Falcon Highlands Filing No. 3

Master Development Drainage Plan

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
21000656

Submitted by: Atwell, LLC

January 28, 2022

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.

Jennifer Irvine / County Engineer, Director Date

Conditions:

Table of Contents

Please switch Appendix F & G. Drainage Maps should be last items in report.

Rearranged.

INTRODUCTION

This Master Development Drainage Plan Report 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 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. Prior to that Final Drainage Report, a Master Development Drainage Plan report entitled *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 was developed. This new Master Development Drainage Plan (MDDP) acts as an update of the previous MDDP for the development of Falcon Highlands Filing No. 3 area and basins.

The entire site for Falcon Highlands Filing No. 3 is approximately 125.6 acres and will include a total of approximately 380 units. This is an additional 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 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 this 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 three phases to plan for and accommodate water supply by the Metro District for what is anticipated to be approximately 55 water service taps in the initial Phase 1 of the development based on available water and an additional 191 taps following the new well connection, which includes Phases 1 and 2. Future Phases 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.

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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 Preliminary Plan and Development Plan for Falcon Highlands Phase 2, Filing No. 2 & 3 prepared by Terra Nova Engineering, most recent revised date of September 15, 2005. 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 cut in during the construction of Filing No. 2 that were designed for development of both Filings Nos. 2 and 3. The on site slopes range from 0 percent to 10 percent and generally sheet flows from west to east. A Historic Drainage Map is included in Appendix F showing the delineated drainage basins.

The west edge of the Site has existing electric power lines and natural gas main within an existing utility easement. 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.

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.

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.

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 and are to be constructed according to engineered construction drawings and a Final Drainage Report for Filing No. 3. More specific details regarding the proposed drainage improvements for the Site will be provided in the Final Drainage Report.

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. Drainage Maps of existing and proposed conditions can be found in Appendix F.

The site falls within the Sand Creek Drainage Basin as well as partially within the Falcon Drainage Basin. The Drainage Basin Planning Study (DBPS) for Sand Creek Drainage Basin by Stantec HDR Dewberry, dated January 2021 and the City of Colorado Springs Sand Creek Basin GIS website show that the nearest creek EF1R9-T1R1 is located approximately 400 feet west of the site, located on the Banning Lewis Ranch Property. The Falcon Drainage Study by Matrix Design Group, dated September 2015, shows no existing or future drainageway improvements within the Site. Drainage from the site will outflow per historical conditions.

DRAINAGE DESIGN CRITERIA

The El Paso County Drainage Criteria Manual and El Paso County Engineering Criteria Manual were used in conjunction with the Mile High Flood District 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.

Revised. Existing

HISTORIC AND OFFSITE DRAINAGE BASINS

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. 2 & 3 by Terra Nova Engineering, Inc. dated August 2010.

The developments of Falcon Highlands Filing No. 1 & 2 remained consistent with their respective Master Development Drainage Plans and Final Drainage Reports and therefore offsite drainage

Include discussion that existing conditions is with Filing 2 developed and historic conditions (pre-Filing 2 development) was done as existing conditions in previous reports and calculations can be found there

Language added.

basin descriptions and delineations provided in this report are based on those previous County approved reports. Relevant excerpts from these reports are included in Append G.

spelling Revised.

All off-site drainage basin runoff data and calculations have been updated for current codes and standards consistent with the El Paso County Drainage Criteria Manual. 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. This delineation is shown on the Drainage Basin Map.

The site has been broken down into six major off-sit Filing No. 3, within the existing development of Filing No. 2 and relatively s g No. 1. Descriptions of the major basins and their respective sub-basins are asins match the naming convention of the previous Final Drainage Report d 3 to be consistent. A drainage map is in the appendix.

FDR excerpts added to replace PDR reference material.

Appendix shows information is from Preliminary Drainage Report.

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

This is Basin OS-1. Did you mean Basin OS-5?

We rearra Offsite Basi the 2010 FD compare apples. mention respon

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 which is connected to the storm system of Filing No. 3, and ultimately outfalls into the existing Pond 1.

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 and ultimately into the public storm system shared with Filing No. 3, outfalling toexisting Detention Pond 2.

OS-4 (9.53 ac, Q_5 = 14.9 cfs, Q_{100} = 31.7 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.

OS-4 Revised.

OS-5 (63.24 ac, Q_5 = 82.7 cfs, Q_{100} = 166.6 cfs) is an off-site basin that stretches from the eastern border of basin OS-1 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 connected to Filing No. 2 where the flow outfalls into the existing Pond 1.

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 connects and daylights to Filing No. 3 within future Antelope Meadows Circle right-of-way.

OS-4

Revised.

How does flow n through Basin C existing condition

Basin A (3.74 ac, Q_5 = 1.2 cfs, Q_{100} = 7.7 cfs) is the basin located southwest of Antelope Mea Circle, just below basin OS-1, west of Basin B. The majority of the site 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 and per historical drainage patterns is not tributary t on-site detention ponds.

Language regarding the diversion ditc has been added.

Include discussion of DP 1, combined flow of Basins OS-4 & A, exits site and where does it go?

Basin B (38.93 ac, Q_5 = 10.2 cfs, *Language added.* cated 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 a dedicated existing pond, Pond 1.

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. 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 a dedicated existing pond, Pond 2.

Basin D (10.54 ac, Q_5 = 3.3 cfs, Q_{100} = 22.4 cfs) is located to the northeast of the Filing and consist of undeveloped area with native grasses. The basin flows directly to existing

Revised.

E?

Basin E (3.14 ac, Q_5 = 1.8 cfs, Q_{100} = 4.2 cfs) is the undeveloped, natural landscaped area between Tamlin Road and the existing Detention Pond 1. Runoff from Basin D 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 pond. This drainage conc presented in the previous master plan and is to remain

Is this an existing inlet & ditch? If so, please show and label on plan. Update paragraph to state they are existing. Is there a change in flows from this plan to the previous plan mentioned?

These i were r installed a MDDP me that abandonm future Ta Road resu no box cu being ins

Basin F (3.67 ac, Q_5 = 5.3 cfs, Q_{100} = 12.5 cfs) is the u the existing Detention Pond 2. The runoff from Basin where an inline inlet will capture the flow and direct it south offsite along with the allowable release rate of the existing Pond 2. This drainage concept and its associated storm infrastructure is presented in the previous master plan and is to remain as the intended plan

east

Revised.

Basin G (7.85 ac, Q_5 = 6.8 cfs, Q_{100} = 16.0 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 historical flow path in the channel south to the box culverts at Highway 24.

G?

Revised.

PROPOSED DRAINAGE BASINS

This report has been prepared in accordance with the El Paso County Drainage Criteria Manual and the Mile High Flood District 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.

Grading design is preliminary or has not begun for much of the site. Due to this, the assumption has been made that the developed conditions drainage patterns presented in the previous MDDP (Terra Nova Engineering, Inc., September 2005) and FDR (Terra Nova Engineering, Inc., August 2010) will remain for all relevant developed areas consistent with the updated design plan and assumed drainage patterns within altered design areas will conform with the design intent. As design and development progress, this should be revisited to confirm the proposed drainage patterns used in this analysis are still applicable. Since the development of Filing No. 2, sketch plans for Filing No. 3 have been altered from the previous MDDP and FDR. Due to the change in the layout of Filing No. 3 from previous design plans and reports, this report serves to provide updated drainage information for the planned development based on new concept grading and drainage patterns. However, as mentioned previously, the drainage concept for the new layout aims to follow previous master plans as closely as possible including basin delineation areas and pond routing in order to keep with previous detention and water quality pond designs.

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 the existing 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 culverts and/or open channels and the public storm system. 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 ditch to convey stormwater from the rear of B-lot sites within Basin C to existing Pond 2. The design of this swale is to be included in the Final Drainage Report. All Pond outlets daylight to the southern open space of the Site, but are not directed to any formal channels or drainageways.

Preliminary pond sizing and conveyance structures will be analyzed as development progresses to ensure that the final design meets the st Revised. forward in the El Paso Co Revised. eering Criteria Manual as well as the Mile-High Flood Control Criteria Manual.

existing 13 existing A-G

As with the historic conditions. the fourteen historic major drainage basins have been delineated into six major basins based on preliminary grading of the Site – basins A1 through F1 within the limits of Filing No. 3 and basins OS-1 through OS-6 for off-site basins consistent with the historic conditions for the developed areas of Filing No. 2 and relatively small developed area of Filing

Revised. existing

Revised.

B & C

Revised.

B,C,D and E

No. 1. Of the major basins within the Site, basins B1, C1, D1, and E1 are consistent with previous reports for Filing Nos. 2 and 3 as those basins are not to be altered during the development of Filing No. 3. Basins B1 and C1 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 hydrolog ns in order to plan for storm infrastructu nnels on the Site.

Revised.

Revised.

will be provided

the preliminary and final drainage reports

The rational method was used to estimate runoff rates for the proposed development and are in accordance to El Paso County Drainage Criteria Manual and any references within the County criteria to the City of Col olumes 1, 2, and 3. These calculations can be found i

This statement doesn't make sense and is used throughout several times. Please revise description for clarity.

change all references from historical to existing

Revised in instances

OS-5?

Offsite Basin OS-1 (6.38 ac, Q5 = 10.7 cfs, Q100 = 21.7 cfs) remains as presented in the Historical Drainage Conditions section due to the full development of Filing No. 2 located directly above basin OS-1. Basin B has been delineated between Filing Nos. 2 and 3 for this report and any basin area tributary to the existing Pond 1 within Filing No. 2 is now considered off-site basin area. The basin drains to Design Point 8 which continues to drain through Filing 3's Basin A.

OS-5?

Update flows to match spreadsheet

Revised.

Offsite Basin OS-2 (3.12 ac, Q5 = 1.8 cfs, Q100 = 4.2 cfs) remains as presented in the Historical Drainage Conditions section due to the full development of Filing No. 2. Basin B has been delineated between Filing Nos. 2 and 3 for this report and any basin area tributary to the existing Pond 1 within Filing No. 2 is now considered off-site basin area. The basin drains to Design Point 9 where it continues through Filing 2's Basin OS-3 as shown on the drainage map for this study.

OS-3?

Offsite Basin OS-3 (1.14 ac, Q5 = 3.4 cfs, Q100 = 6.0 cfs) remains as presented in the Historical Drainage Conditions section due to the full development of Filing No. 2. Basin B has been delineated between Filing Nos. 2 and 3 for this report and any basin area tributary to the existing Pond 2 within Filing No. 2 is now considered off-site basin area. The basin drains to Design Point 10 where it continues to flow through Filing 2's Basin OS-6 as shown on the drainage map for this study.

Removed these sentences for clarification.

OS-4?

Offsite Basin OS-4 (9.53 ac, Q5 = 14.9 cfs, Q100 = 31.7 cfs) remains as presented in the Historical Drainage Conditions section due to the full development of Filing No. 2. Basin A has been delineated between Filing Nos. 2 and 3 for this report and any basin area tributary to off-site drainage within Filing No. 2 is now considered off-site basin area. The runoff from this basin is directed offsite and goes through the western boundary of Filing No. 3 at Design Point 11.

Removed these sentences for clarification.

Flow does not match spreadsheet

OS-5?

Offsite Basin OS-5 (82.7 cfs, Q100 = 166.6 cfs) remains as presented in the Historical Drainage Conditions section due to the full development of Filing No. 2. Basin B has been delineated between Filing Nos. 2 and 3 for this report and any basin area tributary to the existing Pond 1 within Filing No. 2 is now considered off-site basin area. The basin drains to Design Point 12 which is the pipe run for the public 60" RCP storm sewer line that outfalls directly into Pond 1.

Spreadsheet was incorrect, revised.

Removed these sentences for clarification.

Offsite Basin OS-6 (35.75 ac, Q5 = 31.9 cfs, Q100 = 58.4 cfs) remains as presented in the Historical Drainage Conditions section due to the full development of Filing No. 2. Basin C has been

OS-6?

Removed these sentences for clarification.

delineated between Filing Nos. 2 and 3 for this report and any basin area tributary to the existing Pond 2 within Filing No. 2 is now considered off-site basin area. The basin drains to Design Point 13 where an existing public 10' D-10-R Now shown on map. r and conveys it to Antelope Meadows Circle within Filing 3. Need to show & label inlet on plan

Basin A (3.74 ac, Q_5 = 5.8 cfs, Q_{100} = 8.2 cfs) is the western most ba of the site and consists of the open space Tract A and some small portions of the rear lots of the lots. The runoff from Basin A sheet flows west off site and onto the reductions via grass buffers and natural landscape to Design Point 1 basin as no downstream conditions will be affected. An area of disch property is the west end of Antelope Meadows Circle where it will that temporary control measures such as straw bales or sediment co dead end for energy dissipation and to disperse any channelized flow from the cu

Antelope Meadow Cir is within Basin OS-4. Please removed reference of this to Basin OS-4 description. No affects to downstream is not reason for no detention, please revise statement.

This sentence has been removed. Language edited re: detention.

Basin B (40.37 ac, Q_5 = 73.5 cfs, Q_{100} = 176.7 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 high points at the eastern and western edges and low points 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 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 C (57.12 ac, Q_5 = 64.8 cfs, Q_{100} = 170.6 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).

Basin D (7.96 ac, Q_5 = 12.9 cfs, Q_{100} = 30.5 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 E (3.14 ac, Q_5 = 1.8 cfs, Q_{100} = 4.2 cfs) is the undevelope ween Tamlin Road and existing Detention Pond 1. Runoff from Basi ion to a low point where an inline inlet will capture flow and dire h the

existing inlet?

This old suggestion in the 2010 FDR was not constructed according to our current survey. Will field verify but we are not suggesting any offsite construction like the inline ditch inlet and culvert pipe.

allowable release rate of the existing pond. This drainage concept and its associated storm 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 (5.50 ac, Q_5 = 5.3 cfs, Q_{100} = 12.5 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 historical 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 (7.85 ac, Q_5 = 6.8 cfs, Q_{100} = 16.0 cfs) is an open, undevelope[d] within Tract Z that is to remain undisturbed. The basin drains southeast to [ded]icated future Tamlin Road and Highway 24. The basin drains to Design Point 7 [which] is directed offsite due southwest.

Revised for topo gathered.

Revised.

OS-5

Spreadsheet shows 16 ac-ft to top of embankment

Existing Pond 1: The existing Detention Pond 1 (Design Point 2) is a 17-acre-foot pond for water quality and detention basin for the 100-year storm event. The basins that are tributary to Pond 1 are Offsite Basins OS-1, OS-2, ~~OS-3, and OS-4~~ and On-site Basins A and B. The undetained storm water runoff from Basins E and F are accounted for within the pond.

Do you mean you are overdetaining?

Existing Pond 1 was sized using Haestad's Pondpack program [***Revised to only overdetain for the disturbed Basin A.***] dated September of 2010. The pond will need to have more d[etailed] the Final Drainage Report when runoff calculations are finalized and [the required pond volumes] for WQ [***Language about the table in the next section added to keep #'s in one place.***] [E]URV and 100-year de[tention] and release rates are determined. The Existing Pond conditions to determine if earthwork for volume adjustments is requ[ired] existing pond infrastructure is required including the outlet structure, orifice plate, micropool, and spillway. The existing infrastructure will be as-built to verify elevation[s]

State what required volumes are for WQ, EURV and 100-year (both ponds).

Language added.

State what allowable pond release rates are per previous reports (both ponds) and what report they came from.

An existing 42" RCP outlet pipe from the existing outlet structure dis[charges] Pond 1 due south under the future dedicated right-of-way of Taml[in] undeveloped Banning Lewis Ranch property. Rip rap protection will need to be provided at the end of the outlet pipe at the time of final construction. According to the previous study from 2010, the 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.

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) is a 7-acre-foot pond for water quality and detention basin for the 100-year storm event. The basins that are tributary to the existing pond are Offsite Basins OS-5 and OS-6 and On-site Basins C. The undetained storm water runoff from Basin G is accounted for within the pond.

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. ***To be assessed in the PDR / F*** will be assessed for final conditions to determine if earthwork for volume ad and if retrofitting of existing pond infrastructure is required including the ou plate, micropool, and spillway. The existing infrastructure will be as-built to sizes.

State what proposed flows are a culverts & channel. Include anal show culverts & channel are ade handle proposed flows.

An existing 42" RCP outlet pipe from the existing outlet structure discharges 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. Rip rap protection will need to be provided at the end of the outlet pipe at the time of final construction. From here the runoff drains south to an existing channel and then is directed to a Highway 24 culvert. According to the 2010 study, a 50' wide emergency spillway set at 6817.50 will pass the complete 100-year developed flow. Downstream drainage patterns mentioned in the previous report are to be assessed in the Final Drainage Report. Impervious factors and extended detention basin calcu or this pond can be found in Appendix E of this report.

Added.

Existing Pond WU: The existing Detention Pond WU (Design Po storm water quality and detention facility that is owned and mainta previous MDDP called for developed flow conditions to drain to th accounted for in the recent improvements by Galloway and Compa has a slight increase in density with one-eighth acre lots from the pr of open space in the new layout yields a runoff value at or below the previous analysis for this basin and therefore there is no increase to water quality capture volum volume from the previous study or from recent improvements.

Note:Additional improvements may be warranted at Pond WU (specifically a trickle channel may need to be built). Include statement that this will be addressed with Preliminary & Final Drainage Reports

State what the area and Imperviousness were and are now (to show decrease to Pond).

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- not cause any downstream problems as detention of the additional runo conforming to drainage standards will be implemented.

Acreage and runoff numbers now stated.

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 ive affects to downstream areas due to developed drainage conditions.

Added.

Need to state what flows are at each location exiting site, to show no increase.

STORM WATER CONVEYANCE AND STORAGE FACILITIES

xisting

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 ns 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. At sump locat be sized to collect 100-year flows. Runoff entering the inlets will be conveyed w sewer system to detention and water quality ponds. The general onsite drainage pat were previously discussed in the Proposed Drainage Basins section of this report.

Revised.

State that sizing of all this facilities will be sized with the Final drainage report

The existing pond outfalls are routed to the Sand Creek Basin. These outfalls Added. en 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.

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 have outlet structures that contain 2.5-ft deep micro-pools. EURV release rates will be controlled by an orifice plate designed to meet the MHFD release rate criteria. 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.

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. The existing infrastructure is to be assessed for final conditions within a Final Drainage Report to determine if retrofits are required.

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 volume, and the total volume required as a total of each zone.

Include statement that ponds will be designed/updated to function as full-spectrum detention facilities

Added.

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	1.914 ac-ft	3.271 ac-ft	3.865 ac-ft	9.050 ac-ft
Pond 2	1.434 ac-ft	2.115 ac-ft	2.928 ac-ft	6.476 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 9.050 ac-ft and was sized for a 17 ac-ft pond using Haestad's Pondpack Program and HEC modeling according to the 2010 report. A Final Drainage Report for Filing No. 3 will require analysis of Pond 1's size and infrastructure to adjust to final hydrology and hydraulic conditions tributary to the pond for the new, more dense site layout.

Our calculations require 6.476 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. A Final Drainage Report for Filing No. 3 will require analysis of Pond 1's size and infrastructure to adjust to final hydrology and hydraulic conditions tributary to the pond.

2

A Final Drainage Report for Filing No. 3 will require ana ***Revised.*** h existing ponds for size and infrastructure to adjust to final hydrology and hydraulic conditions tributary to the respective facilities.

Existing Regional Detention Pond WU was designed and built as a part of Filing No. 2 and accounted for a portion of future development within Basin D of Filing No. 3 according to the previous MDDP and FDR.

WATER QUALITY ENHANCEMENT BEST MANAGEMENT PRACTICES

The existing detention ponds discussed in the previous section have been designed in accordance with the 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 designed to provide WQCV and detain the EURV and the 100-year Detention Volume. 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.

Non-structural Best Management Practices that will be incorporated into the project are anticipated to include grass swales.

Discuss how water quality will be addressed/provided for on Basins which do not reach either of the ponds. (Basins will minimally grading, no impervious areas or buildings, remain open, etc.)

Language added.

Grass swales was listed under Non-structural BMP's.

Structural Best Management Practices that are incorporated in the Site design include grass swales and extended detention ponds. **Revised.**

MAINTENANCE

Maintenance of the existing 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 F1 and previously discussed in this report. Basin F1 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.

Update this paragraph. There is no Basin F1 and floodplain is not within this project, but adjacent to it.

CONCLUSION

This Master Development Drainage Plan report covers the conceptua **Revised.** ter 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. 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 historic 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 and is not tributary to any of the proposed development.

existing

Revised.

