JURISDICTION	02/11/2022

REVISIONS

DR. SLP CH. RDL
P.M. RDL
JOB 21005234
SHEET NO. 1
DR-02

PROPOSED CONDITIONS DRAINAGE BASIN SUMMARY

Basin	Design Point	Area (acres)	WEIGHTED C5	WEIGHTED C100	Q5 (cfs)	Q100 (cfs)
A	1	3.74	0.09	0.36	1.1	7.7
B	2	33.84	0.36	0.53	44.5	109.9
C	3	59.28	0.34	0.53	79.3	204.7
D	4	10.53	0.42	0.57	16.5	37.6
E	5	1.77	0.09	0.36	0.6	4.3
F	6	6.06	0.10	0.41	2.3	15.6
G	6	8.84	0.09	0.36	6.8	16.0
OS-1	7	6.38	0.27	0.48	10.7	21.7
OS-2	8	3.12	0.30	0.50	7.8	13.6
OS-3	9	1.14	0.90	0.96	3.4	6.0
OS-4	10	13.09	0.21	0.44	12.3	26.3
OS-5 (W/ OS-5.1, 5.2, 5.3)	11	62.20	0.34	0.55	86.4	173.7
OS-6	12	35.75	0.22	0.46	31.9	58.4
OS-7	13	6.47	0.22	0.46	5.2	18.3
OS-8	4	13.79	0.09	0.36	4.6	31.1
TOTAL		266.00			~~313.6~~	~~744.8~~
					313.4	774.9

Add existing street names

Missing Design Point labels for OS-5 basins

What basin is this area part of?

Show and label cross pans

Label all swales (use same naming convention as used in appendix).

Ensure all lot #'s are visible.

Label all High Points (all sheets)

Include match lines

Make phasing lines a bit narrower so basin lines are easier to see.

Need to show overflow path for all sump inlets

Label what this area is

Delete

NOTE: SEE SHEET DR-05, SUB-BASINS SHEET 3, FOR DESIGN POINT AND SUB-BASIN SUMMARY WITH INLET SIZES

Linetypes don't match plan

Show & label existing culverts under Highway 24

No difference between linetypes in plan view

Turn on water line

Show & label inlet mentioned in report

Show & label existing inlet

Label Highway 24

KEY MAP
1" = 1000'

(IN FEET)
1 inch = 80 ft.

LEGEND

- PROPERTY BOUNDARY
- EXISTING RIGHT-OF-WAY
- PROPOSED LOT LINE
- EXISTING LOT LINE
- EXISTING SECTION LINE
- PROPOSED EASEMENT
- EXISTING EASEMENT
- PROPOSED CONTOURS
- EXISTING CONTOURS
- BASIN ID (BASIN / AREA / 5YR / 100YR)
- DESIGN POINT ID (X)
- MAJOR BASIN BOUNDARY
- MINOR BASIN BOUNDARY
- DRAINAGE BASIN BOUNDARY
- FLOW ARROW
- PHASE 1
- PHASE 2
- FUTURE PHASE
- FUTURE PHASE

Know what's below. Call before you dig.

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CHALLENGER HOMES
FALCON HIGHLANDS FILING NO. 3
EL PASO COUNTY, COLORADO

