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**MASTER UTILITY REPORT  
FOR  
Green Valley Master Plan Amendment 2**

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December 22, 2021  
March 1, 2022  
May 24, 2022  
December 22, 2022  
April 14, 2023  
October 23, 2023  
January 26, 2024  
May 17, 2024  
November 22, 2024

Prepared for:

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Phone: 720-975-0177

## CITY OF AURORA APPROVAL BLOCK

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City Engineer

Date

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Aurora Water Department

Date

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Aurora Fire Department

Date



Job No. 50145755

**Master Utility Report  
For  
Green Valley Master Plan Amendment 2**

**Engineer's Certification**

*"This Master Utility Report for the design of the Green Valley Master Plan Amendment 2 was prepared by me or under my direct supervision in accordance with Aurora Water's Standards and Specifications and acceptable professional practices of the industry. We acknowledge that Aurora Water's review of this Utility Study is only for general conformance with submittal requirements, current design criteria and standard engineering principles and practices.*

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Kenneth S. Cecil, PE,  
Licensed Professional Engineer  
State of Colorado  
No. 36209

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Date



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Windler Master Utility Maps  
Skydance Master Utility Maps  
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### **APPENDIX B – WATER SYSTEM**

Total Water Demand  
Model Schematic  
System Model Results: Average Day, Max Daily, Max Hour, and Fire Flow Analyses

### **APPENDIX C – SANITARY SEWER CALCULATIONS**

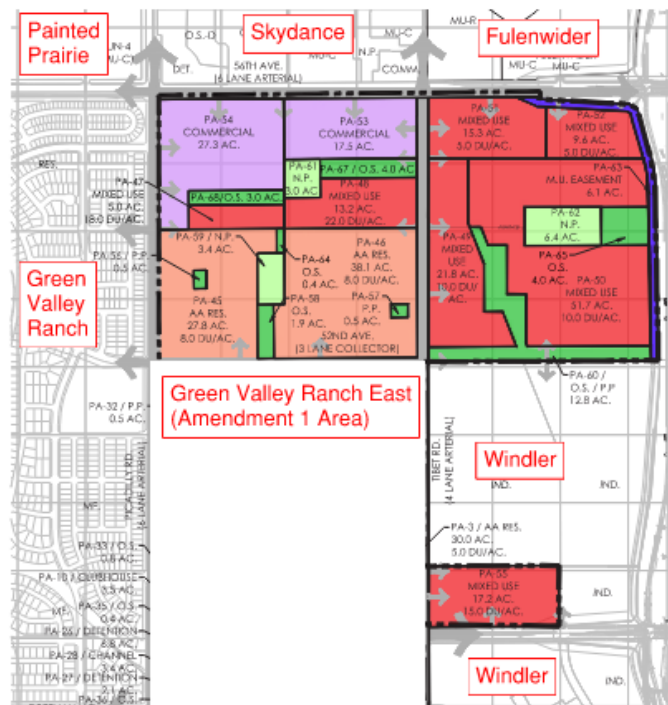
Sanitary Sewer Design Flows  
Sanitary Sewer Routing  
Sanitary Routing Schematic  
Sanitary Sewer FlowMaster Calculations  
2nd Creek Sanitary Sewer Routing  
2nd Creek Sanitary Sewer Schematic  
2nd Creek Sewer FlowMaster Calculations

***WATER AND SANITARY MAPS ~ ATTACHED***

## I. INTRODUCTION

The purpose of this report is to provide a guide for Aurora Water and the developer to use for the planning and design of the proposed sanitary and water facilities for the proposed Green Valley Master Plan Amendment 2 Development. This report does not address water treatment, storage, water rights, or attempt to critique the existing water systems. The narrative provides a description of the project, methodology utilized for analyses and summarizes the sanitary and water line infrastructure needed to serve the proposed uses and density within the Development. Green Valley Master Plan Amendment 2 will be referred to as “Site”, “Project” or “Development” within the body of the report.

The Site is an extension of the Green Valley Ranch East (GVRE) development generally located north of 38th Avenue, west of E-470 and the Windler Development, south of 52nd Avenue and east of Picadilly Road. An overall exhibit, which is an elaboration of Tab 8.4 of the Master Plan document depicting the GVRE development (Amendment 1) within the red dash line and this Project (Green Valley Ranch East Amendment 2) within the cyan solid line, is provided within the Appendix of this Report for reference with a snippet located to the right. A Master Utility Report (MUR) was completed as a portion of the Master Planning process for Amendment 1 and portions of that MUR are included within the Appendix for reference. The portions of the Site tributary to the improvements within the Amendment 1 were anticipated and specifically, the sanitary sewer impacts of sub-basins 310-1 through 310-4 of the Report. Most of the planning areas within Amendment 1 are constructed, under construction, or in-process with the City of Aurora at the time of this Report and therefore, the infrastructure requirements with those planning areas are assumed to be existing. Brief discussion has been provided within this Report pertaining to this Site (Amendment 2) and the impacts to the Amendment 1 infrastructure, if any. Should any assumed existing Amendment 1 infrastructure not be existing and is needed for the development of the specific Planning Area and basins herein, the Site Planning Area would be responsible for the development of the infrastructure consistent with the Amendment 2 PIP.



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## **II. GENERAL LOCATION AND DESCRIPTION**

### **A. Location of Property**

The Project is generally located at the southeast corner of the Picadilly Road and 56th Avenue intersection and is bound by 56th Avenue to the north, Picadilly Road to the west, E-470 to the east and the Green Valley Ranch East and Windler Developments to the south. The Site is located within the North Half of Section 13, Township 3 South, Range 66 West of the 6th Principal Meridian in the City of Aurora, County of Adams, State of Colorado.

### **B. Description of the Proposed Project**

The Project comprises approximately 289.1 acres with a mix of proposed uses including residential, mixed-use, and commercial with associated amenities, parks, and open spaces. The residential uses west of Tibet Road are anticipated to be age targeted and will be developed as an extension of the Green Valley Ranch East community. This will occur via a greenway connection with pedestrian crossing, along with similar available housing types. The Project has been divided in to Planning Areas (PAs), as presented within the attached Master Utility Maps, to identify the areas and uses planned within the Site. Planning Areas 45 and 46 are residential use, PAs 47 to 52 and 55 are mixed-use, PAs 53 and 54 are commercial use, and PAs 56 to 68 are parks and open space. Civil infrastructure will be developed to support the Project in the form of roadways, water distribution system, sanitary sewer system and storm sewer system.

### **C. Adjacent Areas**

The Green Valley Master Plan Amendment 2 development is surrounded by existing and in-process developments in both the City of Aurora and the City and County of Denver. The centerline of Picadilly Road serves as the municipal boundary between Aurora and Denver and the Green Valley Ranch subdivision within the City and County of Denver is located west of the Site. Green Valley Ranch East Filing No. 5 and Filing No. 17 (in design) are directly south of 52nd Avenue and west of Tibet Road. The Windler development is south of the Project and east of Tibet Road and is in the early stages of processing with the City of Aurora. The Sky Dance (Moffit Parcel) Development is the approximate southwest quarter section of Section 12, north of 56th Avenue, and is within the infrastructure civil plan review process Master Plan process with Aurora at the time of this Report. Finally, a portion of the Fulenwider Development consisting of the southeast quarter section of Section 12 is north of 56th Avenue and is within the Master Plan process with the City of Aurora. E-470 and the associated 56th Avenue interchange are directly northeast of the Project.

## **III. EXISTING WATER AND SANITARY SEWER INFRASTRUCTURE**

**Water:** An existing 24-inch steel water main owned and operated by Aurora Water is within the existing 56<sup>th</sup> Avenue ROW along the entirety of the Site's northern boundary. The 24-inch steel line was designed by Dewberry Engineers, Inc. and the construction plans were made available for reference during the development of this Report. Aurora

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Water identified this 24-inch main as a desired connection location for the Green Valley Master Plan Amendment 2 development. A 12-inch PVC water main was developed within Tibet Road as a portion of the Green Valley Ranch East Development from 48<sup>th</sup> Avenue extending north to 52<sup>nd</sup> Avenue and will provide another connection point for the Site. Additionally, a 16-inch PVC water main is being developed within 52<sup>nd</sup> Avenue as a portion of Green Valley Ranch East and provides additional connection opportunities. There is an existing 12" water line stub at 54<sup>th</sup> Avenue off of the existing 24-inch PVC water main within Picadilly that will also be utilized as a connection point for the Site.

Sanitary: The Site is located within three separate tributaries as previously identified within the Green Valley Ranch East Master Utility Report. That Report created three basins to correspond with those tributaries, as follows: Basin 310-1 is in the northeast section of the Site, which is tributary to the Second Creek Lift Station approximately two miles downstream of the Site. Basin 310-2 is in the northwest section of the Site, which was tributary to the Painted Prairie Development and is now tributary to the Second Creek Lift Station. Lastly, Basin 310-3 is in the south section of the Site, which is tributary to the First Creek lift station within the Green Valley Ranch East subdivision.

As a portion of the Green Valley Ranch East development four sanitary sewer connection points were planned to provide outfall locations for the Site. Three 8-inch sanitary sewer stubs are being designed north of 52<sup>nd</sup> Avenue. Additionally, a 10-inch sanitary sewer main has been designed within Tibet Road and will be available for connection at the Tibet Road and 52<sup>nd</sup> Avenue intersection.

Due to serviceability issues within the Painted Prairie Development, Aurora Water has required downstream development within Sky Dance, Fulenwider, and High Point to accommodate the effluent from the 310-2 basin. It is understood those downstream developments are aware of this requirement and will accommodate the Green Valley Master Plan Amendment 2 parcel effluent. Please refer to the Appendix for correspondence on this topic. Consistent with this direction, Fulenwider has designed Phase 1 of the 20-inch sanitary trunk main from the Second Creek lift station up Possum Gully to the east side of E-470. Phase I is under construction at the time of this Report. Future Phases of this trunk main will be extended west under E-470 and generally along the 60<sup>th</sup> Avenue and Tibet Road alignments to the Tibet Road and 56<sup>th</sup> Avenue intersection. The extension(s) will occur by others as a portion of downstream development or, if necessary, the developer will endeavor to make this extension to service the Green Valley Master Plan Amendment 2 parcel and will implement a reimbursement agreement or private development agreement to share the costs with those benefiting. Please see the additional discussion within the Sanitary System Plan Section.

## **IV. DESIGN CRITERIA**

### **A. References**

The criteria utilized for design and loading criteria was based on Section 5 of Aurora Water's *Water, Sanitary Sewer & Storm Drainage Infrastructure Standards & Specifications* (Reference 1). The Master Utility Studies either completed or in-process for the adjacent developments were referenced. Those studies included:

*Moffit/Skydance Master Utility Report*, approval date of February 7, 2023, by Westwood (Reference 2); *Green Valley – Amendment 1 Master Utility Report*, dated Revised September 2018 by Calibre (Reference 3); *Master Utility Report Windler Homestead*, dated 2<sup>nd</sup> Revision: January 2004 by Carter & Burgess, Inc. (Reference 4); Windler Master utility study Aurora, CO, approval date of June 13, 2023 by Olsson (Reference 7). In addition, two construction plan sets were referenced to support this report, as follows: *20" Possum Gully Sanitary Sewer Construction Documents*, approval date of August 7, 2020, amended August 4, 2022, by Martin/Martin Consulting Engineers (Reference 5) and *24-Inch E. 56<sup>th</sup> Ave. Pipeline from Picadilly Rd. to Harvest Rd.*, approval date of September 6, 2019, by Dewberry Engineers, Inc. (Reference 6).

## **B. Domestic Water Design Criteria**

### **1. Water Demands**

Water demands for residential water use are based on a criteria of 2.77 people per unit and an average day per capita flow of 101 gallon per day. Non-residential demands were generated using the criteria in the table below. The calculation sheet can be found in the Appendix for reference.

<b>Land Use</b>	<b>Ave Day (gpd/acre)</b>	<b>Max Day (gpd/acre)</b>	<b>Peak Hour (gpd/acre)</b>
<b>Commercial</b>	1,500	4,200	6,750
<b>Industrial</b>	1,200	3,360	5,400
<b>Parks and Greenbelts</b>	1,800	5,040	N/A

### **2. Water Peaking Factors and Demand Calculations**

The maximum (peak) hourly and maximum day demands are based on peaking factors of 4.5:1 for Max Hour: Average Day and 2.8:1 Max Day: Average Day as required in Section 5.02.2 within Reference 1.

### **3. Water Transmission Lines Requirements**

Transmission system requirements include evaluations of demands, pressures, pipe sizes and lengths along with flow velocities and friction losses to verify they are within permissible values. The model created has delineated major water mains on-site to evaluate the serviceability, fire flows and required minimum system pressures. The table below presents the criteria utilized in the modeling analysis.

<b>Pipe Diameter (in)</b>	<b>Max Velocity (fps)</b>	<b>Head Loss Not to Exceed (ft/1,000 ft)</b>
6	2.5	5
8 to 12	3	5
16-24	4.5	5
Over 24	4.5	2

#### 4. Fire Flow Demand Requirements

The required fire-flow for site was modeled using the table below.

Use Classification	Fire Flow Demand
Residential	1500 gpm for 2 hours
Commercial/Multifamily	2500 gpm for 2 hours
Industrial	4000 gpm for 3 hours

#### 5. Minimum Pressure Requirements

Minimum residual pressure is required to be at least 20 p.s.i. under the maximum day plus fire flow model

### C. Sanitary Sewer Design Criteria

#### 1. Sewage Loading Criteria

Peak demands were generated based on Section 5.03 of *Water, Sanitary Sewer & Storm Drainage Infrastructure Standards & Specifications* (Reference 1). The effluent from the Site basins were calculated at 68 gallons per person per day within the residential planning areas and at 1,500 gallon per acreage per day for the commercial planning areas. The calculation sheet can be found in the Appendix for reference.

#### 2. Pipe Sizing Criteria and Sanitary Sewer Routing

Analysis of the hydraulic capacity and characteristics of the pipe assumed open channel flow (not pressurized) and was completed using Manning's Equation. Bentley Flow Master was utilized for computations for the various routed locations. Based on Aurora Water's Requirements, a minimum slope of 0.40% was used for the basis of design and a Manning's n value of 0.011 was used for PVC pipe unless specified differently. The depth of flow in the proposed pipes shall not exceed 75% of capacity for pipes 12 inches or smaller and 80% for pipes larger than 12 inches. Peak factors were calculated by using the equation:

$$\text{Peaking Factor} = 5 \div p^{0.167}$$

where p = population in thousands. A minimum peaking factor of 1.7 and a maximum peaking factor of 4 was used for the calculations. Infiltration and inflow were calculated at 10% of average day flows and added to the peaked flows. The flow velocities were validated to meeting the City's minimum of two feet per second and maximum of ten feet per second.

### V. WATER SYSTEM PLAN

#### A. General Concept

The property lies within Aurora Water Pressure Zone 3, with a zero p.s.i. water surface elevation of 5720 feet. The Site will connect to the existing 24-inch diameter

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transmission main within 56<sup>th</sup> Avenue, at the proposed 12-inch diameter main within Tibet Road, at the existing 12-inch diameter main at 54<sup>th</sup> Avenue, and at the 16-inch diameter main within 52<sup>nd</sup> Avenue. A 12-inch diameter distribution main will bisect the Site by extending the water main within Tibet Road north to connect at the 24-inch main within 56<sup>th</sup> Avenue. The remainder of the on-site distribution mains will be 8-inch diameters. The water system utilities were modeled by implementing the Bentley WaterGEMS Version 24.00.00.27 program with results for the modeled scenarios presented within the Appendix.

## **B. Specific Details**

The system was modeled with four reservoirs to depict the existing and future infrastructure within Zone 3. A junction was placed at each of the demand locations and some planning area demands were spread across multiple junctions, please refer to the Appendix for the associated demand calculations. The following scenarios were modeled for the Project to validate Aurora Water's criteria were maintained.

- Scenario 1 ~ Average Day Demand
- Scenario 2 ~ Maximum Day Demand
- Scenario 3 ~ Maximum Day Demand with Fire Flow
- Scenario 4 ~ Maximum (Peak) Hour Demand

Input for the scenarios include system layouts, junction elevations, demands, and connecting pipes sizes, lengths, and coefficients. The scenario output lists the demands, pressures, velocities, and head loss for individual pipes within the system under the fire flow and steady state conditions.

The Site is generally located within three major basins, First Creek, Second Creek and Blue Grama Draw, which is a right bank tributary to First Creek. As such, the existing topography within the Site generally consists of a high point within the middle of the property at approximate elevation of 5465. Topography along the perimeter of the Site varies from approximately 5435 at the northwest corner, approximately 5445 at the southwest corner, approximately 5465 at the Tibet Road Green Valley Ranch East connection and approximately 5485 at the southeast corner. The Second Creek portion of the Site has topography generally running south to north.

The models were analyzed for the scenarios presented to ensure design criteria were met and to determine the efficient pipe sizing required to service the uses proposed herein. Modeled output of the scenarios is presented within the Appendix for review. Since all surrounding, regional water mains are existing or being constructed by adjacent developments, it is assumed no contribution or construction of those systems is required. Therefore, no off-site water improvements are contemplated herein.

PAs 49-52 & 55 account for both residential and commercial demands resulting in higher overall demand compared to previous versions. As PAs are developed, developers should check to make sure demands are still met.



The table below contains the key results of the analysis of the water scenario models for this Site. Full modeling results can be found in Appendix B of this report.

<b>Model Results Summary</b>	
Maximum Pressure	123 psi (Junction J-26 & J-28, Max Hour)
Minimum Residual Pressure	111 psi (Junction J-25, Max Hour)
Peak Hour Maximum Pipe Velocity (8-12 inches)	2.64 fps, 3 ft/1000 ft Head loss, Pipe P-27 & 28
Peak Hour Maximum Pipe Velocity (16-24 inches)	0.90 fps, 0.1 ft/1000 ft Head loss, Pipe P-29

## **VI. SANITARY SYSTEM PLAN**

### **A. General Concept**

The proposed Site sanitary sewer infrastructure has been sized to service the proposed uses and to meet Aurora Water's criterion. The system will consist of 8-inch and 10-inch gravity sewer mains generally consistent with the maps attached to this Report.

### **B. Specific Details**

The Site is located within both the First Creek and Second Creek service areas and a servicing concept was presented within the Green Valley Ranch East Master Utility Study, Reference 3. The Study anticipated the southwest portion of the Green Valley Master Plan Amendment 2 site, identified as Basin 310-3, to be serviced via gravity through an extension of the sanitary main through what is now GVRE Filing No. 5. The approved GVRE Filing No. 5 Construction Plans depict the extended sanitary main and therefore, the First Creek Watershed portion of the Site west of proposed Tibet Road will be serviced via this connection. About 44% of the mixed-use parcel (PA-49) will be serviced via a sanitary connection within Tibet Road, developed as a portion of the Green Valley Ranch East – Tibet Road project. The sanitary connection within Tibet Road was designed with Option 2 of Basin 310-1 from the Green Valley Ranch East Master Utility Study (Reference 3) to provide options for the Site. Now that Basin 310-1 is being conveyed to the Second Creek Lift Station, with only a portion of PA-49 using the Tibet Road connection, the existing sanitary in Tibet Road will have capacity for the Site.

