



DEVELOPMENT

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November 22, 2023

Janet Bender P.E., CFM  
Drainage Supervisor Development Review | City of Aurora  
Southeast Area Facility  
26791 E Quincy Ave.  
Aurora, CO 80016

► **RE: 38<sup>TH</sup> AVENUE - HIMALAYA ROAD TO ODESSA STREET, PRELIMINARY DRAINAGE CONFORMANCE**

The purpose of this letter is to confirm the drainage patterns proposed for the south half of 38<sup>th</sup> Avenue from Himalaya Road to Odessa Street are in conformance with those presented previously with the *38<sup>th</sup> Avenue from Himalaya Road to Odessa Street Final Drainage Report* (2020 38<sup>th</sup> Ave FDR) by Calibre Engineering (EDN 220057FD1). This letter has been prepared for the Town Center Metropolitan District to support continued development within the Majestic CommerCenter Subdivision.

The 2020 38<sup>th</sup> Ave FDR presented a complete final drainage design and analysis for the interim (north half) and future phase (south half) of a raised median four lane arterial roadway. The interim condition has been constructed; the future phase is the focus of this letter. Improvements east of Odessa Street are outside the scope of this letter.

Additional previous submittals which have included or are relevant to the subject area include:

- 38th Ave – Tower Road to Picadilly Road, Final Drainage Report and Construction Documents, EDN 205013
- 38th Ave – Odessa to E-470, Preliminary Drainage Plan, EDN 221084
- Majestic CommerCenter Subdivision Filing No. 15, Preliminary Drainage Report, in progress

For ease of review and continuity, basin and design point naming conventions from the 2020 38<sup>th</sup> Ave FDR have been maintained with this analysis. Previously delineated basins along the north half of the roadway (B1, A1, A2, A3, A4, and A5) have been directly incorporated into this analysis without modification to size or calculated time of concentration. Basin delineation along the south side of the street (B5, A6, A7, A7.2, A8, A9 and A10) have been modified slightly to account for final design elements not anticipated with the previous report. The following table provides comparisons of calculated flow rates from the 2020 38<sup>th</sup> Ave FDR and this Letter:

	<b>38<sup>th</sup> Avenue - Himalaya Road to Odessa Street Final Drainage Report Flow Rates</b>		<b>38<sup>th</sup> Avenue - Himalaya Road to Odessa Street Drainage Conformance Letter Flow Rates</b>	
<b>Design Point</b>	<b>Q<sub>2</sub> (CFS)</b>	<b>Q<sub>100</sub> (CFS)</b>	<b>Q<sub>2</sub> (CFS)</b>	<b>Q<sub>100</sub> (CFS)</b>
A6	1.9	5.6	1.3	3.9
A7	2.5	7.3	1.6	5.7
A8	1.9	6.1	0.9	3.0
A9	2.4	6.8	1.3	4.8
A10	0.4	1.1	0.2	0.7
B1	0.4	1.3	0.4	1.6
B5	0.5	1.5	0.5	1.8

## D E V E L O P M E N T

Calculated peak runoff values have decreased for all “A” basins presented. This is partially due to changes in both local criteria and hydrologic methodology since approval of the 2020 38<sup>th</sup> Ave FDR. Runoff values for the “B” basins have increased and this is due to the increase in the basin sizes. These increased flow rates are being discharged to the east and will not affect the existing system.

City of Aurora drainage criteria at the time of the 2020 38<sup>th</sup> Ave FDR instructed the designer to utilize Mile High Flood District’s Urban Storm Drainage Criteria Manual (USDCM) provided rainfall depth-duration-frequency maps for one hour point rainfall values ( $P_1$ ). MHFD Criteria has since been updated to utilize NOAA Atlas 14 for rainfall depth-duration-frequency values for the MHFD region. Point rainfall values used in the 2020 38<sup>th</sup> Ave FDR and this Conformance Letter are summarized below.

Point Rainfall Values, $P_1$		
	2020 FDR USDCM	2023 NOAA 14
2-year	0.96	0.85
100-year	2.60	2.46

Composite C values utilized in the Calibre report have also been slightly revised. The Calibre report used outdated runoff coefficients in all categories. According to the 2023 City of Aurora Drainage Criteria, the impervious values and therefore the runoff coefficients for the undeveloped, paved, and landscape categories have changed. These changes had a slight impact on the C values but did not show an increase in runoff values from the 2020 Final Drainage Report.

Review of hydraulic drainage design components required with a Final Drainage Report (inlet capacities, hydraulic calculations) will be included in a subsequent Final Drainage Report.

In summary, the update of drainage basins and rational calculation methodology from the 2020 38<sup>th</sup> Ave FDR to this analysis have no negative impacts on the existing stormwater management system. The stormwater management plan presented herein follows land uses and drainage patterns established with the *38<sup>th</sup> Avenue from Himalaya Road to Odessa Street Final Drainage Report* and is in conformance with the approved Drainage Report and Plan.

Attachments to this Preliminary Drainage Conformance Letter include:

- Rational method calculations
- Excerpts from relevant Final Drainage Report and Plans



D E V E L O P M E N T

Standard Statement

I hereby certify that this conformance letter and plan for the development, 38<sup>th</sup> Avenue - Himalaya Road to Odessa Street, was prepared by me (or under my direction supervision) in accordance with the provisions of the City of Aurora Storm Drainage Criteria Manual for the owners thereof.

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Registered Professional Engineer  
State of Colorado No.38890  
For an on behalf of HR Green Development LLC

Advisory Note: Preliminary Drainage Report approval is required prior to Civil Plan Approval.

If there are any questions or comments on the contents, please do not hesitate to contact me directly at 720-602-4938.

Sincerely,

**HR GREEN, INC.**

A handwritten signature in blue ink that reads 'Kristine House'.

**Kristine House, P.E., CFM**

Associate | Lead Engineer – Land Development

## HYDROLOGIC CALCULATIONS

COMPOSITE 'C' FACTORS																						
BASIN DESIGNATION	AREAS (ACRES)				SOIL	UNDEV				PAVED				LANDSCAPE				COMP. C FACTOR				REMARKS
	UNDEV	PAVED	LANDSCAPE	TOTAL	TYPE	%I	2YR	5 YR	100 YR	%I	2YR	5 YR	100 YR	%I	2YR	5 YR	100 YR	%I	2YR	5 YR	100 YR	
B1		0.21	0.27	0.48	A	5	0.02	0.02	0.15	95	0.79	0.81	0.85	20	0.10	0.11	0.27	52.5	0.40	0.41	0.52	
B5		0.22	0.17	0.39	A	5	0.02	0.02	0.15	95	0.79	0.81	0.85	20	0.10	0.11	0.27	62.6	0.49	0.50	0.60	
A1		0.73	0.47	1.20	A	5	0.02	0.02	0.15	95	0.79	0.81	0.85	20	0.10	0.11	0.27	65.8	0.52	0.53	0.62	(EDN 220057)
A2		0.93	1.88	2.81	A	5	0.02	0.02	0.15	95	0.79	0.81	0.85	20	0.10	0.11	0.27	44.8	0.33	0.34	0.46	(EDN 220057)
A3		0.72	0.96	1.68	A	5	0.02	0.02	0.15	95	0.79	0.81	0.85	20	0.10	0.11	0.27	52.1	0.40	0.41	0.52	(EDN 220057)
A4		0.81	1.56	2.37	A	5	0.02	0.02	0.15	95	0.79	0.81	0.85	20	0.10	0.11	0.27	45.6	0.34	0.35	0.47	(EDN 220057)
A5		0.16	0.15	0.31	A	5	0.02	0.02	0.15	95	0.79	0.81	0.85	20	0.10	0.11	0.27	58.7	0.46	0.47	0.57	(EDN 220057)
A6		0.65	0.42	1.07	A	5	0.02	0.02	0.15	95	0.79	0.81	0.85	20	0.10	0.11	0.27	65.6	0.52	0.53	0.62	
A7		0.92	0.81	1.73	A	5	0.02	0.02	0.15	95	0.79	0.81	0.85	20	0.10	0.11	0.27	59.9	0.47	0.48	0.58	
A7.2		0.18	0.09	0.27	A	5	0.02	0.02	0.15	95	0.79	0.81	0.85	20	0.10	0.11	0.27	69.6	0.55	0.57	0.65	
A8		0.53	0.23	0.76	A	5	0.02	0.02	0.15	95	0.79	0.81	0.85	20	0.10	0.11	0.27	72.2	0.58	0.59	0.67	
A9		0.78	0.67	1.45	A	5	0.02	0.02	0.15	95	0.79	0.81	0.85	20	0.10	0.11	0.27	60.2	0.47	0.48	0.58	
A10		0.09	0.09	0.18	A	5	0.02	0.02	0.15	95	0.79	0.81	0.85	20	0.10	0.11	0.27	58.3	0.45	0.47	0.56	

COPIED DIRECTLY FROM RATIONAL SPREADSHEET IN 38TH AVENUE FROM  
HIMALAYA ROAD TO ODESSA STREET FINAL DRAINAGE REPORT (220057FD1)

# STORM DRAINAGE SYSTEM DESIGN



Project #: 2202959  
Project: 38th Avenue

Location: City of Aurora  
Plan Stage: Preliminary

By: T. McMunn  
Checked: K. House

Date: 11/20/2023  
Date: 11/20/2023

## TIME OF CONCENTRATION

BASIN DATA			INITIAL/OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					TOTAL	Tc Check (Urbanized Basins)		FINAL Tc	REMARKS
DESIGNATION	C2	AREA (AC)	LENGTH (FT)	SLOPE %	Ti (Min.)*	GRASS/ PAVED	LENGTH (FT)	SLOPE %	VEL. (FPS)**	Tt(Min.)	Ti+Tt(Min.)	LGTH. (FT)	Tc = (L/180) + 10	(minutes)	
B1	0.40	0.48	140	4	9.6	PAVED	123	2.2	3.0	0.7	10.3	263	11.5	10.3	
B5	0.49	0.39	86	4.8	6.1	PAVED	180	2.2	3.0	1.0	7.2	266	11.5	7.2	
A1	0.52	1.20	145	5.2	7.4	PAVED	699	0.9	1.9	6.1	13.5	844	14.7	13.5	
A2	0.33	2.81	44	5.5	5.3	GRASS	1356	0.8	1.3	16.8	22.2	1400	17.8	17.8	
A3	0.40	1.68	469	1.5	24.4	GRASS	813	0.5	1.1	12.8	37.2	1282	17.1	17.1	
A4	0.34	2.37	40	5.9	4.9	GRASS	733	0.6	1.2	10.5	15.4	773	14.3	14.3	
A5	0.46	0.31	56	6.6	4.7	PAVED	148	0.5	1.4	1.7	6.5	204	11.1	6.5	
A6	0.52	1.07	172	2.6	10.2	PAVED	530	0.9	1.9	4.7	14.8	702	13.9	13.9	
A7	0.47	1.73	127	2.2	10.1	PAVED	650	1	2.0	5.4	15.5	777	14.3	14.3	
A7.2	0.55	0.27	92	1.6	8.2	PAVED	115	0.8	1.8	1.1	9.3	207	11.2	9.3	
A8	0.58	0.76	116	1.1	10.0	PAVED	455	0.8	1.8	4.2	14.2	571	13.2	13.2	
A9	0.47	1.45	105	1	11.8	PAVED	675	0.8	1.8	6.3	18.1	780	14.3	14.3	
A10	0.47	1.45	52	0.9	8.6	PAVED	110	0.6	1.5	1.2	9.8	162	10.9	9.8	

COPIED DIRECTLY FROM RATIONAL SPREADSHEET IN 38TH AVENUE FROM HIMALAYA  
ROAD TO ODESSA STREET FINAL DRAINAGE REPORT (220057FD1)



# STORM DRAINAGE SYSTEM DESIGN

Project #: 2202959.00  
Project: 38th Avenue

Location: City of Aurora  
Plan Date:

By: T. McMunn  
Checked: K. House

11/20/2023  
11/20/2023

## RATIONAL METHOD PROCEDURE ~ 2-YEAR DEVELOPED (P1 = 0.85)

			DIRECT RUNOFF						TOTAL RUNOFF					STREET		REMARKS
STRUCTURE	DESIGN POINT	BASIN	AREA (AC)	COEFF. (C)	Tc (MINUTES)	C*A	I (IN/HR)	Q (CFS)	SUM AREA (AC)	SUM Tc (MINUTES)	I (IN/HR)	SUM CA	TOTAL Q (CFS)	SLOPE (%)	STREET FLOW (CFS)	
N/A	B1	B1	0.48	0.40	10.3	0.19	2.29	0.4							0.4	B1 (EDN 220057)
N/A	B5	B5	0.39	0.49	7.2	0.19	2.61	0.5							0.5	B5
IN-A1	A1	A1	1.20	0.52	13.5	0.63	2.03	1.3							-	A1 (EDN 220057)
IN-A2	A2	A2	2.81	0.33	17.8	0.92	1.78	1.7							0	A2 (EDN 220057)
IN-A3	A3	A3	1.68	0.40	17.1	0.66	1.82	1.2							-	A3 (EDN 220057)
IN-A4	A4	A4	2.37	0.34	14.3	0.80	1.98	1.6							-	A4 (EDN 220057)
IN-A5	A5	A5	0.31	0.46	6.5	0.14	2.69	0.4							-	A5 (EDN 220057)
IN-A6	A6	A6	1.07	0.52	13.9	0.55	2.01	1.1							-	A6
9	A6.1								2.27	13.9	2.01	1.18	2.4		0	A1 + A6 (routed pipe flow)
IN-A7	A7	A7	1.73	0.47	14.3	0.81	1.98	1.6							-	A7
7	A7.1								6.81	17.8	1.78	2.91	5.2		0	A1 - A2 + A6 - A7 (routed pipe flow)
IN-A7.2	A7.2	A7.2	0.27	0.55	9.3	0.15	2.38	0.4							-	A7.2
IN-A7.3	A7.3								7.08	17.8	1.78	3.06	5.5		0	A1 - A2 + A6 - A7.2 (routed pipe flow)



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			DIRECT RUNOFF						TOTAL RUNOFF					STREET		REMARKS
STRUCTURE	DESIGN POINT	BASIN	AREA (AC)	COEFF. (C)	Tc (MINUTES)	C*A	I (IN/HR)	Q (CFS)	SUM AREA (AC)	SUM Tc (MINUTES)	I (IN/HR)	SUM CA	TOTAL Q (CFS)	SLOPE (%)	STREET FLOW (CFS)	
IN-A8	A8	A8	0.76	0.58	13.2	0.44	2.06	0.9							-	A8
4	A8.1								9.52	17.8	1.78	4.16	7.4		0	A1 - A3 + A6 - A8 (routed pipe flow)
IN-A9	A9	A9	1.45	0.47	14.3	0.68	1.98	1.3							-	A9
1	A9.1								13.33	17.8	1.78	5.64	10.1		0.0	A1 - A4 + A6 - A9 (routed pipe flow)
IN-A10	A10	A10	0.18	0.45	9.8	0.08	2.33	0.2							-	A10
MH-A10.1	A10.1								13.83	17.8	1.78	5.86	10.5		1.5	A1 - A5 + A6 - A10 (routed pipe flow)



