PRELIMINARY DRAINAGE REPORT
FOR
SOUTH ACADEMY HIGHLANDS FILING NO. 2A

June 2024

Prepared for:
UTW ACADEMY DEVELOPMENT LLC
C/O SNR DENTON
ONE METROPOLITAN SQUARE
211 N. BROADWAY SUITE 3000
ST. LOUIS, MO 63102

Prepared by:
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Job no. 2186.93

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DRAINAGE REPORT STATEMENT

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

Kyle R Campbell, Colorado P.E. #29794 Date

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

Business Name: UTW Academy Development, LLC

By:

Title: Jeffrey P. Otto, Authorized Signer

Address: 211 N. Broadway, Suite 3000

St. Louis, MO 63102

CITY OF FOUNTAIN:

For the City Engineer Date

Conditions:

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PURPOSE

This document is the Preliminary Drainage Report for South Academy Highlands Filing No. 2A, a re-plat of South Academy Highlands Filing No. 2 – Lot 1. The purpose of this report is to identify onsite and offsite drainage patterns and general storm sewer infrastructure to support the lot development in accordance with all applicable previous reports and master drainage plans. This report accompanies a Preliminary Plat submittal creating 4 lots and 1 drainage tract (existing detention facility). Site specific future Final Drainage Reports for each lot will be completed at the time of lot development.

GENERAL DESCRIPTION

Lots 1 through 4 are planned for future commercial single user developments with a portion of Lots 1 & 4 being 'undevelopable' slope area draining to the east and north. Lot 1 is 8.500 acres, Lot 2 is 1.228 acres, Lot 3 is 1.549 acres, and Lot 4 is 12.998 acres. Tract A is 4.188 acres of the existing Full Spectrum Detention and Storm Water Quality facility serving the entire upstream South Academy Highlands development. They are zoned PUD per the Overall Development Plan for South Academy Highlands and have been previously platted as Lot 1 of South Academy Highlands Filing No. 2. A Re-Plat will be submitted in the future, along with site specific development plans for each lot. These four lots are located north of the existing Sam's Club development, east of Venetucci Blvd. with access onto Venetucci Blvd. and to the parking lot of Sam's Club. The site is located in the west half of Section 4, Township 15 South, Range 66 West of the Sixth Principal Meridian in the City of Fountain, County of El Paso, State of Colorado. The site is bounded on the north by Tract A South Academy Highlands Filing No. 2 (Open Space/Drainage, City of Fountain), to the west by existing Venetucci Blvd. and unplatted El Paso County land, to the east by 3:1 slope to existing Interstate 25, and to the south by Lot 1 South Academy Highlands Filing No. 1 (Sam's Club). The average soil condition of the proposed site reflects Hydrologic Groups 'A' & 'C' (Schamber-Razor complex) as determined by the "Web Soil Survey," prepared by the Natural Resources Conservation Service (see map in Appendix).

EXISTING DRAINAGE CONDITIONS

The site is located within the Fishers Canyon Drainage Basin and as been overlot graded with the South Academy Highlands Filing No. 1 infrastructure construction. The now existing grades have created a 'flat developable pad' with 3:1 grade slope ('undevelopable area') to the north and east as per the approved Filing No. 1 grading plans and drainage report. A temporary sediment basin has been created at the south end of the flat pad to intercept the undeveloped (existing conditions) runoff and pipe into the existing 66" RCP storm main draining to the existing detention facility within the site limits. This site was most recently studied in the "Final Drainage Report for Lot 1 South Academy Highlands Filing No. 2," by Classic Consulting Engineers & Surveyors, LLC, approved July 13, 2015. Nothing has occurred within the project limits to change the 'Existing Conditions' from this previously approved report.

The site was originally studied within the "Preliminary/Final Drainage Report for South Academy Highlands Filing No. 1," by Classic Consulting Engineers & Surveyors, LLC, revised August 2013. The proposed drainage patterns are in accordance with the previous approved report and the existing South Academy Highlands storm system discharges into an existing full spectrum detention/water quality facility prior to releasing to the existing downstream Fishers Canyon Channel.

To summarize the previous reports and existing infrastructure in and around the site; the existing 66" RCP storm main within Venetucci Blvd. was not size to convey the developed runoff from the potential development of Basins J and Y (proposed developable area, basin notation is from previous approved reports); however, the Detention/Storm Water Quality Facility (Pond T) was sized to accommodate the water quality and detention requirements for the development of this site. (See Proposed Conditions for pond capacity verification).

More recently than the Filing No. 1 and Filing No. 2 Final Drainage Reports, a study was completed for the adjacent northern Venetucci Blvd. roadway extension to B Street – "Venetucci Boulevard Extension Drainage & Water Quality Improvements – Preliminary/Final Drainage Report," by Matrix Design

Group, dated May 22, 2019. This study makes reference to and correlates with the South Academy Highlands Filing No. 1 report. The Developed Conditions of this report match the constructed conditions of Venetucci Blvd. and this approved report by Matrix Design Group.

PROPOSED DRAINAGE CONDITIONS

A Private Storm Sewer system will be installed throughout the four developable lots, intercepting all developed runoff and conveying it to the existing Full Spectrum Detention and Storm Water Quality Facility (Pond T) located at the north end of the proposed Filing (Tract A). A new concrete forebay and impact structure will be installed within the existing detention facility for the new incoming pipe. This report is only establishing the main segment of the PRIVATE storm sewer with stubs planned for the future connections to each Lot's storm system. Future Final Drainage Reports/Letters will be required for each individual lot development that details site specific private storm system extensions and collection locations. These details are not known at this time and therefore the 'stubs' are provided off the proposed Private storm main. General basin calculations are included for these developable areas to ensure pipe capacities. The proposed Private storm sewer will be maintained by the lot owner(s). A detailed description of the developed flows is as follows:

Design Point 1 (Q_5 = 4.5 cfs, Q_{100}= 8.6 cfs) consists of runoff from Basin C, 1.08 acres of Lot 2 development. A future Final Drainage Letter/Report for Lot 2 will be completed that will detail the collection system and connection to this 24" storm stub (Pipe 1) provided with the initial storm sewer infrastructure construction. Pipe 1 connects to the inlet at DP-2.

Design Point 2 (Q_5 = 0.4 cfs, Q_{100}= 0.7 cfs) consists of runoff from Basin A, 0.09 acres of shared drive aisle east of the connection to Venetucci Blvd. This runoff will drain over the asphalt and along the curb and gutter to a proposed 5.0' CDOT Type R curb (at-grade) inlet. Pipe 2 (Private 24" RCP, Q_5 = 4.9 cfs, Q_{100}= 9.3 cfs) conveys the intercepted runoff and that from Pipe 1 to the north to an adjacent

manhole, combining with Pipe 3. This at-grade inlet intercepts the entirety of the calculated runoff, and anything not collected will continue onto Venetucci Blvd. to downstream facilities.

Design Point 3 (Q_5 = 0.3 cfs, Q_{100}= 0.6 cfs) consists of runoff from Basin B, 0.08 acres of shared drive aisle east of the connection to Venetucci Blvd. This runoff will drain over the asphalt and along the curb and gutter to a proposed 5.0' CDOT Type R curb (at-grade) inlet. Pipe 3 (Private 18" RCP) conveys the entirety of this runoff to the adjacent manhole with Pipe 2. Pipe 4 (Private 24" RCP, Q_5 = 5.2 cfs, Q_{100}= 9.9 cfs) conveys the combined runoff Pipes 2 & 3 to the east within the shared drive aisle to another manhole combining with Pipes 5 & 6. This at-grade inlet intercepts the entirety of the calculated runoff, and anything not collected will continue onto Venetucci Blvd. to downstream facilities.

Design Point 4 (Q_5 = 3.2 cfs, Q_{100}= 6.1 cfs) consists of runoff from Basin D, 0.77 acres of Lot 1 development. A future Final Drainage Repot for Lot 1 will be completed that will detail the collection system and connection to this 18" storm stub (Pipe 5) provided with the storm sewer infrastructure construction. Pipe 5 combines with Pipes 4 & 6.

Design Point 5 (Q_5 = 8.1 cfs, Q_{100}= 15.7 cfs) consists of runoff from Basin F, 1.97 acres of Lot 1 development. A future Final Drainage Repot for Lot 1 will be completed that will detail the collection system and connection to this 24" storm stub (Pipe 6) provided with the storm sewer infrastructure construction. Pipe 6 combines with Pipes 5 & 6. Pipe 7 (Private 30" RCP, Q_5 = 16.1 cfs, Q_{100}= 31.1 cfs) conveys the combined runoff to the north-east within the parking lot of Lot 1 and onto Lot 4 to a manhole combining with Pipe 8.

Design Point 6 (Q_5 = 5.5 cfs, Q_{100}= 10.5 cfs) consists of runoff from Basin E, 1.32 acres of Lot 3 development. A future Final Drainage Repot for Lot 3 will be completed that will detail the collection system and connection to this 24" storm stub (Pipe 8) provided with the storm sewer infrastructure construction. Pipe 8 combines with Pipe 7. Pipe 9 (Private 36" RCP, Q_5 = 20.5 cfs, Q_{100}= 39.6 cfs)

conveys the combined runoff to the north-east within the parking lot of Lot 4 and toward the back of the future developed buildings, to a manhole combining with Pipes 10 & 11.

Design Point 7 (Q_5 = 5.2 cfs, Q_{100}= 10.0 cfs) consists of runoff from Basin K, 1.25 acres of Lot 4 development. A future Final Drainage Repot for Lot 4 will be completed that will detail the collection system and connection to this 24" storm stub (Pipe 10) provided with the storm sewer infrastructure construction. Pipe 10 combines with Pipes 9 & 11.

Design Point 8 (Q_5 = 6.4 cfs, Q_{100}= 12.4 cfs) consists of runoff from Basin H, 1.55 acres of Lot 1 development. A future Final Drainage Repot for Lot 1 will be completed that will detail the collection system and connection to this 24" storm stub (Pipe 11) provided with the storm sewer infrastructure construction. Pipe 11 combines with Pipes 9 & 10. Pipe 12 (Private 42" RCP, Q_5 = 30.1 cfs, Q_{100}= 58.1 cfs) conveys the combined runoff to the north-east within the parking lot of Lot 4 and into the existing open space/slope area to a manhole combining with Pipe 13.

