PRELIMINARY DRAINAGE REPORT
FOR
THE VILLAS AT CLAREMONT RANCH

November 2020

Prepared for:

Rodo Investments, LLC
20 Boulder Crescent, 2nd Floor
Colorado Springs, Co 80903

PUDSP-21-001

Prepared By:

CATAMOUNT ENGINEERING
321 W. Henrietta Ave, Suite A
Woodland Park, CO 80863
719-426-2124

PRELIMINARY DRAINAGE REPORT
THE VILLAS AT CLAREMONT RANCH

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 the criteria established 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.

Certification Statement:
This report and plan for the preliminary drainage design for the Villas at Claremont Ranch was prepared by me (or under my direct supervision) in accordance with the provisions of City of Colorado Springs Drainage Criteria Manual Volumes 1 and 2 Drainage Design and Technical Criteria for the owners thereof. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others.

Only use County signature blocks

David L. Mijares, Colorado PE #40510 Date
For and on behalf of Catamount Engineering

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

Rodo Investments, LLC hereby certifies that the drainage facilities for Villas at Claremont Ranch shall be constructed according to the design presented in this report. I understand that the City of Colorado Springs does not and will not assume liability for the drainage facilities designed and or certified by my engineer and that the City of Colorado Springs reviews drainage plans pursuant to Colorado Revised Statues, Title 30, Article 28; but cannot, on behalf of Villas at Claremont Ranch, guarantee that final drainage design review will absolve Rodo Investments, LLC and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Rodo Investments, LLC
Business Name

By: _____

Title: _____

Address: 20 Boulder Crescent, 2nd floor
Colorado Springs, CO 80903

El Paso County:
Filed in accordance with the requirements of the El Paso County land Development Code and the Drainage Criteria manual Volumes 1 and 2, and the El Paso County Engineering Criteria Manual, latest revision.

Jennifer Irvine, PE Date
County Engineer/ECM Administrator

Conditions:

PRELIMINARY DRAINAGE REPORT for
THE VILLAS AT CLAREMONT RANCH

PURPOSE

The purpose of this drainage report is to identify existing drainage patterns, quantify developed storm water runoff, and establish outfall scenarios from the proposed development. Additionally this analysis will establish compliance with previous drainage studies and provide for water quality and detention of developed runoff.

GENERAL LOCATION AND DESCRIPTION

The subject 10.17 acres is proposed to be platted into 83 residential townhome lots and is located within the southwest ¼ of Section 4, Township 14 South, Range 65 West of the 6th principal meridian El Paso County, Colorado. The parcel was previously platted as tracts G and A, Claremont Ranch Filing No. 7

Tract I and

The parcel is bounded on the north by the East Fork of Sand Creek, on the east by the Claremont Ranch Filing No. 7 single family residential development, on the south by Meadowbrook Parkway and undeveloped tract F, and on the west by Marksheffel Road.

The site has been previously stripped and contains little volunteer vegetation besides erosion control cover. The existing terrain generally slopes to the west at a 2% grade. A swale has been formed adjacent to the Marksheffel embankment conveying undeveloped flow overland to the east Fork of Sand Creek. The site lies within the Sand Creek Drainage Basin.

Soils in the development parcel consist predominantly of Blendon sandy loam (Hydrologic Group 'B' soils) and also contains Blakeland loamy sand and Ellicott loamy coarse sand (Hydrologic Group 'A' soils) as determined by the Natural Resources Conservation Service Web Soil Survey. Hydrologic Group B soils were used in analysis.

No portion of the development lies within an F.E.M.A. designated floodplain per FIRM 08041C0756 G, effective 12/07/2018. The revised F.E.M.A. Flood Insurance Rate Map has been provided in the appendix.

EXISTING DRAINAGE CONDITIONS

The site was previously studied in the Final Drainage Report for Claremont Ranch Filing No. 7. Development of Filing No. 7 required analysis and implementation of improvements within the adjacent Lower East Fork of Sand Creek. Improvements were implemented per the Sand Creek Drainage Basin Planning Study and Preliminary Design Report; City of Colorado Springs, El Paso County, Colorado (DBPS), prepared by Kiowa Engineering Corp., revised March 1996. As upstream detention proposed in the DBPS has not been implemented the more conservative FEMA 100-YR Flow was utilized in channel evaluation and improvement. The FEMA analysis

assumes a 100-YR flow of 4,500 cfs through the adjacent reach, while the DBPS estimates a flow of 3,310 cfs with upstream detention. The adjacent Lower East Fork Sand Creek improvements are detailed in the Final Drainage Report for Claremont Ranch Filing no. 7.

The Villas at Claremont Ranch were platted as Tracts 'G' and 'A' with development of Claremont Ranch Filing No. 7 and was identified as 12.21 acre commercial development (basin 7) in the final drainage report. Anticipated runoff from Basin 7 was Q_5=9.5 cfs, Q_{100}=24.4 in the interim condition and Q_5=56.0 cfs, Q_{100}=96.7 in the fully developed condition. The Villas at Claremont Ranch lies entirely with the Sand Creek Drainage Basin Planning Study area.

Basin 6 Claremont Ranch Filing No. 7 consists of undeveloped tract F south of Meadowbrook Parkway. The 11.18 basin is proposed for commercial use and generates anticipated runoff of was Q_5=10.1 cfs, Q_{100}=25.8 in the interim condition and Q_5=56.0 cfs, Q_{100}=96.7 in the fully developed condition. A temporary 24" culvert crossing was installed with development of Meadowbrook Parkway to convey flows north to Sand Creek. Interim flows will be conveyed in existing swale section developed with Filing No. 7 improvements within the 70' utility and drainage easement located along the west side of the proposed Villas at Claremont Ranch Development. Developed flows will not be accepted onto the Villas at Claremont Ranch and any development scenarios for Tract F will require water quality implementation and full spectrum detention prior to site release across Meadowbrook Parkway. Interim flows defined in the Final Drainage Report for Filing No. 7 will be accepted.

DEVELOPED DRAINAGE BASINS

Developed basins proposed to receive an increase in impervious areas will be routed to an on-site extended detention basin providing full spectrum detention prior to release to the East Fork of Sand Creek. Basins routed through the proposed EDB will be collected in on proposed private roadway sections and collected in a private inlet system. Collected runoff will be conveyed in a private storm system to the EDB. A summary of peak developed runoff for the basins and design points are depicted in the Developed Drainage Plan in the appendix.

Basin 1 consists of perimeter landscape areas directly tributary to the East Fork of Sand Creek and will not be collected in the proposed extended detention basin. Basin 1 contains 2.25 acres and generates runoff of (Q_2=0.2 cfs, Q_5=0.6 cfs, Q_{10}=1.2 cfs, Q_{25}=2.0 cfs, Q_{50}=2.6 cfs, and Q_{100}=3.3 cfs). Runoff from Basin 1 will either sheetflow directly to the reach of Sand Creek or be combined with interim condition runoff from Basin 6 (Claremont Ranch Filing No. 7) of Q_5=10.1 cfs, Q_{100}=25.8 to the existing riprap rundown to Sand Creek. The swale and rundown installed with filing 7 improvements was developed to convey interim flows from both Basin 6 (tract F, Claremont Ranch Filing No. 7) and Basin 7 (tracts G and A, Claremont Ranch Filing No. 7) with a combined flow of Q_5=19.6 cfs, Q_{100}=50.2. Interim flows anticipated in Filing No. 7 are greater than the proposed flows with development of the Villas at Claremont Ranch.

BASINS TRIBUTARY TO EDB

Basins 2-8 consist of the landscape areas, residential townhome lots, and private street improvements tributary to the proposed extended detention basin. Basin 9 consists of rear lots developed within the residential portion of Filing No. 7 tributary to the extended detention basin.

Basin 2 (1.92 Acres, Q_2=1.3 cfs, Q_5=1.9 cfs, Q_{10}=2.7 cfs, Q_{25}=3.8 cfs, Q_{50}=4.6 cfs, and Q_{100}=5.6 cfs) consists of lots and landscape area along the north and east of the development. Flows from basin 2 will be conveyed in a grass swale along the northeast of the development to outfall directly to the proposed detention pond.

Basin 3 (0.76 Acres, Q_2=1.1 cfs, Q_5=1.5 cfs, Q_{10}=2.0 cfs, Q_{25}=2.5 cfs, Q_{50}=2.9 cfs, and Q_{100}=3.4 cfs) consists of townhome lots and roadway improvements tributary to the proposed 5' type R inlet at Design Point 2. Calculations for Carrside Grove street capacity and inlet analysis are provided in the appendix.

Basin 4 (1.00 Acres, Q_2=1.3 cfs, Q_5=1.8 cfs, Q_{10}=2.3 cfs, Q_{25}=2.9 cfs, Q_{50}=3.5 cfs, and Q_{100}=4.1 cfs) consists of townhome lots, landscape corridors, and roadway improvements tributary to the proposed 5' type R inlet at Design Point 3. Calculations for Carrside Grove street capacity and inlet analysis are provided in the appendix.

Basin 5 (0.81 Acres, Q_2=1.2 cfs, Q_5=1.7 cfs, Q_{10}=2.2 cfs, Q_{25}=2.7 cfs, Q_{50}=3.2 cfs, and Q_{100}=3.8 cfs) consists of townhome lots, landscape corridors, and roadway improvements tributary to the proposed 5' type R inlet at Design Point 4. Calculations for Fieldside Way street capacity and inlet analysis are provided in the appendix.

Basin 6 (2.58 Acres, Q_2=2.9 cfs, Q_5=4.0 cfs, Q_{10}=5.2 cfs, Q_{25}=6.7 cfs, Q_{50}=8.0 cfs, and Q_{100}=9.4 cfs) consists of townhome lots, landscape corridors, and roadway improvements tributary to the proposed 10' type R inlet at Design Point 5. Calculations for Fieldside Way street capacity and inlet analysis are provided in the appendix.

Basin 7 (0.65 Acres, Q_2=1.0 cfs, Q_5=1.4 cfs, Q_{10}=1.7 cfs, Q_{25}=2.2 cfs, Q_{50}=2.6 cfs, and Q_{100}=3.0 cfs) consists of townhome lots, landscape corridors, and roadway improvements tributary to the proposed 5' type R inlet at Design Point 7. Calculations for Greengate Way street capacity and inlet analysis are provided in the appendix.

Basin 8 (0.06 Acres, Q_2=0.2 cfs, Q_5=0.2 cfs, Q_{10}=0.3 cfs, Q_{25}=0.3 cfs, Q_{50}=0.4 cfs, and Q_{100}=0.4 cfs) consists of a small landscape area and private roadway improvements tributary to the proposed 5' type R inlet at Design Point 6. Calculations for Greengate Way street capacity and inlet analysis are provided in the appendix.

Basin 9 (0.67 Acres, Q_2=0.1 cfs, Q_5=0.3 cfs, Q_{10}=0.5 cfs, Q_{25}=0.9 cfs, Q_{50}=1.2 cfs, and Q_{100}=1.5 cfs) consists of the rear yards of the residential portion of Filing No. 7 tributary to the Villas at Claremont development. Runoff from this area will sheetflow across the proposed landscape tract and be conveyed in a vegetated swale to the proposed EDB.

CONVEYANCE

Flows at DP-7 will be collected in a 5' Type R inlet and outfall in an 18" RCP at 0.50% to the inlet at DP-6. Combined flows at DP-A of Q_5=1.6 cfs, Q_{100}=3.4 will be conveyed north in an 18" RCP at 1.31% to the proposed manhole at DP-B.

