PHASE II DRAINAGE REPORT
FOR
LOTS 6-A-1A, 6-A-1B, AND 6-A-1C, THE MEADOWS FILING NO. 17, AREA NO. 4, LIMELIGHT CENTER AT THE MEADOWS

Castle Rock, Colorado

Prepared for:

Westbridge Development
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March 2, 2026

RLEG NO. 240701
TOWN NO. SDP25-0024

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PROFESSIONAL ENGINEER CERTIFICATION

"I affirm that this report and plan for the Phase II drainage design of **Limelight Center at The Meadows** was prepared by me (or under my direct supervision) in accordance with the provisions of the Town of Castle Rock Drainage Design and Technical Criteria for the owners thereof. I understand that the Town of Castle Rock does not and will not assume liability for drainage facilities designed by others."

Kevin S. Roth
Registered Professional Engineer
State of Colorado No. 35704

1. GENERAL LOCATION AND DESCRIPTION

A. Site Location

Limelight Center at The Meadows (hereafter referred to as The Site) is in the Northeast quarter of section 34, township 7 south, range 67 west of the 6th principal meridian, Town of Castle Rock, Douglas County, State of Colorado. Please, refer to the Vicinity Map in Appendix A.

The site is bounded to the north by Meadows Parkway, to the south and west by the existing Meadows Commercial development, and to the east by the Atchison, Topeka and Santa Fe Railroad.

B. Description of Property

The area of The Site is 4.25 acres. The Site has been previously overlot graded. There is an existing ridge that runs west to east that splits the drainage patterns of the site. North and east of the ridge, slopes are typically 3:1 (horizontal:vertical). South of the ridge, slopes range from 2% to 6%. Generally, surface water flows across this area from southwest to northeast.

The existing soil conditions are as follows. The soil, as detailed in the USDA NRCS Soil Map of the Castle Rock area (Appendix A) includes Bresser Sandy Loam, classified as Hydrologic Soil Group B across the entirety of the site.

The proposed development includes: a 11,955 SF mixed-use building and a 7,500 medical/dental office building.

2. DRAINAGE BASINS AND SUB-BASINS

A. Major Basin Description

There are no known major drainage way planning studies or flood hazard area delineations that influence the site.

The Site is not within a FEMA regulated floodplain as depicted on the FIRMette map in Appendix A. There are no proposals with this project to request a Letter of Map Revision (LOMR).

The Site was considered within the Phase 3 Drainage Report for Lot 6G, the Meadows Filing No. 17 (“Master Report”), prepared by C2C Engineering Inc, November 15, 2012.

Calculations from the original Phase 3 Drainage Report for Filing No. 17, Lots 5 and 6 prepared by CVL Consultants of Colorado, February 15, 2005 were also considered with this report ("Original Report").

Runoff from this site is directed into the existing storm sewer to the south. These flows are conveyed to the Filing 17 Regional Detention Pond which outlets to East Plum Creek.

B. Sub-Basin Description

The following is a description of the historic drainage patterns of The Site. The site is split into two sub-basins (Basins LD and a portion of LB) from the Master Study. Flows from Basin LD, generally south of the aforementioned ridgeline, drain southeast to an existing temporary sediment basin. Flows from Basin LB, generally south of the ridgeline, drain southeast to the same temporary basin.

There are no major drainage ways or drainage patterns onto The Site.

3. DRAINAGE DESIGN CRITERIA

A. Regulations

This project complies with the Town's floodplain ordinance. No regulated flood plains were found adjacent to The Site and will not be requesting Mile High Flood District maintenance eligibility review.

The runoff from this project is conveyed via roadway and storm sewer to the existing regional detention pond. There are no new or additional impacts to any stream preservation areas with this development and project is not within a Stream Buffer area.

B. Development Criteria

The drainage design for the proposed site has been prepared following the regulations outlined in the Town of Castle Rock Storm Drainage Design and Technical Criteria Manual (SDDTCM), revised 2025, and Volumes 1, 2 and 3 of the Urban Storm Drainage Criteria Manual (USDCM) from the Mile High Flood District.

This report references the previously mentioned Master Report. The findings represented herein comply with the previous study of this area. As shown in this study water quality and detention will not be required for Lots 6-A-1A, 6-A-1B, or 6-A-1C, since the Master Report and the associated construction drawings have already incorporated

the design of a water quality pond east of the site. Per the Town of Castle Rock SDDTCM Section 13.1.5, an exclusion to water quality is being applied for land disturbance for land to remain undeveloped. This excluded impervious area is 2.15 acres that is part of basins D1 and D2 (see Appendix E). There is also an additional 0.11 acres (2.6% of the site) of excluded developed area that is also part of these two basins. This exclusion is provided in the Town of Castle Rock Summary of Water Quality Conformance to MS4 Permit form that has been attached in Appendix G.

C. Hydrologic Criteria

One-hour point rainfall values were obtained from Table 6-1 of the SDDTCM. For the 5-year storm, P1= 1.43 inches and for the 100-year storm P1= 2.60 inches.

The peak discharges were determined by the Rational Method, due to drainage areas in The Site containing less than 90 aces. All calculations were performed using the Rational Method Formula. Runoff “C” coefficients for hydrologic soil group B were taken from Table 6-5 (USDCM) and utilized in the composite impervious calculations. The recommended percentage of imperviousness values were taken from Table 6-3 (USDCM).

Hydrologic calculations have been prepared for the 5-year (minor) and 100-year (major) storm events.

This project does not require onsite water quality or detention as it was provided for regionally.

D. Hydraulic Criteria

Street capacity references are to the local standard although no public streets are impacted.

All storm sewers have been designed to convey the runoff from the 100-year storm event.

There are no detention pond structures, outfalls or open channels that will require hydraulic analysis.

There are no variances from the criteria requested with this project.

4. DRAINAGE FACILITY DESIGN

A. General Concept

The Master report sub-basins LB and LD and the assumptions made therein have been directly compared to the calculated values for this project, reference Appendix (F). Calculations were made using MHFD and Town Criteria. The composite imperviousness of all on-site Basins is 54.0%. Runoff generated from the site will be conveyed to the existing detention pond via a series of RCP and PVC. These pipes have been sized per the requirements in the SDDTCM.

The site will develop into two commercial buildings with requisite parking, drive aisles, and landscaping. The drainage patterns anticipated in previous studies will be followed with this development with some minor exceptions explained below.

Appendices C and D include applicable exhibits of the hydrology and hydraulics that were used in the development of this site.

B. Specific Details

Sub-Basin A1 (0.20-acres) consists of parking area, drive, and landscaped area. Surface runoff will be collected by a double-sided No. 16 combo inlet at design point 1 (DP 1). Storm runoff will be conveyed by a proposed 15-inch RCP from DP 1 to DP 2.

Direct Runoff: Q_5 = 0.67 cfs Q_{100}= 1.42 cfs

Sub-Basin A2 (0.06-acres) consists of parking area, drive, and landscaped area. Surface runoff will be conveyed by gutter flow to a Type R inlet at DP 2. Storm runoff will be conveyed by existing 24-inch RCP from DP 2 to DP 5.

Direct Runoff: Q_5 = 0.20 cfs Q_{100}= 0.43 cfs

Sub-Basin B1 (0.27-acres) consists of roof area of building A (restaurant/retail). Runoff will be conveyed to the site storm sewer via a series of roof drains to the inlet at DP 3. The roof drains have been sized for 3 times the anticipated flows.

Direct Runoff: Q_5 = 1.08 cfs Q_{100}= 2.10 cfs

Sub-Basin B2 (0.17-acres) consists of roof area of building B (medical office building). Runoff will be conveyed to the site storm sewer via a series of roof drains to the inlet at DP 3. The roof drains have been sized for 3 times the anticipated flows.

Direct Runoff: Q_5 = 0.68 cfs Q_{100}= 1.32 cfs

Sub-Basin B3 (0.33-acres) consists of sidewalk, parking area, and landscaping. Surface runoff will be conveyed on the surface and via curb and gutter to a Type R inlet at DP 3. Storm runoff will be conveyed by a proposed 15-inch RCP from DP 3 to DP 4.

Direct Runoff: Q_5 = 1.18 cfs Q_{100}= 2.41 cfs

Sub-Basin B4 (0.62-acres) consists of sidewalk, parking area, and landscaping. Surface runoff will be conveyed on the surface and via curb and gutter to a double No. 16 area inlet at DP 4. Storm runoff will be conveyed by a proposed 15-inch RCP from DP 4 to DP 5.

Direct Runoff: Q_5 = 2.11 cfs Q_{100}= 4.35 cfs

Sub-Basin C1 (0.34-acres) consists of sidewalk, parking area, and landscaping. Surface runoff will be conveyed on the surface and via curb and gutter to a Type R inlet at DP 6. Storm runoff will be conveyed by a proposed 15-inch RCP from DP 6 to DP 7.

Direct Runoff: Q_5 = 1.24 cfs Q_{100}= 2.50 cfs

Sub-Basin D1 (1.28 -acres) consists of some sidewalk and predominantly landscaping/ grassy area. Runoff will drain on the surface to an existing inlet on Meadows Parkway.

Direct Runoff: Q_5 = 0.92 cfs Q_{100}= 5.14 cfs

Sub-Basin D2 (0.98-acres) consists of some sidewalk and predominantly landscaping/ grassy area. Runoff will drain on the surface to an existing inlet on Meadows Parkway.

