PRELIMINARY DRAINAGE REPORT FOR LOT 1 AIRPORT SPECTRUM FILING NO. 3

OCTIBER 2024

Prepared for:

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Project #10-035

PRELIMINARY DRAINAGE REPORT FOR
LOT 1 AIRPORT SPECTRUM FILING NO. 3
DRAINAGE REPORT STATEMENTS

ENGINEER'S STATEMENT

This report and plan for the drainage design of Lot 1 Airport Spectrum Filing No. 3 was prepared by me (or under my direct supervision) and is correct to the best of my knowledge and belief. Said drainage report and plan has been prepared in accordance with the City of Colorado Springs Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

_____

Virgil A. Sanchez, P.E. Colorado #37160 Date
For and on Behalf of M & S Civil Consultants, Inc.

DEVELOPER'S STATEMENT

DTV LLC, hereby certifies that the drainage facilities for Lot 1 Airport Spectrum Filing No. 3 shall be constructed according to the design presented in this report. I understand that the City of Colorado Springs does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that are submitted to the City of Colorado Springs pursuant to Section 7.4.701 of the City Code; and cannot, on behalf of Lot 1 Airport Spectrum Filing No. 3, guarantee that final drainage design review will absolve DTV LLC, and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

BY: _____ DATE: _____

PRINTED: _____
TITLE: Developer
ADDRESS: DTV LLC
1776 N. Scottdale Road
Scottsdale, AZ 85252

CITY OF COLORADO SPRINGS

Filed in accordance with Section 7.4.701 of the Code of the City of Colorado Springs, 2023, as amended,

BY: _____ DATE: _____

For the SWENT Manager

CONDITIONS:

PRELIMINARY DRAINAGE REPORT FOR LOT 1 AIRPORT SPECTRUM FILING NO. 3

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PRELIMINARY DRAINAGE REPORT FOR
LOT 1 AIRPORT SPECTRUM FILING NO. 3

Purpose

The following is the Preliminary Drainage Report for Lot 1 Airport Spectrum Filing No. 3. The purpose of this report is to estimate peak runoff associated with the existing and proposed development and recommend drainage solutions to safely route stormwater to adequate downstream facilities.

General Location, Location Map and Description

Lot 1 Airport Spectrum Filing No. 3, (aka Milton Proby Starbucks) is located in Section 1, of Township 15 South, Range 66 West of the Sixth Principal Meridian, City of Colorado Springs, El Paso County, Colorado. The development is bound to the north by existing Milton E. Proby Parkway, to the east by unplatted and undeveloped land and existing Powers Boulevard, to the south by unplatted and undeveloped land, and to the west by Lot 1 Airport Spectrum Filing No. 2 (an undeveloped parcel of land). Refer to the figure (Figure 1) below for a vicinity map.

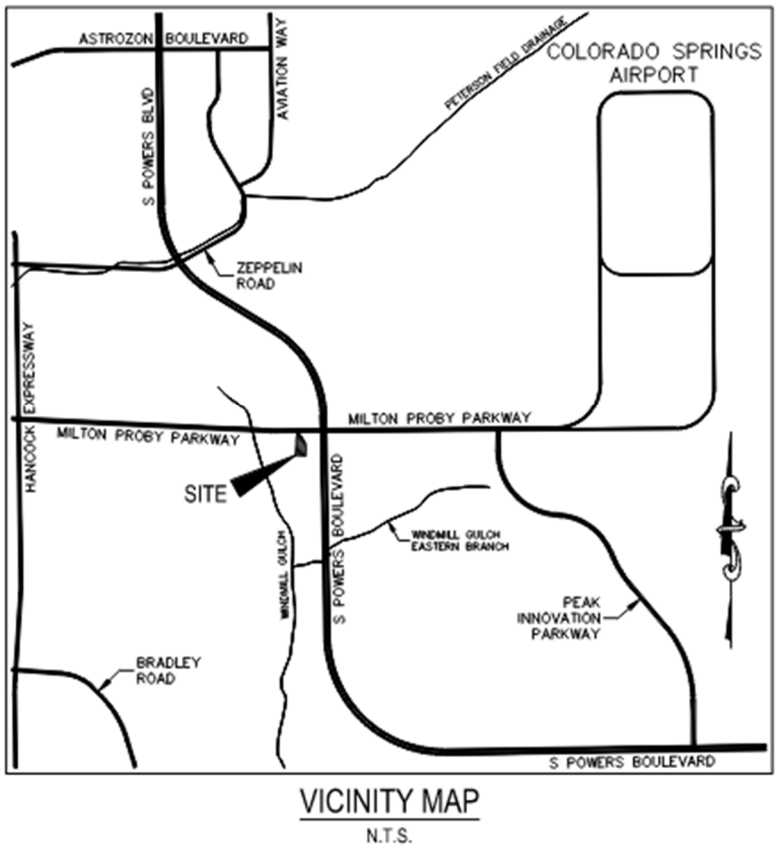


Figure 1. - Vicinity Map of Lot 1 Airport Spectrum Filing No. 3

Lot 1 Airport Spectrum Filing No. 3 is 1.18 acres in size, and is currently zoned for Planned Development. The site is currently undeveloped. The subject site has an existing public utility easement of variable width and a 50' gas easement that runs across the northern portion of the lot. Existing vegetation is sparce and consists primarily of native grasses. Existing site terrain generally slopes from northeast to southwest, with slopes varying between 0.7% to 33%. There are no apparent wetlands within the boundary of this project. The subject property is located within the Windmill Gulch Drainage Basin. Per the Colorado Springs Streamside Overlay Map, no portion of the site lies within a streamside overlay area. The subject site is greater than 500' from the existing Windmill Gulch channel.

Previous Drainage Reports

Below is a brief synopsis of the recommendations and/or key assumptions for the site from the available historic drainage reports/studies. The findings from these reports and utilized for planning of site grading and stormwater infrastructure development. Experts and maps from the previous studies can be found in the appendix of this report.

Final Drainage Report Amendment for Airport Spectrum Filing No. 1, by Classis Consulting Engineers & Surveyors, dated July 2022, approved June 03, 2023.

- The subject site has a planned developed flow of Q=4.8 cfs and Q100=9.0 cfs into the private FSD pond
- The private FSD pond has been sized to treat 14.39 acres of developed area (treating 1.17 acres from the subject site)
- The private FSD pond outfalls into the Windmill Gulch drainage channel at less than historic rates

Drainage Letter for Super Star Car Wash – Powers and Milton, by Bowman, dated January 2024, approved January 26, 2024.

- Located west of the subject site
- States that the Master Developer has allocated 0.148 acres for planned infiltration area, and the developed lot requires 0.017 acres of PIA. (0.131 acres left for future development)
- Planned flows to the private FSD pond for the car wash are Q5=2.78 cfs and Q100=5.5 cfs which is less than what assumed when the private FSD pond was designed (Q5=4.9 cfs, Q100=9.0 cfs)

Floodplain Discussion and FIRM

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel No. 08041C0763G, dated December 7, 2018, the subject site is NOT located within the 100-year floodplain. The property lies within Zone X, area of minimal flood hazard. An annotated FIRM Panel is included in the Appendix with an outline of the project site.

Soils Discussion

Per the Natural Resources Conservation Service Web Soil Survey, the property contains "Blakeland loamy sand" soils (Map Unit 8). They possess a Hydrologic Soil Group Type of "A". Type "A" soils are described to having a high infiltration rate when thoroughly wet and a high rate of water transmission. A copy of the onsite soils is provided in the appendix. If a geotechnical study has been performed, it may be referenced or appended, and should provide the measured groundwater elevation with bore logs provided in an Appendix.

Hydrologic Calculations

Hydrologic calculations were performed using the City of Colorado Springs Storm Drainage Design Criteria manual (Vol.1). The Rational Method was used to estimate storm water runoff anticipated from design storms with minor (5-year) and major (100-year) recurrence intervals. Drainage basins were delineated (see drainage map in Appendix) in order to determine areas. C' coefficients were assigned in accordance with Table 6-6 Volume 1 of the Drainage Criteria Manual. Overland flow and channelized flow paths were analyzed for each sub-basin in order to determine times of concentration. A minimum of 5 minutes was utilized for urban areas. IDF equations presented in Chapter 6 of the DCM were utilized to calculate flow rates.

Hydraulic Calculations

Hydraulic calculations were estimated using the methods described in the City of Colorado Springs Storm Drainage Design Criteria Manual (DCM) along with the Mile High Flood District (MHFD). Manning's Equation was used for estimation of required pipe sizes. The final drainage report, once produced, will utilize StormCAD to calculate the Hydraulic Grade line (HGL) calculations for the systems using the standard head loss method and K coefficients from Table 9-4 in Chapter 9, Volume 1, of the DCM. The starting conditions for the future HGL analysis for the minor and major storm event will be based upon the 5-year and 100-year water surface elevations of the offsite private shared FSD Pond that the proposed system will outfall to. The elevations for these two storm events were determined to be 5923.79' and 5925.45' respectively (as determined by the Final Drainage Report for Airport Spectrum Filing No. 1 by Classic Consulting Engineers & Surveyors, Dated July, 2022, Approved June 01, 2023 **(FDR ASF1).** The WSE elevations were determined by adding the maximum ponding depth for the two storm events of 4.79' and 6.45' to the bottom of pond elevations (5919.00') as provided within their MHFD Detention_V4.06 design worksheet.

Existing Drainage Conditions

This site is currently undeveloped and generally slopes from the northeast to southwest. In the existing condition, runoff from the site sheet flows to the southwest and continues offsite and is eventually intercepted by the existing offsite temporary sediment basin located to the southwest of the site. Flows are ultimately conveyed to the Windmill Gulch Drainage Basin. The following paragraphs detail the existing drainage patterns. Refer to the appendix for hydrologic and hydraulic calculations and the existing conditions drainage map. **DP** shall be the abbreviation for **Design Point**. Basins with an asterisk are basins from the FDR-ASF1 and can be found in the appendix of this report.

Basin OS1, 0.21 acres, is located north of the subject site and consists of portions of the Milton Proby Right of Way. The undeveloped land is covered primarily in sparse, native grasses and vegetation. Runoff produced within the basin (Q5=0.1 cfs, Q100=0.6 cfs) is conveyed as sheet flow to southwest to **Basin A and Basin OS2**.

Basin OS2, 0.50 acres, is located along the northeastern boundary of the site and consists of undeveloped land covered primarily in sparse, native grasses and vegetation. Runoff produced within the basin (Q5=0.2 cfs, Q100=1.7 cfs) is conveyed southwest to **Basin A**.

Basin A, 1.14 acres, the subject site, consists of undeveloped land covered primarily in sparse, native grasses and vegetation. Runoff produced within this basin (Q5=0.4 cfs, Q100=3.1 cfs) continues southwest to **DP2**.

Basin OS5, 0.01 acres, located just southwest of the site, consists of undeveloped land covered primarily in sparse, native grasses and vegetation. Runoff from **Basin A, OS1 and OS2** combine with the flows produced within this basin (Q5=0.0 cfs, Q100=0.0 cfs) and continues southwest to **DP2**. The combined runoff at **DP2** reaches peak flow rates of Q5=0.6 cfs, Q100=4.5 cfs.

Basin *EX-C, 3.28 acres is located to the east of the subject site and consists of a portion of existing Powers Boulevard and off-site tributary area (refer to the Developed Conditions Map in the **FDR-ASF1**). Per the **FDR-ASF1**, runoff produced from within this basin (Q5=4.3 cfs, Q100=11.3 cfs) is conveyed southwest to **Basin OS3.**

Basin OS3, 2.22 acres is located east of the subject site and consists of undeveloped covered primarily in sparse, native grasses and vegetation. Runoff produced from **Basin EX-C** combines with the flows produced within this basin (Q5=0.7 cfs, Q100=5.4 cfs) and continues south to **DP1** (Q5=4.9 cfs, Q100=16.1 cfs).

Basin *OS4, 1.69 acres, is located south of the subject site and consists of the undeveloped land covered primarily in sparse, native grasses and vegetation (refer to the Developed Conditions Map in the **FDR-ASF1**). Per the **FDR-ASF1,** runoff produced from within this basin is (Q5=2.9 cfs, Q100=7.9 cfs).

Basin B, 0.04 acres, the subject site, consists of undeveloped land covered primarily in sparse, native grasses and vegetation. Runoff produced within this basin (Q5=0.0 cfs, Q100=0.1 cfs) continues southwest to **Basin OS6.**

Basin OS6, 0.00 acres, is located west of the subject site and consists of the undeveloped land covered primarily in sparse, native grasses and vegetation. Runoff produced from within this basin (Q5=0.0 cfs, Q100=0.0 cfs) is conveyed south to Lot 1, Airport Spectrum Filing No. 2 to **DP3** (Q5=0.0 cfs, Q100=0.1 cfs). Runoff from this basin is conveyed to the planned private FSD pond.

Four Step Process

Step 1 Employ Runoff Reduction Practices. – The bottom of the private offsite planned FSD pond by Classic Consulting (which is to be completed prior to the start of construction for this site) is being utilized as receiving pervious area. The City of Colorado Springs Drainage Criteria Manual Runoff Reduction criteria will be met with the submittal of this Final Drainage Report, this includes compliance with the Green Infrastructure Manual and Policy Clarification on Green Infrastructure. The corresponding calculations in the Runoff Reduction spreadsheet (UD-BMP v 3.07) and a Runoff Reduction Exhibit meet the minimum requirement of a 10% reduction in the WQCV. The WQCV reduction percentage achieved for Lot 1 was 27%. The Green Infrastructure Map and Runoff Reduction Calculations can be found in the Appendix.

Step 2 Implement PCMs that provide a water quality capture volume with slow release. –A planned privately owned and maintained FSD pond was designed by Classic Consulting and has been sized to collect and treat the developed runoff from this site. The private planned FSD pond will function to slow the release of runoff from the developed lot below historic rates into Windmill Gulch. Refer to the table below for treatment methods for the subject site.

Basin	Associated Disturbance	Area Percent	Treatment Method	Ownership and Maintenance
A	0.04	2.54	FSD Pond	Private
B	0.47	30.05	FSD Pond	Private
C	0.03	2.23	FSD Pond	Private
D	0.01	0.94	FSD Pond	Private
D1	0.01	0.47	FSD Pond	Private
D2	0.00	0.29	FSD Pond	Private
D3	0.02	1.57	FSD Pond	Private
D4	0.00	0.07	FSD Pond	Private
D5	0.02	1.15	FSD Pond	Private
E	0.09	5.84	FSD Pond	Private
F	0.14	8.77	FSD Pond	Private
G	0.03	1.84	FSD Pond	Private
H	0.07	4.69	FSD Pond	Private
I	0.08	5.21	FSD Pond	Private
OS3	0.22	4.52	FSD Pond	Private
OS4	0.23	13.91	FSD Pond	Private
OS5	0.01	14.77	FSD Pond	Private
OS6	0.00	0.83	FSD Pond	Private
Total	**1.56**	**100%**		

The planned private FSD pond will provide water quality capture volume for approximately 1.56 acres of the disturbed area for Lot (including offsite grading done both east and south of the site), which will be released over 40 hours per the **FDR-ASF1**. Per the **FDR-ASF1**, the 100-year release rate for the FSD pond will be less that for equal to the pre-developed conditions runoff. A 15' wide spillway and rundown with type M riprap and topsoil cover provide and emergency overflow. Refer to the **FSD ASF1** for pond sizing and calculations.

Per M&S evaluation, a total of 1.56 acres are to be disturbed with the development of Lot 1. Approximately 1.56 acres (100%) of the total disturbed area to be conveyed to the planned private FSD pond for water quality treatment. It is important to note that the **FSD ASF1** planned for all of Lot 1, along with Basin EX-C, undeveloped Basin OS3, and Basin OS4 to be conveyed to the shared private FSD pond.

The pond was sized by the **FDR-ASF1** to account for planned infiltration area. The total PIA in the planned offsite FSD pond is planned to be 0.148 acres. The adjacent development to the west plans to utilize 0.017 acres of the allotted 0.148 acres, leaving 0.131 acres of PIA remaining for future development. The development of the

subject site is to utilize 0.013 acres of the remaining 0.131 acres. This leaves 0.118 acres of PIA for future development.

Step 3 Stabilize streams. – All new and re-development project are required to construction or participate in the funding of channel stabilization measures. The runoff from the site will be directed to a private FSD Pond which releases runoff below historic rates to the existing Windmill Gulch Channel. Drainage fees paid at the time of platting go towards channel stabilization within the drainage basin. The drainage fees for this site have been previous paid at the time of the initial platting. Therefore, no drainageways are affected by the proposed development.

Step 4 Implement site specific and other source control CMs. – The proposed development will implement a Stormwater Management Plan including property housekeeping practices and spill containment procedures. Material storage (such as backfill stockpiles or landscape materials), designated fueling areas and trash enclosures during construction are to be located away from drainage facilities. Source control measures (CMs) such as covering storage/handling areas and implementing containment measures should be utilized to prevent containments from entering the City's storm sewer systems.

Proposed Drainage Conditions

This development of the site shall construct a Starbuck's building (approximately 2,421 square feet), a drive thru, sidewalks, landscaped areas, drive aisles, and associated parking. Generally, runoff produced from the building will be collected via roof drains, runoff produced from the landscaped areas will be directed to area inlets, and runoff produced from the asphalt drive aisles, concrete drive thru, parking areas, and sidewalks will be conveyed to inlets which will convey the runoff via a proposed storm sewer system to a planned private FSD pond located southwest of the site for treatment.

The following paragraphs detail the proposed drainage patterns. Refer to the appendix for hydrologic and hydraulic calculations and the proposed conditions drainage map. **DP** shall be the abbreviation for **Design Point**. **PR** shall be the abbreviation for **Pipe Run.** HDPE refers to ADS N-12 dual wall HDPE pipe or approved equivalent. PP refers to HP storm polypropylene pipe or approved equivalent. Basins with an asterisk are basins from the **FDR-ASF1** and can be found in the appendix of this report.

Basin C, 0.04 acres, consists of proposed landscaping and sidewalk located north of the proposed building. Runoff produced within this basin (Q5=0.1 cfs, Q100=0.2 cfs) is conveyed to a proposed private nyloplast drain basin with 12" dome greate at **DP1,** (Q5=0.1 cfs, Q100=0.2 cfs). The collected runoff shall continue south via a proposed private 8" PP storm drain, **PR1** (Q5=0.1 cfs, Q100=0.2 cfs).

Basin D1, 0.01 acres, consists primarily of proposed building canopy. Runoff produced within this basin (Q5=0.0 cfs, Q100=0.1 cfs) shall be collected by four (4) proposed private 6" HDPE roof drains, **PR R1, PR R3, PR R5, and PR R7** all with flows of Q5=0.0 cfs and Q100=0.0 cfs. Flows from **PR1** combine with the flows from **PR R1** at a proposed private 8" HDPE roof drain, **PR R2** (Q5=0.1 cfs, Q100=0.2 cfs). Flows from **PR R2 and PR R3** combine at a proposed private 8" HDPE roof drain, **PR R4** (Q5=0.1 cfs, Q100=0.2 cfs). Flows from **PR R4** and **PR R5** combine at a proposed private 8" HDPE roof drain, **PR R6,** (Q5=0.1 cfs, Q100=0.2 cfs). Flows from **PR R6** and **PR R7** combine at a proposed private 8" HDPE roof drain, **PR R8,** (Q5=0.1 cfs, Q100=0.2 cfs).

Basin D4, 0.00 acres, consists primarily of proposed building rooftop. Runoff produced within this basin (Q5=0.0 cfs, Q100=0.0 cfs) shall be collected and piped via a proposed 6" HDPE roof drain, PR R9 (Q5=0.0 cfs, Q100=0.0 cfs). The combined runoff from PR R8 and PR R9 continue downstream to a proposed private 8" HDPE roof drain, PR R10 (Q5=0.1 cfs, Q100=0.2 cfs).

Basin D, 0.01 acres, consists primarily of proposed building rooftop. Runoff produced within this basin (Q5=0.1 cfs, Q100=0.1 cfs) shall be collected and piped via a proposed 8" HDPE roof drain, PR R11 (Q5=0.1 cfs, Q100=0.1 cfs).

Basin D2, 0.00 acres, consists primarily of proposed building canopy located on the back of the building. Runoff produced within this basin (Q5=0.0 cfs, Q100=0.0 cfs) shall be collected and piped via a proposed 6" HDPE roof drain, PR R12 (Q5=0.0 cfs, Q100=0.0 cfs). The combined runoff from PR R11 and PR R12 continue downstream to a proposed private 8" HDPE storm drain, PR R13 (Q5=0.1 cfs, Q100=0.1 cfs).

Basin D3, 0.02 acres, consists primarily of proposed building rooftop. Runoff produced within this basin (Q5=0.1 cfs, Q100=0.2 cfs) shall be collected and piped via a proposed 6" HDPE roof drain, PR R14 (Q5=0.1 cfs, Q100=0.2 cfs). The combined runoff from PR R13 and PR R14 continue downstream to a proposed private 8" HDPE storm drain, PR R15 (Q5=0.2 cfs, Q100=0.3 cfs).

Basin D5, 0.02 acres, consists primarily of proposed building rooftop. Runoff produced within this basin (Q5=0.1 cfs, Q100=0.1 cfs) shall be collected and piped via a proposed 6" HDPE roof drain, PR R16 (Q5=0.1 cfs, Q100=0.1 cfs). The combined runoff from PR R15 and PR R16 continue downstream to a proposed private 8" PP storm drain, PR R17 (Q5=0.2 cfs, Q100=0.4 cfs).

Basin F, 0.14 acres, consists primarily of proposed concrete drive thru and landscaping are located on the east side of the development. Runoff produced within this basin (Q5=0.6 cfs, Q100=1.1 cfs) is conveyed south within the concrete drive aisle to a proposed private 2' wide curb cut at DP3 (Q5=0.6 cfs, Q100=1.1 cfs). Refer to the appendix for curb cut calculations. The flows from DP3 are conveyed to the proposed private nyloplast drain basin located within Basin E.

Basin E, 0.09 acres, consists primarily of proposed landscaping area and sidewalk located south of the proposed building. Runoff produced within this basin (Q5=0.1 cfs, Q100=0.3 cfs) is conveyed to a proposed private nyloplast drain basin with a 12" dome grate at DP2 (Q5=0.1 cfs, Q100=0.3 cfs). The flows from DP2 are collected and combine with the flows from PR R17 and the runoff from Basin F and are piped downstream via a proposed private 12" PP storm drain, PR2 (Q5=0.9 cfs, Q100=1.8 cfs).

Basin G, 0.03 acres, consists primarily of proposed landscaped area located in the southern portion of the lot. Runoff produced within this basin (Q5=0.0 cfs, Q100=0.1 cfs) is conveyed to a proposed private nyloplast drain basin with a 12" dome grate at DP4 (Q5=0.0 cfs, Q100=0.1 cfs). The flows from DP4 are collected and combine with the flows from PR2 and PR R10 at a proposed private 12" PP storm drain, PR3 (Q5=1.1 cfs, Q100=2.2 cfs).

Basin OS1, 0.21 acres, consists primarily of undeveloped offsite area located north of the subject site. In the FDR ASF1 a swale, was proposed to collect the offsite runoff and convey it to the east to an existing private 18" PP storm pipe. However, the swale was never built and the runoff instead flows onsite. The runoff produced within this basin (Q5=0.1 cfs, Q100=0.6 cfs) flows southwest to Basin A.

Basin OS2, 0.23 acres, consists primarily of undeveloped offsite land covered primarily in sparse, native grasses and vegetation, located along the northeastern boundary of the site. Runoff produced within this basin (Q5=0.1 cfs, Q100=0.6 cfs) flows southwest to Basin A.

Basin A, 0.13 acres, consists primarily of landscaped area located in the northern portion of the site. The combined runoff from Basins OS1 and OS2 and the runoff produced within this basin (Q5=0.1 cfs, Q100=0.4 cfs) is conveyed south to Basin B.

Basin I, 0.08 acres, consists primarily of landscaped area located along the west side of the development. The runoff produced within this basin (Q5=0.0 cfs, Q100=0.3 cfs) sheet flows to Basin B.