Flows from DP-5 will be collected in a 5' Type R inlet and outfall in an 18" RCP at 0.50% to the inlet at DP-4. Flows from DP-4 will be collected in a 5' Type R inlet. Combined flows from DP-4 and DP-5 will be conveyed in an 18" RCP at 0.50% to the manhole at DP-B

Combined outflow from the manhole at DP-B will be conveyed in a 24" RCP storm sewer at 0.50% to the manhole at DP-C and combined with flows intercepted in the 5' Type R inlet at DP-3. Combined flows from DP-C of Q_5=6.1 cfs, Q_{100}=19.0 cfs will be conveyed in a 24" RCP at 0.75% to the 5' Type R inlet at DP-D. Combined flows at DP-D of Q_5=9.8 cfs, Q_{100}=21.9 will be conveyed in a 24" RCP at 8.07% to pond outfall within the proposed EDB.

EXTENDED DETENTION BASIN

Proposed EDB 'B will require a WQCV of 0.132 acre-feet and a total storage volume of 0.712 acre-ft. The pond provides 1.07 acre-ft of storage below the emergency outfall. The EDB will be designed to meet current Urban Drainage design criteria for forebay, outfall structure, and micropool to be presented in final construction drawings for the development. Proposed EDB 'B will outfall through a 15" RCP storm sewer directly to the East Branch of Sand Creek. The Basin outfalls developed runoff of (Q_5=0.2 cfs, Q_{100}=4.3 cfs) to Design Point E. The emergency spillway will consist of a 20' wide trapezoidal weir constructed of soil riprap conveying the undetained 100-YR flow from Design Point 1 of 26.1 cfs at a maximum depth of 0.5'. Emergency overflow will be conveyed directly to the East Branch of Sand Creek. See Appendix for calculations.

The area of the development tributary to proposed EDB 'B' includes the following:

Tract/Use	Area	% Impervious
Townhome	2.50	80%
Roadways	1.57	100%
Open Space	3.71	10%
Rear Yards (Filing 7)	0.67	30%
Total Area	8.45	49% Ave % Impervious

WATER QUALITY/4-STEP PROCESS

Address each of the 4 steps individually as outlined in ECM Section I.7.2 BMP Selection.

The development addresses Low Impact Development strategies primarily through the utilization of landscape swales within rear lots directing runoff from rooflines and patios through swales with minimal longitudinal grade prior to outfall to the private street system. On-site flow is directed to a proposed extended detention basin providing water quality capture volume and attenuated release rates prior to release off-site. Site release is directly to the East Branch of Sand Creek. Release from the extended detention basin is less than assumed in the Final

Drainage Report for Filing No. 7 as development was assumed to be commercial in nature and no detention scenario was initially proposed.

A Grading, Erosion Control, and Stormwater Quality Plan and narrative have been submitted concurrently for the development and will be subject to county approval prior to any soil disturbance. The erosion control plan included specific source control BMP's as well defined overall site management practices for the construction period.

COST ESTIMATE

Private Improvements Non-reimbursable

5' TYPE R INLET	5 EA	@$	4,800/EA	$	24,000
10' TYPE R INLET	1 EA	@$	7,500/EA	$	7,500
TYPE I MH	3 EA	@$	4,000/EA	$	12,000
15" RCP	97 LF	@$	40/LF	$	3,880
18"RCP	381 LF	@$	45/LF	$	17,145
24" RCP	359 LF	@$	55/LF	$	19,745
Extended Detention Basin	1 LS	@$	15,000/LS	$	15,000
			SUBTOTAL	**$**	**99,270**
			15% CONTINGENCY	*$*	*14,891*
			TOTAL	**$**	**114,161**

DRAINAGE FEE CALCULATION

Drainage Fees were provided with the original platting of the parcel as tracts G and A of Claremont Ranch Filing No. 7.

accounted for
(see appendix...)

DRAINAGE METHODOLOGY

This drainage report was prepared in accordance to the criteria established in the City of Colorado Springs/El Paso County Drainage Criteria Manual Volumes 1 and 2, as revised May 2014.

The rational method for drainage basin study areas of less than 100 acres was utilized in the analysis. For the Rational Method, flows were calculated for the 2, 5, 10, 25, 50, and 100-year recurrence intervals. The average runoff coefficients, 'C' values, are taken from Table 6-6 and the Intensity-Duration-Frequency curves are taken from Figure 6-5 of the City Drainage Criteria Manual. Time of concentration for overland flow and storm drain or gutter flow are calculated per Section 3.2 of the City Drainage Criteria Manual. Calculations for the Rational Method are shown in the Appendix of this report.

see references -
this is the City
criteria

SUMMARY

The Villas at Claremont Ranch Development exhibits drainage patterns consistent with those anticipated in the Final Drainage Report for Filing No. 7. Volume of water released from the site anticipated in the Filing 7 Final Drainage Report has been significantly reduced due to the parcel developing as residential rather commercial and implementation of on-site water quality and full spectrum detention facilities as required by current criteria. Private Storm system is designed to intercept the full 100-year runoff event and convey to existing east branch of sand creek. Development of the parcel is in conformance of current El Paso County criteria and will not adversely affect downstream properties or facilities.

Provide references for DCM1 (1990), DCM Update (2015) and ECM (2020)

REFERENCES:

City of Colorado Springs Engineering Division Drainage Criteria Manual Volumes 1 and 2, revised May 2014

2002

"Claremont Ranch Subdivision Filing No. 7 Preliminary and Final Drainage Report", prepared by Engineering and Surveying, Inc., dated May 2004.

"Final Master Development Drainage Plan and Preliminary Drainage Plan for the Claremont Ranch", prepared by Matrix Design Group, Inc., revised July 2002.

"Sand Creek Drainage Basin Planning Study Preliminary Drainage Report", prepared by Kiowa Engineering Corporation, revised March 21996.

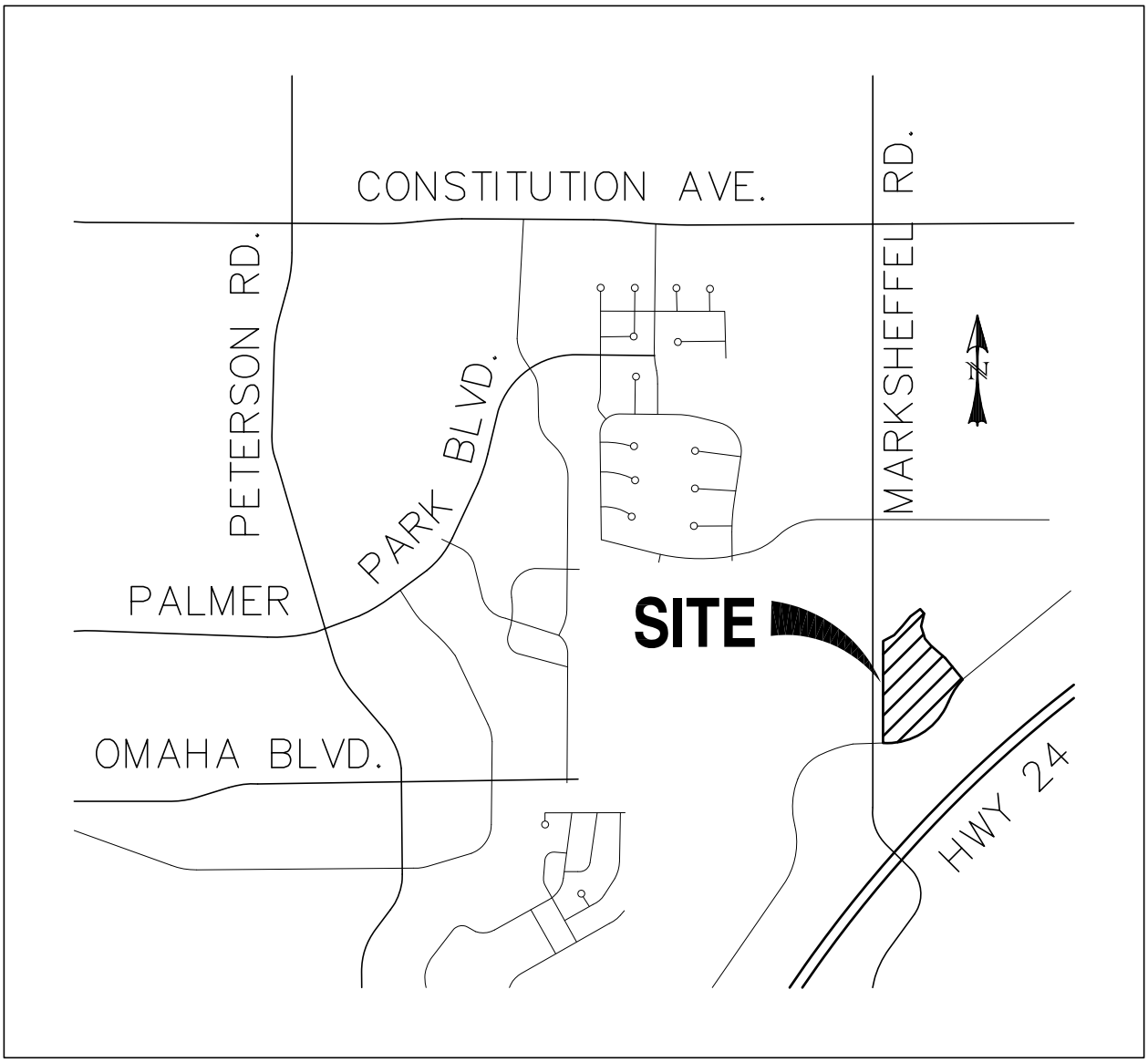
Preliminary and Final Drainage Report for International Bible Society Filing No. 1" prepared by URS Consultants, dated August, 1988.

Flood Insurance rate map 08041C0756 F, as revised to reflect LOMR Case No. 08-08-0630P

Natural Resources Conservation Service Web Soil Survey

APPENDIX

APPENDIX



VICINITY MAP

SCALE: N.T.S.

National Flood Hazard Layer FIRMette

FEMA

104°41'12"W 38°51'31"N

104°40'35"W 38°51'3"N

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

1:6,000

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
- 513 — 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 11/17/2020 at 2:43 PM 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.

Hydrologic Soil Group—El Paso County Area, Colorado
(VILLAS AT CLAREMONT RANCH)

Map Scale: 1:1,920 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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

MAP LEGEND

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

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 14, Sep 23, 2016

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

Date(s) aerial images were photographed: Apr 15, 2011—Mar 9, 2017

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	1.6	16.2%
10	Blendon sandy loam, 0 to 3 percent slopes	B	7.1	74.2%
28	Ellicott loamy coarse sand, 0 to 5 percent slopes	A	0.9	9.6%
Totals for Area of Interest			**9.6**	**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

Provide appendix with previous report excerpts and documenting approved drainage and bridge fee credits.

