

Preliminary Drainage Report
AFC Urgent Care
Shay Plaza Subdivision Filing No. 1, Lot 1, Block 1
11310 E. COLFAX AVE.
AURORA, CO

Prepared For:

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Cushing Terrell Project No. AFC_EASTCOLFAX2

December 13th, 2024

Renee C. Young, PE

Approved For One Year From This Date	
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Aurora Water - Drainage Division	Date

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1.0 INTRODUCTION

1.1 Location

The proposed development is located in the block bordered by Macon Street to the east, Lima Street to the west and East Colfax Ave to the north. The project consists of Lot 1 of the proposed Shay Plaza Subdivision Filing No. 1 and the proposed adjacent ROW improvements. The project is bordered by the following subdivisions:

- To the north: Lot 2 Weber subdivision and Block 194 Boston Heights 2nd Filing
- To the west: Lot 2, Block 4 Aurora Heights
- To the south: Lot 1, Block 1 Lima Center Subdivision Filing No. 1
- To the east: Lot 1 Block 1 Kass subdivision Filing No. 1

1.1.1 Vicinity Map

See Appendix C for the project vicinity map.

1.1.2 Major Drainageways

There are no major drainageways and facilities within or adjacent to the development.

1.2 Proposed Development

The proposed development consists of two structures: an AFC Urgent Care Center at the northwest corner and a medical office building at the northeast corner. The site will also contain a parking lot to serve the two structures, a plaza in between the two buildings, sidewalks, planters, and the utilities needed to serve the lot.

1.3 Changes to MDR

This section is not applicable to this project.

1.4 Variances

1.4.1 Variance Request 1 – 15 Inch Private Storm Sewer Pipe

A 15 inch pipe is proposed to connect the private on-site inlets in the parking lot to the public Type R Inlet. No public flows will be entering these pipes. Per Aurora Storm Drainage Design and Technical Criteria Manual (Criteria Manual), section 6.4.2, the minimum pipe size is 18 inches, but smaller pipes that are privately owner and maintained may be allowed with a variance. For this site, a 15 inch pipe will adequately convey flows while allowing for additional horizontal clearance near an existing fire hydrant, proposed water services, and the proposed building. It also allows for compliance with the required vertical clearance at crossings with a water service and a sanitary service. Flow calculations shown in Appendix B show that the 15 inch pipe adequately conveys flows.

2.0 HISTORIC DRAINAGE

2.1 Description of Property and Drainage Basin

The existing site contains two structures and their associated parking, loading, and driveway pavement areas. The eastern structure is a former restaurant and the western structure is currently used for automotive repair. The existing grading of the site directs stormwater flows from south to north where it is conveyed to the existing inlet at the corner of East Colfax Ave

and Lima St. The entire site consists of Weld Silt Loam, which is classified as hydrologic soil group C (see Appendix E for the NRCS Web Soil Survey report).

The existing site is broken into three sub basins:

Basin X consists of the western automotive repair building and the associated parking and drive aisles. Basin X is bordered by the small existing retaining wall that bisects the site on the east and the property line to the south, west, and north. The groundcover of Basin X is primarily pavement and the existing structure roof. The percent impervious was found to be 87% and the peak runoff was found to be 1.16 CFS in the 10-year event and 2.19 CFS in the 100-year event.

Basin Y consists of the eastern former restaurant building and the associated parking and drive aisles. Basin Y is bordered by the small existing retaining wall that bisects the site on the west and the property line to the south, east and north. The groundcover of Basin Y is primarily pavement and the existing structure roof. The percent impervious was found to be 94% and the peak runoff was found to be 2.06 CFS in the 10-year event and 3.79 CFS in the 100-year event.

Basin OS-Z consists of the area within the street right of way on the North, East, and West sides of the site. The width is from the property line to the curb flowline. The groundcover is a majority pavement, mainly sidewalk around the site. There are some small areas of landscape. The percent impervious was found to be 86% and the peak runoff was found to be 0.66 CFS in the 10-year event and 1.26 CFS in the 100-year event.

There are no major drainageways within or adjacent to the site. The site is not within a FEMA regulated floodplain (see Appendix D for FEMA Firmette 08005C0176K, dated 12/17/2010).

There are no existing irrigation facilities, such as canals or ditches, within 100 feet of the property.

No off-site basins drain through the project site. The existing development to the south does drain from south to north however flows are intercepted via an existing curb, existing timbers, and an existing wall along the property line between the two sites. This curb directs flows into the existing Macon and Lima ROWs. Near Macon St., the curb does end before the street. Existing site topography suggests that flows continue to sheet flow into Macon St., and not onto the project site. No evidence of flows entering the property from the south were observed in site observations.

In the existing condition, all flows sheet flow directly off the property into the curb and gutter for Lima St., Macon St., or East Colfax Ave. These flows are captured by existing inlets around the property. These inlets appear to be Denver Type 16.

The following documents were located and reviewed in the creation of this report

- C8-2-250 - Storm sewer in Lima and Macon As-Built Plans
- Lima Center Filing No. 1 (1974-3051) Property to S. Preliminary Drainage C8-2-292

3.0 DESIGN CRITERIA

3.1 Hydrologic Criteria

Per Criteria Manual, the 100-year storm is used for the major storm event. The 10-year storm is used for the minor storm event. The 2-year storm is used for the minor storm event for sizing inlets.

The 2-year 1-hour storm depth is 0.852 inches. The 10-year 1-hour storm depth is 1.37 inches. The 100-year 1-hour storm depth is 2.40 inches. These values came from NOAA Atlas 14. See Appendix A.

As required per the Criteria Manual Chapter 5, the rational method was used for the hydrological analysis.

No detention is provided for this site. Detention and Water Quality is not required when there is less than 1,000 SF of new impervious area. Extended Detention Basins are prohibited when the impervious area is less than 2 acres. The proposed condition lowers the amount of impervious area by approximately 3,000 SF. The entire site has an area of 0.86 acres. The Aurora Storm Drainage Design and Technical Criteria Manual Tables 10-1 and 11-1 list these requirements. See Appendix A for calculations regarding Impervious Area.

3.2 Hydraulic Criteria

For this study, the 10-year and 100-year storm values are used for the minor and major storm event, respectively. 2 year storm is used for the minor storm event for sizing inlets.

Water quality and detention facilities are not required provided on this project.

An emergency spillway for the parking area was sized using the Trapezoidal Broad Crested Weir Equation, per Criteria Manual section 6.3.2. This emergency spillway uses the western driveway into Lima St (See Appendix B).

This site is not within any FEMA designated floodplain.

Proposed stormwater infrastructure to be installed in the public right-of-way is considered public, as required by the jurisdiction. All stormwater infrastructure located on site to convey runoff from the site to the public infrastructure is private. All private infrastructure to be maintained by the property owner.

Hydraflow Express Extension and the Mile High Flood District Inlet Spreadsheet version 5.02 were used to size proposed infrastructure.

4.0 DRAINAGE PLAN

4.1 General Concept

The proposed plan consists of a ridge running east west, splitting the site approximately into a northern half and southern half. Flows in the northern half runoff directly into the surrounding streets, eventually being captured by inlets in the public right-of-way. These areas include building roofs, concrete sidewalks and a patio, landscaped areas, and planters. Flows in the southern half are intercepted by onsite inlets. They are conveyed via underground storm pipes

to an inlet located in Lima St. These areas include an asphalt parking lot, concrete sidewalks, and landscaped areas. Offsite areas will follow historic drainage patterns and continue to sheet flow directly to the streets. The inlets directly adjacent to the site are to be upsized to current standards.

This plan conforms with the minor amendment to the site plan.

No offsite drainage is conveyed through the site.

Off-site owners have been sent notices for public hearings related to this project. Information regarding public hearings has been posted on site.

Flows from this site outfall into the existing municipal storm sewer infrastructure. Flows from the site are reduced in the proposed condition. The ultimate outfall is assumed to be the South Platte River via Sand Creek.

This site will have no impacts to adjacent sites. Flow routing is not changed to route flows onto any adjacent sites.

No water quality or detention facilities are provided.

4.2 Specific Details

This project will not be phased.

4.3 Basin Descriptions

4.3.1 Basin R1

Basin R1 contains the entire roof area of Building B. The ground cover is only the building roof. These flows are routed through the building's roof drain system, leaving the basin at Design Point 1, then sheet flow south over the parking lot to the inlet in the middle of the parking lot at Design Point 2. From this inlet, flows are routed through a 15" PVC pipe, to Design Point 3.

4.3.2 Basin R2

Basin R2 contains the entire roof area of Building A. The ground cover is only the building roof. The flows are routed through the building's roof drain system, leaving the basin at Design Point 5, then sheet flow towards the south over the sidewalk and into the inlet at Design Point 6. From this inlet, flows are routed through a 15" PVC pipe towards Design Point 8.

4.3.3 Basin E

Basin E contains the small strip between the crest of the proposed mound to the property line on the south side of the site, and the area on the west side of the site which drains off site to the inlet in Macon Street, near the intersection with Colfax. Flows leave the basin at Design Point 12. The ground cover is a mixture of concrete paving and landscape. Flows from this basin sheet flow east through basin O.1 and into Macon Street. Flows enter the gutter in Macon Street and flow north towards a Type R inlet at Design Point 13. Flows are routed through an 18" RCP towards Design Point 16.

4.3.4 Basin F

Basin F contains the northeast corner of the site, which drains to the inlet in Colfax near the intersection with Macon Street. Flows leave this basin at Design Point 14. The ground cover is both concrete paving and landscape areas. Flows from this basin sheet flow northeast across basin O.2 to the gutter at the intersection of Colfax and Macon Street. Flows enter the gutter and flow to the north and west to the Type R inlet in Colfax at Design Point 15. Flows are routed through an 18" RCP to a manhole at Design Point 16.

4.3.5 Basin G

Basin G contains the area of the site north of the buildings, the plaza in between the two buildings, and the area west of Building A draining to the inlet in Colfax near the intersection with Lima Street. Flows leave the basin at Design Point 9. The ground cover is both concrete and landscape area. Flows from this basin sheet flow north across basin O.3 into Colfax. Flows enter the gutter in Colfax and flow north and west towards a Type R inlet at Design Point 10. Flows are routed through an 18" RCP to a manhole at Design Point 11, where they enter the existing storm sewer infrastructure.

4.3.6 Basin H

Basin H contains the area of the site southwest of Building A draining to the Type R inlet in Lima Street, near the intersection with Colfax. Flows leave the basin at Design Point 7. The ground cover is both concrete paving and landscape area. Flows from this basin sheet flow west across basin O.4 into Lima Street. Flows enter the gutter in Lima Street and flow north towards a Type R Inlet at Design Point 8. Flows are routed through an 18" RCP to a manhole at Design Point 11, where they enter the existing storm sewer infrastructure.

4.3.7 Basin A

Basin A contains a majority of the parking lot directly south of Building B, draining to the inlet in the middle of the parking lot at Design Point 2. The ground cover is asphalt paving, concrete paving, and landscape area. From this inlet, flows are routed through a 15" PVC pipe towards Design Point 3.

4.3.8 Basin B

Basin B contains a small portion of the parking lot to the south of Building B, draining to an inlet along the curb near the southwest corner of Building B at Design Point 3. The ground cover is asphalt paving with some concrete sidewalk paving. Flows from this basin enter an inlet, then are routed through a 15" PVC pipe towards Design Point 4.