# STORM DRAINAGE SYSTEM DESIGN

Project #: 2202959.00  
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Location: City of Aurora  
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By: T. McMunn  
Checked: K. House

11/20/2023  
11/20/2023

## RATIONAL METHOD PROCEDURE ~ 100-YEAR DEVELOPED (P1 = 2.46)

			DIRECT RUNOFF						TOTAL RUNOFF					STREET		REMARKS
STRUCTURE	DESIGN POINT	BASIN	AREA (AC)	COEFF. (C)	Tc (MINUTES)	C*A	I (IN/HR)	Q (CFS)	SUM AREA (AC)	SUM Tc (MINUTES)	I (IN/HR)	SUM CA	TOTAL Q (CFS)	SLOPE (%)	STREET FLOW (CFS)	
N/A	B1	B1	0.48	0.52	10.3	0.25	6.59	1.6							1.6	B1 (EDN 220057)
N/A	B5	B5	0.39	0.60	7.2	0.23	7.51	1.8							1.8	B5
IN-A1	A1	A1	1.20	0.62	13.5	0.75	5.86	4.4							0.2	A1 (EDN 220057)
IN-A2	A2	A2	2.81	0.46	17.8	1.29	5.14	6.6							0.2	A2 (EDN 220057)
IN-A3	A3	A3	1.68	0.52	17.1	0.87	5.24	4.5							0.5	A3 (EDN 220057)
IN-A4	A4	A4	2.37	0.47	14.3	1.10	5.71	6.3							-	A4 (EDN 220057)
IN-A5	A5	A5	0.31	0.57	6.5	0.18	7.76	1.4							0.2	A5 (EDN 220057)
IN-A6	A6	A6	1.07	0.62	13.9	0.67	5.79	3.9							3.9	A6
9	A6.1								2.27	13.9	5.79	1.42	8.2		3.9	A1 + A6 (routed pipe flow)
IN-A7	A7	A7	1.73	0.58	14.3	1.00	5.71	5.7							-	A7
7	A7.1								6.81	17.8	5.14	3.70	19.0		0.0	A1 - A2 + A6 - A7 (routed pipe flow)
IN-A7.2	A7.2	A7.2	0.27	0.65	9.3	0.17	6.85	1.2							1.2	A7.2 11/20/2023



# STORM DRAINAGE SYSTEM DESIGN

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11/20/2023  
11/20/2023

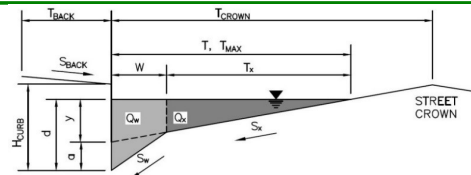
## RATIONAL METHOD PROCEDURE ~ 100-YEAR DEVELOPED (P1 = 2.46)

			DIRECT RUNOFF						TOTAL RUNOFF					STREET		REMARKS
STRUCTURE	DESIGN POINT	BASIN	AREA (AC)	COEFF. (C)	Tc (MINUTES)	C*A	I (IN/HR)	Q (CFS)	SUM AREA (AC)	SUM Tc (MINUTES)	I (IN/HR)	SUM CA	TOTAL Q (CFS)	SLOPE (%)	STREET FLOW (CFS)	
IN-A7.3	A7.3								7.08	17.8	5.14	3.88	19.9		0.0	A1 - A2 + A6 - A7.2 (routed pipe flow)
IN-A8	A8	A8	0.76	0.67	13.2	0.51	5.93	3.0							3	A8
4	A8.1								9.52	17.8	5.14	5.26	27.0		0	A1 - A3 + A6 - A8 (routed pipe flow)
IN-A9	A9	A9	1.45	0.58	14.3	0.84	5.70	4.8							-	A9
1	A9.1								13.33	17.8	5.14	7.20	37.0		0	A1 - A4 + A6 - A9 (routed pipe flow)
IN-A10	A10	A10	0.18	0.56	9.8	0.10	6.70	0.7							-	A10
MH-A10.1	A10.1								13.83	17.8	5.14	7.48	38.4		4.7	A1 - A5 + A6 - A10 (routed pipe flow)

# HYDRAULIC CALCULATIONS

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

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

Project: **38th Avenue - Himalaya to Odessa (south side)**Inlet ID: **38th Avenue****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)

Max. Allowable Spread for Minor &amp; Major Storm

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

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

$T_{BACK}$	=	30.0	ft
$S_{BACK}$	=	0.020	ft/ft
$n_{BACK}$	=	0.018	

$H_{CURB}$	=	6.00	inches
$T_{CROWN}$	=	34.0	ft
$W$	=	2.00	ft
$S_x$	=	0.020	ft/ft
$S_w$	=	0.083	ft/ft
$S_o$	=	0.008	ft/ft
$n_{STREET}$	=	0.016	

	Minor Storm	Major Storm	
$T_{MAX}$	34.0	34.0	ft
$d_{MAX}$	6.0	12.0	inches
	<input type="checkbox"/>	<input type="checkbox"/>	

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

	Minor Storm	Major Storm	
$Q_{allow}$	12.3	63.3	cfs

**Minor storm max. allowable capacity GOOD - greater than the design peak flow of 3.00 cfs on sheet 'Inlet Management'****Major storm max. allowable capacity GOOD - greater than the design peak flow of 5.00 cfs on sheet 'Inlet Management'**

## Project Description

## Input Data

Station (ft)

Elevation (ft)

## Roughness Segment Definitions

Start Station

Ending Station

### Roughness Coefficient

(0+54, 5450.53)

(1+00, 5450.43)

0.018

## Options

## Results

Bentley Systems, Inc. Haestad Methods Solution Center Bentley FlowMaster V8i (SELECTseries 1) [08.11.01.03]

## Worksheet for Emergency Overflow Section 1

### Results

Froude Number	0.82
Flow Type	Subcritical

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.44	ft
Critical Depth	0.42	ft
Channel Slope	0.60	%
Critical Slope	0.00908	ft/ft

## Cross Section for Emergency Overflow Section 1

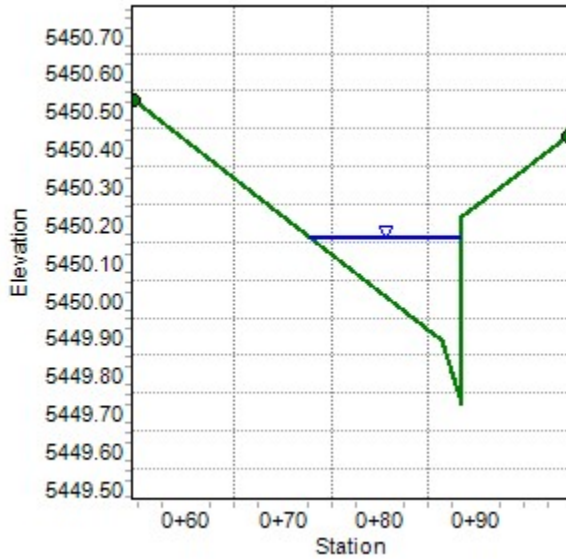
### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Channel Slope	0.60	%
Normal Depth	0.44	ft
Discharge	5.00	cfs

### Cross Section Image



## Worksheet for Emergency Overflow Section 2

### Project Description

Solve For Headwater Elevation

### Input Data

Discharge	5.30	cfs
Crest Elevation	5461.35	ft
Tailwater Elevation	5460.50	ft
Weir Coefficient	2.70	US
Crest Length	60.00	ft
Number Of Contractions	0	

### Results

Headwater Elevation	5461.45	ft
Headwater Height Above Crest	0.10	ft
Tailwater Height Above Crest	-0.85	ft
Flow Area	6.14	ft <sup>2</sup>
Velocity	0.86	ft/s
Wetted Perimeter	60.20	ft
Top Width	60.00	ft

Cross Section for Emergency Overflow Section 2

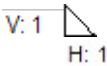
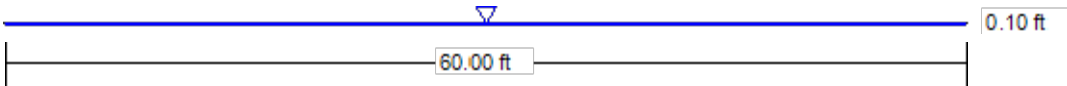
Project Description

Solve For Headwater Elevation

Input Data

Discharge	5.30	cfs
Headwater Elevation	5461.45	ft
Crest Elevation	5461.35	ft
Tailwater Elevation	5460.50	ft
Weir Coefficient	2.70	US
Crest Length	60.00	ft
Number Of Contractions	0	

Cross Section Image



## COPIES OF REFERENCED REPORTS, GRAPHS, TABLES AND FIGURES USED



**NOAA Atlas 14, Volume 8, Version 2**  
**Location name: Aurora, Colorado, USA\***  
**Latitude: 39.7674°, Longitude: -104.7512°**  
**Elevation: 5448 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**