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

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

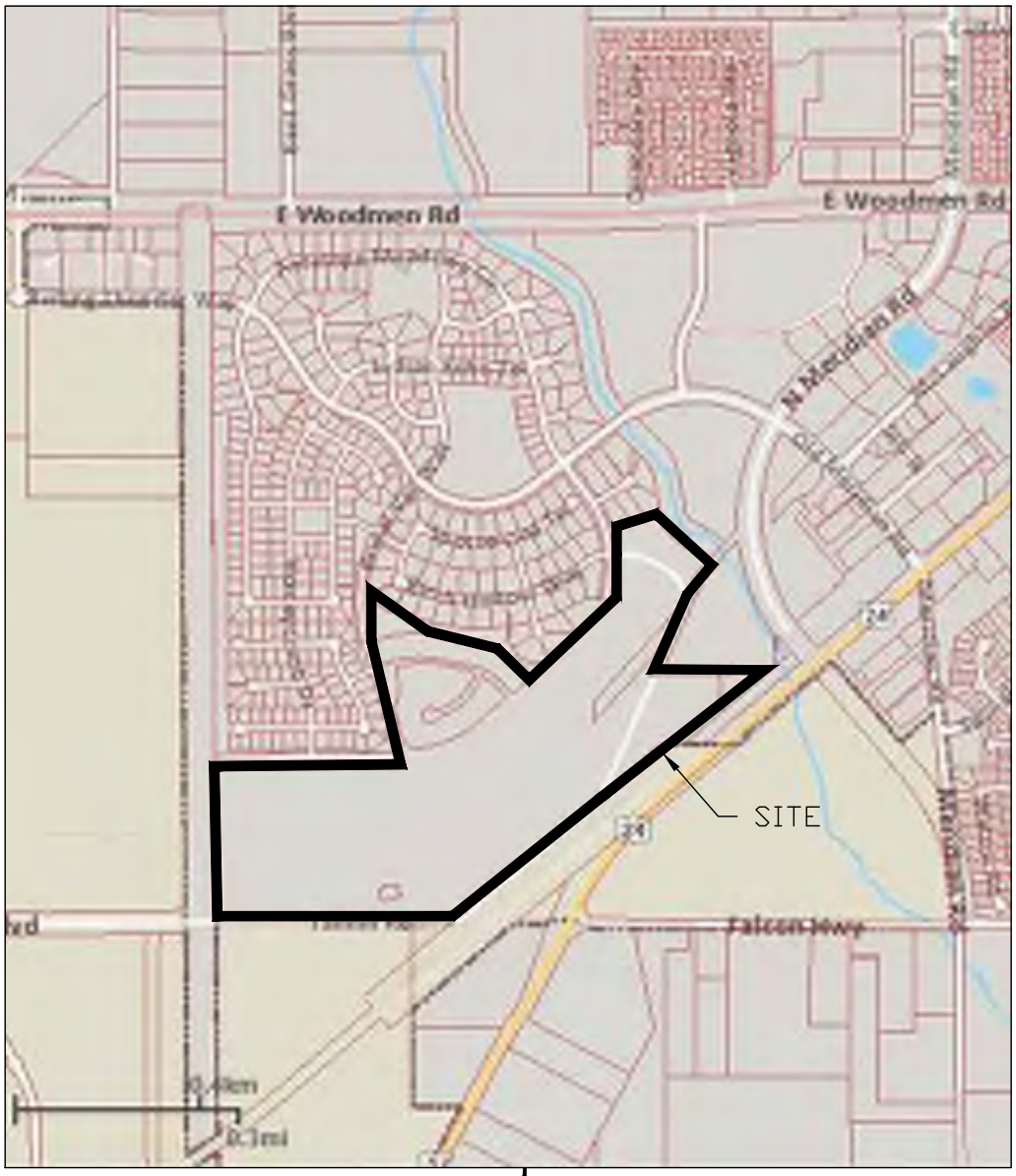
11) Falcon DBPS, developed by Matrix Design Group dated September 2015

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

FALCON HIGHLANDS FILING No. 2

BIRCH HOLLOW WAY

FALCON HIGHLANDS FILING No. 2

ANTELOPE MEADOWS CIRCLE

BRIDAL VAIL WAY

OPEN SPACE

FUTURE PHASE

OPEN SPACE

FUTURE PHASE

WELL SITE

MERIDIAN ROAD

FALCON WASTEWATER TREATMENT FACILITY

50' ROW- PUBLIC

50' ROW- PUBLIC

50' ROW- PUBLIC

50' ROW- PUBLIC

50' ROW- PUBLIC

50' ROW- PUBLIC

50' ROW- PUBLIC

50' ROW- PUBLIC

50' ROW- PUBLIC

50' ELECTRIC EASEMENT (BOOK 2444, PAGE 117)

100' FORCEMAIN CORRIDOR

PHASE 2
UNITS=119

PARK
2.7 ACRES

PHASE 1
UNITS=55

OPEN SPACE

OPEN SPACE

OPEN SPACE

OPEN SPACE

LS

TAMLIN ROAD

TAMLIN ROAD

UNPLATTED

UNPLATTED

UNPLATTED

DATA CHART:

Total Units = 395 (100%)

35'x100'	= 167	(42.3%)
50'X110'	= 161	(40.7%)
60'X110'	= 43	(10.9%)
20,000 SF	= 24	(6.1%)

N

GRAPHIC SCALE

150 0 75 150 300

(IN FEET)

1 inch = 150 ft.

FALCON HIGHLANDS

Matrix

Excellence by Design

2435 Research Parkway, Suite 300
Colorado Springs, CO 80920
Contact: Jason Alwine
Phone (719) 575-0100 | Fax (719) 575-0208

S:\21.1208.001 Falcon Highlands\100 Dwg\105 Exhibits Concept03.dwg

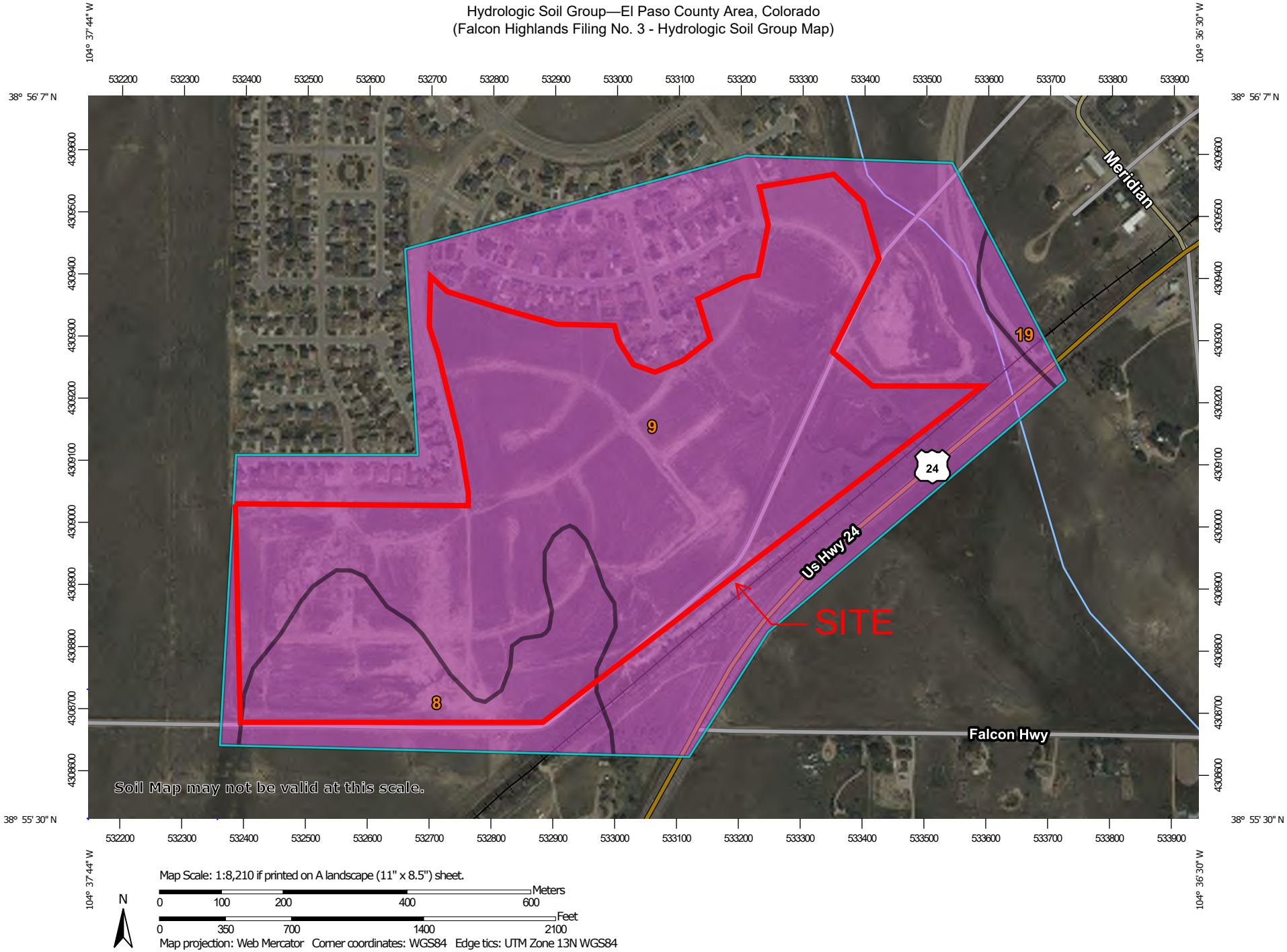
CONCEPT PLAN 03
PHASING EXHIBIT

MAY 17, 2021

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

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.

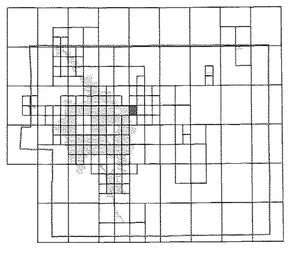
Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this 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

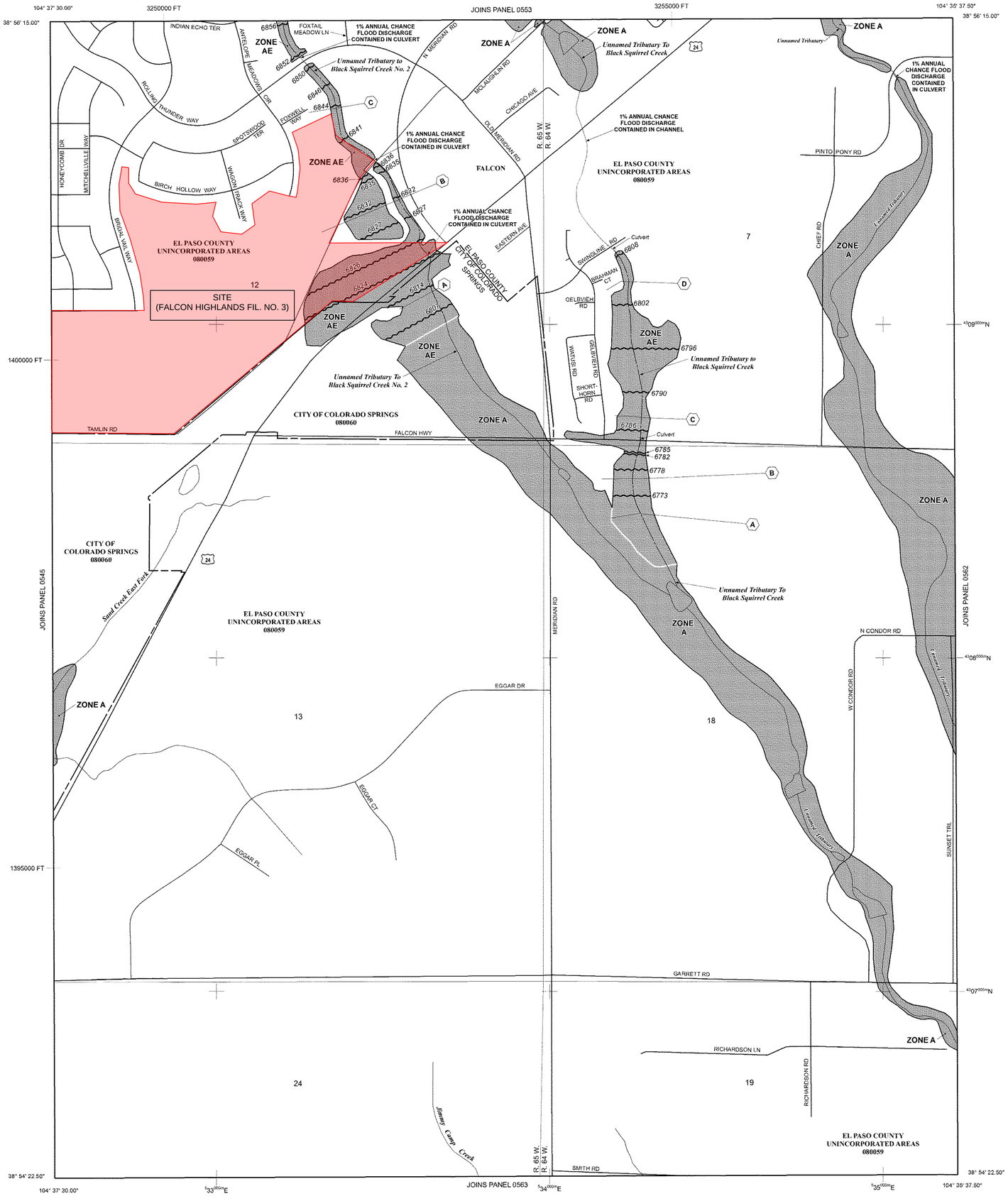
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

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.

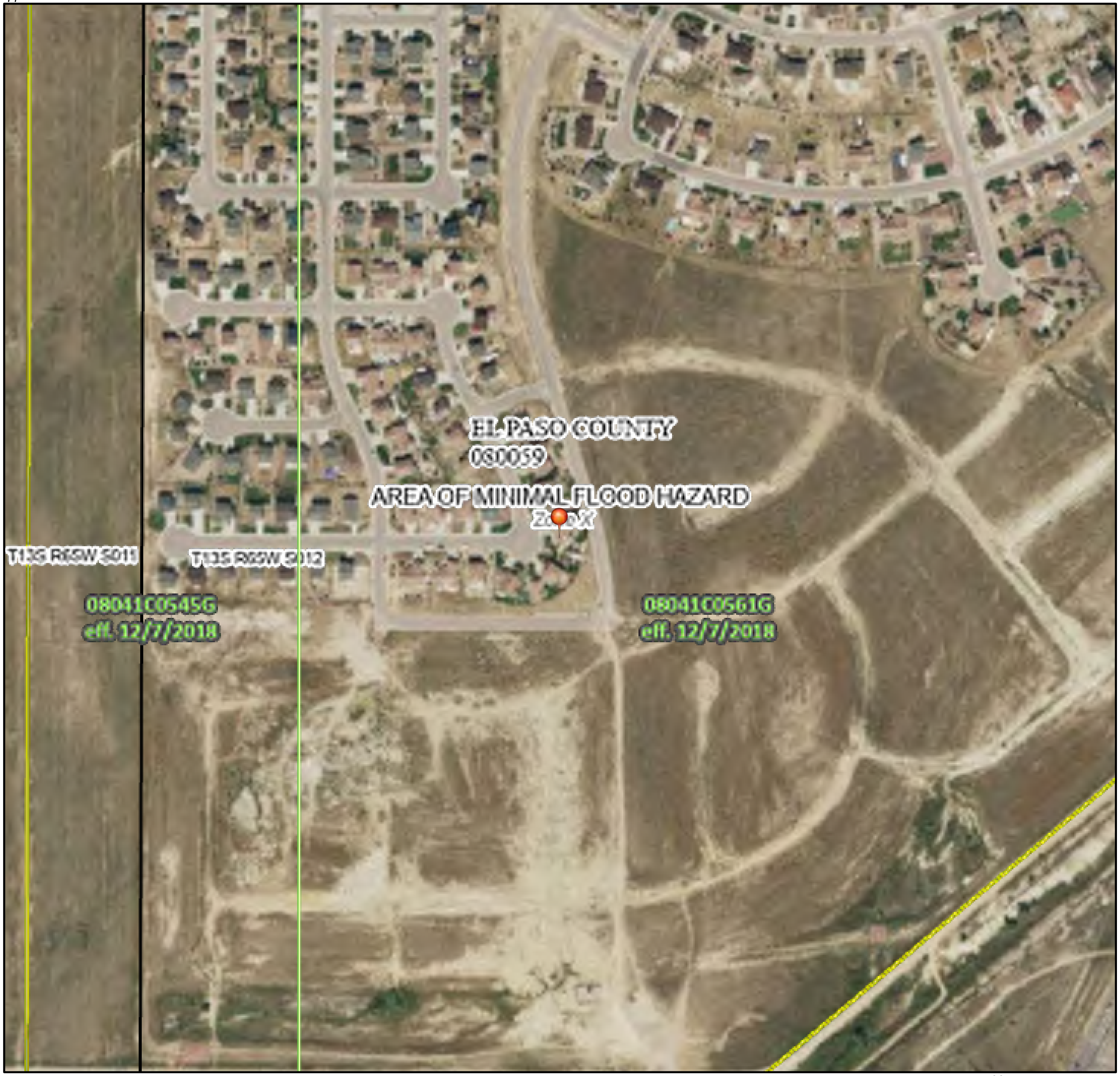
MAP NUMBER 08041C0561G

MAP REVISED DECEMBER 7, 2018

Federal Emergency Management Agency

1DWLRQDO)ORRG+D]DUG/D\HU)Ζ50HWWH

FEMA



)HHW

/HJHQG

6(().ΖVRSEZ5SDUGHWDLOHG

ΖWKRXW%DVH)ORRG(OHYDWLRQ%)(=RQH9
ΖWK%)(RUHSWK =RQH$$2$+9($5
5HJXODWRU\)ORRGZD\

$QQXDO&KDQFH)ORRG+D]DUG$UHDV RIDQQXDOFKDQFHIORRGZLWKDYHUDJH GHSWKOHVVWKDQRQHIRRWRUZLWKGUDLQDJH DUHDVRIOHVVWKDQRQHVTXDUHPLOH =RQH;
)XWXUH&RQGLWLRQV$QQXDO &KDQFH)ORRG+D]DUG =RQH;
$UHDZLWK5HGXFHG)ORRG5LVNGXHWR /HYHH6HH1RWHV =RQH;
$UHDZLWK)ORRG5LVNGXHWR/HYHH =RQH'

$UHDRI0LQLPDO)ORRG+D]DUG =RQH;
(IIHFWLYH/205V
$UHDRI8QGHWHUPLQHG)ORRG+D]DUG =RQH'

&KDQQHO&XOYHUWRU6WRUP6HZHU
/HYHH'LNHRU)ORRGZDOO

&URVV6HFWLRQVZLWK$QQXDO&KDQFH
:DWHU6XUIDFH(OHYDWLRQ
&RDVWDO7UDQVHFW
%DVH)ORRG(OHYDWLRQ/LQH%)(
/LPLWRI6WXG\
-XULVGLFWLRQ%RXQGDU\
&RDVWDO7UDQVHFW%DVHOLQH
3URILOH%DVHOLQH
+\GURJUDSKLF)HDWXUH

'LJLWDO'DWD$YDLODEOH
1R'LJLWDO'DWD$YDLODEOH
8QPDSSHG

7KHSLQGLVSOD\HGRQWKHPDSLVDQDSSUR[LPDWH SRLQWVHOHFWHGE\WKHXVHUDQGGRHVQRWUHSUHVHQW DQDXWKRULWDWLYHSURSHUW\ORFDWLRQ

7KLVPDSFRPSOLHVZLWK)(0$
VVWDQGDUGVIRUWKHXVHRI GLJLWDOIORRGPDSVLILWLVQRWYRLGDVGHVFULEHGEHORZ 7KHEDVHPDSVKRZQFRPSOLHVZLWK)(0$
VEDVHPDS DFFXUDF\VWDQGDUGV

7KHIORRGKD]DUGLQIRUPDWLRQLVGHULYHGGLUHFWO\IURPWKH DXWKRULWDWLYH1)+/ZHEVHUYLFHVSURYLGHGE\)(0$7KLVPDS ZDVH[SRUWHGRQDW$0 DQGGRHVQRW UHIOHFWFKDQJHVRUDPHQGPHQWVVXEVHTXHQWWRWKLVGDWHDQG WLPH7KH1)+/DQGHIIHFWLYHLQIRUPDWLRQPD\FKDQJHRU EHFRPHVXSHUVHGHGE\QHZGDWDRYHUWLPH