4.3.9 Basin C

Basin C contains the parking lot, lying south of the plaza area and the eastern half of Building A, draining to an inlet along the curb near the ADA parking spots at Design Point 4. The ground cover is asphalt paving, concrete sidewalk paving, and landscaping. From the inlet are routed through a 15" PVC pipe towards Design Point 6.

4.3.10 Basin D

Basin D contains the portion of parking lot south of the western half of Building A, draining to an inlet along the curb near the west entrance to the parking lot at Design Point 6. The ground

cover includes asphalt paving, concrete sidewalk, and landscaping. Flows are routed through a 15" PVC pipe towards Design Point 8. Design Point 5 is located at the Type R Inlet on Lima Street.

4.3.11 Basin O.1

Basin O.1 contains the area between the property line and the limit of disturbance within Macon Street that flows to the Type R Curb Inlet at Design Point 13. The ground cover consists of concrete paving, asphalt paving, and planter boxes. Flows for this basin follow their historic pattern. This basin is included with rational calcs for East Basin for the purpose of calculating flows to the inlets.

4.3.12 Basin O.2

Basin O.2 contains the area between the property line and the limit of disturbance between the two Type R Curb Inlets at the intersection of Macon Street and Colfax. The ground cover consists of concrete paving, asphalt paving, and planter boxes. Flows are routed through the street gutter north and west toward the Type R Inlet, Design Point 15, in Colfax, near the intersection with Macon Street. Flows for this basin follow their historic drainage pattern. This basin is included with rational calcs for Northeast Basin for the purpose of calculating flows to the inlets.

4.3.13 Basin O.3

Basin O.3 contains the area between the property line and the limit of disturbance along Colfax, adjacent to the site. The ground cover consists of concrete paving, asphalt paving, and planter boxes. Flows are routed through the street gutter in Colfax west towards a Type R Curb Inlet in Colfax, Design Point 10, near the intersection with Lima Street. From this inlet, flows are routed into an 18" RCP, to a manhole at Design Point 11. From this manhole, flows enter the existing municipal storm sewer. Flows for this basin follow their historic drainage pattern. This basin is included with rational calcs for North Basin for the purpose of calculating flows to the inlets.

4.3.14 Basin O.4

Basin O.4 contains the area between the property line and the limit of disturbance along Lima Street, adjacent to the site. This is the area which flows to the Type R Curb Inlet in Lima Street, near the intersection with Colfax. The ground cover consists of concrete paving, asphalt paving, and planter boxes. Flows are routed through the street gutter in Lima Street north towards the Type R inlet in Lima Street, near the intersection with Colfax, Design Point 8. From here, flows are routed through an 18" RCP to a manhole at design Point 11. At this point, flows enter the existing municipal storm sewer. Flows for this basin follow their historic drainage pattern. This basin is included with rational calcs for West Basin for the purpose of calculating flows to the inlets.

4.4 Proposed Basin Information Table

Basin ID	Percent Impervious (%)	10-Year Runoff Coefficient	100-Year Runoff Coefficient	10-Year Discharge (CFS)	100-Year Discharge (CFS)
R1	95	0.84	0.87	0.61	1.12
R2	95	0.84	0.87	0.33	0.61
E	43	0.45	0.66	0.10	0.25
F	62	0.59	0.74	0.04	0.09
G	91	0.80	0.86	0.45	0.85
H	72	0.66	0.78	0.03	0.06
A	90	0.80	0.85	0.74	1.39
B	95	0.84	0.87	0.09	0.16
C	88	0.78	0.84	0.42	0.80
D	81	0.73	0.82	0.28	0.54
O.1	89	0.79	0.85	0.13	0.25
O.2	94	0.82	0.87	0.09	0.17
O.3	87	0.78	0.84	0.35	0.67

4.5 Proposed Infrastructure

No detention pond is being constructed for this project.

No additional offsite water quality or detention facilities are being used by this project in the proposed condition.

No culverts are proposed for this project.

No bridges are proposed for this project.

Four inlets are provided for the asphalt parking lot. In an emergency, the flow path is to follow the west driveway to overflow into Lima St. Please see Appendix B for the emergency flow calculations. A cross section is provided on the proposed drainage plan sheet, included in Appendix F.

No swale, ditches, or open channels are proposed for this project.

No regional channels are being constructed with this project.

4.6 Street Flow Capacity Table

Street	Flow Capacity (CFS)
Lima Street	17.3
Macon Street	24.0
East Colfax Avenue	54.9

Street capacities are included with the Inlet Calculations included in Appendix B.

In the proposed condition, landscape plantings, mulch, and paving will provide sediment control.

5.0 REFERENCES

- City of Aurora Storm Drainage Criteria
- USDA – Web Soil Survey

APPENDIX A: HYDROLOGIC COMPUTATIONS



NOAA Atlas 14, Volume 8, Version 2
Location name: Aurora, Colorado, USA*
Latitude: 39.7398°, Longitude: -104.8558°
Elevation: 5377 ft**

* source: ESRI Maps

** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffrey Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aerals](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.221 (0.181-0.272)	0.273 (0.223-0.335)	0.364 (0.297-0.448)	0.447 (0.362-0.553)	0.573 (0.453-0.742)	0.678 (0.521-0.885)	0.791 (0.586-1.05)	0.913 (0.647-1.24)	1.09 (0.739-1.52)	1.23 (0.808-1.72)
10-min	0.324 (0.266-0.398)	0.399 (0.327-0.490)	0.533 (0.435-0.656)	0.655 (0.531-0.810)	0.839 (0.663-1.09)	0.993 (0.763-1.30)	1.16 (0.858-1.54)	1.34 (0.948-1.82)	1.59 (1.08-2.22)	1.80 (1.18-2.52)
15-min	0.395 (0.324-0.485)	0.487 (0.398-0.598)	0.650 (0.530-0.800)	0.799 (0.647-0.987)	1.02 (0.808-1.32)	1.21 (0.930-1.58)	1.41 (1.05-1.88)	1.63 (1.16-2.22)	1.94 (1.32-2.70)	2.19 (1.44-3.07)
30-min	0.557 (0.456-0.684)	0.683 (0.559-0.839)	0.908 (0.740-1.12)	1.11 (0.901-1.37)	1.42 (1.12-1.83)	1.67 (1.28-2.18)	1.95 (1.44-2.59)	2.24 (1.59-3.05)	2.66 (1.81-3.71)	3.00 (1.98-4.20)
60-min	0.701 (0.574-0.860)	0.852 (0.696-1.05)	1.12 (0.915-1.38)	1.37 (1.11-1.69)	1.74 (1.38-2.26)	2.06 (1.58-2.69)	2.40 (1.78-3.20)	2.77 (1.96-3.77)	3.29 (2.24-4.59)	3.72 (2.45-5.21)
2-hr	0.845 (0.695-1.03)	1.02 (0.838-1.24)	1.34 (1.10-1.63)	1.63 (1.33-2.00)	2.07 (1.65-2.67)	2.45 (1.89-3.17)	2.85 (2.13-3.78)	3.29 (2.35-4.46)	3.92 (2.69-5.43)	4.44 (2.94-6.17)
3-hr	0.926 (0.765-1.12)	1.11 (0.917-1.35)	1.45 (1.19-1.76)	1.76 (1.44-2.15)	2.24 (1.79-2.87)	2.64 (2.05-3.41)	3.08 (2.30-4.06)	3.56 (2.55-4.80)	4.24 (2.92-5.85)	4.80 (3.20-6.65)
6-hr	1.10 (0.914-1.33)	1.32 (1.09-1.59)	1.71 (1.41-2.06)	2.06 (1.70-2.51)	2.61 (2.09-3.31)	3.06 (2.39-3.92)	3.56 (2.68-4.65)	4.09 (2.95-5.47)	4.85 (3.36-6.64)	5.47 (3.67-7.52)
12-hr	1.34 (1.12-1.60)	1.61 (1.34-1.93)	2.08 (1.73-2.50)	2.50 (2.07-3.02)	3.12 (2.51-3.92)	3.64 (2.85-4.61)	4.18 (3.16-5.41)	4.76 (3.45-6.30)	5.58 (3.88-7.56)	6.24 (4.21-8.51)
24-hr	1.63 (1.36-1.93)	1.95 (1.63-2.32)	2.50 (2.08-2.98)	2.98 (2.47-3.56)	3.67 (2.96-4.55)	4.23 (3.32-5.30)	4.81 (3.65-6.16)	5.43 (3.95-7.10)	6.28 (4.39-8.41)	6.94 (4.72-9.40)
2-day	1.92 (1.62-2.26)	2.27 (1.91-2.68)	2.87 (2.41-3.40)	3.39 (2.83-4.03)	4.13 (3.34-5.07)	4.72 (3.73-5.86)	5.33 (4.07-6.76)	5.96 (4.37-7.74)	6.84 (4.81-9.08)	7.52 (5.15-10.1)
3-day	2.06 (1.74-2.42)	2.44 (2.06-2.88)	3.08 (2.60-3.64)	3.63 (3.04-4.30)	4.41 (3.58-5.38)	5.02 (3.98-6.20)	5.66 (4.33-7.14)	6.32 (4.64-8.15)	7.21 (5.09-9.53)	7.91 (5.44-10.6)
4-day	2.18 (1.84-2.55)	2.58 (2.18-3.02)	3.24 (2.74-3.82)	3.82 (3.20-4.50)	4.62 (3.75-5.62)	5.26 (4.17-6.47)	5.91 (4.53-7.42)	6.58 (4.85-8.47)	7.50 (5.31-9.88)	8.21 (5.66-10.9)
7-day	2.49 (2.12-2.90)	2.92 (2.48-3.40)	3.63 (3.07-4.24)	4.23 (3.56-4.96)	5.08 (4.15-6.14)	5.75 (4.59-7.03)	6.44 (4.96-8.04)	7.14 (5.29-9.13)	8.10 (5.77-10.6)	8.85 (6.14-11.7)
10-day	2.78 (2.38-3.23)	3.22 (2.75-3.74)	3.95 (3.36-4.60)	4.57 (3.86-5.34)	5.44 (4.46-6.55)	6.13 (4.91-7.47)	6.84 (5.29-8.50)	7.56 (5.62-9.62)	8.55 (6.11-11.1)	9.31 (6.48-12.3)
20-day	3.62 (3.10-4.17)	4.10 (3.52-4.73)	4.90 (4.19-5.67)	5.58 (4.74-6.47)	6.52 (5.36-7.76)	7.25 (5.83-8.74)	7.99 (6.22-9.84)	8.75 (6.54-11.0)	9.76 (7.03-12.6)	10.5 (7.40-13.8)
30-day	4.28 (3.69-4.91)	4.84 (4.17-5.56)	5.76 (4.94-6.63)	6.52 (5.56-7.53)	7.56 (6.23-8.94)	8.35 (6.74-10.0)	9.14 (7.14-11.2)	9.94 (7.46-12.5)	11.0 (7.94-14.1)	11.8 (8.31-15.4)
45-day	5.08 (4.39-5.80)	5.78 (4.99-6.62)	6.92 (5.95-7.93)	7.83 (6.70-9.01)	9.05 (7.47-10.6)	9.97 (8.06-11.9)	10.9 (8.50-13.2)	11.7 (8.82-14.6)	12.9 (9.31-16.4)	13.7 (9.68-17.7)
60-day	5.73 (4.96-6.53)	6.59 (5.70-7.52)	7.95 (6.86-9.09)	9.04 (7.75-10.4)	10.5 (8.64-12.2)	11.5 (9.31-13.6)	12.5 (9.80-15.1)	13.5 (10.1-16.7)	14.7 (10.6-18.6)	15.5 (11.0-20.1)