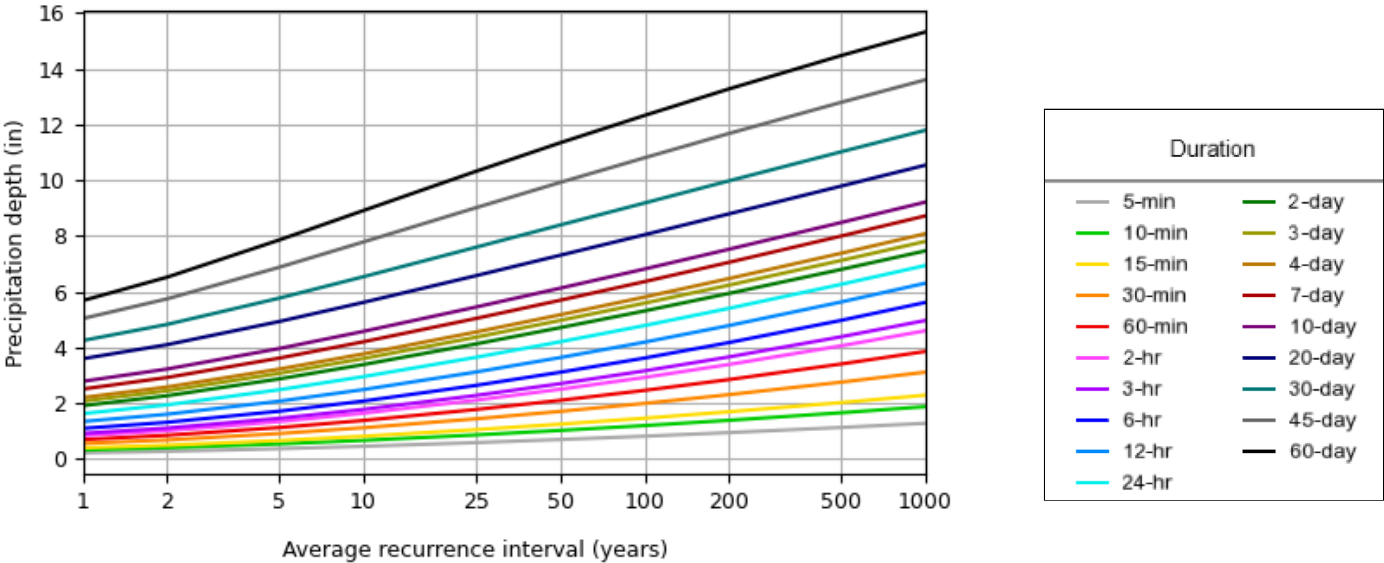
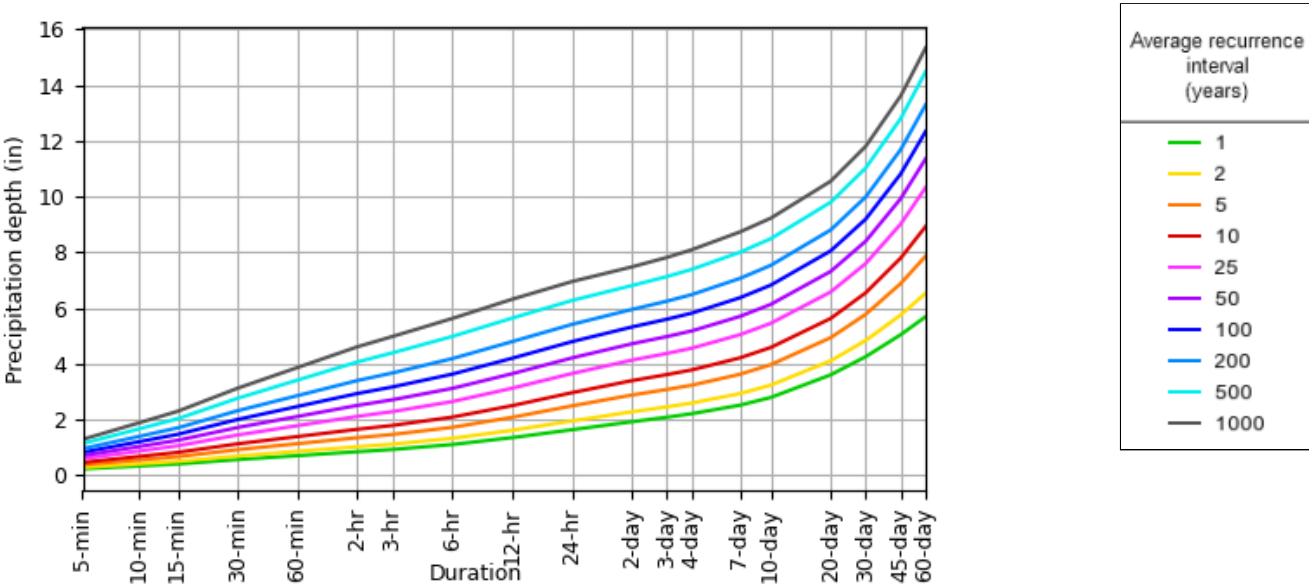
<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)<sup>1</sup></b>										
<b>Duration</b>	<b>Average recurrence interval (years)</b>									
	<b>1</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>	<b>200</b>	<b>500</b>	<b>1000</b>
<b>5-min</b>	<b>0.225</b> (0.180-0.282)	<b>0.278</b> (0.222-0.349)	<b>0.372</b> (0.297-0.469)	<b>0.459</b> (0.364-0.581)	<b>0.591</b> (0.457-0.786)	<b>0.702</b> (0.528-0.942)	<b>0.821</b> (0.596-1.13)	<b>0.951</b> (0.662-1.34)	<b>1.14</b> (0.759-1.64)	<b>1.28</b> (0.832-1.86)
<b>10-min</b>	<b>0.329</b> (0.264-0.413)	<b>0.407</b> (0.325-0.511)	<b>0.545</b> (0.435-0.687)	<b>0.673</b> (0.533-0.850)	<b>0.865</b> (0.670-1.15)	<b>1.03</b> (0.773-1.38)	<b>1.20</b> (0.873-1.65)	<b>1.39</b> (0.969-1.96)	<b>1.66</b> (1.11-2.40)	<b>1.88</b> (1.22-2.73)
<b>15-min</b>	<b>0.402</b> (0.322-0.504)	<b>0.496</b> (0.396-0.623)	<b>0.665</b> (0.530-0.838)	<b>0.820</b> (0.650-1.04)	<b>1.06</b> (0.817-1.40)	<b>1.25</b> (0.943-1.68)	<b>1.47</b> (1.06-2.01)	<b>1.70</b> (1.18-2.39)	<b>2.03</b> (1.36-2.92)	<b>2.29</b> (1.49-3.33)
<b>30-min</b>	<b>0.560</b> (0.449-0.703)	<b>0.687</b> (0.550-0.863)	<b>0.916</b> (0.730-1.15)	<b>1.12</b> (0.891-1.42)	<b>1.44</b> (1.12-1.92)	<b>1.71</b> (1.29-2.30)	<b>2.00</b> (1.45-2.74)	<b>2.31</b> (1.61-3.25)	<b>2.76</b> (1.84-3.98)	<b>3.12</b> (2.02-4.53)
<b>60-min</b>	<b>0.701</b> (0.561-0.880)	<b>0.854</b> (0.682-1.07)	<b>1.13</b> (0.901-1.42)	<b>1.39</b> (1.10-1.75)	<b>1.78</b> (1.38-2.37)	<b>2.11</b> (1.59-2.83)	<b>2.46</b> (1.79-3.38)	<b>2.85</b> (1.99-4.02)	<b>3.41</b> (2.28-4.92)	<b>3.86</b> (2.50-5.60)
<b>2-hr</b>	<b>0.842</b> (0.678-1.05)	<b>1.02</b> (0.821-1.27)	<b>1.34</b> (1.08-1.68)	<b>1.65</b> (1.31-2.07)	<b>2.11</b> (1.65-2.79)	<b>2.50</b> (1.90-3.34)	<b>2.93</b> (2.15-3.99)	<b>3.40</b> (2.38-4.74)	<b>4.06</b> (2.74-5.81)	<b>4.61</b> (3.01-6.62)
<b>3-hr</b>	<b>0.922</b> (0.746-1.14)	<b>1.11</b> (0.899-1.38)	<b>1.46</b> (1.18-1.82)	<b>1.78</b> (1.43-2.23)	<b>2.28</b> (1.79-3.00)	<b>2.70</b> (2.06-3.59)	<b>3.16</b> (2.33-4.29)	<b>3.67</b> (2.59-5.09)	<b>4.39</b> (2.97-6.24)	<b>4.98</b> (3.27-7.11)
<b>6-hr</b>	<b>1.10</b> (0.896-1.35)	<b>1.32</b> (1.07-1.62)	<b>1.72</b> (1.39-2.12)	<b>2.08</b> (1.68-2.58)	<b>2.64</b> (2.08-3.44)	<b>3.11</b> (2.39-4.09)	<b>3.62</b> (2.69-4.86)	<b>4.18</b> (2.97-5.74)	<b>4.98</b> (3.40-7.00)	<b>5.62</b> (3.72-7.96)
<b>12-hr</b>	<b>1.35</b> (1.10-1.64)	<b>1.61</b> (1.32-1.96)	<b>2.08</b> (1.69-2.54)	<b>2.49</b> (2.02-3.06)	<b>3.12</b> (2.47-4.01)	<b>3.64</b> (2.81-4.72)	<b>4.20</b> (3.13-5.56)	<b>4.79</b> (3.43-6.50)	<b>5.64</b> (3.88-7.84)	<b>6.31</b> (4.22-8.85)
<b>24-hr</b>	<b>1.63</b> (1.35-1.97)	<b>1.95</b> (1.60-2.36)	<b>2.49</b> (2.04-3.02)	<b>2.96</b> (2.42-3.61)	<b>3.65</b> (2.90-4.62)	<b>4.21</b> (3.26-5.38)	<b>4.79</b> (3.59-6.27)	<b>5.41</b> (3.90-7.25)	<b>6.27</b> (4.34-8.61)	<b>6.95</b> (4.68-9.64)
<b>2-day</b>	<b>1.92</b> (1.59-2.30)	<b>2.27</b> (1.89-2.73)	<b>2.88</b> (2.38-3.46)	<b>3.39</b> (2.79-4.10)	<b>4.13</b> (3.30-5.16)	<b>4.71</b> (3.68-5.96)	<b>5.32</b> (4.01-6.87)	<b>5.94</b> (4.31-7.87)	<b>6.80</b> (4.75-9.23)	<b>7.47</b> (5.08-10.3)
<b>3-day</b>	<b>2.08</b> (1.74-2.48)	<b>2.45</b> (2.04-2.93)	<b>3.08</b> (2.56-3.68)	<b>3.61</b> (2.98-4.34)	<b>4.37</b> (3.50-5.43)	<b>4.97</b> (3.90-6.25)	<b>5.60</b> (4.24-7.19)	<b>6.24</b> (4.55-8.22)	<b>7.12</b> (5.00-9.61)	<b>7.81</b> (5.34-10.7)
<b>4-day</b>	<b>2.21</b> (1.85-2.62)	<b>2.59</b> (2.16-3.08)	<b>3.23</b> (2.69-3.85)	<b>3.78</b> (3.13-4.52)	<b>4.56</b> (3.66-5.64)	<b>5.18</b> (4.07-6.48)	<b>5.81</b> (4.42-7.44)	<b>6.48</b> (4.74-8.49)	<b>7.38</b> (5.20-9.92)	<b>8.09</b> (5.55-11.0)
<b>7-day</b>	<b>2.51</b> (2.12-2.97)	<b>2.93</b> (2.46-3.46)	<b>3.62</b> (3.04-4.29)	<b>4.21</b> (3.51-5.01)	<b>5.04</b> (4.08-6.18)	<b>5.70</b> (4.50-7.07)	<b>6.37</b> (4.87-8.08)	<b>7.06</b> (5.19-9.17)	<b>8.00</b> (5.67-10.7)	<b>8.73</b> (6.03-11.8)
<b>10-day</b>	<b>2.79</b> (2.36-3.28)	<b>3.23</b> (2.73-3.80)	<b>3.96</b> (3.34-4.68)	<b>4.58</b> (3.84-5.43)	<b>5.45</b> (4.42-6.65)	<b>6.13</b> (4.86-7.56)	<b>6.82</b> (5.24-8.60)	<b>7.53</b> (5.56-9.73)	<b>8.49</b> (6.04-11.2)	<b>9.22</b> (6.40-12.4)
<b>20-day</b>	<b>3.60</b> (3.06-4.20)	<b>4.10</b> (3.49-4.80)	<b>4.93</b> (4.18-5.78)	<b>5.62</b> (4.74-6.61)	<b>6.58</b> (5.37-7.92)	<b>7.31</b> (5.84-8.92)	<b>8.05</b> (6.23-10.0)	<b>8.80</b> (6.55-11.2)	<b>9.79</b> (7.03-12.8)	<b>10.5</b> (7.39-14.0)
<b>30-day</b>	<b>4.25</b> (3.64-4.94)	<b>4.83</b> (4.13-5.62)	<b>5.77</b> (4.91-6.72)	<b>6.54</b> (5.54-7.65)	<b>7.60</b> (6.22-9.09)	<b>8.40</b> (6.74-10.2)	<b>9.19</b> (7.14-11.4)	<b>9.98</b> (7.46-12.7)	<b>11.0</b> (7.94-14.3)	<b>11.8</b> (8.31-15.6)
<b>45-day</b>	<b>5.04</b> (4.33-5.82)	<b>5.75</b> (4.93-6.65)	<b>6.88</b> (5.88-7.97)	<b>7.79</b> (6.63-9.06)	<b>9.01</b> (7.40-10.7)	<b>9.92</b> (7.99-11.9)	<b>10.8</b> (8.43-13.3)	<b>11.7</b> (8.77-14.7)	<b>12.8</b> (9.26-16.5)	<b>13.6</b> (9.64-17.9)
<b>60-day</b>	<b>5.68</b> (4.90-6.55)	<b>6.53</b> (5.61-7.52)	<b>7.86</b> (6.74-9.07)	<b>8.92</b> (7.61-10.3)	<b>10.3</b> (8.49-12.2)	<b>11.3</b> (9.15-13.6)	<b>12.3</b> (9.64-15.1)	<b>13.3</b> (9.99-16.6)	<b>14.5</b> (10.5-18.5)	<b>15.3</b> (10.9-20.0)

<sup>1</sup> 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.

[Back to Top](#)

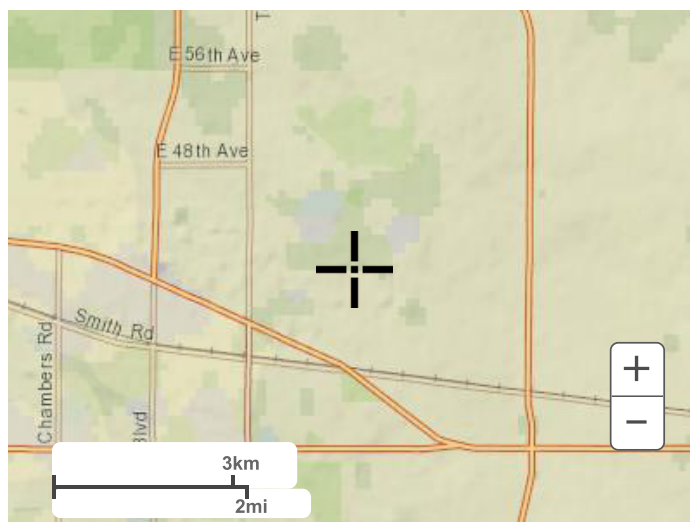
**PF graphical**

PDS-based depth-duration-frequency (DDF) curves  
Latitude: 39.7674°, Longitude: -104.7512°



Maps & aerials

Small scale terrain



Large scale terrain

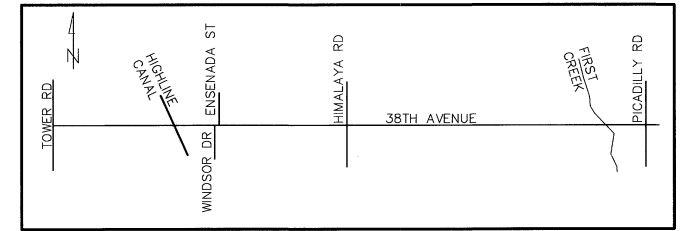
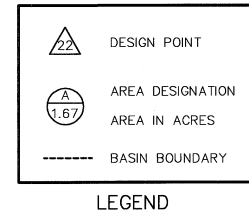
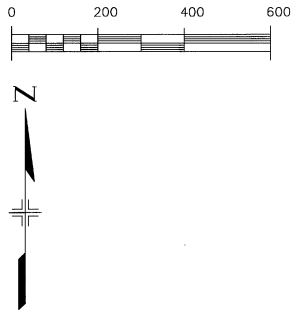


Large scale map

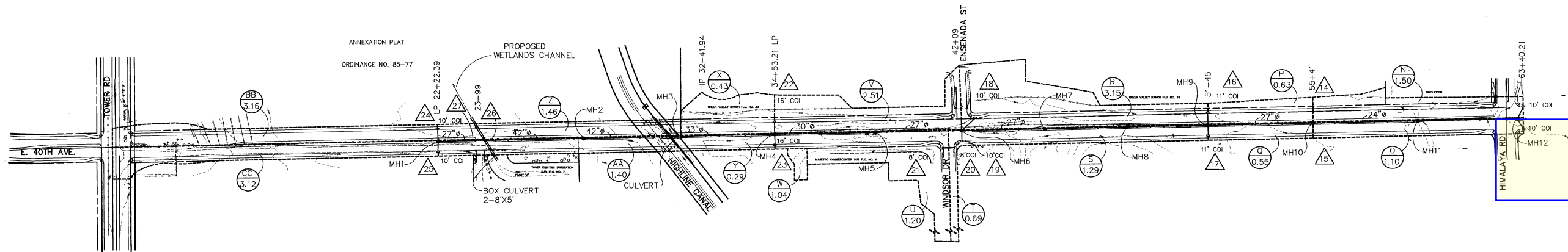


Large scale aerial

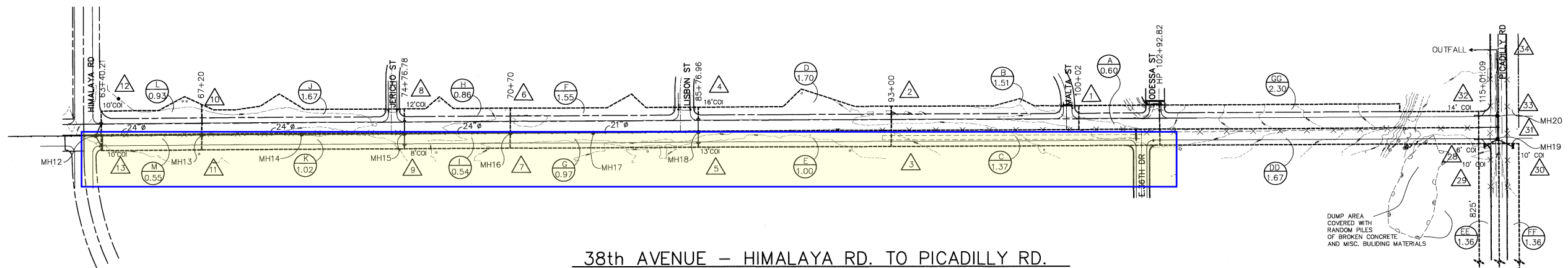
205013 28



VICINITY MAP  
NO SCALE



38th AVENUE - TOWER RD. TO HIMALAYA RD.  
DRAINAGE MAP - PHASE 1  
SCALE 1" = 200'



38th AVENUE - HIMALAYA RD. TO PICADILLY RD.  
DRAINAGE MAP - PHASE 2  
SCALE 1" = 200'

CITY OF AURORA ENGINEERING DIVISION  
1470 S. HAVANA STREET AURORA, COLORADO 80012  
PHONE (303) 739-7300

38th AVENUE  
TOWER ROAD TO PICADILLY ROAD  
DRAINAGE MAP

SHEET 28 of 28

DESIGNED BY: D.ZELEM  
CAD BY: GREG  
CHECKED BY: [Signature]  
SCALE: AS SHOWN  
PROJECT No.: 02052

REVISIONS

DATE	DATE	DATE
2-24-05	2-24-05	2-24-05

Senior Engineer: [Signature]  
City Engineer: [Signature]  
City Engineer: [Signature]

CALL UTILITY NOTIFICATION  
CENTER OF COLORADO  
1-800-922-1987

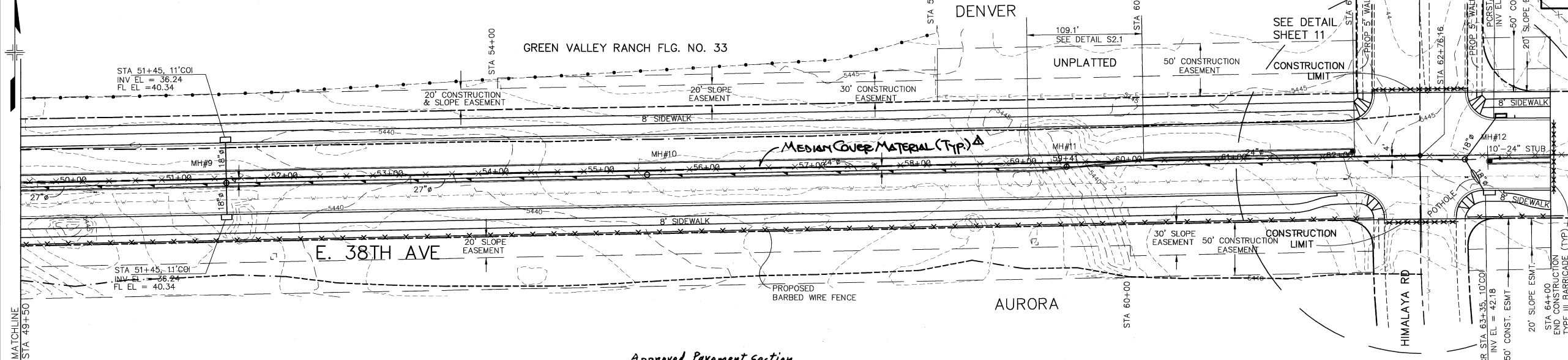
CALL 2-BUSINESS DAYS IN ADVANCE  
BEFORE DIG, GRAB, OR EXCAVATE  
FOR THE MEMBER UTILITIES.