Direct Runoff: Q_5 = 0.77 cfs Q_{100}= 4.11 cfs

C. Compliance with Master Study

Master Report Basin LB: The table below provides a summary of the proposed areas being routed to the existing detention pond as they relate to the assumptions made in the Master Study. The “Proposed Basins” are: all of basins A1 and A2 as well as portions of basins B1 and D1. The majority of this basin was previously developed with another project. The portion of the basin that falls within this project shows a reduction in imperviousness. Due to the overall reduction in imperviousness, no adverse impacts to the storm system are expected.

	Area	C5	C100
Proposed Basin	0.40	0.53	0.74
Master Basin LB	1.38	0.81	0.88

Master Report Basin LD: The table below provides a summary of the proposed areas being routed to the existing detention pond as they relate to the assumptions made in the Master Study. The "Proposed Basins" are: basins B2, B3, B4, and C1 as well as the remaining portion of Basins B1 and portions of basins D1 and D2. This project results in a reduction in imperviousness than what was originally assumed. The proposed storm line has been sized to accommodate these flows. A portion of master basin LD that was previously assumed to be routed to the detention pond as improved area is now proposed landscape and sidewalk area that will sheet flow to Meadows Parkway. This exchange in area is negligible and due to the overall reduction in imperviousness, no adverse impacts to the storm system are anticipated.

	Area	C5	C100
Proposed Basin	2.36	0.64	0.79
Master Basin LD	2.36	0.81	0.88

5. ENVIRONMENTAL PROTECTION CRITERIA

The site will include disturbance of approximately 4.25 acres. The soils on site belong to hydrologic group B. The Site consists of overlot grading and an existing driveway, sidewalk and landscaping. The construction plans will include detailed Construction BMP Plans to mitigate and prevent erosion and sediment transportation.

The erosion control measures are placed on The Site to reduce the on-site erosion, prevent sediment from entering the storm sewer system, and to eliminate sediment deposit off-site. Vehicle tracking control pads will be placed at the entrances to The Site. Silt fences and straw bale barriers will be used in swales and around The Site. Gravel protection will be constructed around all inlets. Surface roughening will be used on all slopes 4:1 and greater. All disturbed areas not being covered by asphalt, concrete, or landscaping will be reseeded with an approved seeding mixture as soon as practical after grading. All erosion control measures shall be maintained and repaired by the

contractor during construction. The contractor shall inspect and repair all erosion control measures as needed following each heavy precipitation or snowmelt.

6. CONCLUSIONS

This Drainage Report complies with the technical criteria set forth in the Town of Castle Rock Storm Drainage Design and Technical Criteria Manual as well as the Storm Drainage Criteria Manual from the Mile High Flood District.

The storm system has been designed to effectively intercept and convey flows up to and including the 100-year storm away from structures and to the downstream system. Conveyed flows will be treated and attenuated for flood control at the existing water quality and detention pond. Therefore, this project should create no adverse impact to upstream or downstream developments or infrastructure if constructed as proposed.

The storm system is a private system located within proposed easements. The maintenance responsibility of the on-site storm system will be the burden of the landowner for this proposed system.

The Sediment and Erosion Concept is designed to prevent soil transport and if transported, soil must be detained before leaving The Site.

7. REFERENCES

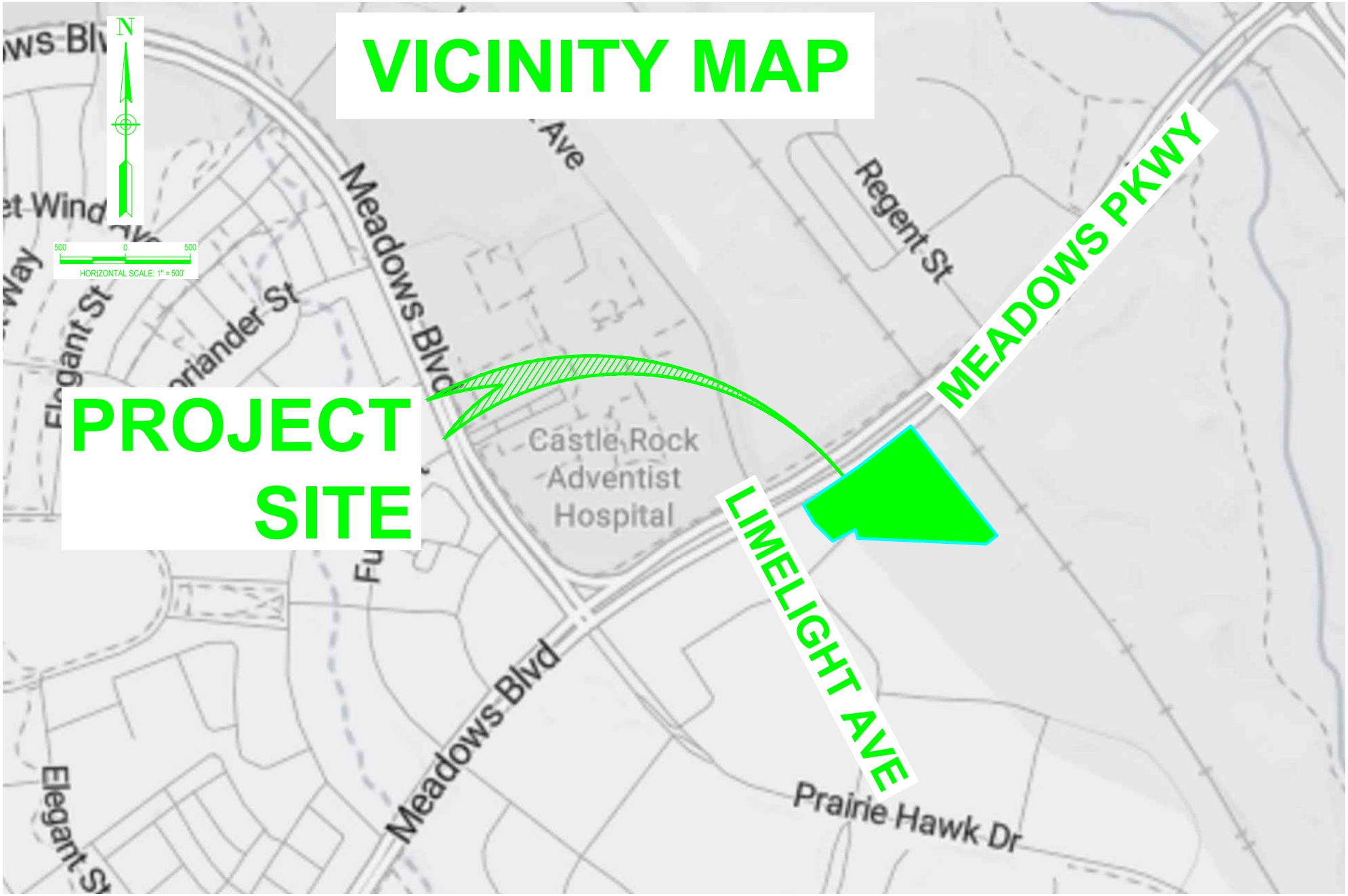
Mile High Flood District, Urban Storm Drainage Criteria Manual., Volumes 1, Partially Updated March 2024, Volume 2, Revised January 2016, and Volume 3, Partially Updated March 2024.

Phase 3 Drainage Report for Log 6G, The Meadows Filing No. 17 November 15, 2012 by C2C Engineering LLC.

Phase 3 Drainage Report for The Meadows Filing No. 17, Lots 5 and 6 February 15, 2005 by CVL Consultants of Colorado Inc.

Town of Castle Rock, Town of Castle Rock Storm Drainage Design and Technical Criteria Manual. Revised and Adopted February 2019.