7KLVPDSLPDJHLVYRLGLIWKHRQHRUPRUHRIWKHIROORZLQJPDS HOHPHQWVGRQRWDSSHDUEDVHPDSLPDJHU\IORRG]RQHODEHOV OHJHQGVFDOHEDUPDSFUHDWLRQGDWHFRPPXQLW\LGHQWLILHUV)Ζ50SDQHOQXPEHUDQG)Ζ50HIIHFWLYHGDWH0DSLPDJHVIRU XQPDSSHGDQGXQPRGHUQL]HGDUHDVFDQQRWEHXVHGIRU UHJXODWRU\SXUSRVHV

%DVHPDS8661DWLRQDO0DS2UWKRLPDJHU\'DWDUHIUHVKHG2FWREHU

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			Drive and Walks			1/2 Acre			1/4 Acre			Historic Flow Analysis -- Greenbelts, Agriculture			Runoff Coefficient		Imperviousness
			65%			100%			25%			40%			2%					
		(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	0.22	0.46	0.00	0.30	0.5	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	0.22	0.46	0.00	0.30	0.5	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	0.22	0.46	0.00	0.30	0.5	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	0.22	0.46	0.00	0.30	0.5	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	0.22	0.46	0.00	0.30	0.5	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	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	3.67	0.09	0.36	2.0%
G	A	7.85	0.45	0.59	0.00	0.90	0.96	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	7.85	0.09	0.36	2.0%
OS-1	A	6.38	0.45	0.59	1.00	0.90	0.96	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	0.22	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	0.22	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	9.53	0.45	0.59	0.00	0.90	0.96	0.00	0.22	0.46	0.00	0.30	0.5	1.61	0.09	0.36	7.92	0.13	0.38	8.4%
OS-5	A	63.24	0.45	0.59	0.00	0.90	0.96	0.00	0.22	0.46	0.00	0.30	0.5	63.24	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	0.22	0.46	35.75	0.30	0.5	0.00	0.09	0.36	0.00	0.22	0.46	25.0%
TOTAL		**244.84**			**1.0**			**1.1**			**35.8**			**71.7**			**135.2**			**17.2%**

TIME OF CONCENTRATION

Falcon Highlands Filing No. 3 - EXISTING CONDITIONS

El Paso County, Colorado

DATE: 2/4/2022
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	108	1.00	18.95	842	1.00	15	1.50	9.36	28.31	950	15.28	15.28
F	3.67	0.09	0	0.00	0.00	1097	1.00	15	1.50	12.19	12.19	1097	16.09	12.19
G	7.85	0.09	340	3.00	23.40	0	0.00	15	0.00	0.00	23.40	340	11.89	11.89
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	9.53	0.13	80	2.00	12.52	2300	2.00	20	2.83	13.55	26.07	2380	23.22	23.22
OS-5	63.24	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

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

DATE: 2/4/2022
CALCULATED BY: AMC/ARP

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	3.01	-	-	-	-	-	-	-	-	-	-	-	-
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			1.80	0.00	**1.80**	-	-	-	-	-	-	-	-	-	-	-	-
F	6	3.67	0.09	0.33			5.30	0.00	**5.30**	-	-	-	-	-	-	-	-	-	-	-	-
G	7	7.85	0.09	0.71			6.80	0.00	**6.80**	-	-	-	-	-	-	-	-	-	-	-	-
OS-1	8	6.38	0.27	1.73			10.70	0.00	**10.70**	-	-	-	-	-	-	-	-	-	-	-	-
OS-2	9	3.12	0.30	0.94			7.80	1.00	**8.80**	-	-	-	-	-	-	-	-	-	-	-	-
OS-3	10	1.14	0.90	1.03			3.40	0.00	**3.40**	-	-	-	-	-	-	-	-	-	-	-	-
OS-4	11	9.53	0.13	1.20			14.90	0.00	**14.90**	-	-	-	-	-	-	-	-	-	-	-	-
OS-5	12	63.24	0.30	18.97			82.70	1.00	**83.70**	-	-	-	-	-	-	-	-	-	-	-	-
OS-6	13	35.75	0.22	7.87			31.90	0.00	**31.90**	-	-	-	-	-	-	-	-	-	-	-	-

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

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.

Pipe run flows from the 2010 FDR were used to botain these flows and are now pointed out in the reference docs.

Does not match Summary table in Appendix G

Corrected.

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

DATE: 2/4/2022
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			4.20	0.00	**4.20**	-	-	-	-	-	-	-	-	-	-	-	-
F	6	3.67	0.36	1.32			12.50	0.00	**12.50**	-	-	-	-	-	-	-	-	-	-	-	-
G	7	7.85	0.36	2.83			16.00	0.00	**16.00**	-	-	-	-	-	-	-	-	-	-	-	-
OS-1	8	6.38	0.48	3.05			21.70	0.00	**21.70**	-	-	-	-	-	-	-	-	-	-	-	-
OS-2	9	3.12	0.50	1.56			13.60	1.00	**14.60**	-	-	-	-	-	-	-	-	-	-	-	-
OS-3	10	1.14	0.96	1.09			6.00	0.00	**6.00**	-	-	-	-	-	-	-	-	-	-	-	-
OS-4	11	9.53	0.38	3.66			31.70	0.00	**31.70**	-	-	-	-	-	-	-	-	-	-	-	-
OS-5	12	63.24	0.50	31.62			166.60	0.00	**166.60**	-	-	-	-	-	-	-	-	-	-	-	-
OS-6	13	35.75	0.46	16.45			58.40	0.00	**58.40**	-	-	-	-	-	-	-	-	-	-	-	-

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

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.

Pipe run flows from the 2010 FDR were used to botain these flows and are now pointed out in the reference docs.

Does not match Summary table in Appendix G

Corrected.

EXISTING CONDITIONS DESIGN POINT 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	1.80	4.20
F	6	3.67	0.09	0.36	5.30	12.50
G	7	7.85	0.09	0.36	6.80	16.00
OS-1	8	6.38	0.27	0.48	10.70	21.70
OS-2	9	3.12	0.30	0.50	7.80	13.60
OS-3	10	1.14	0.90	0.96	3.40	6.00
OS-4	11	9.53	0.13	0.38	14.90	31.70
OS-5	12	63.24	0.30	0.50	82.70	166.60
OS-6	13	35.75	0.22	0.46	31.90	58.40
TOTAL		**244.84**			**196.36**	**539.25**

Include design point that combines DP 11 & DP 1, for flows exiting to west.

DP 5 should be combined flow of Basin E, DP 2, DP 8, DP 9, DP 10, & DP 12 and exits site to south.

DP 6 should be combined flow of Basin F and DP 13 & DP 3.

Cumulative design point summary table created.

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

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	(%)
A	A	3.74	0.45	0.59	0.50	0.90	0.96	0.00	0.08	0.35	3.24	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.13	0.38	8.7%
B	A	40.37	0.45	0.59	31.28	0.90	0.96	0.00	0.08	0.35	4.23	0.22	0.46	4.86	0.30	0.5	0.00	0.09	0.36	0.00	0.38	0.55	53.4%
C	A	57.12	0.45	0.59	34.24	0.90	0.96	0.00	0.08	0.35	3.80	0.22	0.46	10.32	0.30	0.5	0.00	0.09	0.36	8.75	0.33	0.52	43.8%
D	A	7.96	0.45	0.59	5.74	0.90	0.96	0.00	0.08	0.35	2.22	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.46	0.64	59.4%
E	A	3.14	0.45	0.59	1.29	0.90	0.96	0.00	0.08	0.35	1.85	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.23	0.45	26.7%
F	A	5.50	0.45	0.59	0.34	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	5.16	0.11	0.37	5.9%
G	A	7.85	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	7.85	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	9.53	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	1.61	0.09	0.36	7.92	0.13	0.38	8.4%
OS-5	A	63.24	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	63.24	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%
TOTAL		**244.8**			**74.4**			**1.1**			**15.3**			**50.9**			**71.7**			**31.3**			**37.8%**

TIME OF CONCENTRATION

Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS

El Paso County, Colorado

DATE: 1/19/2022
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	0.13	180	2.00	18.70	900	1.00	20	2.00	7.50	26.20	1080	16.00	16.00
B	40.37	0.38	0	0.00	0.00	907	1.30	20	2.28	6.63	6.63	907	15.04	6.63
C	57.12	0.33	532	1.50	28.10	492	1.00	20	2.00	4.10	32.20	1024	15.69	15.69
D	7.96	0.46	200	1.00	16.35	650	1.00	20	2.00	5.42	21.76	850	14.72	14.72
E	3.14	0.23	75	2.00	10.80	150	3.50	20	3.74	0.67	11.47	225	11.25	11.25
F	5.50	0.11	90	8.30	8.41	1080	1.00	20	2.00	9.00	17.41	1170	16.50	16.50
G	7.85	0.09	125	4.90	12.07	630	1.60	20	2.53	4.15	16.22	755	14.19	14.19
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	9.53	0.13	80	2.00	12.52	2300	2.00	20	2.83	13.55	26.07	2380	23.22	23.22
OS-5	63.24	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

Per City of Colorado Springs DCM Ch 6 Section 3.2.1 Max length for overland flow is 300' for non-urban and 100' for urban areas

Revised.

Does not match 5-year C from Coefficient & Imperviousness spreadsheet

Revised.

5-YEAR RUNOFF CALCULATIONS

Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS

El Paso County, Colorado

DATE: 1/19/2022
CALCULATED BY: AMC/ARP

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	0.45	1.68	16.00	3.42	**5.76**	0.00	5.76	-	-	-	-	-	-	-	-	-	-	-	-
B	2	40.37	0.38	15.48	6.63	4.75	**73.48**	0.00	73.48	-	-	-	-	-	-	-	-	-	-	-	-
C	3	57.12	0.33	18.77	15.69	3.45	**64.83**	0.00	64.83	-	-	-	-	-	-	-	-	-	-	-	-
D	4	7.96	0.46	3.66	14.72	3.55	**12.99**	0.00	12.99	-	-	-	-	-	-	-	-	-	-	-	-
E	5	3.14	0.23	0.73			1.80	0.00	**1.80**	-	-	-	-	-	-	-	-	-	-	-	-
F	6	5.50	0.11	0.62			5.30	0.00	**5.30**	-	-	-	-	-	-	-	-	-	-	-	-
G	7	7.85	0.09	0.71			6.80	0.00	**6.80**	-	-	-	-	-	-	-	-	-	-	-	-
OS-1	8	6.38	0.27	1.73			10.70	0.00	**10.70**	-	-	-	-	-	-	-	-	-	-	-	-
OS-2	9	3.12	0.30	0.94			7.80	0.00	**7.80**	-	-	-									
OS-3	10	1.14	0.90	1.03			3.40	0.00	**3.40**	-	-	-	-	-	-	-	-	-	-	-	-
OS-4	11	9.53	0.13	1.20			14.90	0.00	**14.90**	-	-	-	-	-	-	-	-	-	-	-	-
OS-5	12	63.24	0.30	18.97			82.70	0.00	**31.90**	-	-	-	-	-	-	-	-	-	-	-	-
OS-6	13	35.75	0.22	7.87			31.90	0.00	**31.90**	-	-	-	-	-	-	-	-	-	-	-	-

Revised

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.

Notes added in report and pointed out in Appendix reference doc (FDR map) for where these flows were obtained.

Notes:

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

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

DATE: 1/19/2022
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	0.38	1.43	16.00	5.75	**8.21**	0.00	8.21	-	-	-	-	-	-	-	-	-	-	-	-
B	2	40.37	0.55	22.17	6.63	7.97	**176.67**	0.00	176.67	-	-	-	-	-	-	-	-	-	-	-	-
C	3	57.12	0.52	29.43	15.69	5.80	**170.63**	0.00	170.63	-	-	-	-	-	-	-	-	-	-	-	-
D	4	7.96	0.64	5.12	14.72	5.96	**30.52**	0.00	30.52	-	-	-	-	-	-	-	-	-	-	-	-
E	5	3.14	0.45	1.41			4.20	0.00	**4.20**	-	-	-	-	-	-	-	-	-	-	-	-
F	6	5.50	0.37	2.06			12.50	0.00	**12.50**	-	-	-	-	-	-	-	-	-	-	-	-
G	7	7.85	0.36	2.83			16.00	0.00	**16.00**	-	-	-	-	-	-	-	-	-	-	-	-
OS-1	8	6.38	0.48	3.05			21.70	0.00	**21.70**	-	-	-	-	-	-	-	-	-	-	-	-
OS-2	9	3.12	0.50	1.56			13.60	0.00	**13.60**	-	-	-	-	-	-	-	-	-	-	-	-
OS-3	10	1.14	0.96	1.09			6.00	0.00	**58.40**	-	-	-	-	-	-	-	-	-	-	-	-
OS-4	11	9.53	0.38	3.66			31.70	0.00	**31.70**	-	-	-	-	-	-	-	-	-	-	-	-
OS-5	12	63.24	0.50	31.62			166.60	0.00	**64.40**	-	-	-	-	-	-	-	-	-	-	-	-
OS-6	13	35.75	0.46	16.45			58.40	0.00	**58.40**	-	-	-	-	-	-	-	-	-	-	-	-

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

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.

Notes added in report and pointed out in Appendix reference doc (FDR map) for where these flows were obtained.

Does not match flow from spreadsheet in Appendix G

Revised.

PROPOSED CONDITIONS DESIGN POINT SUMMARY

Basin	Design Point	Area (acres)	C_5	C_{100}	Q_5 (cfs)	Q_{100} (cfs)
A	1	3.74	0.13	0.38	5.76	8.21
B	2	40.37	0.38	0.55	73.48	176.67
C	3	57.12	0.33	0.52	64.83	170.63
D	4	7.96	0.46	0.64	12.99	30.52
E	5	3.14	0.23	0.45	1.80	4.20
F	6	5.50	0.11	0.37	5.30	12.50
G	7	7.85	0.09	0.36	6.80	16.00
OS-1	8	6.38	0.27	0.48	10.70	21.70
OS-2	9	3.12	0.30	0.50	7.80	13.60
OS-3	10	1.14	0.90	0.96	3.40	6.00
OS-4	11	9.53	0.13	0.38	14.90	31.70
OS-5	12	63.24	0.30	0.50	82.70	166.60
OS-6	13	35.75	0.22	0.46	31.90	58.40
TOTAL		244.84			322.36	716.74

Does not match flow in previous spreadsheet

All flows have been revised. The 2010 FDR is marked up to show how offsite flows were tabulated.

DP 5 should be combined flow of Basin E, and Pond 1 release rate and exits site to south.

Cumulative design point summary table created.

DP 6 should be combined flow of Basin F and Pond 2 release rate and exits site to south.

this is our development/report, not the old MDDP

DEVELOPED CONDITIONS - SUMMARY OF FILING NO. 3 MDDP COMPARED TO 2010 FDR

2022 FIL NO. 3 MDDP			2010 FDR			DIFFERENCE		ULTIMATE DESIGN POINT
	Q5 (CFS)	Q100 (CFS)		Q5 (CFS)	Q100 (CFS)	Q5 (CFS)	Q100 (CFS)	
BASIN A + OS-4	20.7	39.9	BASIN A	14.9	31.7	5.8	8.2	OFF-SITE
BASIN B + E + OS-1 + OS-2 + OS-5	176.5	382.8	BASIN B + E + OS-1 + OS-2	133.6	259.8	42.9	123.0	POND 1
BASIN C + F + G + OS-3 + OS-6	112.2	294.1	BASIN C + D + F + G + OS-3	102.6	209.2	9.6	84.9	POND 2
BASIN D	13.0	30.5	BASIN D - BASIN D1.1	20.9	42.1	-7.9	-11.6	POND WU
TOTAL	**322.4**	**747.3**		**272.0**	**542.8**	**50.4**	**204.5**	

How do these flows compare to the proposed flows in this report, specifically in regards to Pond WU?

This table has been edited to more explicitly show that the left columns are runoffs tabulated in this new study. The 2022 Filing No. 3 MDDP developed conditions (this report) are on the left, the 2010 FDR developed conditions are on the right. The difference in runoff is the difference columns for minor and major storm events. Pond WU is shown to be taking on less runoff in our new 2022 development compared to that of the 2010 FDR plan/report.

APPENDIX E

HYDRAULIC CALCULATIONS

Include analysis of existing channel & culvert at Highway 24, to ensure adequate to handle proposed flows. (Combined flow of DP 5 & DP 6 exiting site)

As-builts are in production for PDR/FDR. We would like to request that this information be part of the PDR when pond retrofits and outlet flows are determined for the developed conditions to better analyze the culvert pipe at Hwy 24.

POND 1 TRIBUTARY AREA AND IMPERVIOUSNESS

Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS
El Paso County, Colorado
1/19/2022

Basin No	Total Area (AC)	Effective Imperviousness (%)
A	3.74	8.7%
B	40.37	53.4%
E	3.14	26.7%
F	5.50	5.9%
Onsite Subtotal	52.75	43.7%
OS-1	6.38	34.3%
OS-2	3.12	40.0%
OS-4	9.53	8.4%
OS-5	63.24	40.0%
Offsite Subtotal	82.27	35.9%
TOTAL	**135.02**	**38.9%**

Basins E & F, per write up, do not reach Pond 1, but release directly offsite. Update contributing areas and % impervious accordingly.

Getting rid of these tables, use of IRF spreadsheet is the final effective imperviousness calculation.

POND 2 TRIBUTARY AREA AND IMPERVIOUSNESS

Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS
El Paso County, Colorado
1/19/2022

Basin No	Total Area (AC)	Effective Imperviousness (%)
C	57.12	43.8%
G	7.85	2.0%
Onsite Subtotal	64.97	38.7%
OS-3	1.14	100.0%
OS-6	35.75	25.0%
Offsite Subtotal	36.89	27.3%
TOTAL	**101.86**	**34.6%**

Basin G, per write up, does not reach Pond 2, but releases directly offsite. Update contributing areas and % impervious accordingly.

Getting rid of these tables, use of IRF spreadsheet is the final effective imperviousness calculation.

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: February 4, 2022
Project: Falcon Highlands - Pond 1 Tributary Basins
Location: El Paso County

Removed.

Remove Basins E & F as they are not contributing to Pond 1

keeping Basin A which does not flow to Pond 1, but is disturbed/developed area, therefore Pond 1 is to overdetain for this basin that drains directly offsite

SITE INFORMATION (USER-INPUT)

Sub-basin Identifier	A	B	E	F	OS-1	OS-2	OS-4	OS-5						
Receiving Pervious Area Soil Type	Clay Loam	Sand	Sand	Sand	Clay Loam	Sand	Sand	Sand						
Total Area (ac., Sum of DCIA, UIA, RPA, & SPA)	3.740	40.370	3.140	5.500	6.380	3.120	9.530	63.240						
Directly Connected Impervious Area (DCIA, acres)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
Unconnected Impervious Area (UIA, acres)	0.551	18.972	0.000	0.340	2.158	1.248	0.644	25.296						
Receiving Pervious Area (RPA, acres)	0.000	21.398	0.000	5.160	4.222	1.872	8.886	37.944						
Separate Pervious Area (SPA, acres)	3.189	0.000	3.140	0.000	0.000	0.000	0.000	0.000						
RPA Treatment Type: Conveyance (C), Volume (V), or Permeable Pavement (P)	V	V	V	V	V	V	V	V						

CALCULATED RESULTS (OUTPUT)

Total Calculated Area (ac, check against input)	3.740	40.370	3.140	5.500	6.380	3.120	9.530	63.240						
Directly Connected Impervious Area (DCIA, %)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
Unconnected Impervious Area (UIA, %)	14.7%	47.0%	0.0%	6.2%	33.8%	40.0%	6.8%	40.0%						
Receiving Pervious Area (RPA, %)	0.0%	53.0%	0.0%	93.8%	66.2%	60.0%	93.2%	60.0%						
Separate Pervious Area (SPA, %)	85.3%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
A_R (RPA / UIA)	0.000	1.128	0.000	15.176	1.956	1.500	13.798	1.500						
I_a Check	1.000	0.470	1.000	0.060	0.340	0.400	0.070	0.400						
f / I for WQCV Event:	0.4	9.8	9.8	9.8	0.4	9.8	9.8	9.8						
f / I for 10-Year Event:	0.3	0.6	0.6	0.6	0.3	0.6	0.6	0.6						
f / I for 100-Year Event:	0.1	0.6	0.6	0.6	0.1	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	0.00	0.00						
IRF for 10-Year Event:	1.00	0.83	1.00	0.21	0.90	0.81	0.25	0.81						
IRF for 100-Year Event:	1.00	0.84	1.00	0.22	0.95	0.83	0.25	0.83						
IRF for Optional User Defined Storm CUHP:														
Total Site Imperviousness: I_{total}	14.7%	47.0%	0.0%	6.2%	33.8%	40.0%	6.8%	40.0%						
Effective Imperviousness for WQCV Event:	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
Effective Imperviousness for 10-Year Event:	14.7%	39.0%	0.0%	1.3%	30.3%	32.4%	1.7%	32.4%						
Effective Imperviousness for 100-Year Event:	14.7%	39.6%	0.0%	1.3%	32.0%	33.0%	1.7%	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%	17.9%	N/A	116.5%	11.0%	19.9%	106.9%	19.9%	N/A	N/A	N/A	N/A	N/A	N/A
100-Year Event CREDIT**: Reduce Detention By:	0.0%	15.6%	N/A	116.1%	5.4%	17.7%	106.2%	17.7%	N/A	N/A	N/A	N/A	N/A	N/A
User Defined CUHP CREDIT: Reduce Detention By:														

IMPERVIOUSNESS USED FOR UD-DET CALCS	**Total Site Imperviousness:**	**36.4%**
Total Site Effective Imperviousness for WQCV Event:		**0.0%**
Total Site Effective Imperviousness for 10-Year Event:		**29.6%**
Total Site Effective Imperviousness for 100-Year Event:		**30.2%**
Total Site Effective Imperviousness for Optional User Defined Storm CUHP:		

Notes:

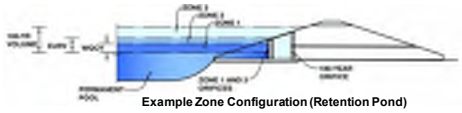
* Use Green-Ampt average infiltration rate values from Table 3-3.
** Flood control detention volume credits based on empirical equations from Storage Chapter of USDCM.
*** Method assumes that 1-hour rainfall depth is equivalent to 1-hour intensity for calculation purposed

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

Project: FALCON HIGHLANDS FILING NO. 3

Basin ID: DETENTION POND 1 (BASIN B)



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	135.02	ac
Watershed Length =	3,600	ft
Watershed Length to Centroid =	800	ft
Watershed Slope =	0.010	ft/
Watershed Imperviousness =	36.40%	pe
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	

Update based on previous comments

Updated.