0 50 100 150

CUT - - - - -

FILL — . . . .

N SCALES:  
 1" = 50' HOR  
 1" = 5' VER



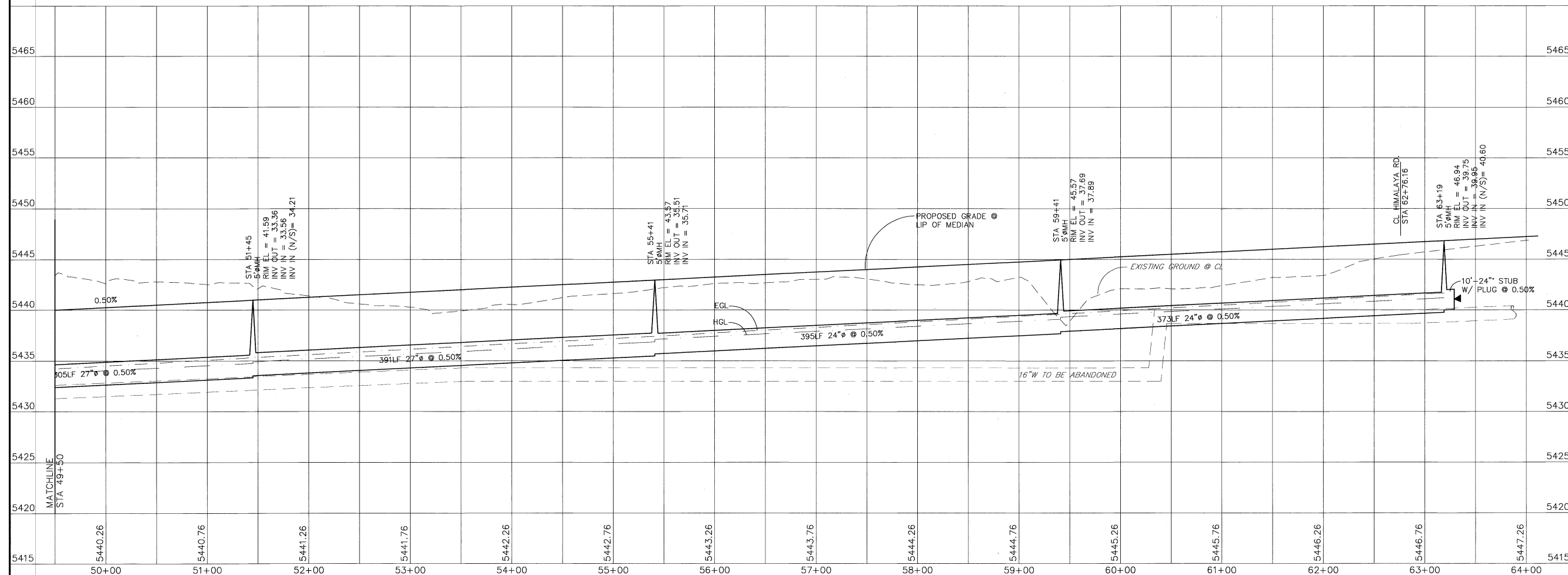
Approved Pavement Section

38TH AVE.: 7 1/2" AC + 6" ABC  
MLH  
3/28/05

Approved for  
Street Permits

MLH 3-28-05  
INITIAL DATE

C.O.A. BENCHMARKS, 3 INCH BRASS CAPS: C-065 ELEVATION = 5426.99, 15-010A ELEVATION = 5443.80  
AND 13-010 ELEVATION = 5432.17






CITY OF AURORA ENGINEERING DIVISION  
15151 E. ALAMEDA PKWY., AURORA, COLORADO 80012  
PHONE (303) 739-7300

38th AVENUE  
TOWER ROAD TO HIMALAYA ROAD  
PLAN AND PROFILE

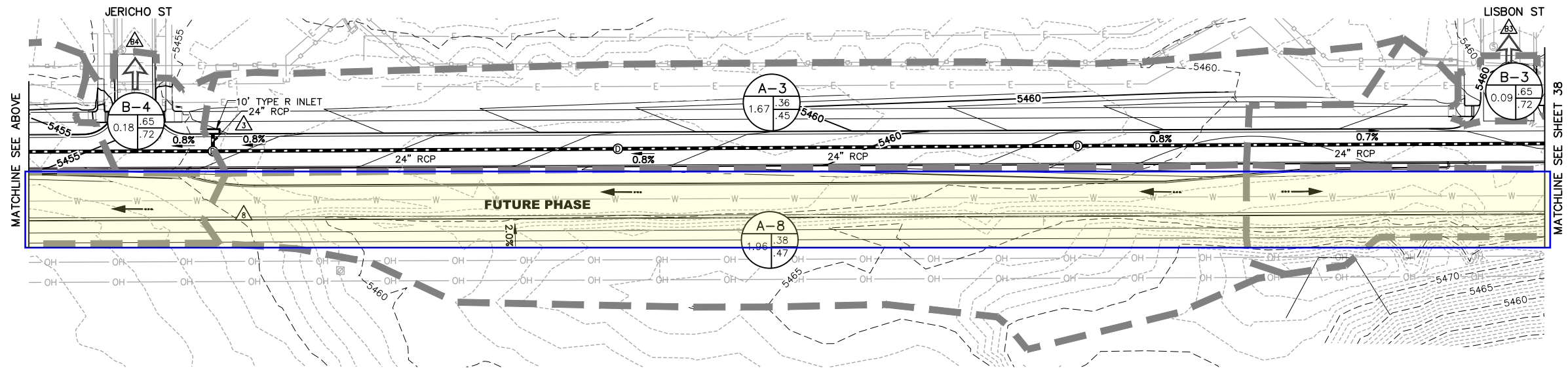
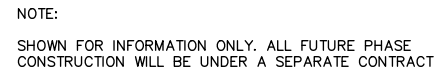
SHEET 7 of 28











DESIGNED BY:	D.ZELEM
CAD BY:	GREG
CHECKED BY:	
SCALE:	AS SHOWN
PROJECT No.:	02052

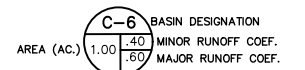
REVISIONS
1 GREG 4-4-06

 CITY ENGINEER	DATE 3-3-05
 SENIOR ENGINEER	DATE 2-24-05
 UTILITIES DEPARTMENT	DATE 2-24-05

3.7.05  
DEPARTMENT DATE



- PROPOSED MAJOR CONTOUR (5') 
- PROPOSED MINOR CONTOUR (1') 
- EXISTING MAJOR CONTOUR (5') 
- EXISTING MINOR CONTOUR (1') 
- PROPOSED STORM DRAIN PIPE 
- PROPOSED STORM DRAIN INLET 
- PROPOSED STORM DRAIN MANHOLE 
- DIRECTIONAL FLOW ARROW 
- PROPOSED BASIN LINE 
- DESIGN POINT 
- PROPOSED BASIN LABEL



MAJOR STORM EMERGENCY  
OVERFLOW ARROW

PLAN REVIEW NOTE:

CITY OF AURORA PLAN REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH CITY OF AURORA DESIGN CRITERIA AND THE CITY CODE. THE CITY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, OF DIMENSIONS AND ELEVATIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT

**BENCHMARK:**  
CITY OF AURORA BENCHMARK # 356626NW005  
3 INCH DIAMETER BRASS CAP, (STAMPED CITY OF  
AURORA, BM 16-14, 1981) SET IN THE NORTHWEST  
WINGWALL OF A CONCRETE HEADWALL WEST OF A  
NORTH-SOUTH RAILROAD TRACK ALONG THE LIVERPOOL  
LANDLINE, APPROXIMATELY AT THE SOUTH LINE OF  
EAST 36TH AVENUE.


SUMMARY RUNOFF TABLE			
DESIGN PT.	TOTAL AREA	TOTAL Q2	TOTAL Q100
	(ACRES)	(CFS)	(CFS)
1	1.20	1.4	4.4
2	2.81	1.7	5.9
3	1.67	1.3	4.2
4	2.36	1.5	5.3
5	0.31	0.4	1.3
6	1.06	1.9	5.6
7	1.41	2.5	7.3
8	1.96	1.9	6.1
9	1.28	2.4	6.8
10	0.17	0.4	1.1
B1	0.20	0.4	1.3
B2	0.09	0.2	0.6
B3	0.09	0.2	0.6
B4	0.18	0.4	1.1
B5	0.21	0.5	1.5



UNCC  
CALL BEFORE  
YOU DIG  
**811**  
OR  
**22-1987**

Utility Notification  
Center of Colorado

	6	
	5	
	4	
	3	
	2	
DATE	1	REVISION DESCRIPTION

Drawing Name <b>21DR3-DR4.dwg</b>			
Job Number <b>TCMD 38</b>			
Prepared For <b>TCMD</b>		Designer <b>KLB</b>	Drafter <b>KLB</b>
			Checked <b>BKM</b>



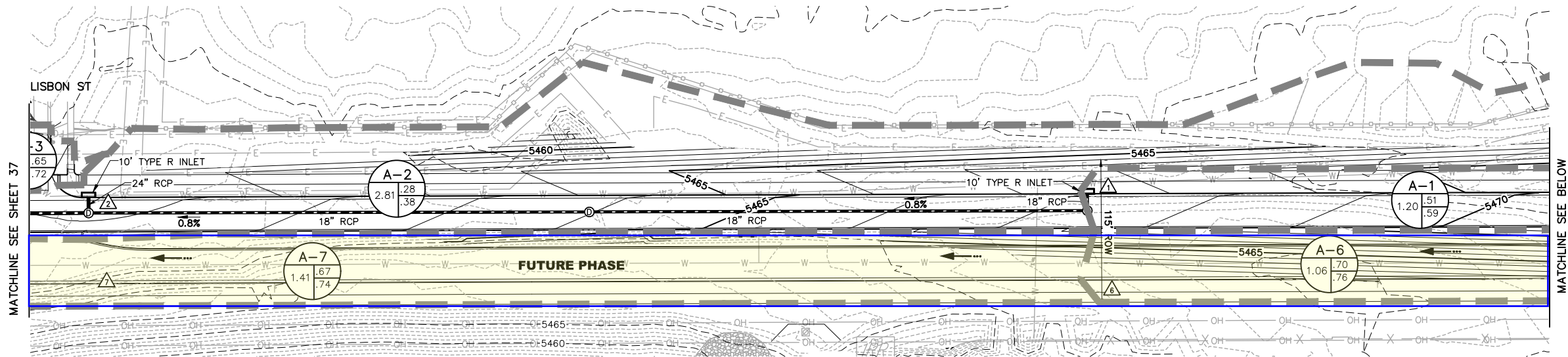
Calibre Engineering, Inc.  
9090 South Ridgeline Boulevard, Suite 105  
Highlands Ranch, CO 80129 (303) 730-0434  
[www.calibre-engineering.com](http://www.calibre-engineering.com)  
Construction Management Civil Engineering Surveying

# EAST 38TH AVENUE

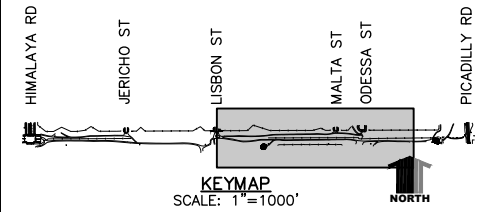
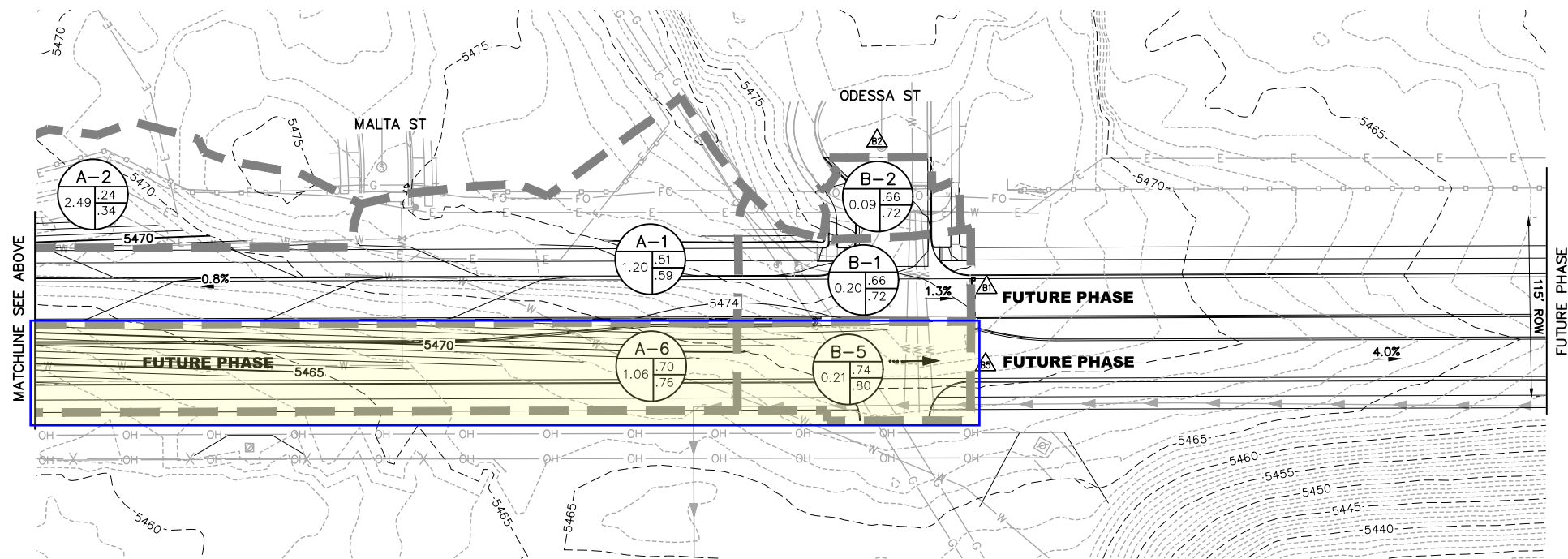
## TRANSPORTATION ENGINEERING PLANS