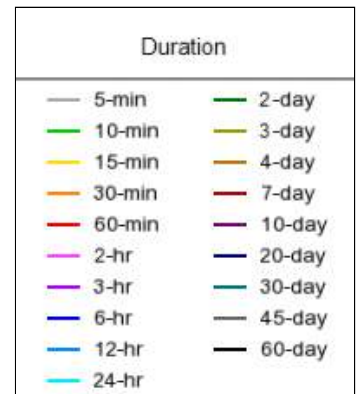
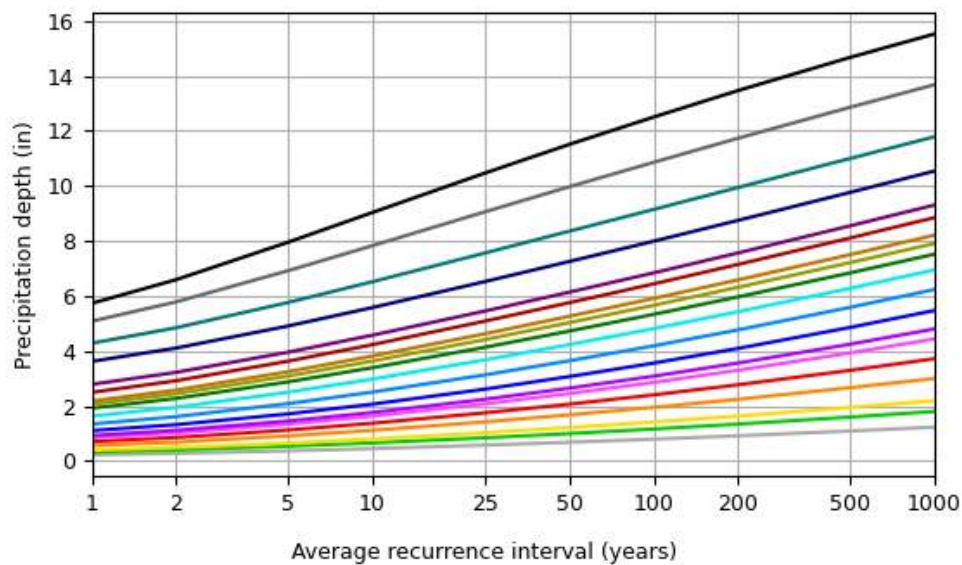
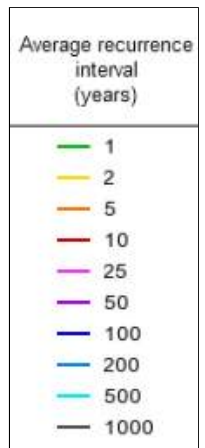
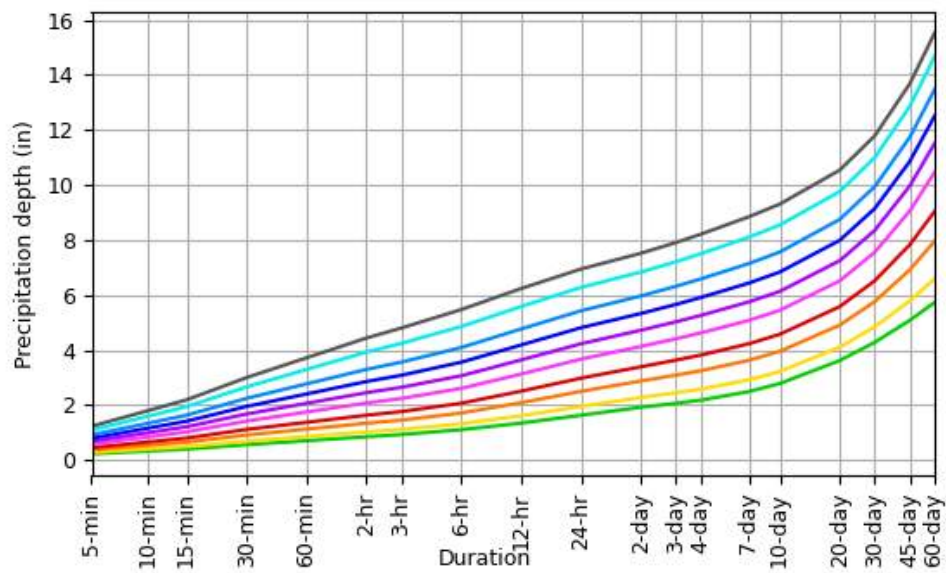
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
 Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
 Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves

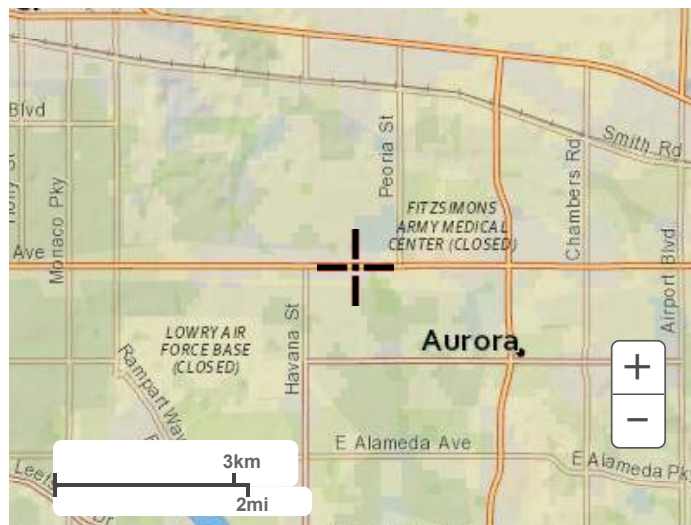
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NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Wed Sep 13 17:57:53 2023

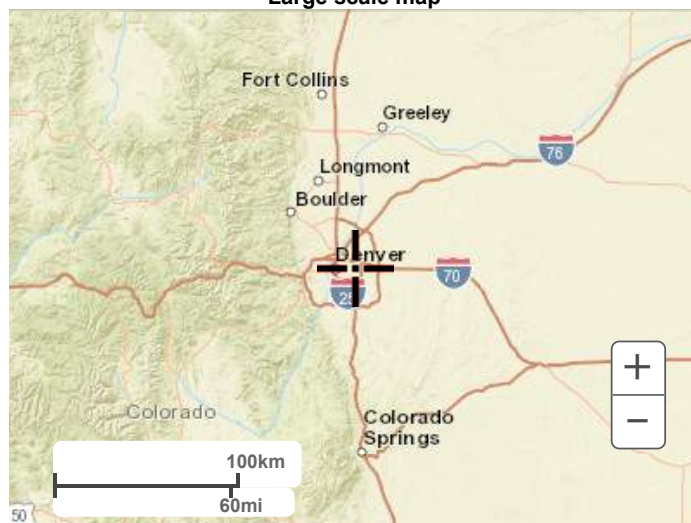
[Back to Top](#)**Maps & aeriels****Small scale terrain**



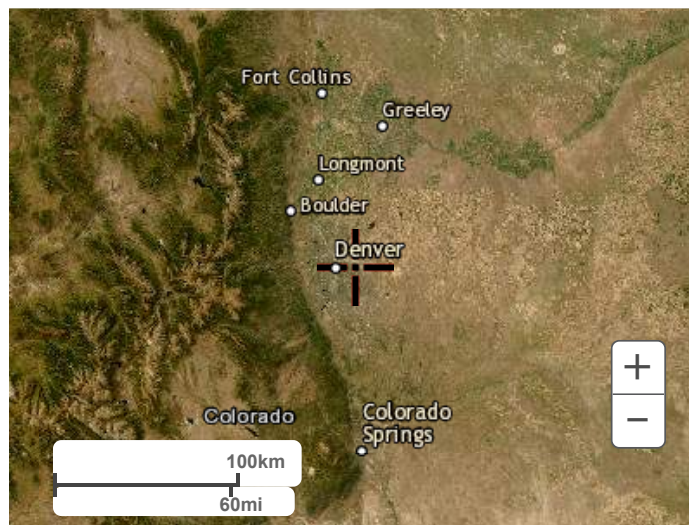
Large scale terrain



Large scale map



Large scale aerial



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1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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Historic Condition

Surface Material Properties				
	Asphalt	Concrete	Roof	Landscaping
% Impervious	95%	95%	95%	20%
Runoff Coefficient 2yr	0.78	0.78	0.78	0.14
Runoff Coefficient 5yr	0.81	0.81	0.81	0.20
Runoff Coefficient 10yr	0.84	0.84	0.84	0.28
Runoff Coefficient 100 Year	0.87	0.87	0.87	0.57

Historic Basin % Impervious										
	Area (SF)				C					
Basin	Asphalt	Concrete	Roof	Lawn	Total (SF)	% Imperv	2yr	5yr	10yr	100yr
X	5367	3567	3485	1408	13827	87%	0.71	0.75	0.78	0.84
Y	20783	0	2575	339	23697	94%	0.77	0.80	0.83	0.87
Total	26150	3567	6060	1747	37524	92%	0.75	0.78	0.81	0.86
Offsite Basin										
OS-Z	2428	4731	0	995	8154	86%	0.70	0.74	0.77	0.83

Proposed Condition

Surface Material Properties					
	Asphalt	Concrete	Roof	Landscaping	Pervious Paver
% Impervious	95%	95%	95%	20%	40%
Runoff Coefficient 2yr	0.78	0.78	0.78	0.14	0.30
Runoff Coefficient 5yr	0.81	0.81	0.81	0.20	0.36
Runoff Coefficient 10yr	0.84	0.84	0.84	0.28	0.43
Runoff Coefficient 100 Year	0.87	0.87	0.87	0.57	0.65

Proposed Basin % Impervious											
	Area (SF)							C			
Basin	Asphalt	Concrete	Roof	Landscaping	Pervious Paver	Total	% Imp	2yr	5yr	10yr	100yr
R1	0	0	6886	0	0	6886	95%	0.78	0.81	0.84	0.87
R2	0	0	3722	0	0	3722	95%	0.78	0.81	0.84	0.87
E	0	710	0	1610	0	2320	43%	0.33	0.39	0.45	0.66
F	0	345	0	276	0	621	62%	0.50	0.54	0.59	0.74
G	0	4387	0	904	0	5291	82%	0.67	0.71	0.74	0.82
H	0	264	0	118	0	382	72%	0.58	0.62	0.66	0.78
A	7372	711	0	627	0	8710	90%	0.74	0.77	0.80	0.85
B	793	199	0	0	0	992	95%	0.78	0.81	0.84	0.87
C	4072	496	0	473	0	5041	88%	0.72	0.76	0.78	0.84
D	2476	414	0	669	0	3559	81%	0.66	0.70	0.73	0.82
Total	14713	7526	10608	4677	0	37524	86%	0.70	0.74	0.77	0.84
Offsite Basin											
O.1	1434	0	0	131	0	1565	89%	0.73	0.76	0.79	0.85
O.2	1022	0	0	19	0	1041	94%	0.77	0.80	0.82	0.87
O.3	3829	0	0	450	0	4279	87%	0.72	0.75	0.78	0.84
O.4	1518	0	0	135	0	1653	89%	0.73	0.76	0.79	0.85