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) =	1.914	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	5.185	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	3.836	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	5.198	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 1.75 in.) =	6.283	acre-feet	1.75 inches
25-yr Runoff Volume (P1 = 2 in.) =	8.584	acre-feet	2.00 inches
50-yr Runoff Volume (P1 = 2.25 in.) =	10.785	acre-feet	2.25 inches
100-yr Runoff Volume (P1 = 2.52 in.) =	13.689	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 3.14 in.) =	19.926	acre-feet	inches
Approximate 2-yr Detention Volume =	3.288	acre-feet	
Approximate 5-yr Detention Volume =	4.364	acre-feet	
Approximate 10-yr Detention Volume =	5.406	acre-feet	
Approximate 25-yr Detention Volume =	6.747	acre-feet	
Approximate 50-yr Detention Volume =	7.682	acre-feet	
Approximate 100-yr Detention Volume =	9.050	acre-feet	

Define Zones and Basin Geometry

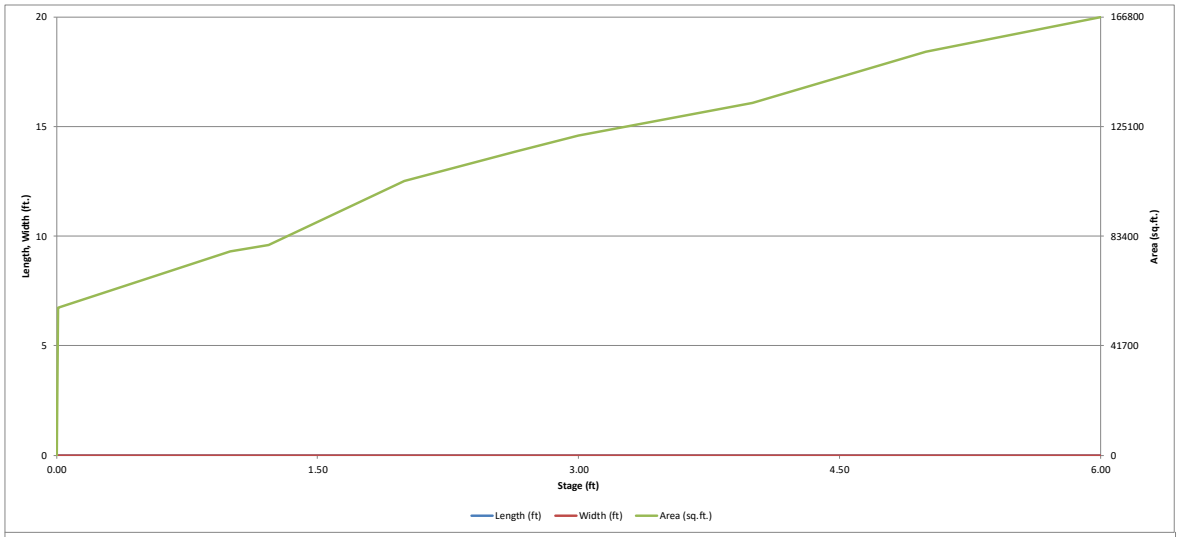
Zone 1 Volume (WQCV) =	1.914	acre-feet
Zone 2 Volume (EURV - Zone 1) =	3.271	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	3.865	acre-feet
Total Detention Basin Volume =	9.050	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (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

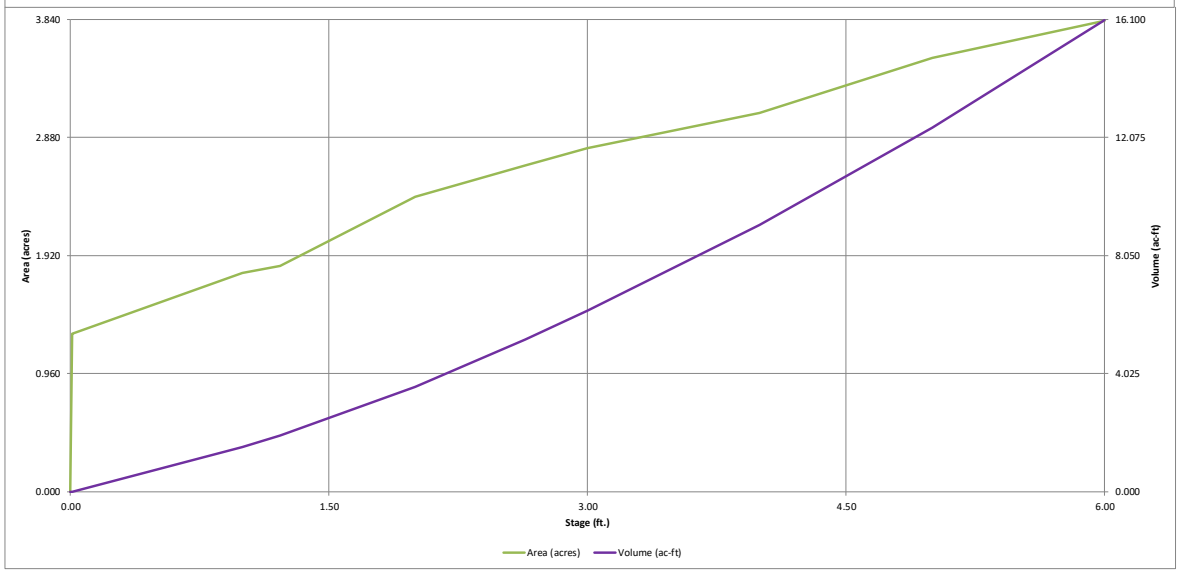
Depth Increment = 0.50 ft

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		
.2	--	0.01	--	--	--	56,053	1.287	187	0.004
.3	--	1.00	--	--	--	77,518	1.780	66,304	1.522
413.22	--	1.22	--	--	--	79,955	1.836	83,626	1.920
.4	--	2.00	--	--	--	104,380	2.396	155,517	3.570
414.64				--	--	115,600	2.654	225,911	5.186
.5				--	--	121,670	2.793	268,619	6.167
100-YR: 6516				--	--	134,100	3.079	396,504	9.102
6517	--	5.00	--	--	--	153,600	3.526	540,354	12.405
6518	--	6.00	--	--	--	166,800	3.829	700,554	16.083

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)





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: February 4, 2022
Project: Falcon Highlands - Pond 2 Tributary Basins
Location: El Paso County

Remove Basin G as it is not contributing to Pond 2

Removed.

SITE INFORMATION (USER-INPUT)

Sub-basin Identifier	C	G	OS-3	OS-6										
Receiving Pervious Area Soil Type	Sand	Sand	Sand	Sand										
Total Area (ac., Sum of DCIA, UIA, RPA, & SPA)	64.680	7.850	1.140	35.750										
Directly Connected Impervious Area (DCIA, acres)	0.000	0.000	0.000	0.000										
Unconnected Impervious Area (UIA, acres)	24.836	0.000	1.140	8.938										
Receiving Pervious Area (RPA, acres)	39.844	0.000	0.000	26.813										
Separate Pervious Area (SPA, acres)	0.000	7.850	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)	64.680	7.850	1.140	35.750										
Directly Connected Impervious Area (DCIA, %)	0.0%	0.0%	0.0%	0.0%										
Unconnected Impervious Area (UIA, %)	38.4%	0.0%	100.0%	25.0%										
Receiving Pervious Area (RPA, %)	61.6%	0.0%	0.0%	75.0%										
Separate Pervious Area (SPA, %)	0.0%	100.0%	0.0%	0.0%										
A_R (RPA / UIA)	1.604	0.000	0.000	3.000										
I_a Check	0.380	1.000	1.000	0.250										
f / I for WQCV Event:	9.8	9.8	9.8	9.8										
f / I for 10-Year Event:	0.6	0.6	0.6	0.6										
f / I for 100-Year Event:	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										
IRF for 10-Year Event:	0.80	1.00	1.00	0.73										
IRF for 100-Year Event:	0.82	1.00	1.00	0.75										
IRF for Optional User Defined Storm CUHP:														
Total Site Imperviousness: I_{total}	38.4%	0.0%	100.0%	25.0%										
Effective Imperviousness for WQCV Event:	0.0%	0.0%	0.0%	0.0%										
Effective Imperviousness for 10-Year Event:	30.8%	0.0%	100.0%	18.4%										
Effective Imperviousness for 100-Year Event:	31.3%	0.0%	100.0%	18.7%										
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%	N/A	0.0%	28.8%	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%	N/A	0.0%	26.7%	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:														

IMPERVIOUSNESS USED FOR UD-DET CALCS	**Total Site Imperviousness:**	**31.9%**
	Total Site Effective Imperviousness for WQCV Event:	**0.0%**
	Total Site Effective Imperviousness for 10-Year Event:	**25.2%**
	Total Site Effective Imperviousness for 100-Year Event:	**25.7%**
	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.

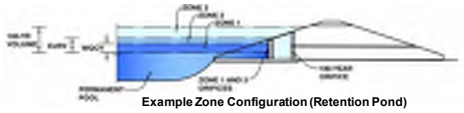
*** Method assumes that 1-hour rainfall depth is equivalent to 1-hour intensity for calculation purposed

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)



Example Zone Configuration (Retention Pond)

Update per previous comments

Updated.

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	109.42	acr
Watershed Length =	2,300	ft
Watershed Length to Centroid =	1,500	ft
Watershed Slope =	0.010	ft/f
Watershed Imperviousness =	31.90%	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) =	1.434	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	3.549	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	2.529	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	3.463	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 1.75 in.) =	4.235	acre-feet	1.75 inches
25-yr Runoff Volume (P1 = 2 in.) =	6.092	acre-feet	2.00 inches
50-yr Runoff Volume (P1 = 2.25 in.) =	7.828	acre-feet	2.25 inches
100-yr Runoff Volume (P1 = 2.52 in.) =	10.146	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 3.14 in.) =	15.127	acre-feet	inches
Approximate 2-yr Detention Volume =	2.237	acre-feet	
Approximate 5-yr Detention Volume =	2.980	acre-feet	
Approximate 10-yr Detention Volume =	3.714	acre-feet	
Approximate 25-yr Detention Volume =	4.674	acre-feet	
Approximate 50-yr Detention Volume =	5.376	acre-feet	
Approximate 100-yr Detention Volume =	6.476	acre-feet	

Define Zones and Basin Geometry

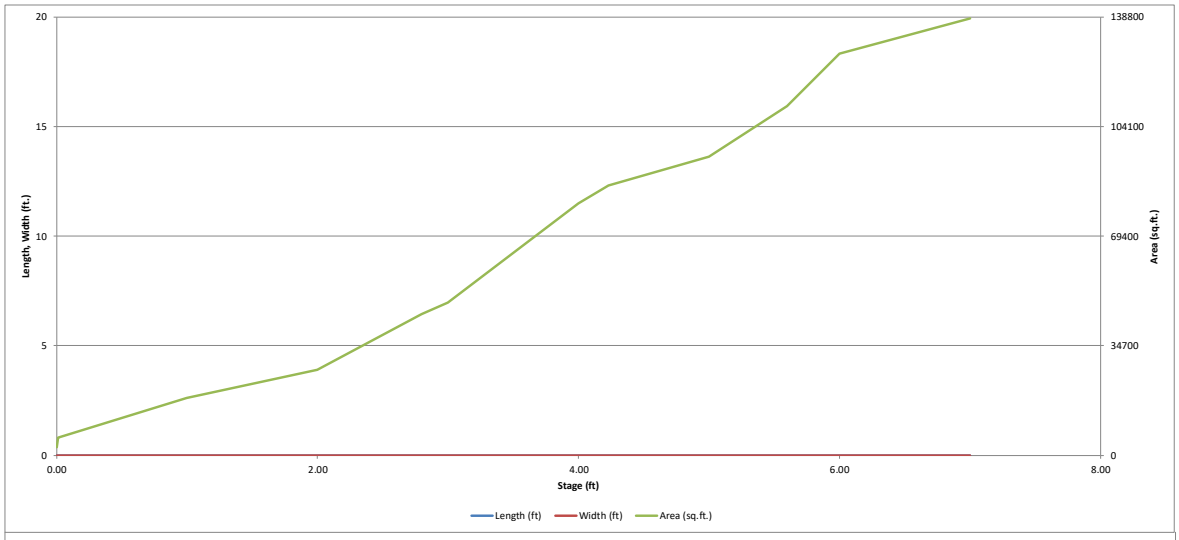
Zone 1 Volume (WQCV) =	1.434	acre-feet
Zone 2 Volume (EURV - Zone 1) =	2.115	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	2.928	acre-feet
Total Detention Basin Volume =	6.476	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (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

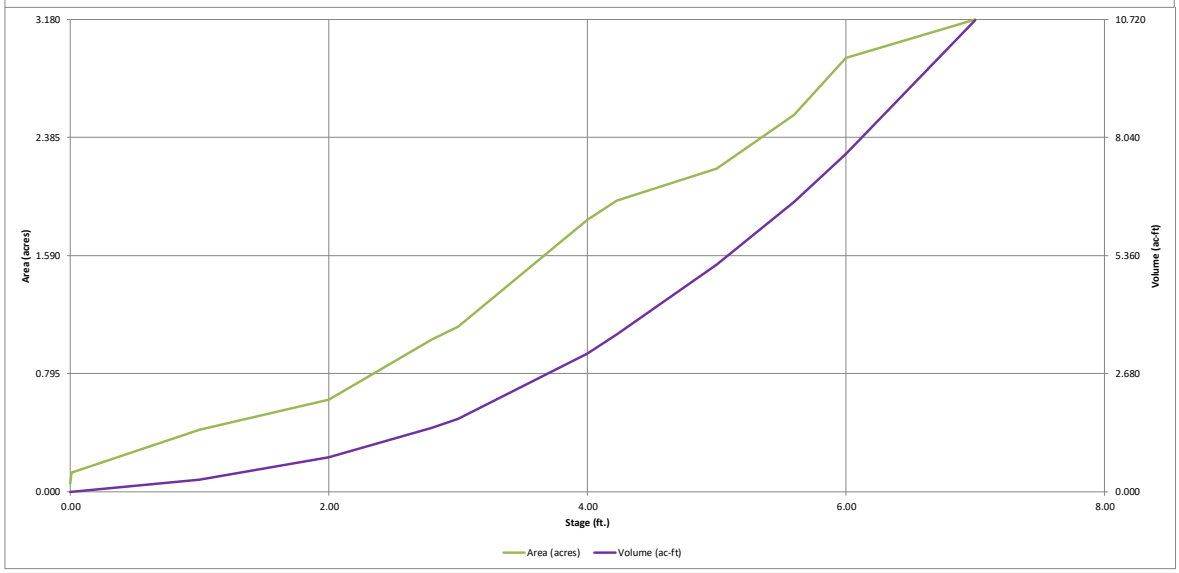
Depth Increment = 0.50 ft

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)
p of Micropool	--	0.00	--	--	--	2,500	0.057		
6412	--	0.01	--	--	--	5,540	0.127	39	0.001
6413	--	1.00	--	--	--	18,103	0.416	11,742	0.270
6414	--	2.00	--	--	--	27,000	0.620	34,294	0.787
/QCV: 6414.80	--	2.80	--	--	--	44,680	1.026	62,966	1.445
6415	--	3.00	--	--	--	48,386	1.111	72,272	1.659
6416	--	4.00	--	--	--	79,750	1.831	136,340	3.130
EURV: 6416.23	--	4.23	--	--	--	85,400	1.961	155,333	3.566
6417	--	5.00	--	--	--	94,655	2.173	224,654	5.157
100 YR: 6417.60	--	5.60	--	--	--	110,500	2.537	286,200	6.570
6418	--	6.00	--	--	--	127,150	2.919	333,730	7.661
6419	--	7.00	--	--	--	138,500	3.180	466,555	10.711

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

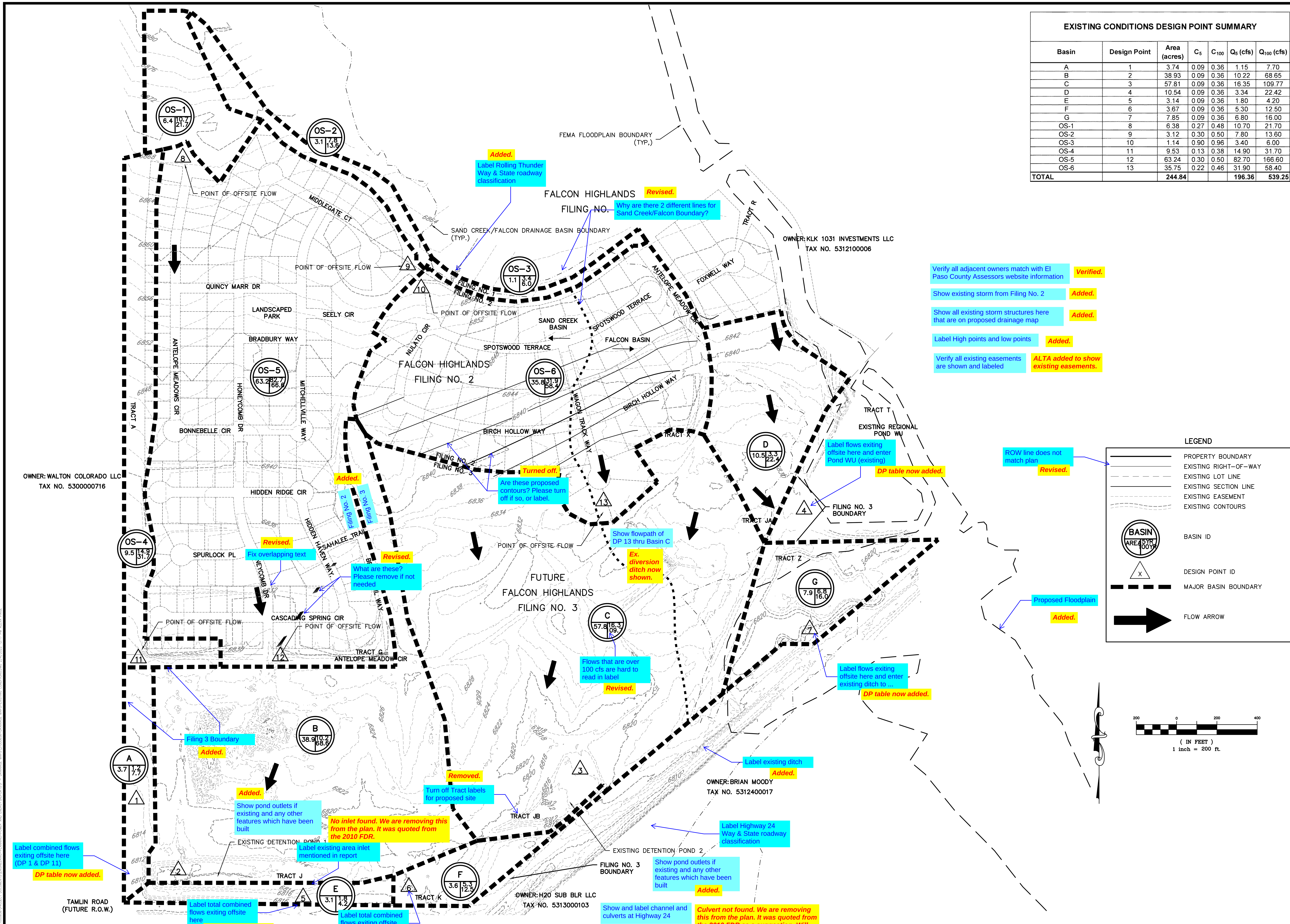
MHFD-Detention, Version 4.04 (February 2021)