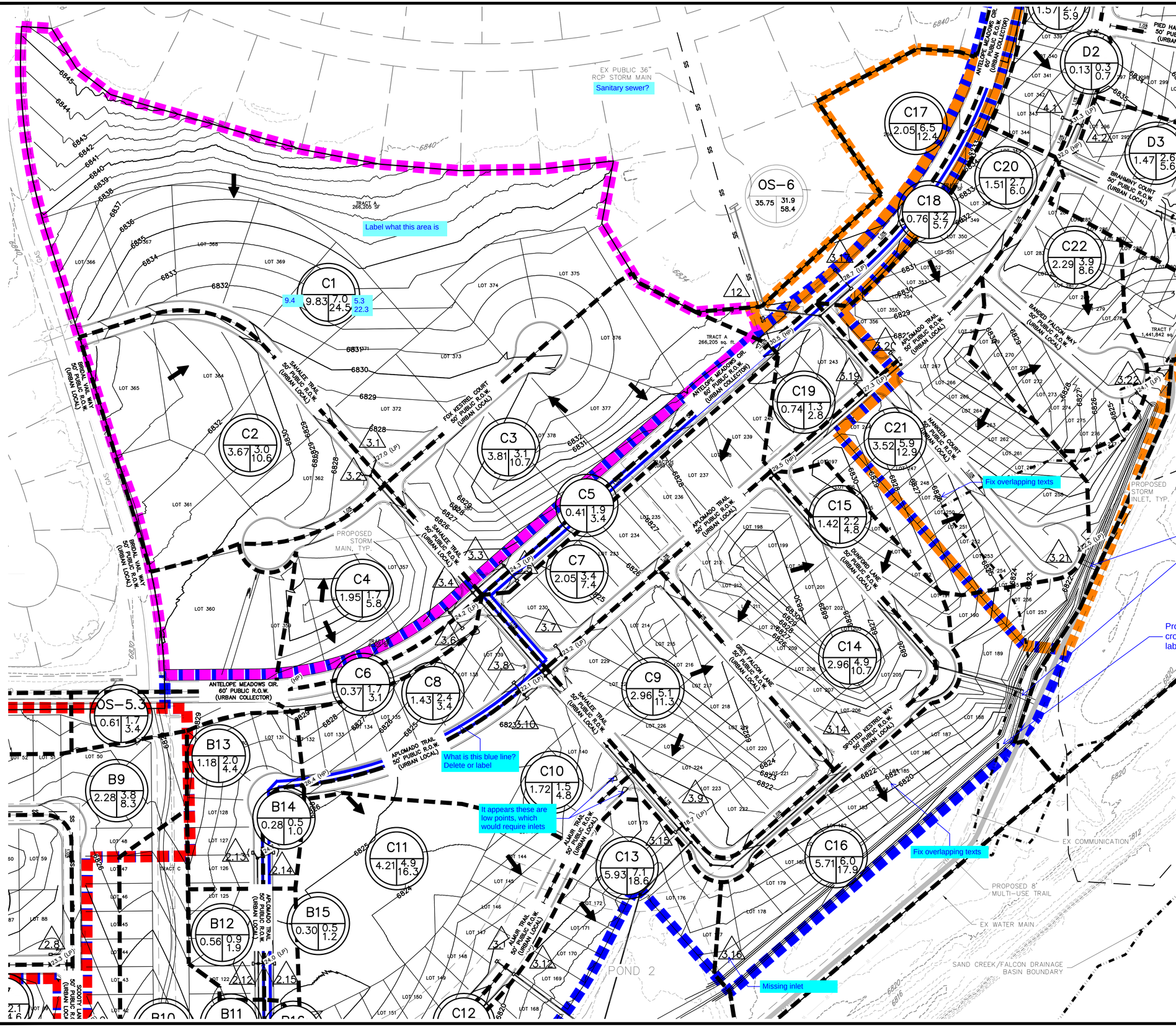
DRAINAGE MAP
SUB-BASINS
SHEET 1

DATE 3/23/2022

REVISIONS
A 1st SUBMITTAL TO JURISDICTION 02/11/2022

DR. SLP | CH. RDL
P.M. RDL
JOB 21005234
SHEET NO. 1
DR-03

CAD FILE: 21005234-DRAINAGE MAPS-SUB BASINS_BASIN B.DWG



KEY MAP
1" = 1000'

(IN FEET)
1 inch = 80 ft.

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FALCON HIGHLANDS FILING NO. 3
EL PASO COUNTY, COLORADO
DRAINAGE MAP
SUB-BASINS
SHEET 2

DATE 3/23/2022

	REVISIONS
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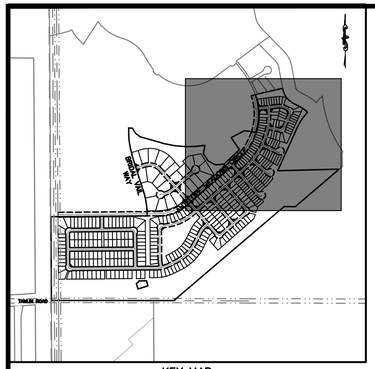
DR. SLP | CH. RDL
P.M. RDL
JOB 21005234
SHEET NO. 1
DR-04

CAD FILE: 21005234-DRAINAGE MAPS-SUB BASINS_BASIN 8.DWG



KEY MAP
1" = 1000'

See comments from sheet DR-03

Add Design Point Summary Table

10' inlet per spreadsheet

Missing inlet

Show outfall, forebay, trickle channel...