Calculation of Peak Runoff using Rational Method	
Area (A)	1000000
Runoff Coefficient (C)	0.8
Intensity (I)	100
Time of Concentration (Tc)	10
Peak Runoff (Qp)	1000000

Select IUDFC location for NOAA Atlas 14 Rainfall depths from the pull-down list OR enter your own depths obtained from the NOAA website (click 1)

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.65	1.12	1.37	1.74	2.06	2.40	3.29
	a	b			c + P ₁		

Rainfall Intensity Equation Coefficients =

28.50	10.00	0.786
-------	-------	-------

$$I(n/hr) = \frac{a + P_1}{(b + t_r)^c}$$

Q(cfs) = CIA

[illegible]

Calculation of Peak Runoff using Rational Method	
Area (A)	1000000
Runoff Coefficient (C)	0.5
Intensity (I)	100
Time of Concentration (Tc)	10
Peak Runoff (Qp)	1000000

Select UDFCD location for NOAA Atlas 14 Rainfall Depths from the pull-down list OR enter your own depths obtained from the NOAA website (click 1)

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.85	1.12	1.37	1.74	2.06	2.40	3.29
	a	b	c				

Rainfall Intensity Equation Coefficients =

28.50	10.00	0.786
-------	-------	-------

$$I(\text{in/hr}) = \frac{a + P_1}{(b + t_r)^c}$$

Q(c/s) = CIA

Runoff Coefficient, C										Overland (Initial) Flow Time					Channelized (Travel) Flow Time					Time of Concentration				Rainfall Intensity, I (in/hr)								Peak Flow, Q (cfs)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness %	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L _t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S _t (ft/ft)	Overland Flow Time t _m (min)	Channelized Flow Length L _t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S _t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V _t (ft/sec)	Channelized Flow Time t _m (min)	Computed t _m (min)	Regional t _m (min)	Selected t _m (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
				0.78	0.81	0.84	0.85	0.86	0.87	0.88																0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00	1.01	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.11	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.27	1.28	1.29	1.30	1.31	1.32	1.33	1.34	1.35	1.36	1.37	1.38	1.39	1.40	1.41	1.42	1.43	1.44	1.45	1.46	1.47	1.48	1.49	1.50	1.51	1.52	1.53	1.54	1.55	1.56	1.57	1.58	1.59	1.60	1.61	1.62	1.63	1.64	1.65	1.66	1.67	1.68	1.69	1.70	1.71	1.72	1.73	1.74	1.75	1.76	1.77	1.78	1.79	1.80	1.81	1.82	1.83	1.84	1.85	1.86	1.87	1.88	1.89	1.90	1.91	1.92	1.93	1.94	1.95	1.96	1.97	1.98	1.99	2.00	2.01	2.02	2.03	2.04	2.05	2.06	2.07	2.08	2.09	2.10	2.11	2.12	2.13	2.14	2.15	2.16	2.17	2.18	2.19	2.20	2.21	2.22	2.23	2.24	2.25	2.26	2.27	2.28	2.29	2.30	2.31	2.32	2.33	2.34	2.35	2.36	2.37	2.38	2.39	2.40	2.41	2.42	2.43	2.44	2.45	2.46	2.47	2.48	2.49	2.50	2.51	2.52	2.53	2.54	2.55	2.56	2.57	2.58	2.59	2.60	2.61	2.62	2.63	2.64	2.65	2.66	2.67	2.68	2.69	2.70	2.71	2.72	2.73	2.74	2.75	2.76	2.77	2.78	2.79	2.80	2.81	2.82	2.83	2.84	2.85	2.86	2.87	2.88	2.89	2.90	2.91	2.92	2.93	2.94	2.95	2.96	2.97	2.98	2.99	3.00	3.01	3.02	3.03	3.04	3.05	3.06	3.07	3.08	3.09	3.10	3.11	3.12	3.13	3.14	3.15	3.16	3.17	3.18	3.19	3.20	3.21	3.22	3.23	3.24	3.25	3.26	3.27	3.28	3.29	3.30	3.31	3.32	3.33	3.34	3.35	3.36	3.37	3.38	3.39	3.40	3.41	3.42	3.43	3.44	3.45	3.46	3.47	3.48	3.49	3.50	3.51	3.52	3.53	3.54	3.55	3.56	3.57	3.58	3.59	3.60	3.61	3.62	3.63	3.64	3.65	3.66	3.67	3.68	3.69	3.70	3.71	3.72	3.73	3.74	3.75	3.76	3.77	3.78	3.79	3.80	3.81	3.82	3.83	3.84	3.85	3.86	3.87	3.88	3.89	3.90	3.91	3.92	3.93	3.94	3.95	3.96	3.97	3.98	3.99	4.00	4.01	4.02	4.03	4.04	4.05	4.06	4.07	4.08	4.09	4.10	4.11	4.12	4.13	4.14	4.15	4.16	4.17	4.18	4.19	4.20	4.21	4.22	4.23	4.24	4.25	4.26	4.27	4.28	4.29	4.30	4.31	4.32	4.33	4.34	4.35	4.36	4.37	4.38	4.39	4.40	4.41	4.42	4.43	4.44	4.45	4.46	4.47	4.48	4.49	4.50	4.51	4.52	4.53	4.54	4.55	4.56	4.57	4.58	4.59	4.60	4.61	4.62	4.63	4.64	4.65	4.66	4.67	4.68	4.69	4.70	4.71	4.72	4.73	4.74	4.75	4.76	4.77	4.78	4.79	4.80	4.81	4.82	4.83	4.84	4.85	4.86	4.87	4.88	4.89	4.90	4.91	4.92	4.93	4.94	4.95	4.96	4.97	4.98	4.99	5.00																																																																																																																																				
R1	0.16	C	95.0	0.79	0.81	0.83	0.85	0.86	0.87	0.89	10.00			0.010	1.66	55.00			0.010	10	1.00	0.92	2.58		5.00	2.89	3.80	4.65	5.90	6.99	8.14	11.16	0.36	0.49	0.61	0.79	0.95	1.12																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			</

Calculation of Peak Runoff using Rational Method	
Area (A)	1000000 m ²
Runoff Coefficient (C)	0.5
Intensity (I)	10 mm/hr
Time of Concentration (T _c)	10 min
Peak Runoff (Q _p)	1000000 m ³ /hr

Select USFCD location for NOAA Atlas 14 Rainfall Depths from the publication list OR enter your own depths obtained from the NOAA website (click [here](#))

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.85	1.12	1.37	1.74	2.06	2.40	3.29
	a	b	c				

Rainfall Intensity Equation Coefficients =

28.50	10.00	0.786
-------	-------	-------

$$I(\text{in/hr}) = \frac{a + P_1}{(b + t_r)^c}$$

Q(c/s) = CIA

[illegible]

APPENDIX B: HYDRAULIC COMPUTATIONS

INLET MANAGEMENT

Worksheet Protected

INLET NAME	Macon	Colfax East	Lima
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT**User-Defined Design Flows**

Minor Q_{Known} (cfs)	6.8	0.1	2.0
Major Q_{Known} (cfs)	27.9	0.4	8.2

Bypass (Carry-Over) Flow from Upstream

Inlets must be organized from upstream (left) to downstream (right) in order for bypass flows to be linked.

Receive Bypass Flow from:	No Bypass Flow Received	Macon	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	3.7	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	22.5	0.0

Watershed Characteristics

Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			

Watershed Profile

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

Minor Storm Rainfall Input

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

Major Storm Rainfall Input

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

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	6.8	3.8	2.0
Major Total Design Peak Flow, Q (cfs)	27.9	22.9	8.2
Minor Flow Bypassed Downstream, Q_b (cfs)	3.7	1.4	0.3
Major Flow Bypassed Downstream, Q_b (cfs)	22.5	17.5	4.7

INLET MANAGEMENT

Worksheet Protected

INLET NAME	Colfax West	Basin S.1	Basin S.2
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	On Grade	In Sump	In Sump
Inlet Type	CDOT Type R Curb Opening	CDOT/Denver 13 Valley Grate	CDOT/Denver 13 Valley Grate

USER-DEFINED INPUT**User-Defined Design Flows**

Minor Q_{Known} (cfs)	0.9	0.4	0.1
Major Q_{Known} (cfs)	3.2	1.4	0.2

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	Lima	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.3	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	4.7	0.0	0.0

Watershed Characteristics

Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			

Watershed Profile

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

Minor Storm Rainfall Input

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

Major Storm Rainfall Input

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

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	1.2	0.4	0.1
Major Total Design Peak Flow, Q (cfs)	7.9	1.4	0.2
Minor Flow Bypassed Downstream, Q_b (cfs)	0.0	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	4.5	N/A	N/A

INLET MANAGEMENT

Worksheet Protected

INLET NAME	Basin S.3	Basin S.4
Site Type (Urban or Rural)	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	In Sump	In Sump
Inlet Type	CDOT/Denver 13 Valley Grate	CDOT/Denver 13 Valley Grate

USER-DEFINED INPUT**User-Defined Design Flows**

Minor Q_{Known} (cfs)	0.2	0.2
Major Q_{Known} (cfs)	0.8	0.5

Bypass (Carry-Over) Flow from Upstream

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

Watershed Characteristics

Subcatchment Area (acres)		
Percent Impervious		
NRCS Soil Type		

Watershed Profile

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

Minor Storm Rainfall Input

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

Major Storm Rainfall Input

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

CALCULATED OUTPUT

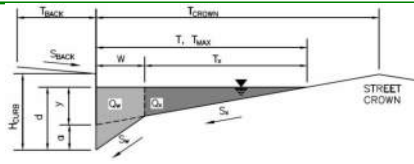
Minor Total Design Peak Flow, Q (cfs)	0.2	0.2
Major Total Design Peak Flow, Q (cfs)	0.8	0.5
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A

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

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

Project: AFC Urgent Care East Colfax

Inlet ID: Macon

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$	16.0	ft
$S_{BACK} =$	0.018	ft/ft
$n_{BACK} =$	0.013	

$H_{CURB} =$	6.00	inches
$T_{CROWN} =$	20.0	ft
$W =$	2.00	ft
$S_X =$	0.020	ft/ft
$S_W =$	0.083	ft/ft
$S_O =$	0.020	ft/ft
$n_{STREET} =$	0.013	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$	20.0	20.0	ft
$d_{MAX} =$	6.0	6.0	inches
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

MINOR STORM Allowable Capacity is based on Depth Criterion

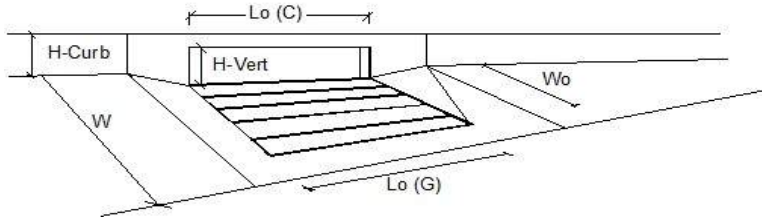
MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
$Q_{allow} =$	24.0	24.0	cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 6.78 cfs on sheet 'Inlet Management'**WARNING: MAJOR STORM max. allowable capacity is less than the design peak flow of 27.89 cfs on sheet 'Inlet Management'**