APPENDIX F

DRAINAGE MAPS



FALCON HIGHLANDS FILING NO. 2
FUTURE FALCON HIGHLANDS FILING NO. 3
FEMA FLOODPLAIN BOUNDARY (TYP.)
SAND CREEK/FALCON DRAINAGE BASIN BOUNDARY (TYP.)
SAND CREEK BASIN
FALCON BASIN
POINT OF OFFSITE FLOW
OWNER: WALTON COLORADO LLC TAX NO. 5300000716
OWNER: KLK 1031 INVESTMENTS LLC TAX NO. 5312100006
OWNER: BRIAN MOODY TAX NO. 5312400017
OWNER: H20 SUB BLR LLC TAX NO. 5313000103
TAMLIN ROAD (FUTURE R.O.W.)
EXISTING REGIONAL POND WU
EXISTING DETENTION POND 1
EXISTING DETENTION POND 2
FILING NO. 3 BOUNDARY
QUINCY MARR DR
LANDSCAPED PARK
SEELY CIR
BRADBURY WAY
NULATO CIR
SPOTSWOOD TERRACE
BIRCH HOLLOW WAY
WAGON TRACK WAY
FOXWELL WAY
ANTELOPE MEADOWS CIR
MIDDLEGATE CT
HONEYCOMB DR
MITCHELVILLE WAY
BONNEBELLE CIR
HIDDEN RIDGE CIR
HIDDEN HAVEN WAY
SPURLOCK PL
SAHALEE TRAIL
CASCADING SPRING CIR
TRACT A
TRACT G
TRACT J
TRACT JA
TRACT JB
TRACT K
TRACT R
TRACT T
TRACT X
TRACT Z
Added.
Label Rolling Thunder Way & State roadway classification
Revised.
Why are there 2 different lines for Sand Creek/Falcon Boundary?
Verify all adjacent owners match with El Paso County Assessors website information
Verified.
Show existing storm from Filing No. 2
Added.
Show all existing storm structures here that are on proposed drainage map
Added.
Label High points and low points
Added.
Verify all existing easements are shown and labeled
ALTA added to show existing easements.
Label flows exiting offsite here and enter Pond WU (existing)
DP table now added.
ROW line does not match plan
Revised.
Turned off.
Are these proposed contours? Please turn off if so, or label.
Filing No. 2
Filing No. 3
Show flowpath of DP 13 thru Basin C
Ex. diversion ditch now shown.
Fix overlapping text
What are these? Please remove if not needed
Proposed Floodplain
Flows that are over 100 cfs are hard to read in label
Label flows exiting offsite here and enter existing ditch to ...
Filing 3 Boundary
Label existing ditch
Removed.
Turn off Tract labels for proposed site
Show pond outlets if existing and any other features which have been built
No inlet found. We are removing this from the plan. It was quoted from the 2010 FDR.
Label Highway 24 Way & State roadway classification
Label combined flows exiting offsite here (DP 1 & DP 11)
Label existing area inlet mentioned in report
Label total combined flows exiting offsite here
Show and label channel and culverts at Highway 24
Culvert not found. We are removing this from the plan. It was quoted from the 2010 FDR as a suggestion. Will assess as part of PDR/FDR.
LEGEND
PROPERTY BOUNDARY
EXISTING RIGHT-OF-WAY
EXISTING LOT LINE
EXISTING SECTION LINE
EXISTING EASEMENT
EXISTING CONTOURS
BASIN ID
DESIGN POINT ID
MAJOR BASIN BOUNDARY
FLOW ARROW
(IN FEET)
1 inch = 200 ft.

EXISTING CONDITIONS DESIGN POINT 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	1.80	4.20
F	6	3.67	0.09	0.36	5.30	12.50
G	7	7.85	0.09	0.36	6.80	16.00
OS-1	8	6.38	0.27	0.48	10.70	21.70
OS-2	9	3.12	0.30	0.50	7.80	13.60
OS-3	10	1.14	0.90	0.96	3.40	6.00
OS-4	11	9.53	0.13	0.38	14.90	31.70
OS-5	12	63.24	0.30	0.50	82.70	166.60
OS-6	13	35.75	0.22	0.46	31.90	58.40
TOTAL		244.84			196.36	539.25

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:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR; NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

ATWELL
866.850.4200 www.atwell-group.com
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, CO 80228
303.462.1100

CHALLENGER HOMES
8605 EXPLORER DRIVE STE. 250
COLORADO SPRINGS, CO 80920
(719) 598-5192
JIM BYERS

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

DATE 2/4/2022

A 1ST SUBMITTAL TO JURISDICTION 00/00/20XX - JOE

REVISIONS

DR. AMC CH. RDL
P.M. RDL
JOB 21000656
SHEET NO. 1
EX-01

CAD FILE: 21000656-DRAINAGE MAPS-EXISTING CONDITIONS.DWG

PROPOSED CONDITIONS DRAINAGE BASIN SUMMARY

Basin	Design Point	Area (acres)	C_5	C_{100}	Q_5 (cfs)	Q_{100} (cfs)
A	1	3.74	0.13	0.38	5.76	8.21
B	2	40.37	0.38	0.55	73.48	176.67
C	3	57.12	0.33	0.52	64.83	170.63
D	4	7.96	0.46	0.64	12.99	30.52
E	5	3.14	0.23	0.45	1.80	4.20
F	6	5.50	0.11	0.37	5.30	12.50
G	7	7.85	0.09	0.36	6.80	16.00
OS-1	8	6.38	0.27	0.48	10.70	21.70
OS-2	9	3.12	0.30	0.50	7.80	13.60
OS-3	10	1.14	0.90	0.96	3.40	6.00
OS-4	11	9.53	0.13	0.38	14.90	31.70
OS-5	12	63.24	0.30	0.50	82.70	166.60
OS-6	13	35.75	0.22	0.46	31.90	58.40
TOTAL		244.84			322.36	716.74

Missing topo — *Added.*

Label Rolling Thunder Way & State roadway classification — *Added.*

Verify all adjacent owners match with El Paso County Assessors website information — *Verified.*

Show existing storm from Filing No. 2 — *Added.*

Label High points and low points & include flow arrows — *Added.*

Verify all existing easements are shown and labeled — *Added. Shown as easements to remain after developed conditions and vacations.*

Label flows exiting offsite here and enter Pond WU (existing) — *Cumulative DP table added.*

Be sure to include any existing structures shown on this plan on the existing map. — *Added.*

Labe flows exiting offsite here — *Cumulative DP table added.*

Label flows exiting offsite here and enter existing ditch to ... — *Cumulative DP table added.*

Labe flows exiting offsite here — *Cumulative DP table added.*

Label existing ditch — *Added.*

Label proposed swale — *Added.*

Label Highway 24 Way & State roadway classification — *Added.*

Label drainage tract/easement — *Added.*

Contour labels — *Added.*

Turn off hatch — *Hatches removed.*

Revised information to match as-built conditions in report.

Where did these numbers come from? If from previous report, include copy of the information in Appendix G, or if part of new pond calcs, include in Appendix E or remove information from note

Where did these numbers come from? If from previous report, include copy of the information in Appendix G, or if part of new pond calcs, include in Appendix E or remove information from note — *Revised information to match as-built conditions in report.*

Include size and private or public — *Added.*

Label existing area inlet — *Not located.*

Label total combined flows exiting offsite here — *Cumulative DP table*

Label total combined flows exiting offsite here — *Cumulative DP table added.*

Show and label channel and culverts at Highway 24 — *None identified to date. To be verified as a part of FDR.*

What are Sections B, BB, C & CC? Either include detail for them or remove label — *Removed.*

Cumulative DP table added.

OWNER: KLK 1031 INVESTMENTS LLC
TAX NO. 5312100006

OWNER: WALTON COLORADO LLC
TAX NO. 5300000716

OWNER: BRIAN MOODY
TAX NO. 53

OWNER: H20 SUB BLR LLC
TAX NO. 5313000103

FEMA FLOODPLAIN BOUNDARY (TYP.)

A FLOODPLAIN BOUNDARY

ZONE AE

EXISTING REGIONAL POND WU

PROPOSED DETENTION POND 1
VOLUME PROVIDED = 13.80 AC
5 YR. HIGH WATER LINE = 6814.60
100 YR. HIGH WATER LINE = 6816.10
TOP OF POND = 6818.00
5 YR. ALLOWABLE = 32.2 CFS
100 YR. ALLOWABLE = 73.2 CFS
5 YR. RELEASE = 28.9 CFS
100 YR. RELEASE = 73.3 CFS

PROPOSED DETENTION POND 2
VOLUME PROVIDED = 9.43 AC
5 YR. HIGH WATER LINE = 6814.25
100 YR. HIGH WATER LINE = 6815.56
TOP OF POND = 6818.50
5 YR. ALLOWABLE = 52.0 CFS
100 YR. ALLOWABLE = 117.6 CFS
5 YR. RELEASE = 44.6 CFS
100 YR. RELEASE = 101.2 CFS

EX. POND 1 OUTLET PIPE

EX. POND 2 OUTLET PIPE

EX. 60" RCP STORM SEWER FROM FIL. NO. 2

EX. 24" RCP STORM SEWER FROM FIL. NO. 2 DAYLIGHTS

FALCON HIGHLANDS FILING NO. 1

FALCON HIGHLANDS FILING NO. 2

FALCON BASIN

SAND CREEK BASIN

TAMLIN ROAD (FUTURE R.O.W.)

LEGEND

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

(IN FEET)
1 inch = 200 ft.

ATWELL
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303.462.1100

CHALLENGER HOMES
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COLORADO SPRINGS, CO 80920
(719) 598-5192
JIM BYERS

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

DATE 2/4/2022

REVISIONS	
A	1st SUBMITTAL TO JURISDICTION 00/00/20XX – JOE

DR. AMC | CH. RDL
P.M. RDL
JOB 21000656
SHEET NO. 1
EX-02

CAD FILE: 21000656-DRAINAGE MAPS-OVERALL SITE.DWG

APPENDIX G

REFERENCE CALCULATIONS & MAPS

HYDROLOGIC PDR CALCULATIONS

Per the references listed, there is a FDR. Why is the calculations from the PDR being used instead of the FDR?

Notes added to these pages. The County Approved FDR has these calculations but the titles in the tabulations were not changed from PDR to FDR. They are the FDR calcs.

FALCON HIGHLANDS FILING NO. 2 & 3
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	14.75	14.75	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B1	14.01	14.01	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B2	3.88	3.88	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B3	7.42	7.42	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B4	17.74	16.65	0.50	0.60	1.09	0.25	0.35	0.48	0.58
B5	11.59	11.59	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B5A	8.76	8.76	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B5B	5.95	5.95	0.45	0.55	0.00	0.25	0.35	0.45	0.55
B6	14.79	13.70	0.50	0.60	1.09	0.25	0.35	0.48	0.58
B7	13.61	13.61	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B8	6.96	6.96	0.50	0.60	0.00	0.25	0.35	0.50	0.60
C1	10.94	10.94	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C2	11.37	11.37	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C3	2.56	2.56	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C5	16.11	12.86	0.45	0.55	3.25	0.25	0.35	0.41	0.51
C8	8.20	6.99	0.45	0.55	1.21	0.25	0.35	0.42	0.52
C9	6.30	6.30	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C9A	6.72	6.72	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C10	12.35	12.35	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C11	10.13	10.13	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C12	3.67	3.67	0.45	0.55	0.00	0.25	0.35	0.45	0.55
D1	9.79	9.79	0.45	0.55	0.00	0.25	0.35	0.45	0.55
D2	3.37	3.37	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	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	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: 05/05/05

FALCON HIGHLANDS FILING NO. 2 & 3
PDR BASINS
(Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T_i	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	14.75	0.50	0.60	0.25	105	2.1	13.0	1625	1.5%	2.4	11.3	24.2	24.2	2.8	4.6	*20.5*	*40.5*
B1	14.01	0.50	0.60	0.25	105	2.1	13.0	1625	1.5%	2.4	11.3	24.2	24.2	2.8	4.6	*19.4*	*38.5*
B2	3.88	0.50	0.60	0.25	110	2.2	13.3	390	0.9%	1.9	3.4	16.7	16.7	3.3	5.6	*6.4*	*13.0*
B3	7.42	0.48	0.58	0.25	135	2.7	14.7	900	0.9%	1.9	7.9	22.6	22.6	2.9	4.8	*10.3*	*20.7*
B4	17.74	0.48	0.58	0.25	165	3.3	16.2	1550	1.3%	2.2	11.7	28.0	28.0	2.6	4.2	*22.1*	*43.8*
B5	11.59	0.50	0.60	0.25	210	4.2	18.3	1100	2.0%	2.3	8.0	26.3	26.3	2.7	4.4	*15.4*	*30.4*
B5A	8.76	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	*11.0*	*21.6*
B5B	5.95	0.45	0.55	0.25	200	4.0	17.9	133	1.3%	2.2	1.0	18.9	18.9	3.1	5.2	*8.4*	*17.2*
B6	14.79	0.48	0.58	0.25	150	3.0	15.5	1425	0.7%	1.8	13.2	28.7	28.7	2.5	4.2	*18.1*	*35.8*
B7	13.61	0.50	0.60	0.25	150	3.0	15.5	950	1.0%	2.0	7.9	23.4	23.4	2.8	4.7	*19.2*	*38.1*
B8	6.96	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	*9.2*	*18.2*
C1	10.94	0.45	0.55	0.25	180	3.6	17.0	1390	1.4%	2.3	10.1	27.0	27.0	2.6	4.3	*12.9*	*25.9*
C2	11.37	0.45	0.55	0.25	180	4.0	16.4	1700	1.1%	2.0	14.2	30.6	30.6	2.5	4.0	*12.6*	*25.1*
C3	2.56	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	*3.7*	*7.5*

FALCON HIGHLANDS FILING NO. 2 & 3
PDR BASINS
(Area Drainage Summary)

		WEIGHTED		*OVERLAND*				*STREET / CHANNEL FLOW*				T_i	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															
C5	16.11	0.41	0.51	0.25	250	4.0	21.5	1530	1.0%	2.0	12.8	34.3	34.3	2.3	3.7	*15.2*	*30.7*
C8	8.20	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	*9.9*	*20.3*
C9	6.30	0.45	0.55	0.25	180	3.6	17.0	425	1.2%	2.2	3.2	20.2	20.2	3.0	5.1	*8.6*	*17.5*
C9A	6.72	0.45	0.55	0.25	180	3.6	17.0	670	1.0%	2.0	5.6	22.5	22.5	2.9	4.8	*8.7*	*17.6*
C10	12.35	0.45	0.55	0.25	180	3.6	17.0	980	0.9%	1.9	8.6	25.6	25.6	2.7	4.4	*15.0*	*30.2*
C11	10.13	0.45	0.55	0.25	150	3.0	15.5	450	1.1%	2.1	3.6	19.1	19.1	3.1	5.2	*14.2*	*29.1*
C12	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	9.79	0.45	0.55	0.25	180	3.6	17.0	1300	1.3%	2.2	9.8	26.8	26.8	2.6	4.3	*11.6*	*23.3*
D2	3.37	0.45	0.55	0.25	70	1.4	10.6	300	1.7%	4.3	1.2	11.7	11.7	3.8	6.6	*5.8*	*12.2*
D3	14.62	0.90	0.95	0.25	185	10.0	12.4	103	1.9%	5.3	0.3	12.7	12.7	3.7	6.4	*48.9*	*88.5*
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	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*

FALCON HIGHLANDS FILING NO. 2 & 3
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															
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 FILING NO. 2 & 3
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 & OS-1**	10.20	12.24	24.2	2.8	4.6	***28.3***	***56.0***
2	**B2 & DP1 F.B.**	5.61	6.98	24.2	2.8	4.6	***15.6***	***32.0***
3	**B3 AND DP2 F.B.**	5.31	7.25	24.2	2.8	4.6	***14.7***	***33.2***
4	**B4**	8.60	10.37	28.0	2.6	4.2	***22.1***	***43.8***
5	**B5 & DP4 & DP 13 F.B.**	8.14	11.09	28.0	2.6	4.2	***21.0***	***46.8***
6	**B6**	7.12	8.60	28.7	2.5	4.2	***18.1***	***35.8***
7	**B7**	6.80	8.16	23.4	2.8	4.7	***19.2***	***38.1***
8	**C1**	4.92	6.02	27.0	2.6	4.3	***12.9***	***25.9***
9	**C2**	5.12	6.25	30.6	2.5	4.0	***12.6***	***25.1***
10	**C3, DP8 & DP9 F.B.**	6.35	9.64	30.6	2.5	4.0	***15.6***	***38.6***
11	**C5**	6.60	8.21	34.3	2.3	3.7	***15.2***	***30.7***
12	**B5B**	2.68	3.27	18.9	3.1	5.2	***8.4***	***17.2***
13	**B5A**	4.38	5.26	29.2	2.5	4.1	***11.0***	***21.6***
14	**C8**	3.45	4.27	22.6	2.9	4.8	***9.9***	***20.3***
15	**C9**	2.83	3.46	20.2	3.0	5.1	***8.6***	***17.5***

FALCON HIGHLANDS FILING NO. 2 & 3
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}
15A	C9A	3.02	3.70	22.5	2.9	4.8	*8.7*	*17.6*
16	C10	5.56	6.79	25.6	2.7	4.4	*15.0*	*30.2*
17	C11	4.56	5.57	19.1	3.1	5.2	*14.2*	*29.1*
18	D1	4.41	5.39	26.8	2.6	4.3	*11.6*	*23.3*
19	D2	1.52	1.85	11.7	3.8	6.6	*5.8*	*12.2*
20	E	0.55	0.77	17.6	3.2	5.4	*1.8*	*4.2*
21	F	1.58	2.22	16.3	3.3	5.7	*5.3*	*12.5*

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

FALCON HIGHLANDS FILING NO. 2 & 3
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**	13.31	15.11	28.0	2.6	4.2	***34.3***	***63.8***
2	**PR-1 & DP-2**	17.22	19.27	28.0	2.6	4.2	***44.3***	***81.3***
3	**PR-2, DP-3 & DP-5**	30.67	37.60	28.0	2.6	4.2	***79.0***	***158.6***
4	**PR-3 & DP-6**	37.79	46.20	28.7	2.5	4.2	***96.0***	***192.2***
5	**DP-7**	13.32	15.39	29.2	2.5	4.1	***33.5***	***63.3***
6	**DP-8 & DP-9**	4.83	4.04	30.6	2.5	4.0	***11.9***	***16.2***
7	**PR-6 & DP-10**	11.19	13.67	30.6	2.5	4.0	***27.5***	***54.8***
8	**PR-7 & DP-14**	14.63	17.94	30.6	2.5	4.0	***35.9***	***71.9***
9	**PR-8 & DP-15**	17.47	21.41	30.6	2.5	4.0	***42.9***	***85.8***
10	**PR-9 & DP-15A**	20.49	25.10	30.6	2.5	4.0	***50.3***	***100.6***
11	**DP-12**	2.68	3.27	18.9	3.1	5.2	***8.4***	***17.2***
11A	**DP-13 PICK UP**	3.84	3.95	29.2	2.5	4.1	***9.7***	***16.3***
11B	**PR-11B & DP-11A**	6.52	7.23	29.2	2.5	4.1	***16.4***	***29.7***
12	**DP-11**	6.60	8.21	34.3	2.3	3.7	***15.2***	***30.7***
13	**PR-12, DP-16 & DP-17**	16.72	20.57	34.3	2.3	3.7	***38.5***	***76.9***
14	**DP-18**	4.41	5.39	26.81	2.6	4.3	***11.6***	***23.3***

FALCON HIGHLANDS FILING NO. 2 & 3
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}
15	**DP-19**	1.52	1.85	11.74	3.8	6.6	***5.8***	***12.2***

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

HYDROLOGIC MDDP CALCULATIONS
PRELIMINARY POND ROUTING

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 * 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)
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: _____