Design Point 9 (Q_5 = 7.7 cfs, Q_{100}= 14.9 cfs) consists of runoff from Basin G, 1.86 acres of Lot 1 development. A future Final Drainage Repot for Lot 1 will be completed that will detail the collection system and connection to this 24" storm stub (Pipe 13) provided with the storm sewer infrastructure construction. Pipe 13 combines with Pipe 12. Pipe 14 (Private 42" RCP, Q_5 = 36.4 cfs, Q_{100}= 70.3 cfs) conveys the combined runoff to the north within the existing open space/slope area to a manhole combining with Pipe 15 prior to releasing into the existing Full Spectrum Detention and Storm Water Quality Facility in Tract A.

Design Point 10 (Q_5 = 16.9 cfs, Q_{100}= 32.6 cfs) consists of runoff from Basin J, 4.08 acres of Lot 4 development. A future Final Drainage Repot for Lot 4 will be completed that will detail the collection system and connection to this 36" storm stub (Pipe 15) provided with the storm sewer infrastructure construction. Pipe 15 combines with Pipe 14. Pipe 16 (Private 42" RCP, Q_5 = 51.3 cfs, Q_{100}= 99.1 cfs) conveys the combined runoff to the north within the existing open space/slope area and into Pond T, the existing Full Spectrum Detention and Storm Water Quality Facility for South Academy Highlands

(Design Point 20). A new concrete impact structure and forebay will be installed at this Pipe 16 entry point into the existing Pond.

The following Design Points (12-19) are included to ensure the adjacent existing Venetucci Blvd. drainage and storm system are not hindered with the development of Lots 1-4 of South Academy Highland Filing 2A.

Design Point 12 (Q_5 = 1.4 cfs, Q_{100}= 2.8 cfs) consists of runoff from Basin R, 0.37 acres of existing Venetucci Blvd. and small portion of proposed shared drive aisle between Lots 2 & 3. An existing 10' Type R curb inlet intercepted with no capacity issues and an existing Pipe 18 (Existing 18" RCP) conveys to the large existing storm main in Venetucci Blvd. (66" RCP, Pipe 17 Q_5 = 141.5 cfs, Q_{100}= 271.5 cfs). The Pipe 17 flow rates are directly from the approved South Academy Highlands Filing No. 1 Final Drainage Report.

Design Point 13 (Q_5 = 1.9 cfs, Q_{100}= 3.7 cfs) consists of runoff from Basin S, 0.46 acres of existing Venetucci Blvd. west of Lot 2. An existing 10' Type R curb inlet intercepted with no capacity issues and an existing Pipe 18 (Existing 18" RCP) conveys to the large existing storm main in Venetucci Blvd. (66" RCP, Pipe 17). Pipe 20 (Existing 66" RCP, Q_5 = 142.3 cfs, Q_{100}= 273.1 cfs) conveys the existing developed runoff to the north within Venetucci Blvd., eventually discharging into the existing detention facility at Design Point 20.

Design Point 14 (Q_5 = 2.1 cfs, Q_{100}= 4.3 cfs) consists of runoff from Basin T, 0.58 acres of existing Venetucci Blvd. and small portion of proposed shared drive aisle between Lots 2 & 3. An existing 10' Type R at-grade curb inlet intercepts a majority of this runoff, while the remaining runoff continues north along existing Venetucci Blvd. to the inlet at Design Point 17. Pipe 21 (Existing 18" RCP) conveys the intercepted runoff (Q_5 = 2.1 cfs, Q_{100}= 4.1 cfs) to the large existing storm main in Venetucci Blvd.

Design Point 15 (Q_5 = 2.2 cfs, Q_{100}= 4.8 cfs) consists of runoff from Basin T, 0.71 acres of existing Venetucci Blvd. west of Lot 3. An existing 10' Type R at-grade curb inlet intercepts a majority of this

runoff, while the remaining runoff continues north along existing Venetucci Blvd. to the inlet at Design Point 16. Pipe 22 (Existing 18" RCP) conveys the intercepted runoff (Q_5 = 2.2 cfs, Q_{100}= 4.4 cfs) to the large existing storm main in Venetucci Blvd. (66" RCP, Pipe 23 Q_5 = 141.4 cfs, Q_{100}= 271.4 cfs). The existing storm main continues draining to the north within Venetucci Blvd. prior to turning north-east and draining into the existing Pond.

Design Point 16 (Q_5 = 2.1 cfs, Q_{100}= 6.5 cfs) consists of runoff from Basin X, 1.31 acres of existing Venetucci Blvd. and adjacent open space, and the flow-by runoff from DP-15. An existing 10' Type R at-grade curb inlet intercepts a majority of this runoff, while the remaining runoff continues north along existing Venetucci Blvd. to the inlet at Design Point 18. Pipe 24 (Existing 18" RCP) conveys the intercepted runoff (Q_5 = 2.1 cfs, Q_{100}= 5.4 cfs) to the large existing storm main in Venetucci Blvd.

Design Point 17 (Q_5 = 1.6 cfs, Q_{100}= 5.2 cfs) consists of runoff from Basin V, 1.11 acres of existing Venetucci Blvd. west of Lot 4, and the flow-by runoff from DP-14. An existing 10' Type R at-grade curb inlet intercepts a majority of this runoff, while the remaining runoff continues north along existing Venetucci Blvd. to the inlet at Design Point 19. Pipe 25 (Existing 18" RCP) conveys the intercepted runoff (Q_5 = 1.6 cfs, Q_{100}= 4.7 cfs) and that from Pipe 24, into the large existing storm main from Venetucci Blvd. (66" RCP, Pipe 26 Q_5 = 142.9 cfs, Q_{100}= 276.2 cfs). The existing storm main continues north-east and drains directly into an existing large concrete forebay at the west end of the existing Full Spectrum Detention and Storm Water Quality Pond (Pond T – Design Point 20). Per the original drainage report (South Academy Highlands Filing No. 1) the ultimate condition flow rate within the existing 66" RCP was Q_5 = 160.1 cfs and Q_{100}= 308.9 cfs. Therefore, the proposed development does not increase the flow or hinder the capacity of the downstream, adjacent infrastructure.

Design Point 18 (Q_5 = 2.8 cfs, Q_{100}= 7.3 cfs) consists of runoff from Basin Y, 1.06 acres of existing Venetucci Blvd. and adjacent open space, and the flow-by runoff from DP-16. An existing 6' Type R sump curb inlet intercepts all of this runoff. Pipe 27 (Existing 18" RCP) conveys the runoff east to the inlet across the street at DP-19. The existing storm inlet and storm sewer at this location were

installed and designed with the "Venetucci Boulevard Extension Drainage & Water Quality Improvements – Preliminary/Final Drainage Report," by Matrix Design Group, approved June 24, 2019.

Design Point 19 (Q_5 = 2.4 cfs, Q_{100}= 5.8 cfs) consists of runoff from Basin U, 0.82 acres of existing Venetucci Blvd. and adjacent open space west of Tract A, and the flow-by runoff from DP-17. An existing 6' Type R at-grade curb inlet intercepts all of this runoff. Pipe 28 (Existing 24" RCP, Q_5 = 5.0 cfs, Q_{100}= 12.7 cfs) conveys the combined runoff from Pipe 27 and this inlet, east directly into an existing large concrete forebay at the west end of the existing Full Spectrum Detention and Storm Water Quality Pond (Pond T – Design Point 20). Per the Matrix Design Report, the developed condition flow rate within the existing 24" RCP was Q_5 = 6.0 cfs and Q_{100}= 12.0 cfs. Therefore, the proposed development does not increase the flow substantially or hinder the capacity of the downstream, adjacent infrastructure.

Design Point 20 (Q_5 = 185.0 cfs, Q_{100}= 371.8 cfs) is the completely developed runoff to the existing Full Spectrum Detention/Storm Water Quality Facility. The facility was designed and constructed in accordance with the South Academy Highlands Filing No. 1 Final Drainage Report. The total runoff is a combination of the developed flows within the existing 66" RCP (Pipe 26), the existing 24" RCP (Pipe 28), the proposed 42" RCP (Pipe 16), and that from Basins L and P. Basin L is 5.81 acres of existing slope area south of the pond that drains directly into the facility and Basin P, 2.26 acres of the existing detention pond itself. Per the Phase 1 Development portion of the Filing No. 1 report, this facility is known as Pond 'T'.

Pe the previously approved report; "this Pond 'T' facility is designed to detain the developed flows (Q_5 = 183.4 cfs, Q_{100}= 357.5 cfs) for all of the proposed Phase 1 area, including future and planned commercial parcels (Basins C, D, G, I, J, & Y). Future drainage reports are required with any development within these basins to prove adequate capacity of Pond 'T'." Per the original report, 77.94 acres of development are tributary to the existing facility at 78.9% imperviousness. With this updated Filing 2A analysis and elimination of Basin C (Filing 1 report) from the tributary area; the existing facility will now collect runoff from 81.12 acres at 73.9% imperviousness. This 81.12 acres

consists of: 8.00 acres of Venetucci Blvd. right-of-way (100% imperviousness), 54.32 acres of commercial (95% imperviousness), and 18.80 acres of open space/native vegetation (2% imperviousness). The required Extended Urban Runoff Volume (EURV) for the updated tributary area and imperviousness is 5.851 acre-feet. The facility was originally constructed and provides an EURV of 6.162 acre-feet. Therefore, modification to the existing outlet structure, or detention facility, is not required with this development.

DRAINAGE CRITERIA

Hydrologic calculations were performed using the City of Colorado Springs/El Paso County Drainage Criteria Manual, Revised January 2021. The Rational Method was used to estimate stormwater runoff (5-year and 100-year recurrence intervals) to the proposed inlets, storm sewer pipes, and existing detention facility (Pond 'T'). The UDFCD UD-Inlet workbook per Mile High Flood District (previously the Urban Drainage and Flood Control District) was used to size the proposed storm inlets.

WATER QUALITY SUMMARY

The City of Fountain has required 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 helps to achieve stormwater permit requirements. This site adheres to this Four Step Process as follows:

1. This site is an approved PUD zoned commercial/retail site. In general, most roof drains are intended to drain across landscaping where feasible, and parking areas contain landscaping to minimize directly connected impervious areas.

2. Permanent BMPs for the overall South Academy Highlands commercial development have been implemented in initial development of the property in the form of the existing Detention and Stormwater Quality Pond 'T' located within proposed Tract A Filing No. 2A.
3. Stormwater drainage from the subject property is being routed through a stormwater detention /stormwater quality treatment facility prior to being released to the historic drainage path as described in the previously approved reports. Developed flows will be required to adhere to release rates established within the previously approved reports and all stormwater discharge to downstream facilities will be required to employ energy dissipation measures to ensure no adverse effect to downstream facilities.
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 control construction BMP's will be detailed in the Grading and Erosion Control plan and in the Stormwater Management Narrative to protect receiving waters. Upon construction of the proposed development, temporary BMP's will be installed and maintained as 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 08041C0743G effective date, December 7, 2018 (See Appendix).