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



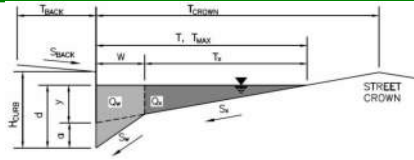
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		$a_{LOCAL} = 3.0$	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		$No = 1$	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		$L_o = 5.00$	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		$W_o = N/A$	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		$C_f (G) = N/A$	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_f (C) = 0.10$	0.10	
Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MAJOR STORM				
Total Inlet Interception Capacity		$Q = 3.1$	5.4	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		$Q_o = 3.7$	22.5	cfs
Capture Percentage = Q_i/Q_o		$C\% = 45$	19	%

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

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

Project: AFC Urgent Care East Colfax

Inlet ID: Colfax East

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$	15.0	ft
$S_{BACK} =$	0.015	ft/ft
$n_{BACK} =$	0.013	

$H_{CURB} =$	6.00	inches
$T_{CROWN} =$	30.0	ft
$W =$	2.00	ft
$S_X =$	0.030	ft/ft
$S_W =$	0.083	ft/ft
$S_O =$	0.010	ft/ft
$n_{STREET} =$	0.013	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$	20.0	30.0	ft
$d_{MAX} =$	6.0	10.0	inches

MINOR STORM Allowable Capacity is based on Depth Criterion

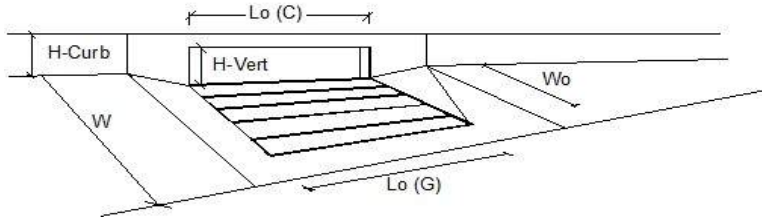
MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
$Q_{allow} =$	13.1	77.7	cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 3.79 cfs on sheet 'Inlet Management'**Major storm max. allowable capacity GOOD - greater than the design peak flow of 22.88 cfs on sheet 'Inlet Management'**

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



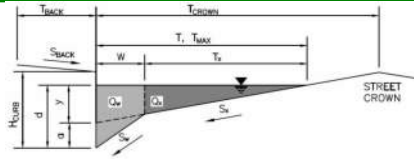
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		N_o =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		$C_f (G)$ =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_f (C)$ =	0.10	0.10	
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$					
Total Inlet Interception Capacity		Q =	2.4	5.4	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q_o =	1.4	17.5	cfs
Capture Percentage = Q_i/Q_o		$C\%$ =	64	24	%

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

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

Project: AFC Urgent Care East Colfax

Inlet ID: Lima

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$	16.0	ft
$S_{BACK} =$	0.019	ft/ft
$n_{BACK} =$	0.013	

$H_{CURB} =$	6.00	inches
$T_{CROWN} =$	20.0	ft
$W =$	2.00	ft
$S_X =$	0.025	ft/ft
$S_W =$	0.083	ft/ft
$S_O =$	0.040	ft/ft
$n_{STREET} =$	0.013	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$	20.0	20.0	ft
$d_{MAX} =$	6.0	6.0	inches
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

MINOR STORM Allowable Capacity is based on Depth Criterion

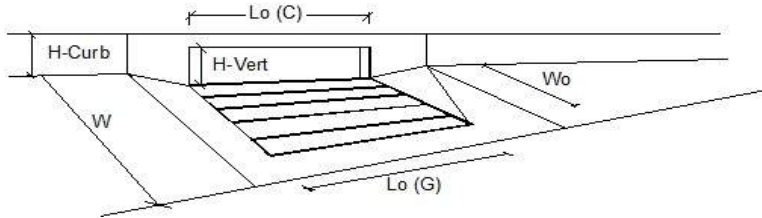
MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
$Q_{allow} =$	17.3	17.3	cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.99 cfs on sheet 'Inlet Management'**Major storm max. allowable capacity GOOD - greater than the design peak flow of 8.20 cfs on sheet 'Inlet Management'**

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



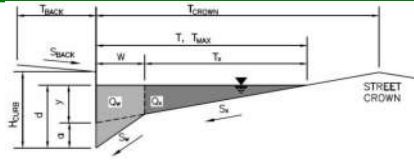
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening	CDOT Type R Curb Opening			
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL}	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		N_o	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		$C_f (G)$	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_f (C)$	0.10	0.10	
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$					
Total Inlet Interception Capacity		Q	1.7	3.5	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q_b	0.3	4.7	cfs
Capture Percentage = Q_i/Q_o		$C\%$	84	42	%

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

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

Project: AFC Urgent Care East Colfax

Inlet ID: Colfax West

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$	15.0	ft
$S_{BACK} =$	0.015	ft/ft
$n_{BACK} =$	0.013	

$H_{CURB} =$	6.00	inches
$T_{CROWN} =$	35.0	ft
$W =$	2.00	ft
$S_X =$	0.030	ft/ft
$S_W =$	0.083	ft/ft
$S_O =$	0.005	ft/ft
$n_{STREET} =$	0.013	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$	25.0	35.0	ft
$d_{MAX} =$	6.0	10.0	inches

MINOR STORM Allowable Capacity is based on Depth Criterion

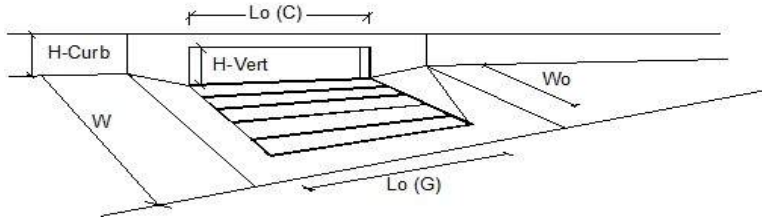
MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
$Q_{allow} =$	9.3	54.9	cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.18 cfs on sheet 'Inlet Management'**Major storm max. allowable capacity GOOD - greater than the design peak flow of 7.91 cfs on sheet 'Inlet Management'**

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



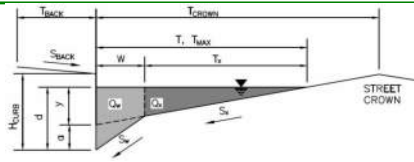
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening	CDOT Type R Curb Opening			
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL}	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		N_o	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		$C_f (G)$	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_f (C)$	0.10	0.10	
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$					
Total Inlet Interception Capacity		Q	1.2	3.5	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q_b	0.0	4.5	cfs
Capture Percentage = Q_i/Q_o		$C\%$	99	44	%

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

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

Project: AFC Urgent Care East Colfax

Inlet ID: Basin S.1

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$	30.0	ft
$S_{BACK} =$	0.055	ft/ft
$n_{BACK} =$	0.013	

$H_{CURB} =$	0.00	inches
$T_{CROWN} =$	30.0	ft
$W =$	2.00	ft
$S_X =$	0.021	ft/ft
$S_W =$	0.021	ft/ft
$S_0 =$	0.000	ft/ft
$n_{STREET} =$	0.013	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

	Minor Storm	Major Storm	
$T_{MAX} =$	30.0	30.0	ft
$d_{MAX} =$	13.0	13.0	inches

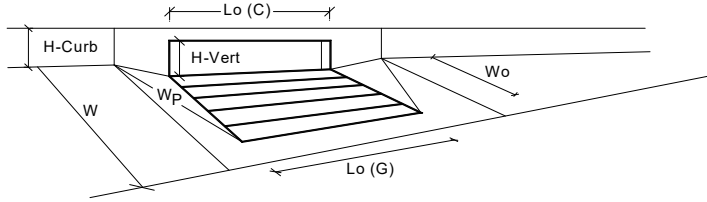
MINOR STORM Allowable Capacity is not applicable to Sump Condition

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 5.02 (August 2022)



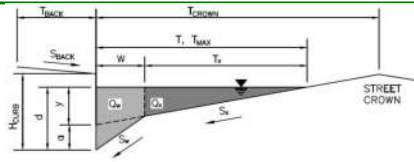
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Valley Grate	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)		a _{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	7.6	7.6	inches
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} =	0.43	0.43	
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) =	3.30	3.30	
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 (see USDCM Figure ST-5)		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} =	0.71	0.71	ft
Depth for Curb Opening Weir Equation		d _{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets		RF _{Grate} =	1.00	1.00	
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	
Total Inlet Interception Capacity (assumes clogged condition)		MINOR		MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)		Q _s =	4.2	4.2	cfs
		Q _{PEAK REQUIRED} =	0.4	1.4	cfs

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

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

Project: AFC Urgent Care East Colfax

Inlet ID: Basin S.2

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} = 0.0$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} = 0.013$

$H_{CURB} = 6.00$ inches
 $T_{CROWN} = 25.0$ ft
 $W = 2.00$ ft
 $S_X = 0.046$ ft/ft
 $S_W = 0.083$ ft/ft
 $S_0 = 0.000$ ft/ft
 $n_{STREET} = 0.013$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

	Minor Storm	Major Storm	
$T_{MAX} =$	25.0	25.0	ft
$d_{MAX} =$	6.0	6.0	inches

MINOR STORM Allowable Capacity is not applicable to Sump Condition

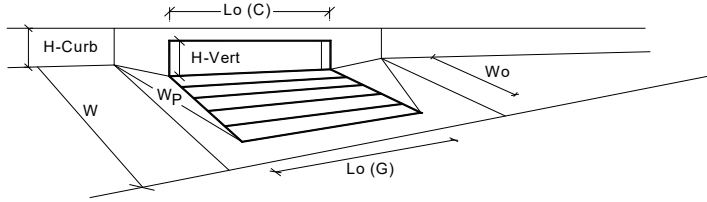
MAJOR STORM Allowable Capacity is not applicable to Sump Condition

$Q_{allow} =$

	Minor Storm	Major Storm	
	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



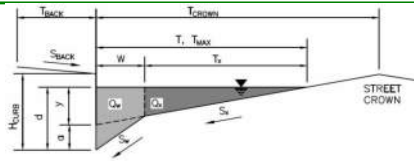
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Valley Grate	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)		a _{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	6.0	inches
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} =	0.43	0.43	
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) =	3.30	3.30	
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 (see USDCM Figure ST-5)		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} =	0.94	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} =	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)		MINOR		MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)		Q _a =	2.6	2.6	cfs
		Q _{PEAK REQUIRED} =	0.1	0.2	cfs

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

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

Project: AFC Urgent Care East Colfax

Inlet ID: Basin S.3

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

T_{BACK} =	0.0	ft
S_{BACK} =		ft/ft
n_{BACK} =	0.013	

H_{CURB} =	6.00	inches
T_{CROWN} =	60.0	ft
W =	2.00	ft
S_X =	0.019	ft/ft
S_W =	0.083	ft/ft
S_0 =	0.000	ft/ft
n_{STREET} =	0.013	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

	Minor Storm	Major Storm	
T_{MAX} =	60.0	60.0	ft
d_{MAX} =	6.0	6.0	inches
	<input type="checkbox"/>	<input type="checkbox"/>	

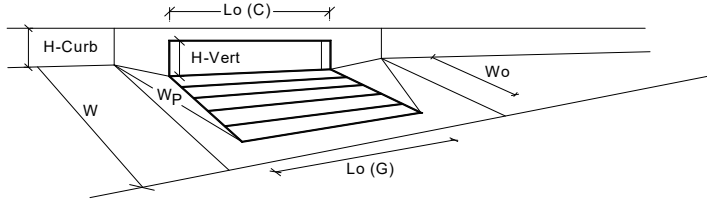
MINOR STORM Allowable Capacity is not applicable to Sump Condition