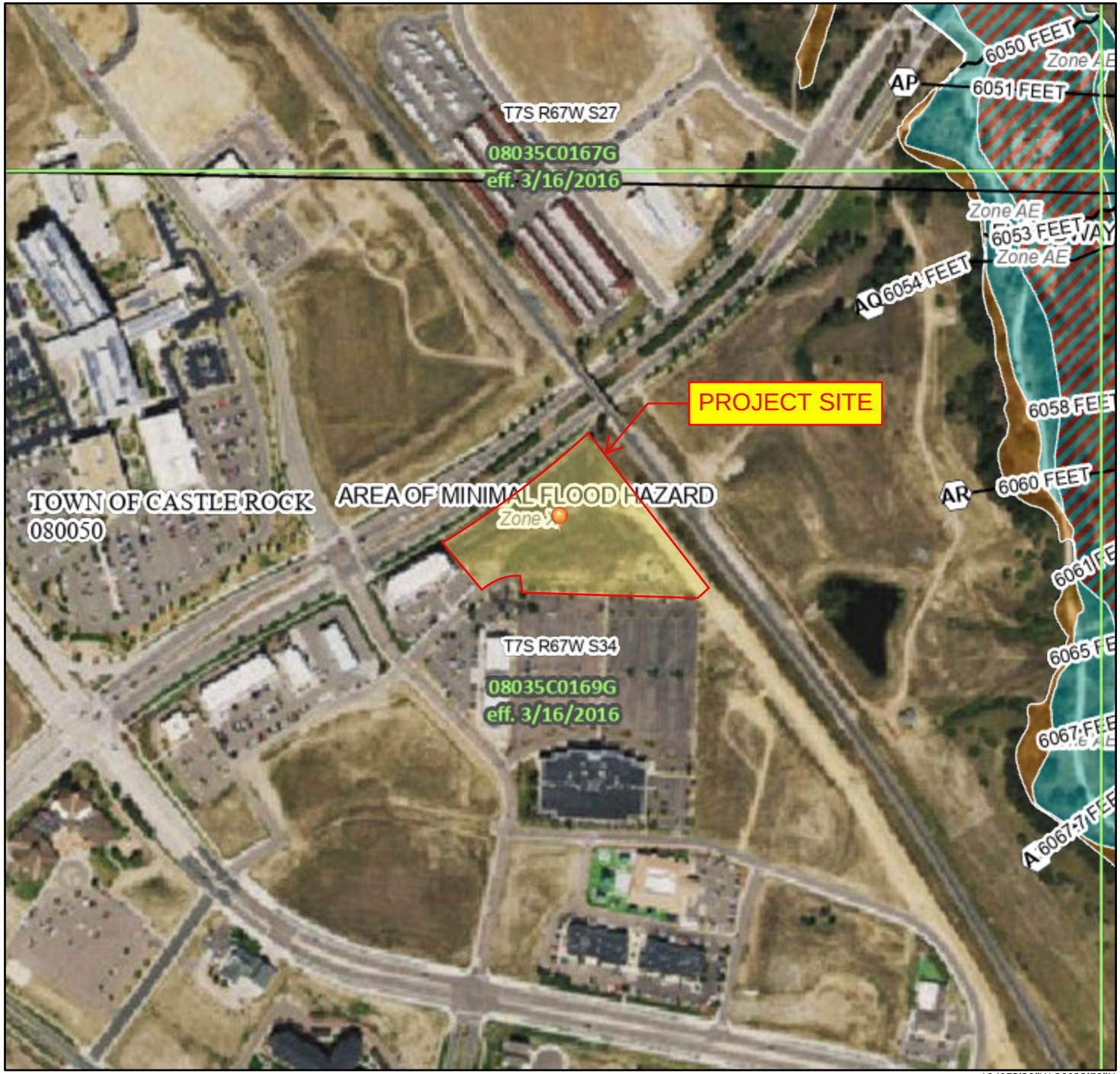
APPENDIX A – Maps


VICINITY MAP
PROJECT SITE
MEADOWS PKWY
LIMELIGHT AVE
Meadows Blvd
Regent St
Castle Rock Adventist Hospital
Prairie Hawk Dr
Elegant St
N
HORIZONTAL SCALE: 1" = 500'

National Flood Hazard Layer FIRMette

FEMA

104°53'7"W 39°24'27"N



104°52'30"W 39°23'59"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

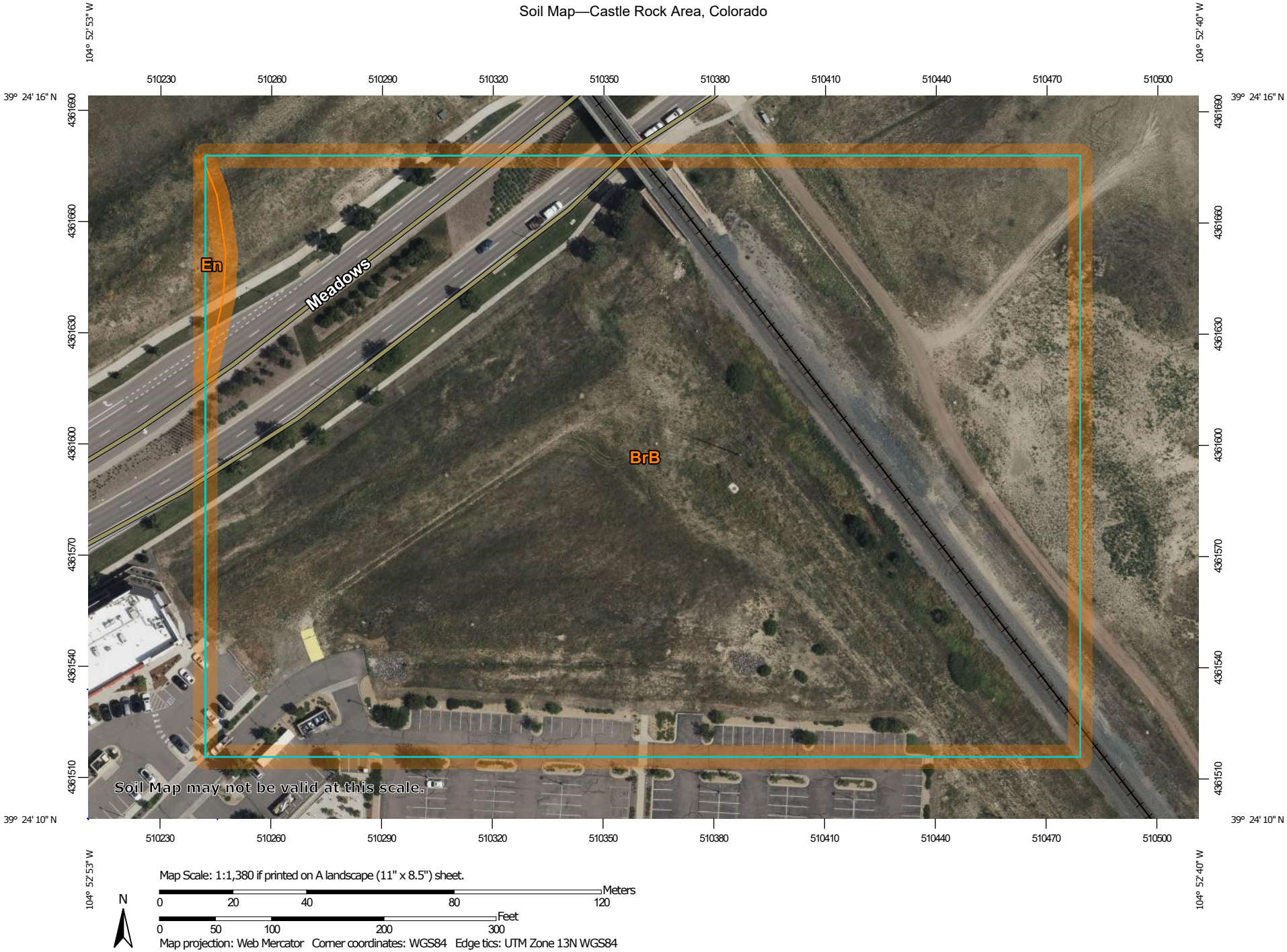
N

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 1/3/2025 at 6:38 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.



Map Scale: 1:1,380 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 20 40 80 120

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 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 1:20,000.

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: Castle Rock Area, Colorado
Survey Area Data: Version 17, Aug 29, 2024

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

Date(s) aerial images were photographed: Mar 1, 2023—Sep 1, 2023

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
BrB	Bresser sandy loam, cool, 1 to 3 percent slopes	9.5	99.5%
En	Englewood clay loam	0.0	0.5%
Totals for Area of Interest		**9.5**	**100.0%**

APPENDIX B – Tables and Figures

TABLE 6-3. RECOMMENDED IMPERVIOUSNESS BY SURFACE TYPES

SURFACE TYPES		IMPERVIOUSNESS
Roadways and Paved Streets		95%
Concrete Driveways and Walks		95%
Roofs		95%
Gravel	No Traffic (Pedestrian Use)	40%
	Low-traffic Areas (Maintenance Paths and Substations)	60%
	High-traffic Areas (Roadways and Parking)	80%
Disturbed Soil (Including Lawns, Managed/Active Turf, Landscaped Areas with Water-Wise Vegetation, and Uncompacted Gravel/Mulch Planting Beds)		20%
Undisturbed or Decompacted Soil (Native Grasses and Open Space Areas)		5%
Artificial Turfs[1]	Landscape Applications (without Subgrade Drainage Layer)	25% – 45%
	Sport Fields (with Underdrain Pipe System)	60% – 80%
Water Surfaces (Lakes/Reservoirs/Irrigation Ponds)		100%
Solar Fields[2]	Grass Cover (Varies with Panel Orientation Relative to Ground Contours)	10% – 45%
	Gravel Cover (Varies with Panel Orientation Relative to Ground Contours)	50% – 75%
Historic Flow Analysis, Greenbelts, Agricultural		5%
Newly Graded Areas		65%
Stormwater Control Measures[3]	Retention Ponds & Constructed Wetland Ponds	100%
	Rooftop Systems – Blue Roofs	95%
	Rooftop Systems – Green Roofs (extensive)	65%
	Rooftop Systems – Green Roofs (intensive)	50%
	Permeable Pavement – CGP/PGP/RGP	55%
	Permeable Pavement – PICP	45%
	Extended Detention Basins	25%
	Receiving Pervious Areas (incl. Grass Buffers & Grass Swales)	20%
	Bioretention & Sand Filters	10%

[1] Consult with the manufacturer to get a recommended value.

[2] Assumes 1:1 ratio of panels to aisles. See MHFD's technical memorandum regarding *Determination of Solar Panel Field Runoff Coefficients and Imperviousness Values* for additional information on procedures for determining percent imperviousness based on panel width, panel spacing, and panel orientation relative to ground contours and how to reflect other impervious areas such as roads and pads that may be part of a solar field and layouts with wider inter-panel spacing.

[3] See MHFD's technical memorandum regarding *Evaluation of Percent Imperviousness for Stormwater Control Measures* for background information.

4.5 RAINFALL INTENSITY

The calculated rainfall intensity, I, is the average rainfall rate in inches per hour over a duration equal to t_c. Obtain 1-hour point precipitation depths from National Oceanic and Atmospheric Administration (NOAA) Atlas 14 for the average return periods of interest and apply Equation 5-1 in the *Rainfall* chapter using t_c as the storm duration, t_d. Use the centroid of the catchment to determine the 1-hour point precipitation depths. The MHFD-Rational and MHFD-Inlet Excel workbooks automatically calculate rainfall intensity based on 1-hour point precipitation depths for a specified location.