DRAINAGE FEES

The proposed Lots 1-4, Tract A of South Academy Highlands Filing No. 2A have already been platted as Lot 1 South Academy Highlands Filing No. 2. A Re-Plat will be completed following the approval of the Preliminary Plat and Preliminary Drainage Report. South Academy Highlands is within the Fishers Canyon Drainage Basin, which is not a formally recognized basin with the City of Fountain's fee structure. Therefore, there are no required basin fees associated with the proposed site.

CONSTRUCTION COST OPINION

Private Drainage Facilities Non-reimbursable

ITEM	DESCRIPTION	QUANTITY	UNIT COST	COST
1.	5.0' CDOT Type R Inlet	2 EACH	$4,000/EA	$ 8,000.00
2.	Type I Manhole	4 EACH	$6,500/EA	$ 26,000.00
3.	Type II Manhole	2 EACH	$5,300/EA	$ 10,600.00
4.	18" RCP Storm Drain	30 LF	$55/LF	$ 1,650.00
5.	24" RCP Storm Drain	260 LF	$70/LF	$ 18,200.00
6.	30" RCP Storm Drain	310 LF	$95/LF	$ 29,450.00
7.	36" RCP Storm Drain	403 LF	$140/LF	$ 56,420.00
8.	42" RCP Storm Drain	482 LF	$170/LF	$ 81,940.00
9.	Impact and Forebay	1 EA	$25,000/EA	$ 25,000.00
	SUB-TOTAL			$ 257,260.00
	10% ENGINEERING			$ 25,726.00
	5% CONTINGENCIES			$ 12,863.00
	TOTAL			**$ 295,849.00**

Classic Consulting Engineers & Surveyors cannot and does not guarantee that the construction cost will not vary from these opinions of probable construction costs. These opinions represent our best judgment as design professionals familiar with the construction industry and this development in particular.

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SUMMARY

All drainage facilities were sized using the current City of Fountain Drainage Criteria and will safely discharge all developed runoff to the proposed storm system and route to the existing Private Full Spectrum Detention/Storm Water Quality Facility in accordance with the previously approved overall drainage study for the development; "Preliminary/Final Drainage Report for South Academy Highlands Filing No. 1," by Classic Consulting Engineers & Surveyors, LLC revised August 2013. The existing facility will treat the developed runoff prior to releasing at below historic rates into the existing Fishers Canyon Channel to the north. The facility was sized and constructed to accommodate the runoff from the proposed development and existing retail shopping center to the south. The proposed development is in compliance with the master drainage study. All proposed storm sewer is Private and will be maintained by the lot owner(s). Construction of Lots 1-4, South Academy Highland Filing No. 2A will not adversely affect any surrounding development or downstream facility.

PREPARED BY:

Classic Consulting Engineers & Surveyors, LLC

Matthew Larson
Project Manager

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REFERENCES

1. City of Colorado Springs/El Paso County Drainage Criteria Manual Vol. 1 dated May 2014, revised January 2021.

2. Drainage Criteria Manual Vol. 2, dated May 2014, revised December 2020.

3. "Fishers Canyon Drainage Basin Planning Study," by Muller Engineering Company, dated July 16, 1991.

4. "Preliminary/Final Drainage Report for South Academy Highlands Filing No. 1," by Classic Consulting Engineers & Surveyors, LLC, revised August 2013.

5. "Final Drainage Report for Lots 1 & 2 South Academy Highlands Filing No. 1A," by Classic Consulting Engineers & Surveyors, LLC, January 2015.

6. "Final Drainage Report for Lot 1 South Academy Highlands Filing No. 2," by Classic Consulting Engineers & Surveyors, LLC, March 2015.

7. "Venetucci Boulevard Extension Drainage & Water Quality Improvements – Preliminary/Final Drainage Report," by Matrix Design Group dated May 22, 2019.

APPENDIX

VICINITY MAP

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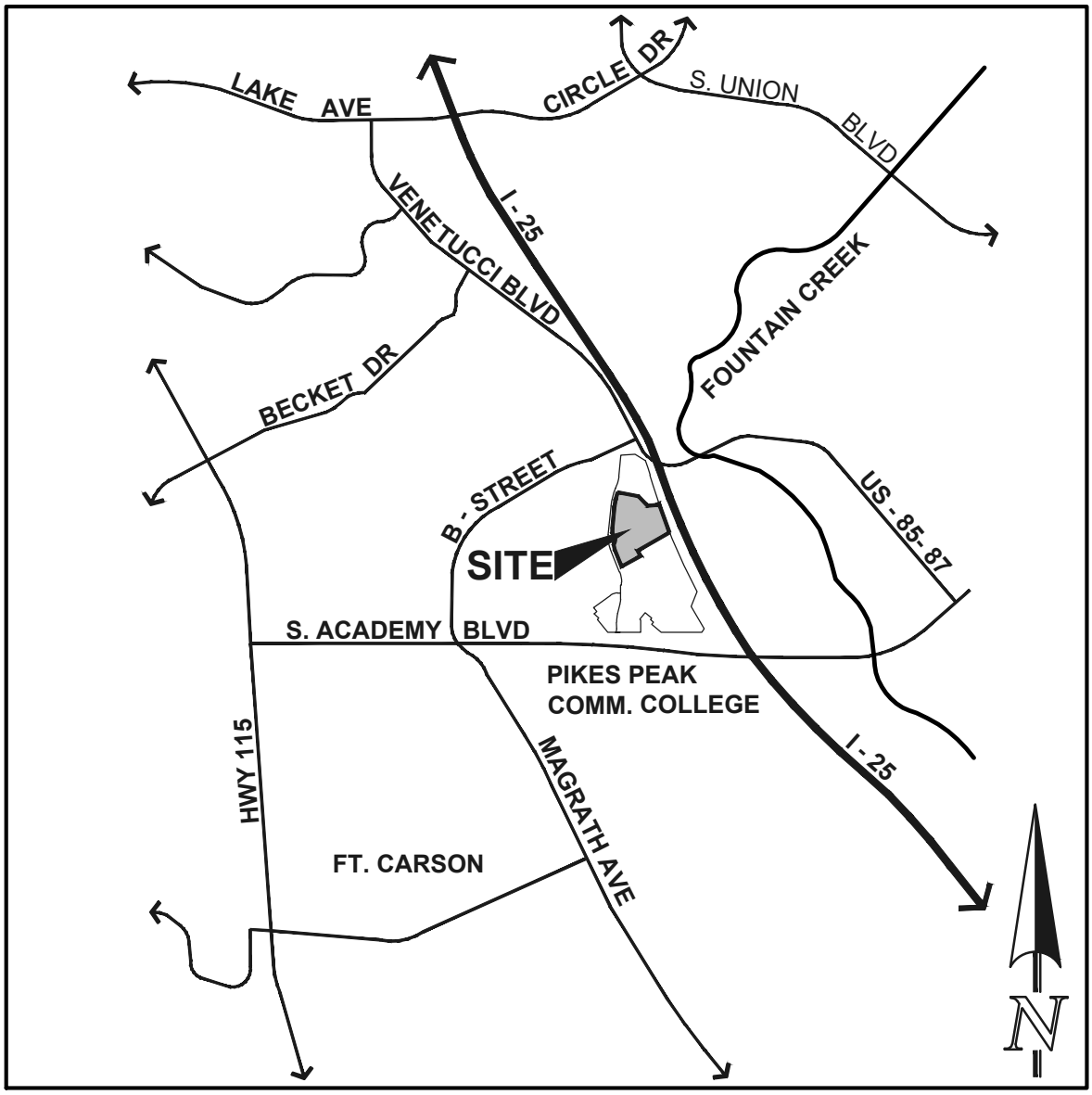

VICINITY MAP

N.T.S.

SOILS MAP (N.C.S SURVEY)

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Map Scale: 1:5,060 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 21, Aug 24, 2023

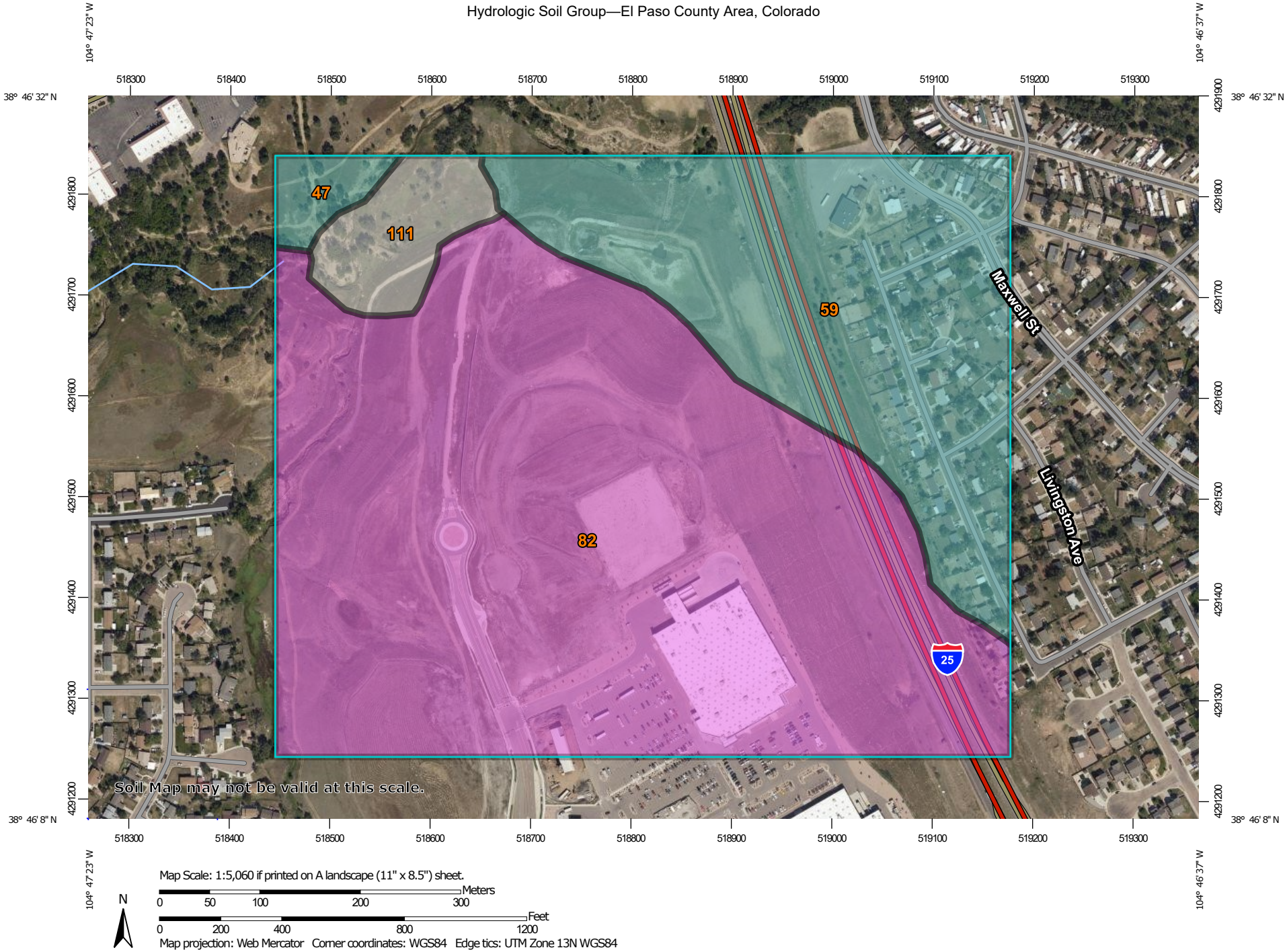
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
47	Limon clay, 0 to 3 percent slopes	1.9	1.7%
59	Nunn clay loam, 0 to 3 percent slopes	30.5	28.1%
82	Schamber-Razor complex, 8 to 50 percent slopes	71.4	65.9%
111	Water	4.6	4.2%
Totals for Area of Interest		**108.4**	**100.0%**