Adjust text to show inlets

Missing Design Point 3.18 on map

Fix overlapping text

Show the outfall swale/connection. About 4 acres appears to be diverted to Sand Creek - if so, a deviation request is required but may not be supported. Show major basin line.

Revise label to match hydrology spreadsheet

Fix overlapping text

0.34

SAND CREEK/FALCON DRAINAGE BASIN BOUNDARY (TYP.)

PROPOSED 8' MULTI-USE TRAIL

EX PUBLIC 24" RCP STORM MAIN

PROPOSED STORM MAIN, TYP.

PROPOSED STORM INLET, TYP.

FEMA FLOODPLAIN BOUNDARY

FLOOD ZONE AE

(IN FEET)
1 inch = 80 ft.

PROPOSED CONDITIONS DESIGN POINT SUMMARY

Basin	Inlet	Design Point	Area (acres)	C5	C100	Q5 (cfs)	Q100 (cfs)
B1	10' CDOT TYPE R, SUMP	2.1	5.30	0.45	0.59	7.88	17.34
B2	10' CDOT TYPE R, SUMP	2.2	4.06	0.45	0.59	6.39	14.07
B3	10' CDOT TYPE R, SUMP	2.3	4.41	0.45	0.59	6.94	15.28
B4	-	2.4	8.65	0.09	0.36	2.65	17.76
B5	5' CDOT TYPE R, SUMP	2.5	1.01	0.45	0.59	2.35	5.17
B6	5' CDOT TYPE R, SUMP	2.6	0.50	0.45	0.59	0.89	1.97
B7	5' CDOT TYPE R, SUMP	2.7	0.90	0.45	0.59	2.09	4.61
B8	5' CDOT TYPE R, SUMP	2.8	1.75	0.45	0.59	2.93	6.45
B9	5' CDOT TYPE R, SUMP	2.9	2.28	0.45	0.59	3.78	8.33
B10	5' CDOT TYPE R, SUMP	2,10	2.07	0.45	0.59	3,48	7.67
B11	5' CDOT TYPE R, SUMP	2.11	0.31	0.45	0.59	0.65	1.43
B12	5' CDOT TYPE R, SUMP	2.12	0.56	0.45	0.59	0.85	1.87
B13	5' CDOT TYPE R, SUMP	2,13	1.18	0.45	0.59	1.98	4.36
B14	5' CDOT TYPE R, SUMP	2,14	0.28	0.45	0.59	0.46	1.01
B15	5' CDOT TYPE R, SUMP	2.15	0.30	0.45	0.59	0.52	1.15
B16	5' CDOT TYPE R, SUMP	2,16	0.28	0.45	0.59	0.64	1.42
C1	15' CDOT TYPE R, SUMP	3.1	9.40	0.17	0.42	5.31	22.31
C2	5' CDOT TYPE R, SUMP	3.2	3.67	0.22	0.46	3.01	10.57
C3	5' CDOT TYPE R, SUMP	3.3	3.81	0.22	0.46	3.05	10.72
C4	5' CDOT TYPE R, SUMP	3.4	1.95	0.22	0.46	1.65	5.81
C5	5' CDOT TYPE R, SUMP	3.5	0.41	0.90	0.96	1.88	3.38
C6	5' CDOT TYPE R, SUMP	3.6	0.37	0.90	0.96	1.72	3.08
C7	5' CDOT TYPE R, SUMP	3.7	2.05	0.45	0.59	3.36	7.39
C8	5' CDOT TYPE R, SUMP	3.8	1.43	0.45	0.59	2.43	5.35
C9	5' CDOT TYPE R, SUMP	3.9	2.96	0.45	0.59	5.11	11.25
C10	5' CDOT TYPE R, SUMP	3.10	1.72	0.23	0.45	1.49	4.84
C11	10' CDOT TYPE R, SUMP	3.11	4.21	0.22	0.45	4.86	16.27