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 5.02 (August 2022)



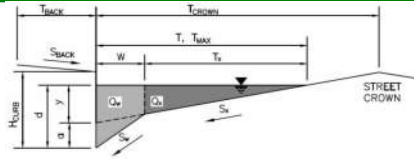
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Valley Grate	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)		N_o =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	6.0	inches
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} =	0.43	0.43	
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) =	3.30	3.30	
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 (see USDCM Figure ST-5)		Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_o =	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} =	0.94	0.94	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)		MINOR		MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)		Q_a =	2.6	2.6	cfs
		$Q_{PEAK REQUIRED}$ =	0.2	0.8	cfs

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

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

Project: AFC Urgent Care East Colfax

Inlet ID: Basin S.4

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} = 0.0$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} = 0.013$

$H_{CURB} = 6.00$ inches
 $T_{CROWN} = 30.0$ ft
 $W = 2.00$ ft
 $S_X = 0.050$ ft/ft
 $S_W = 0.083$ ft/ft
 $S_O = 0.000$ ft/ft
 $n_{STREET} = 0.013$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

	Minor Storm	Major Storm	
$T_{MAX} =$	30.0	30.0	ft
$d_{MAX} =$	6.0	6.0	inches

MINOR STORM Allowable Capacity is not applicable to Sump Condition

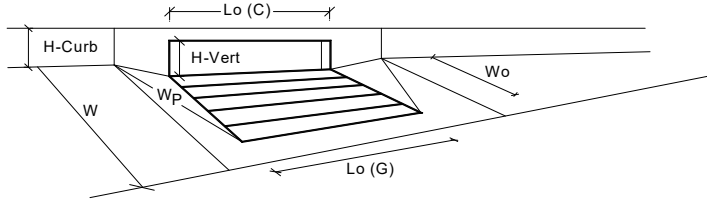
MAJOR STORM Allowable Capacity is not applicable to Sump Condition

$Q_{allow} =$

Minor Storm	Major Storm	
SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Valley Grate	Type =	CDOT/Denver 13 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 =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	6.0	inches
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} =	0.43	0.43	
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) =	3.30	3.30	
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 (see USDCM Figure ST-5)		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} =	0.94	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} =	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)		MINOR		MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)		Q _a =	2.6	2.6	cfs
		Q _{PEAK REQUIRED} =	0.2	0.5	cfs

Weir Parameters

Trapezoidal Broad Crested Weir Equation.

Flow does not need to be doubled, since 100% of the flow effectively moves through one side of a trapezoidal weir.

(C _w)	3.09 Weir coefficient for a Broad Crested Weir
Flow (Q)	2.89 CFS
Angle (θ)	87.14 Degrees
Side Slope (Z)	20.02 Horizontal / Vertical
Height (H)	TBD ft

Governing Equations

$Q = (2/5) * C_w * Z * H^{5/2}$ implies $H = (5Q / (2 * C_w * Z))^{2/5}$

Height (H) 0.42 ft

100-yr WSE is lowest elevation of the weir plus the height

100-yr WSE = 5376.93 + 0.42 = 5377.35

Channel Report

<Name>

Circular

Diameter (ft) = 1.25

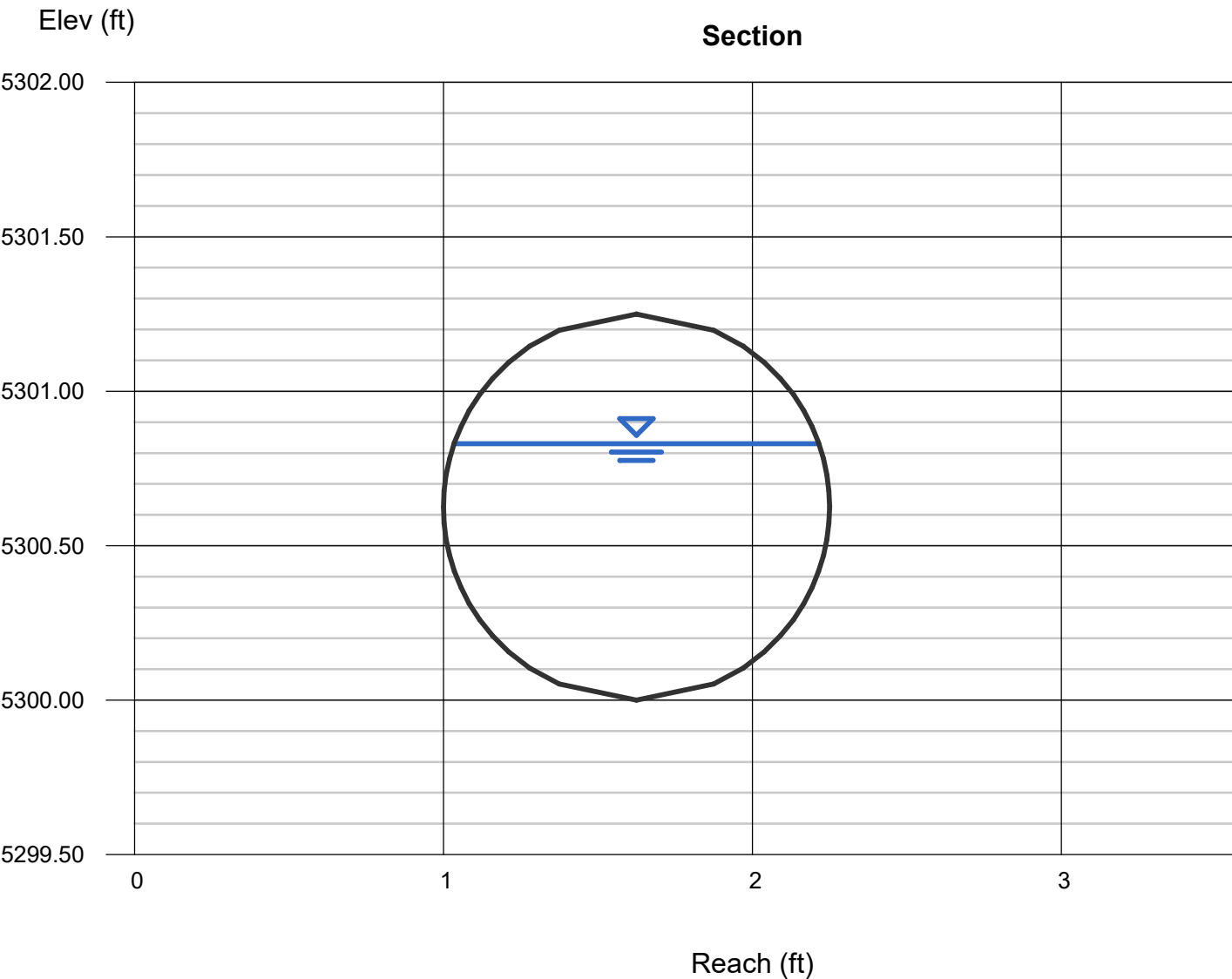
Invert Elev (ft) = 5300.00
Slope (%) = 0.50
N-Value = 0.010

Calculations

Compute by: Known Q
Known Q (cfs) = 4.62

Highlighted

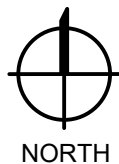
Depth (ft) = 0.83
Q (cfs) = 4.620
Area (sqft) = 0.87
Velocity (ft/s) = 5.34
Wetted Perim (ft) = 2.38
Crit Depth, Yc (ft) = 0.88
Top Width (ft) = 1.18
EGL (ft) = 1.27



APPENDIX C: VICINITY MAP



VICINITY MAP



SCALE: 1" = 500'