### DRAINAGE PLAN (FUTURE BUILDOUT)

Sheet  
**DR3**  
 37  
 APRIL 16, 2020



NOTE:  
SHOWN FOR INFORMATION ONLY. ALL FUTURE PHASE  
CONSTRUCTION WILL BE UNDER A SEPARATE CONTRACT



#### LEGEND

- PROPOSED MAJOR CONTOUR (5') ——— 5250 ———
- PROPOSED MINOR CONTOUR (1') ——— 5250 ———
- EXISTING MAJOR CONTOUR (5') - - - - - 5250 - - - - -
- EXISTING MINOR CONTOUR (1') - - - - - 5250 - - - - -
- PROPOSED STORM DRAIN PIPE ———
- PROPOSED STORM DRAIN INLET ———
- PROPOSED STORM DRAIN MANHOLE ———
- DIRECTIONAL FLOW ARROW ———
- PROPOSED BASIN LINE ———
- DESIGN POINT ———
- PROPOSED BASIN LABEL ———

C-6 BASIN DESIGNATION  
AREA (AC.) 1.00 .40 MINOR RUNOFF COEF.  
.60 MAJOR RUNOFF COEF.

MAJOR STORM EMERGENCY  
OVERFLOW ARROW ———

#### PLAN REVIEW NOTE:

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SHALL BE CONFIRMED AND CORRELATED AT THE JOB  
SITE. THE CITY OF AURORA, THROUGH THE  
APPROVAL OF THIS DOCUMENT, ASSUMES NO  
RESPONSIBILITY FOR THE COMPLETENESS AND/OR  
ACCURACY OF THIS DOCUMENT

BENCHMARK:  
CITY OF AURORA BENCHMARK # 3S6626NW005  
3 INCH DIAMETER BRASS CAP, (STAMPED CITY OF  
AURORA, BM 16-14, 1981) SET IN THE NORTHWEST  
WINGWALL OF A CONCRETE HEADWALL WEST OF A  
NORTH-SOUTH RAILROAD TRACK ALONG THE LIVERPOOL  
LANDLINE, APPROXIMATELY AT THE SOUTH LINE OF  
EAST 36TH AVENUE.

#### SUMMARY RUNOFF TABLE

DESIGN PT.	TOTAL AREA (ACRES)	TOTAL Q2 (CFS)	TOTAL Q100 (CFS)
1	1.20	1.4	4.4
2	2.81	1.7	5.9
3	1.67	1.3	4.2
4	2.36	1.5	5.3
5	0.31	0.4	1.3
6	1.06	1.9	5.6
7	1.41	2.5	7.3
8	1.96	1.9	6.1
9	1.28	2.4	6.8
10	0.17	0.4	1.1
B1	0.20	0.4	1.3
B2	0.09	0.2	0.6
B3	0.09	0.2	0.6
B4	0.18	0.4	1.1
B5	0.21	0.5	1.5



UNCC  
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811  
OR  
1-800-922-1987

Utility Notification  
Center of Colorado

PATH: P:\TCMD\38\CA\DR3\DR3-DR4.DWG  
PLOT BY: KYLER SANFORD PLOT DATE: 4/16/2020 12:11 PM  
XREFS: 20PPN 20EUT, 20EPN, 21KMDR, 22TB

DATE	REVISION DESCRIPTION

Drawing Name 21DR3-DR4.dwg	0 25 50 100 1 inch = 50 ft. Horizontal
Job Number TCMD 38	
Prepared For TCMD	Designer KLB
	Drafter KLB
	Checked BKM

**Calibre**  
Calibre Engineering, Inc.  
9090 South Ridgeline Boulevard, Suite 105  
Highlands Ranch, CO 80129 (303) 730-0434  
www.calibre-engineering.com  
Construction Management Civil Engineering Surveying

## EAST 38TH AVENUE TRANSPORTATION ENGINEERING PLANS DRAINAGE PLAN (FUTURE BUILDOUT)

Sheet <b>DR4</b>	38
Date APRIL 16, 2020	

APPROVED ON 07/07/2020

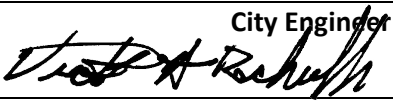



# 38TH AVENUE FROM HIMALAYA ROAD TO ODESSA STREET

## FINAL DRAINAGE REPORT

**MARCH 2020**

**For:**  
Town Center Metropolitan District  
Charlie Foster  
4908 Tower Rd  
Denver, CO 80249

APPROVED FOR ONE YEAR FROM THIS DATE		
07/07/2020		
JRH KIT	City Engineer	Date
		07/07/2020
CWB	Aurora Water Department	Date
		07/06/2020

# 38TH AVENUE FROM HIMALAYA ROAD TO ODESSA STREET

## FINAL DRAINAGE REPORT

### Page 3 of 8

- The Rational Method will be used to calculate runoff for the proposed 38th Avenue from Himalaya Road to Odessa Street.
- For this effort, it has been assumed that the land use will be Lawn and Paved and the design storm frequencies are the 2-year storm for the minor event and the 100-year storm for the major event.
- Inlets have been designed to allow for a single 10ft travel lane to be open at the 100-year event. Inlets in sump condition, due to the proposed profile of 38<sup>th</sup> Ave, are limited to a depth of about 6 inches at the flow line before they start bypassing flow.

### 3. Hydraulic Criteria

- Hydraulic criteria will be based on the City of Aurora criteria.
- Autodesk Storm and Sanitary Analysis 2018 has been used for hydraulic analysis. Results of analysis are provided in Appendix C of this report.
- The downstream HGL for the proposed storm sewer was taken from the previous 38<sup>th</sup> Avenue Drainage Report (EDN No. 205013 March 3, 2005).

## D. DRAINAGE PLAN

### 1. General Concept

- The majority of improvements are tributary to Irondale Gulch. 38<sup>th</sup> Ave is a raised median four lane arterial stretching from east to west. Runoff tributary to Irondale Gulch will travel from east to west and be collected by on-grade and sump condition Type R curb inlets. The proposed storm sewer system will connect to the existing system at the intersection of Himalaya Road and 38<sup>th</sup> Ave. The proposed storm sewer system and resulting hydraulics are limited due to the existing system within Himalaya Road.
- The interim condition of the 38th Avenue from Himalaya Road to Odessa Street site will be that only the north lanes between Himalaya and Odessa will be developed. A future phase of the project will develop the south half of the project. The east portion from Odessa to Picadilly is also a future phase. This phase will provide stub-outs in the storm system for the future buildout of the south half of the project. The calculations provided herein are based on both the north and south halves of 38th Avenue from Himalaya Road to Odessa Street being constructed.
- Per approved Final Drainage Report for 38<sup>th</sup> Avenue, Tower Road – Picadilly Road, Project Nos. 02052 and 02061 dated May 2004, storm drainage from 38<sup>th</sup> Avenue improvements is designed to be collected via street curb and storm sewer infrastructure and outfall into the Bolling Drive Tributary Channel. Runoff will be treated within the channel and ultimately discharge into South Platte River.
- The remaining portion of this initial phase 38<sup>th</sup> Avenue (east of Odessa) will be collected by a temporary sediment basin. Discharge from the sediment basin will overland flow and ultimately be received by First Creek.
- Offsite flows will enter the site from Green Valley Ranch, but these will be minor in nature.
- A vicinity map, soils information and the proposed drainage plan are in Appendix A.

# 38TH AVENUE FROM HIMALAYA ROAD TO ODESSA STREET

## FINAL DRAINAGE REPORT

### Page 4 of 8

- The minor storm (2 year) will be intercepted by proposed storm inlets along the roadway. The major storm (100 year) will be conveyed by the street, curb, and gutter of 38<sup>th</sup> Avenue. It was deemed acceptable within the Irondale Gulch and DFA 0055 Stormwater Outfall Systems Plan that the 100-year storm is to be conveyed through the street and not through the storm sewer system. It is anticipated that the proposed storm system will start bypassing flow above a 2-year event.
- The minor storm flows being conveyed through the proposed storm sewer system will tie into existing storm infrastructure to the north and west of the project site (owned, operated and maintained by the City of Aurora), as determined by the Irondale Gulch Outfall Systems Plan.
- The pipe system for 38<sup>th</sup> Ave is the limiting factor in the performance of the storm system. The existing system that was constructed west of Himalaya is undersized for the 100-year event. Storm events larger than the minor 2-year event will cause water to bypass the inlets and flow offsite in four locations. Flows bypassing inlets will flow north on Lisbon St and Jericho St, as well as both north and south on Himalaya.
- Flows bypassing to the north will be routed through Green Valley Ranch to two nearby detention ponds per the 2014 Denver Storm Drainage Master Plan and Green Valley Ranch Filing 28 Drainage Report (see Appendix D).
- Flows bypassing to the south will be directed to a portion of Himalaya that has not yet been developed and ultimately to storm infrastructure on the Majestic Development site, per the 2014 Denver Storm Drainage Master Plan (See Appendix D).
- Please note that as per an Inter-Governmental Agreement (IGA) written in 2007 by the Cities of Aurora and Denver, all storm sewer within the project area will be owned, operated and maintained by the City of Aurora. See Appendix D for a copy of this agreement.

## 2. Specific Details

- The 38<sup>th</sup> Ave project is divided into the following basins:
  - Basin A-1 is on the north side of 38<sup>th</sup> Ave at the upper end of the Irondale Gulch side of the project. This basin consists of half the roadway section, sidewalk and open space. Runoff from the minor and major events are routed via curb and gutter to an on-grade Type R inlet at DP1. Bypass flow in the major event is routed via curb and gutter to DP2.
  - Basin A-2 is downstream of Basin A-1 on the north side of 38<sup>th</sup> Ave. This basin consists of the north half of the roadway section, sidewalk and open space. Runoff from the major and minor events is routed via curb and gutter to a Type R inlet at DP2 in a sump condition. The sump condition is limited to a depth of about 6-inches at the inlet. Flows bypassing the inlet in the major event are directed north on Lisbon St to DP-B3 per Green Valley Ranch Filing 28 Drainage Report.
  - Basin A-3 is downstream of Basin A-2 on the north side of 38<sup>th</sup> Ave. This basin consists of the north half of the roadway section, sidewalk and open space. Runoff from the major and minor events is routed via curb and gutter to an on-

# 38TH AVENUE FROM HIMALAYA ROAD TO ODESSA STREET

## FINAL DRAINAGE REPORT

Page 5 of 8

grade Type R inlet at DP3. Bypass flow in the major event is routed via curb and gutter into Basin B-4, north on Jericho St to DP-B4 per Green Valley Ranch Filing 28 Drainage Report.

- Basin A-4 is downstream of Basin B-4 on the north half of 38<sup>th</sup> Ave. This basin consists of the north half of the roadway section, sidewalk and open space. Runoff from the major and minor events is routed via curb and gutter to a Type R inlet at DP4 in a sump condition. The sump condition is limited to a depth of about 6-inches at the inlet. Flows bypassing the inlet in the major event are directed to DP5.
- Basin A-5 is downstream of Basin A-4 on the north half of 38<sup>th</sup> Ave. Basin A-5 is separated from Basin A-4 by a minor highpoint. This basin consists of the north half of the roadway section, sidewalk, and open space. Runoff from the major and minor events is routed via curb and gutter to an existing on-grade Type R inlet at DP5. Bypass flow is routed to Himalaya Road via curb and gutter and continues north per Green Valley Ranch Filing 28 Drainage Report.
- Basin A-6 is on the south side of 38<sup>th</sup> Ave at the upper end of the Irondale Gulch side of the project. This basin consists of the south half of the roadway section, sidewalk and landscaping. Runoff from the major and minor events is routed via curb and gutter to an on-grade Type R inlet at DP6. Bypass flow is routed via curb and gutter to DP7.
- Basin A-7 is downstream of Basin A-6 on the south side of 38<sup>th</sup> Ave. Basin A-7 is separated from Basin A-8 by a minor highpoint. This basin consists of the south half of the roadway section, sidewalk and landscaping. Runoff from the major and minor events is routed via curb and gutter to a Type R inlet at DP7 in a sump condition. The sump condition is limited to a depth of about 6-inches at the inlet. Flows bypassing the inlet in the major event are directed to DP8.
- Basin A-8 is downstream of Basin A-7 on the south side of 38<sup>th</sup> Ave. This basin consists of the south half of the roadway section, sidewalk and open space. Runoff from the major and minor events is routed via curb and gutter to an on-grade Type R inlet at DP8. Bypass flow is routed via curb and gutter to DP9.
- Basin A-9 is downstream of Basin A-8 on the south side of 38<sup>th</sup> Ave. This basin consists of the south half of the roadway section, sidewalk and landscaping. Runoff from the major and minor events is routed via curb and gutter to a Type R inlet in sump condition at DP9. The sump condition is limited to a depth of about 6-inches at the inlet. Flows bypassing the inlet in the major event are directed to DP10.
- Basin A-10 is downstream of Basin A-9 on the south side of 38<sup>th</sup> Ave. Basin A-10 is separated from Basin A-9 by a minor highpoint. This basin consists of the south half of the roadway section, sidewalk and landscaping. Runoff from the major and minor events is routed via curb and gutter to an existing on-grade Type R inlet at DP10. Bypass flow is routed via curb and gutter to Himalaya Road and continues south into an undeveloped area in the Majestic Development per the 2014 Denver Storm Drainage Master Plan (See Appendix D).