4.6 RUNOFF COEFFICIENTS

Any watershed can be conceptualized as a combination of pervious and impervious surfaces. Pervious surfaces allow water to infiltrate into the ground, while impervious surfaces do not allow for infiltration. In urban hydrology, the relationships between pervious and impervious surfaces is important. Urbanization increases impervious area, causing rainfall-runoff relationships to change significantly. In the absence of stormwater management controls that infiltrate or detain runoff, urbanization increases peak runoff rates, volumes, and frequency of runoff and decreases the time to peak.

When analyzing a catchment for planning or design purposes, estimates of the existing and probable future imperviousness of the drainage area are needed. In some cases, the pre-development (i.e., historic) condition also must be analyzed. Table 6-2 provides recommended imperviousness values based on land use types and is appropriate for master planning analysis and conceptual design. Note that the land use classifications in Table 6-2 incorporate roads that are included within the land use. Table 6-3 provides recommended imperviousness values for different surface types and is appropriate for use during later stages of design when the layout of different types of impervious and pervious areas on the site is known and the area of each surface type can be quantified.

The runoff coefficient, C, represents the integrated effects of infiltration, evaporation, depression storage, and interception, all of which affect the rate and volume of runoff. Determining representative runoff coefficients requires judgment based on the experience and expertise of the engineer.

Volume-based runoff coefficients were derived to improve consistency between CUHP and the Rational Method for peak flow predictions (Guo 2013; Guo and Urbonas 2013). The coefficients developed by Dr. Guo were recalibrated using CUHP Version 2.0.0 (Rapp et al. 2017). Using imperviousness, expressed as a decimal, and the Natural Resources Conservation Service (NRCS) Hydrologic Soil Group (HSG), the equations in Table 6-5 can be used to calculate runoff coefficients for design storm return periods for the Rational Method.

TABLE 6-5. RUNOFF COEFFICIENT EQUATIONS BASED ON NRCS HSG AND STORM RETURN PERIOD

NRCS HSG	STORM RETURN PERIOD						
	WQE & 2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
A	$C_A = 0.840I^{1.302}$	$C_A = 0.861I^{1.276}$	$C_A = 0.873I^{1.232}$	$C_A = 0.884I^{1.124}$	$C_A = 0.854I + 0.025$	$C_A = 0.779I + 0.110$	$C_A = 0.645I + 0.254$
B	$C_B = 0.835I^{1.169}$	$C_B = 0.857I^{1.088}$	$C_B = 0.807I + 0.057$	$C_B = 0.628I + 0.249$	$C_B = 0.558I + 0.328$	$C_B = 0.465I + 0.426$	$C_B = 0.366I + 0.536$
C/D	$C_{C/D} = 0.834I^{1.122}$	$C_{C/D} = 0.815I + 0.035$	$C_{C/D} = 0.735I + 0.132$	$C_{C/D} = 0.560I + 0.319$	$C_{C/D} = 0.494I + 0.393$	$C_{C/D} = 0.409I + 0.484$	$C_{C/D} = 0.315I + 0.588$

APPENDIX C – Hydrology

DEVELOPED CONDITIONS

	PROPOSED LAND USE [a.] (sf)								RUNOFF COEFFICIENTS [b.] HYDROLOGIC SOIL GROUP B				
SUB-BASIN	PAVED 95%	DRIVE & WALKS 95%	ROOF 95%	LAWN 20%		TOTAL AREA (sf)	TOTAL AREA (acres)	WEIGHTED AVG. PERCENT IMPERVIOUS (*i*)	C_2	C_5	C_{10}	C_{100}	NOTES
A1	-	7,240	-	1,402	-	8,642	0.20	82.83%	0.67	0.70	0.73	0.81	
A2	-	2,161	-	474	-	2,635	0.06	81.50%	0.66	0.69	0.71	0.80	
B1	-	-	11,955	-	-	11,955	0.27	95.00%	0.79	0.81	0.82	0.87	
B2	-	-	7,500	-	-	7,500	0.17	95.00%	0.79	0.81	0.82	0.87	
B3	-	12,888	-	1,360	-	14,248	0.33	87.84%	0.72	0.74	0.77	0.83	
B4	-	23,879	-	3,192	-	27,071	0.62	86.16%	0.70	0.73	0.75	0.83	
C1	-	13,556	-	1,112	-	14,668	0.34	89.31%	0.73	0.76	0.78	0.84	
D1	-	2,363	-	53,513	-	55,876	1.28	23.17%	0.15	0.17	0.24	0.53	
D2	-	2,468	-	40,198	-	42,666	0.98	24.34%	0.16	0.18	0.25	0.54	
On-Site Total	-	64,555	19,455	101,251	-	185,261	4.25	54.01%	0.41	0.44	0.49	0.68	
	-	-	-	-		-	-	0.00%	-	-	0.06	0.43	
Off-Site Total	-	-	-	-	-	-	-	0.00%	-	-	0.06	0.43	
									2-Year	5-year	10-year	100-year	
								C_B	0.835*i*^*1.169*	0.857*i*^*1.088*	0.807*i*+*0.057*	0.465*i*+0.426	

NOTES: a. Mile High Flood District "Urban Storm Drainage Criteria Manual: Volume 1" (Table 6-3)
b. Mile High Flood District "Urban Storm Drainage Criteria Manual: Volume 1" (Table 6-5)

DEVELOPED CONDITIONS

BASIN DATA			INITIAL/OVERLAND TIME (t_i) [a.]			TRAVEL TIME (t_t) [b.]					TIME OF CONC. (t_c) [e.] [f.]	FIRST DESIGN POINT TIME OF CONC. IN URBAN CATCHMENT (t_c) [e.]			FINAL (t_c) [f.]	CONVEYANCE REMARKS
SUB-BASIN	AREA (acres)	C_5	LENGTH L_i (ft)	SLOPE S_o (ft/ft)	t_i (minutes)	LENGTH L_t (ft)	SLOPE S_t (ft/ft)	CONVEYANCE FACTOR K [c.]	VELOCITY V_t (ft/s)	t_t (minutes)	t_c [d.] (minutes)	LENGTH L_t (ft)	IMPERVIOUS i (decimal)	t_c (minutes)	t_c (minutes)	
A1	0.20	0.70	80	0.030	4.5	20	0.020	20	2.83	0.12	5.0	20	0.828	12.03	**5.0**	
A2	0.06	0.69	20	0.040	2.1	30	0.020	20	2.83	0.18	5.0	30	0.815	12.32	**5.0**	
B1	0.27	0.81	125	0.020	4.6	-	-	-	-	-	5.0	-	0.950	-	**5.0**	
B2	0.17	0.81	70	0.020	3.5	-	-	-	-	-	5.0	-	0.950	-	**5.0**	
B3	0.33	0.74	70	0.025	4.0	100	0.010	20	2.00	0.83	5.0	100	0.878	11.85	**5.0**	
B4	0.62	0.73	100	0.025	5.0	100	0.010	20	2.00	0.83	5.8	100	0.862	12.14	**5.8**	
C1	0.34	0.76	100	0.040	3.9	90	0.030	20	3.46	0.43	5.0	90	0.893	11.22	**5.0**	
D1	1.28	0.17	240	0.300	8.4	-	-	-	-	-	8.4	-	0.232	-	**8.4**	
D2	0.98	0.18	200	0.300	7.6	-	-	-	-	-	7.6	-	0.243	-	**7.6**	

NOTES:

a. MHFD, USDCM Volume 1, Equation 6-3: $t_i = (0.395 * (1.1 - C_5) * \sqrt{L_i}) / S_o^{0.33}$
b. MHFD, USDCM Volume 1, Equation 6-4: $t_t = L_t / (60 * K * \sqrt{S_t}) = L_t / (60 * V_t)$
c. MHFD, USDCM Volume 1, Table 6-4: Heavy Meadow = 2.5, Tillage/Field = 5, Short Pasture & Lawns = 7, Nearly Bare Ground = 10, Grassed Waterway = 15, Paved Areas & Shallow Paved Swales = 20
d. MHFD, USDCM Volume 1, Equation 6-2: $t_c = t_i + t_t$
e. MHFD, USDCM Volume 1, Equation 6-5: $t_c = (26 - 17i) + (L_t / (60 * (14i + 9) * \sqrt{S_t}))$
f. MHFD, USDCM Volume 1, Section 4.4.3, "The time of concentration shall be the lesser of the values calculated by Equation 6-2 and Equation 6-5."
f. MHFD, USDCM Volume 1, Section 4.4.4, "Use a minimum t_c value of 5 minutes for urbanized areas."