FALCON HIGHLANDS FILING NO. 2
POND EMERGENCY OVERFLOW SPILLWAYS

Pond 1

The general form of the equation for horizontal crested weirs is $Q = CLH^{3/2}$ where:

Q = Weir flow discharge (cfs)	**244.30**
C = Weir flow coefficient	3.4
H = Depth of flow over the weir (ft)	1.00
L = Length of the weir (ft)	71.9

Pond 2

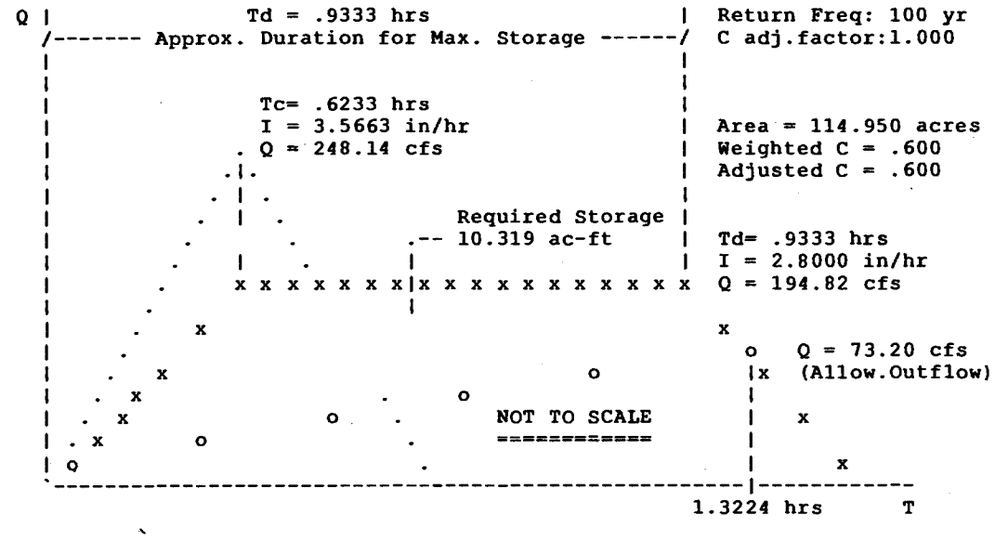
The general form of the equation for horizontal crested weirs is $Q = CLH^{3/2}$ where:

Q = Weir flow discharge (cfs)	**169.70**
C = Weir flow coefficient	3.4
H = Depth of flow over the weir (ft)	1.00
L = Length of the weir (ft)	49.9

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----
Method I

Q = CiA * Units Conversion; Where Conversion = 43560 / (12 * 3600)

RETURN FREQUENCY: 100 yr	Allowable Outflow: 73.20 cfs
'C' Adjustment: 1.000	Required Storage: 10.319 ac-ft
Peak Inflow: 194.82 cfs	
.HYG File: 100y	



File.... \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\POND WEST DP-2.PPW

RATIONAL C COEFFICIENT DATA

Soil/Surface Description	C	Area acres	C x Area acres
basin b	.5900	105.450	62.216
basin os-1	.6000	6.380	3.828
basin os-2	.9500	3.120	2.964
WEIGHTED C & TOTAL AREA --->	.6003	114.950	69.007

LEVEL POOL ROUTING SUMMARY

HYG Dir = \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\
Inflow HYG file = NONE STORED - POND WEST IN 100y
Outflow HYG file = NONE STORED - POND WEST OUT 100y

Pond Node Data = POND WEST
Pond Volume Data = POND WEST
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	= 6809.50	ft
Starting Volume	= .000	ac-ft
Starting Outflow	= .00	cfs
Starting Infiltr.	= .00	cfs
Starting Total Qout	= .00	cfs
Time Increment	= .0500	hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow	= 194.82	cfs	at	.6500 hrs
Peak Outflow	= 71.73	cfs	at	1.3500 hrs
Peak Elevation	= 6816.08	ft		
Peak Storage	= 10.620	ac-ft		

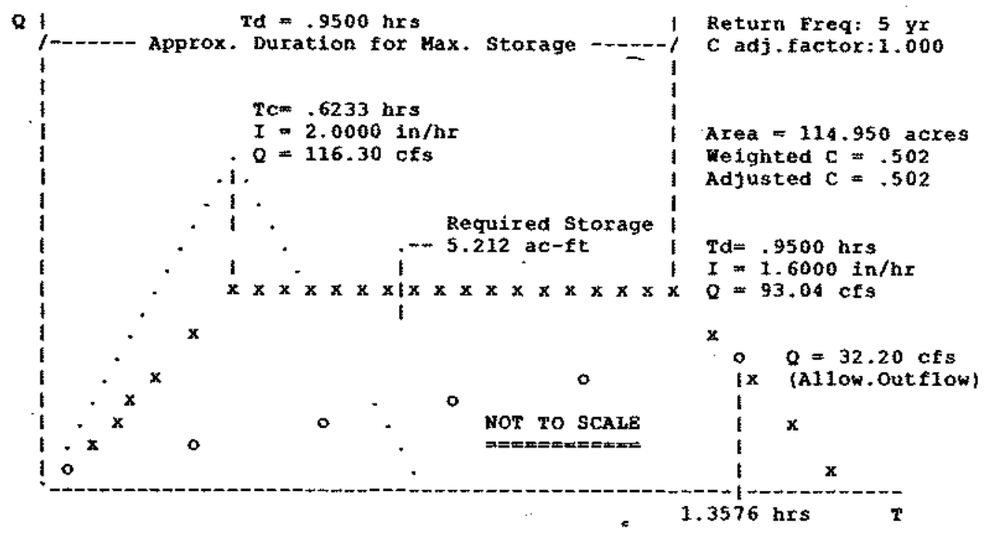
MASS BALANCE (ac-ft)

+ Initial Vol	= .000	
+ HYG Vol IN	= 15.012	
- Infiltration	= .000	
- HYG Vol OUT	= 15.011	
- Retained Vol	= .000	
Unrouted Vol	= -.000	ac-ft (.001% of Inflow Volume)

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----
Method I

Q = CiA * Units Conversion; Where Conversion = 43560 / (12 * 3600)

RETURN FREQUENCY: 5 yr	Allowable Outflow: 32.20 cfs
'C' Adjustment: 1.000	Required Storage: 5.212 ac-ft
Peak Inflow: 93.04 cfs	
.HYG File: 5Y	



File.... \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\POND WEST DP-2.PPW

RATIONAL C COEFFICIENT DATA

Soil/Surface Description	C	Area acres	C x Area acres
basin b	.4900	105.450	51.671
basin os-1	.5000	6.380	3.190
basin os-2	.9000	3.120	2.808
WEIGHTED C & TOTAL AREA --->	.5017	114.950	57.669

LEVEL POOL ROUTING SUMMARY

HYG Dir = \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\
Inflow HYG file = NONE STORED - POND WEST IN 5Y
Outflow HYG file = NONE STORED - POND WEST OUT 5Y

Pond Node Data = POND WEST
Pond Volume Data = POND WEST
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	6809.50 ft
Starting Volume	=	.000 ac-ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	.0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow	=	93.04 cfs	at	.6500 hrs
Peak Outflow	=	21.05 cfs	at	1.4500 hrs
Peak Elevation	=	6814.33 ft		
Peak Storage	=	5.588 ac-ft		

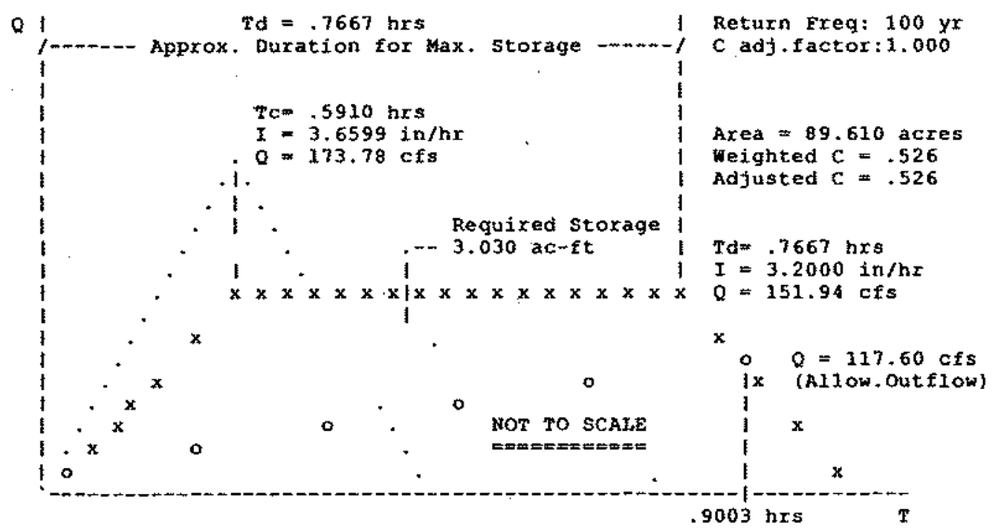
MASS BALANCE (ac-ft)

+ Initial Vol	=	.000
+ HYG Vol IN	=	7.290
- Infiltration	=	.000
- HYG Vol OUT	=	7.290
- Retained Vol	=	.000
Unrouted Vol	=	-.000 ac-ft (.001% of Inflow Volume)

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----
Method I

Q = CiA * Units Conversion; Where Conversion = 43560 / (12 * 3600)

RETURN FREQUENCY: 100 yr	Allowable Outflow: 117.60 cfs
'C' Adjustment: 1.000	Required Storage: 3.030 ac-ft
Peak Inflow: 151.94 cfs	
.HYG File: 100y	



Type.... C and Area
Name.... BASIN C & OS-2 Tag: POST

File.... \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\POND EAST DP-3.PPW

RATIONAL C COEFFICIENT DATA

Soil/Surface Description	C	Area acres	C x Area acres
Basin C	.5200	88.470	46.004
Basin OS-3	.9500	1.140	1.083
WEIGHTED C & TOTAL AREA --->	.5255	89.610	47.087

LEVEL POOL ROUTING SUMMARY

HYG Dir = \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\
Inflow HYG file = NONE STORED - POND EAST IN 100y
Outflow HYG file = NONE STORED - POND EAST OUT 100y

Pond Node Data = POND EAST
Pond Volume Data = POND EAST
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	6811.00 ft
Starting Volume	=	.000 ac-ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	.0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow	=	151.94 cfs	at	.6000 hrs
Peak Outflow	=	111.46 cfs	at	.9000 hrs
Peak Elevation	=	6817.19 ft		
Peak Storage	=	4.352 ac-ft		

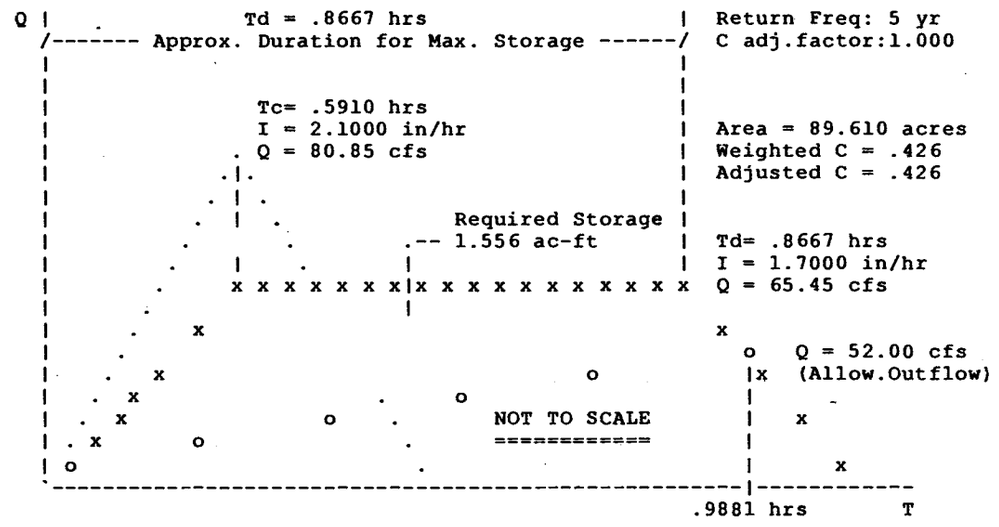
MASS BALANCE (ac-ft)

+ Initial Vol	=	.000
+ HYG Vol IN	=	9.623
- Infiltration	=	.000
- HYG Vol OUT	=	9.623
- Retained Vol	=	.000
Unrouted Vol	=	-.000 ac-ft (.000% of Inflow Volume)

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----
Method I

Q = CiA * Units Conversion; Where Conversion = 43560 / (12 * 3600)

RETURN FREQUENCY: 5 yr	Allowable Outflow: 52.00 cfs
'C' Adjustment: 1.000	Required Storage: 1.556 ac-ft
Peak Inflow: 65.45 cfs	
.HYG File: 5y	



Type.... C and Area
Name.... BASIN C & OS-2 Tag: POST

File.... \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\POND EAST DP-3.PPW

RATIONAL C COEFFICIENT DATA

Soil/Surface Description	C	Area acres	C x Area acres
Basin C	.4200	88.470	37.157
Basin OS-3	.9000	1.140	1.026
WEIGHTED C & TOTAL AREA --->	.4261	89.610	38.183

LEVEL POOL ROUTING SUMMARY

HYG Dir = \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\
Inflow HYG file = NONE STORED - POND EAST IN 5y
Outflow HYG file = NONE STORED - POND EAST OUT 5y

Pond Node Data = POND EAST
Pond Volume Data = POND EAST
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	6811.00 ft
Starting Volume	=	.000 ac-ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	.0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow	=	65.45 cfs	at	.6000 hrs
Peak Outflow	=	46.07 cfs	at	1.0500 hrs
Peak Elevation	=	6815.70 ft		
Peak Storage	=	2.203 ac-ft		

MASS BALANCE (ac-ft)

+ Initial Vol	=	.000
+ HYG Vol IN	=	4.686
- Infiltration	=	.000
- HYG Vol OUT	=	4.686
- Retained Vol	=	.000
Unrouted Vol	=	-.000 ac-ft (.001% of Inflow Volume)

DRAINAGE MAPS

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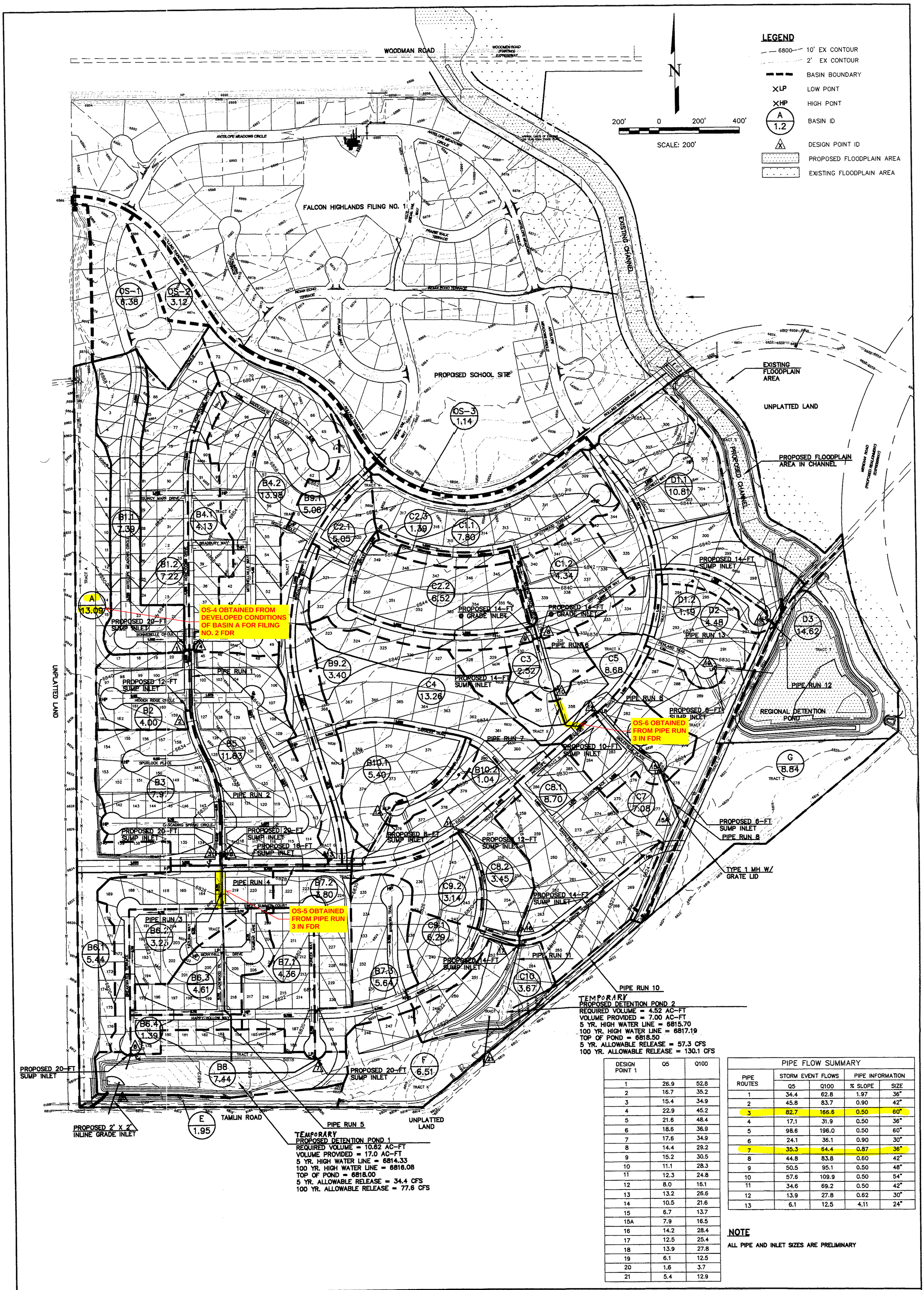


TEMPORARY
PROPOSED DETENTION POND 2
REQUIRED VOLUME = 4.52 AC-FT
VOLUME PROVIDED = 7.00 AC-FT
5 YR. HIGH WATER LINE = 6815.70
100 YR. HIGH WATER LINE = 6817.19
TOP OF POND = 6818.50
5 YR. ALLOWABLE RELEASE = 57.3 CFS
100 YR. ALLOWABLE RELEASE = 130.1 CFS

TEMPORARY
PROPOSED DETENTION POND 1
REQUIRED VOLUME = 10.62 AC-FT
VOLUME PROVIDED = 17.0 AC-FT
5 YR. HIGH WATER LINE = 6814.33
100 YR. HIGH WATER LINE = 6816.08
TOP OF POND = 6818.00
5 YR. ALLOWABLE RELEASE = 34.4 CFS
100 YR. ALLOWABLE RELEASE = 77.6 CFS

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	1.6	3.7
21	5.4	12.9

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"

NOTE

ALL PIPE AND INLET SIZES ARE PRELIMINARY

JOB NO. 0429.00
DATE ISSUED 7/15/05
SHEET NO. 1 OF 1

V-SCALE 1" = 200'
H-SCALE

CHECKED BY
DRAWN BY LDR
DESIGNED BY QNA

FALCON HIGHLANDS FILING NO. 2

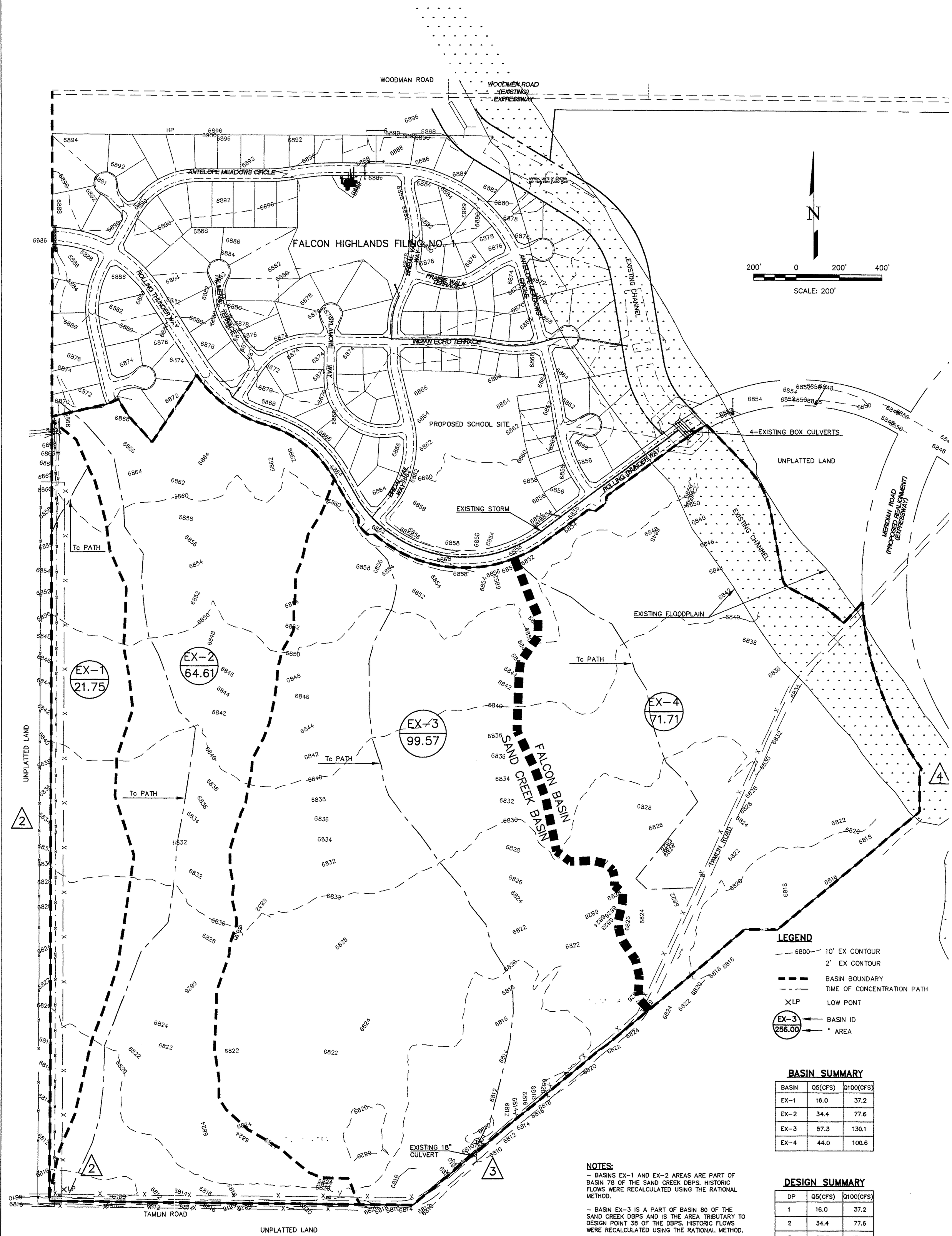
FINAL DRAINAGE PLAN

125 N. WAHSATCH AVE., SUITE 101
COLORADO SPRINGS, CO. 80903
OFFICE: 719-635-6422
FAX: 719-635-6426
www.tnesinc.com
Terra Nova Engineering, Inc.