Basin B, 0.47 acres, consists primarily of proposed asphalt drive aisles, parking areas, and sidewalks located on the west side of the site. The combined runoff from Basins OS1, OS2, A, I and the runoff produced within this basin (Q5=2.1 cfs, Q100=3.8 cfs) are conveyed to DP5 via a proposed 2' concrete ribbon gutter and paved drive aisle The total runoff at DP5, a proposed private 5' CDOT Type R inlet (Inlet 1), reaches peak flow rates of Q5=2.0 cfs, Q100=4.8 cfs. The runoff from DP5 is collected and piped via a proposed private 18" PP storm drain, PR4 (Q5=2.0 cfs, Q100=4.8 cfs). The flows from PR3 and PR4 combine at a proposed private 18" PP storm drain, PR5 (Q5=2.9 cfs, Q100=6.7 cfs). The flows from PR5 continue downstream to a planned private 24" RCP by others, PREX1 (Q5=2.9 cfs, Q100=6.7 cfs) to the private planned FSD pond.

Basin *EX-C, as mentioned above in the existing condition, is 3.28 acres, and consists of a portion of existing Powers Boulevard and off-site tributary area. Runoff produced from within this basin (Q5=4.3 cfs, Q100=11.3 cfs) is conveyed southwest to Basin OS3 (refer to the FDR-AS1 report).

Basin H, 0.07 acres, consists of landscaped area located along the east side of the subject site. The runoff produced within this basin (Q5=0.0 cfs, Q100=0.2 cfs) sheet flows to the east, away from the development, to a proposed grass lined swale (Swale-1) located within Basin OS3. Calculations for Swale-1 can be found in the appendix of this report.

Basin OS3, 2.49 acres, consists of undeveloped land covered primarily in sparse, native grasses and vegetation located east of the site. Runoff from this basin (Q5=0.8 cfs, Q100=6.0 cfs) combines with the runoff from Basins EX-C and H and is conveyed south to DP6. The total combined runoff at DP6 reaches peak flow rates of Q5=5.0 cfs and Q100=16.9 cfs. In the FDR ASF1, the planned flows to DP6 were Q5=5.1 cfs and Q100=17.7 cfs. In the proposed condition by M&S, the flows to DP6 are Q5=5.1 cfs and Q100=16.9 cfs.

Basin J, 0.07 acres, consists of proposed landscaped area located along the southern boundary of the subject site. Runoff from this basin (Q5=0.0 cfs, Q100=0.2 cfs) is conveyed away from the site to Basin OS4.

Basin OS5, 0.01 acres, consists primarily of undeveloped land covered primarily in sparse, native grasses and vegetation, located just southwest of the subject site. Runoff from this basin (Q5=0.0 cfs, Q100=0.0 cfs) is conveyed south to Basin OS4.

Basin *OS4, 1.69 acres, discussed in the FDR-ASF1 report, consists primarily of undeveloped land covered primarily in sparse, native grasses and vegetation and the planned private FSD pond located to the southwest of the development. Runoff from this basin (Q5=2.9 cfs, Q100=7.9 cfs) and the flows from Basin J

combine at DP7. Per the FDR ASF1, the planned flows for Basin OS4 were Q5=2.9 cfs and Q100=7.9 cfs. In the proposed condition (calculated by M&S), the total flows to Basin OS4 are Q5=2.9 cfs and Q100=8.1 cfs. The increase in flow in the major storm event is negligible.

Basin OS6, 0.0 acres, is located west of the subject site and consists of the undeveloped land covered primarily in sparse, native grasses and vegetation. Runoff produced from within this basin (Q5=0.0 cfs, Q100=0.0 cfs) is conveyed south to Lot 1, Airport Spectrum Filing No. 2 to DP8 (Q5=0.0 cfs, Q100=0.0 cfs). Runoff from this basin is conveyed to the planned private FSD pond.

Erosion Control

A stormwater management plan (SWMP) is required for compliance with the State of Colorado Permit for Stormwater Discharges Associated with Construction Activities. The erosion control plan is submitted in conjunction with the final grading plan. Proposed straw bale check dams, silt fence, inlet protection, vehicle traffic control, erosion control protection matting and reseeding are proposed as erosion control measures.

Drainage, Bridge, and Pond Fees

This site has been previous platted and therefore no fees are due.

Comparative Analysis

In the existing condition, flow leaves the site via sheet flow at the southern boundary at peak flows of Q5=0.6 cfs and Q100= 4.5 cfs (DP2). In the proposed condition, flow leaves the site via sheet flow at the southern boundary at peak flows of Q5=0.0 cfs and Q100=0.2 cfs (Basin J).

In the existing condition, no flow leaves the site and is conveyed to the east before being routed to the planned private FSD Pond. In the proposed condition, flow is conveyed to the east and is routed via a proposed grass lined swale to the planned private FSD pond at peak flow rates of Q5=0.0 cfs and Q100=0.2 cfs.

In the existing condition, no flow is routed to the planned private FSD pond via the planned storm sewer system. In the proposed condition, flow is conveyed to the planned storm sewer system at peak flow rates of Q5=2.9 cfs and Q100=6.7 cfs.

The anticipated flows to the shared private FSD pond via a planned private 24" RCP pipe from the FDR-ASF1 for Lot 1 were 4.8 cfs for the minor storm even (Q5) and 9.0 cfs for the major storm event (Q100). Per this report, proposed flows from Lot 1 to the shared private FSD pond via a proposed private 24" RCP pipe are of Q5=2.9 cfs and Q100=6.7 cfs respectively. Additionally, the anticipated offsite flows to the planned private FSD pond (Basins EX-C, B and C) from the FSD ASF1 were 8.0 cfs for the minor storm event (Q5) and 25.6 cfs for the major storm event when directly added. Per this report, proposed offsite flows to the planned private FSD pond (Basin EX-C (known as Basin EX-C in the FSD ASF1), Basin OS3 (known as Basin B in the FSD ASF1) and Basin OS4 (known as Basin C in the FSD ASF1) are calculated at flow rates of 7.9 cfs for the minor storm even (Q5) and 25.0 cfs for the major storm event (Q100).

The FDR-ASF1 calculated the imperviousness for Lot 1, using an area of 1.17 acres, to be 93.8%, a planned calculated flow of 4.8 cfs for the minor storm even (Q5), and a planned calculated flow of 9.0 cfs for the major storm event (Q100). Based upon M&S evaluation, an area of 1.18 acres will be routed to the private FSD pond from Lot 1 with an imperviousness of 61.3%, a flow of 2.9 cfs for the minor storm even (Q5), and 7.1 cfs for the major storm event (Q100). A comparison table has been provided in the attachments which illustrates this (A*I=A*I, 1.18*61.3=72.49 vs 1.17*93.8=106.69).

Conclusions

The proposed drainage facilities associated with the Lot 1 Airport Spectrum Filing No. 3 will adequately convey and detain runoff to the existing FSD Pond located southwest of the site via an existing private 24" RCP pipe (by others). Per the attached analysis runoff directed to the proposed planned FSD pond and the PIA amount utilized from the development is in compliance with the FDR-ASF1. The planned FSD pond does not release developed discharge to downstream properties in excess of the historic condition that would result in a negative effect to said property or water quality. The site runoff and recommended drainage plan have been evaluated and designed in accordance with the City of Colorado Springs Drainage Criteria Manual Volumes 1, (Revised January 2021) and Volume 2 (Revised December 2020). As always, care shall be taken to accommodate overland emergency flow routes on site and both during and after construction.

This report and its findings are in general conformance with the Final Drainage Report Amendment for Airport Spectrum Filing No. 1, by Classic Consulting Engineers & Surveyors, Inc, dated July 2022, approved June 03, 2023.

References

1.) "Design Criteria Manual, Volume 1", Revised January 2021, City of Colorado Springs.

2.) "Design Criteria Manual, Volume 2", Revised December 2020, City of Colorado Springs.

3.) Web Soils Survey", United States Department of Agriculture, National Resources Conservation Service, http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

4.) FEMA Flood Map Service Center", Federal Emergency Management Agency https://msc.fema.gov/portal

5.) "Urban Storm Drainage Criteria Manual, Vol. 1, Revised August 2018, Mile High Flood District.

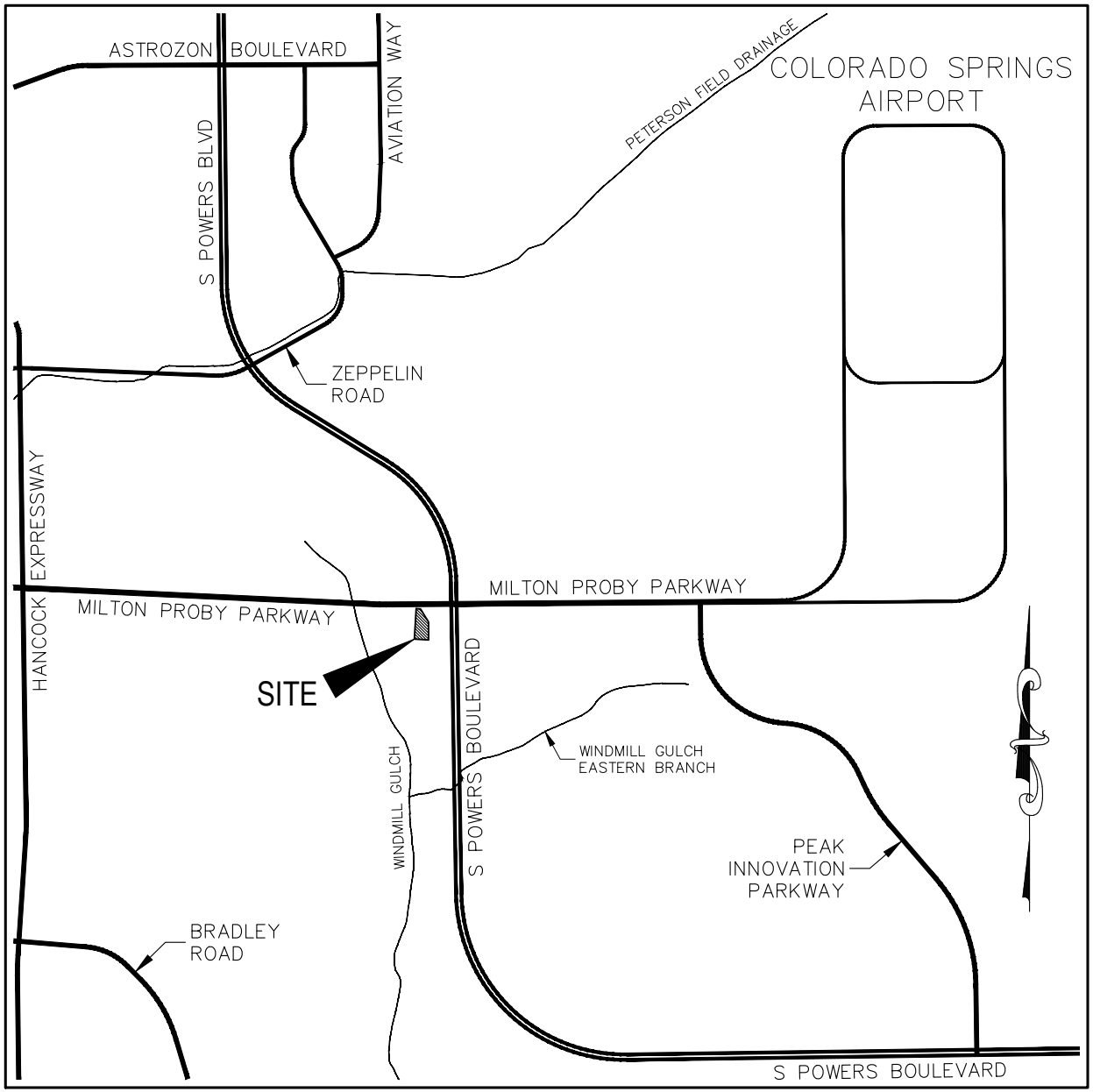
6.) "Urban Storm Drainage Criteria Manual, Vol. 2, Revised September 2017, Mile High Flood District

7.) "Final Drainage Report Amendment for Airport Spectrum Filing No. 1" by Classic Consulting Engineers & Surveyors, Dated July 2002, approved June 03, 2023.

8.) "Drainage Letter for Super Star Car Wash – Powers and Milton" by Bowman, dated January 2024, approved January 26, 2024.

APPENDIX

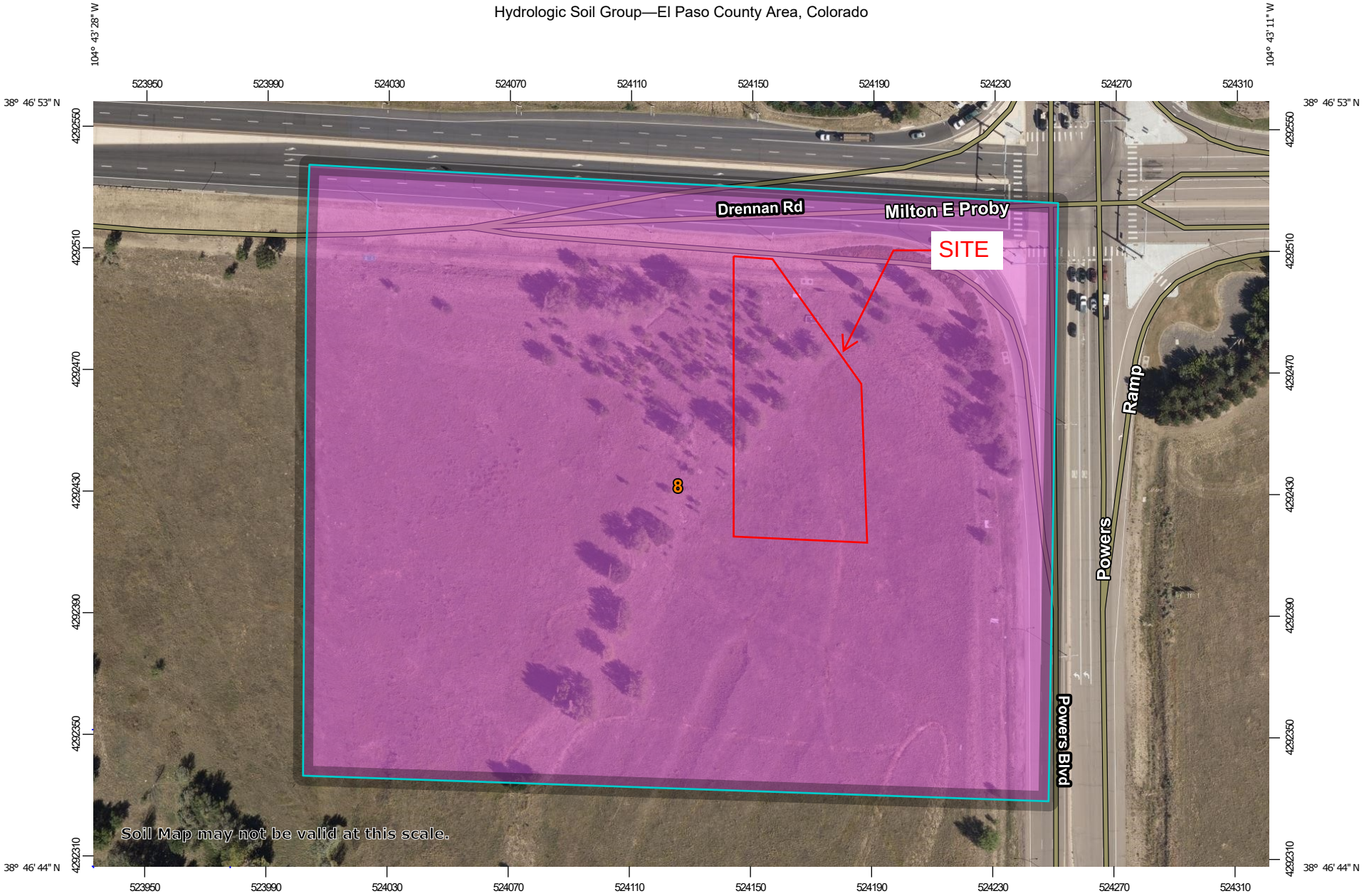
VICINITY MAP



VICINITY MAP

N.T.S.

SOILS MAP



Map Scale: 1:1,780 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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 21, Aug 24, 2023

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

Date(s) aerial images were photographed: Aug 19, 2018—Sep 23, 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	12.2	100.0%
Totals for Area of Interest			**12.2**	**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

FEMA FLOOD MAP

SITE

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/.

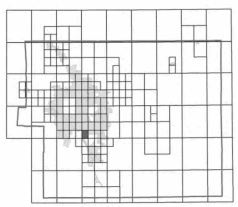
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)

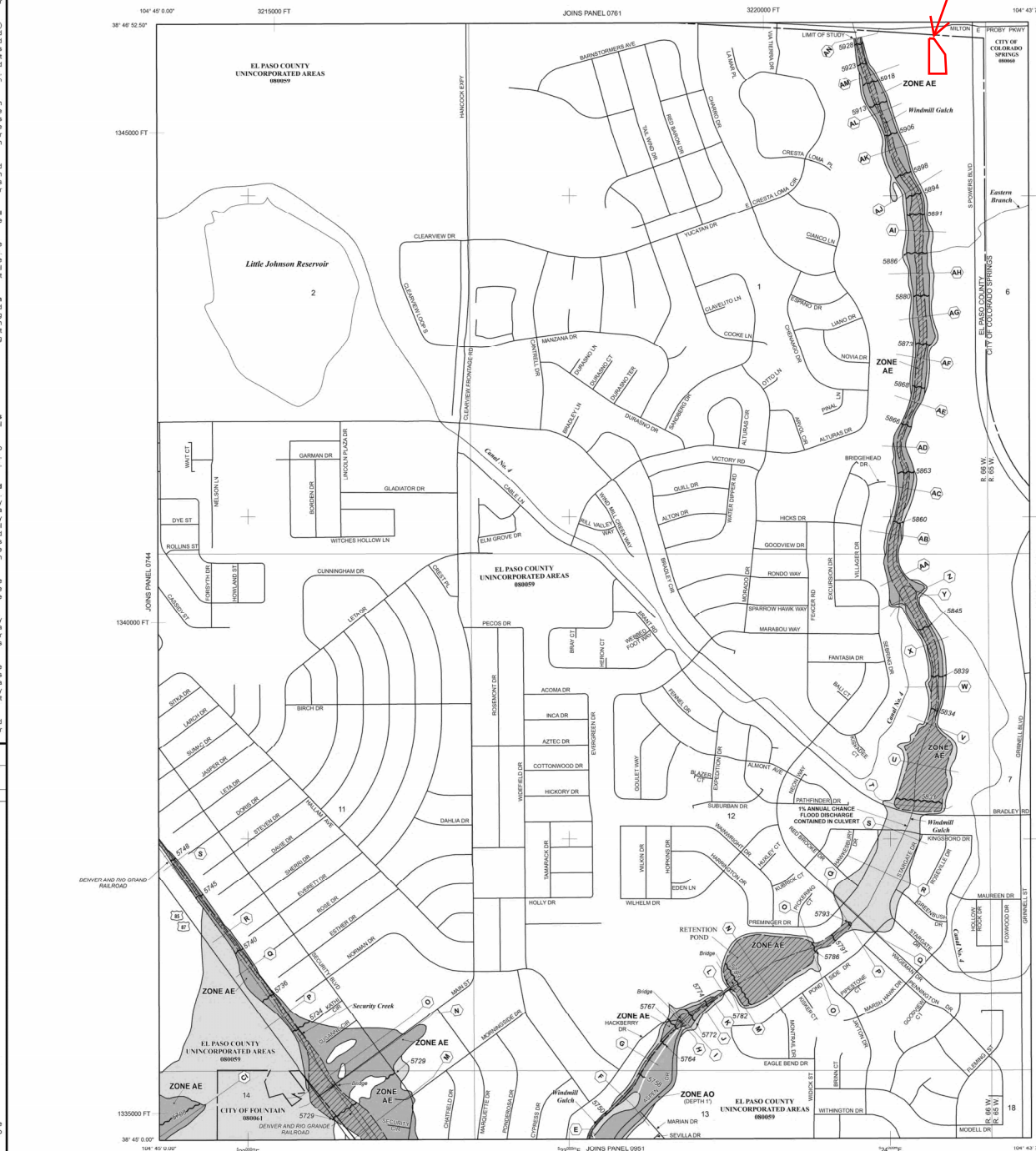
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION

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.



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 (EL 987) Base Flood Elevation line and value; 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

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0763G

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

PANEL 763 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0763	G
EL PASO COUNTY	080059	0763	G
FOUNTAIN, CITY OF	080061	0763	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
08041C0763G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

HYDROLOGIC CALCULATIONS

PRELIMINARY DRAINAGE REPORT
LOT 1-AIRPORT SPECTRUM FILING NO. 3
(Existing Conditions - Area Runoff Coefficient Summary)

			STREETS / ASPHALT DRIVES (0.90-0.96)			*UNDEVELOPED AREAS (0.08-0.35)*			*DEVELOPED AREAS (0.12-0.39)*			*RUNOFF COEFFICIENT*	
BASIN	**TOTAL AREA** *(Sq. Ft.)*	**TOTAL AREA** *(Acres)*	**AREA** *(Acres)*	**C_5**	**C_{100}**	**AREA** *(Acres)*	**C_5**	**C_{100}**	**AREA** *(Acres)*	**C_5**	**C_{100}**	**C_5**	**C_{100}**
A	***49489.2***	1.14	0.00	0.90	0.96	1.14	0.08	0.35	0.00	0.12	0.39	***0.08***	***0.35***
B	***1919.8***	0.04	0.00	0.90	0.96	0.04	0.08	0.35	0.00	0.12	0.39	***0.08***	***0.35***
OS1	***9070.8***	0.21	0.00	0.90	0.96	0.21	0.08	0.35	0.00	0.12	0.39	***0.08***	***0.35***
OS2	***21783.4***	0.50	0.00	0.90	0.96	0.50	0.08	0.35	0.00	0.12	0.39	***0.08***	***0.35***
OS3	**96735.0**	2.22	0.00	0.90	0.96	2.22	0.08	0.35	0.00	0.12	0.39	***0.08***	***0.35***
****OS4***	***73620.6***	1.69	0.52	0.04	0.96	1.17	0.08	0.35	0.00	0.12	0.39	***0.07***	***0.54***
OS5	***566.0***	0.01	0.00	0.9	0.96	0.01	0.08	0.35	0.00	0.12	0.39	***0.08***	***0.35***
OS6	***211.9***	0.00	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.12	0.39	***0.08***	***0.35***

REFER TO THE FINAL DRAINAGE REPORT FOR AIRPORT SPECTRUM FILING NO. 1 (OFFSITE), DATED JULY 2022, BY CLASSIC CONSULTING ENGINEERS & SURVEYORS

Calculated by: SPM
Date: 9/27/2024
Checked by: VAS

PRELIMINARY DRAINAGE REPORT
LOT 1-AIRPORT SPECTRUM FILING NO. 3
(Existing Conditions - Area Drainage Summary)