											CONVEYANCE TC						TT	INTENSITY						TOTAL FLOWS					
BASIN	**AREA TOTAL (Acres)**	**C_2**	**C_5**	**C_{10}**	**C_{25}**	**C_{50}**	**C_{100}**	**Length (ft)**	**Height (ft)**	**TI (min)**	**Length (ft)**	**Height (ft)**	**C_V**	**Slope (%)**	**Velocity (fps)**	**TC (min)**	**TOTAL (min)**	**I_2 (in/hr)**	**I_5 (in/hr)**	**I_{10} (in/hr)**	**I_{25} (in/hr)**	**I_{50} (in/hr)**	**I_{100} (in/hr)**	**Q_2 (c.f.s.)**	**Q_5 (c.f.s.)**	**Q_{10} (c.f.s.)**	**Q_{25} (c.f.s.)**	**Q_{50} (c.f.s.)**	**Q_{100} (c.f.s.)**
1	2.25	**0.05**	**0.12**	**0.20**	**0.30**	**0.34**	**0.39**	100	4	12.0	1030	12	7	1.2%	0.8	22.7	34.7	1.8	2.3	2.6	3.0	3.4	3.8	**0.2**	**0.6**	**1.2**	**2.0**	**2.6**	**3.3**
LANDSCAPED	2.25	0.05	0.12	0.20	0.30	0.34	0.39																						
2	1.92	**0.25**	**0.30**	**0.37**	**0.45**	**0.48**	**0.52**	100	4	9.8	451	10	7	2.2%	1.0	7.2	17.0	2.7	3.3	3.9	4.4	5.0	5.6	**1.3**	**1.9**	**2.7**	**3.8**	**4.6**	**5.6**
HARDSCAPE	0.51	0.79	0.81	0.83	0.85	0.87	0.88																						
LANDSCAPED	1.41	0.05	0.12	0.20	0.30	0.34	0.39																						
3	0.76	**0.41**	**0.45**	**0.49**	**0.54**	**0.57**	**0.59**	46	2.5	4.8	440	7	20	1.6%	2.5	2.9	7.7	3.6	4.5	5.3	6.0	6.8	7.6	**1.1**	**1.5**	**2.0**	**2.5**	**2.9**	**3.4**
LOTS	0.76	0.41	0.45	0.49	0.54	0.57	0.59																						
4	1.00	**0.41**	**0.45**	**0.49**	**0.54**	**0.57**	**0.59**	49	2	5.5	197	3	*7*	1.5%	0.9	3.8	10.2	3.3	4.1	4.8	5.5	6.1	6.9	**1.3**	**1.8**	**2.3**	**2.9**	**3.5**	**4.1**
LOTS	1.00	0.41	0.45	0.49	0.54	0.57	0.59				*138*	*2*	*20*	1.4%	2.4	1.0														
5	0.81	**0.41**	**0.45**	**0.49**	**0.54**	**0.57**	**0.59**	51	2	5.7	176	2.5	20	1.4%	2.4	1.2	6.9	3.7	4.7	5.5	6.2	7.0	7.9	**1.2**	**1.7**	**2.2**	**2.7**	**3.2**	**3.8**
LOTS	0.81	0.41	0.45	0.49	0.54	0.57	0.59																						
6	2.58	**0.37**	**0.41**	**0.45**	**0.51**	**0.54**	**0.57**	91	2	9.8	441	10	20	2.3%	3.0	2.4	12.2	3.1	3.8	4.5	5.1	5.7	6.4	**2.9**	**4.0**	**5.2**	**6.7**	**8.0**	**9.4**
LOTS	2.26	0.41	0.45	0.49	0.54	0.57	0.59																						
LANDSCAPED	0.32	0.05	0.12	0.20	0.30	0.34	0.39																						
7	0.65	**0.41**	**0.45**	**0.49**	**0.54**	**0.57**	**0.59**	54	2	5.9	136	2	20	1.5%	2.4	0.9	6.9	3.7	4.7	5.5	6.3	7.0	7.9	**1.0**	**1.4**	**1.7**	**2.2**	**2.6**	**3.0**
LOTS	0.65	0.41	0.45	0.49	0.54	0.57	0.59																						
8	0.06	**0.73**	**0.75**	**0.77**	**0.80**	**0.82**	**0.83**	10	0.5	1.3	38	0.5	20	1.3%	2.3	0.3	5.0	4.1	5.2	6.0	6.9	7.8	8.7	**0.2**	**0.2**	**0.3**	**0.3**	**0.4**	**0.4**
HARDSCAPE	0.05	0.79	0.81	0.83	0.85	0.87	0.88										*MINIMUM*												
LOTS	0.01	0.41	0.45	0.49	0.54	0.57	0.59																						
9	0.67	**0.05**	**0.12**	**0.20**	**0.30**	**0.34**	**0.39**	87	3	11.8	451	10	15	2.2%	2.2	3.4	15.1	2.8	3.5	4.1	4.7	5.3	5.9	**0.1**	**0.3**	**0.5**	**0.9**	**1.2**	**1.5**
REAR YARD	0.67	0.05	0.12	0.20	0.30	0.34	0.39																						

Calculated by: DLM

Date: 10/1/2017

		WEIGHTED						TT	INTENSITY						TOTAL FLOWS					
DESIGN POINT	**AREA TOTAL (Acres)**	**C_2**	**C_5**	**C_{10}**	**C_{25}**	**C_{50}**	**C_{100}**	**TOTAL (min)**	**I_2 (in/hr)**	**I_5 (in/hr)**	**I_{10} (in/hr)**	**I_{25} (in/hr)**	**I_{50} (in/hr)**	**I_{100} (in/hr)**	**Q_2 (c.f.s.)**	**Q_5 (c.f.s.)**	**Q_{10} (c.f.s.)**	**Q_{25} (c.f.s.)**	**Q_{50} (c.f.s.)**	**Q_{100} (c.f.s.)**
7 BASIN 7	**0.65**	**0.41**	**0.45**	**0.49**	**0.54**	**0.57**	**0.59**	6.9	3.7	4.7	5.5	6.3	7.0	7.9	**1.0**	**1.4**	**1.7**	**2.2**	**2.6**	**3.0**
6 BASIN 8	**0.06**	**0.73**	**0.75**	**0.77**	**0.80**	**0.82**	**0.83**	5.0	4.1	5.2	6.0	6.9	7.8	8.7	**0.2**	**0.2**	**0.3**	**0.3**	**0.4**	**0.4**
5 BASIN 6	**2.58**	**0.37**	**0.41**	**0.45**	**0.51**	**0.54**	**0.57**	12.2	3.1	3.8	4.5	5.1	5.7	6.4	**2.9**	**4.0**	**5.2**	**6.7**	**8.0**	**9.4**
4 BASIN 5	**0.81**	**0.41**	**0.45**	**0.49**	**0.54**	**0.57**	**0.59**	6.9	3.7	4.7	5.5	6.2	7.0	7.9	**1.2**	**1.7**	**2.2**	**2.7**	**3.2**	**3.8**
3 BASIN 4	**1.00**	**0.41**	**0.45**	**0.49**	**0.54**	**0.57**	**0.59**	10.2	3.3	4.1	4.8	5.5	6.1	6.9	**1.3**	**1.8**	**2.3**	**2.9**	**3.5**	**4.1**
2 BASIN 3	**0.76**	**0.41**	**0.45**	**0.49**	**0.54**	**0.57**	**0.59**	7.7	3.6	4.5	5.3	6.0	6.8	7.6	**1.1**	**1.5**	**2.0**	**2.5**	**2.9**	**3.4**
1	**8.45**	**0.33**	**0.38**	**0.43**	**0.49**	**0.52**	**0.55**	17.0	2.7	3.3	3.9	4.4	5.0	5.6	**7.5**	**10.7**	**14.1**	**18.5**	**22.2**	**26.1**
BASIN 2	1.92	0.25	0.30	0.37	0.45	0.48	0.52													
BASIN 9	0.67	0.05	0.12	0.20	0.30	0.34	0.39													
DP-D	5.86	0.39	0.44	0.48	0.53	0.56	0.58													

Calculated by: DLM

Date: 10/1/2017

		WEIGHTED						TT	INTENSITY						TOTAL FLOWS					
DESIGN POINT	**AREA TOTAL (Acres)**	**C_2**	**C_5**	**C_{10}**	**C_{25}**	**C_{50}**	**C_{100}**	**TOTAL (min)**	**I_2 (in/hr)**	**I_5 (in/hr)**	**I_{10} (in/hr)**	**I_{25} (in/hr)**	**I_{50} (in/hr)**	**I_{100} (in/hr)**	**Q_2 (c.f.s.)**	**Q_5 (c.f.s.)**	**Q_{10} (c.f.s.)**	**Q_{25} (c.f.s.)**	**Q_{50} (c.f.s.)**	**Q_{100} (c.f.s.)**
A	**0.71**	**0.44**	**0.48**	**0.51**	**0.56**	**0.59**	**0.61**	6.9	3.7	4.7	5.5	6.3	7.0	7.9	**1.2**	**1.6**	**2.0**	**2.5**	**3.0**	**3.4**
DP-6	0.06	0.73	0.75	0.77	0.80	0.82	0.83													
DP-7	0.65	0.41	0.45	0.49	0.54	0.57	0.59													
B	4.10	**0.39**	**0.43**	**0.47**	**0.53**	**0.56**	**0.58**	12.2	3.1	3.8	4.5	5.1	5.7	6.4	**4.8**	**6.7**	**8.6**	**11.0**	**13.1**	**15.2**
DP-5	2.58	0.37	0.41	0.45	0.51	0.54	0.57													
DP-4	0.81	0.41	0.45	0.49	0.54	0.57	0.59													
DP-A	0.71	0.44	0.48	0.51	0.56	0.59	0.61													
C	**5.10**	**0.39**	**0.43**	**0.48**	**0.53**	**0.56**	**0.58**	12.2	3.1	3.8	4.5	5.1	5.7	6.4	**6.1**	**8.5**	**10.8**	**13.8**	**16.4**	**19.0**
DP3	1.00	0.41	0.45	0.49	0.54	0.57	0.59													
DP-B	4.10	0.39	0.43	0.47	0.53	0.56	0.58													
D	**5.86**	**0.39**	**0.44**	**0.48**	**0.53**	**0.56**	**0.58**	12.2	3.1	3.8	4.5	5.1	5.7	6.4	**7.1**	**9.8**	**12.5**	**15.9**	**18.9**	**21.9**
DP-2	0.76	0.41	0.45	0.49	0.54	0.57	0.59													
DP-C	5.10	0.39	0.43	0.48	0.53	0.56	0.58													
E POND OUTFALL															**2.6**	**4.3**	**6.5**	**9.7**	**10.0**	**10.4**

Calculated by: DLM

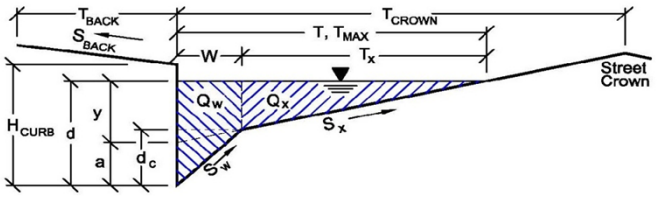
Date: 10/1/2017

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

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

Project: VILLAS AT CLAREMONT RANCH

Inlet ID: DP-2



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	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} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.2	ft
Gutter Width	W =	1.17	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q_{allow} =	SUMP	SUMP	cfs

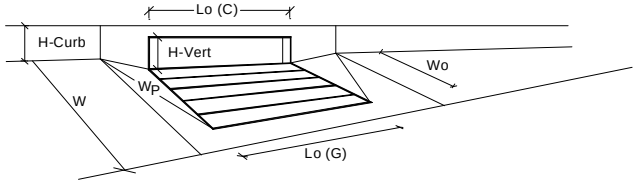
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET IN A SUMP OR SAG LOCATION

Project = VILLAS AT CLAREMONT RANCH

Inlet ID = DP-2



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.0	6.0	inches
Grate Information		MINOR	MAJOR	
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 =	1.17	1.17	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	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**2.6**	**5.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	1.5	3.4	cfs