PREPARED FOR:
FALCON HIGHLANDS, LLC
ATTN: MIKE SCOTT
25 N. TEJON, SUITE 300
COLORADO SPRINGS, CO 80903
(719) 227-1022

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

REVISIONS		
NO.	DESCRIPTION	DATE



LEGEND

- 6800 — 10' EX CONTOUR
- 2' EX CONTOUR
- BASIN BOUNDARY
- TIME OF CONCENTRATION PATH
- XLP — LOW PONT
- EX-3 / 256.00 — BASIN ID / " AREA

BASIN SUMMARY

BASIN	Q5(CFS)	Q100(CFS)
EX-1	16.0	37.2
EX-2	34.4	77.6
EX-3	57.3	130.1
EX-4	44.0	100.6

NOTES:

- BASINS EX-1 AND EX-2 AREAS ARE PART OF BASIN 78 OF THE SAND CREEK DBPS. HISTORIC FLOWS WERE RECALCULATED USING THE RATIONAL METHOD.

- BASIN EX-3 IS A PART OF BASIN 80 OF THE SAND CREEK DBPS AND IS THE AREA TRIBUTARY TO DESIGN POINT 38 OF THE DBPS. HISTORIC FLOWS WERE RECALCULATED USING THE RATIONAL METHOD.

- BASIN EX-4 IS THE AREA OF FALCON HIGHLANDS FILING NO. 2 THAT IS TRIBUTARY TO THE FALCON BASIN.

DESIGN SUMMARY

DP	Q5(CFS)	Q100(CFS)
1	16.0	37.2
2	34.4	77.6
3	57.3	130.1
4	44.0	100.6

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

FALCON HIGHLANDS PHASE 2

FILINGS NO. 2 & 3
HISTORIC MDDP MAP
EXISTING MAJOR BASINS

125 N. WAHSATCH AVE., SUITE 101
COLORADO SPRINGS, CO. 80903
OFFICE: 719-635-6422
FAX: 719-635-6426
www.tnesinc.com

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

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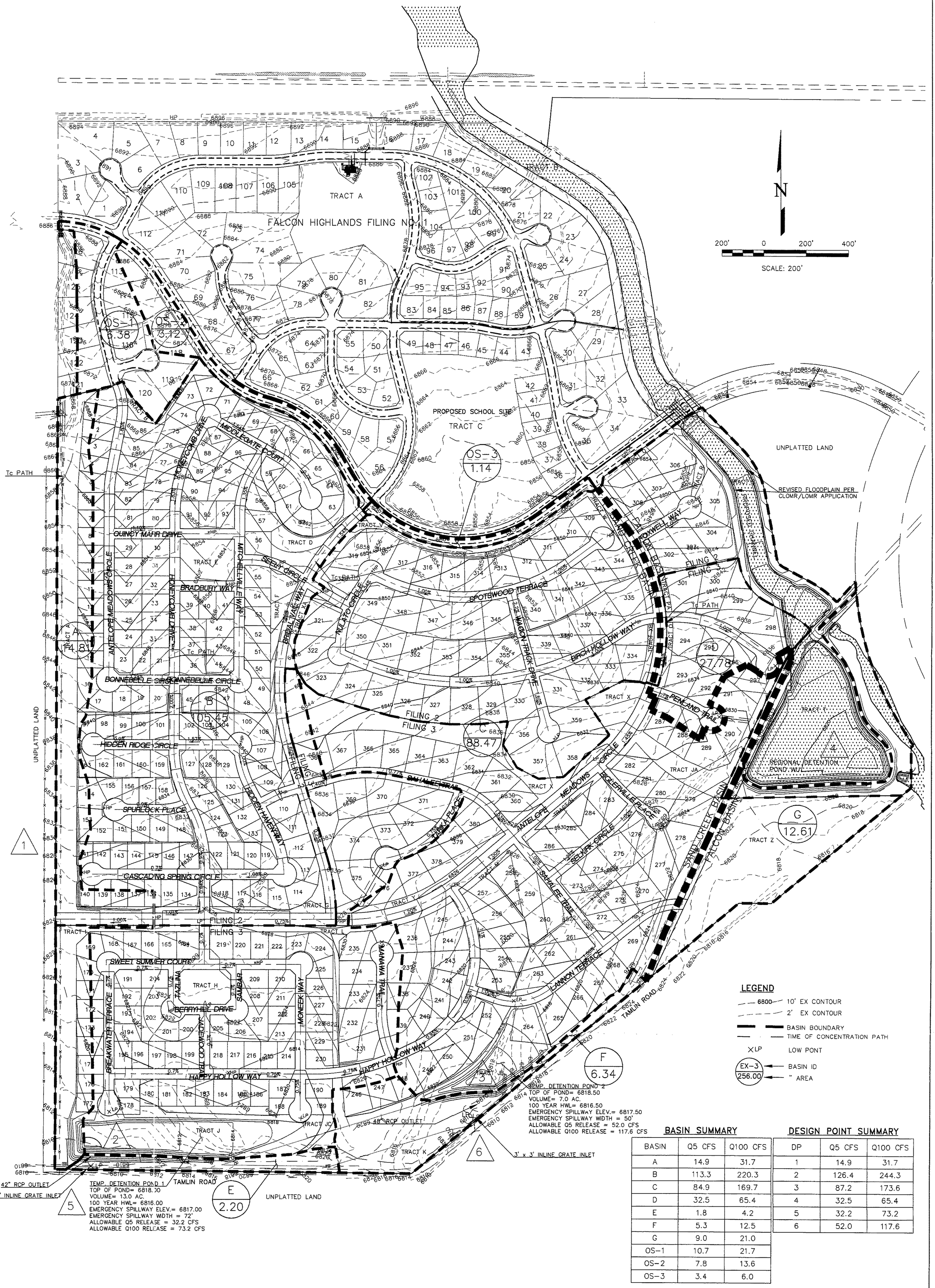
REVISIONS

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



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

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

FALCON HIGHLANDS PHASE 2

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

125 N. WAHSATCH AVE., SUITE 101
COLORADO SPRINGS, CO. 80903
OFFICE: 719-635-6422
FAX: 719-635-6426
www.tnesinc.com
"Creative Civil Engineering"

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

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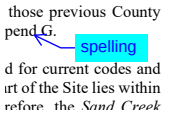
REVISIONS NO.	DESCRIPTION	DATE
1	PER COUNTY DP COMMENTS	5/05/05
2	PER COUNTY DP COMMENTS	9/16/05

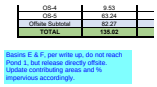
ENG-SKP214-R2-MDDP.pdf Markup Summary

CDurham (153)



Subject: Callout
Page Label: 8
Author: CDurham
Date: 3/1/2022 2:04:07 PM
Status:
Color:
Layer:
Space:

spelling



Subject: Text Box
Page Label: 45
Author: CDurham
Date: 3/2/2022 1:23:16 PM
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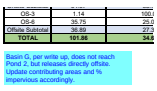
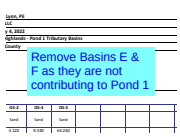
Color:
Layer:
Space:

Basins E & F, per write up, do not reach Pond 1, but release directly offsite. Update contributing areas and % impervious accordingly.



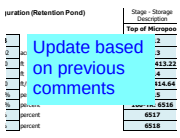
Subject: Text Box
Page Label: 46
Author: CDurham
Date: 3/2/2022 1:25:18 PM
Status:
Color:
Layer:
Space:

Basin G, per write up, does not reach Pond 2, but releases directly offsite. Update contributing areas and % impervious accordingly.



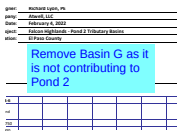
Subject: Text Box
Page Label: 47
Author: CDurham
Date: 3/2/2022 1:30:32 PM
Status:
Color:
Layer:
Space:

Remove Basins E & F as they are not contributing to Pond 1



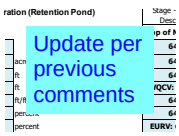
Subject: Text Box
Page Label: 48
Author: CDurham
Date: 3/2/2022 1:31:38 PM
Status:
Color:
Layer:
Space:

Update based on previous comments



Subject: Text Box
Page Label: 50
Author: CDurham
Date: 3/2/2022 1:33:31 PM
Status:
Color:
Layer:
Space:

Remove Basin G as it is not contributing to Pond 2



Subject: Text Box
Page Label: 51
Author: CDurham
Date: 3/2/2022 1:34:02 PM
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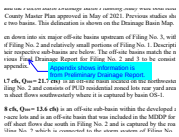
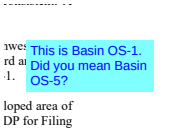
Color:
Layer:
Space:

Update per previous comments



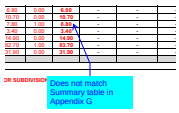
Subject: Callout
Page Label: 8
Author: CDurham
Date: 3/2/2022 1:51:13 PM
Status:
Color:
Layer:
Space:

Appendix shows information is from Preliminary Drainage Report.



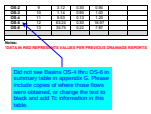
Subject: Text Box
Page Label: 8
Author: CDurham
Date: 3/2/2022 1:53:39 PM
Status:
Color:
Layer:
Space:

This is Basin OS-1. Did you mean Basin OS-5?



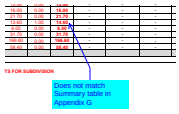
Subject: Callout
Page Label: 35
Author: CDurham
Date: 3/2/2022 11:27:01 AM
Status:
Color:
Layer:
Space:

Does not match Summary table in Appendix G



Subject: Callout
Page Label: 35
Author: CDurham
Date: 3/2/2022 11:28:56 AM
Status:
Color:
Layer:
Space:

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.



Subject: Callout
Page Label: 36
Author: CDurham
Date: 3/2/2022 11:31:18 AM
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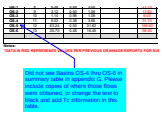
Color:
Layer:
Space:

Does not match Summary table in Appendix G



Subject: Callout
Page Label: 36
Author: CDurham
Date: 3/2/2022 11:31:32 AM
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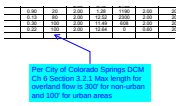
Color:
Layer:
Space:

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.



Subject: Callout
Page Label: 39
Author: CDurham
Date: 3/2/2022 11:41:22 AM
Status:
Color:
Layer:
Space:

Per City of Colorado Springs DCM Ch 6 Section 3.2.1 Max length for overland flow is 300' for non-urban and 100' for urban areas

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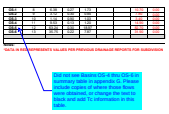
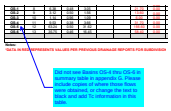


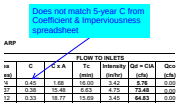
Subject: Callout
Page Label: 40
Author: CDurham
Date: 3/2/2022 11:43:15 AM
Status:
Color:
Layer:
Space:

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.



Subject: Callout
Page Label: 41
Author: CDurham
Date: 3/2/2022 11:43:36 AM
Status:
Color:
Layer:
Space:

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.



Subject: Callout
Page Label: 40
Author: CDurham
Date: 3/2/2022 11:52:13 AM
Status:
Color:
Layer:
Space:

Does not match 5-year C from Coefficient & Imperviousness spreadsheet

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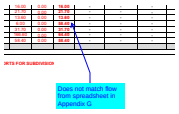
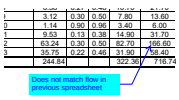


Subject: Callout
Page Label: 41
Author: CDurham
Date: 3/2/2022 11:55:43 AM
Status:
Color:
Layer:
Space:

Does not match flow from spreadsheet in Appendix G

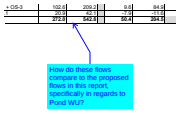


Subject: Callout
Page Label: 42
Author: CDurham
Date: 3/2/2022 11:59:11 AM
Status:
Color:
Layer:
Space:

Does not match flow in previous spreadsheet

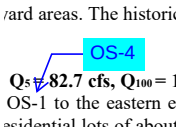
Subject: Text Box
Page Label: 57
Author: CDurham
Date: 3/2/2022 12:32:51 PM
Status:
Color:
Layer:
Space:

Per the references listed, there is a FDR. Why is the calculations from the PDR being used instead of the FDR?



Subject: Callout
Page Label: 43
Author: CDurham
Date: 3/2/2022 12:33:22 PM
Status:
Color:
Layer:
Space:

How do these flows compare to the proposed flows in this report, specifically in regards to Pond WU?



Subject: Callout
Page Label: 8
Author: CDurham
Date: 3/2/2022 2:03:10 PM
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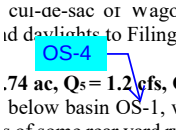
Color:
Layer:
Space:

OS-4



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Page Label: 9
Author: CDurham
Date: 3/2/2022 2:05:57 PM
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Color:
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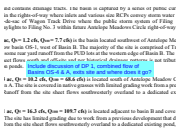
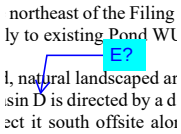
Space:

OS-4



Subject: Text Box
Page Label: 9
Author: CDurham
Date: 3/2/2022 2:08:04 PM
Status:
Color:
Layer:
Space:

Include discussion of DP 1, combined flow of Basins OS-4 & A, exits site and where does it go?



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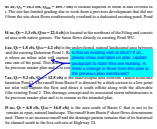
Page Label: 9
Author: CDurham
Date: 3/2/2022 2:11:24 PM
Status:
Color:
Layer:
Space:

E?



Subject: Callout
Page Label: 9
Author: CDurham
Date: 3/2/2022 2:15:23 PM
Status:
Color:
Layer:
Space:

Is this an existing inlet & ditch? If so, please show and label on plan. Update paragraph to state they are existing. Is there a change in flows from this plan to the previous plan mentioned?

Subject: Text Box
Page Label: 9
Author: CDurham
Date: 3/2/2022 2:16:03 PM
Status:
Color:
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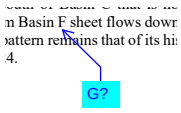
Space:

east



Subject: Callout
Page Label: 9
Author: CDurham
Date: 3/2/2022 2:17:07 PM
Status:
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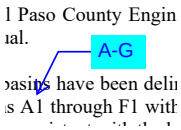
Layer:
Space:

G?



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Page Label: 10
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Date: 3/2/2022 2:20:51 PM
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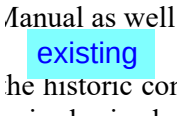
A-G



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Author: CDurham
Date: 3/2/2022 2:21:15 PM
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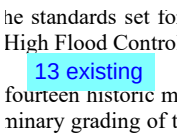
existing



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Author: CDurham
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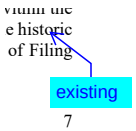
13 existing



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Date: 3/2/2022 2:23:12 PM
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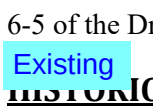
existing



Subject: Text Box
Page Label: 7
Author: CDurham
Date: 3/2/2022 2:24:12 PM
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Color:
Layer:
Space:

Existing

Subject: Text Box
Page Label: 7
Author: CDurham
Date: 3/2/2022 2:25:55 PM
Status:
Color:
Layer:
Space:

Include discussion that existing conditions is with Filing 2 developed and historic conditions (pre-Filing 2 development) was done as existing conditions in previous reports and calculations can be found there

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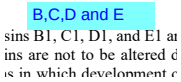

Subject: Text Box
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:26:31 PM
Status:
Color:
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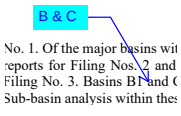
Space:

B,C,D and E



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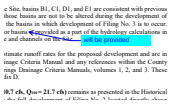
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:26:45 PM
Status:
Color:
Layer:
Space:

B & C



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Page Label: 11
Author: CDurham
Date: 3/2/2022 2:27:11 PM
Status:
Color:
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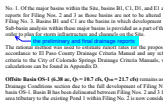
Space:

will be provided



Subject: Callout
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:27:44 PM
Status:
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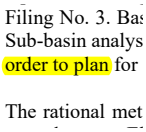
the preliminary and final drainage reports



Subject: Highlight
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:27:52 PM
Status:
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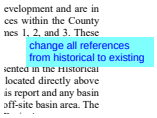
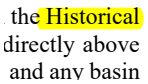
order to plan



Subject: Text Box
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:28:54 PM
Status:
Color:
Layer:
Space:

change all references from historical to existing



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Author: CDurham
Date: 3/2/2022 2:28:58 PM
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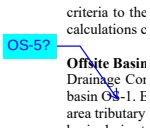
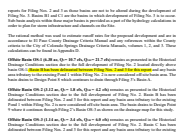
Color:
Layer:
Space:

Historical



Subject: Callout
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:29:19 PM
Status:
Color:
Layer:
Space:

OS-5?



Subject: Highlight
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:31:08 PM
Status:
Color:
Layer:
Space:

Basin B has been delineated between Filing Nos. 2 and 3 for this report

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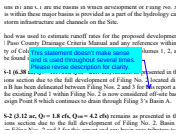
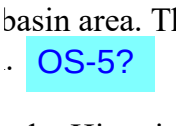


Subject: Callout
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:32:35 PM
Status:
Color:
Layer:
Space:

This statement doesn't make sense and is used throughout several times. Please revise description for clarity.



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Author: CDurham
Date: 3/2/2022 2:32:38 PM
Status:
Color:
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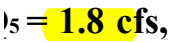
Space:

OS-5?



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Page Label: 11
Author: CDurham
Date: 3/2/2022 2:33:02 PM
Status:
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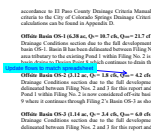
1.8 c

Subject: Highlight
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:33:04 PM
Status:
Color:
Layer:
Space:

4.2 c



Subject: Callout
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:33:27 PM
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Update flows to match spreadsheet

the Historical
n B has been
to the existing

Subject: Highlight
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:33:36 PM
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Historical

:or this study.

the Historical
n C has been
to the existing

Subject: Highlight
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:33:39 PM
Status:
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Historical

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the Historical
n A has been
ary to off-site

Subject: Highlight
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:33:41 PM
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Color:
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Space:

Historical

)int 11.

the Historical
n B has been
to the existing

Subject: Highlight
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:33:44 PM
Status:
Color:
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Space:

Historical

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the Historical
n C has been

Subject: Highlight
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:33:47 PM
Status:
Color:
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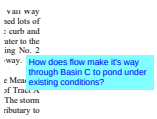
Space:

Historical

The basin drains to Desig
he drainage map for this
OS-3?
is as presented in the Hi
iling No. 2. Basin C ha
sin area tributary to the

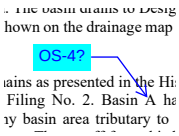
Subject: Callout
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:47:43 PM
Status:
Color:
Layer:
Space:

OS-3?