Map Scale: 1:5,060 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

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
47	Limon clay, 0 to 3 percent slopes	C	1.9	1.7%
59	Nunn clay loam, 0 to 3 percent slopes	C	30.5	28.1%
82	Schamber-Razor complex, 8 to 50 percent slopes	A	71.4	65.9%
111	Water		4.6	4.2%
Totals for Area of Interest			**108.4**	**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

F.E.M.A. MAP

CLASSIC SM
CONSULTING
ENGINEERS & SURVEYORS

National Flood Hazard Layer FIRMette

FEMA

104°47'21"W 38°46'33"N

104°46'43"W 38°46'4"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

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

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

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

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

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

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

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

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/3/2024 at 11:26 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

CALCULATIONS

CLASSIC SM
CONSULTING
ENGINEERS & SURVEYORS

JOB NAME: ***South Academy Highlands Filing No. 2A***
JOB NUMBER: ***2186.93***
DATE: ***06/03/24***
CALCULATED BY: ***MAL***

FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY (DEVELOPED)

BASIN	TOTAL AREA (AC)	IMPERVIOUS AREA / STREETS			LANDSCAPE/UNDEVELOPED AREAS			WEIGHTED		**WEIGHTED CA**		**USE**
		AREA (AC)	C(5)	C(100)	AREA (AC)	C(5)	C(100)	C(5)	C(100)	**CA(5)**	**CA(100)**	
A	0.09	0.09	0.81	0.88	0.00	0.08	0.35	0.81	0.88	**0.07**	**0.08**	**Drive Aisle**
B	0.08	0.08	0.81	0.88	0.00	0.08	0.35	0.81	0.88	**0.06**	**0.07**	**Drive Aisle**
C	1.08	1.08	0.81	0.88	0.00	0.08	0.35	0.81	0.88	**0.87**	**0.95**	**LOT 2**
D	0.77	0.77	0.81	0.88	0.00	0.08	0.35	0.81	0.88	**0.62**	**0.68**	**LOT 1**
E	1.32	1.32	0.81	0.88	0.00	0.08	0.35	0.81	0.88	**1.07**	**1.16**	**LOT 3**
F	1.97	1.97	0.81	0.88	0.00	0.08	0.35	0.81	0.88	**1.60**	**1.73**	**LOT 1**
G	1.86	1.86	0.81	0.88	0.00	0.08	0.35	0.81	0.88	**1.51**	**1.64**	**LOT 1**
H	1.55	1.55	0.81	0.88	0.00	0.08	0.35	0.81	0.88	**1.26**	**1.36**	**LOT 1**
J	4.08	4.08	0.81	0.88	0.00	0.08	0.35	0.81	0.88	**3.30**	**3.59**	**LOT 4**
K	1.25	1.25	0.81	0.88	0.00	0.08	0.35	0.81	0.88	**1.01**	**1.10**	**LOT 4**
L	5.81	0.00	0.81	0.88	5.81	0.08	0.35	0.08	0.35	**0.46**	**2.03**	**EX. SLOPE**

JOB NAME: *South Academy Highlands Filing No. 2A*
JOB NUMBER: *2186.93*
DATE: *06/03/24*
CALCULATED BY: *MAL*

FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY (DEVELOPED)

		IMPERVIOUS AREA / STREETS			LANDSCAPE/UNDEVELOPED AREAS			WEIGHTED		**WEIGHTED CA**		**USE**
BASIN	TOTAL AREA (AC)	AREA (AC)	C(5)	C(100)	AREA (AC)	C(5)	C(100)	C(5)	C(100)	**CA(5)**	**CA(100)**	
M	1.15	0.00	0.81	0.88	1.15	0.08	0.35	0.08	0.35	**0.09**	**0.40**	**EX. SLOPE**
N	3.24	0.00	0.81	0.88	3.24	0.08	0.35	0.08	0.35	**0.26**	**1.13**	**EX. SLOPE**
P	2.26	0.00	0.81	0.88	2.26	0.08	0.35	0.08	0.35	**0.18**	**0.79**	**EX. POND**
Q	1.13	0.00	0.81	0.88	1.13	0.08	0.35	0.08	0.35	**0.09**	**0.40**	**EX. SLOPE**
R	0.37	0.29	0.90	0.95	0.08	0.08	0.35	0.72	0.82	**0.27**	**0.30**	**EX. VENETUCCI BLVD.**
S	0.46	0.42	0.90	0.95	0.04	0.08	0.35	0.83	0.90	**0.38**	**0.41**	**EX. VENETUCCI BLVD.**
T	0.58	0.45	0.90	0.95	0.13	0.08	0.35	0.72	0.82	**0.42**	**0.47**	**EX. VENETUCCI BLVD.**
U	0.82	0.49	0.90	0.95	0.33	0.08	0.35	0.57	0.71	**0.47**	**0.58**	**EX. VENETUCCI BLVD.**
V	1.11	0.27	0.90	0.95	0.84	0.08	0.35	0.28	0.50	**0.31**	**0.55**	**EX. VENETUCCI BLVD.**
W	0.71	0.46	0.90	0.95	0.25	0.08	0.35	0.61	0.74	**0.43**	**0.52**	**EX. VENETUCCI BLVD.**
X	1.31	0.37	0.90	0.95	0.94	0.08	0.35	0.31	0.52	**0.41**	**0.68**	**EX. VENETUCCI BLVD.**
Y	1.06	0.60	0.90	0.95	0.46	0.08	0.35	0.54	0.69	**0.58**	**0.73**	**EX. VENETUCCI BLVD.**

JOB NAME:	***South Academy Highlands Filing No. 2A***
JOB NUMBER:	***2186.93***
DATE:	***06/03/24***
CALC'D BY:	***MAL***

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY (DEVELOPED)

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)*
A	0.07	0.08	0.9	10	0.15	1.0	110	1.5%	4.3	0.4	5.0	5.10	9.07	**0.4**	**0.7**
B	0.06	0.07	0.9	10	0.15	1.0	110	1.5%	4.3	0.4	5.0	5.10	9.07	**0.3**	**0.6**
C	0.87	0.95	0.9	10	0.15	1.0	300	1.0%	3.5	1.4	5.0	5.10	9.07	**4.5**	**8.6**
D	0.62	0.68	0.9	10	0.15	1.0	200	1.5%	4.3	0.8	5.0	5.10	9.07	**3.2**	**6.1**
E	1.07	1.16	0.9	10	0.15	1.0	300	1.0%	3.5	1.4	5.0	5.10	9.07	**5.5**	**10.5**
F	1.60	1.73	0.9	10	0.15	1.0	360	1.5%	4.3	1.4	5.0	5.10	9.07	**8.1**	**15.7**
G	1.51	1.64	0.9	10	0.15	1.0	320	1.5%	4.3	1.2	5.0	5.10	9.07	**7.7**	**14.9**
H	1.26	1.36	0.9	10	0.15	1.0	280	1.5%	4.3	1.1	5.0	5.10	9.07	**6.4**	**12.4**
J	3.30	3.59	0.9	10	0.15	1.0	900	1.5%	4.3	3.5	5.0	5.10	9.07	**16.9**	**32.6**
K	1.01	1.10	0.9	10	0.15	1.0	300	1.5%	4.3	1.2	5.0	5.10	9.07	**5.2**	**10.0**
L	0.46	2.03	0.08	24	8	2.9	225	33.0%	20.1	0.2	5.0	5.10	9.07	**2.4**	**18.5**

JOB NAME:	***South Academy Highlands Filing No. 2A***
JOB NUMBER:	***2186.93***
DATE:	***06/03/24***
CALC'D BY:	***MAL***

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY (DEVELOPED)

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)
M	0.09	0.40	0.08	24	8	2.9	225	33.0%	20.1	0.2	5.0	5.10	9.07	**0.5**	**3.7**
N	0.26	1.13	0.08	24	8	2.9	225	33.0%	20.1	0.2	5.0	5.10	9.07	**1.3**	**10.3**
P	0.18	0.79	0.08	24	8	2.9	200	1.0%	3.5	1.0	5.0	5.10	9.07	**0.9**	**7.2**
Q	0.09	0.40	0.08	24	8	2.9	20	33.0%	20.1	0.0	5.0	5.10	9.07	**0.5**	**3.6**
R	0.27	0.30	0.9	10	0.15	1.0	260	1.5%	4.3	1.0	5.0	5.10	9.07	**1.4**	**2.8**
S	0.38	0.41	0.9	10	0.15	1.0	260	1.5%	4.3	1.0	5.0	5.10	9.07	**1.9**	**3.7**
T	0.42	0.47	0.9	10	0.15	1.0	360	1.5%	4.3	1.4	5.0	5.10	9.07	**2.1**	**4.3**
U	0.47	0.58	0.08	30	8	3.5	580	5.0%	7.8	1.2	5.0	5.10	9.07	**2.4**	**5.3**
V	0.31	0.55	0.08	20	4	3.2	410	7.0%	9.3	0.7	5.0	5.10	9.07	**1.6**	**5.0**
W	0.43	0.52	0.9	10	0.15	1.0	360	1.5%	4.3	1.4	5.0	5.10	9.07	**2.2**	**4.8**
X	0.41	0.68	0.08	36	10	3.8	410	7.0%	9.3	0.7	5.0	5.10	9.07	**2.1**	**6.2**
Y	0.58	0.73	0.08	70	22	5.1	580	5.0%	7.8	1.2	6.4	4.78	8.50	**2.8**	**6.2**