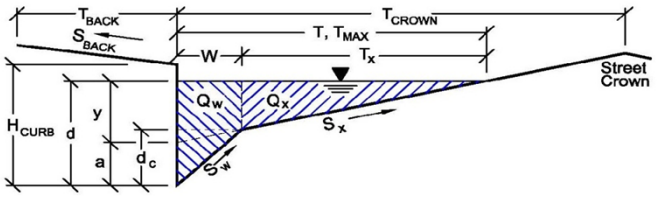
☐ Override Depths

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

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

Project: VILLAS AT CLAREMONT RANCH

Inlet ID: DP-3



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	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} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.2	ft
Gutter Width	W =	1.17	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q_{allow} =	SUMP	SUMP	cfs

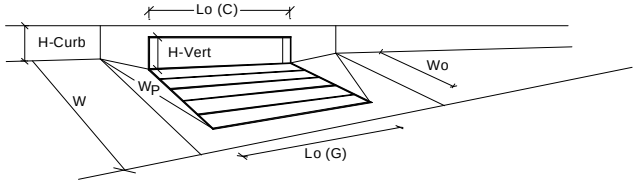
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET IN A SUMP OR SAG LOCATION

Project = VILLAS AT CLAREMONT RANCH

Inlet ID = DP-3



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.0	6.0	inches
Grate Information		MINOR	MAJOR	
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 =	1.17	1.17	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	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**2.6**	**5.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	1.8	4.1	cfs

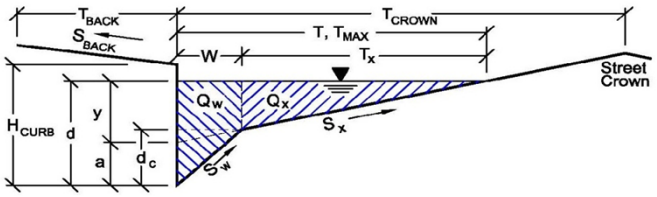
☐ Override Depths

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

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

Project: VILLAS AT CLAREMONT RANCH

Inlet ID: DP-4



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	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} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.2	ft
Gutter Width	W =	1.17	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q_{allow} =	SUMP	SUMP	cfs

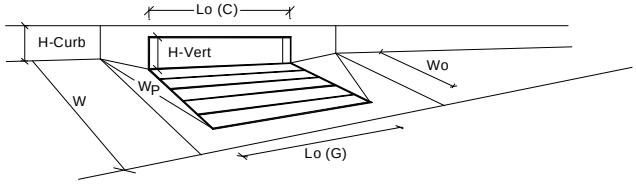
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET IN A SUMP OR SAG LOCATION

Project = VILLAS AT CLAREMONT RANCH

Inlet ID = DP-4



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.0	6.0	inches
Grate Information		MINOR	MAJOR	
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 =	1.17	1.17	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	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**2.6**	**5.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	1.7	3.8	cfs

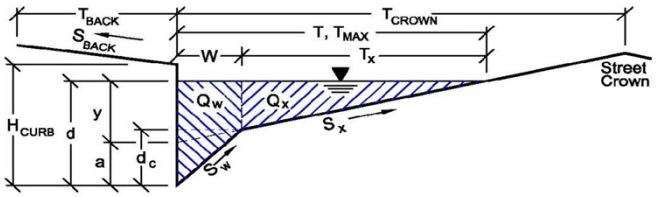
☐ Override Depths

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

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

Project: VILLAS AT CLAREMONT RANCH

Inlet ID: DP-5



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	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} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.2	ft
Gutter Width	W =	1.17	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q_{allow} =	SUMP	SUMP	cfs

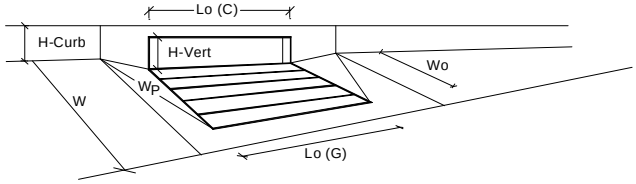
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET IN A SUMP OR SAG LOCATION

Project = VILLAS AT CLAREMONT RANCH

Inlet ID = DP-5



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.2	6.0	inches
Grate Information		MINOR	MAJOR	
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 =	1.17	1.17	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	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**4.2**	**9.8**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	4.0	9.4	cfs

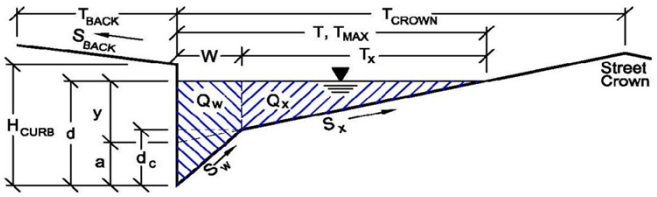
☐ Override Depths

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

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

Project: VILLAS AT CLAREMONT RANCH

Inlet ID: DP-6



Gutter Geometry (Enter data in the blue cells)			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	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} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.2	ft
Gutter Width	W =	1.17	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	8.0	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} =**	**SUMP**	**SUMP**	**cfs**

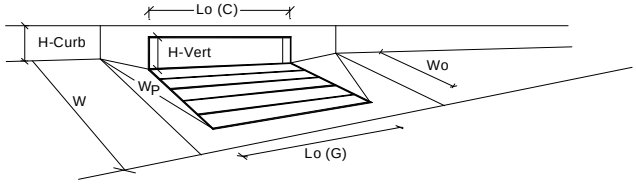
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET IN A SUMP OR SAG LOCATION

Project = VILLAS AT CLAREMONT RANCH

Inlet ID = DP-6



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.0	6.0	inches
Grate Information		MINOR	MAJOR	
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 =	1.17	1.17	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	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**2.6**	**5.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	0.2	0.4	cfs

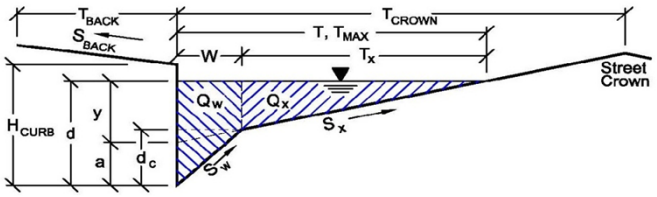
☐ Override Depths

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

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

Project: VILLAS AT CLAREMONT RANCH

Inlet ID: DP-7



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	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} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.2	ft
Gutter Width	W =	1.17	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q_{allow} =	SUMP	SUMP	cfs

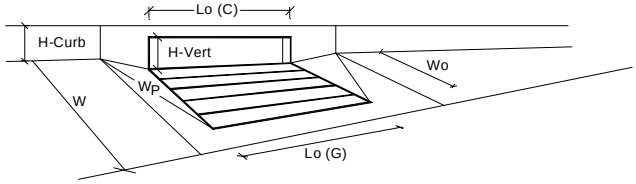
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET IN A SUMP OR SAG LOCATION

Project = VILLAS AT CLAREMONT RANCH

Inlet ID = DP-7

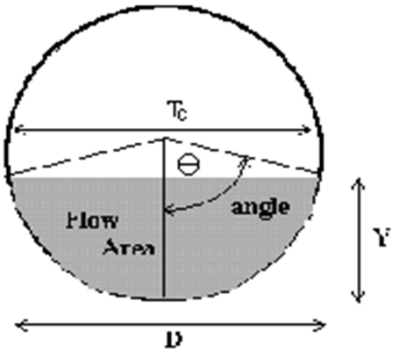


Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.0	6.0	inches
Grate Information		MINOR	MAJOR	
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 =	1.17	1.17	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	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**2.6**	**5.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	1.4	3.0	cfs

☐ Override Depths

CIRCULAR CONDUIT FLOW (Normal & Critical Depth Computation)

Project: VILLAS AT CLAREMONT RANCH
Pipe ID: DP-A



Design Information (Input)			
Pipe Invert Slope	So =	0.0050	ft/ft
Pipe Manning's n-value	n =	0.0130	
Pipe Diameter	D =	18.00	inches
Design discharge	**Q =**	**3.40**	**cfs**

Full-flow Capacity (Calculated)			
Full-flow area	Af =	1.77	sq ft
Full-flow wetted perimeter	Pf =	4.71	ft
Half Central Angle	Theta =	3.14	radians
Full-flow capacity	Qf =	7.45	cfs

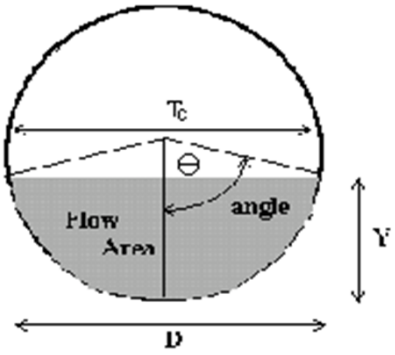
Calculation of Normal Flow Condition			
Half Central Angle (0<Theta<3.14)	Theta =	1.52	radians
Flow area	An =	0.83	sq ft
Top width	Tn =	1.50	ft
Wetted perimeter	Pn =	2.28	ft
Flow depth	Yn =	0.71	ft
Flow velocity	Vn =	4.12	fps
Discharge	Qn =	3.40	cfs
Percent Full Flow	Flow =	45.6%	of full flow
Normal Depth Froude Number	Fr_n =	0.98	subcritical

Calculation of Critical Flow Condition			
Half Central Angle (0<Theta-c<3.14)	Theta-c =	1.51	radians
Critical flow area	Ac =	0.81	sq ft
Critical top width	Tc =	1.50	ft
Critical flow depth	Yc =	0.70	ft
Critical flow velocity	Vc =	4.18	fps
Critical Depth Froude Number	Fr_c =	1.00	

CIRCULAR CONDUIT FLOW (Normal & Critical Depth Computation)

Project: VILLAS AT CLAREMONT RANCH

Pipe ID: DP-A



Design Information (Input)			
Pipe Invert Slope	So =	0.0130	ft/ft
Pipe Manning's n-value	n =	0.0130	
Pipe Diameter	D =	18.00	inches
Design discharge	**Q =**	**3.40**	**cfs**

Full-flow Capacity (Calculated)			
Full-flow area	Af =	1.77	sq ft
Full-flow wetted perimeter	Pf =	4.71	ft
Half Central Angle	Theta =	3.14	radians
Full-flow capacity	Qf =	12.01	cfs

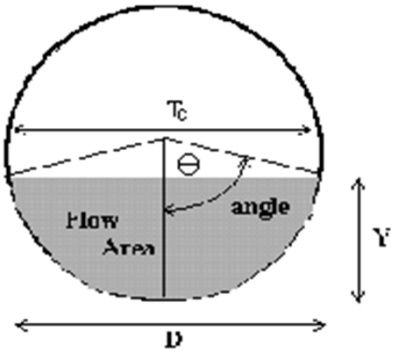
Calculation of Normal Flow Condition			
Half Central Angle (0<Theta<3.14)	Theta =	1.30	radians
Flow area	An =	0.58	sq ft
Top width	Tn =	1.44	ft
Wetted perimeter	Pn =	1.94	ft
Flow depth	Yn =	0.55	ft
Flow velocity	Vn =	5.85	fps
Discharge	Qn =	3.40	cfs
Percent Full Flow	Flow =	28.3%	of full flow
Normal Depth Froude Number	Fr_n =	1.62	supercritical