From Area Runoff Coefficient Summary				*OVERLAND*				*STREET / CHANNEL FLOW*				*Time of Travel (T_t)*		*INTENSITY **		*TOTAL FLOWS*	
BASIN	**AREA TOTAL** *(Acres)*	**C_5** *From DCM Table 6-6*	**C_{100}**	**C_5**	**Length** *(ft)*	**Height** *(ft)*	**T_C** *(min)*	**Length** *(ft)*	**Slope** *(%)*	**Velocity** *(fps)*	**T_t** *(min)*	**TOTAL** *(min)*	**CHECK** *(min)*	**I_5** *(in/hr)*	**I_{100}** *(in/hr)*	**Q_5** *(c.f.s.)*	**Q_{100}** *(c.f.s.)*
A	1.14	0.08	0.35	0.08	30	3.0	4.7	300	6.0%	2.4	2.0	6.8	11.8	4.7	7.9	***0.4***	***3.1***
B	0.04	0.08	0.35	0.08	60	2.5	8.9					8.9	10.3	4.3	7.2	***0.0***	***0.1***
OS1	0.21	0.08	0.35	0.08	20	2.0	3.9	75	6.7%	2.6	0.5	5.0	10.5	5.2	8.7	***0.1***	***0.6***
OS2	0.50	0.08	0.35	0.08	80	4.0	9.7	140	12.9%	3.6	0.7	10.3	11.2	4.1	6.8	***0.2***	***1.2***
OS3	2.22	0.08	0.35	0.08	65	3.0	9.0	245	11.4%	3.4	1.2	10.2	11.7	4.1	6.9	***0.7***	***5.4***
****OS4***	1.69	0.07	0.54	0.07	10	1.0	2.8	360	4.0%	2.0	3.0	5.8	12.1	5.0	8.3	***0.6***	***7.6***
OS5	0.01	0.08	0.35	0.08	10	3.5	1.8	30	6.7%	2.6	0.2	5.0	10.2	5.2	8.7	***0.0***	***0.0***
OS6	0.00	0.08	0.35	0.08	20	0.7	5.4					5.4	10.1	5.0	8.5	***0.0***	***0.0***
****EX-C***	3.28	0.35	0.55	0.35	90	3.0	8.5	490	3.1%	1.7	4.7	13.2	13.2	3.7	6.2	***4.3***	***11.3***

****REFER TO THE FINAL DRAINAGE REPORT FOR AIRPORT SPECTRUM FILING NO. 1 (OFFSITE), DATED JULY 2022, BY CLASSIC CONSULTING ENGINEERS & SURVEYORS***

Calculated by: SPM
Date: 9/27/2024
Checked by: VAS

PRELIMINARY DRAINAGE REPORT
LOT 1-AIRPORT SPECTRUM FILING NO. 3
(Existing Conditions - Basin Routing Summary)

From Area Runoff Coefficient Summary				***OVERLAND***				*PIPE / CHANNEL FLOW*				*(T_t)*	*INTENSITY **		*TOTAL FLOWS*		COMMENTS
DESIGN POINT	**CONTRIBUTING BASINS**	**CA_5**	**CA_{100}**	**C_5**	**Length** *(ft)*	**Height** *(ft)*	**T_C** *(min)*	**Length** *(ft)*	**Slope** *(%)*	**Velocity** *(fps)*	**T_t** *(min)*	**TOTAL** *(min)*	**I_5** *(in/hr)*	**I_{100}** *(in/hr)*	**Q_5** *(c.f.s.)*	**Q_{100}** *(c.f.s.)*	
1	**OS3, EX-C**	1.33	2.59									13.2	3.7	6.2	***4.9***	***16.1***	SOUTH TO TSB
				Basin EX-C Tc Used													
2	**A, OS1, OS2, OS5**	0.15	0.65									10.3	4.1	6.8	***0.6***	***4.5***	SOUTH TO TSB
				Basin OS2 Tc Used													
3	**B, OS6**	0.00	0.02									8.9	4.3	7.2	***0.0***	***0.1***	TO OFFSITE LOT
				Basin OS6 Tc Used													

Calculated by: SPM
Date: 9/27/2027
Checked by: VAS

PRELIMINARY DRAINAGE REPORT
LOT 1-AIRPORT SPECTRUM FILING NO. 3
(Proposed Conditions - Area Runoff Coefficient Summary)

			STREETS / ASPHALT DRIVES (0.90-0.96)			*ROOFS (0.73-0.81)*			*DEVELOPED LANDSCAPING/ UNDEVELOPED AREAS (0.12-0.39)/(0.08-0.35)*			*RUNOFF COEFFICIENT*	
BASIN	**TOTAL AREA** *(Sq. Ft.)*	**TOTAL AREA** *(Acres)*	**AREA** *(Acres)*	**C_5**	**C_{100}**	**AREA** *(Acres)*	**C_5**	**C_{100}**	**AREA** *(Acres)*	**C_5**	**C_{100}**	**C_5**	**C_{100}**
A	*5512.7*	0.13	0.00	0.90	0.96	0.00	0.73	0.81	0.13	0.12	0.39	*0.12*	*0.39*
B	*20430.3*	0.47	0.45	0.90	0.96	0.00	0.73	0.81	0.02	0.12	0.39	*0.87*	*0.93*
C	*1518.6906*	0.03	0.01	0.90	0.96	0.00	0.73	0.81	0.02	0.12	0.39	*0.42*	*0.61*
D	*636.6*	0.01	0.00	0.90	0.96	0.01	0.73	0.81	0.00	0.12	0.39	*0.73*	*0.81*
D1	*318.6*	0.01	0.00	0.90	0.96	0.01	0.73	0.81	0.00	0.12	0.39	*0.73*	*0.81*
D2	*199.6*	0.00	0.00	0.90	0.96	0.00	0.73	0.81	0.00	0.12	0.39	*0.73*	*0.81*
D3	*1064.7*	0.02	0.00	0.90	0.96	0.02	0.73	0.81	0.00	0.12	0.39	*0.73*	*0.81*
D4	*50.5*	0.00	0.00	0.90	0.96	0.00	0.73	0.81	0.00	0.12	0.39	*0.73*	*0.81*
D5	*781.5*	0.02	0.00	0.90	0.96	0.02	0.73	0.81	0.00	0.12	0.39	*0.73*	*0.81*
E	*3969.5*	0.09	0.00	0.90	0.96	0.00	0.73	0.81	0.09	0.12	0.39	*0.14*	*0.41*
F	*5963.63*	0.14	0.12	0.90	0.96	0.01	0.73	0.81	0.00	0.12	0.39	*0.88*	*0.94*
G	*1250.6*	0.03	0.00	0.90	0.96	0.00	0.73	0.81	0.03	0.12	0.39	*0.12*	*0.39*
H	*3185.8*	0.07	0.00	0.90	0.96	0.00	0.73	0.81	0.07	0.12	0.39	*0.12*	*0.39*
I	*3539.8*	0.08	0.00	0.90	0.96	0.00	0.73	0.81	0.08	0.12	0.39	*0.12*	*0.39*
J	*3070.6*	0.07	0.00	0.90	0.96	0.00	0.73	0.81	0.07	0.12	0.39	*0.12*	*0.39*
OS1	*9070.8*	0.21	0.00	0.90	0.96	0.00	0.73	0.81	0.21	0.08	0.35	*0.08*	*0.35*
OS2	*9892.6*	0.23	0.00	0.90	0.96	0.00	0.73	0.81	0.23	0.08	0.35	*0.08*	*0.35*
OS3	*108541.5*	2.49	0.00	0.90	0.96	0.00	0.73	0.81	2.49	0.08	0.35	*0.08*	*0.35*
**OS4*	*73620.6*	1.69	0.52	0.90	0.96	0.00	0.73	0.81	1.17	0.08	0.35	*0.33*	*0.54*
OS5	*566.0*	0.01	0.00	0.90	0.96	0.00	0.73	0.81	0.01	0.08	0.35	*0.08*	*0.35*
OS6	*211.9*	0.00	0.00	0.90	0.96	0.00	0.73	0.81	0.00	0.08	0.35	*0.08*	*0.35*
**EX-C*	*143033.1*	3.28	1.08	0.90	0.96	0.00	0.73	0.81	2.20	0.08	0.35	*0.35*	*0.55*

**REFER TO THE FINAL DRAINAGE REPORT FOR AIRPORT SPECTRUM FILING NO. 1 (OFFSITE), DATED JULY 2022, BY CLASSIC CONSULTING ENGINEERS & SURVEYORS*

Calculated by: SPM
Date: 9/27/2024
Checked by: VAS

PRELIMINARY DRAINAGE REPORT
LOT 1-AIRPORT SPECTRUM FILING NO. 3
(Proposed Conditions - Area Drainage Summary)

From Area Runoff Coefficient Summary				*OVERLAND*				*STREET / CHANNEL FLOW*				*Time of Travel (T_t)*		*INTENSITY **		*TOTAL FLOWS*	
BASIN	**AREA TOTAL**	**C_5**	**C_{100}**	**C_5**	**Length**	**Height**	**T_C**	**Length**	**Slope**	**Velocity**	**T_t**	**TOTAL**	**CHECK**	**I_5**	**I_{100}**	**Q_5**	**Q_{100}**
	(Acres)	*From DCM Table 6-6*			*(ft)*	*(ft)*	*(min)*	*(ft)*	*(%)*	*(fps)*	*(min)*	*(min)*	*(min)*	*(in/hr)*	*(in/hr)*	*(c.f.s.)*	*(c.f.s.)*
A	0.13	0.12	0.39	0.12	20	1.0	4.7	25	24.0%	4.9	0.1	5.0	10.3	5.2	8.7	***0.1***	***0.4***
B	0.47	0.87	0.93	0.87	60	3.0	1.9	95	15.8%	7.9	0.2	5.0	10.9	5.2	8.7	***2.1***	***3.8***
C	0.03	0.42	0.61	0.42	15	0.3	3.8	25	2.4%	1.5	0.3	5.0	10.2	5.2	8.7	***0.1***	***0.2***
D	0.01	0.73	0.81	0.73	30	0.5	3.1					5.0	10.2	5.2	8.7	***0.1***	***0.1***
D1	0.01	0.73	0.81	0.73	15	0.5	1.7					5.0	10.1	5.2	8.7	***0.0***	***0.1***
D2	0.00	0.73	0.81	0.73	13	0.5	1.5					5.0	10.1	5.2	8.7	***0.0***	***0.0***
D3	0.02	0.73	0.81	0.73	30	0.5	3.1					5.0	10.2	5.2	8.7	***0.1***	***0.2***
D4	0.00	0.73	0.81	0.73	13	0.5	1.5					5.0	10.1	5.2	8.7	***0.0***	***0.0***
D5	0.02	0.73	0.81	0.73	30	0.5	3.1					5.0	10.2	5.2	8.7	***0.1***	***0.1***
E	0.09	0.14	0.41	0.14	20	0.5	5.7	45	2.7%	1.6	0.5	6.2	10.4	4.9	8.2	***0.1***	***0.3***
F	0.14	0.88	0.94	0.88	10	0.2	1.0	175	0.6%	0.8	3.9	5.0	11.0	5.2	8.7	***0.6***	***1.1***
G	0.03	0.12	0.39	0.12	20	1.0	4.7	20	2.5%	3.2	0.1	5.0	10.2	5.2	8.7	***0.0***	***0.1***
H	0.07	0.12	0.39	0.12	10	2.5	1.9					5.0	10.1	5.2	8.7	***0.0***	***0.2***
I	0.08	0.12	0.39	0.12	15	0.3	5.8					5.8	10.1	4.9	8.3	***0.0***	***0.3***
J	0.07	0.12	0.39	0.12	10	2.5	1.9	30	23.3%	4.8	0.1	5.0	10.2	5.2	8.7	***0.0***	***0.2***
OS1	0.21	0.08	0.35	0.08	20	2.0	3.9	75	6.7%	2.6	0.5	5.0	10.5	5.2	8.7	***0.1***	***0.6***
OS2	0.23	0.08	0.35	0.08	50	2.0	8.2	120	5.8%	2.4	0.8	9.1	10.9	4.3	7.2	***0.1***	***0.6***
OS3	2.49	0.08	0.35	0.08	65	3.0	9.0	245	11.4%	3.4	1.2	10.2	11.7	4.1	6.9	***0.8***	***6.0***
****OS4***	1.69	0.33	0.54	0.33	10	1.0	2.1	360	4.0%	2.0	3.0	5.1	12.1	5.2	8.7	***2.9***	***7.9***
OS5	0.01	0.08	0.35	0.08	10	3.0	1.9	15	26.7%	5.2	0.0	5.0	10.1	5.2	8.7	***0.0***	***0.0***
OS6	0.00	0.08	0.35	0.08	15	4.0	2.4					5.0	10.1	5.2	8.7	***0.0***	***0.0***
****EX-C***	3.28	0.35	0.55	0.35	90	3.0	8.6	490	3.1%	1.8	4.6	13.2	13.2	3.7	6.2	***4.3***	***11.3***

****REFER TO THE FINAL DRAINAGE REPORT FOR AIRPORT SPECTRUM FILING NO. 1 (OFFSITE), DATED JULY 2022, BY CLASSIC CONSULTING ENGINEERS & SURVEYORS***

Calculated by: SPM
Date: 9/27/2024
Checked by: VAS

PRELIMINARY DRAINAGE REPORT
LOT 1-AIRPORT SPECTRUM FILING NO. 3
(Proposed Conditions - Basin Routing Summary)

From Area Runoff Coefficient Summary				*OVERLAND*				*PIPE / CHANNEL FLOW*				*(T_t)*	*INTENSITY **		*TOTAL FLOWS*		
DESIGN POINT	**CONTRIBUTING BASINS**	**CA_5**	**CA_{100}**	**C_5**	**Length** *(ft)*	**Height** *(ft)*	**T_C** *(min)*	**Length** *(ft)*	**Slope** *(%)*	**Velocity** *(fps)*	**T_t** *(min)*	**TOTAL** *(min)*	**I_5** *(in/hr)*	**I_{100}** *(in/hr)*	**Q_5** *(c.f.s.)*	**Q_{100}** *(c.f.s.)*	COMMENTS
1	**C**	0.01	0.02									5.0	5.2	8.7	***0.1***	***0.2***	AREA INLET
				Basin C Tc Used													
2	**E**	0.01	0.04									6.2	4.9	8.2	***0.1***	***0.3***	AREA INLET
				Basin E Tc Used													
3	**F**	0.12	0.13									5.0	5.2	8.7	***0.6***	***1.1***	2' WIDE CURB CUT
				Basin F Tc Used													
4	**G**	0.00	0.01									5.0	5.2	8.7	***0.0***	***0.1***	AREA INLET
				Basin G Tc Used													
5	**A, B, I, OS1, OS2**	0.47	0.67									9.1	4.3	7.2	***2.0***	***4.8***	5' CDOT TYPE R INLET
				Basin OS2 Tc Used													
6	**H, OS3, EX-C**	1.36	2.71									13.2	3.7	6.2	***5.0***	***16.9***	TO FSD POND
				Basin EX-C Tc Used													
7	**J, OS4, OS5**	0.57	0.94									5.1	5.2	8.7	***2.9***	***8.1***	TO FSD POND
				Basin OS4 Tc Used													
8	**OS6**	0.00	0.00									5.0	5.2	8.7	***0.0***	***0.0***	TO OFFSITE LOT TO BE TREATED BY FSD POND
				Basin OS6 Tc Used													

Calculated by: SPM
Date: 9/6/2024
Checked by: VAS

PRELIMINARY DRAINAGE REPORT
LOT 1-AIRPORT SPECTRUM FILING NO. 3
(Proposed Conditions - Storm Sewer Routing Summary)

PIPE RUN	*Contributing Pipes/Design Points/Basins*	*Equivalent* CA_5	*Equivalent* CA_{100}	*Maximum* T_C	*Intensity**		*Flow*		PIPE SIZE (PVT)
					I_5	I_{100}	Q_5	Q_{100}	
1	**DP1**	0.01	0.02	5.0	5.2	8.7	***0.1***	***0.2***	8" HDPE
R1	**PORTION OF D1**	0.00	0.00	5.0	5.2	8.7	***0.0***	***0.0***	6" HDPE
R2	**PR R1, PR R2**	0.02	0.02	5.0	5.2	8.7	***0.1***	***0.2***	8" HDPE
R3	**PORTION OF D1**	0.00	0.00	5.0	5.2	8.7	***0.0***	***0.0***	6" HDPE
R4	**PR R2, PR R3**	0.02	0.02	5.0	5.2	8.7	***0.1***	***0.2***	8" HDPE
R5	**PORTION OF D1**	0.00	0.00	5.0	5.2	8.7	***0.0***	***0.0***	6" HDPE
R6	**PR R4, PR R5**	0.02	0.03	5.0	5.2	8.7	***0.1***	***0.2***	8" HDPE
R7	**PORTION OF D1**	0.00	0.00	5.0	5.2	8.7	***0.0***	***0.0***	6" HDPE
R8	**PR R6, PR R7**	0.02	0.03	5.0	5.2	8.7	***0.1***	***0.2***	8" HDPE
R9	**BASIN D4**	0.00	0.00	5.0	5.2	8.7	***0.0***	***0.0***	6" HDPE
R10	**PR R8, PR R9**	0.02	0.03	5.0	5.2	8.7	***0.1***	***0.2***	8" HDPE
R11	**BASIN D**	0.01	0.01	5.0	5.2	8.7	***0.1***	***0.1***	8" HDPE
R12	**BASIN D2**	0.00	0.00	5.0	5.2	8.7	***0.0***	***0.0***	6" HDPE
R13	**PR R11, PR R12**	0.01	0.02	5.0	5.2	8.7	***0.1***	***0.1***	8" HDPE
R14	**BASIN D3**	0.02	0.02	5.0	5.2	8.7	***0.1***	***0.2***	6" HDPE
R15	**PR R13, PR R14**	0.03	0.04	5.0	5.2	8.7	***0.2***	***0.3***	8" HDPE
R16	**BASIN D5**	0.01	0.01	5.0	5.2	8.7	***0.1***	***0.1***	6" HDPE
R17	**PR R15, PR R16**	0.04	0.05	5.0	5.2	8.7	***0.2***	***0.4***	8" HDPE
2	**DP2, DP3, PR R17**	0.18	0.22	5.0	5.2	8.7	***0.9***	***1.9***	12" PP
3	**PR1, PR R10, DP4**	0.20	0.26	5.0	5.2	8.7	***1.1***	***2.2***	12" PP
4	**DP5**	0.47	0.67	9.1	4.3	7.2	***2.0***	***4.8***	18" PP
5	**PR2, PR3**	0.67	0.93	9.1	4.3	7.2	***2.9***	***6.7***	18" PP
EX1	**PR7, PR8**	0.67	0.93	9.1	4.3	7.2	***2.9***	***6.7***	24" PP

* Intensity equations assume a minimum travel time of 5 minutes.

DP - Design Point
EX - Existing Design Point
FB- Flow By from Design Point
INT- Intercepted Flow from Design Point

Calculated by: SPM
Date: 9/6/2024
Checked by: VAS

M&S - Total Weighted Percent Imperviousness				
Contributing Basins	***Area (Acres)***	***C_5***	***Impervious (I)***	***(Acres)*(I)***
A	0.13	0.12	7	0.89
B	0.47	0.87	98	46.10
C	0.03	0.42	62	2.15
D	0.01	0.73	90	1.32
D1	0.01	0.73	90	0.66
D2	0.00	0.73	90	0.41
D3	0.02	0.73	90	2.20
D4	0.00	0.73	90	0.10
D5	0.02	0.73	90	1.61
E	0.09	0.14	19	1.73
F	0.14	0.88	99	13.54
G	0.03	0.12	7	0.20
H	0.07	0.12	7	0.51
I	0.08	0.12	7	0.57
J	0.07	0.12	7	0.49
Totals	***1.18***			72.49
Total Imperviousness	***61.32***			

Classic Consulting- Total Weighted Percent Imperviousness				
Contributing Basins	***Area (Acres)***	***C_5***	***Impervious (I)***	***(Acres)*(I)***
A3	1.17	0.79	94	109.69
Totals	***1.17***			109.69
Total Imperviousness	***93.8***			
***TAKEN FROM THE FINAL DRAINAGE REPORT AMENDMENT FOR AIRPORT SPECTRUM FILING NO. 1 (OFFSITE) DATED JULY 2022, BY CLASSING ENGINEERS & SURVEYORS**				

HYDRAULIC CALCULATIONS

MHFD-Inlet, Version 5.03 (August 2023)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	INLET 1 (DP5)
Site Type (Urban or Rural)	URBAN
Inlet Application (Street or Area)	STREET
Hydraulic Condition	In Sump
Inlet Type	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	2.0
Major Q_{Known} (cfs)	4.8

Bypass (Carry-Over) Flow from Upstream Inlets must be organized from upstream (le

Receive Bypass Flow from:	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0

Watershed Characteristics

Subcatchment Area (acres)	
Percent Impervious	
NRCS Soil Type	

Watershed Profile

Overland Slope (ft/ft)	
Overland Length (ft)	
Channel Slope (ft/ft)	
Channel Length (ft)	

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)	
One-Hour Precipitation, P_1 (inches)	

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)	
One-Hour Precipitation, P_1 (inches)	

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**2.0**
Major Total Design Peak Flow, Q (cfs)	**4.8**
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	N/A

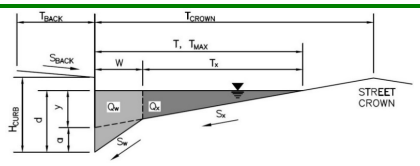
MHFD-Inlet, Version 5.03 (August 2023)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: LOT 1-AIRPORT SPECTRUM FILING NO. 3 (Milton Proby Starbucks)

Inlet ID: INLET 1 (DP5)



Gutter Geometry:

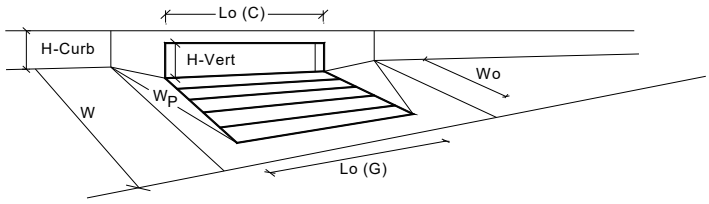
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	28.0	ft
Gutter Width	W =	1.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	10.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.2	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)

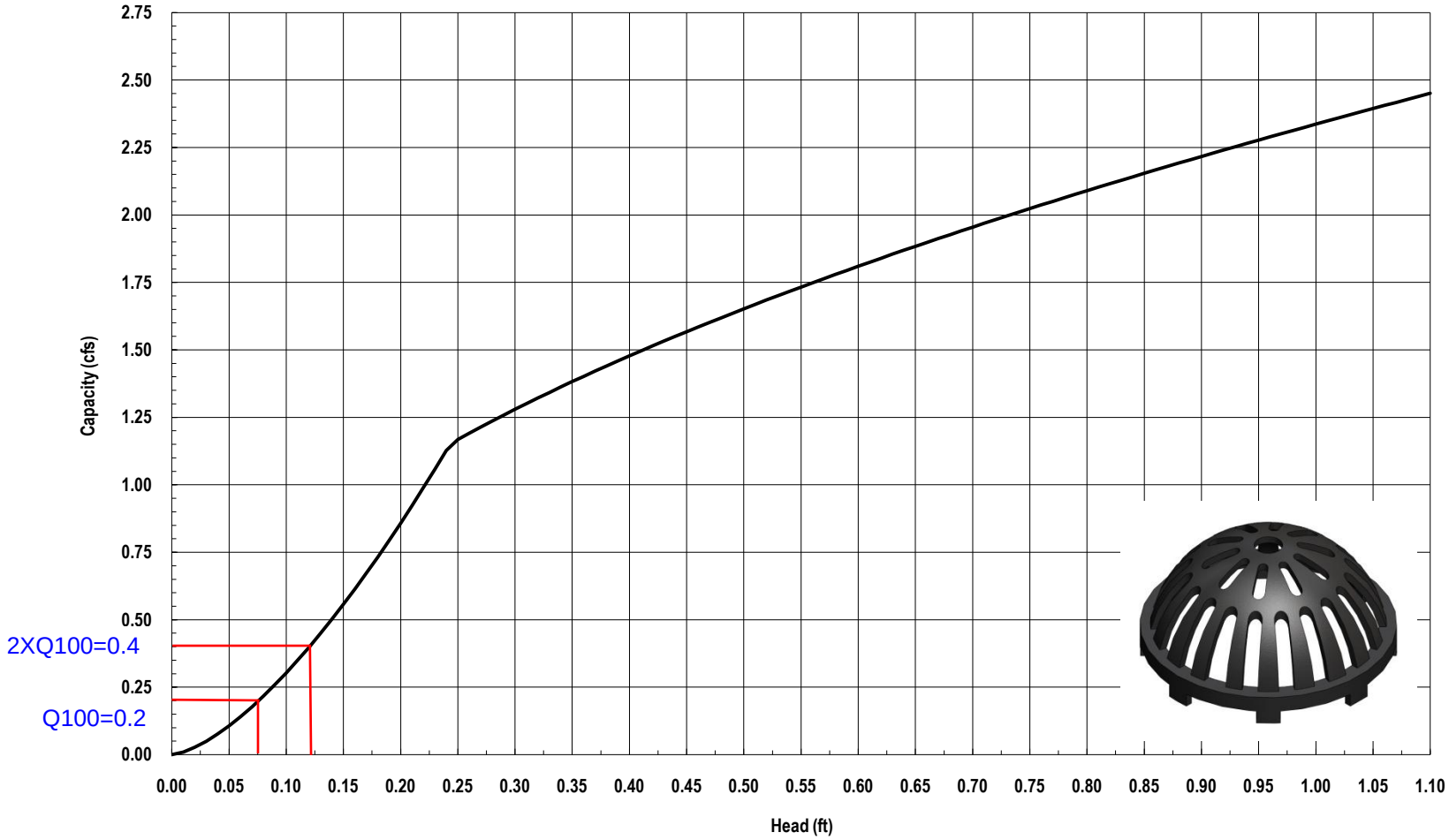


Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.2	6.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	1.00	1.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.27	0.42	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**3.0**	**5.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	2.0	4.8	cfs