The northwest corner of the Site identified within Reference 3 was to outfall to the Painted Prairie subdivision (Option 1 of that Report). However, through conversations with Aurora Water, it has been determined Painted Prairie did not extend a sanitary main to provide for the outfall. As such, Aurora Water determined the preferred solution for the basin identified as 310-2 was to gravity drain to a sanitary main to be extended to the intersection of 56<sup>th</sup> Avenue and Tibet Road. This sanitary main is also anticipated to service the basin 310-1, as named within Reference 3. Aurora Water provided the engineer of the downstream sanitary trunk main an anticipated effluent flow rate from the Site, as presented within the

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Appendix. The first phase of the downstream trunk main within the Second Creek tributary is under construction at the time of this Report. The downstream, off-site, gravity system is anticipated to be designed and constructed by others. The current design based on the Sky Dance Subdivision Filing No. 1 Construction Documents (Reference 8) show that this off-site system is being designed to the appropriate size necessary for the development in this Report. In the event downstream developments have not completed the off-Site gravity sanitary sewer main within the Second Creek Tributary to service the Project, the Developer will reasonably endeavor to design and construct the necessary outfall. If successful, reimbursement for this transmission main (Option 1) may be requested under the guidelines of the City of Aurora Municipal Code.

At the request of city officials regarding the 310-2 basin with the recent changes to the proposed planning area uses within the basin, an analysis of the proposed and existing downstream 2<sup>nd</sup> Creek Sanitary Sewer infrastructure was completed utilizing the Moffit/Skydance MUR (Reference 2) and the reports referenced therein. The results of the analysis indicate the downstream system from 54<sup>th</sup> Ave. 60<sup>th</sup> Ave. & Tibet to the 2<sup>nd</sup> Creek Lift Station as designed by Martin/Martin (Reference 5) has sufficient capacity for the changes in planning area uses.

## **VII. CONCLUSIONS**

The utility plan provided in this report generally complies with the *Standards and Specifications for the Design and Construction of Public and Private Improvements Standards and Specifications for Water, Sanitary Sewer, and Storm Drainage Infrastructure* (Reference 1) as well as standard engineering practices. The utility plan addresses full development of the Site at complete buildout.

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## VIII. REFERENCES

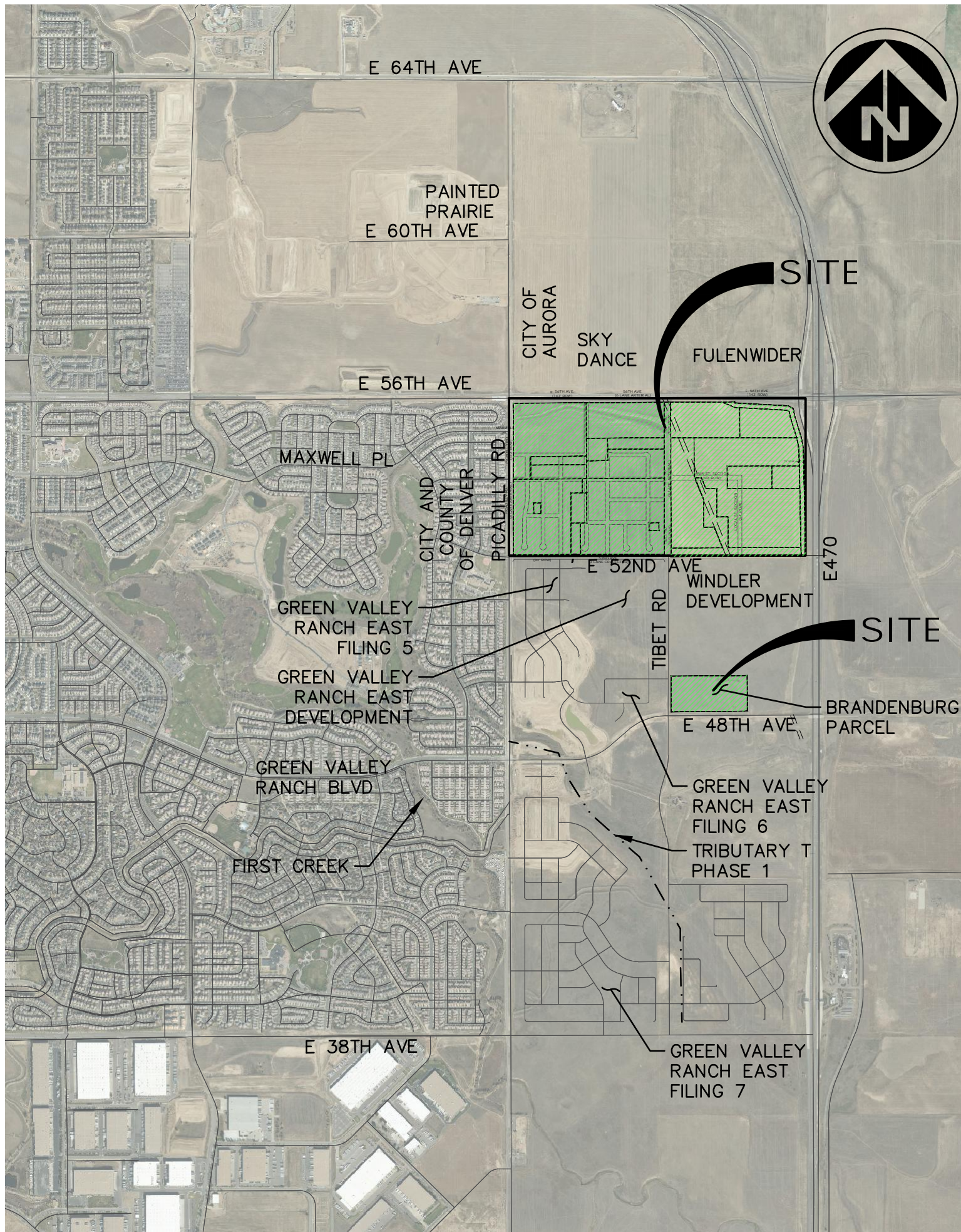
1. *Water, Sanitary Sewer & Storm Drainage Infrastructure Standards & Specifications*, Aurora Water, January 2024.
2. *Moffit/Skydance Master Utility Report*, Westwood; February 7, 2023.
3. *Green Valley – Amendment 1 Master Utility Report*, Calibre Engineering Inc.; October 24, 2018.
4. *Master Utility Report Windler Homestead*, Carter & Burgess, Inc.; January 2004
5. *20" Possum Gully Sanitary Sewer Construction Documents*, Martin/Martin Consulting Engineers; August 4, 2022.
6. *24-Inch E. 56<sup>th</sup> Ave. Pipeline from Picadilly Rd. to Harvest Rd.*, Dewberry Engineers, Inc.; September 6, 2019.
7. *Windler Master Utility Study Aurora, CO*, Rev. June 2022 by Olsson.
8. *Skydance Subdivision Filing No. 1 Construction Documents*, Martin/Martin Consulting Engineers; June 24, 2024.

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## **APPENDIX A – Figures and Supporting Documents**

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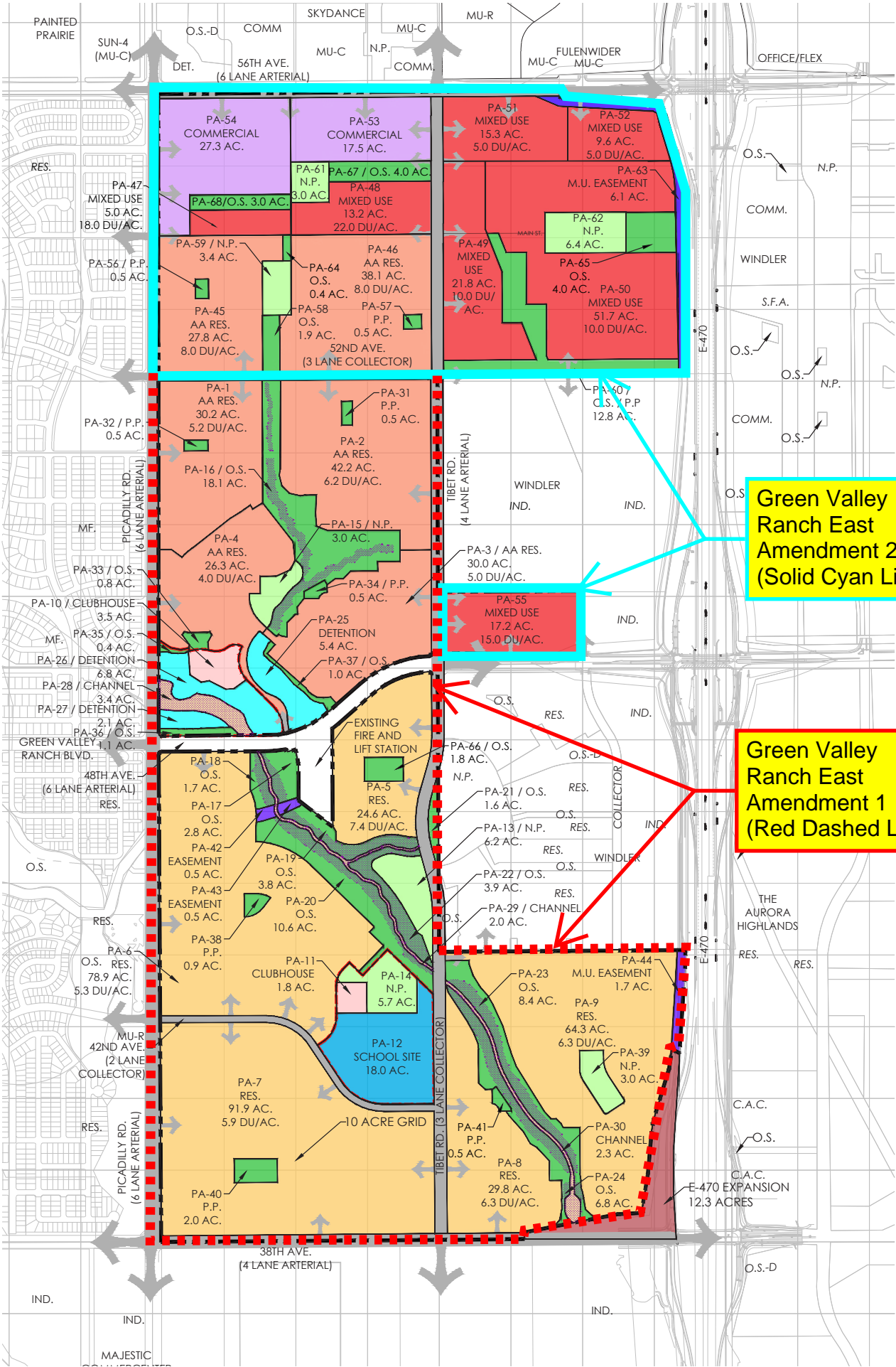




## VICINITY MAP

SCALE: 1"=2000'





LEGEND

SINGLE FAMILY RES.

ACTIVE ADULT RES.

OPEN SPACE

DETENTION POND

FLOODWAY CHANNEL

CLUBHOUSE

NEIGHBORHOOD PARK

100 YEAR FLOOD PLAIN

SCHOOL SITE

ROAD RIGHT OF WAY

EASEMENT

COMMERCIAL

MIXED USE

NAC BOUNDARY

IND = INDUSTRIAL

COMM. = COMMERCIAL

C.A.C. = COMMUNITY ACTIVITY CENTER

MU-C = MULTI USE COMMERCIAL

O.S. = OPEN SPACE

N.P. = NEIGHBORHOOD PARK

P.P. = POCKET PARK

RES. = RESIDENTIAL

M.F. = MULTI FAMILY

S.F.A. = SINGLE FAMILY ATTACHED

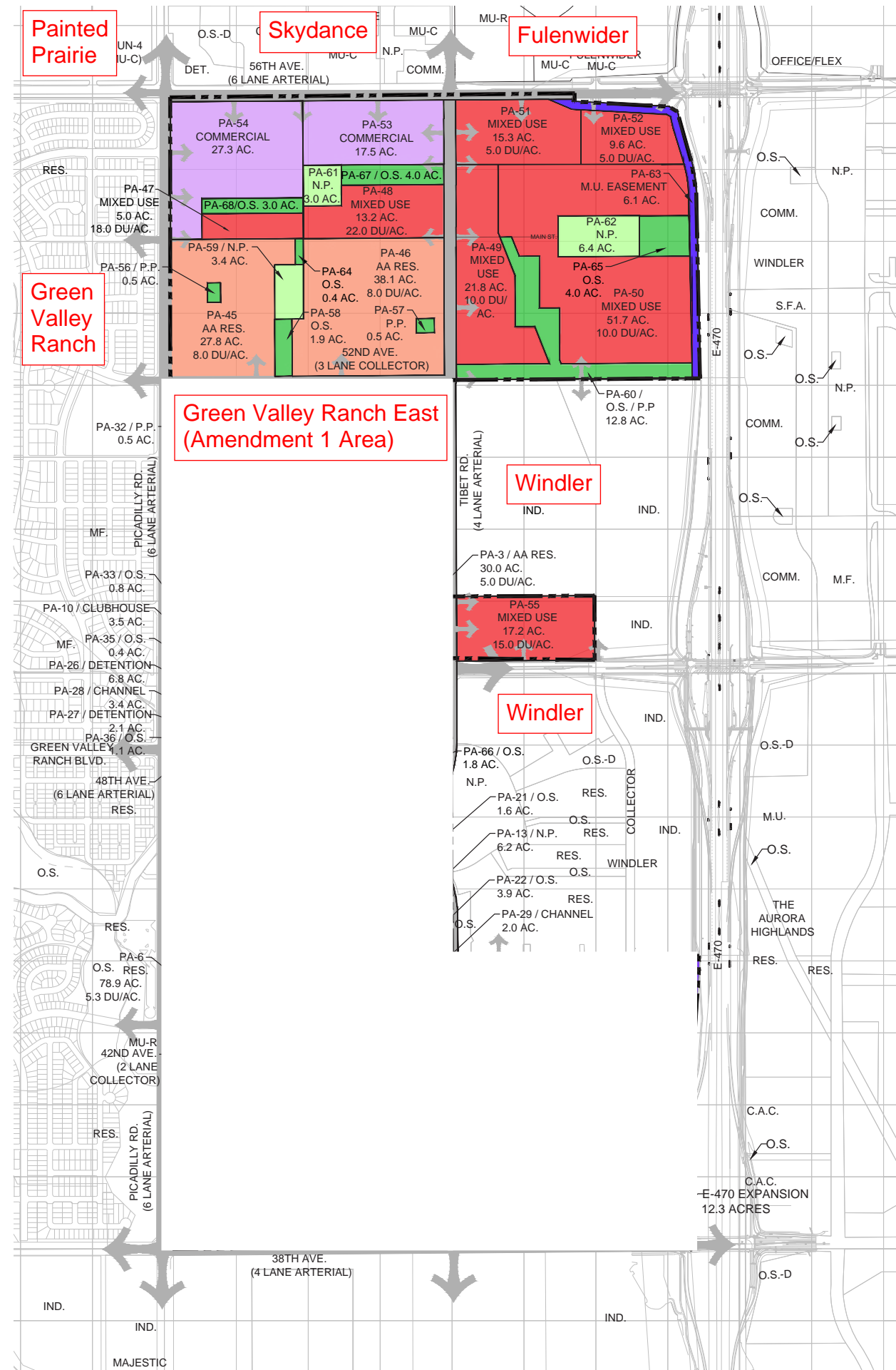
S.F.D. = SINGLE FAMILY DETACHED

















Sheet Title:  
**LAND USE PLAN  
OVERALL**  
Land Use Map, Matrix and  
Standard Notes  
Master Plan

Project Title:  
**Green Valley Ranch Master  
Plan Amendment 2**  
Aurora, Colorado

**GREEN VALLEY  
RANCH**



### LEGEND

- |   |                      |   |                                    |
|---|----------------------|---|------------------------------------|
|  | SINGLE FAMILY RES.   |  | SCHOOL SITE                        |
|  | ACTIVE ADULT RES.    |  | ROAD RIGHT OF WAY                  |
|  | OPEN SPACE           |  | EASEMENT                           |
|  | DETENTION POND       |  | COMMERCIAL                         |
|  | FLOODWAY CHANNEL     |  | MIXED USE                          |
|  | CLUBHOUSE            |  | NAC BOUNDARY                       |
|  | NEIGHBORHOOD PARK    |   | IND = INDUSTRIAL                   |
|   |                      |   | COMM. = COMMERCIAL                 |
|   |                      |   | C.A.C. = COMMUNITY ACTIVITY CENTER |
|  | 100 YEAR FLOOD PLAIN |   | MU-C = MULTI USE COMMERCIAL        |
- O.S. = OPEN SPACE  
 N.P. = NEIGHBORHOOD PARK  
 P.P. = POCKET PARK  
 RES. = RESIDENTIAL  
 M.F. = MULTI FAMILY  
 S.F.A. = SINGLE FAMILY ATTACHED  
 S.F.D. = SINGLE FAMILY DETACHED



Sheet Title:

# LAND USE PLAN OVERALL Land Use Map, Matrix and Standard Notes Master Plan

Project Title:

# Green Valley Ranch Master Plan Amendment 2 Aurora, Colorado

**GREEN VALLEY**  
RANCH

## Greg Proulx

**From:** Ballard, Casey <cballard@auroragov.org>  
**Sent:** Friday, November 1, 2019 9:56 AM  
**To:** Greg Proulx; Tran, Anthony "Tony"  
**Subject:** RE: Harvest Mile MUS  
**Attachments:** 310 West SS Exhibit.pdf

Good morning Greg,

Based on discussion with planning we wanted to provide the below updated flows from the 310 West development. These flows are broken down to two scenarios. The first scenario being just the second creek flows going through the Harvest Mile development and the second scenario being all flows going through the Harvest Mile development. I have included a map from a previous utility study for planning areas but please use the below tables to view densities, uses, and flows. I want to have your report look at both of these scenarios and see if Harvest Mile can take these flows and if upsizing is required, what that upsizing would look like.

Scenario 1												
	Use	Acre	Units	DU/acre	Non-Residential Loading (gpd/acre)	Pop Equivelant/acre	Residential Loading (gpd/cap)	Population/Unit	Total Average Day GPD	GPM	I+I (gpd)	Population
4	Residential	22.9	274.8	12			68	2.77	51,761.33	35.95	5,176.13	761.196
9	Residential	27.1	487.8	18			68	2.77	91,882.01	63.81	9,188.20	1351.206
16	Residential	20.5	246	12			68	2.77	46,336.56	32.18	4,633.66	681.42
5	Commercial	30.5			1500	22			45,750.00	31.77	4,575.00	671
12	Commercial	25.3			1500	22			37,950.00	26.35	3,795.00	556.6
18	Commercial	20.1			1500	22			30,150.00	20.94	3,015.00	442.2
17	Commercial	15.5			1500	22			23,250.00	16.15	2,325.00	341
	Total	161.90						Total	327,079.90	227.14	32,707.99	4804.622

Scenario 2											
Use	Acre	Units	DU/Acre	Loading (gpd/acre)	Pop Equivelant/acre	Loading (gpd/cap)	Population/Unit	Average Day GPD	GPM	I+I (gpd)	Population
Residential	16.7	116.9	7			68	2.77	22,019.28	15.29	2,201.93	323.813
Residential	21.2	148.4	7			68	2.77	27,952.62	19.41	2,795.26	411.068
Residential	22.9	274.8	12			68	2.77	51,761.33	35.95	5,176.13	761.196
Residential	20	140	7			68	2.77	26,370.40	18.31	2,637.04	387.8
Residential	27.1	487.8	18			68	2.77	91,882.01	63.81	9,188.20	1351.206
Residential	20.5	246	12			68	2.77	46,336.56	32.18	4,633.66	681.42
Commercial	30.5			1500	22			45,750.00	31.77	4,575.00	671
Commercial	25.3			1500	22			37,950.00	26.35	3,795.00	556.6
Commercial	20.1			1500	22			30,150.00	20.94	3,015.00	442.2
Commercial	15.5			1500	22			23,250.00	16.15	2,325.00	341



<b>Total</b>	288.20	1892.7					Total	403,422.20	280.15	40,342.22	5927.303

Respectfully,

Casey Ballard  
Engineer|City of Aurora|Aurora Water  
office 303-739-7382



[Facebook](#) | [Twitter](#) | [Nextdoor](#) | [AuroraTV.org](#)

---

**From:** Greg Proulx [mailto:GProulx@martinmartin.com]  
**Sent:** Thursday, October 31, 2019 1:39 PM  
**To:** Tran, Anthony "Tony" <atran@auroragov.org>  
**Cc:** Ballard, Casey <cballard@auroragov.org>  
**Subject:** RE: Harvest Mile MUS

Appreciate the update and you following up on my question.