Calculation of Critical Flow Condition			
Half Central Angle (0<Theta-c<3.14)	Theta-c =	1.51	radians
Critical flow area	Ac =	0.81	sq ft
Critical top width	Tc =	1.50	ft
Critical flow depth	Yc =	0.70	ft
Critical flow velocity	Vc =	4.18	fps
Critical Depth Froude Number	Fr_c =	1.00	

CIRCULAR CONDUIT FLOW (Normal & Critical Depth Computation)

Project: VILLAS AT CLAREMONT RANCH

Pipe ID: DP-4



Design Information (Input)			
Pipe Invert Slope	So =	0.0050	ft/ft
Pipe Manning's n-value	n =	0.0130	
Pipe Diameter	D =	18.00	inches
Design discharge	**Q =**	**3.80**	**cfs**

Full-flow Capacity (Calculated)			
Full-flow area	Af =	1.77	sq ft
Full-flow wetted perimeter	Pf =	4.71	ft
Half Central Angle	Theta =	3.14	radians
Full-flow capacity	Qf =	7.45	cfs

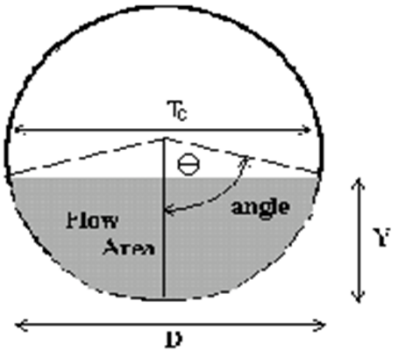
Calculation of Normal Flow Condition			
Half Central Angle (0<Theta<3.14)	Theta =	1.58	radians
Flow area	An =	0.90	sq ft
Top width	Tn =	1.50	ft
Wetted perimeter	Pn =	2.37	ft
Flow depth	Yn =	0.76	ft
Flow velocity	Vn =	4.24	fps
Discharge	Qn =	3.80	cfs
Percent Full Flow	Flow =	51.0%	of full flow
Normal Depth Froude Number	Fr_n =	0.97	subcritical

Calculation of Critical Flow Condition			
Half Central Angle (0<Theta-c<3.14)	Theta-c =	1.56	radians
Critical flow area	Ac =	0.88	sq ft
Critical top width	Tc =	1.50	ft
Critical flow depth	Yc =	0.75	ft
Critical flow velocity	Vc =	4.34	fps
Critical Depth Froude Number	Fr_c =	1.00	

CIRCULAR CONDUIT FLOW (Normal & Critical Depth Computation)

Project: VILLAS AT CLAREMONT RANCH

Pipe ID: DP-B



Design Information (Input)			
Pipe Invert Slope	So =	0.0050	ft/ft
Pipe Manning's n-value	n =	0.0130	
Pipe Diameter	D =	24.00	inches
Design discharge	**Q =**	**15.20**	**cfs**

Full-flow Capacity (Calculated)			
Full-flow area	Af =	3.14	sq ft
Full-flow wetted perimeter	Pf =	6.28	ft
Half Central Angle	Theta =	3.14	radians
Full-flow capacity	Qf =	16.04	cfs

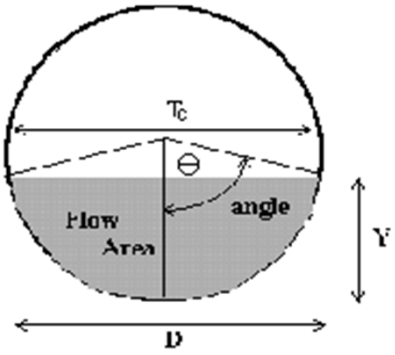
Calculation of Normal Flow Condition			
Half Central Angle (0<Theta<3.14)	Theta =	2.16	radians
Flow area	An =	2.62	sq ft
Top width	Tn =	1.67	ft
Wetted perimeter	Pn =	4.31	ft
Flow depth	Yn =	1.55	ft
Flow velocity	Vn =	5.81	fps
Discharge	Qn =	15.20	cfs
Percent Full Flow	Flow =	94.8%	of full flow
Normal Depth Froude Number	Fr_n =	0.82	subcritical

Calculation of Critical Flow Condition			
Half Central Angle (0<Theta-c<3.14)	Theta-c =	1.99	radians
Critical flow area	Ac =	2.36	sq ft
Critical top width	Tc =	1.83	ft
Critical flow depth	Yc =	1.41	ft
Critical flow velocity	Vc =	6.44	fps
Critical Depth Froude Number	Fr_c =	1.00	

CIRCULAR CONDUIT FLOW (Normal & Critical Depth Computation)

Project: VILLAS AT CLAREMONT RANCH

Pipe ID: DP-7



Design Information (Input)			
Pipe Invert Slope	So =	0.0050	ft/ft
Pipe Manning's n-value	n =	0.0130	
Pipe Diameter	D =	18.00	inches
Design discharge	**Q =**	**3.00**	**cfs**

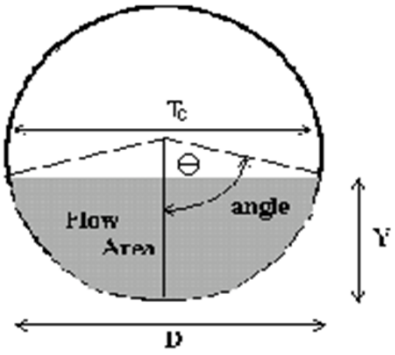
Full-flow Capacity (Calculated)			
Full-flow area	Af =	1.77	sq ft
Full-flow wetted perimeter	Pf =	4.71	ft
Half Central Angle	Theta =	3.14	radians
Full-flow capacity	Qf =	7.45	cfs

Calculation of Normal Flow Condition			
Half Central Angle (0<Theta<3.14)	Theta =	1.45	radians
Flow area	An =	0.75	sq ft
Top width	Tn =	1.49	ft
Wetted perimeter	Pn =	2.18	ft
Flow depth	Yn =	0.66	ft
Flow velocity	Vn =	3.99	fps
Discharge	Qn =	3.00	cfs
Percent Full Flow	Flow =	40.3%	of full flow
Normal Depth Froude Number	Fr_n =	0.99	subcritical

Calculation of Critical Flow Condition			
Half Central Angle (0<Theta-c<3.14)	Theta-c =	1.45	radians
Critical flow area	Ac =	0.75	sq ft
Critical top width	Tc =	1.49	ft
Critical flow depth	Yc =	0.66	ft
Critical flow velocity	Vc =	4.02	fps
Critical Depth Froude Number	Fr_c =	1.00	

CIRCULAR CONDUIT FLOW (Normal & Critical Depth Computation)

Project: VILLAS AT CLAREMONT RANCH
Pipe ID: DP-C



Design Information (Input)			
Pipe Invert Slope	So =	0.0075	ft/ft
Pipe Manning's n-value	n =	0.0130	
Pipe Diameter	D =	24.00	inches
Design discharge	**Q =**	**19.00**	**cfs**

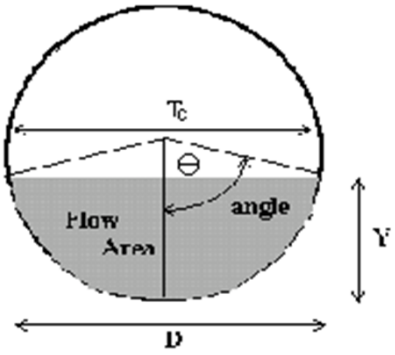
Full-flow Capacity (Calculated)			
Full-flow area	Af =	3.14	sq ft
Full-flow wetted perimeter	Pf =	6.28	ft
Half Central Angle	Theta =	3.14	radians
Full-flow capacity	Qf =	19.64	cfs

Calculation of Normal Flow Condition			
Half Central Angle (0<Theta<3.14)	Theta =	2.19	radians
Flow area	An =	2.67	sq ft
Top width	Tn =	1.62	ft
Wetted perimeter	Pn =	4.39	ft
Flow depth	Yn =	1.58	ft
Flow velocity	Vn =	7.12	fps
Discharge	Qn =	19.00	cfs
Percent Full Flow	Flow =	96.7%	of full flow
Normal Depth Froude Number	Fr_n =	0.98	subcritical

Calculation of Critical Flow Condition			
Half Central Angle (0<Theta-c<3.14)	Theta-c =	2.18	radians
Critical flow area	Ac =	2.64	sq ft
Critical top width	Tc =	1.65	ft
Critical flow depth	Yc =	1.57	ft
Critical flow velocity	Vc =	7.19	fps
Critical Depth Froude Number	Fr_c =	1.00	

CIRCULAR CONDUIT FLOW (Normal & Critical Depth Computation)

Project: VILLAS AT CLAREMONT RANCH
Pipe ID: DP-D



Design Information (Input)			
Pipe Invert Slope	So =	0.0807	ft/ft
Pipe Manning's n-value	n =	0.0130	
Pipe Diameter	D =	24.00	inches
Design discharge	**Q =**	**21.90**	**cfs**

Full-flow Capacity (Calculated)			
Full-flow area	Af =	3.14	sq ft
Full-flow wetted perimeter	Pf =	6.28	ft
Half Central Angle	Theta =	3.14	radians
Full-flow capacity	Qf =	64.44	cfs

Calculation of Normal Flow Condition			
Half Central Angle (0<Theta<3.14)	Theta =	1.37	radians
Flow area	An =	1.18	sq ft
Top width	Tn =	1.96	ft
Wetted perimeter	Pn =	2.75	ft
Flow depth	Yn =	0.80	ft
Flow velocity	Vn =	18.54	fps
Discharge	Qn =	21.90	cfs
Percent Full Flow	Flow =	34.0%	of full flow
Normal Depth Froude Number	Fr_n =	4.21	supercritical

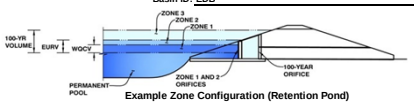
Calculation of Critical Flow Condition			
Half Central Angle (0<Theta-c<3.14)	Theta-c =	2.31	radians
Critical flow area	Ac =	2.81	sq ft
Critical top width	Tc =	1.48	ft
Critical flow depth	Yc =	1.67	ft
Critical flow velocity	Vc =	7.81	fps
Critical Depth Froude Number	Fr_c =	1.00	

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: VILLAS AT CLAREMONT RANCH

Basin ID: EDB



Example Zone Configuration (Retention Pond)

6386?