Nyloplast 12" Dome Grate Inlet Capacity Chart



Design Point 1 = Q5=0.1 cfs, Q100=0.2 cfs
Required Ponding Depth = 0.07 ft
Safety Factor = 2xQ100 = Q100=0.4
Depth = 0.13 ft

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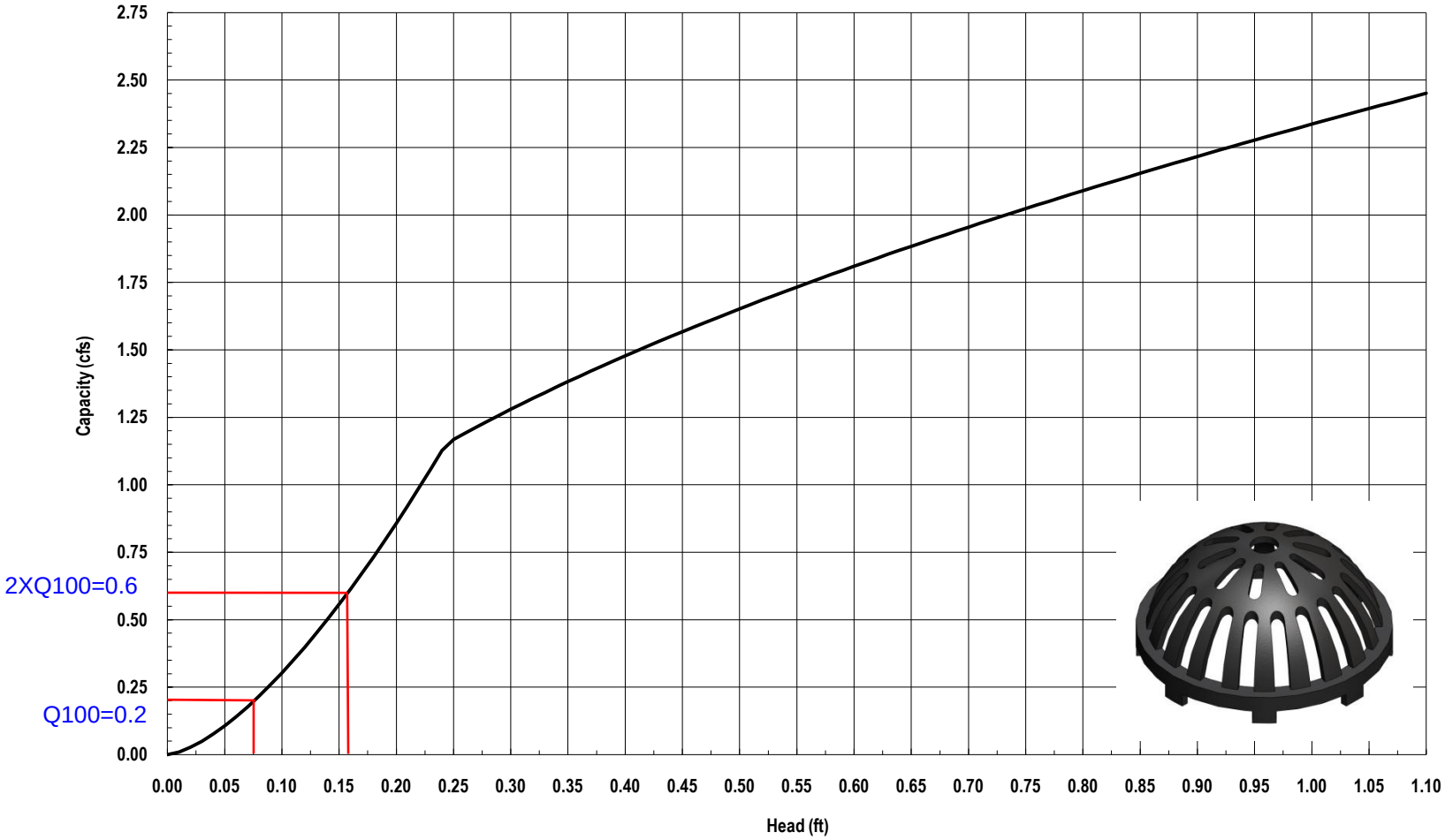
Nyloplast 12" Dome Grate Inlet Capacity Chart



Design Point 2 = Q5=0.1 cfs, Q100=0.3 cfs
Required Ponding Depth = 0.07 ft
Safety Factor = 2xQ100 = Q100=0.6
Depth = 0.17 ft

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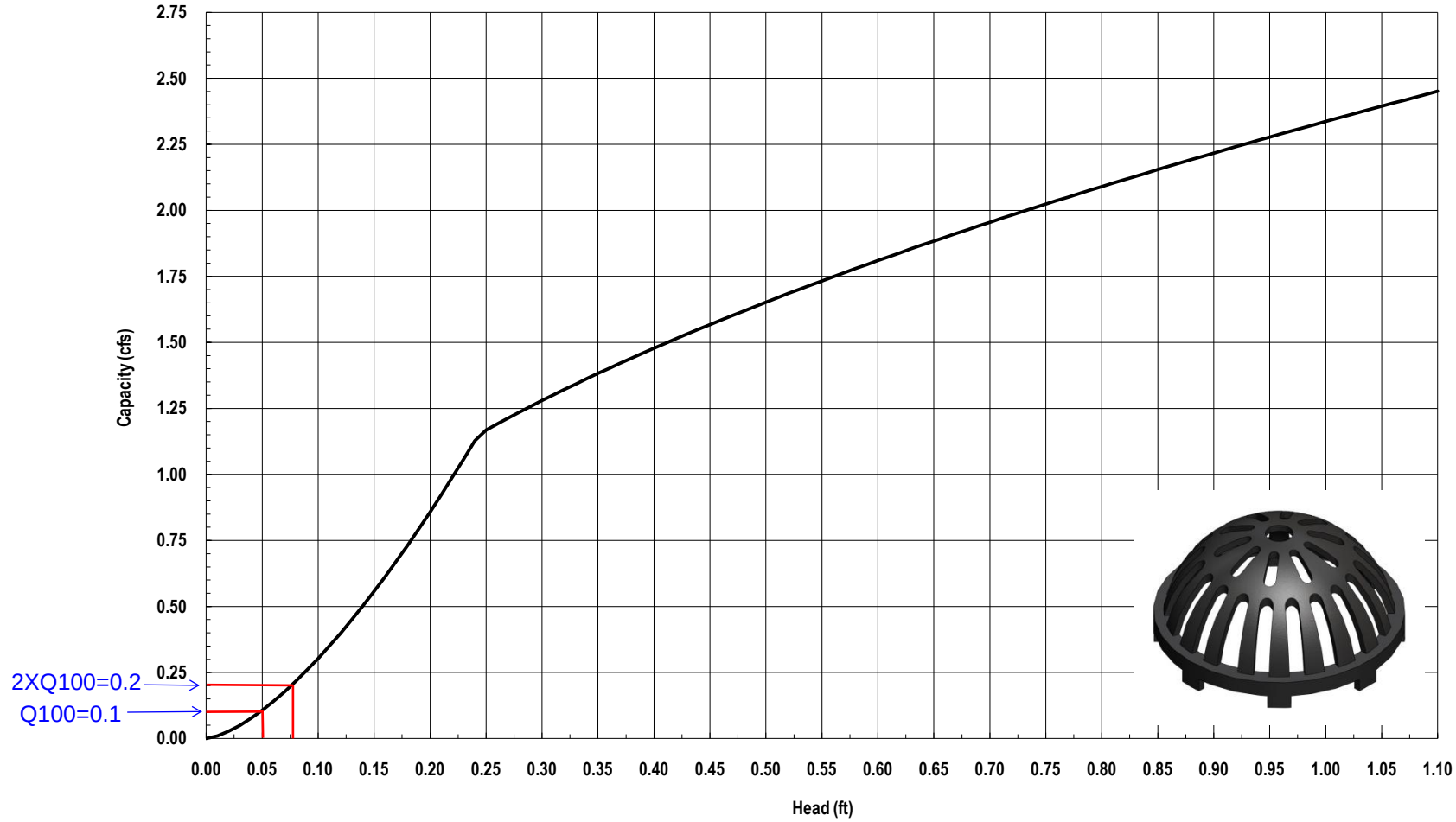
Nyloplast 12" Dome Grate Inlet Capacity Chart



Design Point 4 = Q5=0.0 cfs, Q100=0.1 cfs
Required Ponding Depth = 0.05 ft
Safety Factor = 2xQ100 = Q100=0.2
Depth = 0.08 ft

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Manning Formula Uniform Pipe Flow at Given Slope and Depth

Printable Title

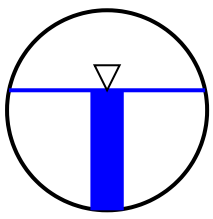
Printable Subtitle

Inputs

Pipe diameter, d_0	12	in
Manning roughness, n	.013	
Pressure slope (possibly ? equal to pipe slope), S_0	.01	rise/run
Relative flow depth, y/d_0	60	%

Results

Flow depth, y	0.6000	ft
Flow area, a	0.4920	ft^2
Pipe area, a0	0.7854	ft^2
Relative area, a/a0	62.6470	%
Wetted perimeter, P_w	1.7721	ft
Hydraulic radius, R_h	0.2776	ft
Top width, T	0.9798	ft
Velocity, v	4.8645	ft/sec
Velocity head, h_v	0.3678	ft H2O
Froude number, F	1.21	
Average shear stress (tractive force), tau	0.1733	psf
Flow, Q (See notes)	2.3934	cfs
Full flow, Q0	3.5625	cfs
Ratio to full flow, Q/Q0	67.1840	%



PR2: Q100= 1.8 cfs
PR3: Q100= 2.2 cfs

Notes:

This is the flow and depth inside an *infinitely long* pipe.
Getting the flow into the pipe may require significantly higher headwater depth. Add at least 1.5 times the velocity head to get the headwater depth or see my 2-minute tutorial for standard culvert headwater calculations using HY-8.

Manning Formula Uniform Pipe Flow at Given Slope and Depth

Printable Title

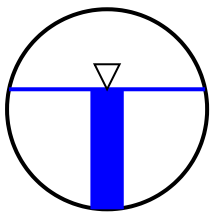
Printable Subtitle

Inputs

Pipe diameter, d_0	18	in
Manning roughness, n	.013	
Pressure slope (possibly ? equal to pipe slope), S_0	.01	rise/run
Relative flow depth, y/d_0	60	%

Results

Flow depth, y	0.9000	ft
Flow area, a	1.1071	ft^2
Pipe area, a0	1.7672	ft^2
Relative area, a/a0	62.6470	%
Wetted perimeter, P_w	2.6582	ft
Hydraulic radius, R_h	0.4165	ft
Top width, T	1.4697	ft
Velocity, v	6.3743	ft/sec
Velocity head, h_v	0.6315	ft H2O
Froude number, F	1.29	
Average shear stress (tractive force), tau	0.2600	psf
Flow, Q (See notes)	7.0566	cfs
Full flow, Q0	10.5033	cfs
Ratio to full flow, Q/Q0	67.1840	%



PR4: Q100= 4.8 cfs
PR5: Q100= 6.7 cfs

Notes:

This is the flow and depth inside an *infinitely long* pipe.
Getting the flow into the pipe may require significantly higher headwater depth. Add at least 1.5 times the velocity head to get the headwater depth or see my 2-minute tutorial for standard culvert headwater calculations using HY-8.

Worksheet for Parabolic Swale - 1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.050 ft/ft
Constructed Depth	12.0 in
Constructed Top Width	20.00 ft
Discharge	16.90 cfs

Results	
Normal Depth	5.0 in
Flow Area	3.6 ft²
Wetted Perimeter	12.9 ft
Hydraulic Radius	3.3 in
Top Width	12.91 ft
Critical Depth	6.3 in
Critical Slope	0.019 ft/ft
Velocity	4.71 ft/s
Velocity Head	0.34 ft
Specific Energy	0.76 ft
Froude Number	1.574
Flow Type	Supercritical

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

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.0 in
Critical Depth	6.3 in
Channel Slope	0.050 ft/ft
Critical Slope	0.019 ft/ft

Design Procedure Form: Runoff Reduction

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

Designer:	**Stephanie Meadows**
Company:	**M&S Civil Consultants Inc.**
Date:	**September 30, 2024**
Project:	**Lot 1-Airport Spectrum Filing No. 3 (Milton Proby Starbucks)**
Location:	**Colorado Springs, CO**

SITE INFORMATION (User Input in Blue Cells)

WQCV Rainfall Depth = 0.60 inches

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

Area Type	UIA:RPA	SPA	SPA	SPA	SPA	SPA	SPA					
Area ID	1	2	3	4	5	6	7					
Downstream Design Point ID	1	2	3	4	5	6	7					
Downstream BMP Type	EDB	EDB	EDB	EDB	EDB	EDB	EDB					
DCIA (ft^2)	--	--	--	--	--	--	--					
UIA (ft^2)	28,806	--	--	--	--	--	--					
RPA (ft^2)	566	--	--	--	--	--	--					
SPA (ft^2)	--	931	3,866	595	1,250	6,469	25,736					
HSG A (%)	100%	100%	100%	100%	100%	100%	100%					
HSG B (%)	0%	0%	0%	0%	0%	0%	0%					
HSG C/D (%)	0%	0%	0%	0%	0%	0%	0%					
Average Slope of RPA (ft/ft)	0.005	--	--	--	--	--	--					
UIA:RPA Interface Width (ft)	2.50	--	--	--	--	--	--					

CALCULATED RUNOFF RESULTS

Area ID	1	2	3	4	5	6	7					
UIA:RPA Area (ft^2)	29,372	--	--	--	--	--	--					
L / W Ratio	16.00	--	--	--	--	--	--					
UIA / Area	0.9807	--	--	--	--	--	--					
Runoff (in)	0.36	0.00	0.00	0.00	0.00	0.00	0.00					
Runoff (ft^3)	879	0	0	0	0	0	0					
Runoff Reduction (ft^3)	321	47	193	30	63	323	1287					

CALCULATED WQCV RESULTS

Area ID	1	2	3	4	5	6	7					
WQCV (ft^3)	1200	0	0	0	0	0	0					
WQCV Reduction (ft^3)	321	0	0	0	0	0	0					
WQCV Reduction (%)	27%	0%	0%	0%	0%	0%	0%					
Untreated WQCV (ft^3)	879	0	0	0	0	0	0					

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

Downstream Design Point ID	1	2	3	4	5	6	7					
DCIA (ft^2)	0	0	0	0	0	0	0					
UIA (ft^2)	28,806	0	0	0	0	0	0					
RPA (ft^2)	566	0	0	0	0	0	0					
SPA (ft^2)	0	931	3,866	595	1,250	6,469	25,736					
Total Area (ft^2)	29,372	931	3,866	595	1,250	6,469	25,736					
Total Impervious Area (ft^2)	28,806	0	0	0	0	0	0					
WQCV (ft^3)	1,200	0	0	0	0	0	0					
WQCV Reduction (ft^3)	321	0	0	0	0	0	0					
WQCV Reduction (%)	27%	0%	0%	0%	0%	0%	0%					
Untreated WQCV (ft^3)	879	0	0	0	0	0	0					

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

Total Area (ft^2)	68,219
Total Impervious Area (ft^2)	28,806
WQCV (ft^3)	1,200
WQCV Reduction (ft^3)	321
WQCV Reduction (%)	27%
Untreated WQCV (ft^3)	879

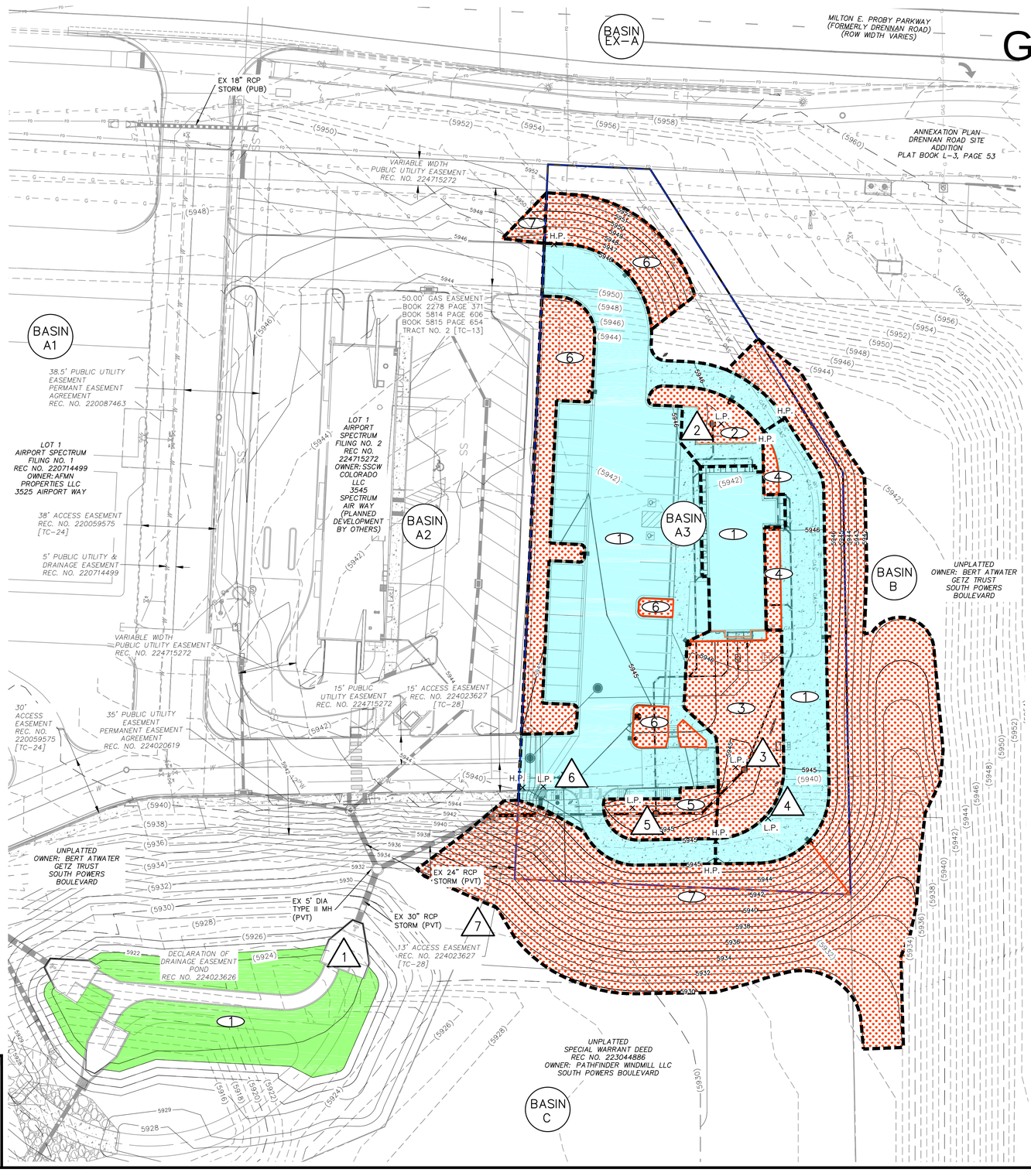
DRAINAGE AND GREEN INFRASTRUCTURE MAPS

LOT 1- AIRPORT SPECTRUM FILING NO. 3

CITY OF COLORADO SPRINGS, STATE OF COLORADO

GREEN INFRASTRUCTURE MAP

SEPTEMBER 2024



NOTES:

1. LOT 1 AIRPORT SPECTRUM FILING NO. 2, WHICH PROVIDES ACCESS TO THE SUBJECT SITE, SHALL BE CONSTRUCTED CONCURRENTLY OR PRIOR TO THE DEVELOPMENT OF LOT 1 AIRPORT SPECTRUM FILING NO. 3.
2. THE CONVERSION OF THE OFFSITE TEMPORARY SEDIMENT BASIN TO A FULL SPECTRUM DETENTION POND TO SERVE THE SUBJECT SITE PRIOR TO THE DEVELOPMENT AND AFTER CONSTRUCTION OF SITE AND SHALL BE COMPLETED BY LOT 1, AIRPORT SPECTRUM FILING NO. 1.