We completely understand, since we were in a similar boat with providing Avelon our flows a few months ago.

Thanks again for the help and Happy Halloween!

Greg

Greg Proulx, PE  
Professional Engineer  
PE (CO)  
V 303.431.6100 ext. 265



12499 West Colfax Avenue | Lakewood, CO 80215  
[martinmartin.com](#)       
 2019 Denver Post Top Workplace (Four Time Winner)

---

**From:** Tran, Anthony "Tony" <[atran@auroragov.org](mailto:atran@auroragov.org)>  
**Sent:** Thursday, October 31, 2019 1:03 PM  
**To:** Greg Proulx <[GProulx@martinmartin.com](mailto:GProulx@martinmartin.com)>  
**Cc:** Ballard, Casey <[cballard@auroragov.org](mailto:cballard@auroragov.org)>  
**Subject:** Harvest Mile MUS

Hi Greg,

Casey will be providing the planned loadings to be used for the MUS, hopefully by early-mid next week.

I apologize for the long delay, we were expecting this information to be provided by the current land owners, however, they have not been responsive.

We will provide loadings based on land use and zoning provided to us from our planning department to move this forward.

Thanks,

Tony H. Tran, PE, MCE, PMP, CFM  
Project Engineer | [City of Aurora](#) | [Aurora Water](#)  
15151 East Alameda Avenue, Suite 3600  
Aurora, Colorado 80012  
office 303.739.7376



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## Kerstiens, Katherine

---

**From:** Ballard, Casey <cballard@auroragov.org>  
**Sent:** Thursday, August 19, 2021 5:15 PM  
**To:** Margraf, Jason D.  
**Subject:** RE: Aurora 310 Sanitary

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

**[CAUTION]** External Email. DO NOT click links or open attachments unless expected. Please use the "Phish Alert" button to report all suspicious emails.

Jason,

Please see below:

- 1) I understood from talking w/Vern that a portion of the sanitary main that is planned to service the A310 parcel is under construction (from the 2<sup>nd</sup> Creek lift station to E-470). I found what should be those CDs on the City's map system. Are you able to tell me where they stand in construction?
  - a. I am waiting on information from the inspectors as to the current status of that extension.
- 2) Are you able to tell me what the trigger(s) are for the extension of the sanitary main to the west of E-470 for the areas within Fulenwider or Avelon?
  - a. There is no specific trigger outside of development. What I mean is any part of what was Avelon needs that sanitary sewer extension to develop per their MUS while Fulenwider won't need it until they begin developing a land use that requires sanitary service in planning areas 2 or 40. Planning areas 12, 13, and 16 I don't think will require sanitary service as they are an Xcel substation, neighborhood park, or stormwater detention.
- 3) Are there any existing reimbursement agreement associated with the "under construction" portion of this sanitary?
  - a. To my knowledge no reimbursement agreement has been started with the Fulenwider development regarding the Possum Gully sanitary sewer. That isn't saying one won't be started in the future.
- 4) In the GVRE Master Utility Study the A310 parcel was broken into three basins. Basin 310-1 is tributary to Possum Creek. Basin 310-2 to the northwest and Basin 310-3 appears to flow into GVRE. Do you have any information on down stream improvement for Basin 310-2?
  - a. During the development of the Painted Prairie, Avelon, Fulenwider utility studies it was found that numerous utilities existed within the Picadilly and 56<sup>th</sup> Avenue intersection making a sanitary crossing in that area difficult. It was decided that 310 West was to discharge entirely north through the Possum Gully sanitary sewer.
- 5) I see in the Fulenwider study that you, via email on 11/1/19 provided Martin and Martin two scenarios for the A310 parcel. Where did you get that information? Which scenarios is the Fulenwider sanitary sized for?
  - a. The information that I provided Fulenwider was information obtain from Terra Forma Solution. They provided anticipated uses while I used those uses and our current water/sanitary requirements to determine potential sanitary sewer loading. At the time they had an application in to rezone the property into commercial and medium density residential, 7-12 DU/acre with one area being 18 DU/acre.
- 6) What progress has Westside (and CVL) made on Avelon parcel and specifically on their Master Utility Study?
  - a. The most recent information I have is the submittal made it to roughly the 5<sup>th</sup> round of review but the owner decided to no longer pursue the project. The utility study itself was essentially complete but needed to be updated to match the most current numbers from the High Point and Fulenwider studies.

Respectfully,

Casey Ballard, PE  
Engineer|City of Aurora|Aurora Water  
office 303-739-7382



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---

**From:** Margraf, Jason D. <jmargraf@Dewberry.com>  
**Sent:** Thursday, August 19, 2021 11:29 AM  
**To:** Ballard, Casey <cballard@auroragov.org>  
**Subject:** RE: Aurora 310 Sanitary

Casey:

Just checking in on the questions below.

Thanks,

Jason

Jason Margraf, PE

Associate Vice President, Department Manager  
Real Estate and Commercial Development Market Segment  
8100 East Maplewood Avenue, Suite 150  
Greenwood Village, CO 80111  
D 720.386.4325 C 303.520.4575  
LICENSED PE: CO, UT



.....



[www.dewberry.com](http://www.dewberry.com)

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**From:** Margraf, Jason D.  
**Sent:** Friday, August 13, 2021 4:03 PM  
**To:** Ballard, Casey <[cballard@auroragov.org](mailto:cballard@auroragov.org)>  
**Subject:** Aurora 310 Sanitary

Casey:

I hope you are have a good Friday. Thank you for providing the Fulenwider Master Utility information. I am in the process of reviewing it and have a couple of quick questions/requests.

- 1) I understood from talking w/Vern that a portion of the sanitary main that is planned to service the A310 parcel is under construction (from the 2<sup>nd</sup> Creek lift station to E-470). I found what should be those CDs on the City's map system. Are you able to tell me where they stand in construction?
- 2) Are you able to tell me what the trigger(s) are for the extension of the sanitary main to the west of E-470 for the areas within Fulenwider or Avelon?
- 3) Are there any existing reimbursement agreement associated with the "under construction" portion of this sanitary?
- 4) In the GVRE Master Utility Study the A310 parcel was broken into three basins. Basin 310-1 is tributary to Possum Creek. Basin 310-2 to the northwest and Basin 310-3 appears to flow into GVRE. Do you have any information on down stream improvement for Basin 310-2?
- 5) I see in the Fulenwider study that you, via email on 11/1/19 provided Martin and Martin two scenarios for the A310 parcel. Where did you get that information? Which scenarios is the Fulenwider sanitary sized for?
- 6) What progress has Westside (and CVL) made on Avelon parcel and specifically on their Master Utility Study?

Thanks!

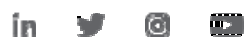
Jason.

Jason Margraf, PE

Associate Vice President, Department Manager  
Real Estate and Commercial Development Market Segment  
8100 East Maplewood Avenue, Suite 150  
Greenwood Village, CO 80111  
D 720.386.4325 C 303.520.4575  
LICENSED PE: CO, UT



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[www.dewberry.com](http://www.dewberry.com)

Visit Dewberry's website at [www.dewberry.com](http://www.dewberry.com) If you've received this email even though it's intended for someone else, then please delete the email, don't share its contents with others, and don't read its attachments. Thank you.

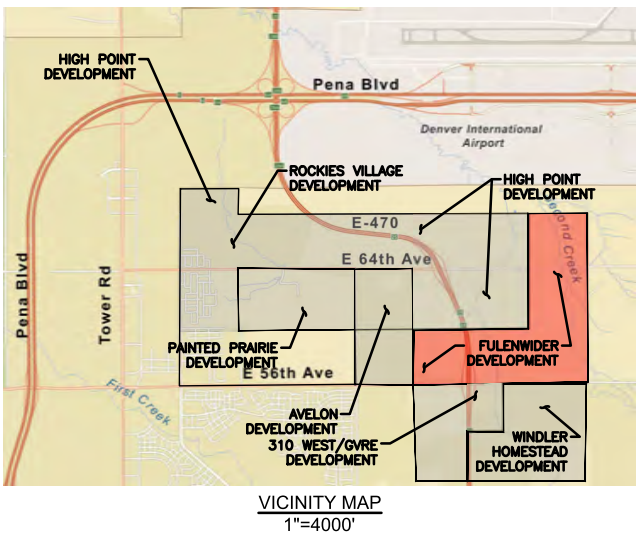
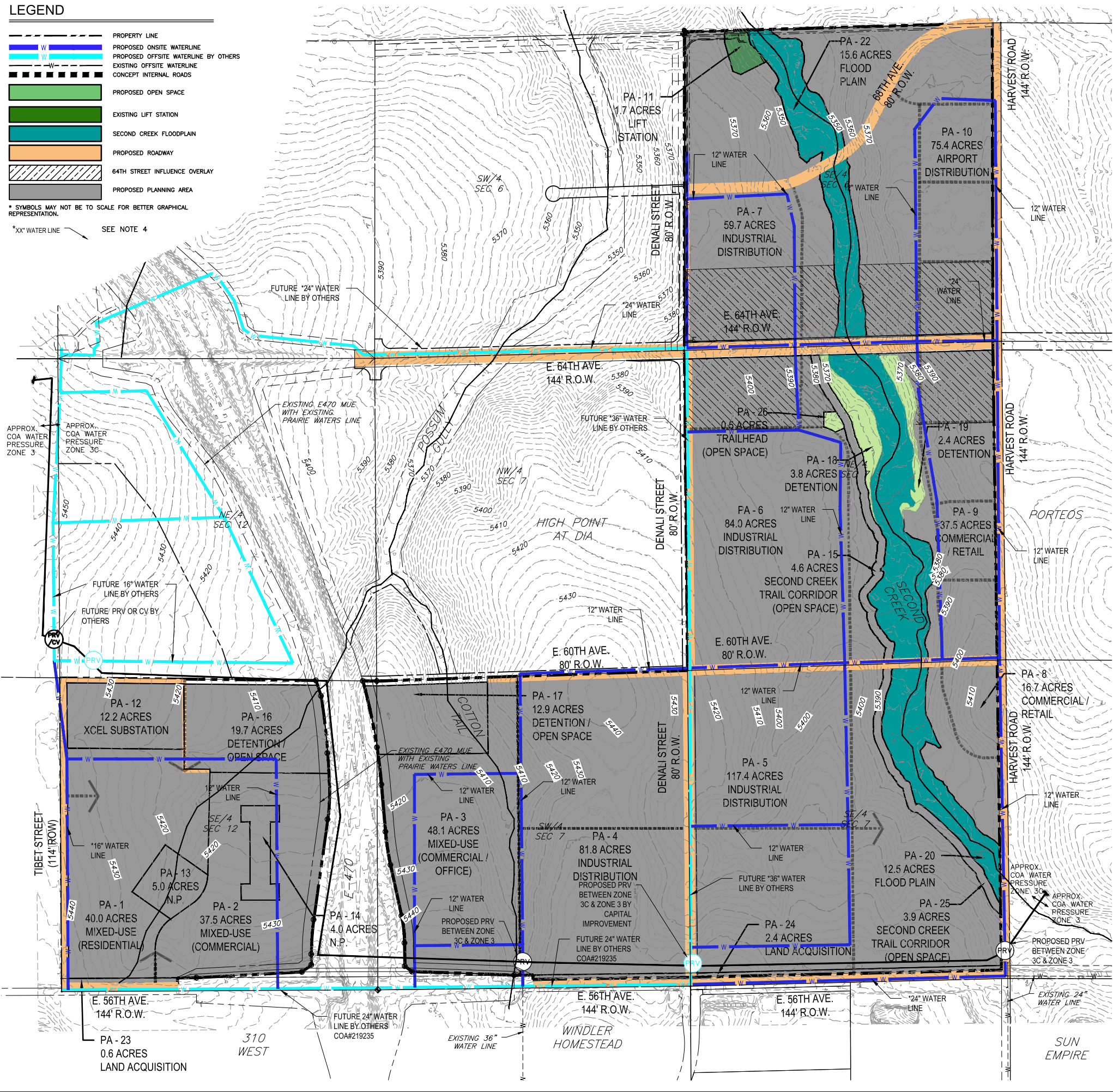


**LEGEND**

- PROPERTY LINE
- PROPOSED ONSITE WATERLINE
- PROPOSED OFFSITE WATERLINE BY OTHERS
- EXISTING OFFSITE WATERLINE
- CONCEPT INTERNAL ROADS
- PROPOSED OPEN SPACE
- EXISTING LIFT STATION
- SECOND CREEK FLOODPLAIN
- PROPOSED ROADWAY
- 64TH STREET INFLUENCE OVERLAY
- PROPOSED PLANNING AREA

\* SYMBOLS MAY NOT BE TO SCALE FOR BETTER GRAPHICAL REPRESENTATION.

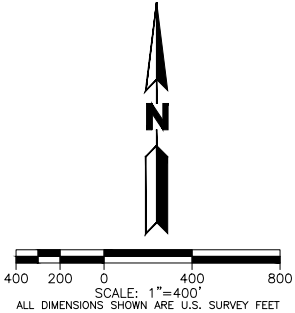
\*XX" WATER LINE SEE NOTE 4



- NOTES:**
1. LOOPED WATER TO SUPPORT PUBLIC FIRE HYDRANTS AND PRIVATE FIRE SUPPRESSION SYSTEMS ARE REQUIRED WITH EACH PHASE OF DEVELOPMENT.
  2. ADDITIONAL PRVS MAY BE REQUIRED ON THE INTERNAL DEVELOPMENT WATER INFRASTRUCTURE TO SUPPORT CERTAIN PHASES OF DEVELOPMENT THAT ARE LOCATED ON OR NEAR THE WATER PRESSURE ZONE BOUNDARY.
  3. IF THE OFF-SITE WATER SYSTEM INFRASTRUCTURE HAS NOT YET BEEN INSTALLED, OR IS LABELED AS BY-OTHERS, THE DEVELOPING PLANNING AREA MAY BE RESPONSIBLE FOR BUILDING THE NECESSARY OFF-SITE WATER SYSTEM REQUIRED TO SUPPORT THE PLANNING AREA. THE PLANNING AREA DEVELOPMENT SHALL WORK WITH THE CITY OF AURORA DURING THE CSP PROCESS TO DETERMINE THE BEST OPTION FOR CONNECTING TO THE CITY'S EXISTING WATER SYSTEM, BY EXTENDING THE EXISTING WATER SYSTEM, UPDATING THE DEMANDS AND DESIGN POINTS DESCRIBED IN THIS REPORT. THIS REPORT SHOWS GRAPHICAL WATER SYSTEM LOCATIONS THAT WILL BE LOCATED IN MORE DETAIL DURING THE CITY OF AURORA CSP PROCESS AND CAN BE UPDATED OR AMENDED IF NECESSARY, TO SUPPORT THE WATER NEEDS FOR PLANNING AREAS DETERMINED IN THE FUTURE.
  4. FULEWIDER PROPERTY NEEDED 12" WATER LINE TO MEET PROPOSED FULEWIDER DEMANDS, INCREASED PIPE SIZE BASED ON THE COA COMMENTS, OTHER OFFSITE COA DEMANDS/LOOPING, CAPITAL IMPROVEMENT PROJECTS, ETC.

FACSIMILE  
THIS ELECTRONIC PLAN IS A FACSIMILE OF THE SIGNED AND SEALED PDF PLAN

(P.E. SIGNATURE) DATE 07/23/2020  
DAVID M. LE (PRINTED NAME)



CITY OF AURORA APPROVAL BLOCK			
CITY ENGINEER	for Victor Rachael	07/31/2020	DATE
FIRE DEPARTMENT		07/30/2020	DATE
AURORA WATER DEPARTMENT		08/05/2020	DATE

FULEWIDER  
MASTER UTILITY PLAN (WATER)

No.	Issue / Revision	Date	Name
1	ISSUE FOR COA APPROVAL	07/22/20	W/M

Job Number	19.0001
Project Manager	D.L.E. & G. PROULX
Design By	G. PROULX
Drawn By	G. PROULX
Principal in Charge	P. HORN

THE DESIGNS SHOWN HEREIN INCLUDING ALL TECHNICAL DRAWINGS, GRAPHIC REPRESENTATION & MODELS THEREOF ARE PROPRIETARY AND NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, IN WHOLE OR IN PART, WITHOUT THE WRITTEN PERMISSION FROM MARTIN/MARTIN, INC.