JOB NAME: *South Academy Highlands Filing No. 2A*
JOB NUMBER: *2186.93*
DATE: *06/03/24*
CALCULATED BY: *MAL*

FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY (DEVELOPED)

Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Outfall
					I(5)	I(100)	Q(5)	Q(100)	
1	BASIN C	0.87	0.95	5.0	5.10	9.07	**4.5**	**8.6**	STUB
2	BASIN A	0.07	0.08	5.0	5.10	9.07	**0.4**	**0.7**	5' Type R At-Grade
3	BASIN B	0.06	0.07	5.0	5.10	9.07	**0.3**	**0.6**	5' Type R At-Grade
4	BASIN D	0.62	0.68	5.0	5.10	9.07	**3.2**	**6.1**	STUB
5	BASIN F	1.60	1.73	5.0	5.10	9.07	**8.1**	**15.7**	STUB
6	BASIN E	1.07	1.16	5.0	5.10	9.07	**5.5**	**10.5**	STUB
7	BASIN K	1.01	1.10	5.0	5.10	9.07	**5.2**	**10.0**	STUB
8	BASIN H	1.26	1.36	5.0	5.10	9.07	**6.4**	**12.4**	STUB
9	BASIN G	1.51	1.64	5.0	5.10	9.07	**7.7**	**14.9**	STUB
10	BASIN J	3.30	3.59	5.0	5.10	9.07	**16.9**	**32.6**	STUB

JOB NAME: *South Academy Highlands Filing No. 2A*
JOB NUMBER: *2186.93*
DATE: *06/03/24*
CALCULATED BY: *MAL*

FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY (DEVELOPED)

Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Outfall
					I(5)	I(100)	Q(5)	Q(100)	
12	BASIN R + FLOW-BY DP-2	0.27	0.30	5.0	5.10	9.07	**1.4**	**2.8**	EX. 10' SUMP INLET
13	BASIN S	0.38	0.41	5.0	5.10	9.07	**1.9**	**3.7**	EX. 10' SUMP INLET
14	BASIN T + FLOW-BY DP-3	0.42	0.47	5.0	5.10	9.07	**2.1**	**4.3**	EX. 10' AT-GRADE INLET
15	BASIN W	0.43	0.52	5.0	5.10	9.07	**2.2**	**4.8**	EX. 10' AT-GRADE INLET
16	BASIN X + FLOW-BY DP-15	0.41	0.72	5.0	5.10	9.07	**2.1**	**6.5**	EX. 10' AT-GRADE INLET
17	BASIN V + FLOW-BY DP-14	0.31	0.57	5.0	5.10	9.07	**1.6**	**5.2**	EX. 10' AT-GRADE INLET
18	BASIN Y + FLOW-BY DP-16	0.58	0.86	6.4	4.78	8.50	**2.8**	**7.3**	EX. 6' SUMP INLET
19	BASIN U + FLOW-BY DP-17	0.47	0.63	5.0	5.10	9.07	**2.4**	**5.8**	EX. 6' SUMP INLET
20	BASIN P + BASIN L + PIPE 16 + PIPE 26 + PIPE 28	57.41	64.88	17.5	3.22	5.73	**185.0**	**371.8**	EXISTING DETENTION POND

JOB NAME: *South Academy Highlands Filing No. 2A*
JOB NUMBER: *2186.93*
DATE: *06/03/24*
CALCULATED BY: *MAL*

* 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	0.87	0.95	5.0	5.10	9.07	4.5	8.6	PROP. 24" RCP
2	DP-2 (Intercepted) + PIPE 1	0.95	1.03	5.0	5.10	9.07	4.9	9.3	PROP. 24" RCP
3	DP-3 (Intercepted)	0.06	0.07	5.0	5.10	9.07	0.3	0.6	PROP. 18" RCP
4	PIPE 2 + PIPE 3	1.02	1.10	5.1	5.09	9.04	5.2	9.9	PROP. 24" RCP
5	DP-4	0.62	0.68	5.0	5.10	9.07	3.2	6.1	PROP. 18" RCP
6	DP-5	1.60	1.73	5.0	5.10	9.07	8.1	15.7	PROP. 24" RCP
7	PIPE 4 + PIPE 5 + PIPE 6	3.24	3.51	5.5	4.98	8.86	16.1	31.1	PROP. 30" RCP
8	DP-6	1.07	1.16	5.0	5.10	9.07	5.5	10.5	PROP. 24" RCP
9	PIPE 7 + PIPE 8	4.30	4.67	6.4	4.77	8.49	20.5	39.6	PROP. 36" RCP
10	DP-7	1.01	1.10	5.0	5.10	9.07	5.2	10.0	PROP. 24" RCP
11	DP-8	1.26	1.36	5.0	5.10	9.07	6.4	12.4	PROP. 24" RCP
12	PIPE 9 + PIPE 10 + PIPE 11	6.57	7.13	7.3	4.58	8.15	30.1	58.1	PROP. 42" RCP
13	DP-9	1.51	1.64	5.0	5.10	9.07	7.7	14.9	PROP. 24" RCP
14	PIPE 12 + PIPE 13	8.08	8.77	7.7	4.51	8.02	36.4	70.3	PROP. 42" RCP

JOB NAME: *South Academy Highlands Filing No. 2A*
JOB NUMBER: *2186.93*
DATE: *06/03/24*
CALCULATED BY: *MAL*

* 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)	
15	DP-10	3.30	3.59	5.0	5.10	9.07	16.9	32.6	PROP. 36" RCP
16	PIPE 14 + PIPE 15	11.38	12.36	7.7	4.51	8.02	51.3	99.1	PROP. 42" RCP
17	EX. 66" FROM FILING NO. 1 REPORT	42.12	45.44	16.0	3.36	5.97	141.5	271.5	EX. 66" RCP
18	DP-12	0.27	0.30	5.0	5.10	9.07	1.4	2.8	EX. 18" RCP
19	DP-13	0.38	0.41	5.0	5.10	9.07	1.9	3.7	EX. 18" RCP
20	PIPE 17 + PIPE 18 + PIPE 19	42.77	46.16	16.3	3.33	5.92	142.3	273.1	EX. 66" RCP
21	DP-14 (Intercepted)	0.41	0.45	5.0	5.10	9.07	2.1	4.1	EX. 18" RCP
22	DP-15 (Intercepted)	0.43	0.48	5.0	5.10	9.07	2.2	4.4	EX. 18" RCP
23	PIPE 20 + PIPE 21 + PIPE 22	43.61	47.09	17.3	3.24	5.76	141.4	271.4	EX. 66" RCP
24	DP-16 (Intercepted)	0.41	0.60	5.0	5.10	9.07	2.1	5.4	EX. 18" RCP
25	PIPE 24 + DP-17 (Intercepted)	0.72	1.11	5.0	5.10	9.07	3.7	10.1	EX. 18" RCP
26	PIPE 23 + PIPE 25	44.34	48.21	17.5	3.22	5.73	142.9	276.2	EX. 66" RCP
27	DP-18	0.58	0.86	6.4	4.78	8.50	2.8	7.3	EX. 18" RCP
28	PIPE 27 + DP-19	1.04	1.49	6.4	4.78	8.50	5.0	12.7	EX. 24" RCP

JOB NAME: ***South Academy Highlands Filing No. 2A***
JOB NUMBER: ***2186.93***
DATE: ***06/03/24***
CALCULATED BY: ***MAL***

At-Grade Inlet - Flow Routing (DEVELOPED CONDITIONS)

Design Point	TOTAL						INTERCEPTED				FLOW-BY			
	CA5	CA100	I5	I100	Q5	Q100	Q5	Q100	CA5	CA100	Q5	Q100	CA5	CA100
2	0.07	0.08	5.10	9.07	0.4	0.7	0.4	0.7	0.08	0.08	0.0	0.0	0.00	0.00
3	0.06	0.07	5.10	9.07	0.3	0.6	0.3	0.6	0.06	0.07	0.0	0.0	0.00	0.00
14	0.42	0.47	5.10	9.07	2.1	4.3	2.1	4.1	0.41	0.45	0.0	0.2	0.00	0.02
15	0.43	0.52	5.10	9.07	2.2	4.8	2.2	4.4	0.43	0.48	0.0	0.4	0.00	0.04
16	0.41	0.72	5.10	9.07	2.1	6.5	2.1	5.4	0.41	0.60	0.0	1.1	0.00	0.13
17	0.31	0.57	5.10	9.07	1.6	5.2	1.6	4.7	0.31	0.52	0.0	0.5	0.00	0.05

JOB NAME: South Academy Highlands Filing No. 2A
JOB NUMBER: 2186.93
DATE: 6/3/2024
CALCULATED BY:

FINAL DRAINAGE REPORT ~ PIPE TRAVEL TIMES

PIPE RUN	STREET / CHANNEL FLOW				
	Pipe Diameter *(ft)*	Length *(ft)*	Slope *(%)*	Velocity *(fps)*	Tc *(min)*
2	2.0	20	0.5%	5.1	0.1
4	2.0	130	0.5%	5.1	0.4
7	2.5	290	0.5%	5.9	0.8
9	3.0	360	0.5%	6.7	0.9
12	3.0	150	0.5%	6.7	0.4
17	5.5	200	0.5%	10.0	0.3
20	5.5	560	0.5%	10.0	0.9
23	5.5	470	7.2%	38.0	0.2
26	5.5	500	7.3%	38.3	0.2

Design Procedure Form: Extended Detention Basin (EDB)

UD-BMP (Version 3.07, March 2018)

Designer: M. LARSON
Company: CLASSIC CONSULTING
Date: May 31, 2024
Project: SOUTH ACADEMY HIGHLANDS FIL. 2A
Location: POND