1	UIA 28,806 SQ FT-0.661 AC RPA 566 SQ FT-0.013 AC
2	SPA 931 SQ FT-0.021 AC
3	SPA 3,866 SQ FT-0.089 AC
4	SPA 595 SQ FT-0.013 AC
5	SPA 1,250 SQ FT-0.029 AC
6	SPA 6,469 SQ FT-0.148 AC
7	SPA 25,736 SQ FT-0.591 AC

LEGEND

- AREA ID LABEL
- SURFACE DESIGN POINT
- BASIN BOUNDARY
- (6920) EXISTING CONTOUR
- 6920 PLANNED CONTOUR (BY OTHERS)
- 6920 PROP CONTOUR
- SUBDIVISION/PROPERTY BOUNDARY
- PROPOSED STORM SEWER PIPE
- EXISTING STORM SEWER PIPE
- UIA/RPA FLOW ARROW
- H.P. HIGH POINT
- L.P. LOW POINT

GREEN INFRASTRUCTURE CALCULATIONS

PCM	CONTRIBUTING BASINS	IMPERVIOUS AREA TOTAL (ACRE)	20% IF IMP. AREA (ACRE)	10% OF 20% OF IMP. ARES (ACRE)=MIN. RECEIVING PERVIOUS AREA (RPA) REQ.	TOTAL WQ EVENT WETTED AREA (ACRE)	REMAINING WQ EVENT WETTED AREA (ACRE)
POND	EX-A, EX-C,A1, A2, A3, A4, B, C	7.4	1.48	0.148	0.148	0
POND	A2 (BOWMAN)	0.859	0.172	0.017	0.148	0.131
POND	A3 (M&S)	0.661	0.132	0.013	0.148	0.118

COMMERCIAL	
TOTAL DISTURBED SITE AREA, (AC)	1.56
TOTAL IMPERVIOUS AREA, (AC)	0.66
TOTAL SITE PERCENT IMPERVIOUS	42.2%
UNCONNECTED IMPERVIOUS AREA (IN BLUE), AC	0.66
PIA (IN GREEN), AC	.013
WQCV, CF	1200
STORMWATER VOLUME REDUCTION,CF	321
STORMWATER VOLUME REDUCTION AS % OF WQCV	27%

1" = 30'

0 15 30 60

Scale in Feet

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LOT 1 – AIRPORT SPECTRUM FILING NO. 3

GREEN INFRASTRUCTRE MAP

PROJECT NO. 10-035	SCALE: HORIZONTAL: 1"=30' VERTICAL: N/A	DATE: 09/03/2024	
DESIGNED BY: SPM DRAWN BY: SPM CHECKED BY: VAS		SHEET 1 OF 1	GIM

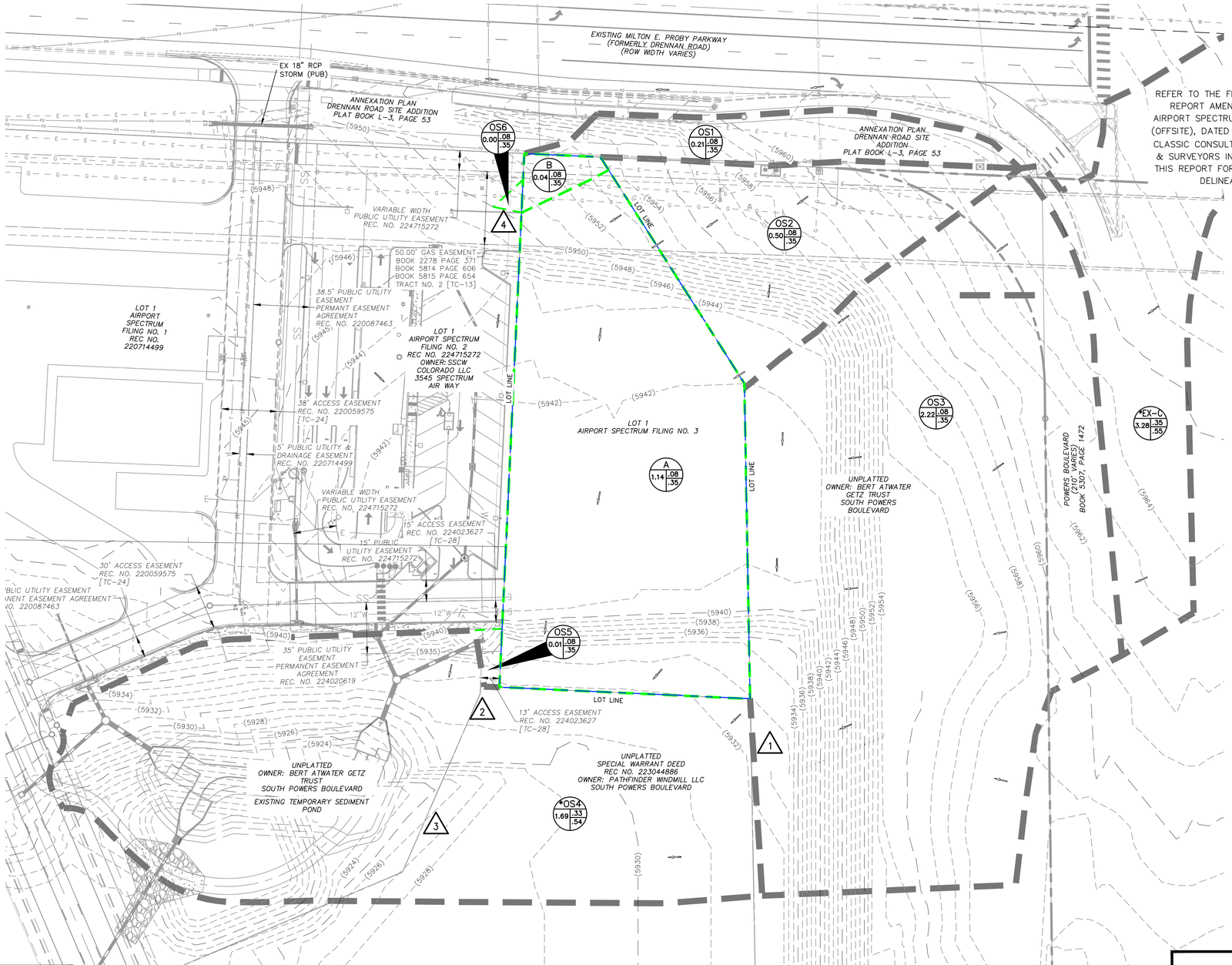
File: C:\10035A-Milton Proby Starbucks\Brian Zurek\Drainage\Drainage Map\10035 GIM.dwg Plotstamp: 10/1/2024 1:16 PM

LOT 1 - AIRPORT SPECTRUM FILING NO. 3

CITY OF COLORADO SPRINGS, STATE OF COLORADO

EXISTING DRAINAGE MAP

SEPTEMBER 2024



REFER TO THE FINAL DRAINAGE REPORT AMENDMENT FOR AIRPORT SPECTRUM FILING NO. 1 (OFFSITE), DATED JULY 2022, BY CLASSIC CONSULTING ENGINEERS & SURVEYORS IN APPENDIX OF THIS REPORT FOR ENTIRE BASIN DELINEATION

LEGEND

- BASIN DESIGNATION (Z; 25 ACRES; .25 C5; .35 C100)
- 4 — PIPE RUN REFERENCE LABEL
- 6 — SURFACE DESIGN POINT
- INLET
- EXISTING FLOW DIRECTION ARROW
- H.P. — HIGH POINT
- L.P. — LOW POINT
- PROP BASIN BOUNDARY
- BASIN BOUNDARY FROM MDDP/FDR
- (6920) EXISTING INDEX CONTOUR (5')
- (6920) EXISTING NOMINAL CONTOUR (1')
- PROPERTY BOUNDARY
- EXISTING STORM SEWER PIPE
- G EXISTING GAS LINE
- SS EXISTING SANITARY LINE
- W EXISTING WATER LINE
- E UNDERGROUND ELECTRICAL

BASIN SUMMARY

BASIN	AREA (ACRES)	Q_5	Q_{100}
A	1.14	0.4	3.1
B	0.04	0.0	0.1
OS1	0.21	0.1	0.6
OS2	0.50	0.2	1.7
OS3	2.22	0.7	5.4
*OS4	1.69	2.9	7.9
OS5	0.01	0.0	0.0
OS6	0.00	0.0	0.0
*EX-C	3.28	4.3	11.3

*ORIGINAL BASINS FROM THE FINAL DRAINAGE REPORT AMENDMENT FOR AIRPORT SPECTRUM FILING NO. 1 (OFFSITE), DATED JULY 2022, BY CLASSIC CONSULTING ENGINEERS & SURVEYORS IN THE APPENDIX OF THIS REPORT

DESIGN POINT SUMMARY

DESIGN POINT	Q_5	Q_{100}	BASIN(S)/ DESIGN PT(S)	STRUCTURE
1	4.9	16.1	OS3, EX-C	TEMPORARY SEDIMENT BASIN
2	0.6	4.5	A, OS1, OS2, OS5	TEMPORARY SEDIMENT BASIN
4	0.0	0.1	B, OS6	TEMPORARY SEDIMENT BASIN

1" = 40'

0 20 40 80

Scale in Feet

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LOT 1 – AIRPORT SPECTRUM FILING NO. 3

EXISTING DRAINAGE MAP

PROJECT NO. 10-035	SCALE: HORIZONTAL: 1"=40' VERTICAL: N/A	DATE: 09/03/2024	
DESIGNED BY: SPM		SHEET 1 OF 1	EDM
DRAWN BY: SPM			
CHECKED BY: VAS			

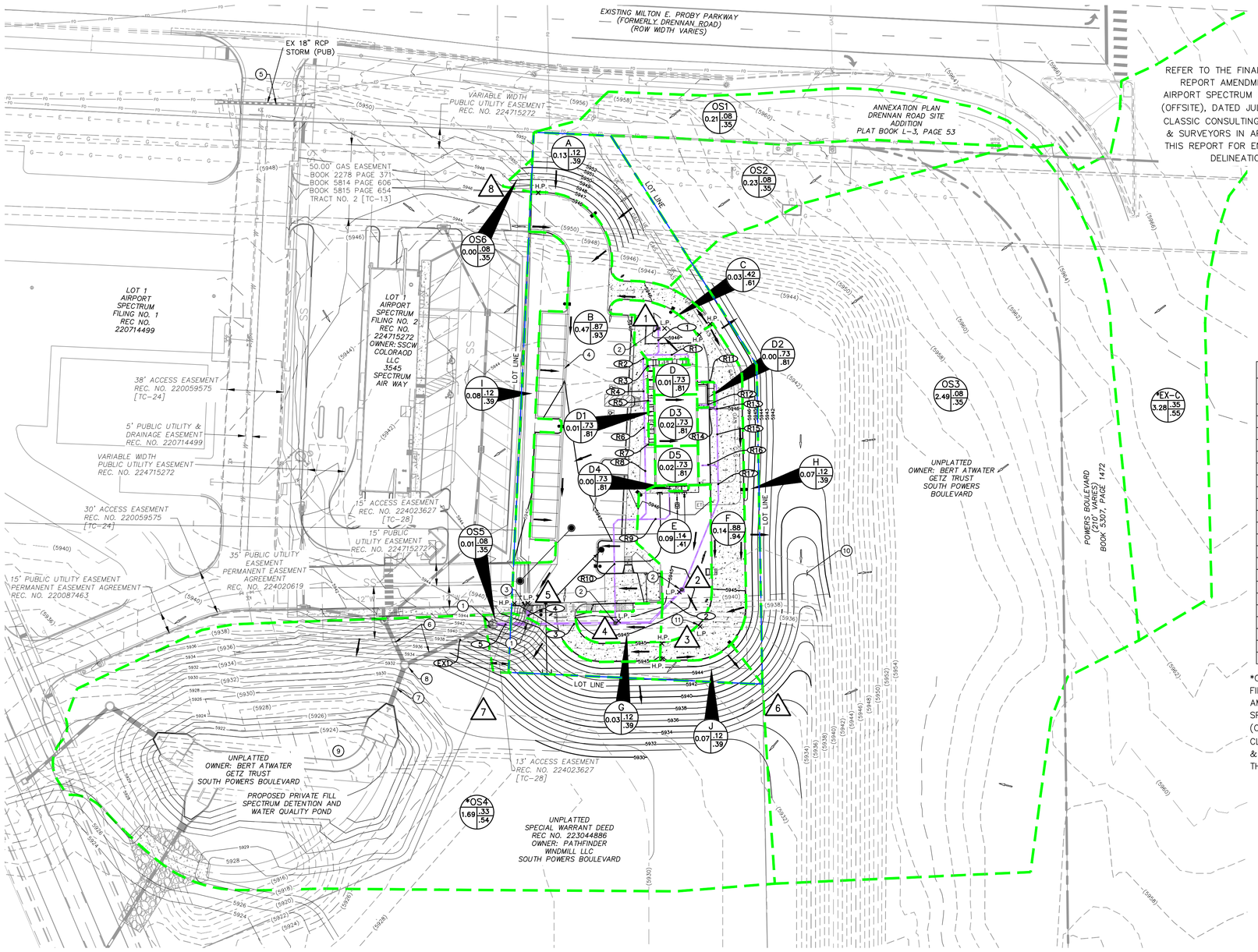
File: O:\10035A-Milton Proby Starbucks\Brian Zurek\Drainage\Drainage Map\EDM.dwg Plotstamp: 10/1/2024 1:15 PM

LOT 1 - AIRPORT SPECTRUM FILING NO. 3

CITY OF COLORADO SPRINGS, STATE OF COLORADO

PROPOSED DRAINAGE MAP

SEPTEMBER 2024



REFER TO THE FINAL DRAINAGE REPORT AMENDMENT FOR AIRPORT SPECTRUM FILING NO. 1 (OFFSITE), DATED JULY 2022, BY CLASSIC CONSULTING ENGINEERS & SURVEYORS IN APPENDIX OF THIS REPORT FOR ENTIRE BASIN DELINEATION

KEY NOTES:

1. PROPOSED PRIVATE 5' DIA TYPE II MANHOLE
2. PROPOSED PRIVATE NYLOPLAST DRAIN BASIN
3. PROPOSED PRIVATE 5' CDOT TYPE R INLET (INLET 1)
4. PROPOSED 2' CONCRETE CHASE
5. EXISTING PUBLIC 18" RCP
6. PLANNED PRIVATE 24" RCP BY OTHERS
7. PLANNED PRIVATE 30" RCP BY OTHERS
8. PLANNED PRIVATE 5' DIA TYPE II MH BY OTHERS
9. PLANNED PRIVATE FSD POND BY OTHERS
10. PROPOSED GRASS LINED SWALE (SWALE-1)
11. PROPOSED CURB CUT WITH RIP RAP PROTECTIONS

LEGEND

BASIN DESIGNATION: Z / 25 / .25 / .35 (ACRES: 25; C5: .25; C100: .35)

- PIPE RUN REFERENCE LABEL
- SURFACE DESIGN POINT
- PROPOSED INLET
- PROPOSED STORM SEWER MANHOLE
- EXISTING FLOW DIRECTION ARROW
- PROPOSED FLOW DIRECTION ARROW
- H.P. HIGH POINT
- L.P. LOW POINT
- BASIN BOUNDARY FROM MDDP/FDR
- PROP BASIN BOUNDARY
- (6920) EXISTING INDEX CONTOUR (5')
- (6920) EXISTING NOMINAL CONTOUR (1')
- 6920 PROPOSED INDEX CONTOUR (5')
- 6920 PROPOSED NOMINAL CONTOUR (1')
- 6920 PLANNED INDEX CONTOUR (BY OTHERS) (5')
- 6920 PLANNED NOMINAL CONTOUR (BY OTHERS) (1')
- PROPERTY BOUNDARY
- EXISTING STORM SEWER PIPE
- PROPOSED STORM SEWER PIPE
- G EXISTING GAS LINE
- SS EXISTING SANITARY LINE
- W EXISTING WATER LINE
- E UNDERGROUND ELECTRICAL

BASIN SUMMARY			
BASIN	AREA (ACRES)	Q_5	Q_{100}
A	0.13	0.1	0.4
B	0.47	2.1	3.8
C	0.03	0.1	0.2
D	0.01	0.1	0.1
D1	0.01	0.0	0.1
D2	0.00	0.0	0.0
D3	0.02	0.1	0.2
D4	0.00	0.0	0.0
D5	0.02	0.1	0.1
E	0.09	0.1	0.3
F	0.14	0.6	1.1
G	0.03	0.0	0.1
H	0.07	0.0	0.2
I	0.08	0.0	0.3
J	0.07	0.0	0.2
OS1	0.21	0.1	0.6
OS2	0.23	0.1	0.6
OS3	2.49	0.8	6.0
*OS4	1.69	2.9	7.9
OS5	0.01	0.0	0.0
OS6	0.00	0.0	0.0
*EX-C	3.28	4.3	11.3

*ORIGINAL BASINS FROM THE FINAL DRAINAGE REPORT AMENDMENT FOR AIRPORT SPECTRUM FILING NO. 1 (OFFSITE), DATED JULY 2022, BY CLASSIC CONSULTING ENGINEERS & SURVEYORS IN APPENDIX OF THIS REPORT

STORM SEWER SUMARY			
PIPE RUN	Q_5	Q_{100}	PIPE SIZE (PVT)
1	0.1	0.2	PROP 8" HDPE
R1	0.0	0.0	PROP 6" HDPE
R2	0.1	0.2	PROP 8" HDPE
R3	0.0	0.0	PROP 6" HDPE
R4	0.1	0.2	PROP 8" HDPE
R5	0.0	0.0	PROP 6" HDPE
R6	0.1	0.2	PROP 8" HDPE
R7	0.0	0.0	PROP 6" HDPE
R8	0.1	0.2	PROP 8" HDPE
R9	0.0	0.0	PROP 6" HDPE
R10	0.1	0.2	PROP 8" HDPE
R11	0.1	0.1	PROP 8" HDPE
R12	0.0	0.0	PROP 6" HDPE
R13	0.1	0.1	PROP 8" HDPE
R14	0.1	0.2	PROP 6" HDPE
R15	0.2	0.3	PROP 8" HDPE
R16	0.1	0.1	PROP 6" HDPE
R17	0.2	0.4	PROP 8" HDPE
2	0.9	1.8	PROP 12" PP
3	1.1	2.2	PROP 12" PP
4	2.0	4.8	PROP 18" PP
5	2.9	6.7	PROP 18" PP
EX1	2.9	6.7	PLANNED 24" RCP

HDPE=ADS N-12 DUAL WALL HDPE PIPE
PP=ADS HP STORM (POLYPROPYLENE) PIPE

DESIGN POINT SUMMARY				
DESIGN POINT	Q_5	Q_{100}	BASIN(S)/ DESIGN PT(S)	STRUCTURE (PVT)
1	0.1	0.2	C	NYLOPLAST AREA INLET
2	0.1	0.3	E	NYLOPLAST AREA INLET
3	0.6	1.1	F	2' WIDE CURB CUT
4	0.0	0.1	G	NYLOPLAST AREA INLET
5	2.0	4.8	A, B, I, OS1, OS2	5' CDOT TYPE R INLET
6	5.0	16.9	H, OS3, EX-C	FSD POND
7	2.9	8.1	J, OS4, OS5	FSD POND
8	0.0	0.0	OS6	TO OFFSITE LOT

1" = 40'

0 20 40 80

Scale in Feet

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NOTES:

1. LOT 1 AIRPORT SPECTRUM FILING NO. 2, WHICH PROVIDES ACCESS TO THE SUBJECT SITE, SHALL BE CONSTRUCTED CONCURRENTLY OR PRIOR TO THE DEVELOPMENT OF LOT 1 AIRPORT SPECTRUM FILING NO. 3.
2. THE CONVERSION OF THE OFFSITE TEMPORARY SEDIMENT BASIN TO A FULL SPECTRUM DETENTION POND TO SERVE THE SUBJECT SITE PRIOR TO THE DEVELOPMENT AND AFTER CONSTRUCTION OF SITE AND SHALL BE COMPLETED BY LOT 1, AIRPORT SPECTRUM FILING NO. 1.

PIA NOTE

PLANNED INFILTRATION AREA (PIA) IS NOT LOCATED ON SITE. PIA IS LOCATED IN THE PLANNED POND SOUTHWEST OF THE SITE. REFER TO THE "FINAL DRAINAGE REPORT AMENDED FOR AIRPORT SPECTRUM FILING NO. 1 (OFFSITE)", DATED JULY 2022 (STM-REV22-0894) BY CLASSIC CONSULTING ENGINEERS & SURVEYORS, LLC. FOR POND DESIGN AND THE "DRAINAGE LETTER FOR SUPER STAR CARWASH - POWERS AND MILTON", DATED JANUARY 2024 BY BOWMAN FOR GREEN INFRASTRUCTURE PLANNED INFILTRATION AREA MASTER DEVELOPER ALLOCATION LETTER.

CIVIL CONSULTANTS, INC.
212 N. WAHSATCH AVE., STE 305
COLORADO SPRINGS, CO 80903
PHONE: 719.955.5485

LOT 1 - AIRPORT SPECTRUM FILING NO. 3

PROPOSED DRAINAGE MAP

PROJECT NO. 10-035	SCALE: HORIZONTAL: 1"=40' VERTICAL: N/A	DATE: 09/27/2024	
DESIGNED BY: SPM		SHEET 1 OF 1	PDM
DRAWN BY: SPM			
CHECKED BY: VAS			

File: C:\10035A-Milton Proby Starbucks\Brian Zurek\Drainage\Drainage Map\PDM.dwg Plotstamp: 10/1/2024 1:15 PM

BACKGROUND INFORMATION

FINAL DRAINAGE REPORT AMENDMENT
FOR
AIRPORT SPECTRUM FILING NO. 1
(OFF-SITE)

July 2022

Prepared for:
BERT A GETZ TRUST
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PARADISE VALLEY, AZ 85253
(480) 991-0500

Prepared by:
CLASSIC CONSULTING ENGINEERS & SURVEYORS
619 N. CASCADE AVENUE SUITE 200
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Job no. 2429.10

FINAL DRAINAGE REPORT AMENDMENT FOR
AIRPORT SPECTRUM FILING NO. 1 (OFF-SITE)

Engineer's Statement

This report and plan for the drainage design of **Airport Spectrum Filing No. 1 (Off-Site) FDR Amendment** was prepared by me (or under my direct supervision) and is correct to the best of my knowledge and belief. Said report and plan has been prepared in accordance with the City of Colorado Springs Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

COLORADO LICENSED KYLE RAYE CAMPBELL 29794 PROFESSIONAL ENGINEER

SIGNATURE (Affix Seal): _____ 4/17/23

Kyle R. Campbell, Colorado P.E. No. 29794 Date:

Developer's Statement

Bert A. Getz Trust hereby certifies that the drainage facilities for **Airport Spectrum Filing No. 1 (Off-Site) FDR Amendment** shall be constructed according to the design presented in this report. I understand that the City of Colorado Springs does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that are submitted to the City of Colorado Springs pursuant to section 7.7.906 of the City Code; and cannot, on behalf of **Airport Spectrum Filing No. 1 (Off-Site) FDR Amendment**, guarantee that final drainage design review will absolve **Bert A. Getz Trust** and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Bert A. Getz Trust
Name of Developer

_____ 4/17/23
Authorized Signature Date

Michael J. Olsen
Printed Name

Treasurer of Trustee
Title

6730 N. Scottsdale Rd, #250 Paradise Valley, AZ 85253
Address:

City of Colorado Springs Statement:

Filed in accordance with Section 7.7.906 of the Code of the City of Colorado Springs, 2001, as amended.

_____ Hao Vo 06/01/2023

For City Engineer Date

Conditions:

CLASSIC CONSULTING ENGINEERS & SURVEYORS

Design Point 1 (Q_5 = 4.8 cfs, Q_{100} = 9.0 cfs) is the runoff from Basin A3, 1.17 acres of planned commercial development directly south of Milton Proby Pkwy. A future storm system will intercept the entirety of this runoff and route to the proposed pipe stub (Private Pipe 1, 24" RCP). A separate drainage report (by others) will detail the site-specific Private storm system for this basin and development within.

Design Point 2 (Q_5 = 4.9 cfs, Q_{100} = 9.0 cfs) is the runoff from Basin A2, 1.18 acres of planned commercial development directly south of Milton Proby Pkwy. A future storm system will intercept the entirety of this runoff and route to the proposed pipe stub (Private Pipe 2, 24" RCP). A separate drainage report (by others) will detail the site-specific Private storm system for this basin and development within. Pipe 3 (Private 30" RCP, Q_5 = 9.7 cfs, Q_{100} = 18.0 cfs) conveys the combined runoff from Pipes 1 & 2 to the south directly into the proposed permanent full spectrum detention and water quality facility (Design Point 6). A concrete impact structure will be installed at the entry point of this 30" RCP into the detention facility.

Design Point 3 (Q_5 = 15.0 cfs, Q_{100} = 27.6 cfs) is the runoff from Basin EX-A and Basin A1. Basin EX-A (Q_5 = 6.9 cfs, Q_{100} = 12.4 cfs) is 1.51 acres of existing Powers Blvd. and Milton Proby Parkway that drains into the Airport Spectrum development (Basin A1). Basin A1 (Q_5 = 8.1 cfs, Q_{100} = 15.2 cfs) is 2.02 acres of Lot 1 Airport Spectrum Filing No. 1 (Kum & Go). This runoff is collected in a private onsite storm system within Basin A1 (Kum & Go Development) and connects to the existing storm stub out of the existing 15' CDOT Type R At-Grade inlet at this DP-3 location. See previously approved final drainage report for additional discussion of runoff to this location. Pipe 4 (Existing 24" RCP, Q_5 = 15.0 cfs, Q_{100} = 27.6 cfs) conveys the runoff south to a proposed manhole combining with Pipe 5 prior to draining directly into the permanent pond. Per the previously approved report, this runoff drained into the temporary detention/water quality facility located just south of Design Point 3. The developer proposes to remove this temporary facility and associated storm infrastructure (inlet pipe, outlet pipe, riprap rundown and spillway) and install a permanent facility at Design Point 6.

Design Point 4 (Q_5 = 3.8 cfs, Q_{100} = 6.8 cfs) is the runoff from Basin A4, 0.82 acres of existing Spectrum Air Way (Public R.O.W.) that drains south from the Milton Proby Pkwy. connection point and off the edge of the existing pavement. A proposed Type C grated inlet will be placed south of the roadway to intercept the entirety of this runoff. A proposed 18" RCP (Private) will convey the collected runoff to the junction manhole with Pipe 4. Proposed Private Pipe 6 (30" RCP, Q_5 = 18.8 cfs, Q_{100} = 34.4 cfs) will convey the combined runoff from this manhole to the south directly into the permanent detention facility (Design Point 6). A concrete impact structure will be installed at the entry point of this 42" RCP into the detention facility.

With the extension of Spectrum Air Way (public 70' ROW), at grade inlets shall be installed to intercept this DP-4 runoff and continue to drain to the proposed permanent pond. Alternatively, the runoff may continue to a future detention/water quality basin as desired by future development.