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	8.45	acres
Watershed Length =	1,130	ft
Watershed Slope =	0.015	ft/ft
Watershed Imperviousness =	49.00%	percent
Percentage Hydrologic Soil Group A =	25.8%	percent
Percentage Hydrologic Soil Group B =	74.2%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Denver - Capitol Building	
Water Quality Capture Volume (WQCV) =	0.143	acre-feet
Excess Urban Runoff Volume (EURV) =	0.450	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.347	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	0.471	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	0.626	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	0.857	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	1.036	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	1.266	acre-feet
500-yr Runoff Volume (P1 = 3.14 in.) =	1.750	acre-feet
Approximate 2-yr Detention Volume =	0.326	acre-feet
Approximate 5-yr Detention Volume =	0.443	acre-feet
Approximate 10-yr Detention Volume =	0.577	acre-feet
Approximate 25-yr Detention Volume =	0.649	acre-feet
Approximate 50-yr Detention Volume =	0.690	acre-feet
Approximate 100-yr Detention Volume =	0.774	acre-feet

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
	inches

Stage-Storage Calculation

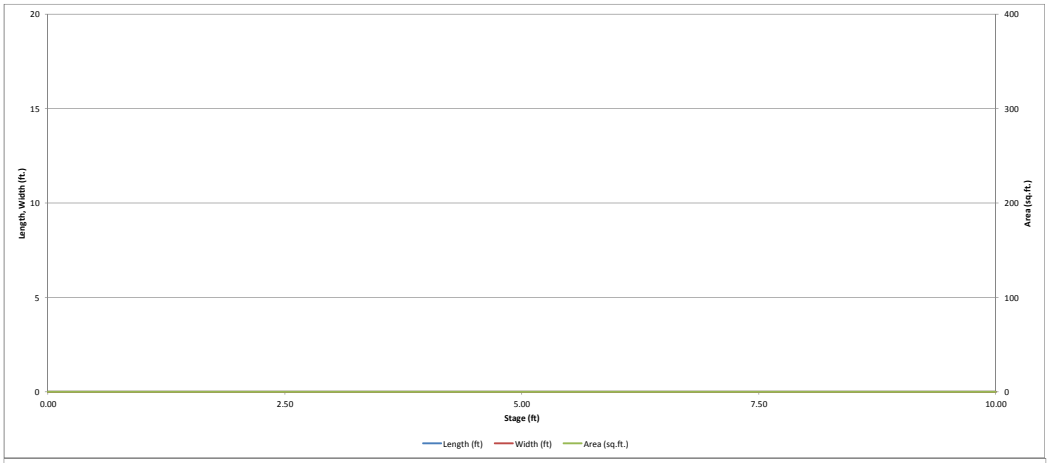
Zone 1 Volume (WQCV) =	0.143	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.307	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.323	acre-feet
Total Detention Basin Volume =	0.774	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	user	acre-feet

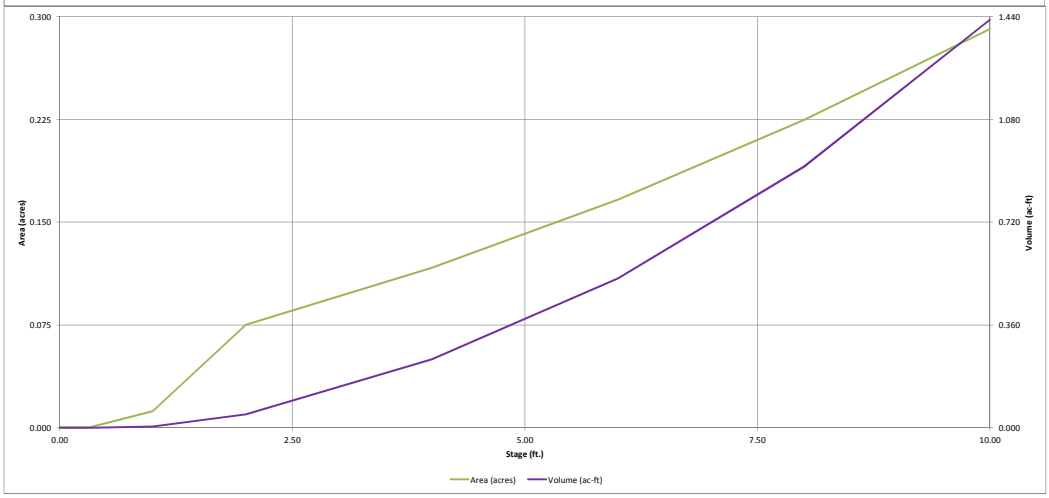
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	20	0.000		
ISV	--	0.33	--	--	--	20	0.000	6	0.000
FLOOR-6381	--	1.00	--	--	--	522	0.012	183	0.004
6382	--	2.00	--	--	--	3,278	0.075	2,055	0.047
6384	--	4.00	--	--	--	5,082	0.117	10,448	0.240
6386	--	6.00	--	--	--	7,252	0.166	22,782	0.523
6388	--	8.00	--	--	--	9,783	0.225	39,817	0.914
6390	--	10.00	--	--	--	12,669	0.291	62,269	1.430

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)





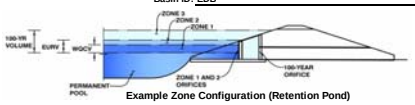
Why are there 2?

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: VILLAS AT CLAREMONT RANCH

Basin ID: EDB



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	7.78	acres
Watershed Length =	1,130	ft
Watershed Slope =	0.015	ft/ft
Watershed Imperviousness =	49.00%	percent
Percentage Hydrologic Soil Group A =	25.8%	percent
Percentage Hydrologic Soil Group B =	74.2%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Denver - Capitol Building	
Water Quality Capture Volume (WQCV) =	0.132	acre-feet
Excess Urban Runoff Volume (EURV) =	0.415	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.320	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	0.433	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	0.576	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	0.789	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	0.954	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	1.166	acre-feet
500-yr Runoff Volume (P1 = 3.14 in.) =	1.611	acre-feet
Approximate 2-yr Detention Volume =	0.300	acre-feet
Approximate 5-yr Detention Volume =	0.408	acre-feet
Approximate 10-yr Detention Volume =	0.531	acre-feet
Approximate 25-yr Detention Volume =	0.598	acre-feet
Approximate 50-yr Detention Volume =	0.635	acre-feet
Approximate 100-yr Detention Volume =	0.712	acre-feet

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
	inches

Stage-Storage Calculation

Zone 1 Volume (WQCV) =	0.132	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.283	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.298	acre-feet
Total Detention Basin Volume =	0.712	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	user	acre-feet

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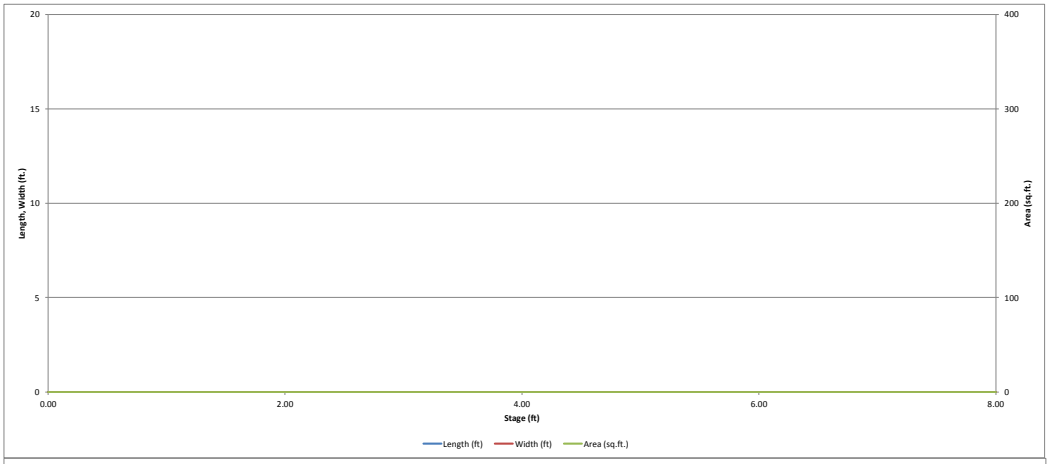
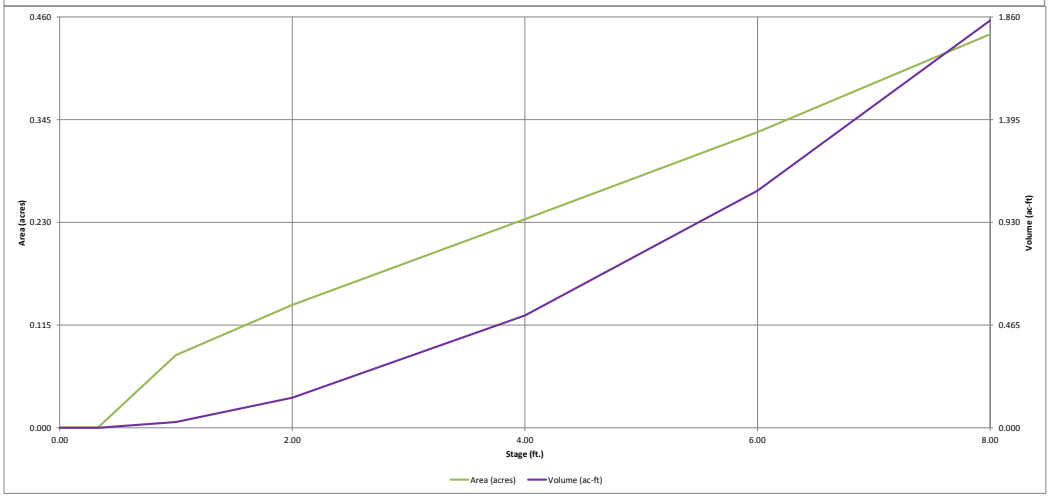
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	16	0.000		
ISV	--	0.33	--	--	--	16	0.000	5	0.000
FLOOR-6384	--	1.00	--	--	--	3,547	0.081	1,164	0.027
6386	--	2.00	--	--	--	5,992	0.138	5,908	0.136
6388	--	4.00	--	--	--	10,178	0.234	22,138	0.508
6340	--	6.00	--	--	--	14,422	0.331	46,738	1.073
6342	--	8.00	--	--	--	19,186	0.440	80,346	1.844

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



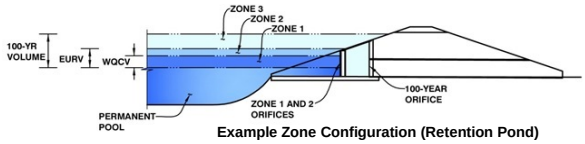


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: VILLAS AT CLAREMONT RANCH

Basin ID: EXTENDED DETENTION BASIN



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.97	0.132	Orifice Plate
Zone 2 (EURV)	3.59	0.283	Orifice Plate
Zone 3 (100-year)	4.81	0.298	Weir&Pipe (Restrict)
		0.712	Total

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

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

Calculated Parameters for Underdrain

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

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	3.59	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.20	2.50					
Orifice Area (sq. inches)	0.79	0.79	2.41					

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

User Input: Vertical Orifice (Circular or Rectangular)

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

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	3.75	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	3.75	N/A	feet
Overflow Weir Front Edge Length =	4.00	N/A	feet	Over Flow Weir Slope Length =	4.00	N/A	feet
Overflow Weir Slope =	0.00	N/A	H:V (enter zero for flat grate)	Grate Open Area / 100-yr Orifice Area =	28.52	N/A	should be ≥ 4
Horiz. Length of Weir Sides =	4.00	N/A	feet	Overflow Grate Open Area w/o Debris =	11.20	N/A	ft^2
Overflow Grate Open Area % =	70%	N/A	%, grate open area/total area	Overflow Grate Open Area w/ Debris =	5.60	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

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

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.50	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	0.39	N/A	ft^2
Outlet Pipe Diameter =	12.00	N/A	inches	Outlet Orifice Centroid =	0.29	N/A	feet
Restrictor Plate Height Above Pipe Invert =	6.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.57	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

= 6391?