1. Basin Storage Volume

A) Effective Imperviousness of Tributary Area, I_a — I_a = 73.9 %

B) Tributary Area's Imperviousness Ratio ($i = I_a / 100$) — i = 0.739

C) Contributing Watershed Area — Area = 81.120 ac

D) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm — d_6 = 0.42 in

E) Design Concept (Select EURV when also designing for flood control)

Choose One
- ○ Water Quality Capture Volume (WQCV)
- ◉ Excess Urban Runoff Volume (EURV)

F) Design Volume (WQCV) Based on 40-hour Drain Time
($V_{DESIGN} = (1.0 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i) / 12 * Area$)
V_{DESIGN} = ac-ft

G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume
($V_{WQCV\ OTHER} = (d_6 * (V_{DESIGN} / 0.43))$)
$V_{DESIGN\ OTHER}$ = 1.940 ac-ft

H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired)
$V_{DESIGN\ USER}$ = ac-ft

I) NRCS Hydrologic Soil Groups of Tributary Watershed
i) Percentage of Watershed consisting of Type A Soils — HSG_A = 0 %
ii) Percentage of Watershed consisting of Type B Soils — HSG_B = 0 %
iii) Percentage of Watershed consisting of Type C/D Soils — $HSG_{C/D}$ = 100 %

J) Excess Urban Runoff Volume (EURV) Design Volume
For HSG A: $EURV_A = 1.68 * i^{1.28}$
For HSG B: $EURV_B = 1.36 * i^{1.08}$
For HSG C/D: $EURV_{C/D} = 1.20 * i^{1.08}$
$EURV_{DESIGN}$ = 5.851 ac-f t

K) User Input of Excess Urban Runoff Volume (EURV) Design Volume (Only if a different EURV Design Volume is desired)
$EURV_{DESIGN\ USER}$ = ac-f t

2. Basin Shape: Length to Width Ratio (A basin length to width ratio of at least 2:1 will improve TSS reduction.)
L : W = 4.0 : 1

3. Basin Side Slopes

A) Basin Maximum Side Slopes (Horizontal distance per unit vertical, 4:1 or flatter preferred)
Z = 4.00 ft / ft

4. Inlet

A) Describe means of providing energy dissipation at concentrated inflow locations:
CONCRETE IMPACT STRUCTURE & FOREBAY

5. Forebay

A) Minimum Forebay Volume (V_{FMIN} = 3% of the WQCV)
V_{FMIN} = 0.058 ac-ft

B) Actual Forebay Volume
V_F = 0.204 ac-ft

C) Forebay Depth (D_F = 30 inch maximum)
D_F = 24.0 in

D) Forebay Discharge

i) Undetained 100-year Peak Discharge
Q_{100} = 369.00 cfs

ii) Forebay Discharge Design Flow ($Q_F = 0.02 * Q_{100}$)
Q_F = 7.38 cfs

E) Forebay Discharge Design

Choose One
- ◉ Berm With Pipe
- ○ Wall with Rect. Notch
- ○ Wall with V-Notch Weir

ROUND UP TO NEAREST PIPE SIZE

F) Discharge Pipe Size (minimum 8-inches)
Calculated D_P = 16 in

G) Rectangular Notch Width
Calculated W_N = in

Design Procedure Form: Extended Detention Basin (EDB)

Designer: M. LARSON
Company: CLASSIC CONSULTING
Date: May 31, 2024
Project: SOUTH ACADEMY HIGHLANDS FIL. 2A
Location: POND

6. Trickle Channel		
A) Type of Trickle Channel	Choose One: ○ Concrete ◉ Soft Bottom	PROVIDE A CONSISTENT LONGITUDINAL SLOPE FROM FOREBAY TO MICROPOOL WITH NO MEANDERING. RIPRAP AND SOIL RIPRAP LINED CHANNELS ARE NOT RECOMMENDED.
F) Slope of Trickle Channel	S = 0.0100 ft / ft	MINIMUM DEPTH OF 1.5 FEET
7. Micropool and Outlet Structure		
A) Depth of Micropool (2.5-feet minimum)	D_M = 2.5 ft	
B) Surface Area of Micropool (10 ft^2 minimum)	A_M = 1163 sq ft	
C) Outlet Type	Choose One: ◉ Orifice Plate ○ Other (Describe):	
D) Smallest Dimension of Orifice Opening Based on Hydrograph Routing (Use UD-Detention)	$D_{orifice}$ = 0.50 inches	
E) Total Outlet Area	A_{ot} = 1.70 square inches	
8. Initial Surcharge Volume		
A) Depth of Initial Surcharge Volume (Minimum recommended depth is 4 inches)	D_{IS} = 4 in	
B) Minimum Initial Surcharge Volume (Minimum volume of 0.3% of the WQCV)	V_{IS} = 254 cu ft	
C) Initial Surcharge Provided Above Micropool	V_s = 387.7 cu ft	
9. Trash Rack		
A) Water Quality Screen Open Area: $A_t = A_{ni} * 38.5*(e^{-0.095D})$	A_t = 62 square inches	
B) Type of Screen (If specifying an alternative to the materials recommended in the USDCM, indicate "other" and enter the ratio of the total open are to the total screen are for the material specified.)	*S.S. Well Screen with 60% Open Area*	
Other (Y/N): N		
C) Ratio of Total Open Area to Total Area (only for type 'Other')	User Ratio =	
D) Total Water Quality Screen Area (based on screen type)	A_{total} = 104 sq. in.	
E) Depth of Design Volume (EURV or WQCV) (Based on design concept chosen under 1E)	H= 6.5 feet	
F) Height of Water Quality Screen (H_{TR})	H_{TR}= 106 inches	
G) Width of Water Quality Screen Opening ($W_{opening}$) (Minimum of 12 inches is recommended)	$W_{opening}$ = 12.0 inches	VALUE LESS THAN RECOMMENDED MIN. WIDTH. WIDTH HAS BEEN SET TO 12 INCHES.

Design Procedure Form: Extended Detention Basin (EDB)

Designer: M. LARSON
Company: CLASSIC CONSULTING
Date: May 31, 2024
Project: SOUTH ACADEMY HIGHLANDS FIL. 2A
Location: POND

10. Overflow Embankment

A) Describe embankment protection for 100-year and greater overtopping: Riprap emergency spillway

B) Slope of Overflow Embankment
(Horizontal distance per unit vertical, 4:1 or flatter preferred)

Ze = 3.00 ft / ft
DIFFICULT TO MAINTAIN, INCREASE WHERE POSSIBLE

11. Vegetation

Choose One
- ○ Irrigated
- ◉ Not Irrigated

12. Access

A) Describe Sediment Removal Procedures: ACCESS ROAD TO BOTTOM OF FACILITY

Notes:

Version 4.05 Released March 2017

INLET MANAGEMENT

Worksheet Protected

INLET NAME	DP2	DP3	DP-12	DP-13	DP-14	DP-15
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	In Sump	In Sump	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	0.4	0.3	1.4	1.9	2.1	2.2
Major Q_{Known} (cfs)	0.7	0.6	2.8	3.7	4.3	4.8

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0	0.0	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0	0.0	0.0	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)	**0.4**	**0.3**	**1.4**	**1.9**	**2.1**	**2.2**
Major Total Design Peak Flow, Q (cfs)	**0.7**	**0.6**	**2.8**	**3.7**	**4.3**	**4.8**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.0	0.0	N/A	N/A	0.0	0.0
Major Flow Bypassed Downstream, Q_b (cfs)	0.0	0.0	N/A	N/A	0.2	0.4

Minor Storm (Calculated) Analysis of Flow Time

C	N/A	N/A	N/A	N/A	N/A	N/A
C_5	N/A	N/A	N/A	N/A	N/A	N/A
Overland Flow Velocity, Vi	N/A	N/A	N/A	N/A	N/A	N/A
Channel Flow Velocity, Vt	N/A	N/A	N/A	N/A	N/A	N/A
Overland Flow Time, Ti	N/A	N/A	N/A	N/A	N/A	N/A
Channel Travel Time, Tt	N/A	N/A	N/A	N/A	N/A	N/A
Calculated Time of Concentration, T_c	N/A	N/A	N/A	N/A	N/A	N/A
Regional T_c	N/A	N/A	N/A	N/A	N/A	N/A
Recommended T_c	N/A	N/A	N/A	N/A	N/A	N/A
T_c selected by User	N/A	N/A	N/A	N/A	N/A	N/A
Design Rainfall Intensity, I	N/A	N/A	N/A	N/A	N/A	N/A
Calculated Local Peak Flow, Q_p	N/A	N/A	N/A	N/A	N/A	N/A

Major Storm (Calculated) Analysis of Flow Time

C	N/A	N/A	N/A	N/A	N/A	N/A
C_5	N/A	N/A	N/A	N/A	N/A	N/A
Overland Flow Velocity, Vi	N/A	N/A	N/A	N/A	N/A	N/A
Channel Flow Velocity, Vt	N/A	N/A	N/A	N/A	N/A	N/A
Overland Flow Time, Ti	N/A	N/A	N/A	N/A	N/A	N/A
Channel Travel Time, Tt	N/A	N/A	N/A	N/A	N/A	N/A
Calculated Time of Concentration, T_c	N/A	N/A	N/A	N/A	N/A	N/A
Regional T_c	N/A	N/A	N/A	N/A	N/A	N/A
Recommended T_c	N/A	N/A	N/A	N/A	N/A	N/A
T_c selected by User	N/A	N/A	N/A	N/A	N/A	N/A
Design Rainfall Intensity, I	N/A	N/A	N/A	N/A	N/A	N/A
Calculated Local Peak Flow, Q_p	N/A	N/A	N/A	N/A	N/A	N/A

Version 4.05 Released March 2017

INLET MANAGEMENT

Worksheet Protected

INLET NAME	DP-16	DP-17	DP-18	DP-19
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	In Sump	In Sump
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	2.1	1.6	2.8	2.4
Major Q_{Known} (cfs)	6.1	5.0	6.2	5.3

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.4	0.2	1.1	0.5

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)	**2.1**	**1.6**	**2.8**	**2.4**
Major Total Design Peak Flow, Q (cfs)	**6.5**	**5.2**	**7.3**	**5.8**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.0	0.0	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	1.1	0.5	N/A	N/A