Design Point 5 (Q_5 = 5.1 cfs, Q_{100} = 17.7 cfs) contains the runoff from Basin EX-C and Basin B. Basin EX-C (Q_5 = 4.3 cfs, Q_{100} = 11.3 cfs) is 3.28 acres of existing Powers Blvd. and off-site tributary area that drains into the existing roadside ditch and to Basin B. Basin B (Q_5 = 0.9 cfs, Q_{100} = 6.5 cfs) is 2.72 acres of undeveloped land adjacent to Powers Blvd. that is to be dedicated to the City of Colorado Springs for Powers Blvd. Right-of-way. This area currently drains directly onto the Airport Spectrum developable area and into the proposed permanent detention/water quality facility. Future Developed runoff from Basin B is not anticipated to drain into the proposed facility (only the undeveloped runoff). The combined runoff from existing Powers Blvd. (Basin EX-C) and Basin B, drains to the east and into Basin C to Design Point 6.

Design Point 6 (Q_5 = 27.7 cfs, Q_{100} = 60.6 cfs) is the total developed runoff into the proposed Permanent Full Spectrum Detention and Water Quality Facility. This consists of runoff from Pipes 3 & 6, Design Point 5, and Basin C. Basin C (Q_5 = 2.9 cfs, Q_{100} = 7.9 cfs) is 1.69 acres of the detention pond and surrounding tributary area. The area of Basin C, outside of the proposed pond, was calculated as undeveloped. Development of this area, or any other tributary area not specified with this report, will require separate detention and water quality or modifications and new calculations of the proposed facility. This facility could serve as the Green Infrastructure (PIA) requirements for the upstream tributary area.

This permanent facility is a PRIVATE, Full Spectrum Extended Detention Basin per the City of Colorado Springs and Mile High Flood District (MHFD formally Urban Drainage/UDFCD). This pond replaces the temporary pond approved and installed with the Airport Spectrum Subdivision Filing No. 1 Final Drainage Report. The facility sizing spreadsheet is located in the appendix of this report. A total of 14.39 acres of developed Airport Spectrum tributary area, undeveloped adjacent land, and surrounding arterial roadways is to drain to this facility, with a composite impervious value of 51.6%. The composite impervious value was determined using the Site-Level Low Impact Development (LID) Design Effective Impervious Calculator (IRF Form) located in the Appendix of this report. Per the UD-BMP spreadsheet, an Excess Urban Runoff Volume (EURV) of 0.864 acre-feet is required; this volume is provided under the top of outlet box opening (within the orifice plate of the outlet box, elevation 5924.25, 0.879 acre-feet EURV provided). See Pond Volume Calculations in Appendix of this report. The proposed EDB will include concrete impact structures & forebays at all incoming pipe

locations (Pipes 3 & 6). A 7.0' wide concrete trickle channel at 0.50% minimum grade will drain to the 2.5' deep micropool in front of the 4' x 4' outlet box and 18" outlet pipe (Pipe 7). Sizing has been completed for each proposed forebay per the MHFD sizing spreadsheets located in the Appendix of this report Amendment.

Per the City of Colorado Springs Drainage Criteria Manual Vol. 1, Chapter 6, Table 6-2, 1-hour rainfall depths were used in the UD-Detention workbook and outlet drain time calculations. These values are: 2-year = 1.19", 5-year = 1.50", 10-year = 1.75", 25-year = 2.00", 50-year = 2.25", and 100-year = 2.52". The bottom of the detention basin (lowest orifice hole) is at an elevation of 5919.00 with the EURV provided at the elevation 5924.23. A 4' wide outlet box (4' deep opening) is proposed with a top of box at elevation 5924.25. For a Full Spectrum facility, the outlet box orifice hole within the front plate is to drain the EURV is less than 72 hours. Per the latest MHFD-Detention version 4.05 spreadsheet from Mile High Flood District (Urban Drainage) a total of (3) orifice holes are to be installed in the front of the orifice plat of the outlet box with a lower orifice hole of 1" x 1", a middle orifice of 2" x 1.5", and an upper orifice of 2" x 2.5". This orifice hole sizing and overall pond outlet design meet all the required drain times for various storm events on the MH-Detention workbook located in the Appendix of this report. A 2.5' deep concrete bottom micropool is to be installed within the wing walls of the outlet structure, with a surface area of 235 square feet (min. required is 10 square feet). An initial surcharge depth of 4" will be provided within the micropool structure. A removable trash screen of 12" in width will be placed in front of the orifice plate to help prevent the orifice holes from clogging.

A proposed Private 18" RCP outlet (Pipe 7) will convey the detained release (Q_5 = 0.4 cfs, Q_{100}= 9.2 cfs, 100-yr water surface elevation of 5925.45, into the adjacent Windmill Gulch drainage channel and just outside of the effective 100-yr FEMA floodplain. A 4' wide x 7' long riprap pad (D50 = 6", Depth = 1.0' min.) will be installed at the exit point of this 18" pipe (sizing calculation included in the Appendix). A 15' length riprap (Type M, D50 = 12", Depth = 2.0' min.) emergency overflow spillway located at elevation 5926.00 will pass the entire 100-year storm event (62.0 cfs) into the downstream Windmill Gulch at a flood depth of less than 1.0' in case of complete outlet pipe failure. The proposed 12' wide top of berm elevation is at 5929.00, allowing for over 1.0' of freeboard of the emergency spillway flow elevation. A 11' wide maintenance access road at 15% maximum grade will be installed to the bottom of the facility and to each concrete structure. The emergency overflow path for this private facility is to overtop the spillway to the west and drain over the future Spectrum Air Way roadway extension and directly into exiting Windmill Gulch.

This facility adequately treats all 14.39 acres of existing, proposed, and future tributary development for storm water quality and detains the release to below historic rates. Per the Cod of Colorado Regulations 4.2.5.1 a Jurisdictional Size Dam height is measured, either from the invert of the outlet pipe at the longitudinal centerline of the embankment (spillway elevation = 5926.00 & 18" invert directly below is 5917.88, 8.12') or the spillway elevation compared to the existing ground at the centerline (spillway elevation = 5926.00 & existing ground 5921.98, 4.02'). A dam height of 10' or below is not considered a 'Jurisdictional' facility with the State of Colorado. Therefore, this is a non-jurisdictional size dam and additional documentation and coordination with the State Engineer, beyond the typical non-jurisdictional form, is not required for the proposed facility. Maintenance of this Private detention facility will be by the Business Owners Association.

Design Point 7 (Q_5 = 1.0 cfs, Q_{100} = 13.3 cfs) is the runoff from the proposed development and tributary areas that drains directly into the existing Windmill Gulch channel to the west of the site. Specifically, this runoff is from Pipe 7 (Pond outfall pipe) and from Basin F (Q_5 = 0.8 cfs, Q_{100} = 5.7 cfs), 1.87 acres of undeveloped land and adjacent slope area that drains directly west into the Windmill Gulch corridor. This runoff amount is less than in the Existing Conditions due to the installation of the permanent full spectrum detention facility and limited release rate. All developed runoff is treated via the detention/water quality facility and thus the proposed development does not hinder runoff within and downstream of Windmill Gulch and the Fountain Creek tributaries. All construction and proposed grading are outside of the effective FEMA 100-year floodplain limits; therefore, no additional permitting is required.

FLOODPLAIN STATEMENT

No portion of this site is located within a floodplain as determined by the Flood Insurance Rate Maps (F.I.R.M.) Map Number 08041C 0763G effective date, December 7, 2018 (See Appendix).

DRAINAGE CRITERIA

Hydrologic calculations were performed using the City of Colorado Springs/El Paso County Drainage Criteria Manual, revised January 2021. Stormwater quality analysis and Extended Detention Basin (EDB) design for the proposed Pond are per the Mile High Flood District (previously the Urban Drainage and Flood Control District) Manual and MHFD-Detention v4.05 & UD-BMP v3.05 spreadsheets. The Rational Method was used to estimate stormwater runoff to the proposed storm system and detention facility. The UDFCD UD-Inlet workbook was used to verify the one proposed Type C inlet with this report. Hydraulic Grade Lines (HGLs) for minor and major storm events are provided for the proposed storm sewer system using UD-Sewer (See Appendix of this report). MHFD-Detention v4.05 spreadsheet was used to size the orifice plate holes and outlet box and pipe with acceptable drain

times for all storm events. Erosion protection at the exit of the pond outfall pipe was sized using the MH-Culvert and is included in the Appendix.

Green Infrastructure (GI) requirements are not required with this Final Drainage Report as the purpose is to replace a temporary full spectrum detention facility with a permanent one. Upstream tributary development to this facility is required to provide GI requirements per City criteria.

STORMWATER QUALITY

The City of Colorado Springs requires the Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainage ways, and implementing long-term source controls. The Four Step Process pertains to management of smaller, frequently occurring storm events, as opposed to larger storms for which drainage and flood control infrastructure are sized. Implementation of these four steps to achieve stormwater permit requirements is required. The site adheres to this Four Step Process as follows:

1. All developed runoff from the tributary area will be collected in the future and proposed private storm system and routed to the proposed private full spectrum detention and water quality facility. Portions of the surrounding and internal sidewalks will be directed onto pervious landscape areas prior to be collected by the various area drains and grated inlets. Draining onto landscape areas provides the following: 1) Minimize directly impervious areas. 2) Provides initial pollutant and sediment removal before entering the storm system.

2. The downstream pond provides Full Spectrum Detention and Stormwater Quality Treatment. The facility will address all required Water Quality Capture Volume and Slow Release Requirements. Total Disturbed Area (including off-site basins) = 14.92 acres with 14.39 acres (96.4%) to the proposed Pond. Only 0.53 acres (3.6%) of disturbed area (open space area only) drains directly to downstream facilities.

3. The ultimate recipient of the drainage flows from the site is Windmill Gulch to the west via the downstream facility's pipe outfall. The downstream corridor is very well established with vegetation, and an approved D.B.P.S. stating minimum improvements are required within Windmill Gulch. All new and re-development projects are required to construct or participate in the funding of channel stabilization measures. Drainage Basin Fees paid, at the time of platting, go towards channel stabilization within the drainage basin. See Section A-A in appendix and on Drainage Map that shows

a stabilized natural downstream area from the proposed facility. Existing Windmill Gulch is 400' downstream of the Pond pipe outlet and has adequate stabilization.

4. A site-specific stormwater quality and erosion control plan and narrative will be submitted and approved by City Engineering prior to any disturbance within the project area. Details such as site-specific source Construction Control Measures (CCMs) as well as any permanent CCMs, will be detailed in this plan and narrative to protect receiving waters. Such CCMs include temporary sediment basins, inlet protection, silt fence, vehicle tracking control, and concrete washout areas. Post construction source control will be comprised of user spill containment protocols used at all of their facilities. All new and re-development that includes outdoor storage or the potential for the introduction of contaminants to the City's MS4 shall be required to implement site specific and/or source control measures to protect receiving waters.

CONSTRUCTION COST OPINION (Private Storm Sewer)

Private Drainage Facilities Non-reimbursable

ITEM	DESCRIPTION	QUANTITY	UNIT COST	COST
1.	CDOT Type C Inlet	1 EACH	$4,500/EA	$ 4,500.00
2.	Type II Storm Manhole	2 EACH	$5,300/EA	$ 10,600.00
3.	18" RCP Storm Drain	243 LF	$55/LF	$ 13,365.00
4.	24" RCP Storm Drain	103 LF	$70/LF	$ 7,210.00
5.	30" RCP Storm Drain	62 LF	$95/LF	$ 5,890.00
SUB-TOTAL				$ 41,565.00
10% ENGINEERING				$ 4,156.50
5% CONTINGENCIES				$ 2,078.25
TOTAL				**$ 47,799.75**

Private Drainage Facilities Non-reimbursable (FULL SPECTRUM POND)

ITEM	DESCRIPTION	QUANTITY	UNIT COST	COST
1.	30" Impact Structure	2 EACH	$35,000/EA	$ 70,000.00
2.	Trickle Channel	130 LF	$79/LF	$ 10,270.00
3.	Riprap Spillway	120 CY	$47.85/CY	$ 5,742.00
4.	Outlet Box (4' x 4')	1 EACH	$35,000/EA	$ 35,000.00
SUB-TOTAL				$ 121,012.00
10% ENGINEERING				$ 12,101.20
5% CONTINGENCIES				$ 6,050.60
TOTAL				**$ 139,163.80**

JOB NAME: *Airport Spectrum Subdivision Filing No. 1 - PERMANENT POND*
JOB NUMBER: *2429.10*
DATE: *07/01/22*
CALCULATED BY: *MAL*

FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY (PROPOSED CONDITIONS)

BASIN	TOTAL AREA (AC)	IMPERVIOUS AREA / STREETS			LOTS/LANDSCAPE/UNDEV. AREAS (NOT PAVEMENT)			WEIGHTED		WEIGHTED CA	
		AREA (AC)	C(5)	C(100)	AREA (AC)	C(5)	C(100)	C(5)	C(100)	**CA(5)**	**CA(100)**
EX-A	1.51	1.47	0.90	0.96	0.04	0.08	0.35	0.88	0.94	**1.33**	**1.43**
EX-C	3.28	1.08	0.90	0.96	2.20	0.08	0.35	0.35	0.55	**1.15**	**1.81**
A1	2.02	1.72	0.90	0.96	0.30	0.08	0.35	0.78	0.87	**1.57**	**1.76**
A2	1.18	1.03	0.90	0.96	0.15	0.08	0.35	0.80	0.88	**0.94**	**1.04**
A3	1.17	1.02	0.90	0.96	0.15	0.08	0.35	0.79	0.88	**0.93**	**1.03**
A4	0.82	0.82	0.90	0.96	0.00	0.08	0.35	0.90	0.96	**0.74**	**0.79**
B	2.72	0.00	0.90	0.96	2.72	0.08	0.35	0.08	0.35	**0.22**	**0.95**
C	1.69	0.52	0.90	0.96	1.17	0.08	0.35	0.33	0.54	**0.56**	**0.91**
F	1.87	0.00	0.90	0.96	1.87	0.08	0.35	0.08	0.35	**0.15**	**0.65**

JOB NAME *Airport Spectrum Subdivision Filing No. 1 - PERMANENT POND*
JOB NUME *2429.10*
DATE: *7/1/2022*
CALCULAT *MAL*

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY (PROPOSED CONDITIONS)

BASIN	WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				Tc	INTENSITY		TOTAL FLOWS	
	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	TOTAL (min)	I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)
EX-A	1.33	1.43	0.90	10	1	0.5	750	2.5%	5.5	2.3	5.0	5.17	8.68	**6.9**	**12.4**
EX-C	1.15	1.81	0.08	150	10	12.1	390	3.0%	6.1	1.1	13.1	3.72	6.25	**4.3**	**11.3**
A1	1.57	1.76	0.90	10	1	0.5	300	5.0%	7.8	0.6	5.0	5.17	8.68	**8.1**	**15.2**
A2	0.94	1.04	0.90	10	1	0.5	260	4.0%	7.0	0.6	5.0	5.17	8.68	**4.9**	**9.0**
A3	0.93	1.03	0.90	10	1	0.5	260	4.0%	7.0	0.6	5.0	5.17	8.68	**4.8**	**9.0**
A4	0.74	0.79	0.90	10	1	0.5	300	5.0%	7.8	0.6	5.0	5.17	8.68	**3.8**	**6.8**
B	0.22	0.95	0.08	80	4	9.7	290	4.1%	7.1	0.7	10.4	4.08	6.84	**0.9**	**6.5**
C	0.56	0.91	0.90	10	1	0.5	340	4.0%	7.0	0.8	5.0	5.17	8.68	**2.9**	**7.9**
F	0.15	0.65	0.08	50	18	4.0	70	3.0%	6.1	0.2	5.0	5.17	8.68	**0.8**	**5.7**

JOB NAME: *Airport Spectrum Subdivision Filing No. 1 - PERMANENT POND*
JOB NUMBER: *2429.10*
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FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY - PROPOSED CONDITIONS

Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Inlet Size
					I(5)	I(100)	Q(5)	Q(100)	
1	BASIN A3	0.93	1.03	5.0	5.17	8.68	4.8	9.0	FUTURE STORM
2	BASIN A2	0.94	1.04	5.0	5.17	8.68	4.9	9.0	FUTURE STORM
3	BASIN EX-A + BASIN A1	2.90	3.18	5.0	5.17	8.68	15.0	27.6	EX. 15' AT-GRADE
4	BASIN A4	0.74	0.79	5.0	5.17	8.68	3.8	6.8	TYPE C INLET
5	BASIN EX-C + BASIN B	1.37	2.76	13.1	3.72	6.25	5.1	17.2	SURFACE
6	BASIN C + DP-5 + PIPE 3 + PIPE 6	7.43	9.71	13.1	3.72	6.25	27.7	60.6	PROP. POND
7	POND OUTFALL + BASIN F	0.26	2.12	13.1	3.72	6.25	1.0	13.3	TO EX. CHANNEL

JOB NAME: *Airport Spectrum Subdivision Filing No. 1 - PERMANENT POND*
JOB NUMBER: *2429.10*
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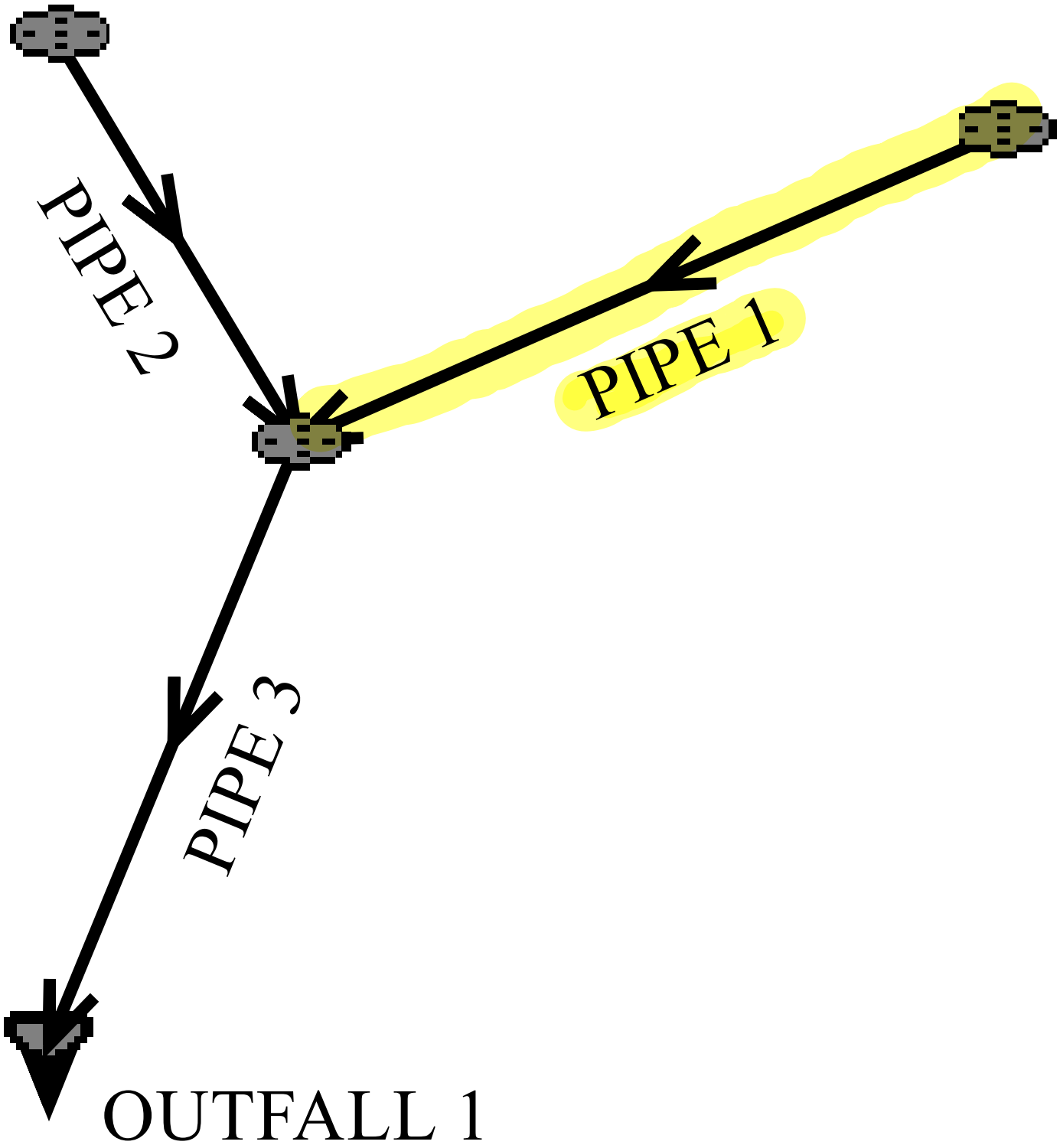
* PIPES ARE LISTED AT MAXIMUM SIZE REQUIRED TO ACCOMMODATE Q100 FLOWS AT MINIMUM GRADE.
REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.

FINAL DRAINAGE REPORT ~ PIPE ROUTING SUMMARY

Pipe Run	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Pipe Size*
					I(5)	I(100)	Q(5)	Q(100)	
1	DP-1	0.93	1.03	5.0	5.17	8.68	4.8	9.0	24" RCP
2	DP-2	0.94	1.04	5.0	5.17	8.68	4.9	9.0	24" RCP
3	PIPE 1 + PIPE 2	1.87	2.07	5.0	5.17	8.68	9.7	18.0	30" RCP
4	DP-3	2.90	3.18	5.0	5.17	8.68	15.0	27.6	EX. 24" RCP
5	DP-4	0.74	0.79	5.0	5.17	8.68	3.8	6.8	18" RCP
6	PIPE 4 + PIPE 5	3.64	3.97	5.0	5.17	8.68	18.8	34.4	30" RCP
7	POND OUTFALL	0.11	1.47	13.1	3.72	6.25	0.4	9.2	18" RCP


PIPE 2
PIPE 1
PIPE 3
OUTFALL 1

System Input Summary 100-YR HGLS PIPES 1, 2, & 3

Rainfall Parameters

Rainfall Return Period: 100
Rainfall Calculation Method: Formula

One Hour Depth (in):
Rainfall Constant "A": 28.5
Rainfall Constant "B": 10
Rainfall Constant "C": 0.786

Rational Method Constraints

Minimum Urban Runoff Coeff.: 0.20
Maximum Rural Overland Len. (ft): 500
Maximum Urban Overland Len. (ft): 300
Used UDFCD Tc. Maximum: Yes

Sizer Constraints

Minimum Sewer Size (in): 18.00
Maximum Depth to Rise Ratio: 0.90
Maximum Flow Velocity (fps): 18.0
Minimum Flow Velocity (fps): 2.0

Backwater Calculations:

Tailwater Elevation (ft): 0.00

Manhole Input Summary:

		Given Flow		Sub Basin Information						
Element Name	Ground Elevation (ft)	Total Known Flow (cfs)	Local Contribution (cfs)	Drainage Area (Ac.)	Runoff Coefficient	5yr Coefficient	Overland Length (ft)	Overland Slope (%)	Gutter Length (ft)	Gutter Velocity (fps)
OUTFALL 1	5920.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPE 3	5932.03	18.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPE 2	5940.00	9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPE 1	5939.00	9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Manhole Output Summary:

	Local Contribution					Total Design Flow				
Element Name	Overland Time (min)	Gutter Time (min)	Basin Tc (min)	Intensity (in/hr)	Local Contrib (cfs)	Coeff. Area	Intensity (in/hr)	Manhole Tc (min)	Peak Flow (cfs)	Comment
OUTFALL 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PIPE 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.00	Surface Water Present (Downstream)
PIPE 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00	
PIPE 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00	

Sewer Input Summary:

		Elevation			Loss Coefficients			Given Dimensions		
Element Name	Sewer Length (ft)	Downstream Invert (ft)	Slope (%)	Upstream Invert (ft)	Mannings n	Bend Loss	Lateral Loss	Cross Section	Rise (ft or in)	Span (ft or in)
PIPE 3	26.79	5921.25	1.0	5921.52	0.013	0.03	1.00	CIRCULAR	30.00 in	30.00 in
PIPE 2	39.65	5922.02	8.0	5925.19	0.013	0.38	0.00	CIRCULAR	24.00 in	24.00 in
PIPE 1	63.17	5922.02	8.0	5927.07	0.013	0.38	0.44	CIRCULAR	24.00 in	24.00 in

---

Sewer Flow Summary:

	Full Flow Capacity		Critical Flow		Normal Flow						
Element Name	Flow (cfs)	Velocity (fps)	Depth (in)	Velocity (fps)	Depth (in)	Velocity (fps)	Froude Number	Flow Condition	Flow (cfs)	Surcharged Length (ft)	Comment
PIPE 3	41.29	8.41	17.24	6.17	13.85	8.12	1.52	Supercritical	18.00	0.00	
PIPE 2	64.14	20.42	12.85	5.26	6.07	14.40	4.23	Supercritical	9.00	0.00	
PIPE 1	64.13	20.41	12.85	5.26	6.07	14.40	4.23	Supercritical	9.00	0.00	

- A Froude number of 0 indicates that pressured flow occurs (adverse slope or undersized pipe).
- If the sewer is not pressurized, full flow represents the maximum gravity flow in the sewer.
- If the sewer is pressurized, full flow represents the pressurized flow conditions.