Spillway Invert Stage=	5.00	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.38	feet
Spillway Crest Length =	20.00	feet	Stage at Top of Freeboard =	6.38	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.35	acres
Freeboard above Max Water Surface =	1.00	feet			

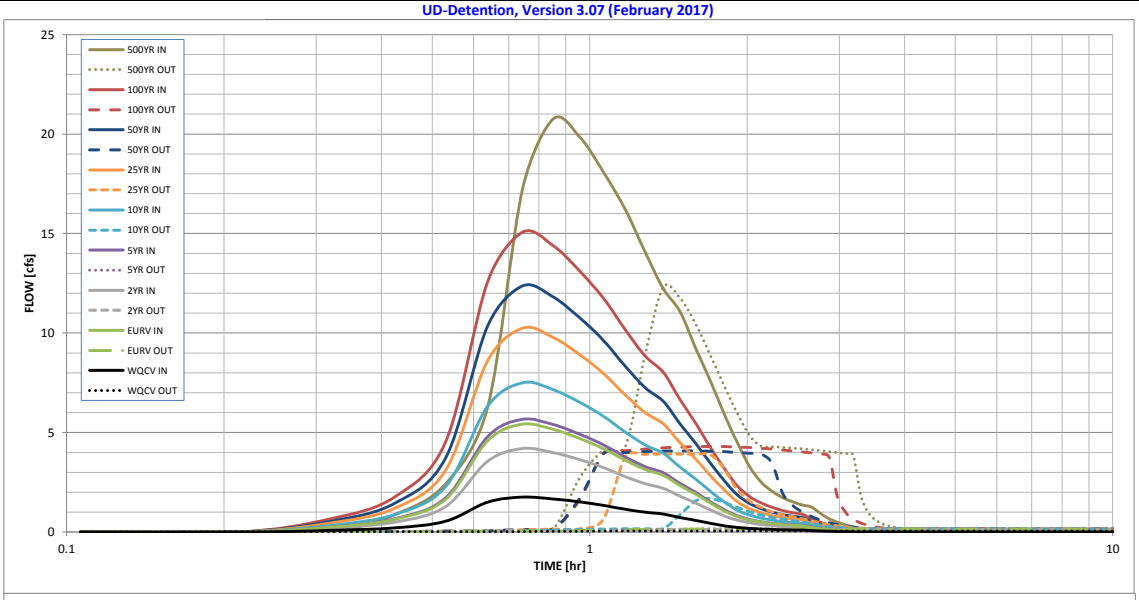
Calculated Parameters for Spillway

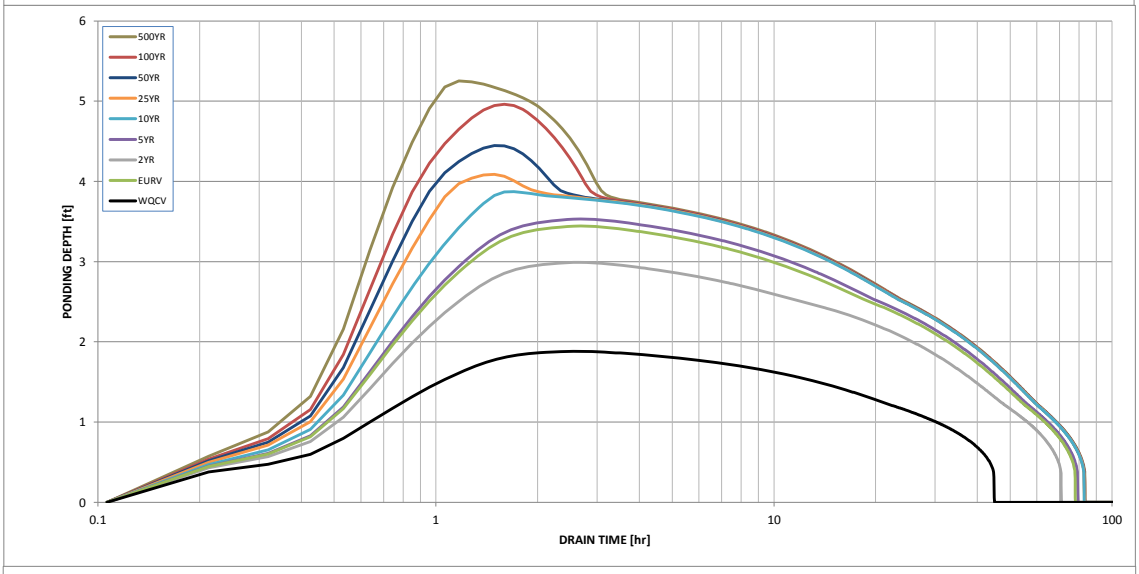
Routed Hydrograph Results

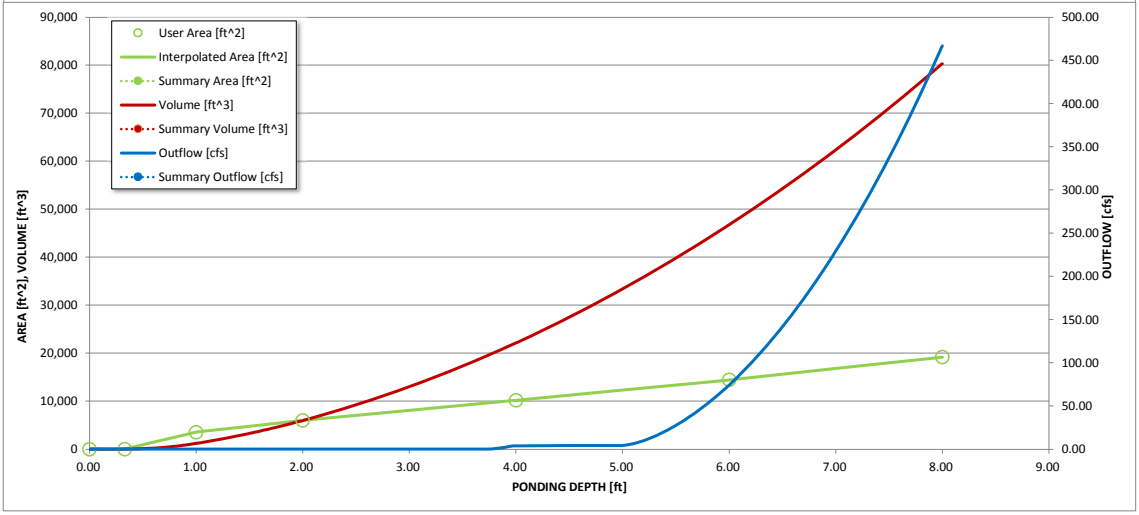
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.14
Calculated Runoff Volume (acre-ft) =	0.132	0.415	0.320	0.433	0.576	0.789	0.954	1.166	1.611
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.132	0.414	0.320	0.433	0.576	0.790	0.955	1.166	1.611
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.01	0.11	0.37	0.55	0.79	1.24
Predevelopment Peak Q (cfs) =	0.0	0.0	0.1	0.1	0.8	2.9	4.3	6.1	9.7
Peak Inflow Q (cfs) =	1.8	5.4	4.2	5.7	7.5	10.3	12.4	15.1	20.7
Peak Outflow Q (cfs) =	0.1	0.2	0.1	0.2	1.7	3.9	4.1	4.3	12.3
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.8	2.0	1.3	1.0	0.7	1.3
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Grate 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.1	0.3	0.3	0.4	0.4
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	42	71	65	72	73	70	68	65	60
Time to Drain 99% of Inflow Volume (hours) =	**44**	75	69	77	79	78	77	76	74
Maximum Ponding Depth (ft) =	1.88	3.44	2.99	3.53	3.87	4.09	4.45	4.96	5.25
Area at Maximum Ponding Depth (acres) =	0.13	0.21	0.19	0.21	0.23	0.24	0.26	0.28	0.29
Maximum Volume Stored (acre-ft) =	0.121	0.385	0.297	0.404	0.478	0.527	0.616	0.755	0.838

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Detention Basin Outlet Structure Design

Outflow Hydrograph Workbook Filename:

Storm Inflow Hydrographs **UD-Detention, Version 3.07 (February 2017)**

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

Time Interval	SOURCE	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK
	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
6.38 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:06:23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydrograph	0:12:46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	0:19:08	0.08	0.24	0.19	0.25	0.33	0.45	0.54	0.66	0.90
0.784	0:25:31	0.21	0.65	0.50	0.68	0.90	1.22	1.47	1.78	2.44
	0:31:54	0.55	1.67	1.30	1.75	2.30	3.13	3.77	4.58	6.28
	0:38:17	1.51	4.59	3.57	4.80	6.33	8.61	10.36	12.58	17.24
	0:44:40	1.75	5.42	4.20	5.67	7.50	10.25	12.37	15.06	20.75
	0:51:02	1.66	5.16	4.00	5.40	7.16	9.79	11.82	14.40	19.85
	0:57:25	1.51	4.70	3.64	4.92	6.51	8.91	10.76	13.11	18.07
	1:03:48	1.34	4.19	3.24	4.38	5.82	7.97	9.63	11.74	16.21
	1:10:11	1.14	3.60	2.78	3.77	5.02	6.89	8.33	10.18	14.07
	1:16:34	1.00	3.15	2.43	3.29	4.37	6.00	7.25	8.85	12.23
	1:22:56	0.90	2.85	2.20	2.98	3.96	5.44	6.57	8.02	11.09
	1:29:19	0.73	2.34	1.80	2.45	3.27	4.49	5.44	6.66	9.23
	1:35:42	0.59	1.90	1.46	1.99	2.66	3.68	4.46	5.47	7.60
	1:42:05	0.44	1.45	1.11	1.53	2.05	2.84	3.46	4.25	5.94
	1:48:28	0.32	1.08	0.82	1.13	1.52	2.12	2.59	3.20	4.51
	1:54:50	0.24	0.78	0.60	0.82	1.10	1.53	1.87	2.33	3.30
	2:01:13	0.19	0.61	0.47	0.64	0.86	1.19	1.44	1.79	2.51
	2:07:36	0.15	0.50	0.38	0.53	0.70	0.98	1.19	1.46	2.05
	2:13:59	0.13	0.43	0.33	0.45	0.60	0.83	1.01	1.24	1.73
	2:20:22	0.12	0.37	0.29	0.39	0.53	0.73	0.88	1.08	1.52
	2:26:44	0.10	0.34	0.26	0.35	0.47	0.65	0.79	0.98	1.36
	2:33:07	0.10	0.31	0.24	0.33	0.44	0.60	0.73	0.90	1.25
	2:39:30	0.07	0.23	0.18	0.24	0.32	0.44	0.54	0.66	0.92
	2:45:53	0.05	0.17	0.13	0.18	0.23	0.32	0.39	0.48	0.67
	2:52:16	0.04	0.12	0.09	0.13	0.17	0.24	0.29	0.35	0.49
	2:58:38	0.03	0.09	0.07	0.09	0.13	0.18	0.21	0.26	0.37
	3:05:01	0.02	0.06	0.05	0.07	0.09	0.13	0.15	0.19	0.26
	3:11:24	0.01	0.05	0.03	0.05	0.06	0.09	0.11	0.13	0.19
	3:17:47	0.01	0.03	0.02	0.03	0.05	0.06	0.08	0.10	0.14
	3:24:10	0.01	0.02	0.02	0.02	0.03	0.04	0.05	0.06	0.09
	3:30:32	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.04	0.06
	3:36:55	0.00	0.01	0.00	0.01	0.01	0.01	0.02	0.02	0.03
	3:43:18	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
	3:49:41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:56:04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:02:26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:08:49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:21:35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:27:58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:34:20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:47:06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:53:29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:59:52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:06:14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:12:37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:19:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:31:46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:38:08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:44:31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:57:17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:03:40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:10:02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:16:25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:22:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:29:11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:35:34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:41:56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:48:19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:54:42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:01:05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:07:28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:13:50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:20:13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:26:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:32:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:39:22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