Minor Storm (Calculated) Analysis of Flow T

C	N/A	N/A	N/A	N/A
C_5	N/A	N/A	N/A	N/A
Overland Flow Velocity, Vi	N/A	N/A	N/A	N/A
Channel Flow Velocity, Vt	N/A	N/A	N/A	N/A
Overland Flow Time, Ti	N/A	N/A	N/A	N/A
Channel Travel Time, Tt	N/A	N/A	N/A	N/A
Calculated Time of Concentration, T_c	N/A	N/A	N/A	N/A
Regional T_c	N/A	N/A	N/A	N/A
Recommended T_c	N/A	N/A	N/A	N/A
T_c selected by User	N/A	N/A	N/A	N/A
Design Rainfall Intensity, I	N/A	N/A	N/A	N/A
Calculated Local Peak Flow, Q_p	N/A	N/A	N/A	N/A

Major Storm (Calculated) Analysis of Flow T

C	N/A	N/A	N/A	N/A
C_5	N/A	N/A	N/A	N/A
Overland Flow Velocity, Vi	N/A	N/A	N/A	N/A
Channel Flow Velocity, Vt	N/A	N/A	N/A	N/A
Overland Flow Time, Ti	N/A	N/A	N/A	N/A
Channel Travel Time, Tt	N/A	N/A	N/A	N/A
Calculated Time of Concentration, T_c	N/A	N/A	N/A	N/A
Regional T_c	N/A	N/A	N/A	N/A
Recommended T_c	N/A	N/A	N/A	N/A
T_c selected by User	N/A	N/A	N/A	N/A
Design Rainfall Intensity, I	N/A	N/A	N/A	N/A
Calculated Local Peak Flow, Q_p	N/A	N/A	N/A	N/A

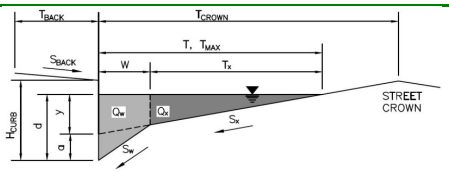
Version 4.05 Released March 2017

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

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

Project: Enter Your Project Name Here

Inlet ID: DP2



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	12.0	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 =	0.063	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	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} =	12.0	12.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.1	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

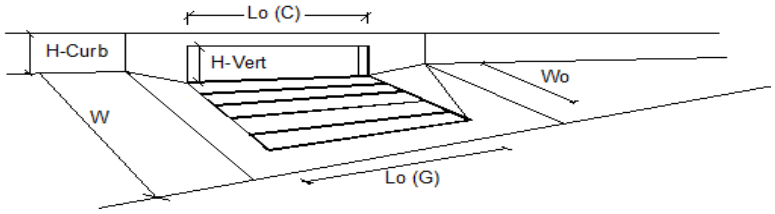
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**4.9**	**4.9**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.4**	**0.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**100**	**%**

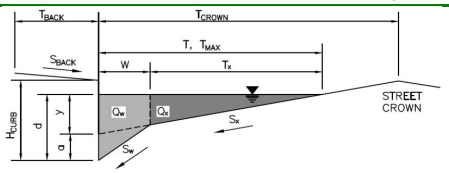
Version 4.05 Released March 2017

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

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

Project: Enter Your Project Name Here

Inlet ID: DP3



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	12.0	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 =	0.062	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	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} =	12.0	12.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.1	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

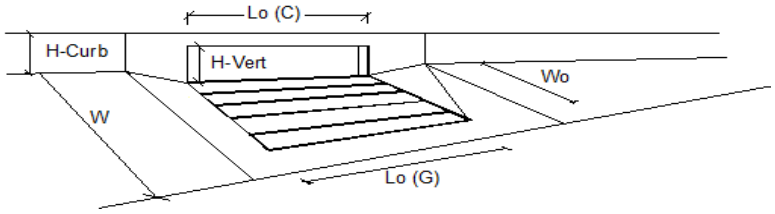
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**4.9**	**4.9**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.3**	**0.6**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**100**	**%**

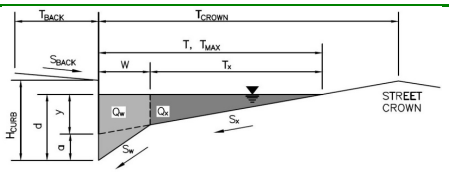
Version 4.05 Released March 2017

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

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

Project: Enter Your Project Name Here

Inlet ID: DP-12



Gutter Geometry (Enter data in the blue cells)

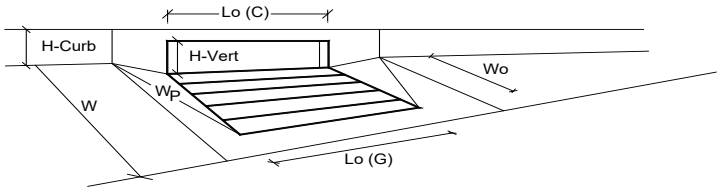
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	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 =	0.063	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.1	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



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 =	6.0	9.1	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
Area Opening 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) =	10.00	10.00	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 (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	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} =	0.38	0.63	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	0.86	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.93	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**9.9**	**21.1**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	1.4	2.8	cfs

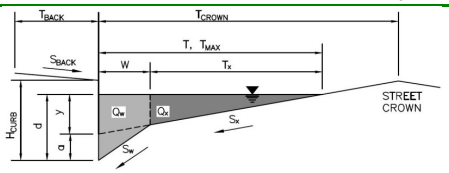
Version 4.05 Released March 2017

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

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

Project: Enter Your Project Name Here

Inlet ID: DP-13



Gutter Geometry (Enter data in the blue cells)

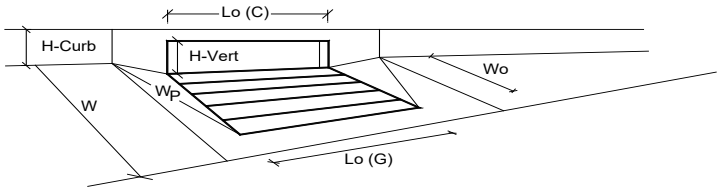
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	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 =	0.063	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.1	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		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 =	6.0	9.1	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
Area Opening 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) =	10.00	10.00	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 (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	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} =	0.38	0.63	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.57	0.86	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	0.93	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		**Q_a =**	**9.9**	**21.1**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	1.9	3.7	cfs

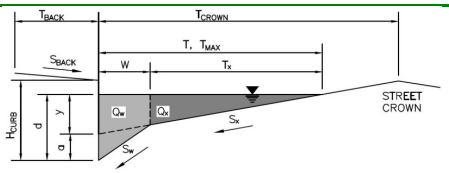
Version 4.05 Released March 2017

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

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

Project: Enter Your Project Name Here

Inlet ID: DP-14



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	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 =	0.063	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.017	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.1	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

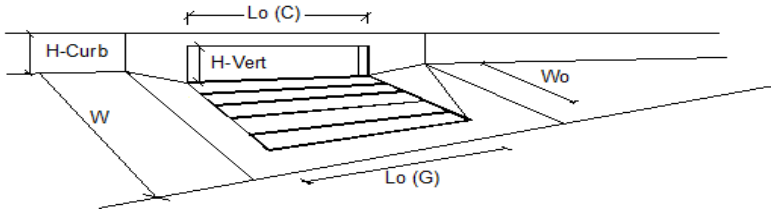
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**13.7**	**13.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.1**	**4.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**94**	**%**

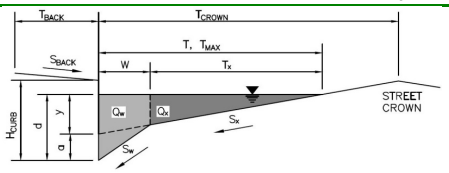
Version 4.05 Released March 2017

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

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

Project: Enter Your Project Name Here

Inlet ID: DP-15



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	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 =	0.063	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.017	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.1	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

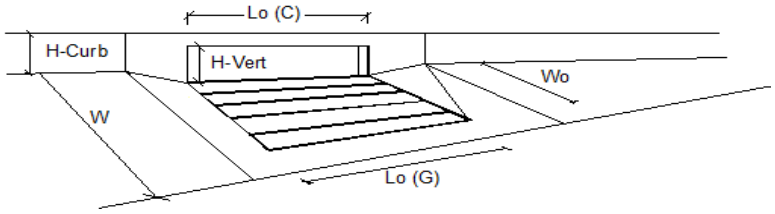
	Minor Storm	Major Storm	
Q_{allow} =	**13.7**	**69.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening	
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0 inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00 ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.2**	**4.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.4**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**91**	**%**

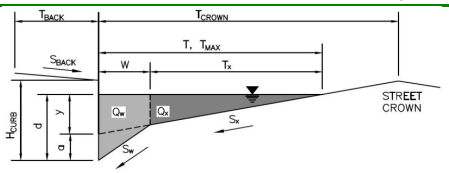
Version 4.05 Released March 2017

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

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

Project: Enter Your Project Name Here

Inlet ID: DP-16



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	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 =	0.063	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.080	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.1	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

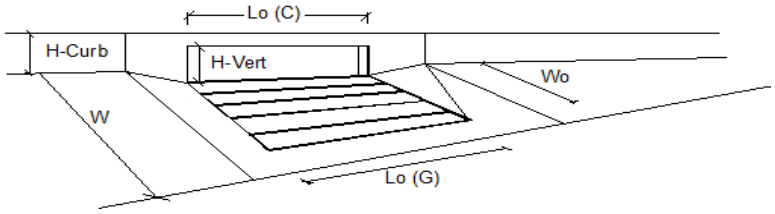
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**16.7**	**43.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.1**	**5.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.1**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**83**	**%**

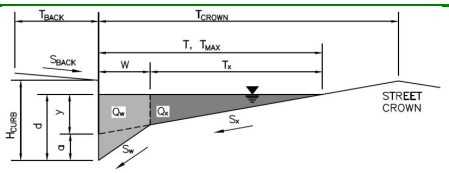
Version 4.05 Released March 2017

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

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

Project: Enter Your Project Name Here

Inlet ID: DP-17



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	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 =	0.063	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.080	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.1	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

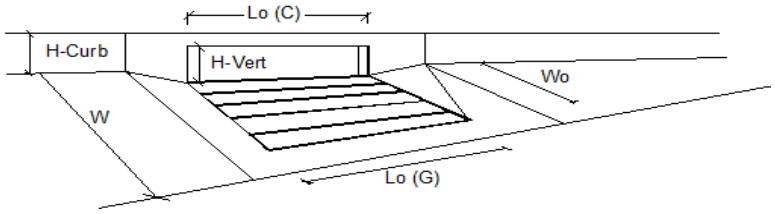
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**16.7**	**43.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.6**	**4.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.5**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**90**	**%**