Sewer Sizing Summary:

			Existing		Calculated		Used			
Element Name	Peak Flow (cfs)	Cross Section	Rise	Span	Rise	Span	Rise	Span	Area (ft^2)	Comment
PIPE 3	18.00	CIRCULAR	30.00 in	30.00 in	24.00 in	24.00 in	30.00 in	30.00 in	4.91	
PIPE 2	9.00	CIRCULAR	24.00 in	24.00 in	18.00 in	18.00 in	24.00 in	24.00 in	3.14	
PIPE 1	9.00	CIRCULAR	24.00 in	24.00 in	18.00 in	18.00 in	24.00 in	24.00 in	3.14	

- Calculated diameter was determined by sewer hydraulic capacity rounded up to the nearest commercially available size.
- Sewer sizes should not decrease downstream.
- All hydraulics where calculated using the 'Used' parameters.

Grade Line Summary:

Tailwater Elevation (ft): 0.00

	Invert Elev.		Downstream Manhole Losses		HGL		EGL		
Element Name	Downstream (ft)	Upstream (ft)	Bend Loss (ft)	Lateral Loss (ft)	Downstream (ft)	Upstream (ft)	Downstream (ft)	Friction Loss (ft)	Upstream (ft)
PIPE 3	5921.25	5921.52	0.00	0.00	5922.40	5922.96	5923.43	0.12	5923.55
PIPE 2	5922.02	5925.19	0.05	0.00	5923.01	5926.26	5925.75	0.94	5926.69
PIPE 1	5922.02	5927.07	0.05	0.15	5923.16	5928.14	5925.75	2.82	5928.57

- Six inches for pipes less than 60 inches.
- Eight inches for all larger sizes.

System Input Summary 5-YR HGLS PIPES 1, 2, & 3

Rainfall Parameters

Rainfall Return Period: 5
Rainfall Calculation Method: Formula

One Hour Depth (in):
Rainfall Constant "A": 28.5
Rainfall Constant "B": 10
Rainfall Constant "C": 0.786

Rational Method Constraints

Minimum Urban Runoff Coeff.: 0.20
Maximum Rural Overland Len. (ft): 500
Maximum Urban Overland Len. (ft): 300
Used UDFCD Tc. Maximum: Yes

Sizer Constraints

Minimum Sewer Size (in): 18.00
Maximum Depth to Rise Ratio: 0.90
Maximum Flow Velocity (fps): 18.0
Minimum Flow Velocity (fps): 2.0

Backwater Calculations:

Tailwater Elevation (ft): 0.00

Manhole Input Summary:

		Given Flow		Sub Basin Information						
Element Name	**Ground Elevation (ft)**	**Total Known Flow (cfs)**	**Local Contribution (cfs)**	**Drainage Area (Ac.)**	**Runoff Coefficient**	**5yr Coefficient**	**Overland Length (ft)**	**Overland Slope (%)**	**Gutter Length (ft)**	**Gutter Velocity (fps)**
OUTFALL 1	5920.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPE 3	5932.03	9.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPE 2	5940.00	4.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPE 1	5939.00	4.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Manhole Output Summary:

	Local Contribution	Total Design Flow	

Element Name	Overland Time (min)	Gutter Time (min)	Basin Tc (min)	Intensity (in/hr)	Local Contrib (cfs)	Coeff. Area	Intensity (in/hr)	Manhole Tc (min)	Peak Flow (cfs)	Comment
OUTFALL 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PIPE 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.70	Surface Water Present (Downstream)
PIPE 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.90	
PIPE 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.80	

Sewer Input Summary:

		Elevation			Loss Coefficients			Given Dimensions		
Element Name	Sewer Length (ft)	Downstream Invert (ft)	Slope (%)	Upstream Invert (ft)	Mannings n	Bend Loss	Lateral Loss	Cross Section	Rise (ft or in)	Span (ft or in)
PIPE 3	26.79	5921.25	1.0	5921.52	0.013	0.03	1.00	CIRCULAR	30.00 in	30.00 in
PIPE 2	39.65	5922.02	8.0	5925.19	0.013	0.38	0.00	CIRCULAR	24.00 in	24.00 in
PIPE 1	63.17	5922.02	8.0	5927.07	0.013	0.38	0.44	CIRCULAR	24.00 in	24.00 in

Sewer Flow Summary:

	Full Flow Capacity		Critical Flow		Normal Flow						
Element Name	Flow (cfs)	Velocity (fps)	Depth (in)	Velocity (fps)	Depth (in)	Velocity (fps)	Froude Number	Flow Condition	Flow (cfs)	Surcharged Length (ft)	Comment

PIPE 3	41.29	8.41	12.48	5.02	9.89	6.87	1.56	Supercritical	9.70	0.00	
PIPE 2	64.14	20.42	9.35	4.32	4.49	12.06	4.17	Supercritical	4.90	0.00	
PIPE 1	64.13	20.41	9.25	4.30	4.44	11.99	4.16	Supercritical	4.80	0.00	

- A Froude number of 0 indicates that pressured flow occurs (adverse slope or undersized pipe).
- If the sewer is not pressurized, full flow represents the maximum gravity flow in the sewer.
- If the sewer is pressurized, full flow represents the pressurized flow conditions.

Sewer Sizing Summary:

			Existing		Calculated		Used			
Element Name	**Peak Flow (cfs)**	**Cross Section**	**Rise**	**Span**	**Rise**	**Span**	**Rise**	**Span**	**Area (ft^2)**	**Comment**
PIPE 3	9.70	CIRCULAR	30.00 in	30.00 in	18.00 in	18.00 in	30.00 in	30.00 in	4.91	
PIPE 2	4.90	CIRCULAR	24.00 in	24.00 in	18.00 in	18.00 in	24.00 in	24.00 in	3.14	
PIPE 1	4.80	CIRCULAR	24.00 in	24.00 in	18.00 in	18.00 in	24.00 in	24.00 in	3.14	

- Calculated diameter was determined by sewer hydraulic capacity rounded up to the nearest commercially available size.
- Sewer sizes should not decrease downstream.
- All hydraulics where calculated using the 'Used' parameters.

Grade Line Summary:

Tailwater Elevation (ft): 0.00

	Invert Elev.		Downstream Manhole Losses		HGL		EGL		
Element Name	Downstream (ft)	Upstream (ft)	Bend Loss (ft)	Lateral Loss (ft)	Downstream (ft)	Upstream (ft)	Downstream (ft)	Friction Loss (ft)	Upstream (ft)
PIPE 3	5921.25	5921.52	0.00	0.00	5922.07	5922.56	5922.81	0.14	5922.95
PIPE 2	5922.02	5925.19	0.01	0.00	5922.57	5925.97	5924.65	1.61	5926.26
PIPE 1	5922.02	5927.07	0.01	0.04	5922.62	5927.84	5924.62	3.51	5928.13

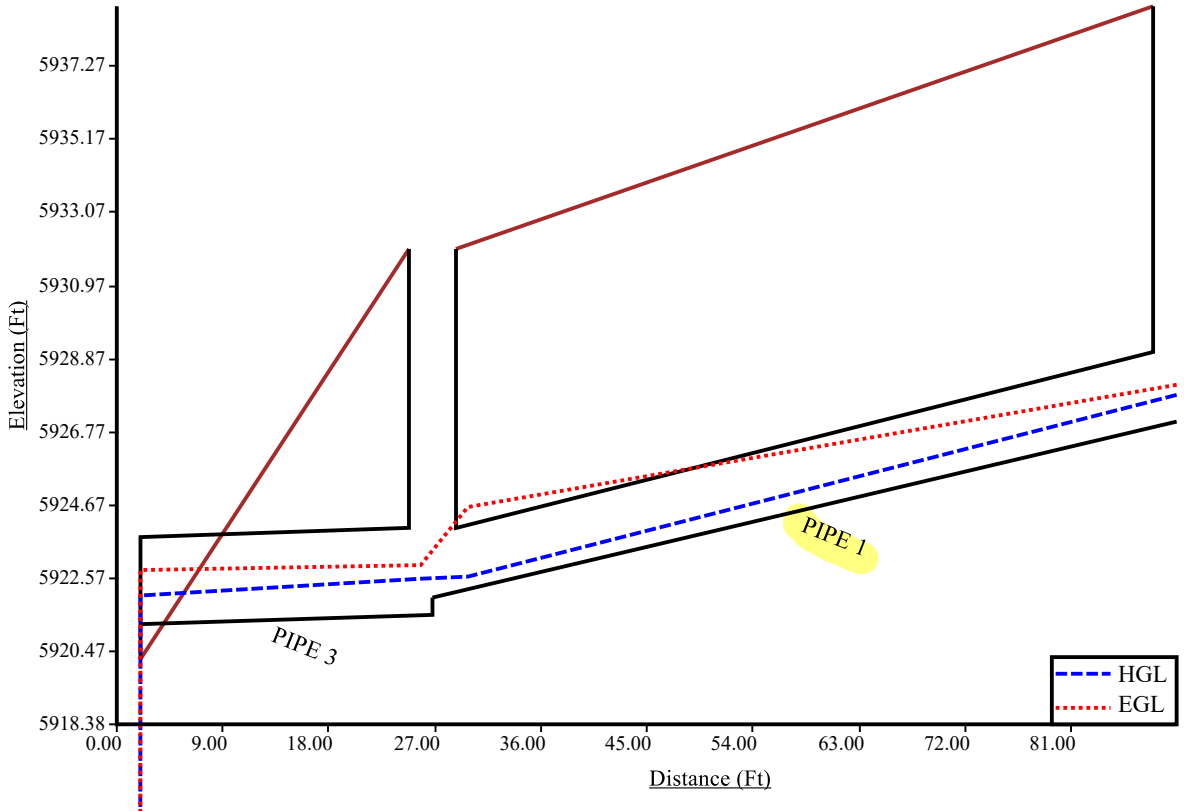
- Bend and Lateral losses only apply when there is an outgoing sewer. The system outfall, sewer #0, is not considered a sewer.
- Bend loss = Bend K * V_fi ^ 2/(2*g)
- Lateral loss = V_fo ^ 2/(2*g)- Junction Loss K * V_fi ^ 2/(2*g).
- Friction loss is always Upstream EGL - Downstream EGL.

Excavation Estimate:

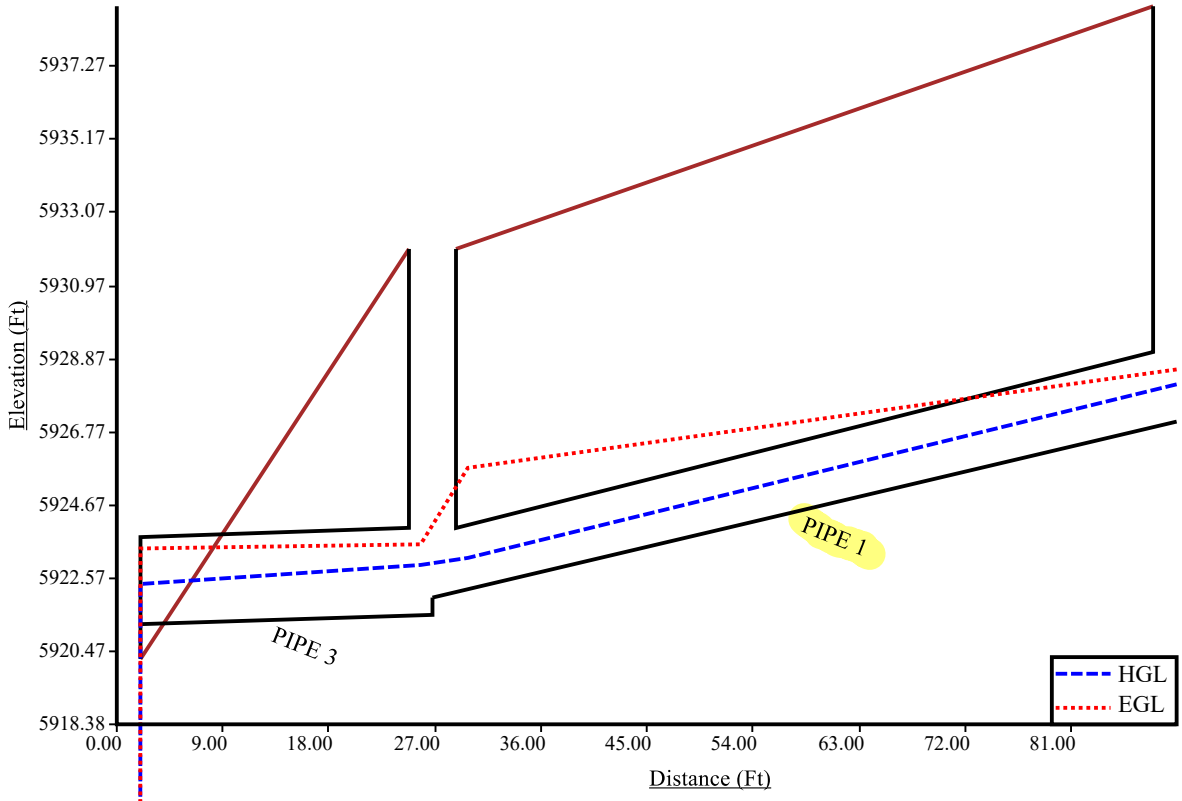
The trench side slope is 1.0 ft/ft
The minimum trench width is 2.00 ft

					Downstream			Upstream				
Element Name	Length (ft)	Wall (in)	Bedding (in)	Bottom Width (ft)	Top Width (ft)	Trench Depth (ft)	Cover (ft)	Top Width (ft)	Trench Depth (ft)	Cover (ft)	Volume (cu. yd)	Comment
PIPE 3	26.79	3.50	6.00	6.08	0.00	0.00	0.00	19.52	11.30	7.72	56.50	Sewer Too Shallow

PIPE 3 - 1 - 5YR


5937.27
5935.17
5933.07
5930.97
5928.87
5926.77
5924.67
5922.57
5920.47
5918.38
Elevation (Ft)
0.00
9.00
18.00
27.00
36.00
45.00
54.00
63.00
72.00
81.00
Distance (Ft)
PIPE 3
PIPE 1
HGL
EGL

PIPE 3 - 1 - 100YR

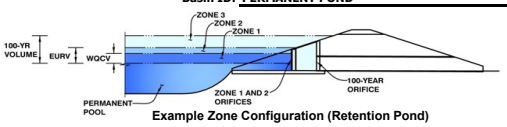


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: **Airport Spectrum Sub. Fil. 1**

Basin ID: **PERMANENT POND**



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	14.39	acres
Watershed Length =	792	ft
Watershed Length to Centroid =	520	ft
Watershed Slope =	0.043	ft/ft
Watershed Imperviousness =	51.60%	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	

0 elevation (top of micropool = 5919.0'

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) =	0.253	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.864	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.618	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.820	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 1.75 in.) =	0.982	acre-feet	1.75 inches
25-yr Runoff Volume (P1 = 2 in.) =	1.231	acre-feet	2.00 inches
50-yr Runoff Volume (P1 = 2.25 in.) =	1.474	acre-feet	2.25 inches
100-yr Runoff Volume (P1 = 2.52 in.) =	1.782	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 3.1 in.) =	2.405	acre-feet	3.10 inches
Approximate 2-yr Detention Volume =	0.556	acre-feet	
Approximate 5-yr Detention Volume =	0.732	acre-feet	
Approximate 10-yr Detention Volume =	0.891	acre-feet	
Approximate 25-yr Detention Volume =	1.088	acre-feet	
Approximate 50-yr Detention Volume =	1.213	acre-feet	
Approximate 100-yr Detention Volume =	1.361	acre-feet	

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.253	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.611	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.498	acre-feet
Total Detention Basin Volume =	1.361	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 = 0.25 ft

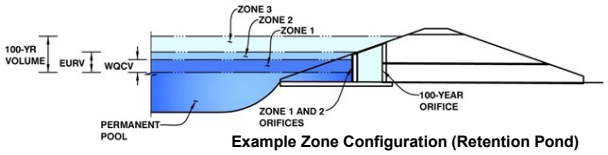
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	235	0.005		
	--	0.33	--	--	--	235	0.005	78	0.002
	--	1.00	--	--	--	2,214	0.051	898	0.021
	--	2.00	--	--	--	7,132	0.164	5,571	0.128
	--	3.00	--	--	--	9,348	0.215	13,811	0.317
	--	4.00	--	--	--	10,950	0.251	23,960	0.550
	--	5.00	--	--	--	12,745	0.293	35,807	0.822
	--	7.00	--	--	--	16,954	0.389	65,506	1.504
	--	9.00	--	--	--	21,672	0.498	104,132	2.391
	--	10.00	--	--	--	24,340	0.559	127,138	2.919

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **Airport Spectrum Sub. Fil. 1**

Basin ID: **PERMANENT POND**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.69	0.253	Orifice Plate
Zone 2 (EURV)	5.15	0.611	Orifice Plate
Zone 3 (100-year)	6.63	0.498	Weir&Pipe (Circular)
Total (all zones)		1.361	

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

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

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

			Calculated Parameters for Plate		
Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	5.25	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	20.60	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	sq. inches	Elliptical Slot Area =	N/A	ft^2

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.75	3.50					
Orifice Area (sq. inches)	1.00	3.00	5.00					

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

User Input: Vertical Orifice (Circular or Rectangular)

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

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

				Calculated Parameters for Overflow Weir		
	Zone 3 Weir	Not Selected		Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	5.25	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	6.25	N/A	feet
Overflow Weir Front Edge Length =	4.00	N/A	feet	Overflow Weir Slope Length =	4.12	N/A	feet
Overflow Weir Grate Slope =	4.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	6.50	N/A	
Horiz. Length of Weir Sides =	4.00	N/A	feet	Overflow Grate Open Area w/o Debris =	11.48	N/A	ft^2
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	5.74	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

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

				Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate		
	Zone 3 Circular	Not Selected		Zone 3 Circular	Not Selected	
Depth to Invert of Outlet Pipe =	0.25	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	1.77	N/A	ft^2
Circular Orifice Diameter =	18.00	N/A	inches	Outlet Orifice Centroid =	0.75	N/A	feet
				Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

			Calculated Parameters for Spillway		
Spillway Invert Stage=	7.00	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.75	feet
Spillway Crest Length =	15.00	feet	Stage at Top of Freeboard =	8.75	feet
Spillway End Slopes =	6.67	H:V	Basin Area at Top of Freeboard =	0.48	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	2.27	acre-ft

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

Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.10
CUHP Runoff Volume (acre-ft) =	0.253	0.864	0.618	0.820	0.982	1.231	1.474	1.782	2.405
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.618	0.820	0.982	1.231	1.474	1.782	2.405
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.2	0.3	0.4	3.7	7.2	11.7	20.0
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.02	0.03	0.26	0.50	0.81	1.39
Peak Inflow Q (cfs) =	N/A	N/A	11.6	15.4	18.2	24.5	30.0	37.8	51.1
Peak Outflow Q (cfs) =	0.2	0.5	0.4	0.4	0.5	2.1	4.4	9.2	18.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.4	1.3	0.6	0.6	0.8	0.9
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.0	0.1	0.3	0.8	1.5
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	44	64	61	64	66	65	63	60	55
Time to Drain 99% of Inflow Volume (hours) =	**47**	71	66	70	74	74	73	72	70
Maximum Ponding Depth (ft) =	2.70	5.15	4.09	4.79	5.30	5.72	6.03	6.45	7.02
Area at Maximum Ponding Depth (acres) =	0.20	0.30	0.26	0.28	0.31	0.33	0.34	0.36	0.39
Maximum Volume Stored (acre-ft) =	0.255	0.866	0.573	0.759	0.912	1.045	1.149	1.293	1.508

5-YEAR POND ELEVATION: 5919.0+4.79= 5924.79'
100-YEAR POND ELEVATION: 5919+6.45= 5925.45'

LEGEND

EXISTING GROUND CONTOUR (5500)
PROPOSED FINISHED CONTOUR 5500
SUBDIVISION BOUNDARY
LOT LINE
100-YR FLOODPLAIN LIMITS
BASIN IDENTIFIER / AREA IN ACRES D / 1.41
DESIGN POINT 1
PIPE RUN
PROPOSED BASIN BOUNDARY
DIRECTION OF DRAINAGE
EXISTING STORM SEWER
EXISTING STORM INLET
PROPOSED STORM SEWER
PROPOSED STORM INLET
LOW POINT/HIGH POINT LP/HP

N

60 30 0 60 120

SCALE: 1" = 60'

EXISTING SKY VIEW COMMUNITY PARK

EXISTING POWERS BOULEVARD

EXISTING PUBLIC GRATED INLETS W/ PUBLIC 36" RCP STORM

EXISTING PUBLIC 72" RCP STORM SEWER

EXISTING PUBLIC 24" RCP STORM SEWER

EXISTING PUBLIC TYPE 2 MANHOLE WITH PUBLIC 30" RCP STORM

EXISTING PUBLIC GRATED INLETS W/ PUBLIC 24" RCP STORM

EXISTING PUBLIC 10' TYPE R AT-GRADE INLET W/ PUBLIC 18" RCP STORM

EXISTING PUBLIC 10' X 5' RCB (BOX CULVERT)

EXISTING MILTON E PROBY PARKWAY

EXISTING PUBLIC 18" RCP W/OPEN END FES

EXISTING PUBLIC 18" RCP W/OPEN END FES

PUBLIC TYPE 2 STORM MANHOLE

REFERRED TO AS BASIN EX-C BY M&S CIVIL

EX-C 3.28

LOT 1 COLORADO SPRINGS AIRPORT & INDUSTRIAL PARK FILING NO. 1

EX-A 1.51

EXISTING MILTON E PROBY PARKWAY

PLANNED (IN PROGRESS) DEVELOPABLE AREA

SITE

A1 2.02

A4 0.82

A2 1.18

A3 1.17

LOT 1 AIRPORT SPECTRUM SUBDIVISION FILING NO. 1 (EXISTING KUM & GO)

LOT 5 COLORADO SPRINGS AIRPORT FILING NO. 1D

SPECTRUM AIR WAY

PRIVATE 12" HDPE STORM (EXISTING)

CONNECT EXISTING 24" RCP TO PROPOSED TYPE 2 MANHOLE

4:1 SIDE SLOPES (ALL SIDES OF POND)

7.0' WIDE TRICKLE CHANNEL W/6" CURB HEADS @ 0.50%

CLEAR VIEW ESTATES SUBDIVISION NO. 8

EXISTING PRIVATE 15' TYPE R AT-GRADE INLET W/ PRIVATE 24" RCP STORM

PROPOSED CONCRETE FOREBAY 'A' AND IMPACT STRUCTURE

BEGIN 11' ACCESS ROAD TO POND STRUCTURES

PRIVATE 24" RCP

PRIVATE TYPE 2 STORM MANHOLE

PRIVATE 30" RCP

PRIVATE 30" RCP

LAND TO BE DEDICATED TO CITY OF COLORADO SPRINGS FOR POWERS BLVD. R.O.W.