# 38TH AVENUE FROM HIMALAYA ROAD TO ODESSA STREET

## FINAL DRAINAGE REPORT

Page 6 of 8

- Basin B-1 is located within the First Creek Tributary at the East end of the proposed development. This basin consists of roadway and landscape on the north half of the roadway. Runoff from the major and minor events are captured and treated via temporary sediment basin and will overland flow into First Creek per the 2014 Denver Storm Drainage Master Plan.
  - Basin B-2 is located within the First Creek Tributary at the East end of the proposed development. This basin contains of roadway and landscaping along Odessa St. Runoff from the major and minor events continue north on Odessa St per the 2014 Denver Storm Drainage Master Plan.
  - Basin B-3 is located downstream of Basin A-2. This basin consists of the north half of the roadway section, sidewalk and open space. Runoff from the major and minor events is routed via curb and gutter north on Lisbon St to DP-B3. Flows continue north into Green Valley Ranch and ultimately to Himalaya Pond #808 per the 2014 Denver Storm Drainage Master Plan.
  - Basin B-4 is located downstream of Basin A-3. This basin consists of the north half of the roadway section, sidewalk and open space. Runoff from the major and minor events is routed via curb and gutter north on Jericho St to DP-B4. Flows continue north into Green Valley Ranch and ultimately to Himalaya Pond #808 per the 2014 Denver Storm Drainage Master Plan.
  - Basin B-5 is located within the First Creek Tributary at the East end of the proposed development. This basin consists of roadway and landscape on the south half of the roadway. Runoff from the major and minor events are captured and treated via temporary sediment basin and will overland flow into First Creek per the 2014 Denver Storm Drainage Master Plan.
- The most recent values for rainfall intensity and runoff coefficients have been used in the hydrologic calculations in this report. The composite runoff coefficient for the proposed improvements is less than the estimated composite C Factor calculated in the Final Drainage Report for 38<sup>th</sup> Avenue, Tower Road-Picadilly Road dated May 2004.
  - The Irondale Gulch portion of the project, specifically basins A-1 to A-5 and A-6 to A-10 will be routed through the existing storm sewer system to the existing Bolling Drive Tributary channel. Runoff will ultimately drain to South Platte River.
  - Two basins tributary to First Creek (Basins B-1 and B-5) will be treated by a temporary sediment basin.
  - All proposed improvements have been accounted for in the design of the Bolling Drive Tributary per the Bolling Drive Tributary – Channel Improvements Report.
  - As per the Irondale Gulch and DFA 055 Stormwater Outfall Systems Plan (1990) and the First Creek (Upstream of Buckley Road) Major Drainageway Plan (2009), stormwater detention and water quality is not required for this portion of 38<sup>th</sup> Avenue.
  - All runoff from minor storms and runoff from major storms in Basin A-6 through A-10 are tributary to the Silverado II Detention Facility near E 38<sup>th</sup> Ave and Pena Blvd, where both detention and water quality is provided.



## COMPOSITE 'C' FACTORS

**LOCATION:**

**City of Aurora**

**DATE :**

**3/6/2020**

BASIN DESIGNATION				SOIL TYPE	PAVED				LAWNS				COMP. C FACTOR			
	PAVED	LAWNS	TOTAL		%I	2YR	10 YR	100 YR	%I	2YR	10 YR	100 YR	%I	2YR	10 YR	100 YR
DEVELOPED																
A-1	0.74	0.47	1.20	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	61.83	0.51	0.53	0.59
A-2	0.93	1.88	2.81	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	34.43	0.28	0.29	0.38
A-3	0.72	0.96	1.67	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	44.00	0.36	0.38	0.45
A-4	0.81	1.56	2.36	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	35.43	0.29	0.30	0.39
A-5	0.16	0.15	0.31	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	51.63	0.43	0.44	0.51
A-6	0.88	0.18	1.06	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	83.51	0.70	0.72	0.76
A-7	1.13	0.28	1.41	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	80.58	0.67	0.70	0.74
A-8	0.89	1.08	1.96	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	46.23	0.38	0.40	0.47
A-9	1.07	0.21	1.28	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	83.79	0.70	0.73	0.76
A-10	0.14	0.03	0.17	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	83.08	0.70	0.72	0.76
B-1	0.16	0.05	0.20	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	78.38	0.66	0.68	0.72
B-2	0.07	0.02	0.09	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	78.70	0.66	0.68	0.72
B-3	0.07	0.02	0.09	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	77.63	0.65	0.67	0.72
B-4	0.14	0.04	0.18	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	77.73	0.65	0.67	0.72
B-5	0.18	0.03	0.21	A	100	0.84	0.87	0.89	2	0.01	0.01	0.13	87.94	0.74	0.76	0.80



TIME OF CONCENTRATION														REMARKS	
LOCATION: 38th Ave Himalaya to Odessa			Final Drainage Report			BY: CAP			DATE: 3/6/2020			FORMULAS:			
BASIN DATA			INIT./OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					TOTAL	Tc Check		FINAL Tc	* Ti = 0.395 (1.1-C5)L^0.5/S^1/3  (USDCM Volume 1 Equation 6-3)  ** V=Cv(Sw^1/2)  where Cv=15 for grassed waterways and 20 for paved areas  (USDCM Volume 1 Equation 6-4)
DESIGNATION	C5	AREA (AC)	LENGTH (FT)	SLOPE %	Ti (Min.)*	GRASS/PAVED	LENGTH (FT)	SLOPE %	VEL. (FPS)**	Tt(Min.)	Ti+Tt(Min.)	LENGTH (FT)	Urbanized Basins	(minutes)	
DEVELOPED															
A-1	0.53	1.20	145	5.2	7.3	PAVED	699	0.9	1.9	6.3	13.6	843.40	13.7	13.6	
A-2	0.29	2.81	44	5.5	5.6	GRASS	1356	0.8	1.4	16.4	22.0	1399.80	16.8	16.8	(USDCM Volume 1 Equation 6-4)
A-3	0.37	1.67	169	1.5	15.3	GRASS	813	0.5	1.1	12.4	27.7	981.60	16.7	16.7	
A-4	0.30	2.36	40	5.9	5.2	GRASS	733	0.6	1.2	10.4	15.5	773.46	17.9	15.5	
A-5	0.44	0.31	56	6.6	4.9	PAVED	148	0.5	1.5	1.7	6.5	204.40	16.5	6.5	
A-6	0.72	1.06	18	2.0	2.4	PAVED	816	0.7	1.7	8.1	10.5	834.00	10.3	10.3	
A-7	0.69	1.41	24	2.0	2.9	PAVED	785	0.8	1.8	7.3	10.2	808.90	10.7	10.2	
A-8	0.39	1.96	70	16.5	4.3	PAVED	818	0.8	1.8	7.6	11.9	888.18	16.0	11.9	
A-9	0.72	1.28	24	2.0	2.7	PAVED	816	0.8	1.8	7.6	10.3	839.88	10.1	10.1	
A-10	0.71	0.17	18	2.0	2.4	PAVED	162	0.6	1.6	1.7	4.1	179.70	11.2	5.0	
B-1	0.67	0.20	54	9.0	2.8	PAVED	141	0.8	1.8	1.3	4.1	195.20	12.0	5.0	
B-2	0.67	0.09	30	8.0	2.1	PAVED	29	2.8	3.3	0.1	2.3	58.80	12.0	5.0	
B-3	0.67	0.09	21	2.7	2.6	PAVED	49	2.0	2.8	0.3	2.9	70.60	12.2	5.0	
B-4	0.67	0.18	35	2.7	3.4	PAVED	92	1.5	2.5	0.6	4.0	127.60	12.0	5.0	
B-5	0.75	0.21	38	2.0	3.1	PAVED	150	0.8	1.8	1.4	4.5	188.05	10.4	5.0	

# STORM DRAINAGE SYSTEM DESIGN



(RATIONAL METHOD PROCEDURE)

DESIGN STORM: 2-YEAR DEVELOPED

CAP

BKM

LOCATION:

38th Ave Himalaya to Odessa

Final Drainage Report

City of Aurora

3/6/2020

STRUCTURE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF					REMARKS
		BASIN	AREA (AC)	COEFF. (C)	Tc (Min.)	C*A	I (in./hr.)	Q (cfs)	SUM AREA	SUM Tc (min.)	I (in./hr.)	SUM CA	TOTAL Q (cfs)	
		DEVELOPED												
IN-1	1	A-1	1.20	0.53	13.6	0.63	2.28	1.4						
IN-2	2	A-2	2.81	0.29	16.8	0.81	2.06	1.7						
IN-3	3	A-3	1.67	0.37	16.7	0.62	2.07	1.3						
IN-4	4	A-4	2.36	0.30	15.5	0.70	2.14	1.5						
IN-5	5	A-5	0.31	0.44	6.5	0.14	3.02	0.4						
IN-6	6	A-6	1.06	0.72	10.3	0.76	2.57	1.9						
IN-7	7	A-7	1.41	0.69	10.2	0.97	2.58	2.5						
IN-8	8	A-8	1.96	0.39	11.9	0.77	2.42	1.9						
IN-9	9	A-9	1.28	0.72	10.1	0.92	2.58	2.4						
IN-10	10	A-10	0.17	0.71	5.0	0.12	3.26	0.4						
	B1	B-1	0.20	0.67	5.0	0.14	3.26	0.4						
	B2	B-2	0.09	0.67	5.0	0.06	3.26	0.2						
	B3	B-3	0.09	0.67	5.0	0.06	3.26	0.2						
	B4	B-4	0.18	0.67	5.0	0.12	3.26	0.4						
	B5	B-5	0.21	0.75	5.0	0.16	3.26	0.5						



# STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

DESIGN STORM: 100-YEAR DEVELOPED

CAP

BKM

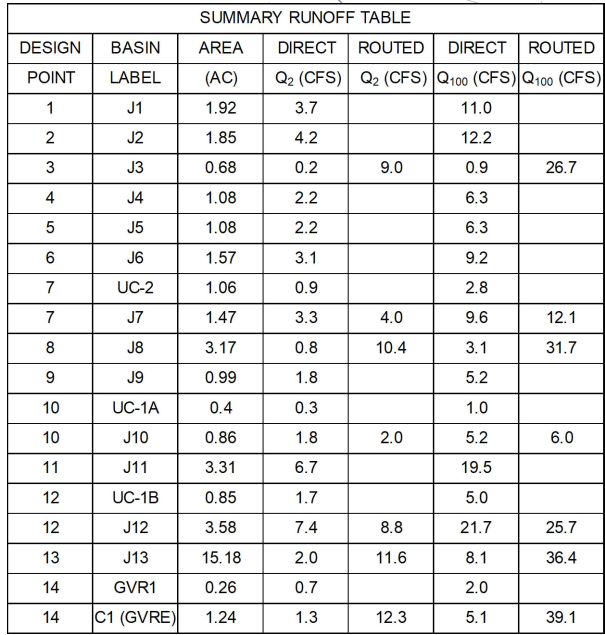
LOCATION:

38th Ave Himalaya to Odessa

Final Drainage Report

City of Aurora 3/6/2020

STRUCTURE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF					REMARKS
		BASIN	AREA (AC)	COEFF. (C)	Tc (Min.)	C*A	I (in./hr.)	Q (cfs)	SUM AREA	SUM Tc (min.)	I (in./hr.)	SUM CA	TOTAL Q (cfs)	
		DEVELOPED												
IN-1	1	A-1	1.20	0.59	13.6	0.71	6.18	4.4						
IN-2	2	A-2	2.81	0.38	16.8	1.06	5.58	5.9						
IN-3	3	A-3	1.67	0.45	16.7	0.76	5.60	4.2						
IN-4	4	A-4	2.36	0.39	15.5	0.91	5.81	5.3						
IN-5	5	A-5	0.31	0.51	6.5	0.16	8.17	1.3						
IN-6	6	A-6	1.06	0.76	10.3	0.81	6.96	5.6						
IN-7	7	A-7	1.41	0.74	10.2	1.04	6.99	7.3						
IN-8	8	A-8	1.96	0.47	11.9	0.92	6.55	6.1						
IN-9	9	A-9	1.28	0.76	10.1	0.97	7.00	6.8						
IN-10	10	A-10	0.17	0.76	5.0	0.13	8.82	1.1						
	B1	B-1	0.20	0.72	5.0	0.15	8.82	1.3						
	B2	B-2	0.09	0.72	5.0	0.07	8.82	0.6						
	B3	B-3	0.09	0.72	5.0	0.07	8.82	0.6						
	B4	B-4	0.18	0.72	5.0	0.13	8.82	1.1						
	B5	B-5	0.21	0.80	5.0	0.17	8.82	1.5						



DRAWN BY: KLH JOB DATE: 1/19/2021 BAR IS ONE INCH ON  
APPROVED: RWL JOB NUMBER: 181211.23 OFFICIAL DRAWINGS.  
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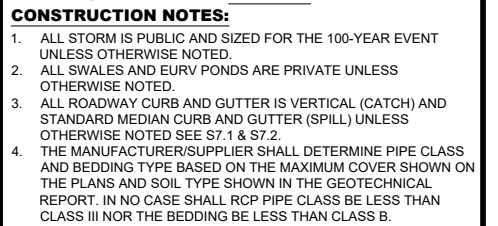
NO.	DATE	BY	REVISION DESCRIPTION



# 38TH AVENUE PRELIMINARY DRAINAGE REPORT

## DRAINAGE PLAN

2



- FLOODPLAIN NOTES:**
1. EFFECTIVE FLOODPLAIN INFORMATION SHOWN TAKEN FROM PANELS 08005C0664L & 08001C0665J, EFFECTIVE 2/17/2017.
  2. CLOMR CASE NO. 20-08-0166R WAS APPROVED ON 7/21/2020 FOR PHASE I IMPROVEMENTS SHOWN ON THESE PLANS ASSOCIATED WITH THE EXISTING FIRST CREEK FLOODPLAIN AND FLOODWAY.
  3. A CLOMR OR NO-RISE CERTIFICATION IS REQUIRED WITH PHASE II FINAL DESIGN FOR FOR THE 38TH AVENUE CROSSING OF FIRST CREEK.
  4. A CLOMR OR NO-RISE CERTIFICATION IS REQUIRED WITH PHASE III FINAL DESIGN OF THE 38TH AVENUE CROSSING OF TRIBUTARY T AND ASSOCIATED IMPROVEMENTS.
  5. REGARDLESS OF PHASE, NO WORK CAN OCCUR WITHIN THE FLOODPLAIN WITHOUT AN APPROVED FLOODPLAIN DEVELOPMENT PERMIT.

PROPOSED MAJOR CONTOUR —5250—

PROPOSED MINOR CONTOUR —

PROP. MAJOR CONTOUR (SEPARATE PHASE) —5250—

PROP. MINOR CONTOUR (SEPARATE PHASE) —

EXISTING MAJOR CONTOUR ---5250---

EXISTING MINOR CONTOUR ---

EASEMENT \_ \_ \_ \_ \_

PROPOSED BASIN LINE

MASTER BASIN LINE (PER MDR)

MASTER BASIN LINE (UPDATED)

DESIGN POINT 

FLOW ARROW 

EFFECTIVE 100-YR FLOODPLAIN — · · · —

EFFECTIVE 100-YR FLOODWAY — · · · —

EMERGENCY OVERTFLOW ARROW 

PROPOSED BASIN LABEL

C-6

1.00 .40 .60

BASIN DESIGNATION  
MINOR 2-YR  
RUNOFF COEFF.  
MAJOR 100-YR  
RUNOFF COEFF.