DENVER, CO
p 720.359.1416
f 720.359.1417

**Cushing
Terrell**

AFC URGENT CARE
VICINTIY MAP

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2.28.2023
AFC URGENT CARE

TAG
1

REVISION
0

CHECKED BY
WHITE

REF SHEET

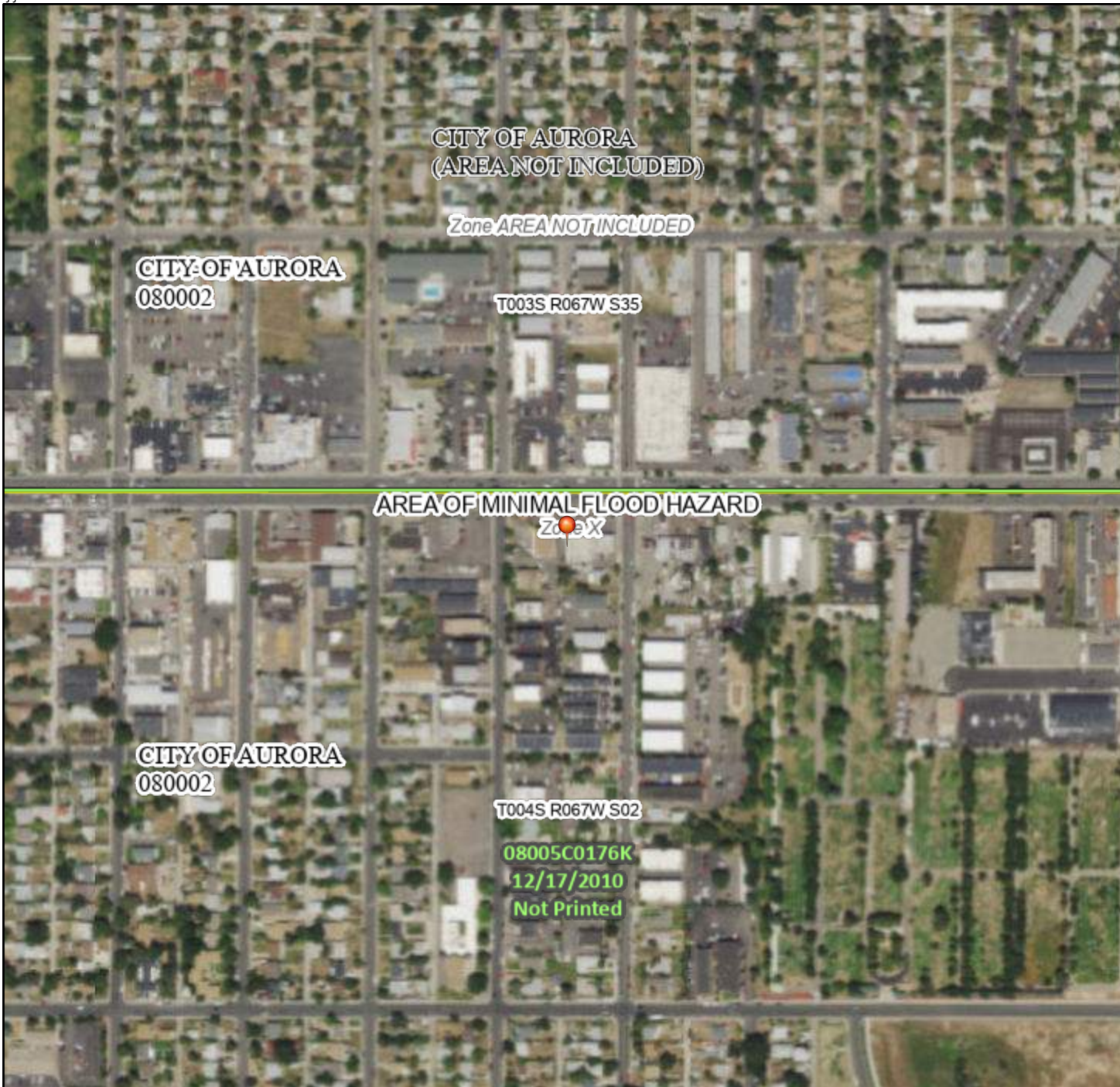
SHEET NAME
VC01

APPENDIX D: FEMA FIRMETTE

DWL RQDD PRRG-EPUGDHU)5WVWH



ff 1



%DVBS 86 DWL RQDD DS 2JWKRLBHA DVDUHUH-KGZWRHU

FHOG

4)637 75(13(13)55 55

65.52 65.55		LWKRW %DVHJPRGPHDWLRQ % -FCH\$ 9 \$
		LWK%RUHFWK -FCH\$ 2-9 \$
		\$KODWRLUJPRG
26.52 26.55		\$0000 800HJPRG-EPUG \$JHD/ R 0000 F00FHIOHGGZWKDHUHD G-BWKOHW/WHQRFHIRW RU ZWKGLDQ DUHD/R OHW/WHQRFHVTXUHEOH-FCH;
		XWUH800 WLRLQ/\$000 800HJPRG-EPUG -FCH;
		\$JHDZWK\$G-HGJPRG\$VNGHWR HMH 6H RMH/ -FCH;
		\$JHDZWKJPRG\$VNGHWRHMH -FCH'
26.55 26.55		\$JHDR 0000 JPRG-EPUG -FCH;
		\$JHDR 0000WHQ-HGJPRG-EPUG -FCH'
65 65.55		80000 80YHUW RU 8VRUJHJ
		HMH'LN RU JPRG00
		8VRUJHJ/LV/ ZWK\$0000 800H
		DVHU 800FHIOHMDWLRLQ
		80000 0000FW
		%DVHJPRGPHDWLRQLQ %
		LEW R 8VXG
		-XULVLFWLRQ%80000
26 26.55		80000 0000FW %DVHOLQH
		8VRUJHJ%DVHOLQH
		8VRUJHJ%DVHOLQH
65.55		LJLWDD DVD\$00000
		RLJLWDD DVD\$00000
		80000
		74HSLQQLVSDHGRQWKHBSLV/DQDSSJLBMH SLQV VHOHFWHGBWKHXLJ DQGGRH/QRV UHJH DQDWKRLWDLWLHSLRSHUWOFDVLRLQ

§

74LVBSF80LHVZWKJWVWDDUG/IRU WKHXLH
GLJLWDD IOHGBS/LI LW LVQRV YRLGDVGHVULBGBORZ
74HEDHBSV80LHVZWKJWV EDHBS
DFXUDF WDDUG/

74HIOHGBKQUGLQRUBMLRLV GULYHGGLUHFWO\IURVWK
DVKRLWDLWLH%ZEHVUYLHV/SURLGGB 74LVBS
ZVH8VUWHGRQ DV 3 DQGGRVQRV
UHOHFW RQJH/RU DQDQVWV8HIXQV WRWLVGDVHDDG
WLR 74H%DDGHIHFWLYHLQRUBMLRLQ RQJH/RU
BFFHVSUWHGBGQZGDVDRYUWLR

74LVBSL8HLVYRLGLI WKHQRU RUHRI WKHIOORZQBS
HOFQWVGRQRV DSSDU EDHBSL8H IOHGBRQDHOV
OHFG VDDHEDU BSFJHDLRLQDWH F80WALGHQVILHJV
)80000 QH-U DQG)8HIFWLYHGDMH DSLBHVIRU
X0000DQXRGUQLJGDVH/FDQV BHXGIRU
UHKDWRU/SUSRV/

APPENDIX E: NRCS WEB SOIL SURVEY

Hydrologic Soil Group—Arapahoe County, Colorado



Soil Map may not be valid at this scale.

Map Scale: 1:588 if printed on A landscape (11" x 8.5") sheet.

0 5 10 20 30 Meters

0 25 50 100 150 Feet

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




**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

3/29/2023
Page 1 of 4

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 1:20,000.

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: Arapahoe County, Colorado
 Survey Area Data: Version 18, Sep 1, 2022

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

Date(s) aerial images were photographed: Jun 9, 2021—Jun 12, 2021

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
WeB	Weld silt loam, 0 to 3 percent slopes	C	1.8	100.0%
Totals for Area of Interest			1.8	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

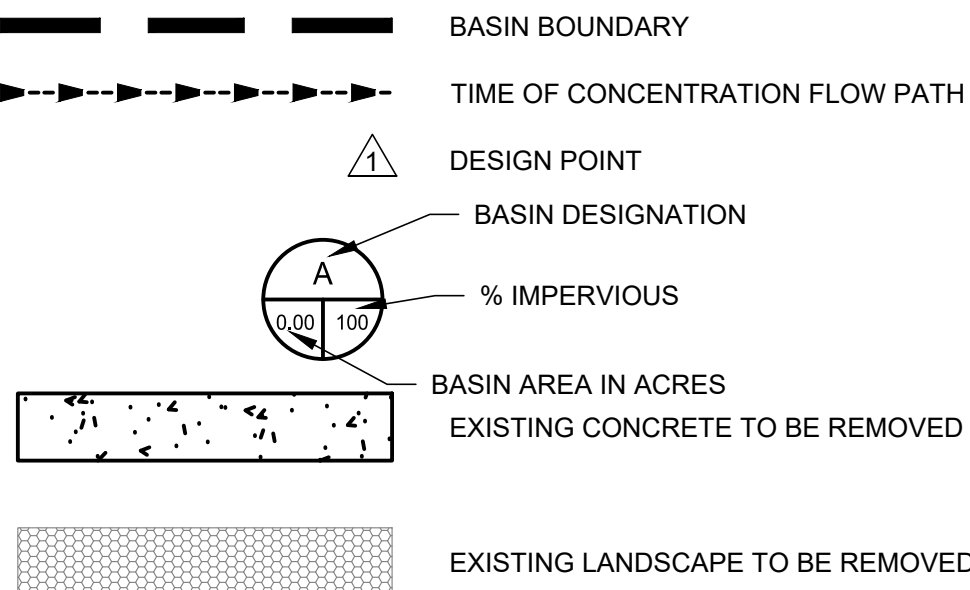
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX F: PRELIMINARY DRAINAGE PLANS

LEGEND

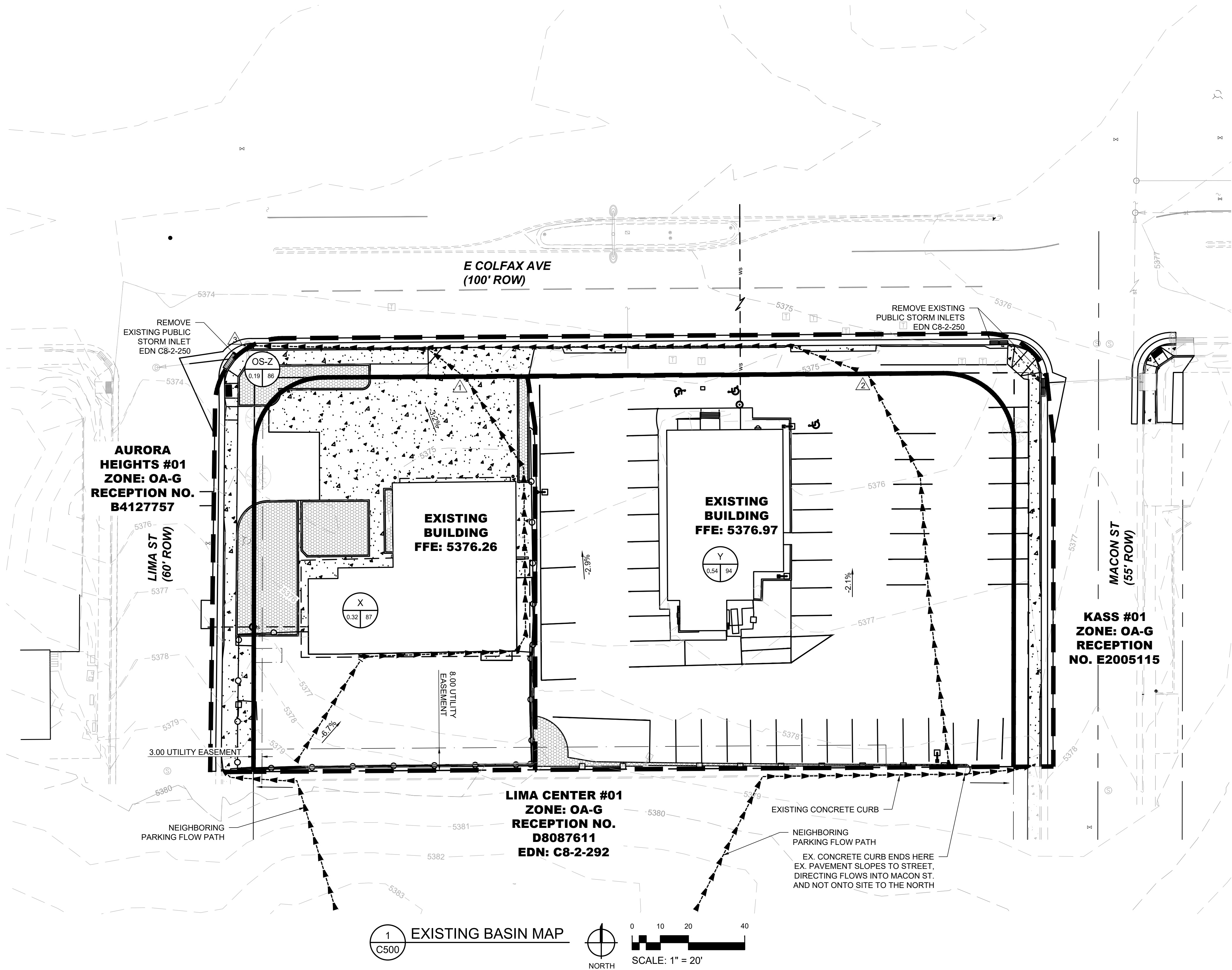


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- ALL PRIVATE STORMWATER INFRASTRUCTURE MAINTENANCE IS THE SOLE RESPONSIBILITY OF THE LANDOWNER.
- ALL STORM PIPES AND STRUCTURES ARE DESIGNED FOR THE 100 YEAR EVENT.
- ENSURE THAT THE PROVISIONS OF CRS 37-92-602, AS AMENDED BY SENATE BILL 15-212, REGARDING NOTIFICATION OF DOWNSTREAM WATER RIGHTS HOLDERS ARE UPHOLD.
- BENCHMARK: CITY OF AURORA BM # 4S6702NE004- 3" DIAMETER BRASS CAP ON SW COR OF MOLINE/COLFAX, BEING ON THE S.PCR ON A CURB OPENING INLET. ELEVATION: 5382.76 FEET (NAVD 1988 DATUM). THE CONTOURS SHOWN HEREON ARE AT ONE (1) FOOT INTERVALS.
- PUBLICLY AVAILABLE GIS CONTOUR DATA WAS USED TO SUPPLEMENT THE PROJECT SPECIFIC SURVEY DATA AND PROVIDE A GREATER CONTEXT AREA.