Sheet Number:

MUS-W

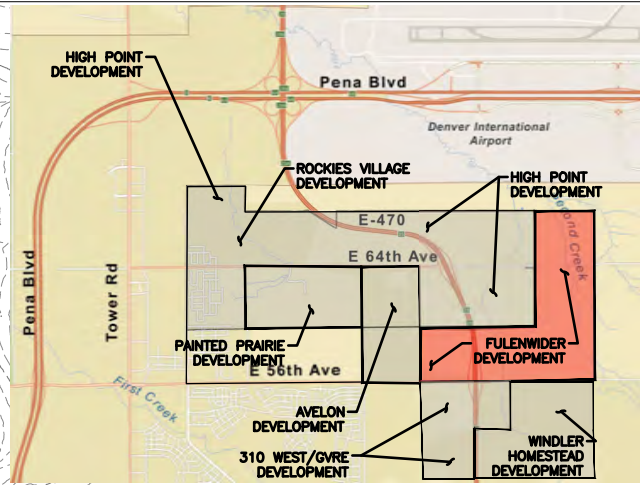
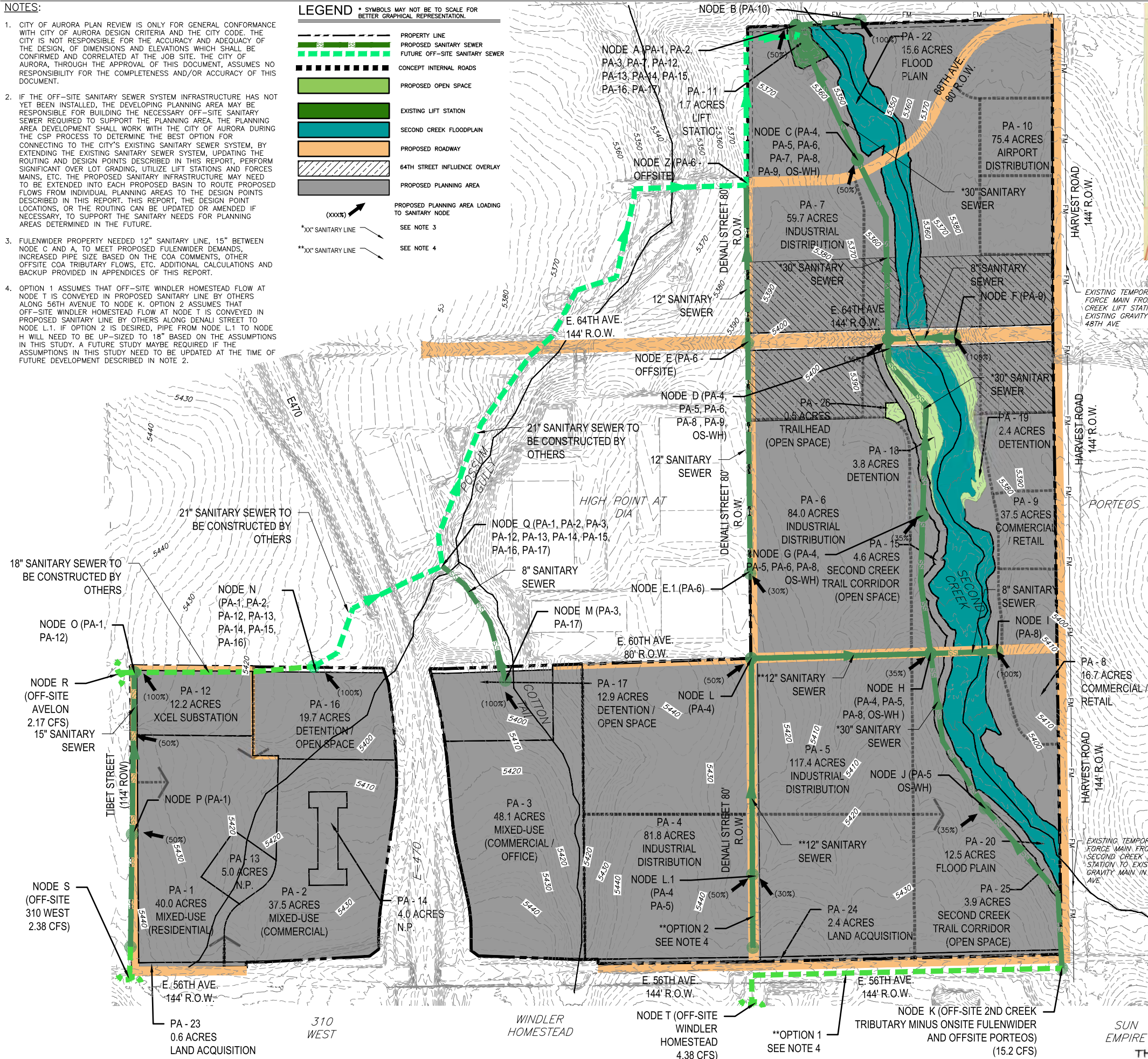


NOTES:

- 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.
- IF THE OFF-SITE SANITARY SEWER SYSTEM INFRASTRUCTURE HAS NOT YET BEEN INSTALLED, THE DEVELOPING PLANNING AREA MAY BE RESPONSIBLE FOR BUILDING THE NECESSARY OFF-SITE SANITARY SEWER REQUIRED TO SUPPORT THE PLANNING AREA. THE PLANNING AREA DEVELOPMENT SHALL WORK WITH THE CITY OF AURORA DURING THE CSP PROCESS TO DETERMINE THE BEST OPTION FOR CONNECTING TO THE CITY'S EXISTING SANITARY SEWER SYSTEM, BY EXTENDING THE EXISTING SANITARY SEWER SYSTEM, UPDATING THE ROUTING AND DESIGN POINTS DESCRIBED IN THIS REPORT, PERFORM SIGNIFICANT OVER LOT GRADING, UTILIZE LIFT STATIONS AND FORCES MAINS, ETC. THE PROPOSED SANITARY INFRASTRUCTURE MAY NEED TO BE EXTENDED INTO EACH PROPOSED BASIN TO ROUTE PROPOSED FLOWS FROM INDIVIDUAL PLANNING AREAS TO THE DESIGN POINTS DESCRIBED IN THIS REPORT. THIS REPORT, THE DESIGN POINT LOCATIONS, OR THE ROUTING CAN BE UPDATED OR AMENDED IF NECESSARY, TO SUPPORT THE SANITARY NEEDS FOR PLANNING AREAS DETERMINED IN THE FUTURE.
- FULENWIDER PROPERTY NEEDED 12" SANITARY LINE, 15" BETWEEN NODE C AND A, TO MEET PROPOSED FULENWIDER DEMANDS, INCREASED PIPE SIZE BASED ON THE COA COMMENTS, OTHER OFFSITE COA TRIBUTARY FLOWS, ETC. ADDITIONAL CALCULATIONS AND BACKUP PROVIDED IN APPENDICES OF THIS REPORT.
- OPTION 1 ASSUMES THAT OFF-SITE WINDLER HOMESTEAD FLOW AT NODE T IS CONVEYED IN PROPOSED SANITARY LINE BY OTHERS ALONG 56TH AVENUE TO NODE K. OPTION 2 ASSUMES THAT OFF-SITE WINDLER HOMESTEAD FLOW AT NODE T IS CONVEYED IN PROPOSED SANITARY LINE BY OTHERS ALONG DENALI STREET TO NODE L.1. IF OPTION 2 IS DESIRED, PIPE FROM NODE L.1 TO NODE H WILL NEED TO BE UP-SIZED TO 18" BASED ON THE ASSUMPTIONS IN THIS STUDY. A FUTURE STUDY MAYBE REQUIRED IF THE ASSUMPTIONS IN THIS STUDY NEED TO BE UPDATED AT THE TIME OF FUTURE DEVELOPMENT DESCRIBED IN NOTE 2.

LEGEND

- \* SYMBOLS MAY NOT BE TO SCALE FOR BETTER GRAPHICAL REPRESENTATION.
- PROPERTY LINE
  - PROPOSED SANITARY SEWER
  - FUTURE OFF-SITE SANITARY SEWER
  - CONCEPT INTERNAL ROADS
  - PROPOSED OPEN SPACE
  - EXISTING LIFT STATION
  - SECOND CREEK FLOODPLAIN
  - PROPOSED ROADWAY
  - 64TH STREET INFLUENCE OVERLAY
  - PROPOSED PLANNING AREA
  - PROPOSED PLANNING AREA LOADING TO SANITARY NODE
  - SEE NOTE 3
  - SEE NOTE 4
  - \*XX" SANITARY LINE
  - \*XX" SANITARY LINE



VICINITY MAP

1"=4000'

400 200 0 400 800  
SCALE: 1"=400'  
ALL DIMENSIONS SHOWN ARE U.S. SURVEY FEET

FACSIMILE  
THIS ELECTRONIC PLAN IS A FACSIMILE OF THE SIGNED AND SEALED PDF PLAN  
DATE: 07/23/2020  
DAVID M. LE  
PRINTED NAME

	FROM Node	TO Node	Peak Flow + Infiltration (MGD)	Peak Flow + Infiltration (cfs)	Required Pipe Size (in)	Pipe Percent Full
4	T	K	2.83	4.38	18	53.4
1	S	R	1.54	2.38	12	73.7
2	R	O	1.41	2.17	12	68.6
	P	O	2.95	4.57	15	77.4
	O	N	3.31	5.12	18	58.8
	N	Q	3.46	5.36	21	47.2
	M	Q	0.30	0.46	8	51.2
	Q	LIFTSTATION	3.76	5.81	21	49.5
	L.1	L	0.37	0.58	12	31.7
	L	H	0.58	0.89	12	39.9
3	K	J	9.81	15.17	30	49.7
	J	H	11.64	18.01	30	55.1
	I	H	0.10	0.16	8	28.8
	H	G	12.12	18.75	30	56.5
	G	D	12.19	18.86	30	56.7
	F	D	0.23	0.36	8	44.6
	E.1	E	0.12	0.19	12	18.2
	E	Z	0.12	0.19	12	18.2
	D	C	12.39	19.17	30	57.3
	C	A	12.46	19.28	30	57.5
	B	A	0.37	0.57	8	58.9
	A	LIFTSTATION	13.86	21.44		

- OFFSITE from 310 West 1.54 MGD based on COA email from Aurora Planning Department & Aurora Water Engineering 11/1/2019
- Offsite from Avelon Development MUS prepared by Dewberry/J3 dated 8/9/2019 currently under COA Review: DP-19 0.362 MGD & 5,327 Population
- OFFSITE from 2nd Creek Tributary Area meeting on 06/30/2020 and updated 2nd Creek Tributary Area Map included in Appendix A
- OFFSITE from Windler Homestead MUS prepared by Carter & Burgess dated 2006 (MGD & Population updated to target peak flow of 4.38 cfs based on COA email from Aurora Water Engineering also as shown in the previously reference report for the Windler Homestead MUS) OPTION 1 ALONG 56TH TO NODE K OR OPTION 2 TO DENALI STREET NODE L.1

CITY OF AURORA APPROVAL BLOCK

Craig Paul  
CITY ENGINEER  
for Victor Rachael  
07/31/2020  
DATE

Will Paul  
FIRE DEPARTMENT  
07/30/2020  
DATE

Vernon A. Adam  
AURORA WATER DEPARTMENT  
08/05/2020  
DATE

FULENWIDER

MASTER UTILITY PLAN (SANITARY)

No.	Issue / Revision	Date	Name
1	ISSUE FOR COA APPROVAL	07/22/20	W/M

Job Number 19.0001  
Project Manager DLE & G. PROULX  
Design By G. PROULX  
Drawn By G. PROULX  
Principal in Charge P. HORN

Sheet Number:

MUS-S

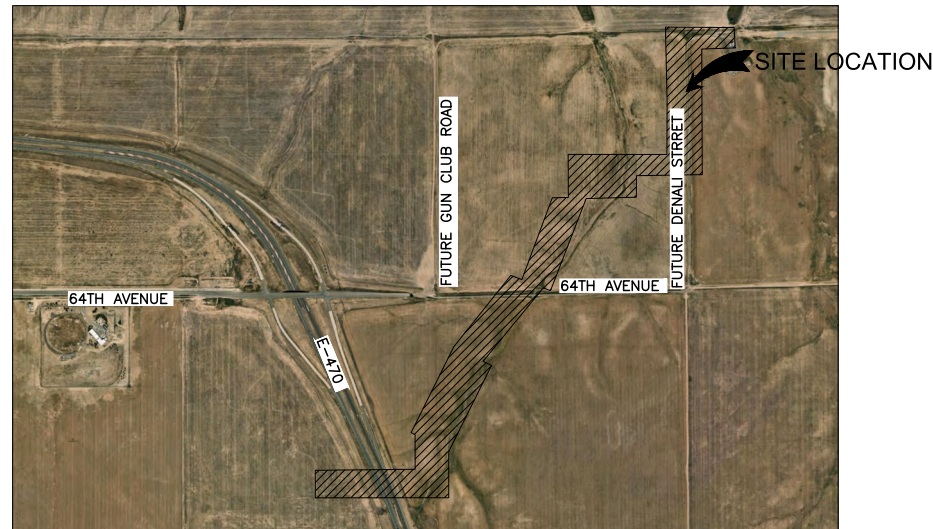
MARTIN/MARTIN  
CONSULTING ENGINEERS  
12499 WEST COLFAX AVENUE, LAKEWOOD, COLORADO 80215  
303.431.6100 MARTINMARTIN.COM



# 20" POSSUM GULLY SANITARY SEWER

## CONSTRUCTION DOCUMENTS

PARCELS OF LAND LOCATED IN THE SOUTH HALF OF SECTION 6, THE NORTHWEST QUARTER OF SECTION 7, TOWNSHIP 3 SOUTH, RANGE 65 WEST, AND THE NORTHEAST OF SECTION 12, TOWNSHIP 3 SOUTH, RANGE 66 WEST, OF THE SIXTH PRINCIPAL MERIDIAN, CITY OF AURORA, COUNTY OF ADAMS, STATE OF COLORADO.



Sheet List Table	
SHEET NUMBER	SHEET TITLE
1	COVER
2	GENERAL NOTES
3	GENERAL NOTES
4	OVERALL UTILITY PLAN
5	SANITARY PLAN & PROFILE 0+00 - 12+00
6	SANITARY PLAN & PROFILE 12+00 - 25+00
7	SANITARY PLAN & PROFILE 25+00 - 32+50
8	SANITARY PLAN & PROFILE 32+50 - 42+50
9	SANITARY PLAN & PROFILE 42+50 - 52+50
10	SANITARY PLAN & PROFILE 52+50 - 62+50
11	SANITARY PLAN & PROFILE 62+50 - 69+50
12	SANITARY PLAN & PROFILE 69+50 - 77+00
13	EROSION CONTROL PLAN
14	SANITARY PLAN & PROFILE

**Proposed Easements for this project are in the plat for High Point East No. 3**

**No initial acceptance shall occur until the plat for High Point East Subdivision Filing No. 3 has been recorded with the County.**

### BASIS OF BEARINGS:

BEARINGS ARE BASED ON AN ASSUMED BEARING OF  
S00°33'21"E ALONG THE EASTERLY LINE OF THE SOUTHWEST  
QUARTER OF SECTION 7, TOWNSHIP 3 SOUTH, RANGE 65 WEST  
OF THE 6TH P.M. BEING MONUMENTED AS A FOUND 3 1/4"  
ALUMINUM CAP PLS # 25379 IN RANGEBOX AT THE CENTER  
QUARTER CORNER AND A FOUND 2 1/2" ALUMINUM CAP PLS #  
28285 AT THE SOUTH QUARTER CORNER.

BENCHMARK:

COA ID: 3S6508NW001

ELEVATIONS ARE BASED ON THE CITY OF AURORA AND COUNTY OF ADAMS BENCHMARK #3S6508BNW001 A CITY OF AURORA AND COUNTY OF ADAMS 3-1/4" ALUMINUM CAP STAMPED (CITY OF AURORA B.M., #3S6508BNW001, 2007.) ON A 5' #6 REBAR, IN A 2" PVC PIPE WITH A CAP LOCATED SOUTHWEST OF THE SECTION CORNER TO SECTIONS 6, 8, TOWNSHIP 3 SOUTH, RANGE 65 WEST, SOUTHEAST OF YELLOW STEEL CONCRETE POST, SOUTH OF THE CENTERLINE OF A DIRT ROAD (64TH AVENUE) AND EAST OF THE INTERSECTION OF E-470 AND 64TH AVENUE.

ELEVATION = 5394.58 (NAVD 1988) DATUM.



CALL **811** 2-BUSINESS DAYS IN ADVANCE  
BEFORE YOU DIG, GRADE OR EXCAVATE FOR  
MARKING OF UNDERGROUND MEMBER UTILITIES

MARTIN/MARTIN ASSUMES NO RESPONSIBILITY FOR UTILITY LOCATIONS. THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM (PROVIDED) ASCE (38) UTILITY QUALITY LEVEL D ( $Q_{90}$ ) AVAILABLE INFORMATION. IT IS, HOWEVER, THE CONTRACTORS RESPONSIBILITY TO FIELD VERIFY THE SIZE, MATERIAL, HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES (DEPICTED OR NOT DEPICTED) PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.

OWNER'S REPRESENTATIVE:

**SILVERBLUFF COMPANIES**  
TED L. LAUDICK  
303-638-9553

OWNER


OWNER  
C/O WESTSIDE INVESTMENT PARTNERS, INC.  
KEVIN SMITH  
4100 E. MISSISSIPPI AVE., SUITE 500  
DENVER, CO 80246  
303-984-9800

ENGINEER:

**ENGINEER:**  
MARTIN/MARTIN, INC.  
ATTN: PAT HORN, P.E.  
12499 WEST COLFAX AVENUE  
LAKEWOOD, COLORADO 80215  
PH: (303) 431-6100  
PHORN@MARTINMARTIN.COM

FACSIMILE

THIS ELECTRONIC PLAN IS A FACSIMILE  
OF THE SIGNED AND SEALED PDF PLAN







DATE 08/05/2020

(PE SIGNATURE)

DAVID M. LE

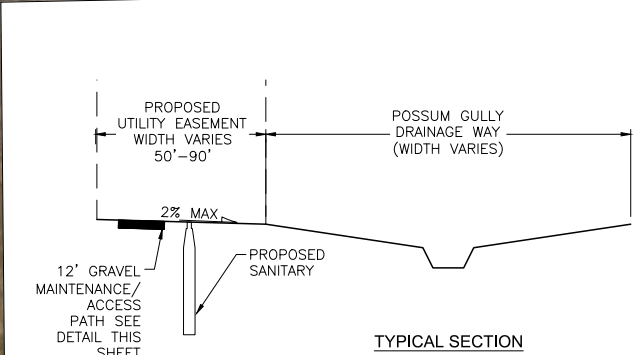
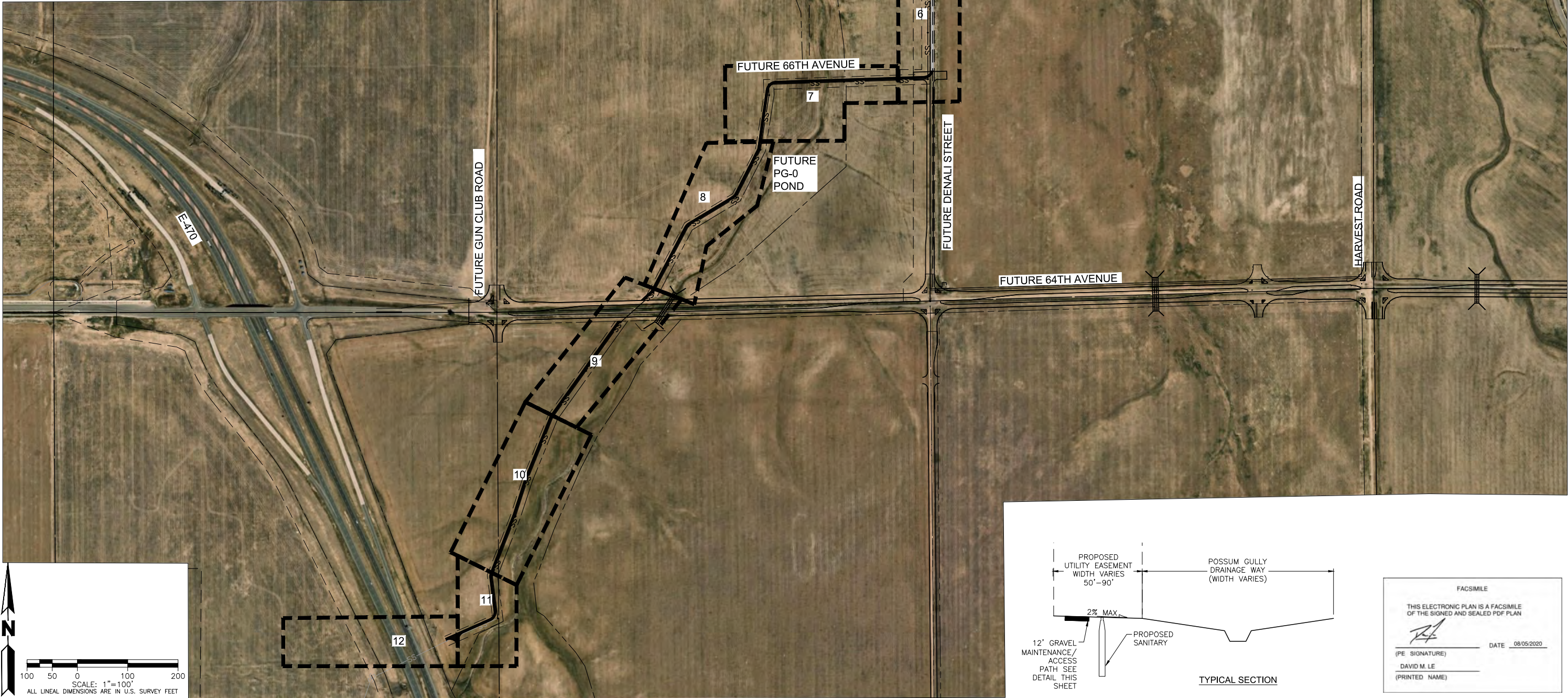
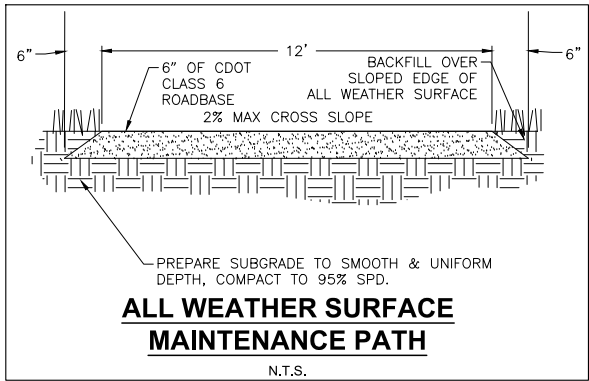
(PRINTED NAME)