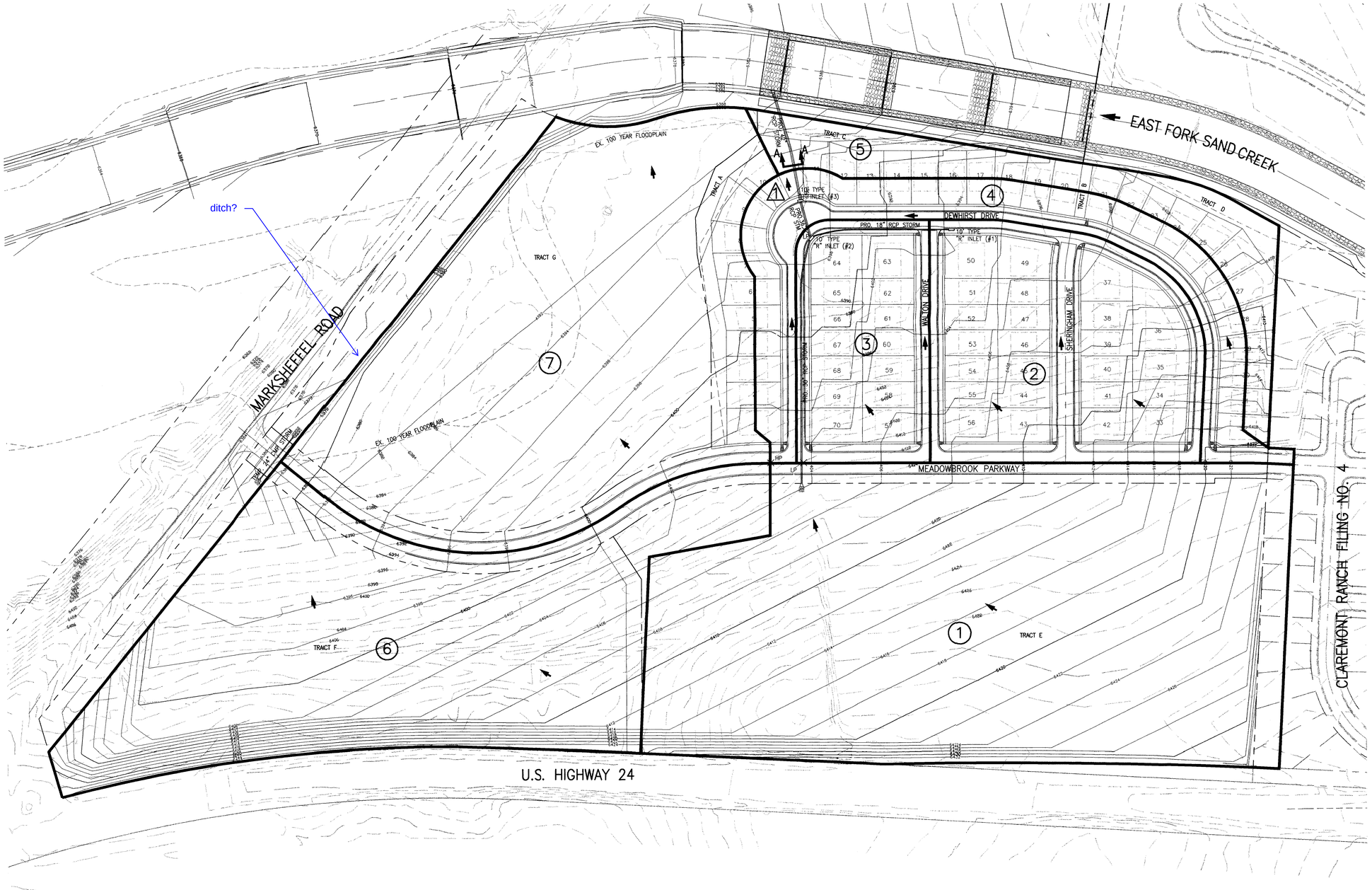
The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

DRAINAGE MAPS



1" = 100'

0 50 100 200

Scale in Feet

LEGEND

- EXISTING CONTOURS–MNR (2')
- EXISTING CONTOURS–MJR (10')
- PROPOSED CONTOURS–MNR (2')
- PROPOSED CONTOURS–MJR (10')
- BASIN BOUNDARY
- BASIN DESIGNATOR (1)
- DESIGN POINT DESIGNATOR (1)
- DIRECTION OF FLOW
- HIGH POINT (HP)
- LOW POINT (LP)

TEMPORARY OVERFLOW
SECTION A–A
NTS

BASIN TABLE

#	AC	Q_5 (cfs)	Q_{100} (cfs)
1	15.60	35.6	77.5
2	5.15	11.1	24.9
3	2.77	6.5	14.6
4	3.36	7.9	18.1
5	2.43	5.8	13.1
6	11.18	60.4	90.5
7	12.21	56.0	96.7

DESIGN POINT TABLE

#	AC	Q_5 (cfs)	Q_{100} (cfs)
1	26.88	58.1	128.0

REVISIONS:

NO.	DATE:	BY:	DESCRIPTION:	APPROVED BY:	DATE:

TIM D. McCONNELL, COLORADO P.E. NO. 33797

FOR AND ON BEHALF OF ENGINEERING AND SURVEYING INC. (ESI)

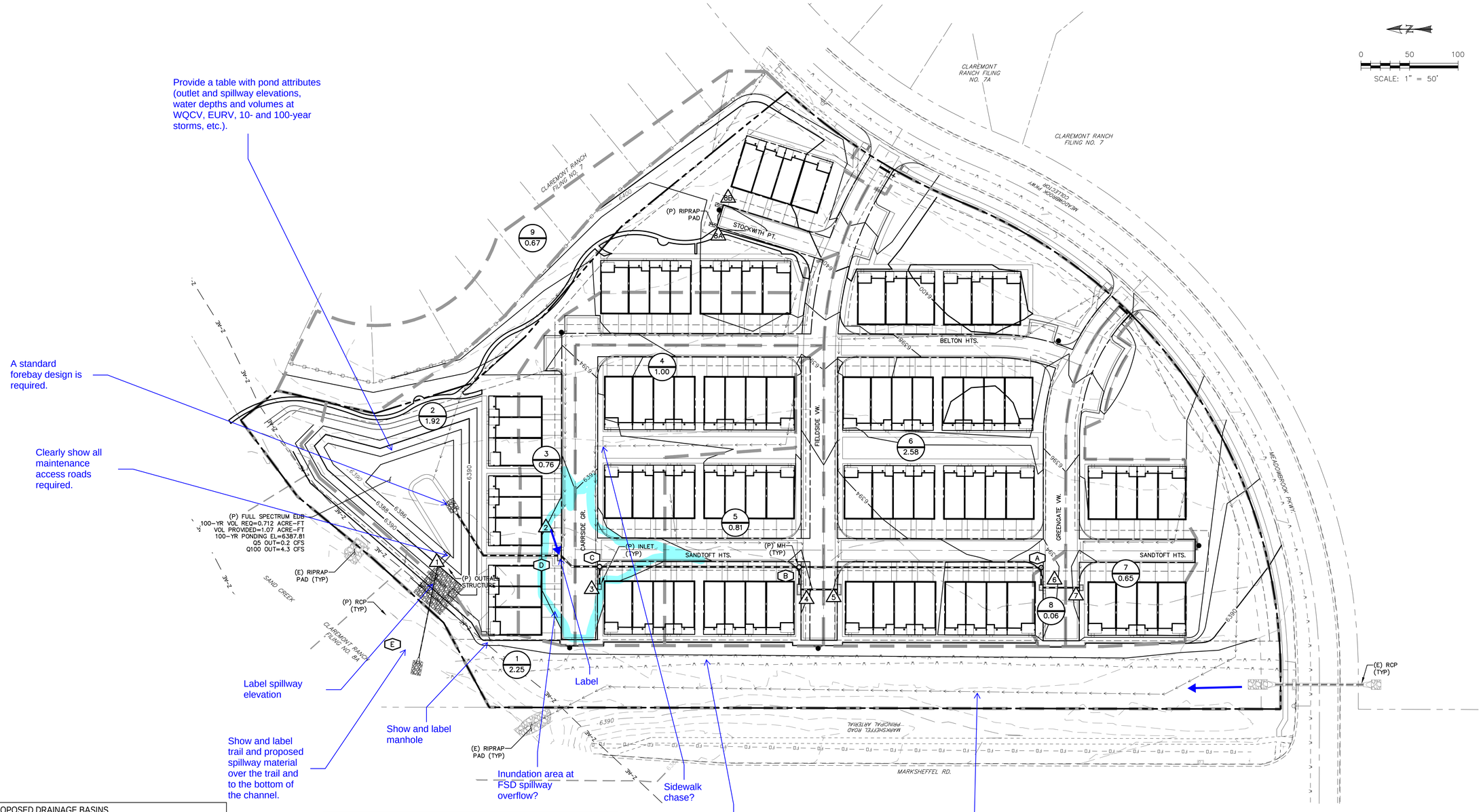
ENGINEERING AND SURVEYING INC. ESI

20 BOULDER CRESCENT, 2nd FLOOR
COLORADO SPRINGS, CO 80903
(719) 955-5485, FAX (719) 471-4812

CLAREMONT RANCH FILING NO. 7

DRAINAGE PLAN

PROJECT NO. 01-006		FILE: Claremont #7\dwg\D1-drainage.dwg	
DESIGNED BY:	TDM	SCALE	DATE: 05/17/04
DRAWN BY:	KGV	HORIZ: 1"=100'	SHEET 1 OF 1
CHECKED BY:	TDM	VERT: N/A	D1



PROPOSED DRAINAGE BASINS							
BASIN	AREA (ACRES)	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)	Q100 (CFS)
1	2.25	0.2	0.6	1.2	2.0	2.6	3.3
2	1.92	1.3	1.9	2.7	3.8	4.6	5.6
3	0.76	1.1	1.5	2.0	2.5	2.9	3.4
4	1.00	1.3	1.8	2.3	2.9	3.5	4.1
5	0.81	1.2	1.7	2.2	2.7	3.2	3.8
6	2.58	2.9	4.0	5.2	6.7	8.0	9.4
7	0.65	1.0	1.4	1.7	2.2	2.6	3.0
8	0.06	0.2	0.2	0.3	0.3	0.4	0.4
9	0.67	0.1	0.3	0.5	0.9	1.2	1.5

PROPOSED DESIGN POINTS						
DESIGN POINT	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)	Q100 (CFS)
1	7.5	10.7	14.1	18.5	22.2	26.1
2	1.1	1.5	2.0	2.5	2.9	3.4
3	1.3	1.8	2.3	2.9	3.5	4.1
4	1.2	1.7	2.2	2.7	3.2	3.8
5	2.9	4.0	5.2	6.7	8.0	9.4
6	0.2	0.2	0.3	0.3	0.4	0.4
7	1.0	1.4	1.7	2.2	2.6	3.0
A	1.2	1.6	2.0	2.5	3.0	3.4
B	4.8	6.7	8.6	11.0	13.1	15.2
C	6.1	8.5	10.8	13.8	16.4	19.0
D	7.1	9.8	12.5	15.9	18.9	21.9
E (POND OUT)	0.1	0.2	1.7	3.9	4.1	4.30

REV.	DESCRIPTION	DATE

PREPARED FOR:

RODO INVESTMENTS, LLC

20 BOULDER CRESCENT
2ND FLOOR
COLORADO SPRINGS, CO 80903

CATAMOUNT ENGINEERING
PO BOX 692 DIVIDE, CO 80814 (719)426-2124

THE VILLAS AT CLAREMONT RANCH

PROPOSED DRAINAGE MAP

DESIGNED BY:	DRAWN BY:
DLM	MGP
SCALE: 1"=50'	DATE: 06/13/17
JOB NUMBER: 16-102	SHEET: __ OF __