EXISTING FEMA FLOODPLAIN

PROPOSED PRIVATE TYPE C GRATED INLET W/ PRIVATE 18" RCP STORM

PROPOSED CONCRETE FOREBAY 'B' AND IMPACT STRUCTURE

4:1 SIDE SLOPES (ALL SIDES OF POND)

B 2.72

C 1.69

F 1.87

PROPOSED PRIVATE FULL SPECTRUM DETENTION AND WATER QUALITY POND

EXISTING 24" RCP INTO TEMPORARY POND TO BE REMOVED

EXISTING TEMPORARY POND TO BE REMOVED

4:1 SIDE SLOPES (ALL SIDES OF POND)

11' WIDE ACCESS ROAD TO POND STRUCTURES

PROPOSED PRIVATE 4' X 4' POND OUTLET BOX & PRIVATE 18" RCP STORM

PROPOSED 15' WIDE EMERGENCY SPILLWAY & RUNDOWN ~ TYPE 'M' RIPRAP W/TOPSOIL COVER

REFERRED TO AS BASIN OS4 BY M&S CIVIL

EXISTING TEMP. POND SPILLWAY & OUTLET PIPE TO BE REMOVED

FUTURE DEVELOPABLE AREA

WINDMILL GULCH

DOWNSTREAM SECTION A-A. VELOCITY IN 100-YR = 3.17 FT/S

PROPOSED CONCRETE IMPACT STRUCTURE & PRIVATE TYPE 'VL' D50 = 6" RIPRAP PAD, 9.7' WIDTH, 10.6' LENGTH, 1' DEPTH

LAND TO BE DEDICATED TO CITY OF COLORADO SPRINGS FOR POWERS BLVD. R.O.W.

EXISTING POWERS BOULEVARD

ILEVARD

BASIN RUNOFF (RATIONAL)			
BASIN	Q5 (CFS)	Q100 (CFS)	ACREAGE
EX-A	6.9	12.4	1.51
EX-C	4.3	11.3	3.28
A1	8.1	15.2	2.02
A2	4.9	9.0	1.18
A3	4.8	9.0	1.17
A4	3.8	6.8	0.82
B	0.9	6.5	2.72
C	2.9	7.9	1.69
F	0.8	5.7	1.87

PIPE RUN SUMMARY			
PIPE	Q5 (CFS)	Q100 (CFS)	PIPE SIZE
1	4.8	9.0	24" RCP
2	4.9	9.0	24" RCP
3	9.7	18.0	30" RCP
4	15.0	27.6	EX. 24" RCP
5	3.8	6.8	18" RCP
6	18.8	34.4	30" RCP
7	0.4	9.2	18" RCP

DESIGN POINT SUMMARY (RATIONAL METHOD)			
DESIGN POINT	Q5 (CFS)	Q100 (CFS)	FEATURE
1	4.8	9.0	FUTURE STORM
2	4.9	9.0	FUTURE STORM
3	15.0	27.6	EX. AT-GRADE INLET
4	3.8	6.8	TYPE C INLET
5	5.1	17.2	SURFACE
6	27.7	60.6	PERMANENT POND
7	1.0	13.3	TO EX. CHANNEL

CLASSIC CONSULTING SM
619 N. Cascade Avenue, Suite 200 (719)785-0790
Colorado Springs, Colorado 80903 (719)785-0799(Fax)

AIRPORT SPECTRUM SUBDIVISION
FILING NO. 1
FINAL DRAINAGE REPORT AMENDMENT
DEVELOPED CONDITIONS MAP

CLASSIC CONSULTING

DESIGNED BY	MAL	SCALE		DATE	07/29/19
DRAWN BY	MAL	(H) 1"= 60'		SHEET	1 OF 1
CHECKED BY		(V) 1"= N/A		JOB NO.	2429.10

DRAINAGE LETTER
FOR
SUPER STAR CAR WASH – POWERS AND MILTON

COLORADO SPRINGS, COLORADO

Prepared for:

Super Star Car Wash
960 Behrend Drive, Suite 1
Phoenix, AZ 85027

Contact: Tim Varley
Phone: (801) 651-1748

Prepared by:

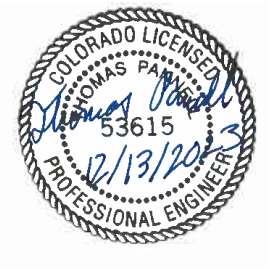
1526 Cole Blvd, Suite 100
Lakewood, Colorado 80401

Contact: Thomas Pannell, PE – Team Lead
Phone: (303) 801-2900

JN: 020441-01-008
January 2024

Signature Page
Super Star Car Wash – Powers and Milton

Engineer's Certification Statement
This report and plan for the drainage design of Super Star Car Wash – Powers & Milton was prepared by me (or under my direct supervision) and is correct to the best of my knowledge and belief. Said report and plan has been prepared in accordance with the City of Colorado Springs Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.



Thomas Pannell, PE – Team Lead
Registed Professional Engineer State of Colorado No. 53615
For and on behalf of Bowman Consulting Group, Ltd.

Developer's Statement
Super Star Car Wash hereby certifies that the drainage facilities for Super Star Car Wash – Powers and Milton shall be constructed according to the design presented in this report. I understand that the City of Colorado Springs does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that are submitted to the City of Colorado Springs pursuant to section 7.7.906 of the City Code; and cannot, on behalf of Super Star Car Wash – Powers and Milton, guarantee that final drainage design review will absolve Super Star Car Wash and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Superstar Car Wash
Name of Developer

John Lueken 12/13/2023
Authorized Signature Date

John Lueken
Printed Name

Title

960 W Behrend Dr Ste 2 Phoeniz, AZ 85027
Address

City of Colorado Springs Statement:
Filed in accordance with Section 7.7.906 of the Code of the City of Colorado Springs, 2001, as amended.

Hao Vo 1/26/2024
For City Engineer Date
Conditions

According to the FEMA FIRM for El Paso County, Colorado and Incorporated Areas, Panel 763 of 1275, Map No. 08041C0763G, dated 12/07/2018, the is located in Zone X (area of minimal flood hazard). For more information, please see the FEMA FIRMette in Appendix G.
Per the Classic report, the site takes up the majority of basin A2. The drainage map developed by Classic Consulting Engineers & Surveyors for the overall development can be found in Appendix E.

Flows from this site will be conveyed via a proposed storm drain system to the southwest of the site to an existing private full spectrum extended detention and water quality pond that is sized for the entire subdivision. The total area analyzed by Classic Consulting is 16.26ac, with 14.39ac tributing to the pond, of which 1.21ac is analyzed in this letter. A total of 3.77ac of impervious landcover producing 17.8cfs, and 33.2cfs for the 5-yr and 100-yr storm events are routed to the pond. The Final Drainage Report Amendment for Airport Spectrum Filing No. 1 states that Basin A2, 1.18-acres, was designed to have a 5-year flow rate of 4.9cfs and a 100-year flow rate of 9.0cfs. The proposed site will combine sub-basin flows for a 5-year flow rate of 2.78cfs and a 100-year flow rate of 5.5cfs, both well below the designed capacity for Basin A2. No on-site detention will be required because the off-site proposed private full spectrum extended detention and water quality pond will have capacity for this development.

As demonstrated in this report and appendices, the proposed development complies with the assumptions provided in the original analysis by Classic Consulting Engineers & Surveyors in the "Final Drainage Report Amendment for Airport Spectrum Filing No. 1 (Off-Site)", dated July 2022, Approved on June 1st, 2023.

Construction on the downstream infrastructure and pond mentioned in the "Final Drainage Report Amendment for Airport Spectrum Filing No. 1 (Off-Site)", dated July 2022, Approved on June 1st, 2023, will commence prior to the construction of Super Star Car Wash – Milton & Powers.

3.2. Sub-Basin Descriptions

Existing Drainage Basins
Information for existing basin is from FINAL DRAINAGE REPORT AMENDMENT FOR AIRPORT SPECTRUM FILING NO. 1 (OFF-SITE). See Appendix E.

Basin A2 (1.18 Ac., C_5 =0.94, C_{100}=1.04)
"(Q5 = 4.9cfs, Q100 = 9.0cfs) is the runoff from Basin A2, 1.18 acres of planned commercial development directly south of Milton Proby Pkwy. A future storm system will intercept the entirety of this runoff and route to the proposed pipe stub (Private Pipe 2, 24" RCP). A separate drainage report (by others) will detail the site-specific Private storm system for this basin and development within. Pipe 3 (Private 30" RCP, Q5 = 9.7cfs, Q100 = 18.0cfs) conveys the combined runoff from Pipes 1 & 2 to the south directly into the proposed private full spectrum detention and

Basin A3 is located on the east side of the site and composed of down-sloping landscaping to tie into existing grades. No impervious area is proposed in this area for neighboring property to develop. Runoff from this basin will sheet flow over grasses east and then south to the proposed private full spectrum detention and water quality pond, by others. The 5-year and 100-year storm events for this basin are 0.001cfs and 0.03cfs, respectively, and this basin is not included in any Design Point. The proposed conditions in this letter are in conformance with what the master drainage report has assumed for the A3 Basin.

TABLE 1. BASIN COMPARISON

	BASIN ID	AREA (Ac.)	BASIN ID	AREA (Ac.)
	A2	1.18	B1	0.3
			B2	0.22
			B3	0.07
			B4	0.06
			B5	0.15
			B6	0.2
			UD1	0.18
TOTAL		1.18		1.18

4. Compliance with Previous Report

This report, and the associated proposed conditions, are in compliance with "Final Drainage Report Amendment for Airport Spectrum Filing No. 1", prepared by Classic Consulting Engineers & Surveyors, dated July 2022, approved June 1st, 2023. This is demonstrated by analyzing the A2 basin in the previous report and the proposed new sub-basins. In the Final Drainage Report Amendment for Airport Spectrum Filing No. 1, it was assumed that Basin A2 would consist of 1.03ac of impervious landcover and 0.15ac of pervious landcover. The same report assumed that basin would produce 4.9cfs and 9.0cfs for the 5-yr and 100-yr storm events, respectively. The proposed Super Star Car Wash plans 0.93ac of impervious landcover and 0.25ac of pervious landcover, as well as 2.78cfs and 5.50cfs for the 5-yr and 100-yr storm events, respectively. As shown in Appendix H, the Runoff Reduction Exhibit and PIA Master Developer Allocation, the Master Developer has allocated 0.148 acres for planned infiltration area (PIA) where, the proposed site requires 0.017 acres of PIA, see Table 2 for tabulated information. With both, lower impervious landcover and resulting lower runoff rates, the proposed Super Star Car Wash is in compliance with the Final Drainage Report Amendment for Airport Spectrum Filing No. 1.

TABLE 2. GREEN INFRASTRUCTURE CALCULATIONS						
PCM	CONTRIBUTING BASINS	IMPERVIOUS AREA TOTAL (ACRE)	20% OF IMP. AREA (ACRE)	10% OF 20% OF IMP. AREA (ACRE) = MIN. RECEIVING PERVIOUS AREA (RPA) REQ.	TOTAL WQ EVENT WETTED AREA (ACRE)	REMAINING WQ EVENT WETTED AREA (ACRE)
POND	EX-A, EX-C, A1, A2, A3, A4, B, C	7.4	1.48	0.148	0.148	0
POND	A2 (Bowman)	0.859	0.172	0.017	0.148	0.131

5. Drainage Design Criteria

5.1. Development Criteria Reference

As demonstrated in this report and appendices, the proposed development complies with the assumptions provided in the original analysis by Classic Consulting Engineers & Surveyors, and with the latest editions of the City of Colorado Springs Drainage Criteria Manual, (COCS DCM) and the Mile High Flood District Urban Storm Drainage Criteria Manual (MHFD USDCM).

5.2. Hydrologic Criteria

Site calculations were performed to determine the proposed runoff quantities for the 5-yr, and 100-yr 24-hour storm events for the developed conditions using the Rational Method as required by the City of Colorado Springs for basins containing less than 100 acres. According to the Classic Consulting Engineers & Surveyors report, basin A2 was designed to have a 5-year flow rate of 4.90cfs and a 100-year flow rate of 9.00cfs. The proposed site will have an undetained 5-year flow rate of 2.78cfs and a 100-year flow rate of 5.50cfs. In addition, the proposed private full spectrum detention and water quality pond has been designed to have post-development flow rates at or below pre-development levels up to and including the 100-year storm event.

Runoff from basins B1 to B6 and UD1 are conveyed via proposed private storm drains to the existing above-ground detention system. Off-site existing private full spectrum detention and water quality treatment will be provided.

5.3. Stormwater Quality Four Step Process

The City of Colorado Springs requires all proposed development projects to follow their Four Step Process to minimize adverse impacts of urbanization. The Site was examined using the Four Step Process and a summary of the process for the Site is below:

Step 1 – Employ Runoff Reduction Practices

In step 1 the applicant is asked to identify areas of the Site that can be used to reduce runoff and implement GI practices such as permeable pavement, green roofs, grass buffers, grass swales, and

bioretention. This is accomplished by providing landscape areas adjacent to the building, driveways, and parking areas, and utilizing approximately 6980 square feet of the bottom of the proposed private full spectrum and water quality pond (by Classic Consulting) as RPA area. This pond is to be completed prior to start of construction for this project. Furthermore, all site runoff, 100% (1.18ac), is directed to the existing private full spectrum detention and water quality pond where 91% runoff reduction is achieved. This plan includes 0.006 acres (0.79%) of disturbed area to not be captured with proposed inlets, however this runoff is routed to a downstream inlet and eventually is treated in the proposed private full spectrum detention and water quality pond. See Appendix I for the Runoff Reduction Spreadsheet.

Step 2 – Treat and Slowly Release the WQCV

In step 2, the applicant is asked to treat the remaining runoff through capture and slow release of the WQCV. This is being accomplished through the proposed Extended Detention Basin by Classic Consulting, where runoff will flow in the full spectrum pond while sediment settles, and then runoff is slowly released through the outlet structure at or below historic rates. 100% (1.47 acres) of the disturbed area will be treated through the full spectrum extended detention basin facility, by Classic Consulting, achieving 91% WQCV reduction. As shown in Appendix H, the Runoff Reduction Exhibit and PIA Master Developer Allocation, all basins with the exception of Basin F are routed to the EDB, by Classic Consulting. Emergency spillway for the EDB is described as 15' wide emergency spillway & rundown with type 'M" riprap and topsoil cover.

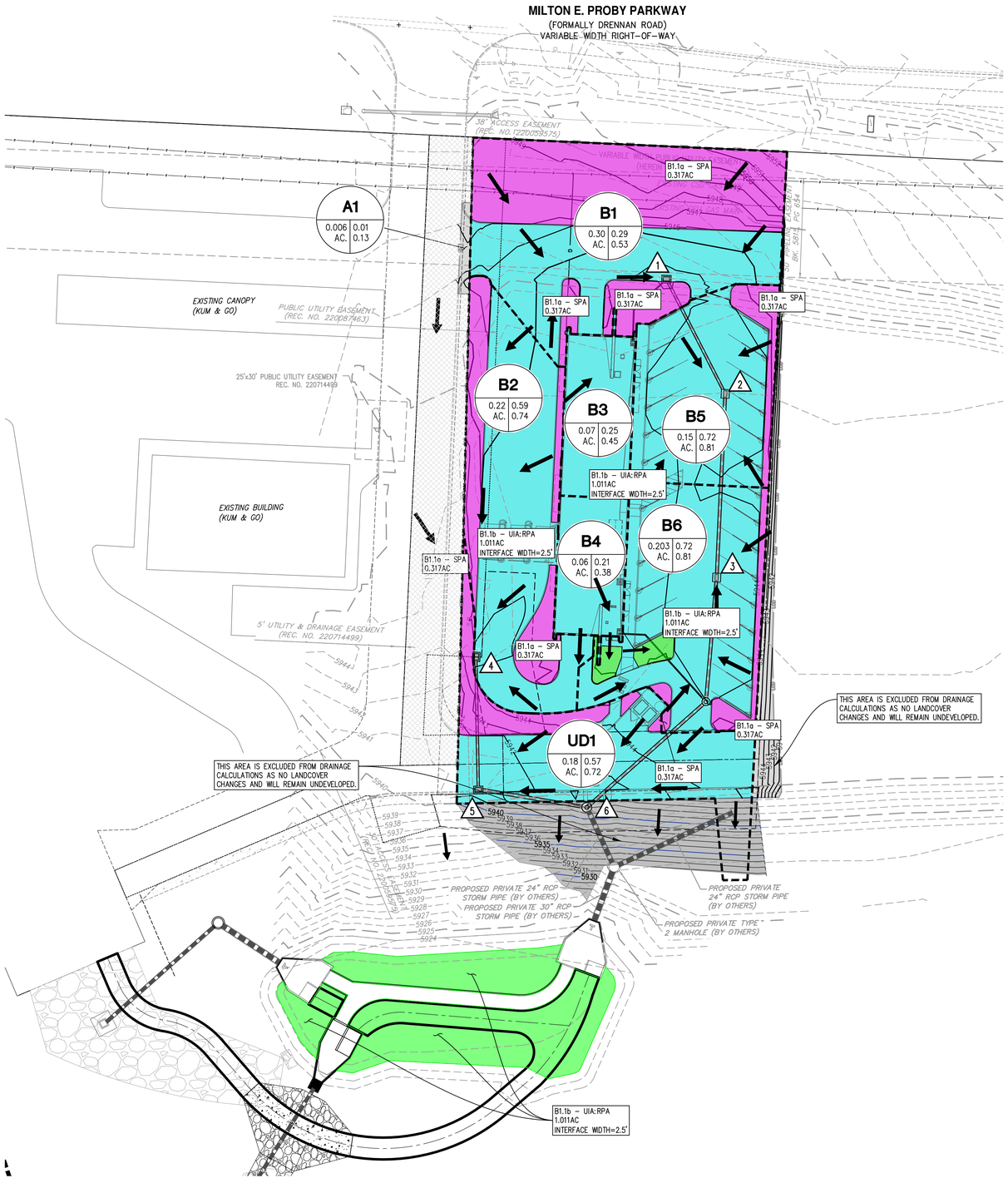
Design Point	Associated Disturbance Area (Ac)	Treatment Method	Ownership/Maintenance
1	0.303	75% Infiltration	SSCW
2	0.857	Extended Detention Basin A	Bert A. Getz
3	0.15	Utility exclusion	N/A
4	0.006	Not Treated	N/A
Total	1.32		

Step 3 – Stabilize Drainageways

Per the OWA Report, this will be accomplished through a combination of seeding and mulching and riprap around the outfall and spillway to stabilize the land and prevent erosion. All new and re-development projects are required to construct or participate in the funding of channel stabilization measures. Drainage basin fees paid, at the time of platting, go towards channel stabilization within the drainage basin. According to the drainage report, "Final Drainage Report Amendment for Airport Spectrum Filing No. 1", prepared by Classic Consulting Engineers & Surveyors, dated July 2022, approved June 1st, 2023, channel stabilization criteria has been met.

Step 4 – Implement Source Controls

A combination of source control CCM's will be utilized including landscape maintenance, snow and ice management, and street sweeping and cleaning. All effluent from the car wash operations is captured within a trench drain that runs the length of the tunnel building. This effluent drains to the sanitary sewer connections to the building and is then treated through a combination of water



LEGEND:

- EXISTING GROUND MAJOR CONTOUR
- EXISTING GROUND MINOR CONTOUR
- PROPOSED GRADE MAJOR CONTOUR
- PROPOSED GRADE MINOR CONTOUR
- PROPOSED GRADE MAJOR CONTOUR (BY OTHERS)
- PROPOSED GRADE MINOR CONTOUR (BY OTHERS)
- PROPERTY BOUNDARY
- DESIGN POINT
- BASIN BOUNDARY
- FLOW DIRECTION
- EMERGENCY OVERFLOW PATH

BASIN DESIGNATION — X0.0 — 32.14 AC. | .26 | .36 — BASIN AREA; 5-YEAR COEFFICIENT; 100-YEAR COEFFICIENT

KEY NOTES

- UIA
- RPA
- SPA
- DCIA
- AREA WITHIN PROPERTY BOUNDARY TO NOT BE DISTURBED (0.2 Ac.)
- GRADING TO BE COMPLETED BY OTHERS (POND CONTRACTOR)
- CONTRACTOR TO COORDINATE WITH (PLANSET FROM CLASSIC) FOR GRADING BETWEEN SOUTH SIDEWALK AND POND.

TABLE 2. GREEN INFRASTRUCTURE CALCULATIONS

PCM	CONTRIBUTING BASINS	IMPERVIOUS AREA TOTAL (ACRE)	20% OF IMP. AREA (ACRE)	10% OF 20% OF IMP. AREA (ACRE) = MIN. RECEIVING PERVIOUS AREA (RPA) REQ.	TOTAL WQ EVENT WETTED AREA (ACRE)	REMAINING WQ EVENT WETTED AREA (ACRE)
POND	EX-A, EX-C, A1, A2, A3, A4, B, C	7.4	1.48	0.148	0.148	0
POND	A2 (Bowman)	0.859	0.172	0.017	0.148	0.131

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

Total Area (ft²)	64,063
Total Impervious Area (ft²)	37,422
WQCV (ft³)	1,559
WQCV Reduction (ft³)	1,416
WQCV Reduction (%)	91%
Untreated WQCV (ft³)	143

GENERAL NOTES

1. THIS SITE IS NOT WITHIN THE STREAMSIDE OVERLAY ZONE

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.

N

Bowman
1526 Cole Blvd, Suite 100
Lakewood, CO 80401
Phone: (303) 861-2800
www.bowman.com

REVISIONS

REVISION	DESCRIPTION	DATE
01	RESPONSE TO 1ST SUBMITTAL COMMENTS	04/12/2023

RUNOFF REDUCTION EXHIBIT

SUPER STAR CAR WASH - MILTON & POWERS
AIRPORT SPECTRUM FILING NO. 2

CITY OF COLORADO SPRINGS — COLORADO

SEAL
NOT FOR CONSTRUCTION

DESIGN	DRAWN	CHKD
EJF	EJF	ART

SCALE H: 1" = 20' V: 1" = XXX'
JOB No. 020441-01-008
DATE : 04/07/2023
SHEET 1 OF 1

Cad file name: V:\020441 - Super Star Car Wash\020441-01-008 (ENG) - Powers_Milton\Engineering\Engineering Plans\Drainage\020441-01-008 RRE.dwg

December 7, 2023

City of Colorado Springs
Stormwater Enterprise
30 S. Nevada Avenue, Suite 400
Colorado Springs, CO 80903

ATTN: Erin Powers, P.E. – Compliance Program Manager

RE: Airport Spectrum Filing No. 1 – Green Infrastructure Planned Infiltration Area
Master Developer Allocation

Dear Erin,

In conjunction with the development of the Airport Spectrum Development located southwest of the intersection of Milton E. Proby Parkway and Powers Boulevard, a Private Permanent Control Measurement (PCM) is proposed as approved on plans dated 6/8/23 (STM-Rev23-0895). This facility was defined in the report also approved titled, "Final Drainage Report Amendment for Airport Spectrum Filing No. 1 (Off-site)", dated July 2022 (STM-Rev22-0894). Both documents were prepared by Classic Consulting Engineers & Surveyors, LLC.

As all of the developable area tributary to the approved PCM is owned by the Master Developer Globe Corporation, the use of the PIA/RPA (Planned Infiltration Area/Receiving Pervious Area) in the pond bottom is allocated by them as well. The following is a summary of the proposed allocation.

- Total pervious pond bottom area (WQCV inundation area without trickle channels, impervious improvements. 0.148 AC
  (Based on Approved Pond Report and WQCV Depth)
- PIA area required for Airport Spectrum Filing No. 2. 0.017 AC
- Remaining PIA area for future development. 0.131 AC

As the developable tributary area is relatively small for the PCM (only one additional easterly adjacent lot), use of the pond PIA/RPA is also assumed for that future lot and will be documented in that preliminary and/or final drainage report.

This executed letter will be included in the "Drainage Letter for Super Star Carwash – Powers and Milton".

Globe Corporation acknowledges and allocates the described PIA/RPA area within the PCM to Super Star Car Wash.

Sincerely,

Globe Corporation