EXISTING	LEGEND	PROPOSED
	PROPERTY LINE	
	RIGHT-OF-WAY LINE	
	SECTION LINE	
	EASEMENT	
	RETAINING WALL	
	CURB & GUTTER	
	HANDICAP RAMPS	
	UTILITY CROSSING	
	STORM SEWER	
	STORM MANHOLE	
	ROOF DRAIN	
	STORM INLET	
	FLARED END SECTION	
	SANITARY SEWER	
	SANITARY MANHOLE	
	CLEAN OUT	
	WATER LINE	
	WATER VALVE	
	FIRE HYDRANT	
	WATER METER	
	IRRIGATION LINE	
	IRRIGATION CONTROL	
	OVERHEAD ELECTRIC	
	ELECTRIC LINE	
	LIGHT POLE	
	POWER POLE	
	ELECTRIC METER	
	TELEPHONE LINE	
	CABLE TV	
	GAS LINE	
	SIGN	
	MONITOR WELL	
DRIVE	DESCRIPTIONS	DRIVE

Approved for One Year From this Date	
	<u>08/07/2020</u>
CGE	 for Victor Rachael City Engineer 07/30/2020 Date
THT	 Water Department 08/07/2020 Date  Fire Department 7-27-2020 Date  Traffic Manager 7-29-2020 Date

Print Date: Thursday, July 23, 2020		<div><div><div></div><div></div><div></div><div></div><div></div></div></div>	Sheet Revisions			<div><div></div><div><div>MARTIN/MARTIN</div><div>CONSULTING ENGINEERS</div><div>12499 WEST COLFAX AVENUE, LAKEWOOD, COLORADO 80215 MAIN 303.431.6100 MARTINMARTIN.COM</div></div></div> <div><div>M/M JOB NO.:</div><div>19.0281</div></div>	As Constructed		COVER			Project No./Code	
File Name: COVER													
Horiz. Scale:                      Vert. Scale:			07/23/20 FOR COA APPROVAL				No Revisions:		Designer:                      DL/GP				
Unit Information                      Unit Leader							Revised:		Detailer:                      DB				
							Void:		Sheet Subset:                      Subset Sheet:		1		





FACSIMILE  
THIS ELECTRONIC PLAN IS A FACSIMILE  
OF THE SIGNED AND SEALED PDF PLAN  
  
(PE SIGNATURE) DATE 08/05/2020  
DAVID M. LE  
(PRINTED NAME)

Print Date: Wednesday, August 5, 2020	
File Name: AERIAL	
Horiz. Scale:	Vert. Scale:
Unit Information	Unit Leader

Sheet Revisions		
Date:	Comments	Init.
08/05/20	FOR COA APPROVAL	



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CONSULTING ENGINEERS  
12499 WEST COLFAX AVENUE,  
LAKEWOOD, COLORADO 80215  
MAIN 303.431.6100  
MARTINMARTIN.COM

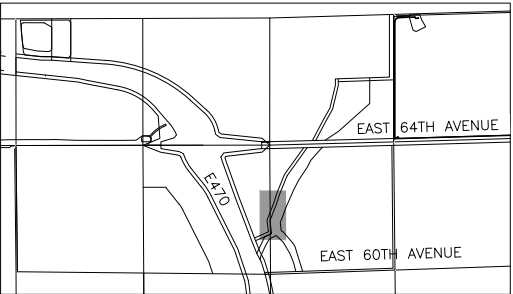
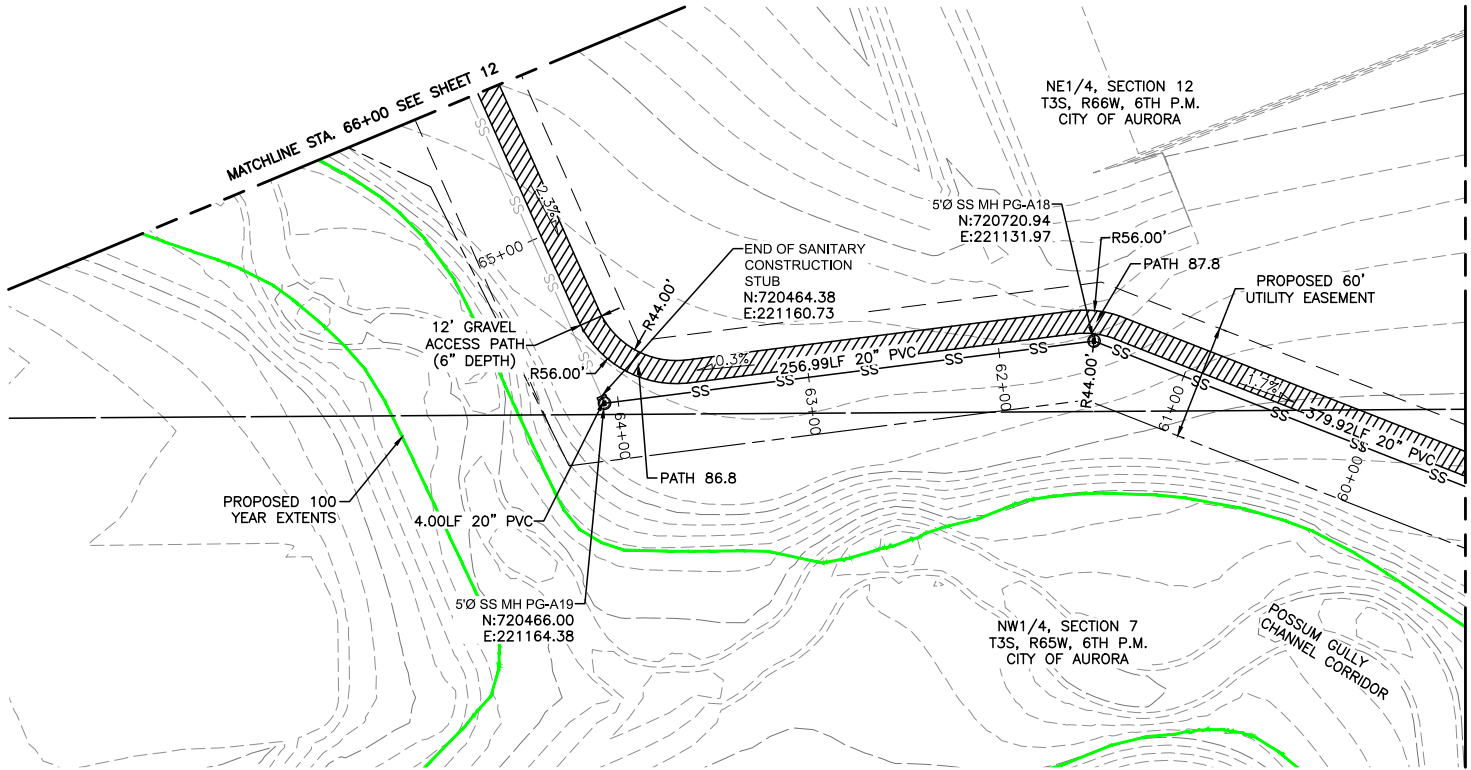
M/M JOB NO.:  
19.0281

As Constructed
No Revisions:
Revised:
Void:

OVERALL UTILITY PLAN			
Designer:	DL/GP		
Detailer:	DB		
Sheet Subset:		Subset Sheet:	

Project No./Code
4





KEYMAP  
SCALE: 1"=2000'

NOTES:

- EXISTING CONTOURS SHOWN ARE ANTICIPATED GRADES THAT WILL BE PRESENT AT TIME OF SANITARY SEWER MAIN INSTALLATION BASED ON CURRENT OVERLOT GRADING OPERATIONS AND PLANNED IMPROVEMENTS
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- MAINTENANCE PATH FROM STATION 17+00 TO 68+00 TO BE GRADED SO THERE IS A MAXIMUM LONGITUDINAL SLOPE OF 5.0% AND A CROSS SLOPE OF 2.0%.

LEGEND

EXISTING		PROPOSED
---	PROPERTY LINE	---
---	RIGHT-OF-WAY LINE	---
---	SECTION LINE	---
---	EASEMENT	---
---SS---	SANITARY SEWER	SS
SS	SANITARY MANHOLE	○
○	MONITOR WELL	
DRIVE	DESCRIPTIONS	DRIVE

BASIS OF BEARINGS:

BEARINGS ARE BASED ON AN ASSUMED BEARING OF S00°33'21"E ALONG THE EASTERLY LINE OF THE SOUTHWEST QUARTER OF SECTION 7, TOWNSHIP 3 SOUTH, RANGE 65 WEST OF THE 6TH P.M. BEING MONUMENTED AS A FOUND 3 1/4" ALUMINUM CAP PLS # 25379 IN RANGEBOX AT THE CENTER QUARTER CORNER AND A FOUND 2 1/2" ALUMINUM CAP PLS # 28285 AT THE SOUTH QUARTER CORNER.

BENCHMARK:

COA ID: 3S6508NW001

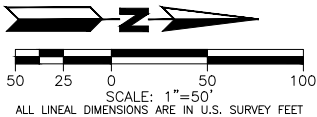
ELEVATIONS ARE BASED ON THE CITY OF AURORA AND COUNTY OF ADAMS BENCHMARK #3S6508NW001 A CITY OF AURORA AND COUNTY OF ADAMS 3-1/4" ALUMINUM CAP STAMPED (CITY OF AURORA B.M., 3S6508NW001, 2007.) ON A 5" #6 REBAR, IN A 8" PVC PIPE WITH A CAP, LOCATED SOUTHEAST OF THE SECTION CORNER TO SECTIONS 6, 5, 8, 7, TOWNSHIP 3 SOUTH, RANGE 65 WEST, SOUTHEAST OF YELLOW STEEL CONCRETE POST, SOUTH OF THE CENTERLINE OF A DIRT ROAD (64TH AVENUE) AND EAST OF THE INTERSECTION OF E-470 AND 64TH AVENUE.

ELEVATION = 5394.58 (NAVD 1988) DATUM.



CALL 811 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR MARKING OF UNDERGROUND MEMBER UTILITIES

MARTIN/MARTIN ASSUMES NO RESPONSIBILITY FOR UTILITY LOCATIONS. THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM (PROVIDED) ASCE (38) UTILITY QUALITY LEVEL D (Qd) AVAILABLE INFORMATION. IT IS, HOWEVER, THE CONTRACTORS RESPONSIBILITY TO FIELD VERIFY THE SIZE, MATERIAL, HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES (DEPICTED OR NOT DEPICTED) PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.



FACSIMILE

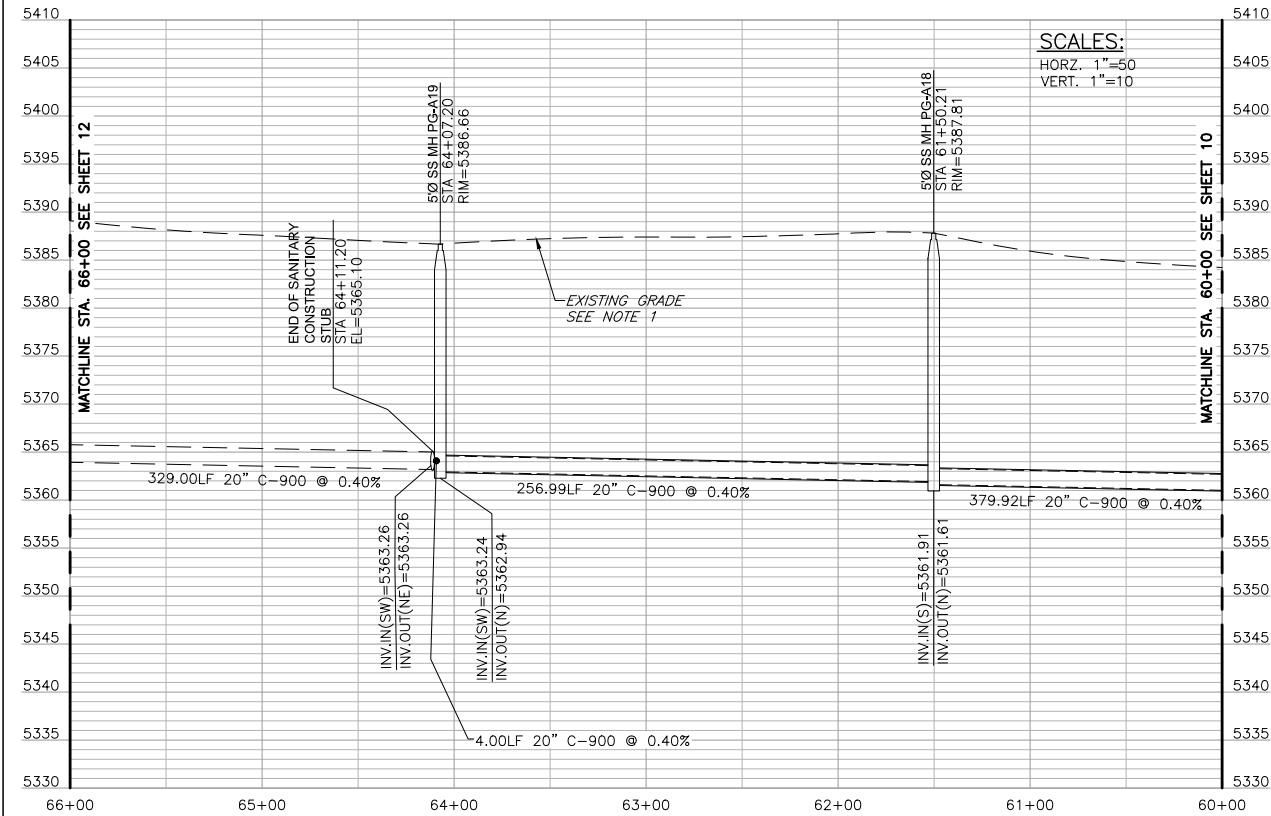
THIS ELECTRONIC PLAN IS A FACSIMILE OF THE SIGNED AND SEALED PDF PLAN

*[Signature]* DATE 08/05/2020

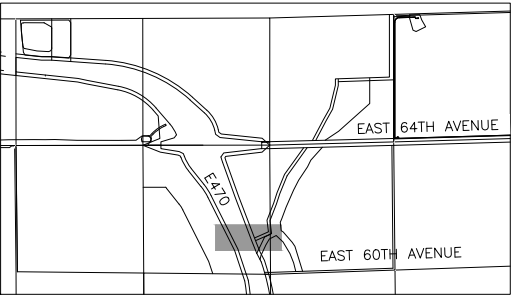
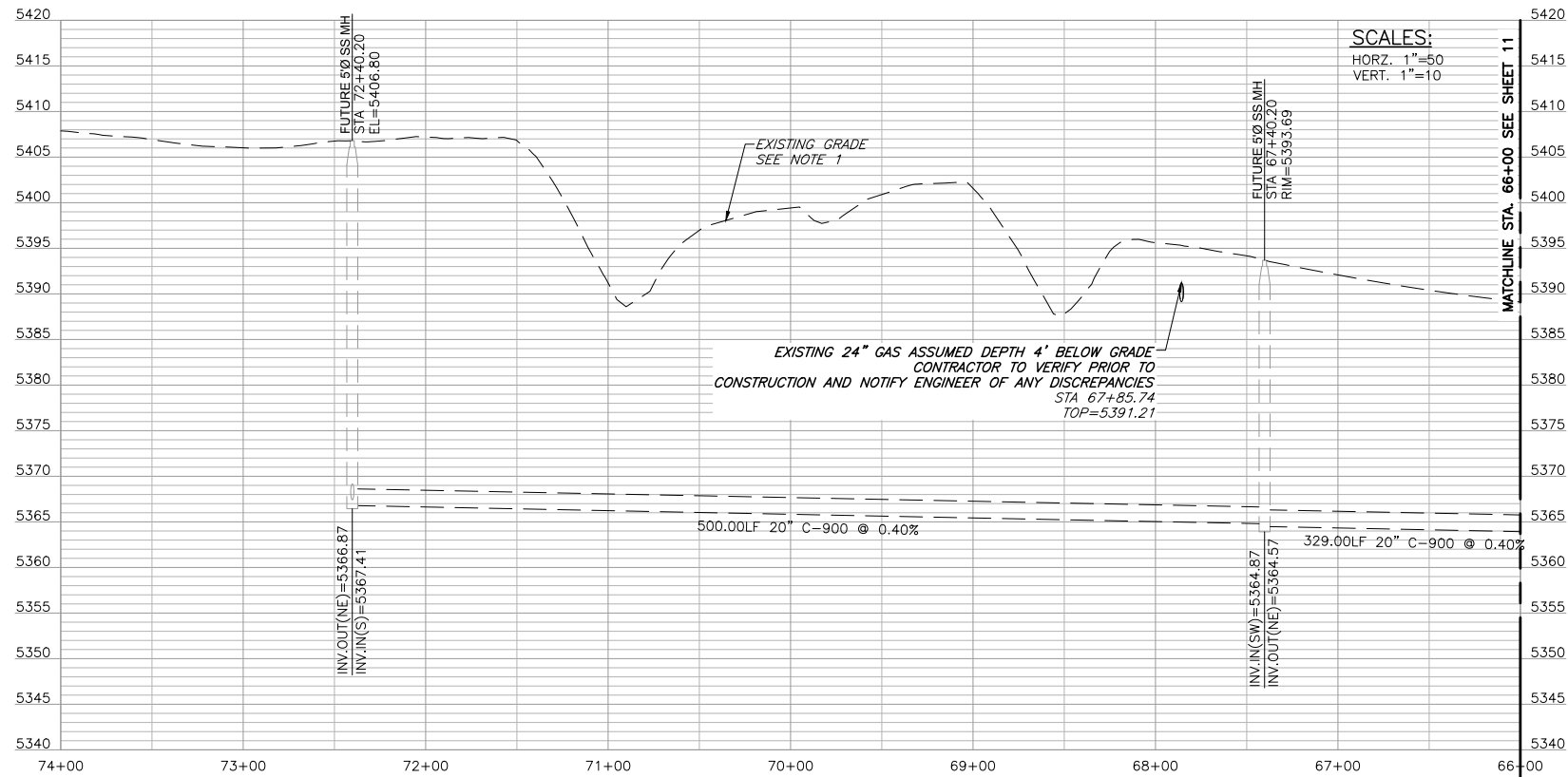
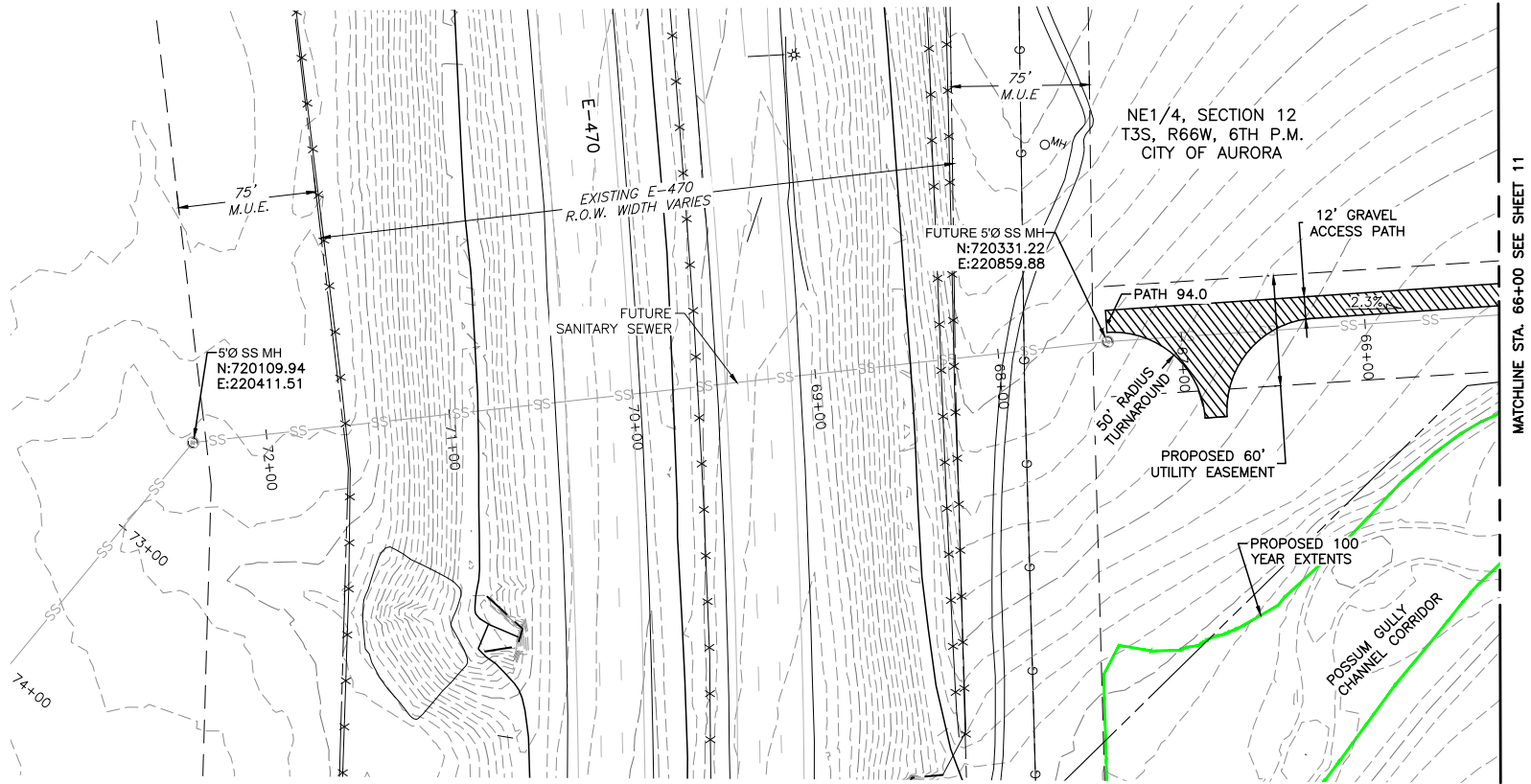
(PE SIGNATURE)