DEVELOPED CONDITIONS

	DIRECT RUNOFF								TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
MASTER BASIN	DESIGN POINT	AREA (acres)	RUNOFF COEFF	Tc (min)	C * A (acres)	P_1 [a.]	$I^{b.}$ (in/hour)	Q (cfs) [c.]	Tc (min)	C * A (acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	DESIGN FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
A1	1	0.20	0.70	5.0	0.14	1.43	4.85	0.67													
															0.67	0.5	15	72	2.58	0.47	Routed from DP-1 Inlet to DP-2 Inlet
A2	2	0.06	0.69	5.0	0.04	1.43	4.85	0.20													
	2								5.5	0.18	4.74	0.85									Total flow at DP-2 Inlet
															0.85	0.4	24	259	2.48	1.74	Routed from DP-2 Inlet to DP-5 Manhole
B1	3	0.27	0.81	5.0	0.22	1.43	4.85	1.08													
															1.08	0.5	12	75	3.22	0.39	Routed from B1 Roofdrain to DP-3 Inlet
B2	3	0.17	0.81	5.0	0.14	1.43	4.85	0.68													
															0.68	0.5	12	80	2.86	0.47	Routed from B2 Roofdrain to DP-3 Inlet
B3	3	0.33	0.74	5.0	0.24	1.43	4.85	1.18													
	3								5.5	0.61	4.74	2.87									Total flow at DP-3 Inlet
															2.87	0.5	15	95	3.87	0.41	Routed from DP-3 Inlet to DP-4 Inlet
B4	4	0.62	0.73	5.8	0.45	1.43	4.66	2.11													
	4								5.8	1.06	4.66	4.93									Total flow at DP-4 Inlet
															4.93	0.5	15	18	4.21	0.07	Routed from DP-4 Inlet to DP-5 Manhole
	5								7.2	1.24	4.35	5.39									Total flow at DP-5 Manhole
															5.39	0.4	24	158	4.17	0.63	Routed from DP-5 Manhole to DP-7 Manhole
C1	6	0.34	0.76	5.0	0.26	1.43	4.85	1.24													
															1.24	0.5	15	44	3.1	0.24	Routed from DP-6 Inlet to DP-7 Manhole
	7								7.8	1.49	4.23	6.32									Total flow at DP-7 Manhole
D1	-	1.28	0.17	8.4	0.22	1.43	4.13	0.92													
D2	-	0.98	0.18	7.6	0.18	1.43	4.28	0.77													

NOTES:
a. Castle Rock Storm Drainage Design and Technical Criteria Manual: 5-year (P1 = 1.43 in.), 100-year (P1 = 2.60 in.)
b. MHFD, USDCM Volume 1, Equation 5-1: $I = (28.5 * P_1) / (10 + T_c)^{0.786}$
c. MHFD, USDCM Volume 1, Equation 6-1: $Q = CIA$

DEVELOPED CONDITIONS

	DIRECT RUNOFF								TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
MASTER BASIN	DESIGN POINT	AREA (acres)	RUNOFF COEFF	Tc (min)	C * A (acres)	P_1 [a.]	$I^{b.}$ (in/hour)	Q (cfs) [c.]	Tc (min)	C * A (acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	DESIGN FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
A1	1	0.20	0.81	5.0	0.16	2.60	8.82	1.42							1.42	0.5	15	72	3.25	0.37	Routed from DP-1 Inlet to DP-2 Inlet
A2	2	0.06	0.80	5.0	0.05	2.60	8.82	0.43													
	2								5.4	0.21	8.65	1.81									Total flow at DP-2 Inlet
B1	3	0.27	0.87	5.0	0.24	2.60	8.82	2.10							1.81	0.4	24	259	3.11	1.39	Routed from DP-2 Inlet to DP-5 Manhole
B2	3	0.17	0.87	5.0	0.15	2.60	8.82	1.32							2.10	0.5	12	75	3.81	0.33	Routed from B1 Roofdrain to DP-3 Inlet
B3	3	0.33	0.83	5.0	0.27	2.60	8.82	2.41							1.32	0.5	12	80	3.43	0.39	Routed from B2 Roofdrain to DP-3 Inlet
	3								5.4	0.66	8.64	5.71									Total flow at DP-3 Inlet
B4	4	0.62	0.83	5.8	0.51	2.60	8.47	4.35							5.71	0.5	15	95	4.1	0.39	Routed from DP-3 Inlet to DP-4 Inlet
	4								5.8	1.17	8.47	9.95									Total flow at DP-4 Inlet
	5								6.8	1.38	8.08	11.19			9.95	0.5	15	18	4.5	0.07	Routed from DP-4 Inlet to DP-5 Manhole Total flow at DP-5 Manhole
C1	6	0.34	0.84	5.0	0.28	2.60	8.82	2.50							11.19	0.4	24	158	5.02	0.52	Routed from DP-5 Manhole to DP-7 Manhole
	7								7.3	1.67	7.89	13.15			2.50	0.5	15	44	3.79	0.19	Routed from DP-6 Inlet to DP-7 Manhole Total flow at DP-7 Manhole
D1	-	1.28	0.53	8.4	0.68	2.60	7.50	5.14													
D2	-	0.98	0.54	7.6	0.53	2.60	7.77	4.11													

NOTES:
a. Castle Rock Storm Drainage Design and Technical Criteria Manual: 5-year (P1 = 1.43 in.), 100-year (P1 = 2.60 in.)
b. MHFD, USDCM Volume 1, Equation 5-1: $I = (28.5 * P_1) / (10 + T_c)^{0.786}$
c. MHFD, USDCM Volume 1, Equation 6-1: $Q = CIA$

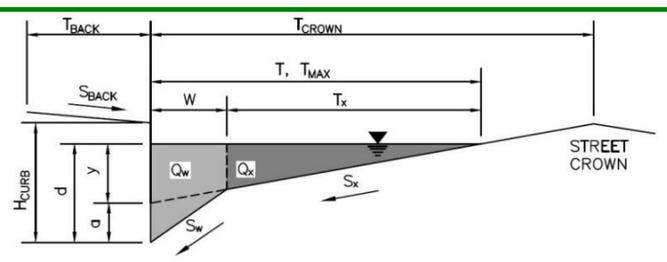
APPENDIX D – Hydraulics

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

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

Project: **Limelight Center at The Meadows**

Inlet ID: **DP 1**



Gutter Geometry:

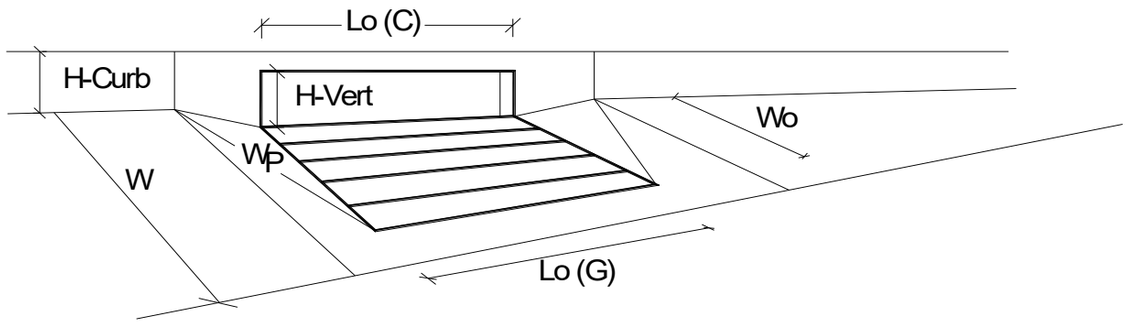
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	12.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.040	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} =	0.020	

		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	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	Denver No. 16 Combination		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	6.0	inches

Override Depths

Grate Information		MINOR	MAJOR	
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.31	0.31	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.60	3.60	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	

Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	3.00	3.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.50	6.50	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	5.25	5.25	inches
Angle of Throat	Theta =	0.00	0.00	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) =	3.70	3.70	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.66	0.66	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.52	0.52	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.33	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.94	0.94	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.94	0.94	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.6**	**5.6**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	0.7	1.4	cfs

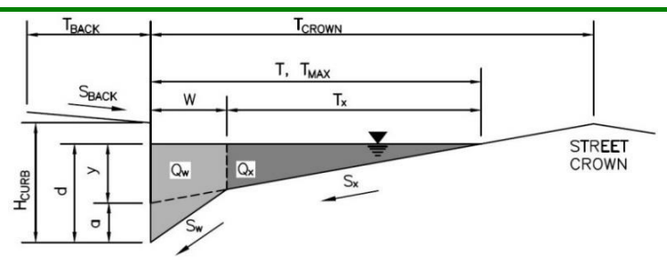
MHFD-Inlet, Version 5.03 (August 2023)

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

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

Project: **Limelight Center at The Meadows**

Inlet ID: **DP 2**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	4.0	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 =	0.083	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} =	0.020	

		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	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

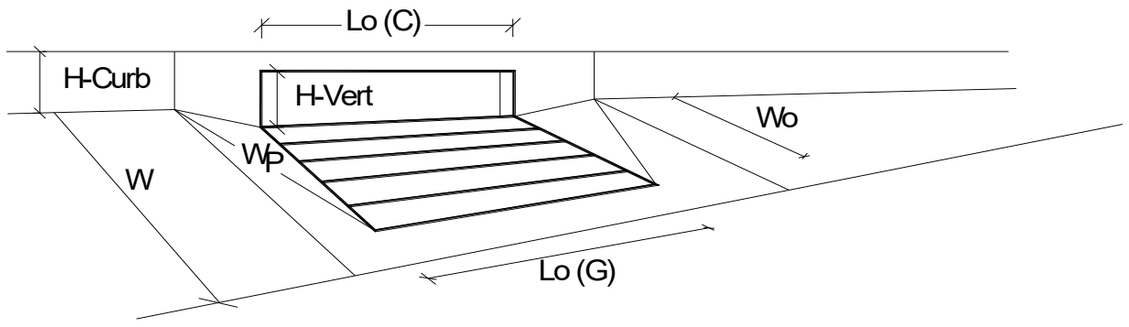
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

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

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	3.6	3.6	inches

Override Depths

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
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	

Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	1.00	1.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.22	0.22	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**2.3**	**2.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	0.2	0.4	cfs

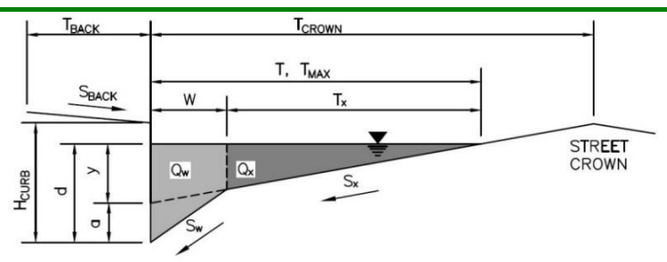
MHFD-Inlet, Version 5.03 (August 2023)

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

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

Project: **Limelight Center at The Meadows**

Inlet ID: **DP 3**



Gutter Geometry:

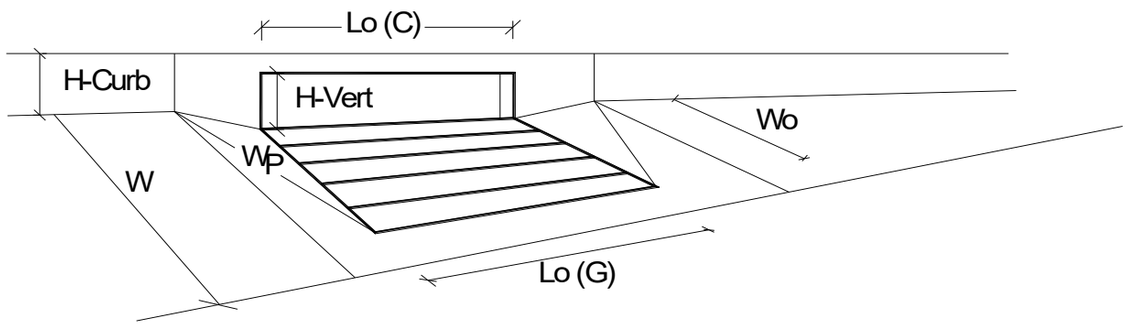
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.200	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	60.0	ft
Gutter Width	W =	1.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	20.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.6	5.6	inches

Override Depths

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
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	

Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	1.00	1.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.38	0.38	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	

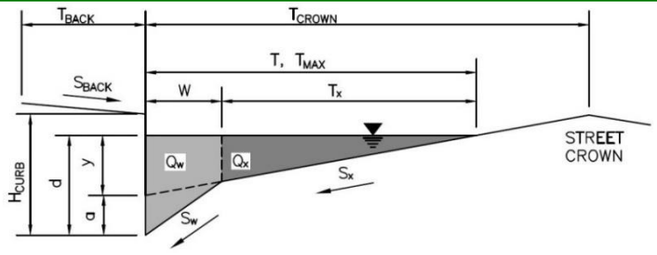
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.2**	**5.2**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	1.2	2.4	cfs

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

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

Project: **Limelight Center at The Meadows**

Inlet ID: **DP 4**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	30.0	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 =	0.083	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} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	30.0	30.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

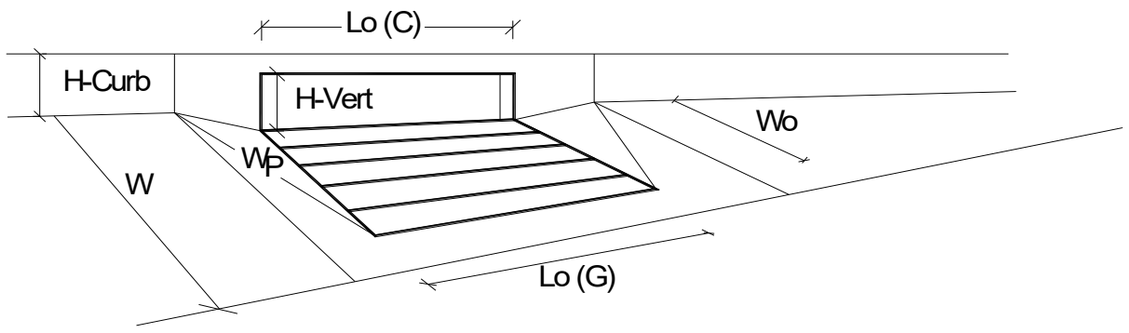
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

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

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	Denver No. 16 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	3	3	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	6.0	inches

Grate Information		MINOR	MAJOR	Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.31	0.31	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.60	3.60	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	

Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	N/A	N/A	inches
Angle of Throat	Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	N/A	N/A	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.52	0.52	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.57	0.57	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	

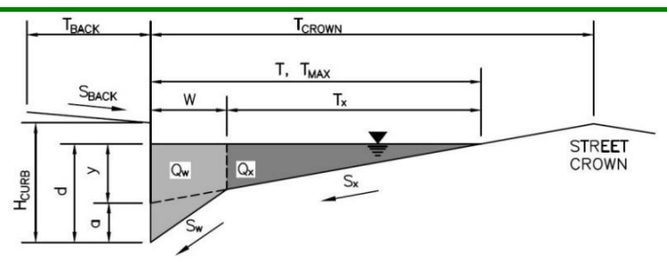
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.0**	**5.0**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	2.1	4.4	cfs

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

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

Project: **Limelight Center at The Meadows**

Inlet ID: **DP 6**



Gutter Geometry:

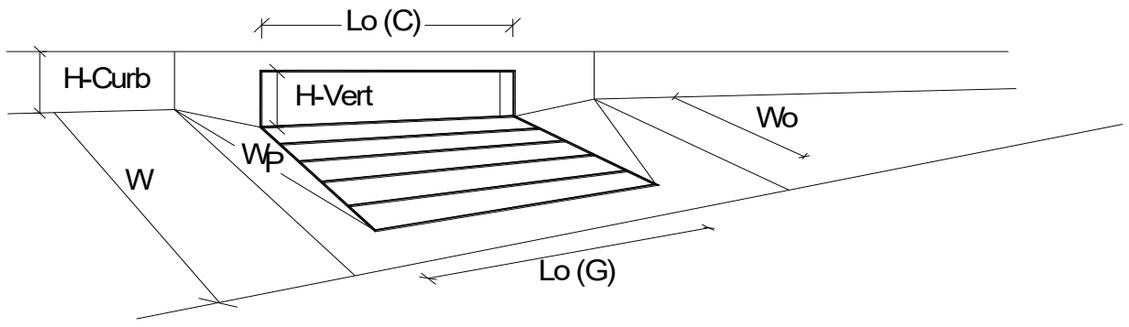
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	20.0	ft
Gutter Width	W =	1.00	ft
Street Transverse Slope	S_X =	0.040	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} =	0.020	

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

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

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.3	5.3	inches

Override Depths

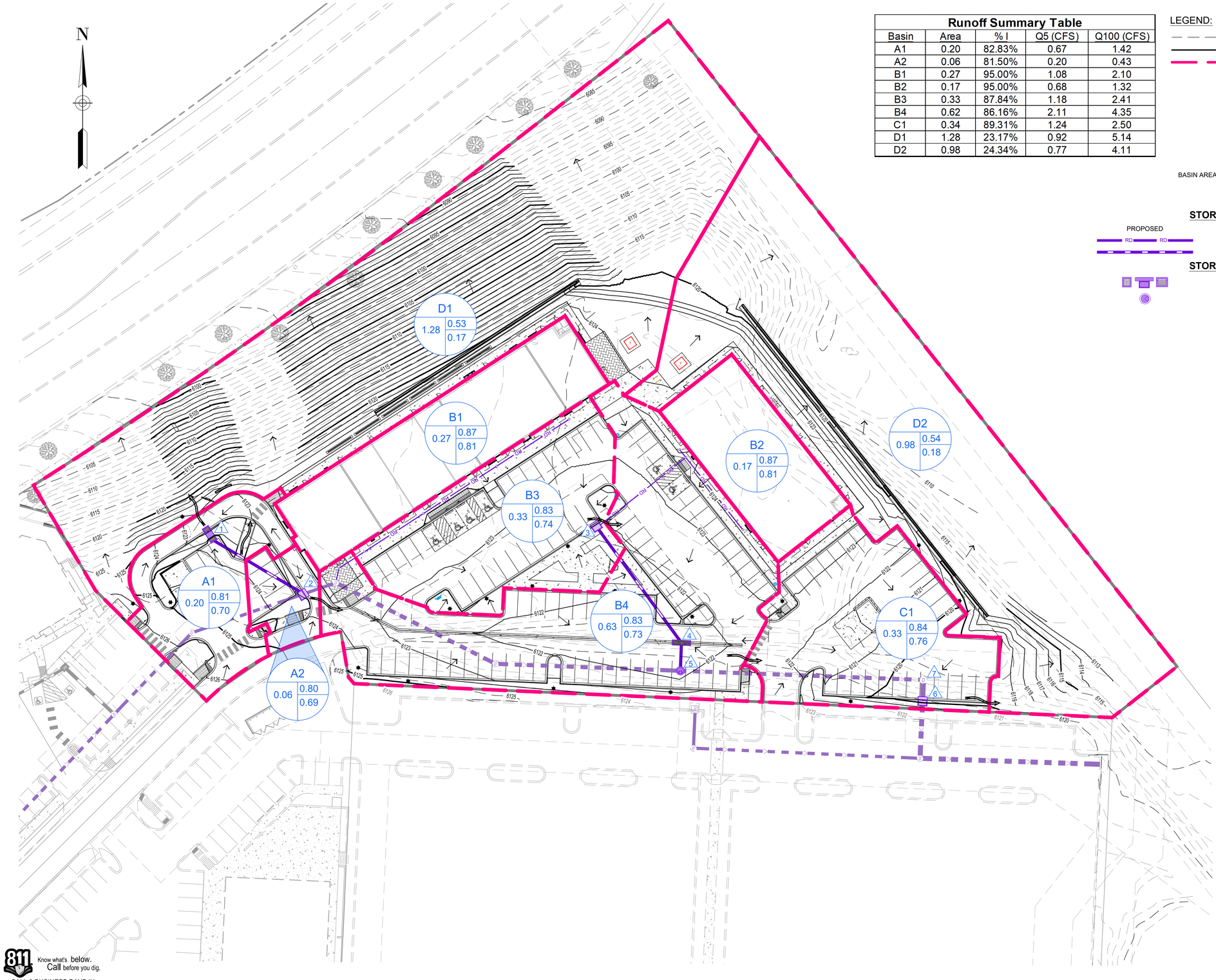
Grate Information		MINOR	MAJOR	
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	

Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	1.00	1.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.36	0.36	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**4.8**	**4.8**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	1.2	2.5	cfs

APPENDIX E – Drainage Plan



Runoff Summary Table				
Basin	Area	% I	Q5 (CFS)	Q100 (CFS)
A1	0.20	82.83%	0.67	1.42
A2	0.06	81.50%	0.20	0.43
B1	0.27	95.00%	1.08	2.10
B2	0.17	95.00%	0.68	1.32
B3	0.33	87.84%	1.18	2.41
B4	0.62	86.16%	2.11	4.35
C1	0.34	89.31%	1.24	2.50
D1	1.28	23.17%	0.92	5.14
D2	0.98	24.34%	0.77	4.11

LEGEND:

- 5280 — EXISTING CONTOUR
- 5280 — PROPOSED CONTOUR
- BASIN BOUNDARY
- EMERGENCY OVERFLOW PATH
- 7 — DESIGN POINT
- FLOW DIRECTION
- BASIN AREA / B / A / M / m — BASIN DESIGNATION, MAJOR RUNOFF COEFFICIENT, MINOR RUNOFF COEFFICIENT

STORM LINETYPE LEGEND

PROPOSED		EXISTING
RD — RD	ROOF DRAIN	
	STORM SEWER	

STORM SYMBOLS LEGEND

	STORM INLET
	STORM MANHOLE

811 Know what's below. Call before you dig.

CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

LIMELIGHT COMMERCIAL

FINAL DRAINAGE PLAN

WESTBRIDGE DEVELOPMENT

PREPARED FOR:

ISSUE DATE: 8/18/2025

DATE	REVISIONS	BY

DESIGNED BY:	KSR
DRAWN BY:	JJH
JOB NUMBER:	240701

30 0 30

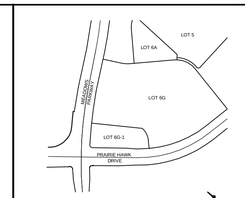
HORIZONTAL SCALE: 1" = 30'

PRELIMINARY NOT FOR CONSTRUCTION

SHEET NUMBER:

D1.01

APPENDIX F – Master Report Basin Drainage Plan



KEY MAP
N.T.S.

LEGEND

- A = BASIN DESIGNATION; B = BASIN AREA (Ac); C = MINOR RUNOFF COEFFICIENT; D= MAJOR RUNOFF COEFFICIENT
- DESIGN POINT DESIGNATION
- EXISTING MAJOR CONTOUR / EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR / PROPOSED MINOR CONTOUR
- FLOW ARROW
- MAJOR BASIN
- PROPOSED STORM PIPE
- PROPOSED TYPE-R INLET
- BOUNDARY

BASIN SUMMARY

BASIN	Q_5 (cfs)	Q_{100} (cfs)
I-A	6.6	13.1
I-B	4.9	11.2
I-C	0.7	1.5
I-UN	1.1	10.9
I-SD	0.1	1.3
OSA	1.1	2.3
L-A	4.8	9.6
L-B	5.4	10.7
L-C	3.9	7.8
L-D	9.3	18.3

DESIGN POINT SUMMARY

D.P.	Q_5 (cfs)	Q_{100} (cfs)
1	12.8	27.2
2	10.4	9.1
10	4.80	9.47
11	0.7	1.5
12	4.9	9.7
13	6.6	13.1
20	1.1	2.3
30	4.0	7.20
31	9.89	19.14
32	23.89	48.21

60 30 0 60 120

SCALE: 1" = 60'

No.	Revisions	Date	Init.	Appr.	Date

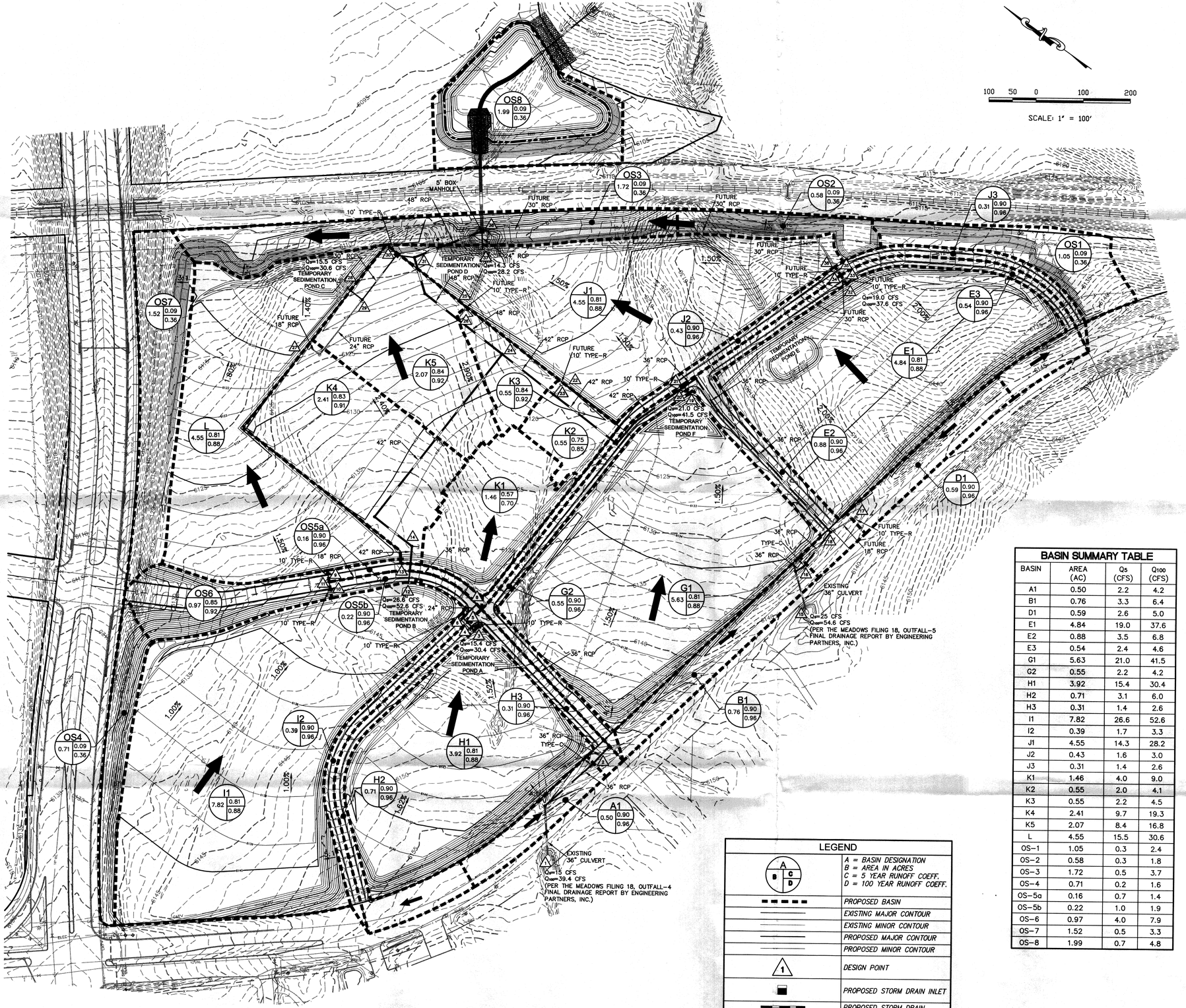
C2C ENGINEERING, LLC
6551 S. Revere Parkway, Suite 140
Centennial, Colorado 80111
P:720-221-4520
www.c2ceng.com
engineering, llc
CIVIL ENGINEERING • WATER RESOURCES • LAND PLANNING

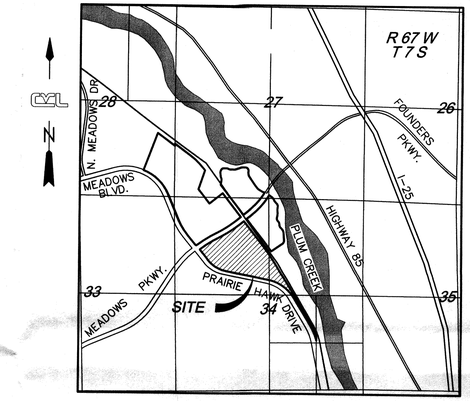
CASTLE ROCK DEVELOPMENT CO.
3033 E. 1ST AVENUE, SUITE 401
DENVER, COLORADO 80206