C12	5' CDOT TYPE R, SUMP	3.12	0.41	0.90	0.96	1.91	3.42
C13	-	3.13	5.93	0.32	0.51	7.05	18.61
C14	5' CDOT TYPE R, SUMP	3.14	2.96	0.45	0.59	4.85	10.67
C15	5' CDOT TYPE R, SUMP	3.15	1.42	0.45	0.59	2.16	4.76
C16	10' CDOT TYPE R, SUMP	3.16	5.71	0.27	0.47	6.00	17.86
C17	5' CDOT TYPE R, SUMP	3.17	2.05	0.72	0.81	6.54	12.39
C18	5' CDOT TYPE R, SUMP	3.18	0.76	0.90	0.96	3.16	5.67
C19	5' CDOT TYPE R, SUMP	3.19	0.74	0.45	0.59	1.28	2.81
C20	5' CDOT TYPE R, SUMP	3.20	1.51	0.45	0.59	2.73	6.02
C21	5' CDOT TYPE R, SUMP	3.21	3.52	0.45	0.59	5.88	12.94
C22	5' CDOT TYPE R, SUMP	3.22	2.29	0.45	0.59	3.88	8.55
D1	5' CDOT TYPE R, SUMP	4.1	1.57	0.45	0.59	2.66	5.86
D2	5' CDOT TYPE R, SUMP	4.2	0.13	0.45	0.59	0.30	0.67
D3	5' CDOT TYPE R, SUMP	4.3	1.47	0.45	0.59	2.56	5.63
D4	5' CDOT TYPE R, SUMP	4.4	1.87	0.45	0.59	3.13	6.90
D5	10' CDOT TYPE R, SUMP	4.5	3.90	0.45	0.59	6.23	13.72
D6	5' CDOT TYPE R, SUMP	4.6	1.59	0.26	0.47	1.62	4.86
OS-5.1	5' CDOT TYPE R, SUMP	OS.1	0.79	0.45	0.59	1.50	3.31
OS-5.2	5' CDOT TYPE R, SUMP	OS.2	1.18	0,60	0.71	3,10	6.20
OS-5.3	5' CDOT TYPE R, SUMP	OS.3	0.61	0.60	0.71	1.72	3.44
A	-	1	3.74	0.09	0.36	1.15	7.70
E	-	5	1.77	0.09	0.36	0.64	4.29
F	-	6	6.06	0.10	0.41	2.33	15.61
G	-	6	8.84	0.09	0.36	6.80	16.00
OS-1	-	7	6.38	0.27	0.48	10.70	21.70
OS-2	-	8	3.12	0.30	0.50	7.80	13.60
OS-3	-	9	1.14	0.90	0.96	3.40	6.00
OS-4	-	10	13.09	0.21	0.44	12.30	26.30
OS-5	-	11	59.62	0.30	0.50	80.10	160.70
OS-6	-	12	35.75	0.22	0.46	31.90	58.40
OS-7	-	13	6.47	0.22	0.46	5.22	18.32
OS-8	-	4	13.79	0.09	0.36	4.63	31.08

LEGEND

- PROPERTY BOUNDARY
- EXISTING RIGHT-OF-WAY
- PROPOSED LOT LINE
- EXISTING LOT LINE
- EXISTING SECTION LINE
- PROPOSED EASEMENT
- EXISTING EASEMENT
- PROPOSED CONTOURS
- EXISTING CONTOURS
- BASIN ID (BASIN / AREA / 5YR / 100YR)
- DESIGN POINT ID
- MAJOR BASIN BOUNDARY
- MINOR BASIN BOUNDARY
- DRAINAGE BASIN BOUNDARY
- FLOW ARROW
- PHASE 1
- PHASE 2
- FUTURE PHASE
- FUTURE PHASE

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DRAINAGE MAP
SUB-BASINS
SHEET 3

DATE 3/23/2022

REVISIONS
A 1st SUBMITTAL TO JURISDICTION 02/11/2022

DR. SLP CH. RDL
P.M. RDL

JOB 21005234
SHEET NO. 1
DR-05

CAD FILE: 21005234-DRAINAGE MAPS-SUB BASINS_BASIN B.DWG