DAVID M. LE

(PRINTED NAME)



Print Date: Wednesday, August 5, 2020	0000	Sheet Revisions			 <b>MARTIN/MARTIN</b> CONSULTING ENGINEERS 12499 WEST COLFAX AVENUE, LAKEWOOD, COLORADO 80215 MAIN 303.431.6100 MARTINMARTIN.COM	As Constructed	SANITARY PLAN & PROFILE 60+00 - 66+00		Project No./Code
File Name: SANITARY 62+50 - 69+50		Date:	Comments	Init.		No Revisions:			
Horiz. Scale:                      Vert. Scale:		08/05/20	FOR COA APPROVAL			Revised:	Designer: DL/GP		
Unit Information                      Unit Leader						Void:	Detailer: DB		
					M/M JOB NO.: 19.0281		Sheet Subset:	Subset Sheet:	11



KEYMAP  
SCALE: 1"=2000'

NOTES:

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LEGEND

EXISTING		PROPOSED
---	PROPERTY LINE	---
---	RIGHT-OF-WAY LINE	---
---	SECTION LINE	---
---	EASEMENT	---
---SS---	SANITARY SEWER	---
SS	SANITARY MANHOLE	SS
OW	MONITOR WELL	OW
DRIVE	DRIVE	DRIVE



CALL 811 2-BUSINESS DAYS IN ADVANCE  
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MARKING OF UNDERGROUND MEMBER UTILITIES

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BASIS OF BEARINGS:

BEARINGS ARE BASED ON AN ASSUMED BEARING OF 500°33'21"E ALONG THE EASTERLY LINE OF THE SOUTHWEST QUARTER OF SECTION 7, TOWNSHIP 3 SOUTH, RANGE 65 WEST OF THE 6TH P.M. BEING MONUMENTED AS A FOUND 3 1/4" ALUMINUM CAP PLS # 25379 IN RANGEBOX AT THE CENTER QUARTER CORNER AND A FOUND 2 1/2" ALUMINUM CAP PLS # 28285 AT THE SOUTH QUARTER CORNER.

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COA ID: 3S6508NW001

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ELEVATION = 5394.58 (NAVD 1988) DATUM.

FACSIMILE

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DAVID M. LE  
(PRINTED NAME)

DATE 08/05/2020

Print Date: Wednesday, August 5, 2020
File Name: SANITARY 69+50 - 72+86
Horiz. Scale: Vert. Scale:
Unit Information Unit Leader

Sheet Revisions		
Date:	Comments	Init.
08/05/20	FOR COA APPROVAL	

**MARTIN/MARTIN**  
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LAKEWOOD, COLORADO 80215  
MAIN 303.431.6100  
MARTINMARTIN.COM

M/M JOB NO.:  
19.0281

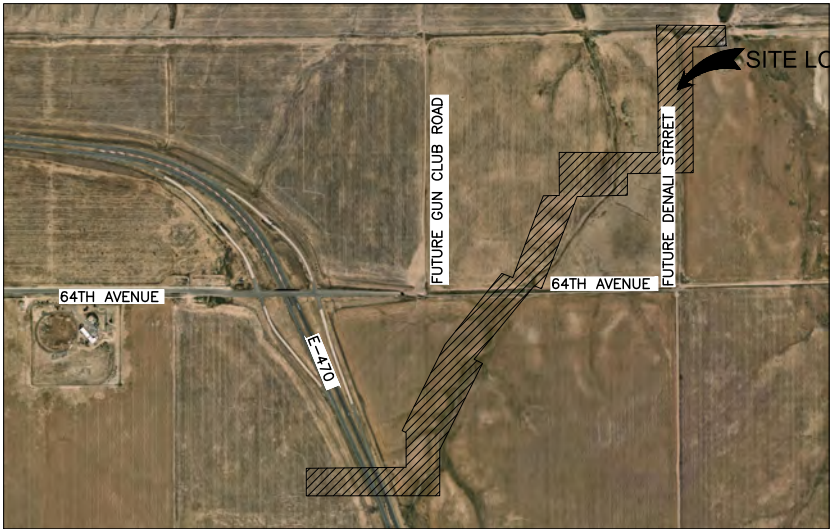
As Constructed	SANITARY PLAN & PROFILE			Project No./Code
No Revisions:	66+00 - 73+00			
Revised:	Designer: DL/GP			12
	Detailer: DB			
Void:	Sheet Subset:	Subset Sheet:		



# 20" POSSUM GULLY SANITARY SEWER

## CONSTRUCTION DOCUMENTS

PARCELS OF LAND LOCATED IN THE SOUTH HALF OF SECTION 6, THE NORTHWEST QUARTER OF SECTION 7, TOWNSHIP 3 SOUTH, RANGE 65 WEST, AND THE NORTHEAST OF SECTION 12, TOWNSHIP 3 SOUTH, RANGE 66 WEST, OF THE SIXTH PRINCIPAL MERIDIAN, CITY OF AURORA, COUNTY OF ADAMS, STATE OF COLORADO.



VICINITY MAP  
1"=1000'

Sheet List Table

SHEET NUMBER	SHEET TITLE
1	COVER
2	GENERAL NOTES
3	GENERAL NOTES
4	OVERALL UTILITY PLAN
5	SANITARY PLAN & PROFILE 0+00 - 12+00
6	SANITARY PLAN & PROFILE 12+00 - 20+00
7	SANITARY PLAN & PROFILE 20+00 - 30+00
8	SANITARY PLAN & PROFILE 30+00 - 40+00
9	SANITARY PLAN & PROFILE 40+00 - 50+00
10	SANITARY PLAN & PROFILE 50+00 - 60+00
11	SANITARY PLAN & PROFILE 60+00 - 66+00
12	SANITARY PLAN & PROFILE 66+00 - 73+00
13	SANITARY PLAN & PROFILE 73+00 - 82+00
14	SANITARY PLAN & PROFILE 82+00 - 89+00
15	SANITARY PLAN & PROFILE 89+00 - 97+43.13
16	EROSION CONTROL PLAN



CALL 811 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR MARKING OF UNDERGROUND MEMBER UTILITIES. MARTIN/MARTIN ASSUMES NO RESPONSIBILITY FOR UTILITY LOCATIONS. THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM INFORMATION PROVIDED BY THE PROJECT'S SUE CONSULTANT. THE ASCE (38) UTILITY QUALITY LEVEL IS AS INDICATED ON THE STAMPED/SIGNED SUE PLANS PREPARED BY THE PROJECT'S SUE CONSULTANT. IT IS, HOWEVER, THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE SIZE, MATERIAL, HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES (DEPICTED OR NOT DEPICTED) PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.

M/M JOB NO.:  
19.0281

**MARTIN/MARTIN**  
CONSULTING ENGINEERS  
12499 WEST COLFAX AVENUE,  
LAKEWOOD, COLORADO 80215  
MAIN 303.431.6100  
MARTINMARTIN.COM

### LEGEND

EXISTING		PROPOSED
---	PROPERTY LINE	---
- - - -	RIGHT-OF-WAY LINE	- - - -
---	SECTION LINE	---
- - - -	EASEMENT	- - - -
////	RETAINING WALL	
=====	CURB & GUTTER	
	HANDICAP RAMPS	
	UTILITY CROSSING	
- - - -ST- - - -	STORM SEWER	
	STORM MANHOLE	
- - - -RD- - - -	ROOF DRAIN	
	STORM INLET	
<	FLARED END SECTION	
- - - -SS- - - -	SANITARY SEWER	SS
	SANITARY MANHOLE	
	CLEAN OUT	
- - - -W- - - -	WATER LINE	
	WATER VALVE	
	FIRE HYDRANT	
	WATER METER	
- - - -IR- - - -	IRRIGATION LINE	
	IRRIGATION CONTROL	
- - - -OHE- - - -	OVERHEAD ELECTRIC	
- - - -E- - - -	ELECTRIC LINE	
	LIGHT POLE	
	POWER POLE	
	ELECTRIC METER	
- - - -T- - - -	TELEPHONE LINE	
	TELEPHONE LINE	
- - - -CT- - - -	CABLE TV	
- - - -G- - - -	GAS LINE	
	SIGN	
	MONITOR WELL	
DRIVE	DRIVE	DRIVE
	DESCRIPTIONS	DRIVE

### GEOTECHNICAL BASELINE REPORT NOTE:

- THE CONTRACTOR IS TO COMPLETE THE CONSTRUCTION AND INSTALLATION OF THE CASING AND CARRIER PIPE UNDER E-470 AND UNDER THE EXISTING 60" WATER MAIN PER THE RECOMMENDATIONS AND REQUIREMENTS OF THE GEOTECHNICAL BASELINE REPORT (GBR) PREPARED BY LITHOS ENGINEERING DATED **02/24/2022** AND PER ALL SUPPORTING DOCUMENTS AND SPECIFICATIONS.
- THE CONTRACTOR IS TO COMPLETE THE CONSTRUCTION AND INSTALLATION OF ALL REQUIRED INSTRUMENTATION AND MONITORING ELEMENTS PER THE PLANS PREPARED BY LITHOS ENGINEERING DATED **02/24/2022**

### SUBSURFACE UTILITY ENGINEERING NOTE:

THE EXISTING UTILITIES SHOWN ON THESE DRAWINGS ARE BASED ON INFORMATION PROVIDED BY A SUBSURFACE UTILITY ENGINEERING (SUE) SURVEY PROVIDED BY **T2 UTILITY ENGINEERS**, DATED **02/02/2022**. THIS STAMPED/SIGNED SUE SURVEY IS AVAILABLE BY REQUEST AS A SEPARATE DOCUMENT. MARTIN/MARTIN RELIED UPON PROVIDED EXISTING UTILITY INFORMATION TO COMPLETE THE DESIGN AND ASSUMES NO RESPONSIBILITY FOR THE UTILITY LOCATIONS, SIZES, MATERIALS, OR COMPLETENESS OF THE SUE SURVEY. THE CONTRACTOR IS REQUIRED TO VERIFY THE ACTUAL LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION, INCLUDING COMPLIANCE WITH PROVISIONS OF COLORADO REVISED STATUTE, TITLE 9 AND CALLING THE COLORADO 811 UTILITY LOCATE SERVICE TO PROVIDE UTILITY LOCATES BEFORE DIGGING.

### BASIS OF BEARINGS:

BEARINGS ARE BASED ON AN ASSUMED BEARING OF S00°33'21"E ALONG THE EASTERLY LINE OF THE SOUTHWEST QUARTER OF SECTION 7, TOWNSHIP 3 SOUTH, RANGE 65 WEST OF THE 6TH P.M. BEING MONUMENTED AS A FOUND 3 1/4" ALUMINUM CAP PLS # 25379 IN RANGEBOX AT THE CENTER QUARTER CORNER AND A FOUND 2 1/2" ALUMINUM CAP PLS # 28285 AT THE SOUTH QUARTER CORNER.

### BENCHMARK:

COA ID: 3S6508NW001

ELEVATIONS ARE BASED ON THE CITY OF AURORA AND COUNTY OF ADAMS BENCHMARK #3S6508NW001 A CITY OF AURORA AND COUNTY OF ADAMS 3-1/4" ALUMINUM CAP STAMPED (CITY OF AURORA B.M., 3S6508NW001, 2007.) ON A 5' #6 REBAR, IN A 8" PVC PIPE WITH A CAP, LOCATED SOUTHEAST OF THE SECTION CORNER TO SECTIONS 6, 5, 8, 7, TOWNSHIP 3 SOUTH, RANGE 65 WEST, SOUTHEAST OF YELLOW STEEL CONCRETE POST, SOUTH OF THE CENTERLINE OF A DIRT ROAD (64TH AVENUE) AND EAST OF THE INTERSECTION OF E-470 AND 64TH AVENUE.

ELEVATION = 5394.58 (NAVD 1988) DATUM.

### OWNER'S REPRESENTATIVE:

SILVERBLUFF COMPANIES  
TED L. LAUDICK  
303-638-9553

### OWNER

C/O WESTSIDE INVESTMENT PARTNERS, INC  
KEVIN SMITH  
4100 E. MISSISSIPPI AVE., SUITE 500  
DENVER, CO 80246  
303-984-9800

### ENGINEER:

MARTIN/MARTIN, INC.  
ATTN: DAVID LE, P.E.  
12499 WEST COLFAX AVENUE  
LAKEWOOD, COLORADO 80215  
PH: (720) 544-5490  
DLE@MARTINMARTIN.COM



Approved for One Year From this Date

City Engineer \_\_\_\_\_ Date \_\_\_\_\_

Water Department \_\_\_\_\_ Date \_\_\_\_\_

Fire Department \_\_\_\_\_ Date \_\_\_\_\_

Traffic Manager \_\_\_\_\_ Date \_\_\_\_\_

Print Date: Monday, April 25, 2022

File Name: COVER

Horiz. Scale: \_\_\_\_\_ Vert. Scale: \_\_\_\_\_

Unit Information \_\_\_\_\_ Unit Leader \_\_\_\_\_

### Sheet Revisions

Date:	Comments	Init.
08/05/20	FOR COA APPROVAL	
04/25/22	PLAN AMENDMENT	

As Constructed

No Revisions:

Revised:

Void:

COVER

Designer: DL/GP

Detailer: FJ/DB

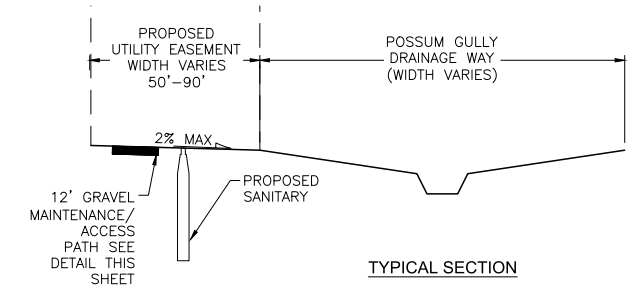
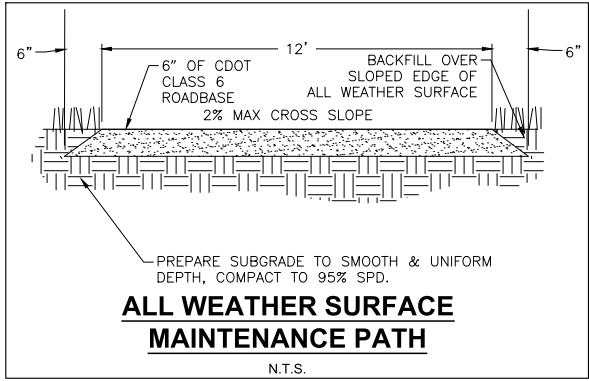
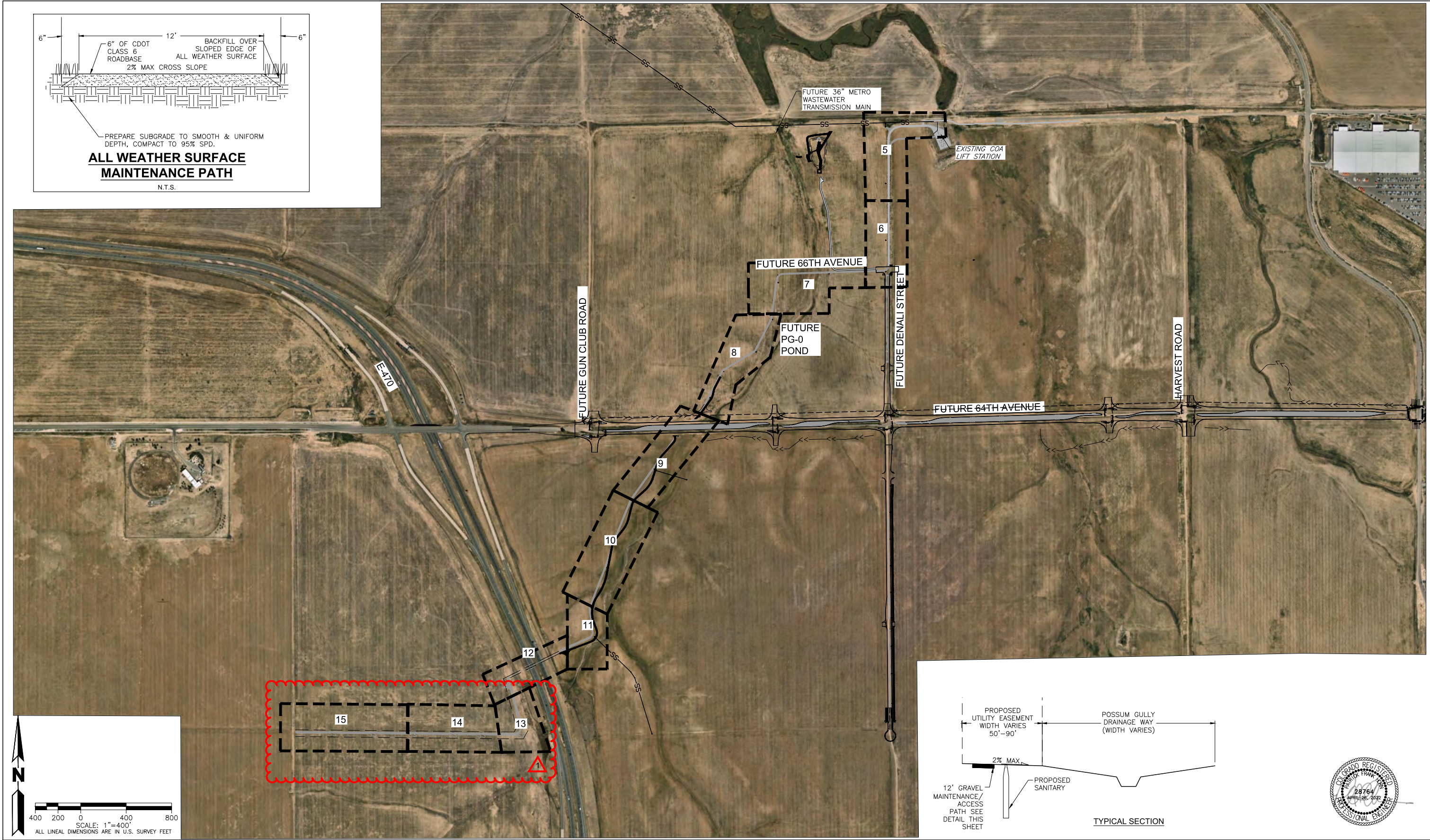
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Subset Sheet:

Project No./Code

1





Print Date: Monday, April 25, 2022	
File Name: AERIAL	
Horiz. Scale:	Vert. Scale:
Unit Information	Unit Leader

Sheet Revisions		
Date:	Comments	Init.
08/05/20	FOR COA APPROVAL	
04/25/22	PLAN AMENDMENT	

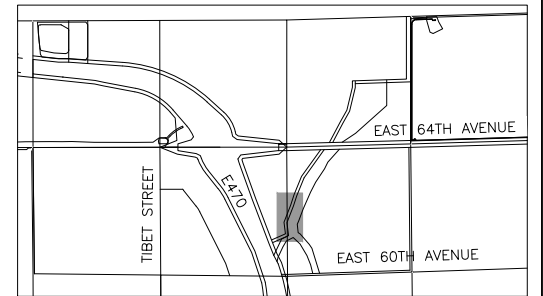
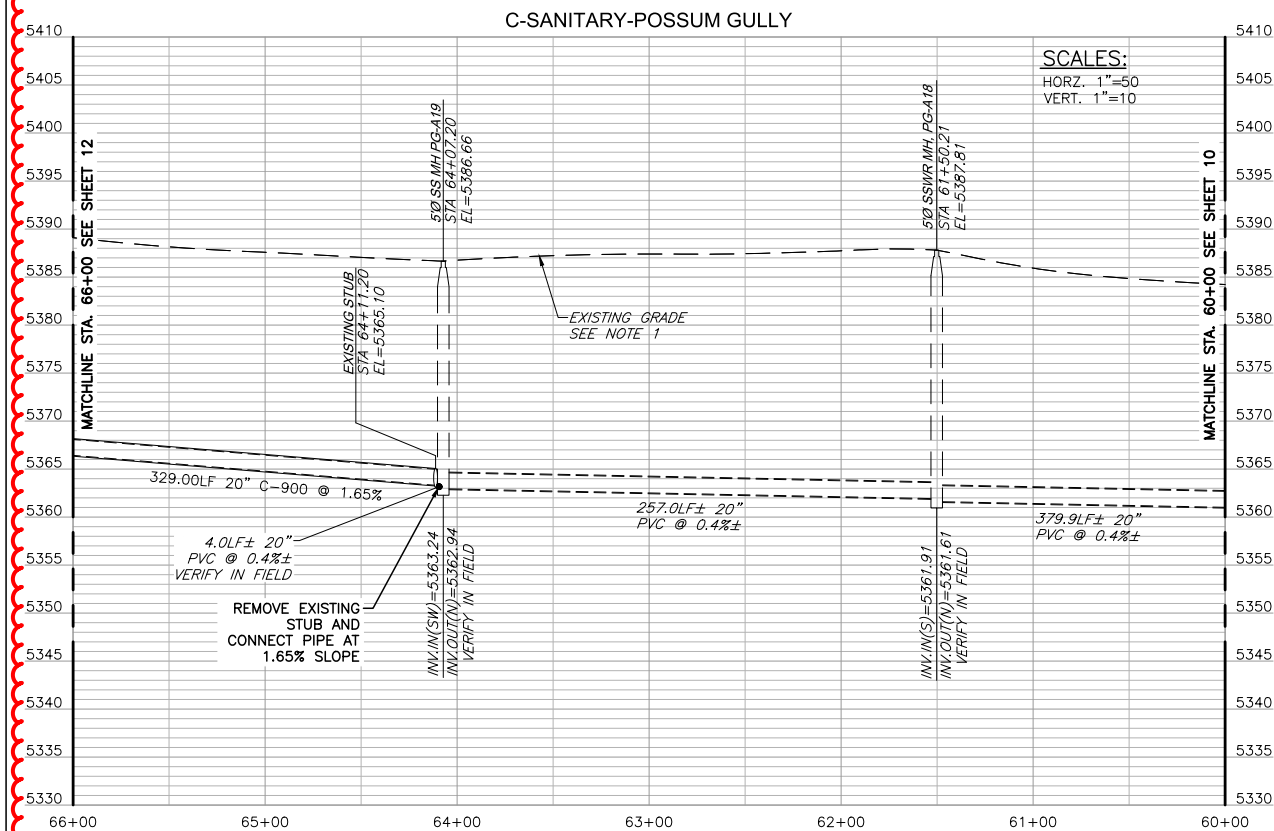
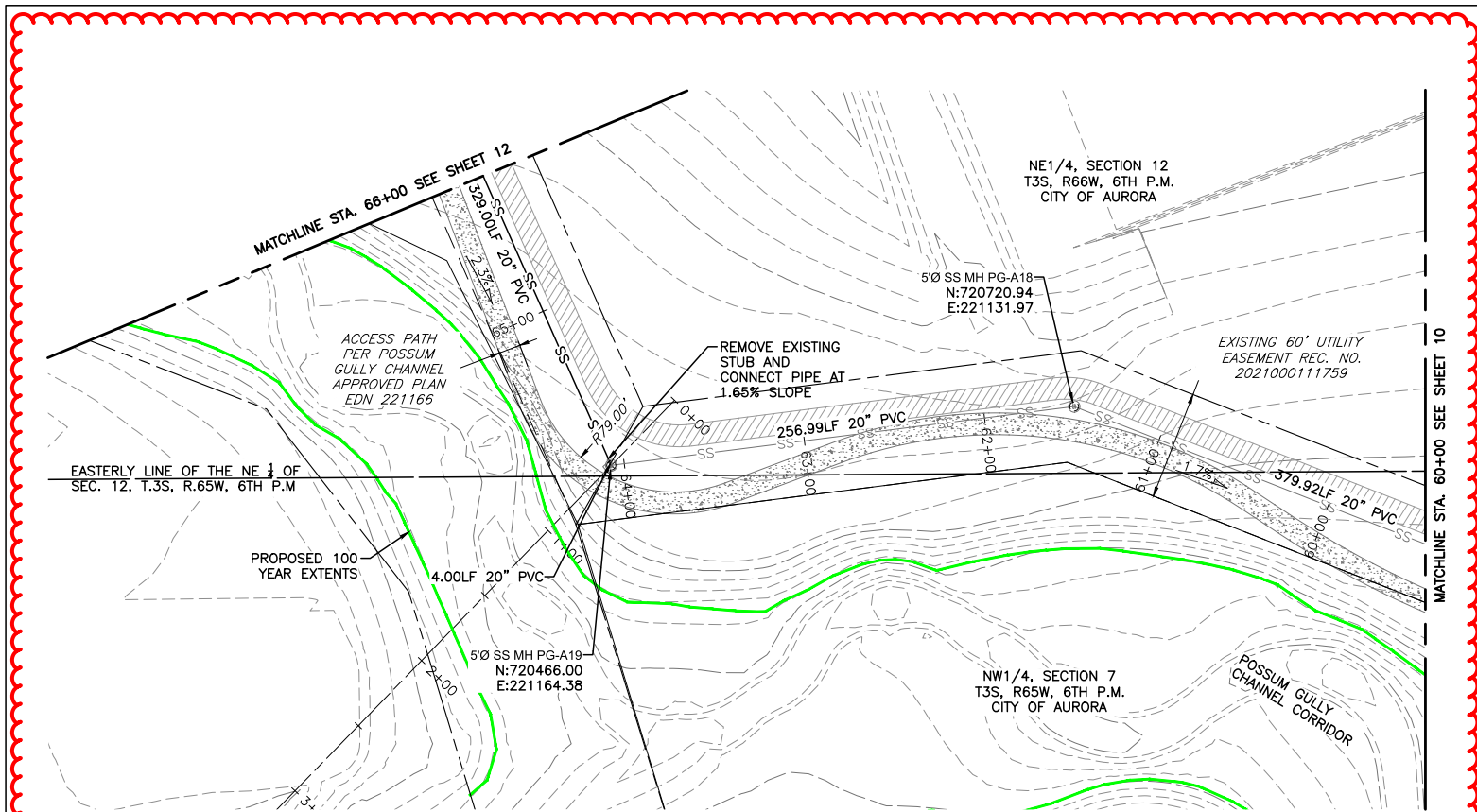


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MAIN 303.431.6100  
MARTINMARTIN.COM

M/M JOB NO.:  
19.0281

As Constructed		OVERALL UTILITY PLAN		Project No./Code
No Revisions:				
Revised:		Designer: DL/GP		
Void:		Detailer: FJ/DB		
Sheet Subset:		Subset Sheet:		4





KEYMAP  
SCALE: 1"=2000'

NOTES:

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EXISTING		PROPOSED
---	PROPERTY LINE	---
---	RIGHT-OF-WAY LINE	---
---	SECTION LINE	---
---	EASEMENT	---
---SS---	SANITARY SEWER	SS---
SS	SANITARY MANHOLE	SS
OW	MONITOR WELL	OW
DRIVE	DRIVE	DRIVE

BASIS OF BEARINGS:

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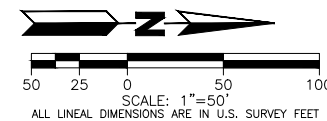
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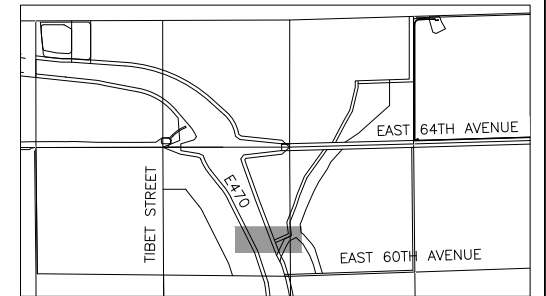
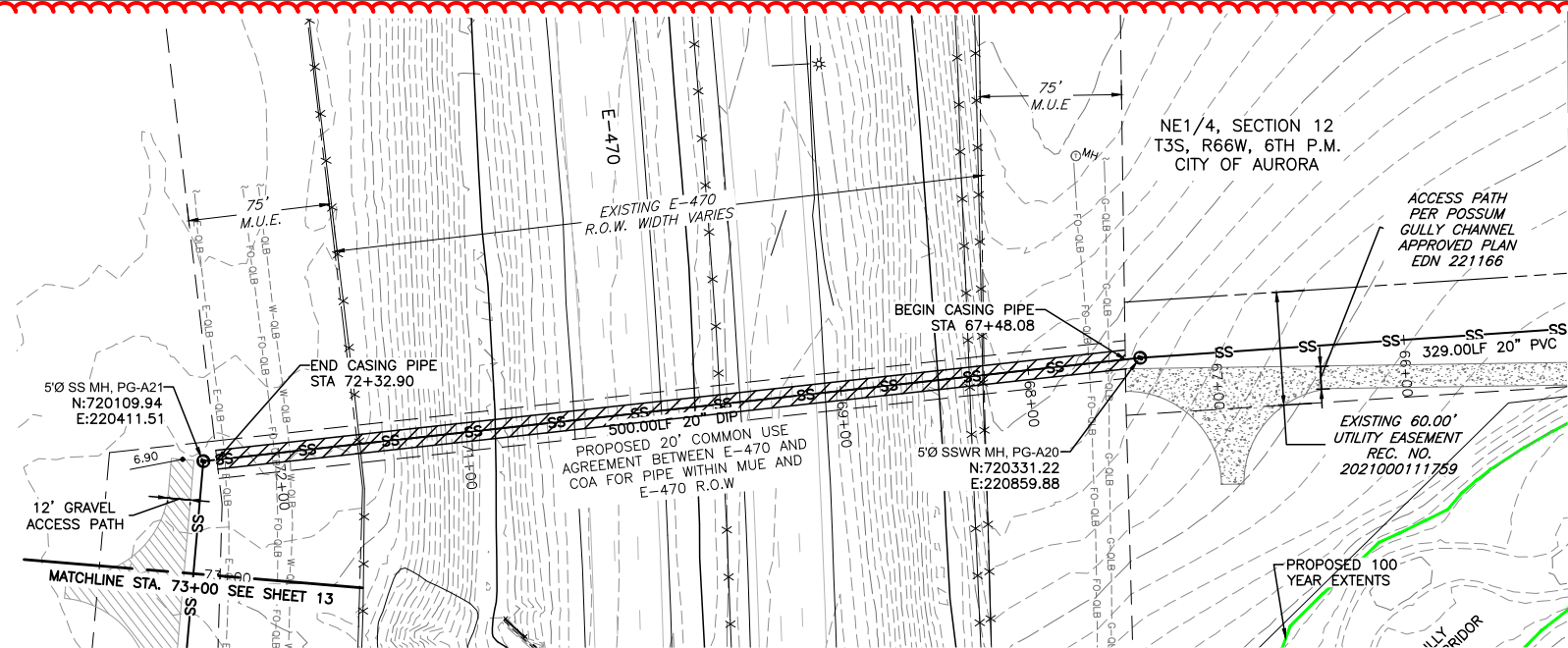
Print Date: Monday, April 25, 2022
File Name: SANITARY PLAN & PROFILE 60+00 - 66+00
Horiz. Scale: Vert. Scale:
Unit Information Unit Leader

Sheet Revisions		
Date:	Comments	Init.
08/05/20	FOR COA APPROVAL	
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M/M JOB NO.:  
19.0281

As Constructed	SANITARY PLAN & PROFILE			Project No./Code
No Revisions:	60+00 - 66+00			
Revised:	Designer: DL/GP			11
	Detailer: FJ/DB			
Void:	Sheet Subset:	Subset Sheet:		



KEYMAP  
SCALE: 1"=2000'

- NOTES:

1. EXISTING CONTOURS SHOWN ARE ANTICIPATED GRADES THAT WILL BE PRESENT AT TIME OF SANITARY SEWER MAIN INSTALLATION BASED ON CURRENT OVERLOT GRADING OPERATIONS AND PLANNED IMPROVEMENTS
2. CONTRACTOR TO RESTORE DISTURBED AREA BACK TO EXISTING GRADE AND VEGETATION TO EXISTING CONDITION PRIOR TO CONSTRUCTION.
3. MAINTENANCE PATH FROM STATION 17+00 TO 68+00 TO BE GRADED SO THERE IS A MAXIMUM LONGITUDINAL SLOPE OF 5.0% AND A CROSS SLOPE OF 2.0%.
4. DUCTILE IRON PIPE TO BE LINED WITH PROTECTIVE 401 CERAMIC EPOXY LINING OR APPROVED EQUAL WITH JOINT RESTRAINTS PER COA CRITERIA.
5. BORE CONTRACTOR TO PROVIDE PLAN PRIOR TO START OF CONSTRUCTION SHOWING LAYOUT OF BORE PITS WITH ANY ENCRoACHMENT INTO THE E-470.

E-470 REQUIRED NOTES:

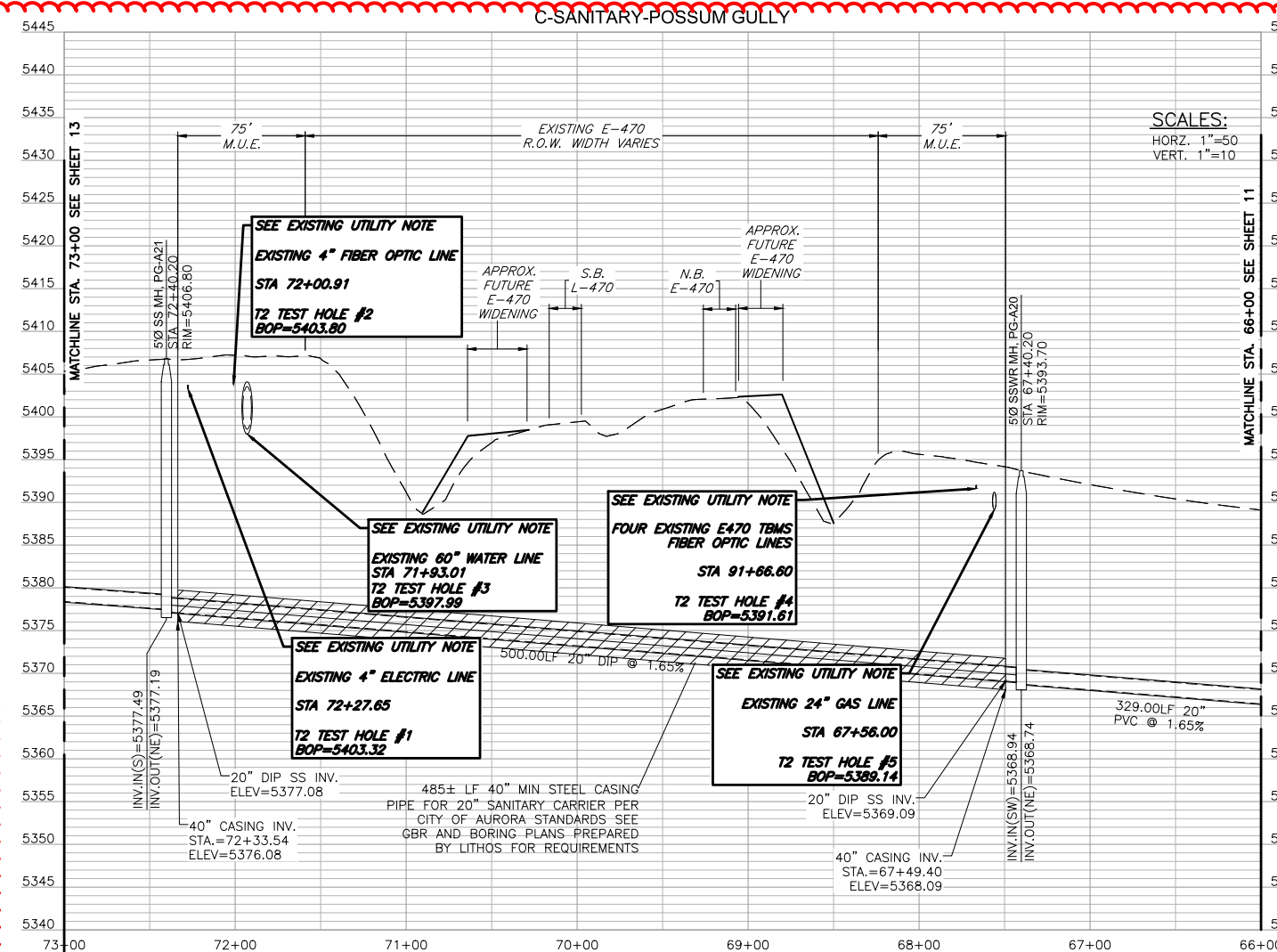
1. OCCUPYING SPACE FOR UTILITY WORK, ACCESS, AND ANY CONSTRUCTION WITHIN THE E-470 ROW, MUE, AND PROPERTY OWNED IN FEE IS SUBJECT TO AND WILL BE IN COMPLIANCE WITH THE E-470 PUBLIC HIGHWAY AUTHORITY PERMIT MANUAL APRIL 2008, AS MAY BE AMENDED FROM TIME TO TIME (THE "PERMIT MANUAL") AND WILL REQUIRE AN E-470 CONSTRUCTION OR ACCESS PERMIT. THE ADMINISTRATION FEE IS \$75,000 PER ACRE FOR CONSTRUCTION, AND THE PERMIT FEE IS \$750.
2. SURVEY MONUMENT ALONG AND WITHIN THE E-470 ROW/MUE WHICH ARE DISTURBED SHALL BE RESET AND CONFORM TO THE E-470 COORDINATE SYSTEM.
3. DISTURBED AREA SHALL BE RESTORED TO CONDITION SIMILAR TO PRE-CONSTRUCTION UNLESS OTHERWISE AGREED UPON.
4. NO ACCESS IS ALLOWED FROM E-470 MAINLINE.
5. REVEGETATION OF DISTURBED AREAS WITHIN THE E-470 PROPERTY WILL NEED TO MEET E-470 SEED MIX SPECIFICATIONS.