ORIGINAL MASTER BASIN LABEL

507

1.00 50.1 % IMPERV.

BASIN DESIGNATION

REVISSED MASTER BASIN LABEL

507

1.00 50.1 % IMPERV.

BASIN DESIGNATION

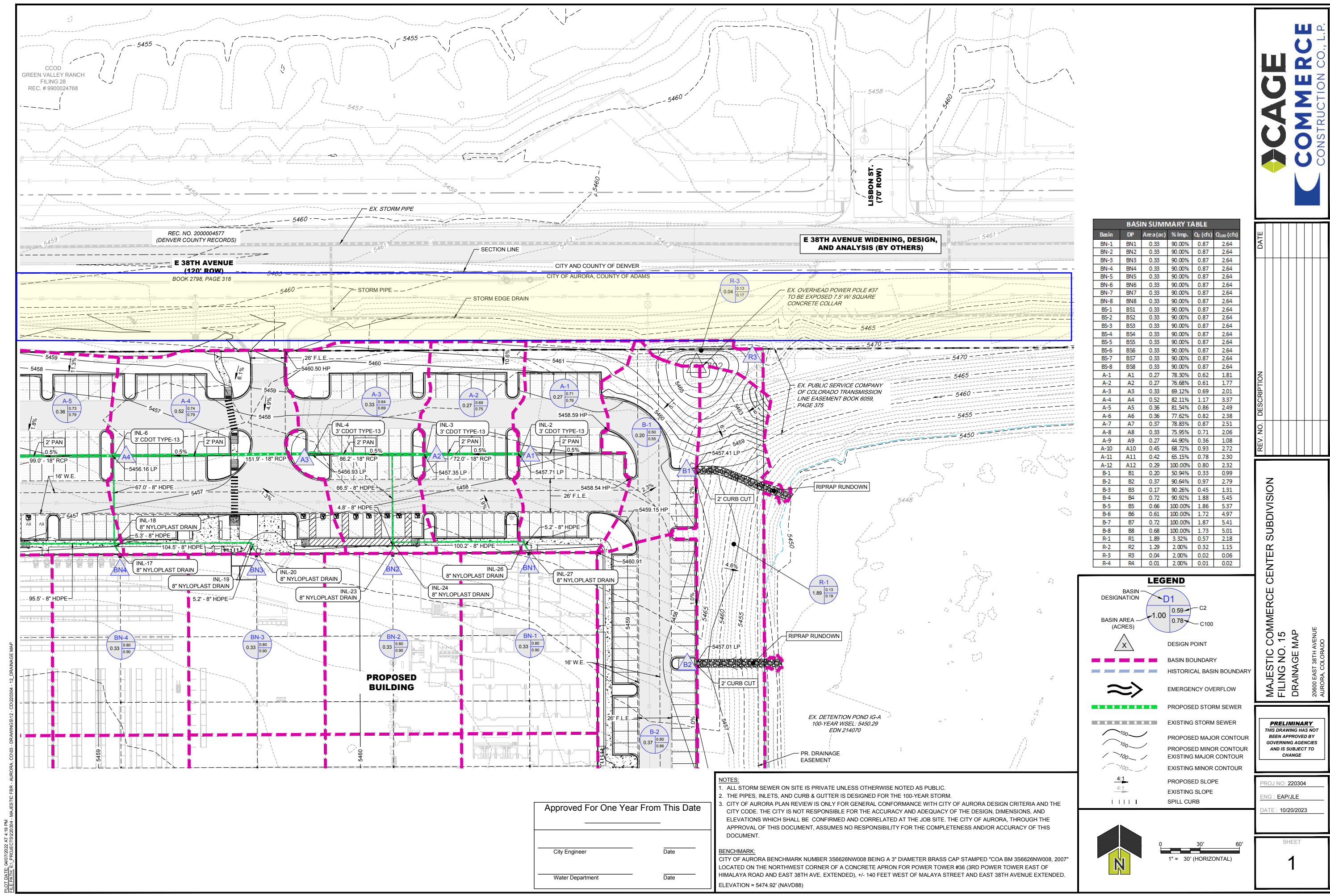
AREA (AC.)

PHASE I	PHASE II	PHASE III
<p>CITY OF AURORA PLAN REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH CITY OF AURORA DESIGN CRITERIA AND THE CITY CODE. THE CITY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND ELEVATIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.</p>		

ENSURE THAT THE PROVISIONS OF CRS 37-92-602, AS AMMENDED BY SENATE BILL 15-212, REGARDING NOTIFICATION OF DOWNSTREAM WATER RIGHTS HOLDERS ARE UPHELD

**SITE BENCHMARK:**  
CITY OF AURORA BENCHMARK 3S6636NE003 BEING A 3"  
DIAM. BRASS CAP (COA BM, 19-020B, E-090A) ATOP  
THE S. WALL @ THE S.E. COR. OF THE E. 26TH AVE.  
BRIDGE CROSSING OVER E-470. BRASS CAP AT LOWER  
STEP ON WALL WHERE THE RAILING ENDS ON THE E.  
END. AK4 19-020B.

ELEVATION = 5521.54 (NAVD88)



BASIN SUMMARY TABLE						
Basin	DP	Area (ac)	% Imp.	Q <sub>2</sub> (cfs)	Q <sub>100</sub> (cfs)	
BN-1	BN1	0.33	90.00%	0.87	2.64	
BN-2	BN2	0.33	90.00%	0.87	2.64	
BN-3	BN3	0.33	90.00%	0.87	2.64	
BN-4	BN4	0.33	90.00%	0.87	2.64	
BN-5	BN5	0.33	90.00%	0.87	2.64	
BN-6	BN6	0.33	90.00%	0.87	2.64	
BN-7	BN7	0.33	90.00%	0.87	2.64	
BN-8	BN8	0.33	90.00%	0.87	2.64	
BS-1	BS1	0.33	90.00%	0.87	2.64	
BS-2	BS2	0.33	90.00%	0.87	2.64	
BS-3	BS3	0.33	90.00%	0.87	2.64	
BS-4	BS4	0.33	90.00%	0.87	2.64	
BS-5	BS5	0.33	90.00%	0.87	2.64	
BS-6	BS6	0.33	90.00%	0.87	2.64	
BS-7	BS7	0.33	90.00%	0.87	2.64	
BS-8	BS8	0.33	90.00%	0.87	2.64	
A-1	A1	0.27	78.30%	0.62	1.81	
A-2	A2	0.27	76.68%	0.61	1.77	
A-3	A3	0.33	69.12%	0.69	2.01	
A-4	A4	0.52	82.11%	1.17	3.37	
A-5	A5	0.36	81.54%	0.86	2.49	
A-6	A6	0.36	77.62%	0.82	2.38	
A-7	A7	0.37	78.83%	0.87	2.51	
A-8	A8	0.33	75.95%	0.71	2.06	
A-9	A9	0.27	44.90%	0.36	1.08	
A-10	A10	0.45	68.72%	0.93	2.72	
A-11	A11	0.42	65.15%	0.78	2.30	
A-12	A12	0.29	100.00%	0.80	2.32	
B-1	B1	0.20	50.94%	0.33	0.99	
B-2	B2	0.37	90.64%	0.97	2.79	
B-3	B3	0.17	90.26%	0.45	1.31	
B-4	B4	0.72	90.92%	1.88	5.45	
B-5	B5	0.66	100.00%	1.86	5.37	
B-6	B6	0.61	100.00%	1.72	4.97	
B-7	B7	0.72	100.00%	1.87	5.41	
B-8	B8	0.68	100.00%	1.73	5.01	
R-1	R1	1.89	3.32%	0.57	2.18	
R-2	R2	1.29	2.00%	0.32	1.15	
R-3	R3	0.04	2.00%	0.02	0.06	
R-4	R4	0.01	2.00%	0.01	0.02	

**LEGEND**

BASIN DESIGNATION: D1, C2, C100

BASIN AREA (ACRES): 1.00, 0.59, 0.78

DESIGN POINT: X

BASIN BOUNDARY: Dashed line

HISTORICAL BASIN BOUNDARY: Solid line

EMERGENCY OVERFLOW: Wavy arrow

PROPOSED STORM SEWER: Thick dashed line

EXISTING STORM SEWER: Thin dashed line

PROPOSED MAJOR CONTOUR: Solid line with elevation

PROPOSED MINOR CONTOUR: Dashed line with elevation

EXISTING MAJOR CONTOUR: Solid line with elevation

EXISTING MINOR CONTOUR: Dashed line with elevation

PROPOSED SLOPE: 4:1

EXISTING SLOPE: 4:1

SPILL CURB: Line with cross-ticks

**NOTES:**

- ALL STORM SEWER ON SITE IS PRIVATE UNLESS OTHERWISE NOTED AS PUBLIC.
- THE PIPES, INLETS, AND CURB & GUTTER IS DESIGNED FOR THE 100-YEAR STORM.
- CITY OF AURORA PLAN REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH CITY OF AURORA DESIGN CRITERIA AND THE CITY CODE. THE CITY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND ELEVATIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

**BENCHMARK:**  
CITY OF AURORA BENCHMARK NUMBER 3S6626NW008 BEING A 3" DIAMETER BRASS CAP STAMPED "COA BM 3S6626NW008, 2007" LOCATED ON THE NORTHWEST CORNER OF A CONCRETE APRON FOR POWER TOWER #36 (3RD POWER TOWER EAST OF HIMALAYA ROAD AND EAST 38TH AVE. EXTENDED), +/- 140 FEET WEST OF MALAYA STREET AND EAST 38TH AVENUE EXTENDED. ELEVATION = 5474.92' (NAVD88)

Approved For One Year From This Date

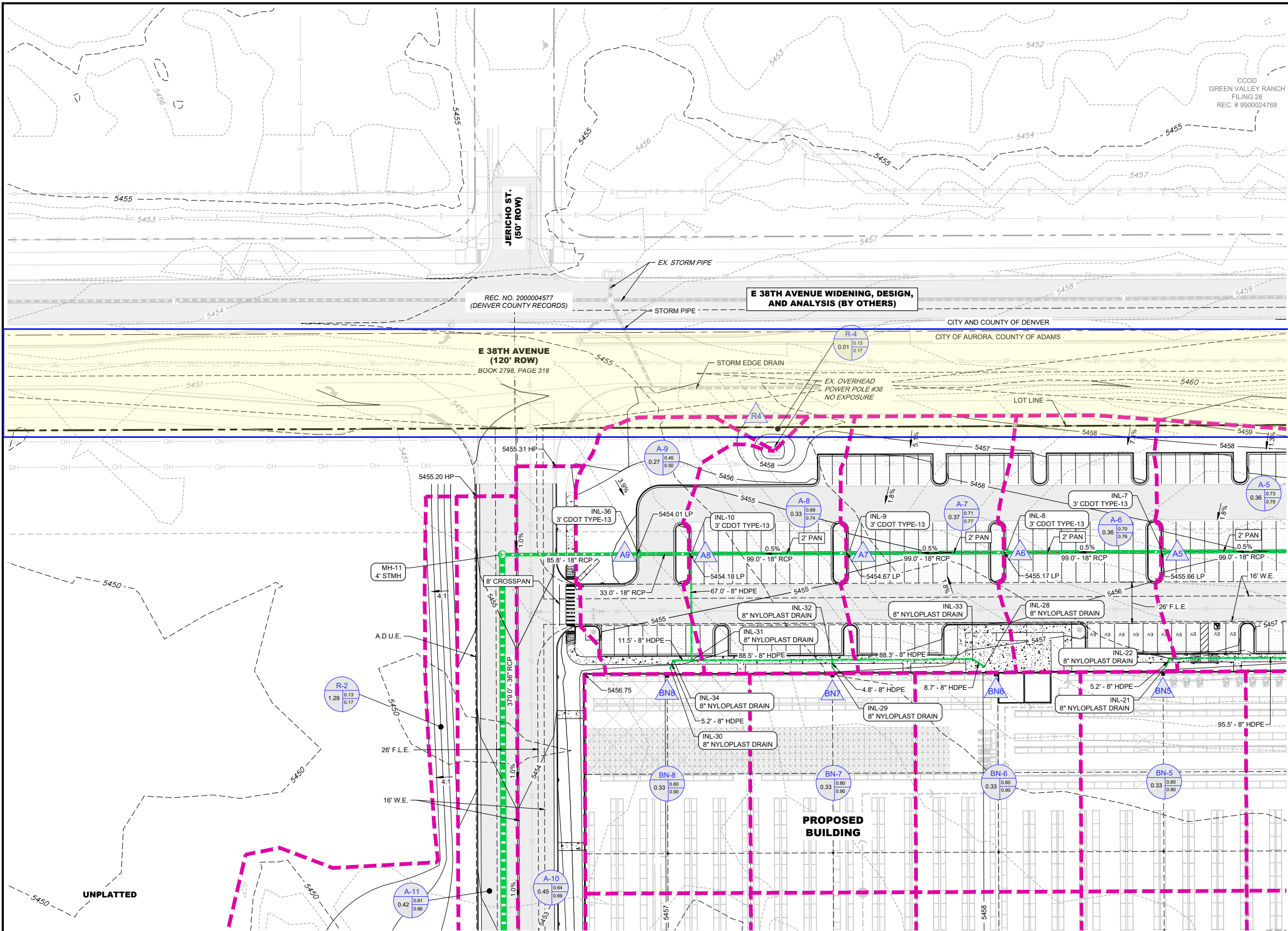
City Engineer	Date
Water Department	Date

MAJESTIC COMMERCE CENTER SUBDIVISION  
FILING NO. 15  
DRAINAGE MAP  
20600 EAST 38TH AVENUE  
AURORA, COLORADO

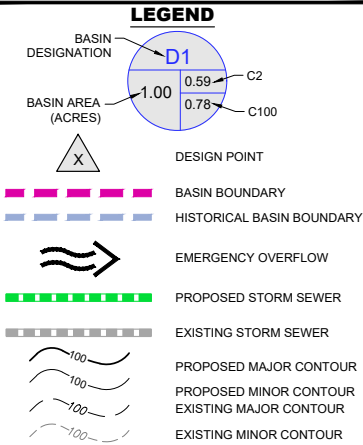
**PRELIMINARY**  
THIS DRAWING HAS NOT  
BEEN APPROVED BY  
GOVERNING AGENCIES  
AND IS SUBJECT TO  
CHANGE

PROJ NO: 220304  
ENG: EAP/JLE  
DATE: 10/20/2023

PLOT DATE: 04/07/2022 AT 4:19 PM  
FILE PATH: E:\PROJECTS\220304 - MAJESTIC FBR - AURORA, CO\03 - DRAWINGS\12 - CD\220304 - 12 - DRAINAGE MAP