Subject: Text Box
Page Label: 9
Author: CDurham
Date: 3/2/2022 2:54:09 PM
Status:
Color:
Layer:
Space:

How does flow make it's way through Basin C to pond under existing conditions?



Subject: Callout
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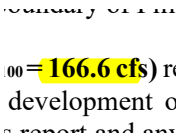
Author: CDurham
Date: 3/2/2022 2:55:09 PM
Status:
Color:
Layer:
Space:

OS-4?



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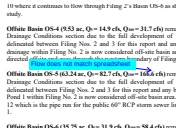
Author: CDurham
Date: 3/2/2022 2:55:44 PM
Status:
Color:
Layer:
Space:

166.6 cf



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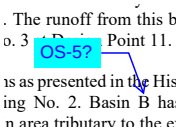
Page Label: 11
Author: CDurham
Date: 3/2/2022 2:56:03 PM
Status:
Color:
Layer:
Space:

Flow does not match spreadsheet



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Author: CDurham
Date: 3/2/2022 2:56:20 PM
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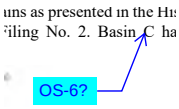
Space:

OS-5?



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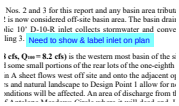
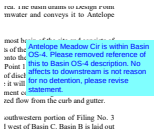
OS-6?



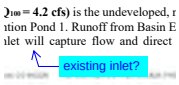
Subject: Text Box
Page Label: 12
Author: CDurham
Date: 3/2/2022 2:57:39 PM
Status:
Color:
Layer:
Space:

Need to show & label inlet on plan



Subject: Text Box
Page Label: 12
Author: CDurham
Date: 3/2/2022 3:03:02 PM
Status:
Color:
Layer:
Space:

Antelope Meadow Cir is within Basin OS-4. Please removed reference of this to Basin OS-4 description. No affects to downstream is not reason for no detention, please revise statement.



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Page Label: 12
Author: CDurham
Date: 3/2/2022 3:05:43 PM
Status:
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Layer:
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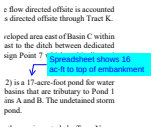
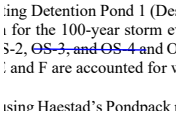
existing inlet?



Subject: Callout
Page Label: 13
Author: CDurham
Date: 3/2/2022 3:09:56 PM
Status:
Color:
Layer:
Space:

Spreadsheet shows 16 ac-ft to top of embankment



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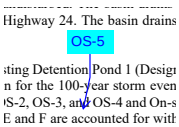
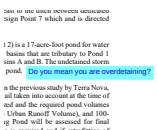


Subject: Callout
Page Label: 13
Author: CDurham
Date: 3/2/2022 3:11:56 PM
Status:
Color:
Layer:
Space:

OS-5



Subject: Text Box
Page Label: 13
Author: CDurham
Date: 3/2/2022 3:14:18 PM
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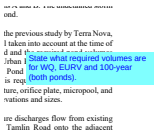
Do you mean you are overdetaining?



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Page Label: 13
Author: CDurham
Date: 3/2/2022 3:16:39 PM
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Color:
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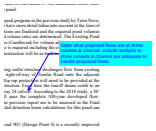
Space:

State what required volumes are for WQ, EURV and 100-year (both ponds).



Subject: Callout
Page Label: 14
Author: CDurham
Date: 3/2/2022 3:18:33 PM
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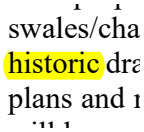
State what proposed flows are at these culverts & channel. Include analysis to show culverts & channel are adequate to handle proposed flows.



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Page Label: 15
Author: CDurham
Date: 3/2/2022 3:21:17 PM
Status:
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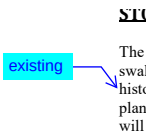
historic



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Page Label: 15
Author: CDurham
Date: 3/2/2022 3:21:37 PM
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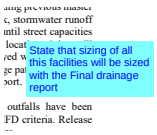
existing



Subject: Text Box
Page Label: 15
Author: CDurham
Date: 3/2/2022 3:22:39 PM
Status:
Color:
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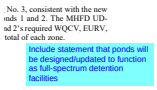
Space:

State that sizing of all this facilities will be sized with the Final drainage report



Subject: Text Box
Page Label: 15
Author: CDurham
Date: 3/2/2022 3:24:49 PM
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Include statement that ponds will be designed/updated to function as full-spectrum detention facilities

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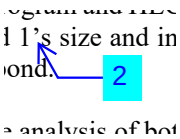

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Date: 3/2/2022 3:26:47 PM
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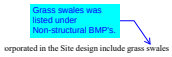
2



Subject: Callout
Page Label: 17
Author: CDurham
Date: 3/2/2022 3:27:41 PM
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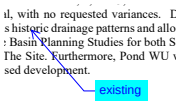
Grass swales was listed under Non-structural BMP's.



Subject: Callout
Page Label: 17
Author: CDurham
Date: 3/2/2022 3:31:24 PM
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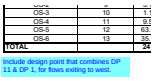
existing



Subject: Text Box
Page Label: 37
Author: CDurham
Date: 3/2/2022 3:35:48 PM
Status:
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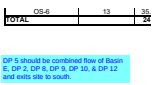
Include design point that combines DP 11 & DP 1, for flows exiting to west.



Subject: Text Box
Page Label: 37
Author: CDurham
Date: 3/2/2022 3:37:22 PM
Status:
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DP 5 should be combined flow of Basin E, DP 2, DP 8, DP 9, DP 10, & DP 12 and exits site to south.

DP 6 should be combined flow of Basin F and DP 13 & DP 3.

Subject: Text Box
Page Label: 37
Author: CDurham
Date: 3/2/2022 3:38:19 PM
Status:
Color:
Layer:
Space:

DP 6 should be combined flow of Basin F and DP 13 & DP 3.

DP 5 should be combined flow of Basin E, and Pond 1 release rate and exits site to south.

Subject: Text Box
Page Label: 42
Author: CDurham
Date: 3/2/2022 3:39:15 PM
Status:
Color:
Layer:
Space:

DP 5 should be combined flow of Basin E, and Pond 1 release rate and exits site to south.

DP 6 should be combined flow of Basin F and Pond 2 release rate and exits site to south.

Subject: Text Box
Page Label: 42
Author: CDurham
Date: 3/2/2022 3:39:38 PM
Status:
Color:
Layer:
Space:

DP 6 should be combined flow of Basin F and Pond 2 release rate and exits site to south.

HYDRAULIC CAL

Include analysis of existing channel & culvert at Highway 24, to ensure adequate to handle proposed flows. (Combined flow of DP 5 & DP 6 exiting site)

Subject: Text Box
Page Label: 44
Author: CDurham
Date: 3/2/2022 3:40:40 PM
Status:
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Include analysis of existing channel & culvert at Highway 24, to ensure adequate to handle proposed flows. (Combined flow of DP 5 & DP 6 exiting site)

Verify all adjacent owners match with El Paso County Assessors website information

Subject: Text Box
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:44:38 PM
Status:
Color:
Layer:
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Verify all adjacent owners match with El Paso County Assessors website information

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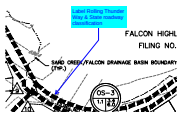
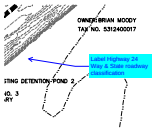


Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:45:41 PM
Status:
Color:
Layer:
Space:

Label Rolling Thunder Way & State roadway classification

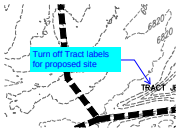


Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:46:11 PM
Status:
Color:
Layer:
Space:

Label Highway 24 Way & State roadway classification

Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:47:47 PM
Status:
Color:
Layer:
Space:

Are these proposed contours? Please turn off if so, or label.



Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:48:05 PM
Status:
Color:
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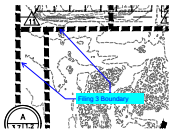
Space:

Turn off Tract labels for proposed site



Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:48:39 PM
Status:
Color:
Layer:
Space:

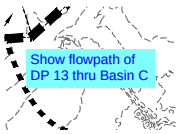
Filing 3 Boundary

Subject: Text Box
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:49:34 PM
Status:
Color:
Layer:
Space:

Filing No. 3

Subject: Text Box
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:49:45 PM
Status:
Color:
Layer:
Space:

Filing No. 2



Subject: Text Box
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:51:11 PM
Status:
Color:
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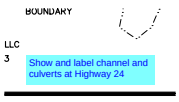
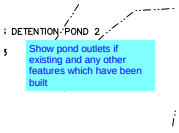
Space:

Show flowpath of DP 13 thru Basin C



Subject: Text Box
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:52:29 PM
Status:
Color:
Layer:
Space:

Show and label channel and culverts at Highway 24



Subject: Text Box
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:53:06 PM
Status:
Color:
Layer:
Space:

Show pond outlets if existing and any other features which have been built

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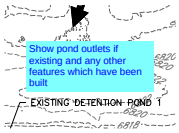

Subject: Text Box
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:53:16 PM
Status:
Color:
Layer:
Space:

Show pond outlets if existing and any other features which have been built

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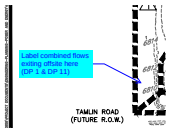
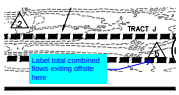


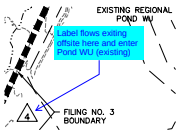
Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:53:49 PM
Status:
Color:
Layer:
Space:

Label combined flows exiting offsite here (DP 1 & DP 11)



Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:54:28 PM
Status:
Color:
Layer:
Space:

Label total combined flows exiting offsite here



Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:55:15 PM
Status:
Color:
Layer:
Space:

Label flows exiting offsite here and enter Pond WU (existing)

Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:55:32 PM
Status:
Color:
Layer:
Space:

Label existing ditch

Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:55:56 PM
Status:
Color:
Layer:
Space:

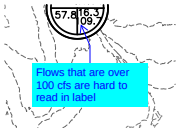
Label flows exiting offsite here and enter existing ditch to ...

Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:56:36 PM
Status:
Color:
Layer:
Space:

Fix overlapping text

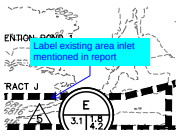
Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:57:08 PM
Status:
Color:
Layer:
Space:

What are these? Please remove if not needed



Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:57:40 PM
Status:
Color:
Layer:
Space:

Flows that are over 100 cfs are hard to read in label



Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 3:58:42 PM
Status:
Color:
Layer:
Space:

Label existing area inlet mentioned in report

Show existing storm from Filing No. 2

Subject: Text Box
Page Label: 54
Author: CDurham
Date: 3/2/2022 4:07:10 PM
Status:
Color:
Layer:
Space:

Show existing storm from Filing No. 2

Label High points and low points

Subject: Text Box
Page Label: 54
Author: CDurham
Date: 3/2/2022 4:07:13 PM
Status:
Color:
Layer:
Space:

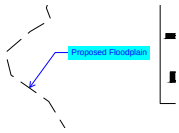
Label High points and low points

Show all existing storm structures here that are on proposed drainage map

Subject: Text Box
Page Label: 54
Author: CDurham
Date: 3/2/2022 4:07:17 PM
Status:
Color:
Layer:
Space:

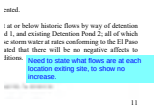
Show all existing storm structures here that are on proposed drainage map

---



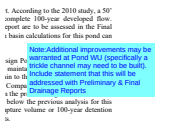
Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 4:10:21 PM
Status:
Color:
Layer:
Space:

Proposed Floodplain



Subject: Text Box
Page Label: 14
Author: CDurham
Date: 3/2/2022 4:11:36 PM
Status:
Color:
Layer:
Space:

Need to state what flows are at each location exiting site, to show no increase.



Subject: Text Box
Page Label: 14
Author: CDurham
Date: 3/2/2022 4:19:36 PM
Status:
Color:
Layer:
Space:

Note:Additional improvements may be warranted at Pond WU (specifically a trickle channel may need to be built). Include statement that this will be addressed with Preliminary & Final Drainage Reports

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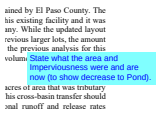
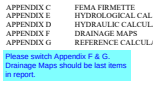


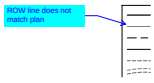
Subject: Text Box
Page Label: 14
Author: CDurham
Date: 3/2/2022 4:20:11 PM
Status:
Color:
Layer:
Space:

State what the area and Imperviousness were and are now (to show decrease to Pond).



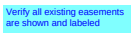
Subject: Text Box
Page Label: 3
Author: CDurham
Date: 3/2/2022 4:21:36 PM
Status:
Color:
Layer:
Space:

Please switch Appendix F & G. Drainage Maps should be last items in report.



Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 4:22:07 PM
Status:
Color:
Layer:
Space:

ROW line does not match plan

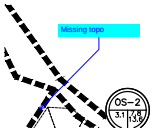


Subject: Text Box
Page Label: 54
Author: CDurham
Date: 3/2/2022 4:22:38 PM
Status:
Color:
Layer:
Space:

Verify all existing easements are shown and labeled

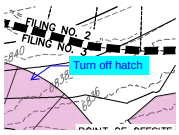
Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 4:22:42 PM
Status:
Color:
Layer:
Space:

Why are there 2 different lines for Sand Creek/Falcon Boundary?



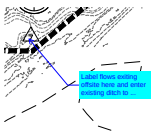
Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:23:03 PM
Status:
Color:
Layer:
Space:

Missing topo



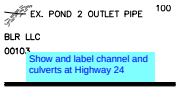
Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:23:35 PM
Status:
Color:
Layer:
Space:

Turn off hatch



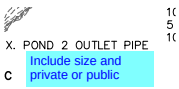
Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:24:19 PM
Status:
Color:
Layer:
Space:

Label flows exiting offsite here and enter existing ditch to ...



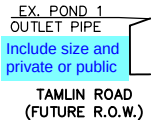
Subject: Text Box
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:24:34 PM
Status:
Color:
Layer:
Space:

Show and label channel and culverts at Highway 24



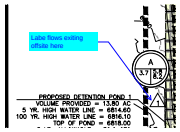
Subject: Text Box
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:24:53 PM
Status:
Color:
Layer:
Space:

Include size and private or public



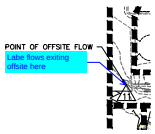
Subject: Text Box
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:25:05 PM
Status:
Color:
Layer:
Space:

Include size and private or public



Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:25:34 PM
Status:
Color:
Layer:
Space:

Labe flows exiting offsite here



Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:25:49 PM
Status:
Color:
Layer:
Space:

Labe flows exiting offsite here

Subject: Text Box
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:26:44 PM
Status:
Color:
Layer:
Space:

Verify all adjacent owners match with El Paso County Assessors website information

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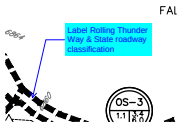
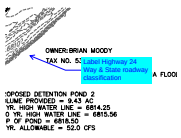
Subject: Text Box
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:26:57 PM
Status:
Color:
Layer:
Space:

Show existing storm from Filing No. 2



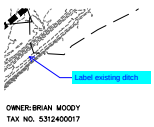
Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:27:59 PM
Status:
Color:
Layer:
Space:

Label Rolling Thunder Way & State roadway classification



Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:28:12 PM
Status:
Color:
Layer:
Space:

Label Highway 24 Way & State roadway classification

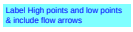


Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:28:27 PM
Status:
Color:
Layer:
Space:

Label existing ditch

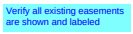
Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:28:45 PM
Status:
Color:
Layer:
Space:

Label flows exiting offsite here and enter Pond WU (existing)



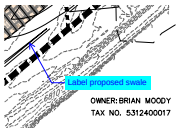
Subject: Text Box
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:29:07 PM
Status:
Color:
Layer:
Space:

Label High points and low points & include flow arrows



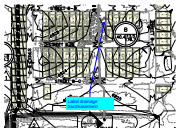
Subject: Text Box
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:29:09 PM
Status:
Color:
Layer:
Space:

Verify all existing easements are shown and labeled



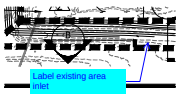
Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:29:38 PM
Status:
Color:
Layer:
Space:

Label proposed swale



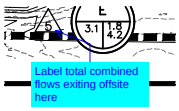
Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:30:37 PM
Status:
Color:
Layer:
Space:

Label drainage tract/easement



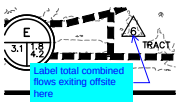
Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:31:22 PM
Status:
Color:
Layer:
Space:

Label existing area inlet



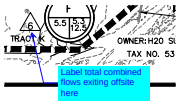
Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:31:25 PM
Status:
Color:
Layer:
Space:

Label total combined flows exiting offsite here



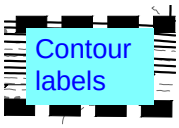
Subject: Callout
Page Label: 54
Author: CDurham
Date: 3/2/2022 4:31:31 PM
Status:
Color:
Layer:
Space:

Label total combined flows exiting offsite here



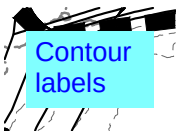
Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:31:41 PM
Status:
Color:
Layer:
Space:

Label total combined flows exiting offsite here



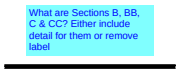
Subject: Text Box
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:32:05 PM
Status:
Color:
Layer:
Space:

Contour labels



Subject: Text Box
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:32:17 PM
Status:
Color:
Layer:
Space:

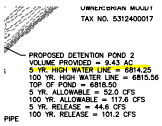
Contour labels



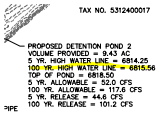
Subject: Text Box
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:32:56 PM
Status:
Color:
Layer:
Space:

What are Sections B, BB, C & CC? Either include detail for them or remove label

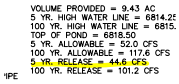
---



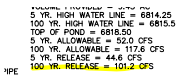
Subject: Highlight
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:33:05 PM
Status:
Color:
Layer:
Space:



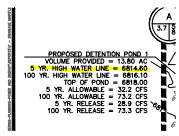
Subject: Highlight
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:33:07 PM
Status:
Color:
Layer:
Space:



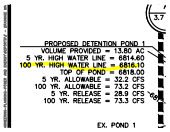
Subject: Highlight
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:33:10 PM
Status:
Color:
Layer:
Space:



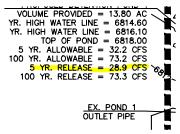
Subject: Highlight
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:33:12 PM
Status:
Color:
Layer:
Space:



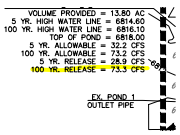
Subject: Highlight
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:34:26 PM
Status:
Color:
Layer:
Space:



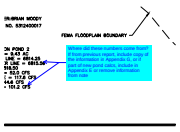
Subject: Highlight
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:34:28 PM
Status:
Color:
Layer:
Space:



Subject: Highlight
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:34:32 PM
Status:
Color:
Layer:
Space:



Subject: Highlight
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:34:34 PM
Status:
Color:
Layer:
Space:



Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:35:15 PM
Status:
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Where did these numbers come from? If from previous report, include copy of the information in Appendix G, or if part of new pond calcs, include in Appendix E or remove information from note

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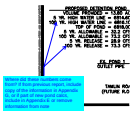

Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:35:35 PM
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Where did these numbers come from? If from previous report, include copy of the information in Appendix G, or if part of new pond calcs, include in Appendix E or remove information from note

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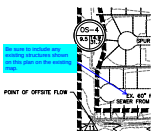

Subject: Callout
Page Label: 55
Author: CDurham
Date: 3/2/2022 4:36:51 PM
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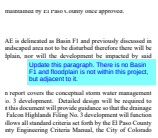
Be sure to include any existing structures shown on this plan on the existing map.



Subject: Text Box
Page Label: 17
Author: CDurham
Date: 3/2/2022 4:38:53 PM
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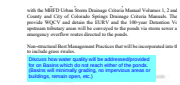
Update this paragraph. There is no Basin F1 and floodplain is not within this project, but adjacent to it.



Subject: Text Box
Page Label: 16
Author: CDurham
Date: 3/2/2022 4:39:13 PM
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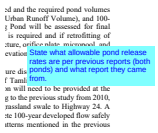
Discuss how water quality will be addressed/provided for on Basins which do not reach either of the ponds. (Basins will minimally grading, no impervious areas or buildings, remain open, etc.)



Subject: Text Box
Page Label: 13
Author: CDurham
Date: 3/2/2022 4:40:09 PM
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State what allowable pond release rates are per previous reports (both ponds) and what report they came from.