EXISTING BASIN SUMMARY TABLE						
BASIN	AREA (AC)	% IMPERV	10 YEAR RUNOFF COEFFICIENT	100 YEAR RUNOFF COEFFICIENT	10 YEAR PEAK FLOW (CFS)	100 YEAR PEAK FLOW (CFS)
X	0.32	87	0.78	0.84	1.16	2.19
Y	0.54	94	0.83	0.87	2.06	3.79
OS-Z	0.19	86	0.77	0.84	0.66	1.26

NOT FOR CONSTRUCTION



BENCHMARK:
CITY OF AURORA BM #4S6702NE004 (G-016A) - 3" DIAMETER BRASS CAP ON SW CORNER OF MOLINE / COLFAX, BEING ON THE S. PCR ON A CURB INLET.
ELEVATION: 5382.76 FEET (NAVD 1988 DATUM). THE CONTOURS SHOWN HEREON ARE AT ONE (1) FOOT INTERVALS.

LEGEND

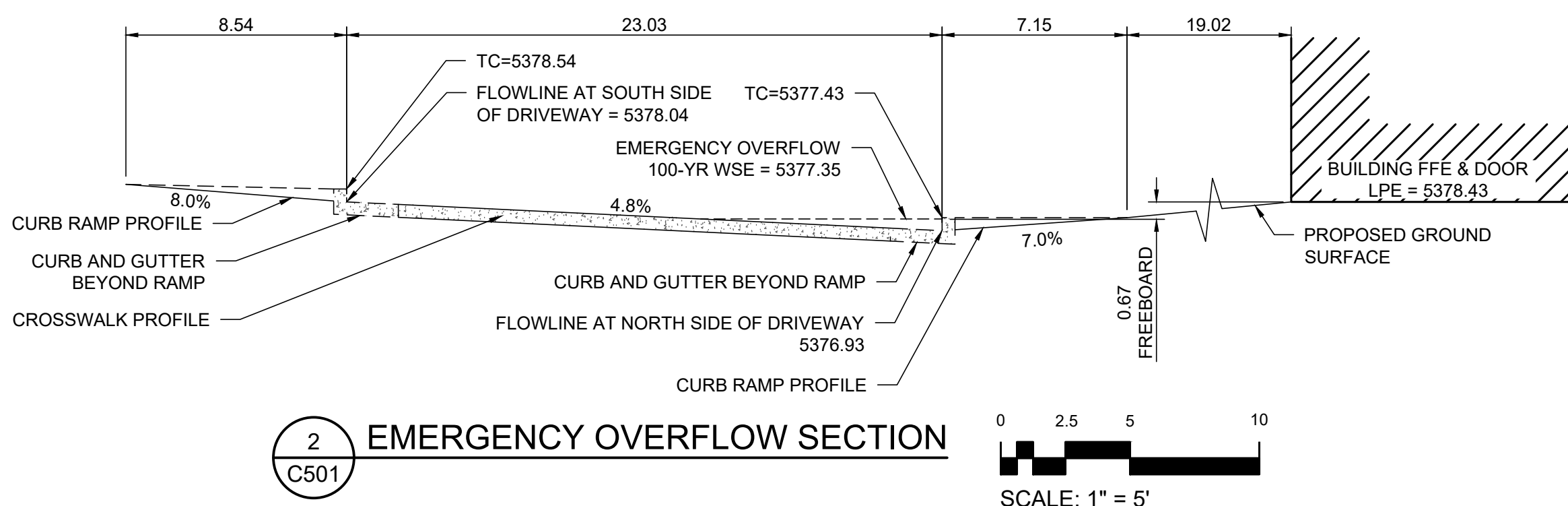
- BASIN BOUNDARY
- TIME OF CONCENTRATION FLOW PATH
- EMERGENCY OVER FLOW ROUTIG
- DESIGN POINT
- BASIN DESIGNATION
- % IMPERVIOUS
- BASIN AREA IN ACRES
- PROPOSED CONCRETE PAVING
- PROPOSED ASPHALT PAVING
- PROPOSED PERMEABLE PAVERS
- EMERGENCY OVERFLOW PATH AND DIRECTION

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- ALL PRIVATE STORMWATER INFRASTRUCTURE MAINTENANCE IS THE SOLE RESPONSIBILITY OF THE LANDOWNER.
- ALL STORM PIPES AND STRUCTURES ARE DESIGNED FOR THE 100 YEAR EVENT.
- ENSURE THAT THE PROVISIONS OF CRS 37-92-602 AS AMENDED BY SENATE BILL 15-212, REGARDING NOTIFICATION OF DOWNSTREAM WATER RIGHTS HOLDERS ARE UPHELD.
- BENCHMARK: CITY OF AURORA BM # 4S6702NE004 - 3" DIAMETER BRASS CAP ON SW COR OF MOLINE/COLFAX, BEING ON THE S.PCR ON A CURB OPENING INLET. ELEVATION: 5382.76 FEET (NAVD 1988 DATUM), THE CONTOURS SHOWN HEREON ARE AT ONE (1) FOOT INTERVALS.
- PUBLICLY AVAILABLE GIS CONTOUR DATA WAS USED TO SUPPLEMENT THE PROJECT SPECIFIC SURVEY DATA AND PROVIDER A GREATER CONTEXT AREA.
- APPROVAL OF THIS DOCUMENT BY COA DOES NOT IMPLY APPROVAL FOR ANY OFFSITE WORK WITHIN ADJACENT CDOT RIGHT-OF-WAY. IT IS THE OWNER'S RESPONSIBILITY TO COORDINATE WITH CDOT AND OBTAIN ALL NECESSARY APPROVALS AND EASEMENTS FOR SUCH WORK. IF APPROVALS ARE NOT OBTAINED BY THE START OF CONSTRUCTION, REVISIONS TO CIVIL PLANS WILL BE REQUIRED.
- ENSURE THE PROVISIONS OF CRS 37-92-602, AS AMENDED BY SENATE BILL 15-212, REGARDING NOTIFICATION OF DOWNSTREAM WATER RIGHTS HOLDERS ARE UPHELD.
- THE DEVELOPER SHALL HAVE A LICENSED PROFESSIONAL ENGINEER CERTIFY EACH STORMWATER DETENTION POND AND/OR WATER QUALITY BMP IS BUILT ACCORDING TO THE APPROVED PLANS AND SPECIFICATIONS AND THE REQUIRED DETENTION VOLUME, INCLUDING THE WQCV WHEN USED, IS MET. THE CERTIFICATION SHALL ALSO VERIFY ALL PERTINENT DIMENSIONS, ELEVATIONS, REQUIRED OUTLET ORIFICE PLATES FOR DETENTION AND WQCV AND OTHER PERMANENT BMPS REQUIREMENTS ARE INSTALLED PER THE APPROVED PLANS AND SPECIFICATIONS, AND SHALL SHOW THE AS-BUILT DESIGN VOLUMES (WQCV, 10- YEAR, 100 YEAR, EURV) AND OTHER PERTINENT DIMENSIONS, ELEVATIONS AND CAPACITY REQUIREMENTS ASSOCIATED WITH THE WQ BMP USED. THE CERTIFICATION SHALL BE PROVIDED TO THE CITY OF AURORA ENGINEERING CONTROL SECTION PRINCIPAL ENGINEER. AN APPROVED POND CERTIFICATE SHALL BE REQUIRED PRIOR TO THE RETURN OF ANY FISCAL SECURITY DEPOSIT (AS WELL AS SATISFYING OTHER CONDITIONS OF THE STORMWATER PERMIT) FOR SITES THAT DO NOT REQUIRE A CERTIFICATE OF OCCUPANCY. EXAMPLES OF THESE SITES INCLUDE BUT ARE NOT LIMITED TO: SITES WITHOUT VERTICAL CONSTRUCTION, OIL AND GAS WELL PADS, OUTDOOR STORAGE, AND TOW YARDS. AN APPROVED POND CERTIFICATE SHALL BE REQUIRED PRIOR TO COMMENCEMENT OF BUSINESS OPERATIONS. IN NO CASE SHALL A CERTIFICATE OF OCCUPANCY OR TEMPORARY CERTIFICATE OF OCCUPANCY BE ISSUED WITHOUT AN APPROVED POND CERTIFICATE. PERMEABLE PAVERS ARE PROVIDING WATER QUALITY AND THEREFORE WILL NEED A POND CERTIFICATE. PHOTOGRAPHS DURING CONSTRUCTION (SHOWING UNDERDRAIN INSTALLATION, THE MEMBRANE INSTALLATION, BACKFILL, AND PERMEABLE PAVERS) AND AFTER CONSTRUCTION ARE REQUIRED IN POND CERTIFICATES. EACH SIDE, EAST AND WEST, WILL NEED THEIR OWN POND CERTIFICATE.

NOT FOR CONSTRUCTION

PROPOSED BASIN SUMMARY TABLE						
BASIN	AREA (AC)	% IMPERV	10 YEAR RUNOFF COEFFICIENT	100 YEAR RUNOFF COEFFICIENT	10 YEAR PEAK FLOW (CFS)	100 YEAR PEAK FLOW (CFS)
R1	0.16	95	0.84	0.87	0.61	1.12
R2	0.09	95	0.84	0.87	0.33	0.61
E	0.05	43	0.45	0.66	0.10	0.25
F	0.01	62	0.59	0.74	0.04	0.09
G	0.12	91	0.80	0.86	0.45	0.85
H	0.01	72	0.66	0.78	0.03	0.06
A	0.20	90	0.80	0.85	0.74	1.39
B	0.02	95	0.84	0.87	0.09	0.16
C	0.12	88	0.78	0.84	0.42	0.80
D	0.08	81	0.73	0.82	0.28	0.54
O.1	0.04	89	0.79	0.85	0.13	0.25
O.2	0.02	94	0.82	0.87	0.09	0.17
O.3	0.10	87	0.78	0.84	0.35	0.67
O.4	0.04	89	0.79	0.85	0.14	0.26



BENCHMARK:
CITY OF AURORA BM #4S6702NE004 (G-016A) - 3" DIAMETER BRASS CAP ON SW CORNER OF MOLINE / COLFAX, BEING ON THE S. PCR ON A CURB INLET. ELEVATION: 5382.76 FEET (NAVD 1988 DATUM). THE CONTOURS SHOWN HEREON ARE AT ONE (1) FOOT INTERVALS.



BENCHMARK:
CITY OF AURORA BM #4S6702NE004 (G-016A) - 3" DIAMETER BRASS CAP ON SW CORNER OF MOLINE / COLFAX, BEING ON THE S. PCR ON A CURB INLET.
ELEVATION: 5382.76 FEET (NAVD 1988 DATUM). THE CONTOURS SHOWN HEREON ARE AT ONE (1) FOOT INTERVALS.

LEGEND	
	WEST BASIN
	EAST BASIN
	NORTH BASIN
	NORTHEAST BASIN
	RECEIVING INLET

GENERAL NOTES

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- PUBLICLY AVAILABLE GIS CONTOUR DATA WAS USED TO SUPPLEMENT THE PROJECT SPECIFIC SURVEY DATA AND PROVIDER A GREATER CONTEXT AREA.

OFFSITE BASIN SUMMARY TABLE						
BASIN	AREA (AC)	% IMPERV	10 YEAR RUNOFF COEFFICIENT	100 YEAR RUNOFF COEFFICIENT	10 YEAR PEAK FLOW (CFS)	100 YEAR PEAK FLOW (CFS)
WEST	1.69	65	0.61	0.75	3.78	8.14
EAST	7.11	65	0.61	0.75	12.83	27.64
NORTH	0.32	65	0.61	0.75	0.81	1.75
NORTH EAST	0.05	65	0.61	0.75	0.14	0.31