BASIN SUMMARY TABLE					
Basin	DP	Area (ac)	% Imp.	Q <sub>2</sub> (cfs)	Q <sub>100</sub> (cfs)
BN-1	BN1	0.33	90.00%	0.87	2.64
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BN-7	BN7	0.33	90.00%	0.87	2.64
BN-8	BN8	0.33	90.00%	0.87	2.64
B5-1	B51	0.33	90.00%	0.87	2.64
B5-2	B52	0.33	90.00%	0.87	2.64
B5-3	B53	0.33	90.00%	0.87	2.64
B5-4	B54	0.33	90.00%	0.87	2.64
B5-5	B55	0.33	90.00%	0.87	2.64
B5-6	B56	0.33	90.00%	0.87	2.64
B5-7	B57	0.33	90.00%	0.87	2.64
B5-8	B58	0.33	90.00%	0.87	2.64
A-1	A1	0.27	78.30%	0.62	1.81
A-2	A2	0.27	76.68%	0.61	1.77
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A-12	A12	0.29	100.00%	0.80	2.32
B-1	B1	0.20	50.94%	0.33	0.99
B-2	B2	0.37	90.64%	0.97	2.79
B-3	B3	0.17	90.26%	0.45	1.31
B-4	B4	0.72	90.92%	1.88	5.45
B-5	B5	0.66	100.00%	1.86	5.37
B-6	B6	0.61	100.00%	1.72	4.97
B-7	B7	0.72	100.00%	1.87	5.41
B-8	B8	0.68	100.00%	1.73	5.01
R-1	R1	1.89	3.32%	0.57	2.18
R-2	R2	1.29	2.00%	0.32	1.15
R-3	R3	0.04	2.00%	0.02	0.06
R-4	R4	0.01	2.00%	0.01	0.02



- NOTES:
1. ALL STORM SEWER ON SITE IS PRIVATE UNLESS OTHERWISE NOTED AS PUBLIC.
  2. THE PIPES, INLETS, AND CURB & GUTTER IS DESIGNED FOR THE 100-YEAR STORM.
  3. CITY OF AURORA PLAN REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH CITY OF AURORA DESIGN CRITERIA AND THE CITY CODE. THE CITY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND ELEVATIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

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DATE	
REV. NO.	DESCRIPTION

MAJESTIC COMMERCE CENTER SUBDIVISION  
FILING NO. 15  
DRAINAGE MAP

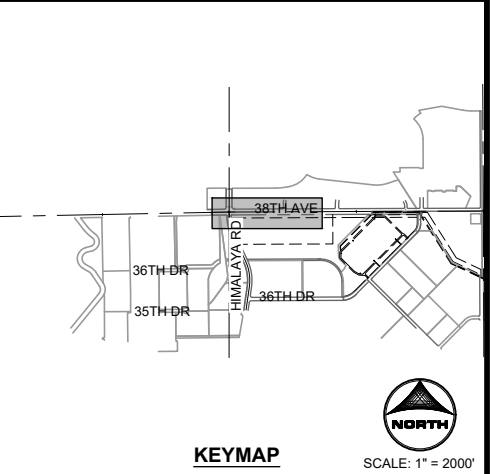
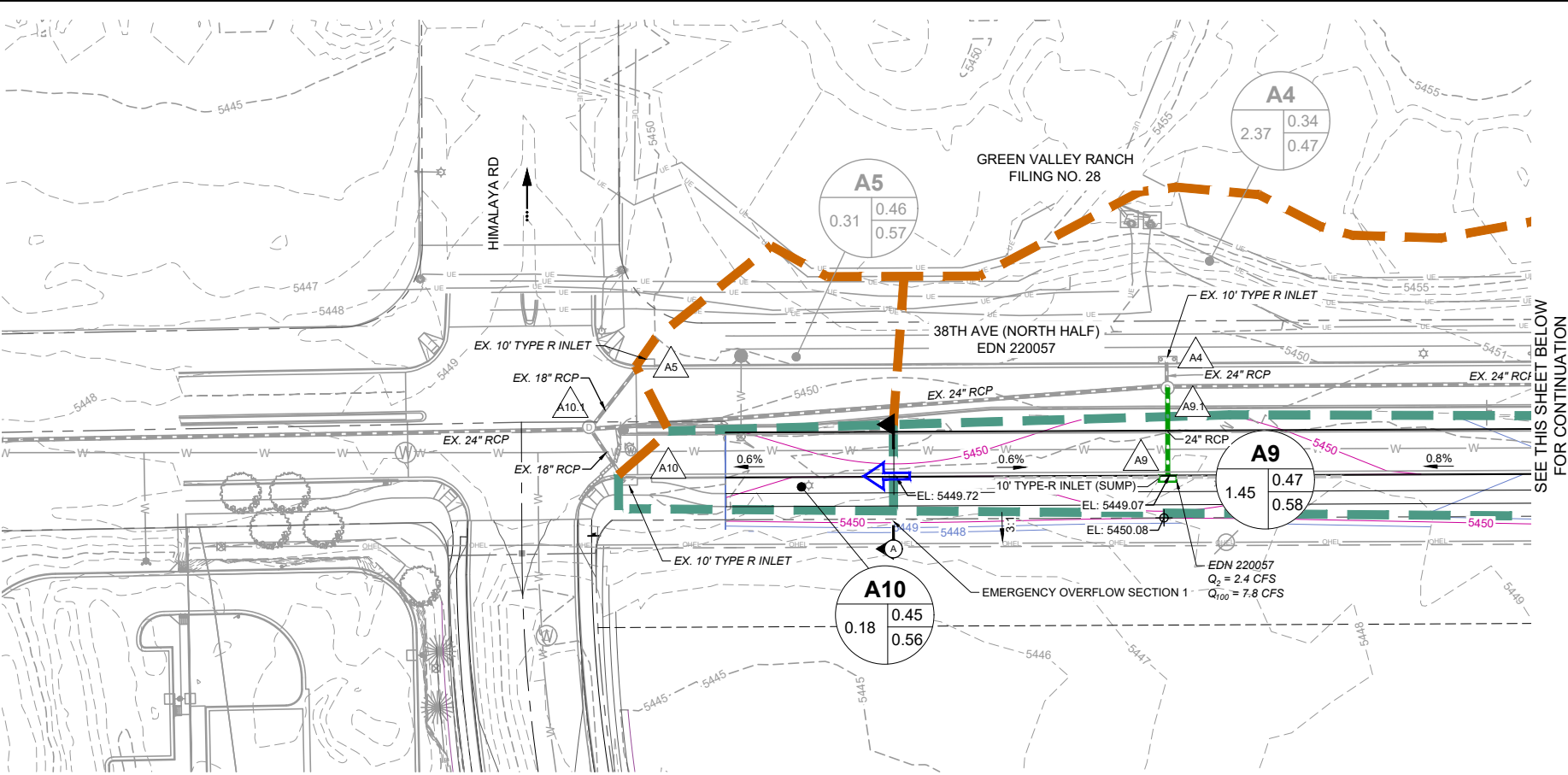
20600 EAST 38TH AVENUE  
AURORA, COLORADO

**PRELIMINARY**  
THIS DRAWING HAS NOT  
BEEN APPROVED BY  
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AND IS SUBJECT TO  
CHANGE

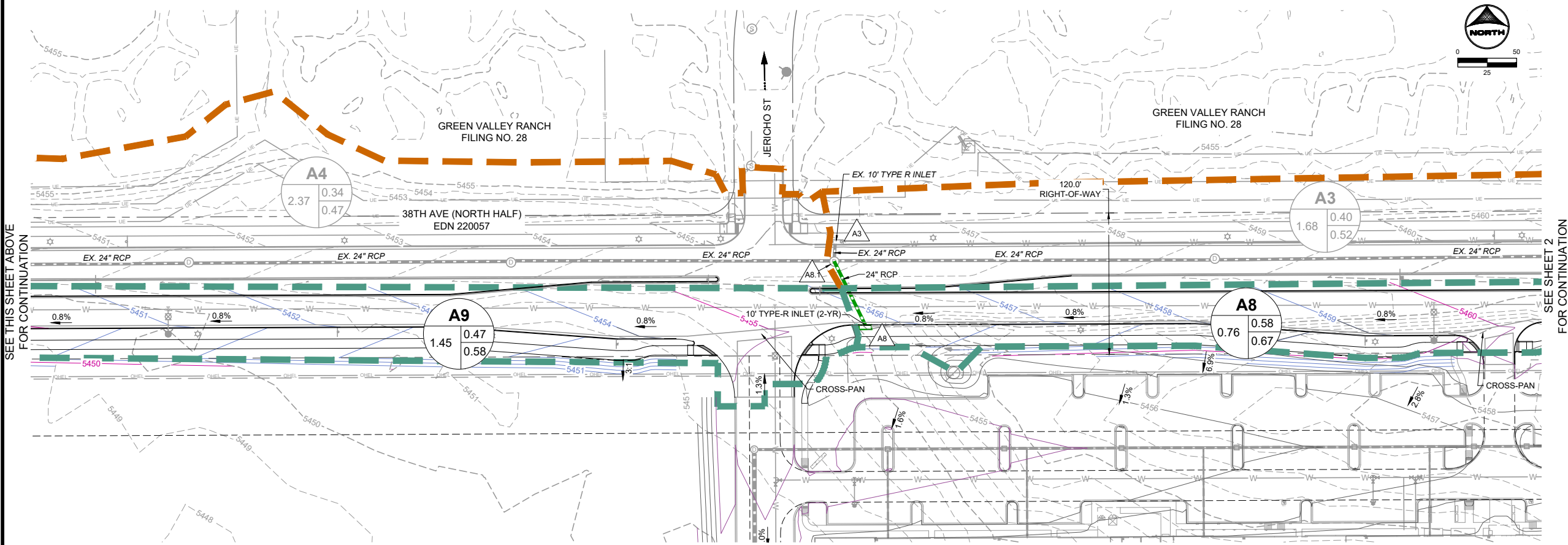
PROJ NO: 220304  
ENG: EAP/JLE  
DATE: 10/20/2023

SHEET  
**1**

SUMMARY RUNOFF TABLE							
DESIGN POINT	BASIN LABEL	PERCENT IMP. (%)	AREA (AC)	DIRECT Q <sub>2</sub> (CFS)	ROUTED Q <sub>2</sub> (CFS)	DIRECT Q <sub>100</sub> (CFS)	ROUTED Q <sub>100</sub> (CFS)
B1	B1	52.5	0.48	0.4	-	1.6	-
B5	B5	62.6	0.39	0.5	-	1.8	-
-	-	0.0	-	-	-	-	-
A1	A1	65.8	1.20	1.3	-	4.4	-
A2	A2	44.8	2.81	1.7	-	6.6	-
A3	A3	52.1	1.68	1.2	-	4.5	-
A4	A4	45.6	2.37	1.6	-	6.3	-
A5	A5	58.7	0.31	0.4	-	1.4	-
A6	A6	65.6	1.07	1.1	-	3.9	-
A6.1	-	59.9	-	-	2.4	-	8.2
A7	A7	69.6	1.73	1.6	-	5.7	-
A7.1	-	72.2	-	-	5.2	-	19.0
A7.2	A7.2	60.2	0.27	0.4	-	1.2	-
A7.3	-	58.3	-	-	5.5	-	19.9
A8	A8	0.0	0.76	0.9	-	3.0	-
A8.1	-	86.2	-	-	7.4	-	27.0
A9	A9	93.4	1.45	1.3	-	4.8	-
A9.1	-	94.5	-	-	10.1	-	37.0
A10	A10	87.8	0.18	0.2	-	0.7	-
A10.1	-	0.0	-	-	10.5	-	38.4



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  - ALL CURB AND GUTTER WITHIN THIS FILING IS VERTICAL UNLESS OTHERWISE NOTED.
  - THE MANUFACTURER/SUPPLIER SHALL DETERMINE PIPE CLASS AND BEDDING TYPE BASED ON THE MAXIMUM COVER SHOWN ON THE PLANS AND SOIL TYPE SHOWN IN THE GEOTECHNICAL REPORT. IN NO CASE SHALL RCP PIPE CLASS BE LESS THAN CLASS III NOR THE BEDDING BE LESS THAN CLASS B.
  - ALL STORM INFRASTRUCTURE IS PUBLIC, MAINTAINED BY THE CITY, AND IS SIZED FOR THE 100-YEAR EVENT UNLESS OTHERWISE NOTED.
  - 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.
  - SEE STORMWATER MANAGEMENT PLANS (SWMP) WITHIN THE CONSTRUCTION DOCUMENTS FOR COMPLETE STORMWATER MANAGEMENT CONTROLS AND DETAILS.



- LEGEND:**
- EXISTING MAJOR CONTOUR --- 5050 ---
  - EXISTING MINOR CONTOUR --- 5045 ---
  - PROPOSED MAJOR CONTOUR --- 5250 ---
  - PROPOSED MINOR CONTOUR --- 5250 ---
  - FUTURE MAJOR CONTOUR --- 5250 ---
  - FUTURE MINOR CONTOUR --- 5250 ---
  - STORM LINE --- 5250 ---
  - PROPOSED BASIN LINE --- 5250 ---
  - BASIN LINE BY OTHERS --- 5250 ---
  - OVERLAND FLOW ARROW --- 5250 ---
  - EMERGENCY OVERFLOW ARROW --- 5250 ---
  - PROPOSED BASIN LABEL --- 5250 ---
  - BASIN DESIGNATION --- 5250 ---
  - AREA (AC.) --- 5250 ---
  - MINOR 2-YR RUNOFF COEF. --- 5250 ---
  - MAJOR 100-YR RUNOFF COEF. --- 5250 ---
  - DESIGN POINT --- 5250 ---

**SITE BENCHMARK:**  
CITY OF AURORA BENCHMARK 3S6626NW008 BEING A 3" DIAM. BRASS CAP STAMPED "COA BM 3S6626NW008, 2007" LOCATED ON THE NORTHWEST CORNER OF A CONCRETE APRON FOR POWER TOWER #36 (3RD POWER TOWER EAST OF HIMALAYA ROAD AND EAST 38TH AVE. EXTENDED), +/- 140 FEET WEST OF HIMALAYA STREET AND EAST 38TH AVENUE EXTENDED  
ELEVATION = 5474.92 (NAVD88)

DRAWN BY: TMM  
APPROVED: KLH  
CAD DATE: 11/22/2023  
CAD FILE: J:\2022\2202959\CAD\Drawings\Exhibits\2023-10-27 38th\_PDR

JOB DATE: 11/20/2023  
JOB NUMBER: 2202959

BAR IS ONE INCH ON OFFICIAL DRAWINGS.  
IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

NO.	DATE	BY	REVISION DESCRIPTION



HIMALAYA ROAD  
TOWER METROPOLITAN DISTRICT  
AURORA, COLORADO

38TH AVENUE PRELIMINARY DRAINAGE REPORT  
PRELIMINARY DRAINAGE PLAN

SHEET  
DR1

1