THE MEADOWS FILING 17
LOT 6G-1
CASTLE ROCK, COLORADO
FINAL DRAINAGE MAP

SCALE:	FILE NO:
AS SHOWN	12-07051
DRAWN BY: CT	DATE: AUGUST 31, 2012
CHECKED BY: KAL	

SHEET NUMBER
1





VICINITY MAP
1" = 2000'

SUMMARY RUNOFF TABLE

DESIGN POINT	CONTRIBUTING AREA (AC)	Q5 (CFS)	Q100 (CFS)	CONTRIBUTING BASIN(S)
1	OFFSITE	15.0	39.4	OS
2	0.50	17.2	43.6	A1, OS
3	3.92	15.4	30.4	H1
4	1.02	4.5	8.6	H2, H3
5	4.94	19.9	39.1	H1, H2, H3
6	0.39	1.7	3.3	I2
7	DESIGN POINT 7 NOT USED			
8	5.33	38.7	86.0	H1–H3, I2, OS
9	0.16	0.7	1.4	OS5a
10	0.22	1.0	1.9	OS5b
11	0.38	1.7	3.2	OS5a, OS5b
12	7.82	26.6	52.6	I1
13	13.53	63.6	135.1	H1–H3, I1, I2, OS5a, OS5b, OS
14	14.99	67.1	143.0	H1–H3, I1, I2, OS5a, OS5b, OS, K1
15	OFFSITE	25.0	54.6	OS
16	0.76	28.3	61.0	B1, OS
17	0.59	2.6	5.0	D1
18	1.35	30.9	66.0	B1, D1, OS
19	5.63	21.0	41.5	G1
20	6.18	22.2	43.8	G1, G2
21	7.53	52.6	108.8	B1, D1, G1, G2, OS
22	0.55	2.0	4.1	K2
23	8.08	53.1	110.0	B1, D1, G1, G2, K2, OS
24	23.07	116.9	246.3	BASINS FOR D.P.'S 14 AND 23
25	0.55	2.2	4.5	K3
26	23.62	118.7	250.0	BASINS FOR D.P. 24, K3
27	2.41	9.7	19.3	K4
28	4.55	15.5	30.6	L
29	6.96	23.9	47.4	K4, L
30	9.03	31.2	61.9	K4, K5, L
31	32.65	108.6	215.3	BASINS FOR D.P.'S 30 AND 26
32	4.84	19.0	37.6	E1
33	1.42	5.6	10.9	E2, E3
34	6.26	22.9	44.9	E1, E2, E3
35	0.74	2.7	5.2	J2, J3
36	7.0	23.6	46.4	E1, E2, E3, J2, J3
37	4.55	14.3	28.2	J1
38	44.2	141.3	279.5	BASINS FOR D.P.'S 31, 36 AND 37

BASIN SUMMARY TABLE

BASIN	AREA (AC)	Q5 (CFS)	Q100 (CFS)
A1	0.50	2.2	4.2
B1	0.76	3.3	6.4
D1	0.59	2.6	5.0
E1	4.84	19.0	37.6
E2	0.88	3.5	6.8
E3	0.54	2.4	4.6
G1	5.63	21.0	41.5
G2	0.55	2.2	4.2
H1	3.92	15.4	30.4
H2	0.71	3.1	6.0
H3	0.31	1.4	2.6
I1	7.82	26.6	52.6
I2	0.39	1.7	3.3
J1	4.55	14.3	28.2
J2	0.43	1.6	3.0
J3	0.31	1.4	2.6
K1	1.46	4.0	9.0
K2	0.55	2.0	4.1
K3	0.55	2.2	4.5
K4	2.41	9.7	19.3
K5	2.07	8.4	16.8
L	4.55	15.5	30.6
OS–1	1.05	0.3	2.4
OS–2	0.58	0.3	1.8
OS–3	1.72	0.5	3.7
OS–4	0.71	0.2	1.6
OS–5a	0.16	0.7	1.4
OS–5b	0.22	1.0	1.9
OS–6	0.97	4.0	7.9
OS–7	1.52	0.5	3.3
OS–8	1.99	0.7	4.8

LEGEND

A / B / C / D	A = BASIN DESIGNATION B = AREA IN ACRES C = 5 YEAR RUNOFF COEFF. D = 100 YEAR RUNOFF COEFF.
	PROPOSED BASIN
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
1	DESIGN POINT
	PROPOSED STORM DRAIN INLET
	PROPOSED STORM DRAIN
	FLOW AROW

I HEREBY AFFIRM THAT THESE FINAL CONSTRUCTION PLANS WERE PREPARED UNDER MY DIRECT SUPERVISION, IN ACCORDANCE WITH ALL APPLICABLE TOWN OF CASTLE ROCK AND STATE OF COLORADO STANDARDS AND STATUTES, RESPECTIVELY; AND THAT I AM FULLY REPONSIBLE FOR ALL DESIGN AND REVISIONS RELATIVE TO SAID PLANS.

COLORADO REGISTERED KURT A. LANG 32249 02-15-25 PROFESSIONAL ENGINEER

KURT A. LANG, COLORADO P.E. DATE

TOWN OF CASTLE ROCK APPROVALS
THESE PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES DIRECTOR APPROVAL

RECOMMEND APPROVAL BY:

ENGINEERING DIVISION DATE

APPROVED BY:

DEVELOPMENT SERVICES DIRECTOR DATE

No.	Revisions	Date	Init.	Appr.	Date
	ISSUED FOR CONSTRUCTION	02/15/05	KAL		

7901 E. Belleview Avenue
Suite 150
Englewood, CO 80111
(720) 482-9526
Fax: (720) 482-9546

CVL CONSULTANTS OF COLORADO, INC.
CIVIL ENGINEERING · LAND SURVEYING · LAND PLANNING

CASTLE ROCK LAND COMPANY
3033 EAST 1ST AVENUE, #410
DENVER, CO 80206

THE MEADOWS FILING 17
LOT 5 AND 6

DEVELOPED DRAINAGE MAP

SCALE:	AS SHOWN	FILE NO:	04811401
DRAWN BY:	ACS		
CHECKED BY:	AMZ		
DATE:	FEB. 15, 2004		

SHEET NUMBER 1

APPENDIX G – Summary of Water Quality Conformance to MS4 Permit Form

Summary of Water Quality Conformance to MS4 Permit

The purpose of this worksheet is to document conformance with the Town of Castle Rock's MS4 permit with regard to permanent water quality on land disturbance projects.

Project Name Limelight Center at The Meadows

Project Owner Castle Rock Limelight LLC

Project Location Lots 6-A-1A, 6-A-1B, and 6-A-1C, The Meadows Filing No. 17, Area No. 4.

ToCR Project Number SDP25-0024

Total Site Area 4.25 **acres**

Total Size of Common Plan of Development 4.25 **acres**

Check all that apply:

- ☑ **Project within Plum Creek Basin**
- ☐ **Project within Cherry Creek Basin**

Estimated construction completion date Fall 2027

---

1. The water quality control measure(s) for applicable development sites shall meet one of the following base design standards as per the SDDTCM Section 14.4. Please select all design standards that were applied to meet conformance with the MS4 on this site.

   - ☑ WQCV standard
   - ☐ Pollutant removal standard
   - ☐ Runoff reduction standard
   - ☐ Applicable site draining to regional WQVC control measure (accepts drainage prior to discharging to WOTS)
   - ☐ Applicable site draining to regional WQVC control facility (with receiving pervious area control measure upstream of WOTS)
   - ☐ Constrained redevelopment sites standard
     - Imperviousness of existing site _____/_____(Imp. Ac/Site Ac) =____%
     - Variance required TCV No. _____
   - ☑ Existing control measure with WQCV per previous criteria standards
     - Reference Construction Permit No. _____
   - ☐ Cherry Creek Basin only, choose one: ☐ Tier 1 ☐ Tier 2 ☐ Tier 3
   - ☐ No control measures provided (See Permanent WQ Worksheet for applicability)

Summary of Water Quality Conformance to MS4 Permit

2. Was an exclusion to water quality applied as per SDDTCM Section 13.1.5? ☑ Yes ☐ No

   i. If yes, please select all that apply, provide total excluded impervious area(s) and submit variance, as applicable: TCV No. _____

   - ☐ Pavement management site
     Excluded impervious area: _____ acres
   - ☐ Excluded roadway redevelopment
     Excluded impervious area: _____ acres
   - ☐ Excluded existing roadway areas
     Excluded impervious area: _____ acres
   - ☐ Above ground and below ground utilities
   - ☐ Large lot single family home
   - ☐ Non-residential and non-commercial infiltration
     Excluded impervious area: _____ acres
   - ☑ Land disturbance for land to remain undeveloped
     Excluded impervious area: 2.15 acres
   - ☐ Stream Stabilization Sites
     Excluded impervious area: _____ acres
   - ☐ Trails
     Excluded impervious area: _____ acres
   - ☐ Oil and Gas Exploration

3. For Development and Redevelopment sites, following any exclusions claimed above, was any portion of the site excluded up to 20% of the site and not to exceed one acre? ☑ Yes ☐ No

   If yes, complete the following:

   Excluded area: 0.11 acres

   Total Site area: 4.25 acres, 2.6 % site excluded

4. For Constrained sites, was any portion of the site excluded up to 50% of the site and not to exceed 50% of the impervious area? ☐ Yes ☑ No

   If yes, complete the following:

   Excluded area: _____ acres

   Excluded impervious area: _____ acres

   Total Site area: _____ acres, _____ % site excluded

   Total Impervious area: _____ acres, _____ % impervious excluded