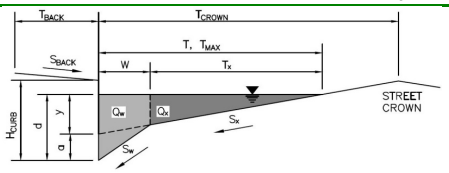
Version 4.05 Released March 2017

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

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

Project: Enter Your Project Name Here

Inlet ID: DP-18



Gutter Geometry (Enter data in the blue cells)

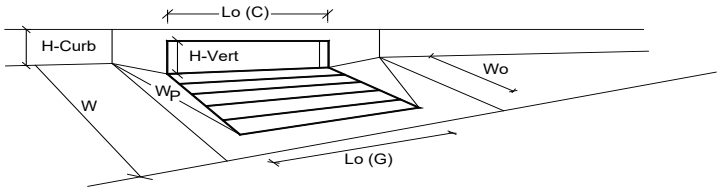
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	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 =	0.063	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.1	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



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 =	6.0	9.1	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
Area Opening 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 (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	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} =	0.38	0.63	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**6.4**	**10.7**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.8	7.3	cfs

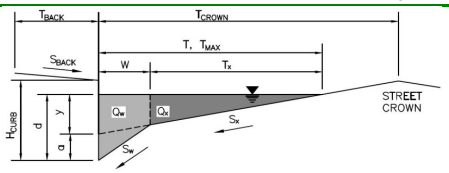
Version 4.05 Released March 2017

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

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

Project: Enter Your Project Name Here

Inlet ID: DP-19



Gutter Geometry (Enter data in the blue cells)

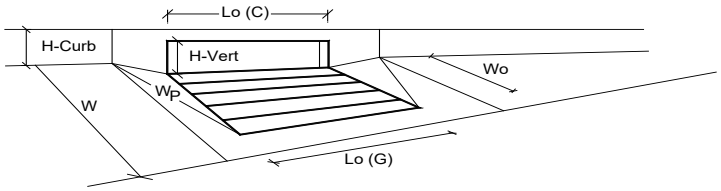
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	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 =	0.063	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.1	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		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 =	6.0	9.1	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
Area Opening 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 (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	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} =	0.38	0.63	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		**Q_a =**	**6.4**	**10.7**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	2.4	5.8	cfs

DRAINAGE MAPS

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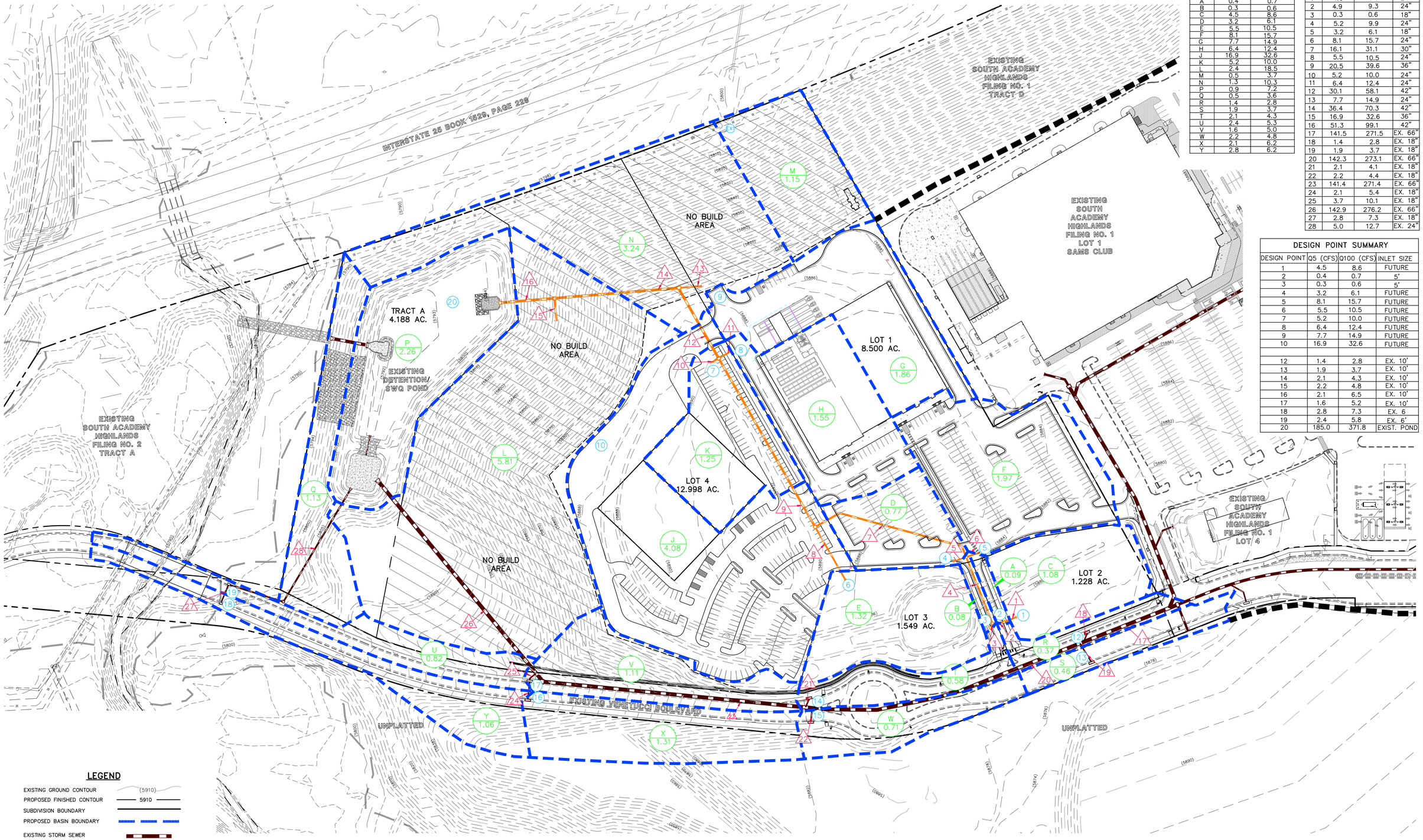

BASIN RUNOFF SUMMARY		
BASIN	Q5 (CFS)	Q100 (CFS)
A	0.4	0.7
B	0.3	0.6
C	4.5	8.6
D	3.2	6.1
E	5.5	10.5
F	8.1	15.7
G	7.7	14.9
H	6.4	12.4
J	16.9	32.6
K	5.2	10.0
L	2.4	18.5
M	0.5	3.7
N	1.3	10.3
P	0.9	7.2
Q	0.5	3.6
R	1.4	2.8
S	1.9	3.7
T	2.1	4.3
U	2.4	5.3
V	1.6	5.0
W	2.2	4.8
X	2.1	6.2
Y	2.8	6.2

PIPE RUN SUMMARY			
PIPE	Q5 (CFS)	Q100 (CFS)	SIZE
1	4.5	8.6	24"
2	4.9	9.3	24"
3	0.3	0.6	18"
4	5.2	9.9	24"
5	3.2	6.1	18"
6	8.1	15.7	24"
7	16.1	31.1	30"
8	5.5	10.5	24"
9	20.5	39.6	36"
10	5.2	10.0	24"
11	6.4	12.4	24"
12	30.1	58.1	42"
13	7.7	14.9	24"
14	36.4	70.3	42"
15	16.9	32.6	36"
16	51.3	99.1	42"
17	141.5	271.5	EX. 66"
18	1.4	2.8	EX. 18"
19	1.9	3.7	EX. 18"
20	142.3	273.1	EX. 66"
21	2.1	4.1	EX. 18"
22	2.2	4.4	EX. 18"
23	141.4	271.4	EX. 66"
24	2.1	5.4	EX. 18"
25	3.7	10.1	EX. 18"
26	142.9	276.2	EX. 66"
27	2.8	7.3	EX. 18"
28	5.0	12.7	EX. 24"

DESIGN POINT SUMMARY			
DESIGN POINT	Q5 (CFS)	Q100 (CFS)	INLET SIZE
1	4.5	8.6	FUTURE
2	0.4	0.7	5'
3	0.3	0.6	5'
4	3.2	6.1	FUTURE
5	8.1	15.7	FUTURE
6	5.5	10.5	FUTURE
7	5.2	10.0	FUTURE
8	6.4	12.4	FUTURE
9	7.7	14.9	FUTURE
10	16.9	32.6	FUTURE
12	1.4	2.8	EX. 10'
13	1.9	3.7	EX. 10'
14	2.1	4.3	EX. 10'
15	2.2	4.8	EX. 10'
16	2.1	6.5	EX. 10'
17	1.6	5.2	EX. 10'
18	2.8	7.3	EX. 6
19	2.4	5.8	EX. 6'
20	185.0	371.8	EXIST. POND

LEGEND

- EXISTING GROUND CONTOUR (5910)
- PROPOSED FINISHED CONTOUR 5910
- SUBDIVISION BOUNDARY
- PROPOSED BASIN BOUNDARY
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- BASIN IDENTIFIER / AREA IN ACRES: D / 1.41
- DESIGN POINT: 10
- PIPE RUN: 1

N

80 40 0 80 160

SCALE: 1" = 80'

48 HOURS BEFORE YOU DIG, CALL UTILITY LOCATORS
811
UTILITY NOTIFICATION OF COLORADO
IT'S THE LAW

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NO.	REVISION	DATE

REVIEW:

PREPARED UNDER MY DIRECT SUPERVISION FOR AND ON BEHALF OF CLASSIC CONSULTING ENGINEERS AND SURVEYORS, LLC

KYLE R. CAMPBELL, COLORADO P.E. #29794 DATE

CLASSIC SM
CONSULTING ENGINEERS & SURVEYORS
6385 Corporate Drive, Suite 101 (719)785-0790
Colorado Springs, Colorado 80919 (719)785-0799(Fax)

SOUTH ACADEMY HIGHLANDS
FILING NO. 2A
PRELIMINARY DRAINAGE REPORT
DRAINAGE MAP

DESIGNED BY	MAL	SCALE		DATE	05/31/24
DRAWN BY	MAL	(H) 1"=	80'	SHEET	1 OF 1
CHECKED BY		(V) 1"=	N/A	JOB NO.	2184.92

N:\21863\DRAWINGS\DEVELOPMENT\DEVELOPED MAP.dwg, 6/3/2024 11:06:13 AM, 1:1