LEGEND

EXISTING

PROPOSED

PROPERTY LINE	RIGHT-OF-WAY LINE	SECTION LINE	EASEMENT	SANITARY SEWER	SANITARY MANHOLE	MONITOR WELL	DESCRIPTIONS
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CALL **811** 2-BUSINESS DAYS IN ADVANCE  
BEFORE YOU DIG, GRADE OR EXCAVATE FOR  
MARKING OF UNDERGROUND MEMBER UTILITIES  
MARTIN/MARTIN ASSUMES NO RESPONSIBILITY FOR UTILITY LOCATIONS.  
THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM  
INFORMATION PROVIDED BY THE PROJECT'S SUE CONSULTANT. THE  
ASCE (38) UTILITY QUALITY LEVEL IS AS INDICATED ON THE  
STAMPED/SIGNED SUE PLANS PREPARED BY THE PROJECT'S SUE  
CONSULTANT. IT IS, HOWEVER, THE CONTRACTOR'S RESPONSIBILITY TO  
FIELD VERIFY THE SIZE, MATERIAL, HORIZONTAL AND VERTICAL LOCATION  
OF ALL UTILITIES (DEPICTED OR NOT DEPICTED) PRIOR TO THE  
COMMENCEMENT OF ANY CONSTRUCTION.

**EXISTING UTILITY NOTE:**

EXISTING UTILITY TO REMAIN AND BE PROTECTED. CONTRACTOR TO VERIFY LOCATION AND DEPTH PRIOR TO CONSTRUCTION AND NOTIFY ENGINEER OF ANY DISCREPANCIES. CONTRACTOR TO COORDINATE WITH UTILITY PROVIDER ON CROSSING AND ANY OTHER REQUIREMENTS.

### BASIS OF BEARINGS:

BEARINGS ARE BASED ON AN ASSUMED BEARING OF  
S00°33'21"E ALONG THE EASTERLY LINE OF THE  
SOUTHWEST QUARTER OF SECTION 7, TOWNSHIP 3  
SOUTH, RANGE 65 WEST OF THE 6TH P.M. BEING  
MONUMENTED AS A FOUND 3 1/4" ALUMINUM CAP  
PLS # 25379 IN RANGEBOX AT THE CENTER QUARTER  
CORNER AND A FOUND 2 1/2" ALUMINUM CAP PLS #  
28285 AT THE SOUTH QUARTER CORNER.

BENCHMARK:

COA ID: 3S6508NW001

ELEVATIONS ARE BASED ON THE CITY OF AURORA  
AND COUNTY OF ADAMS BENCHMARK  
#3S6508N0001 A CITY OF AURORA AND COUNTY  
OF ADAMS 3-1/4" ALUMINUM CAP STAMPED (CITY  
OF AURORA B.M., #3S6508N001, 2007.) ON A 5"  
#6 REBAR, IN A 12" PVC PIPE WITH A CAP.  
LOCATED SOUTHEAST OF THE SECTION CORNER TO  
SECTIONS 6, 5, 8, 7, TOWNSHIP 3 SOUTH, RANGE  
65 WEST, SOUTHEAST OF YELLOW STEEL CONCRETE  
POST, SOUTH OF THE CENTERLINE OF A DIRT ROAD  
(64TH AVENUE) AND EAST OF THE INTERSECTION  
OF E-470 AND 64TH AVENUE.

ELEVATION = 5394.58 (NAVD 1988) DATUM.



Print Date: Monday, April 25, 2022

File Name: SANITARY 69+50 - 72+86

Horiz. Scale:

Vert. Scale:

Unit Information	Unit Leader
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## Sheet Revisions

Date:	Comments	Init.
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08/05/20	FOR COA APPROVAL
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04/25/22	PLAN AMENDMENT
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M/M JOB NO.:  
19.0281

**MARTIN/MARTIN**  
CONSULTING ENGINEERS

12499 WEST COLFAX AVENUE,  
LAKEWOOD, COLORADO 80215  
MAIN 303.431.6100  
MARTINMARTIN.COM

As Constructed

No Revisions:

Revised:

Void:
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## SANITARY PLAN & PROFILE

66+00 - 73+00

Designer:	DL/GP
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Detailer: FJ/DB

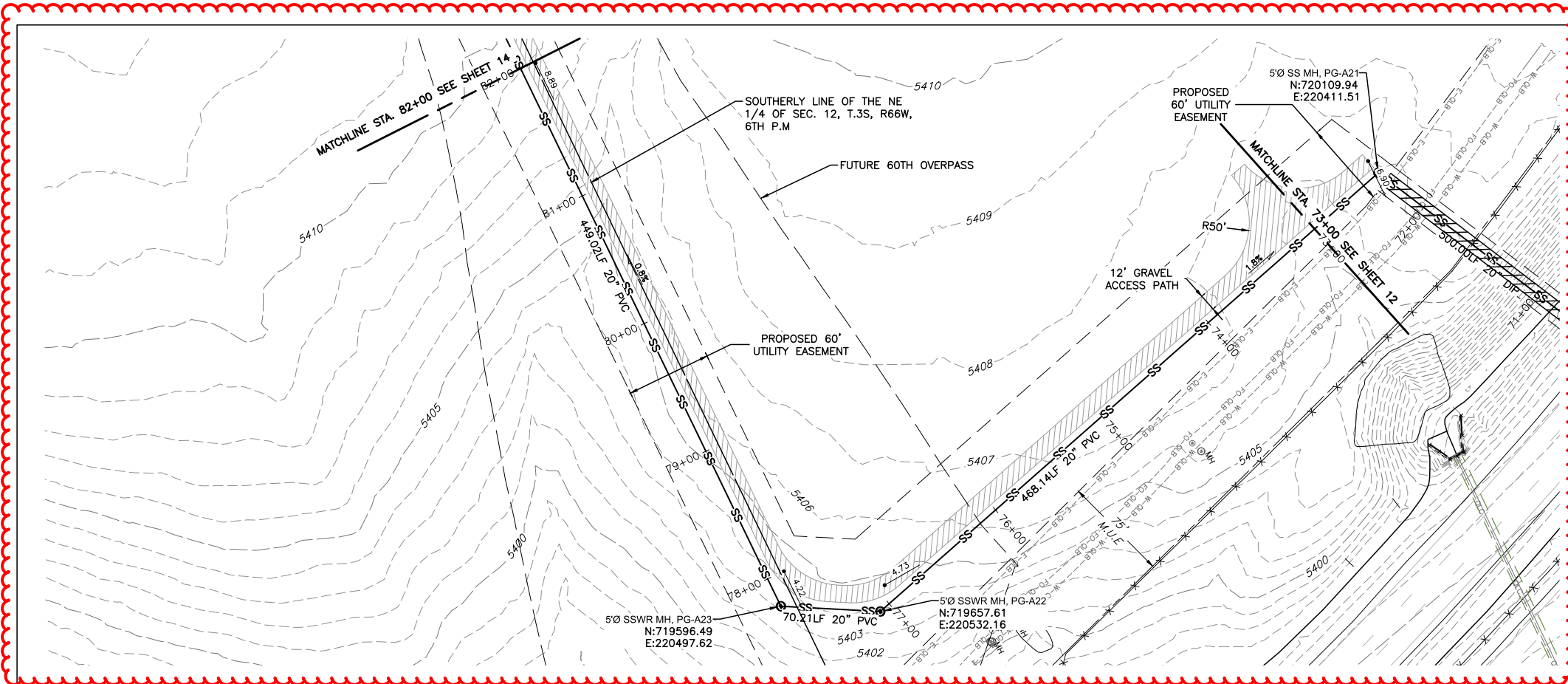
Sheet Subset:

Subset Sheet:

Project No./Code

12





**BENCHMARK:**

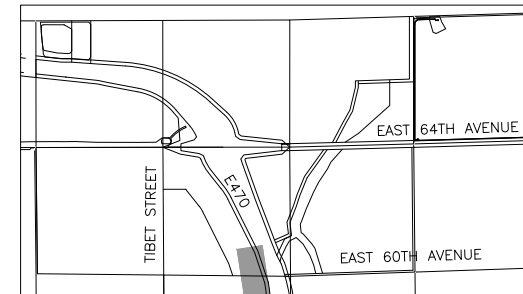
COA ID: 3S6508NW001

ELEVATIONS ARE BASED ON THE CITY OF AURORA AND COUNTY OF ADAMS BENCHMARK #3S6508NW001 A CITY OF AURORA AND COUNTY OF ADAMS 3-1/4" ALUMINUM CAP STAMPED (CITY OF AURORA B.M., 3S6508NW001, 2007.) ON A 5' #6 REBAR, IN A 8" PVC PIPE WITH A CAP, LOCATED SOUTHEAST OF THE SECTION CORNER TO SECTIONS 6, 5, 8, 7, TOWNSHIP 3 SOUTH, RANGE 65 WEST, SOUTHEAST OF YELLOW STEEL CONCRETE POST, SOUTH OF THE CENTERLINE OF A DIRT ROAD (64TH AVENUE) AND EAST OF THE INTERSECTION OF E-470 AND 64TH AVENUE.

ELEVATION = 5394.58 (NAVD 1988) DATUM.

**BASIS OF BEARINGS:**

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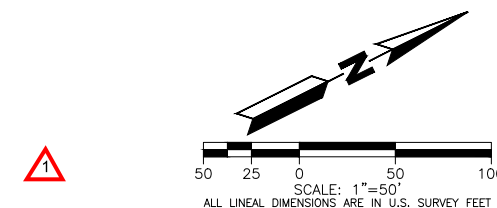
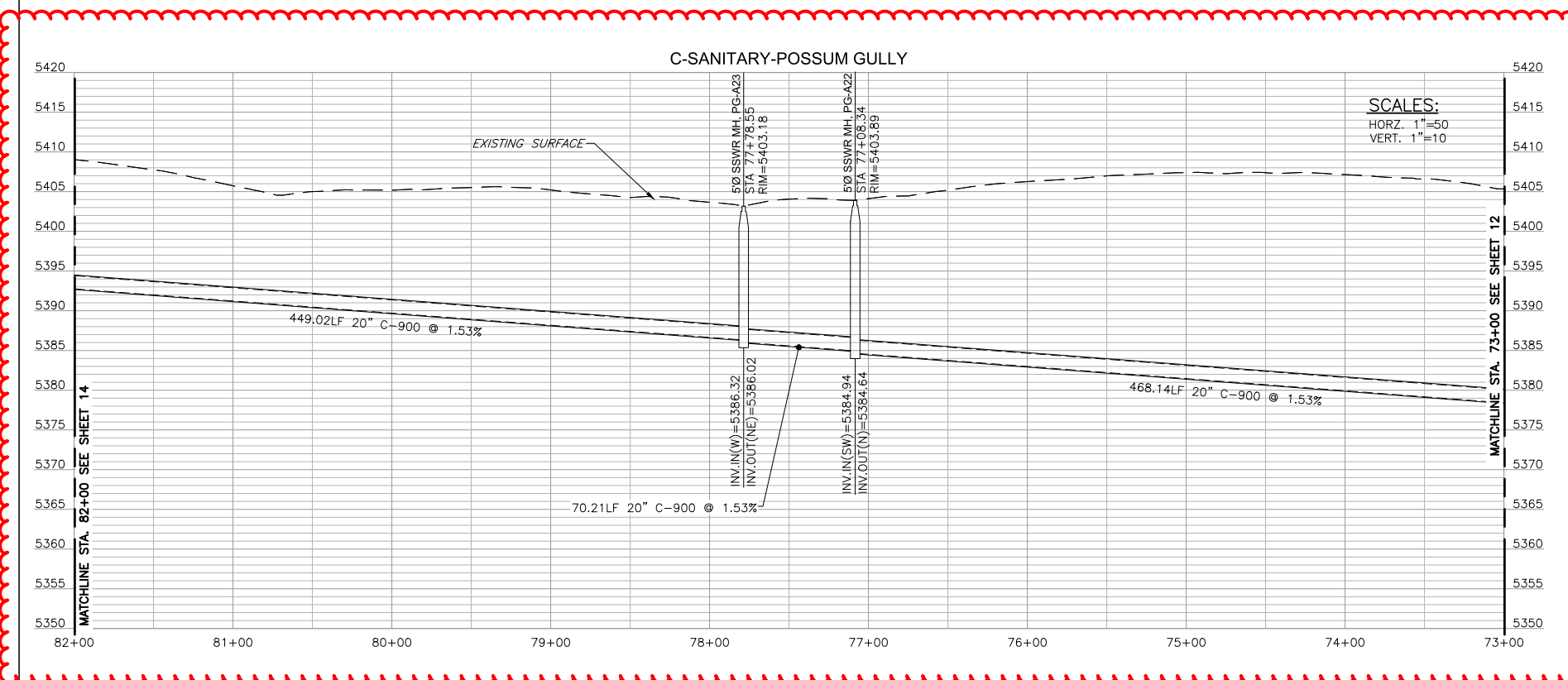
KEYMAP  
SCALE: 1"=2000'

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- MAINTENANCE PATH FROM STATION 72+40 TO 97+40 TO BE GRADED SO THERE IS A MAXIMUM LONGITUDINAL SLOPE OF 5.0% AND A CROSS SLOPE OF 2.0%.

**LEGEND**

EXISTING		PROPOSED
---	PROPERTY LINE	---
---	RIGHT-OF-WAY LINE	---
---	SECTION LINE	---
---	EASEMENT	---
---SS---	SANITARY SEWER	---SS---
SS	SANITARY MANHOLE	SS
D.W.	MONITOR WELL	
DRIVE	DRIVE	DRIVE



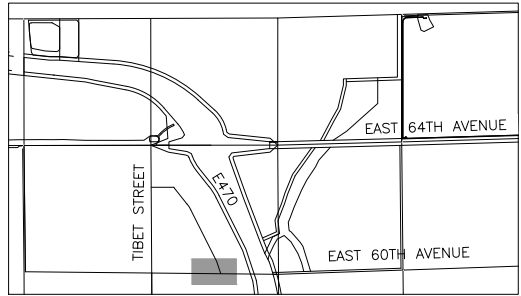
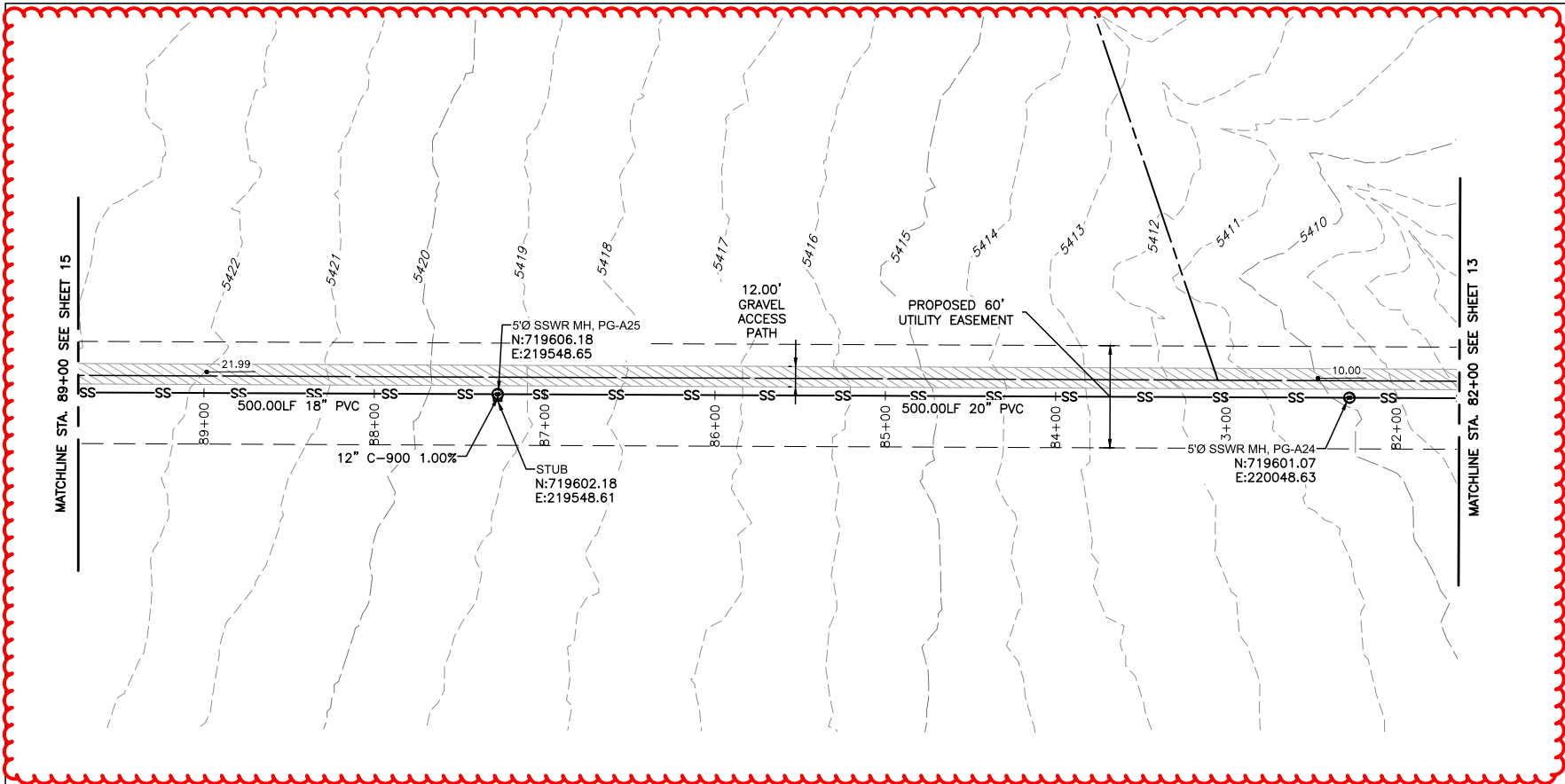
CALL 811 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR MARKING OF UNDERGROUND MEMBER UTILITIES. MARTIN/MARTIN ASSUMES NO RESPONSIBILITY FOR UTILITY LOCATIONS. THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM INFORMATION PROVIDED BY THE PROJECT'S SUE CONSULTANT. THE ASCE (38) UTILITY QUALITY LEVEL IS AS INDICATED ON THE STAMPED/SIGNED SUE PLANS PREPARED BY THE PROJECT'S SUE CONSULTANT. IT IS, HOWEVER, THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE SIZE, MATERIAL, HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES (DEPICTED OR NOT DEPICTED) PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.



New Sheet Added

Print Date: Monday, April 25, 2022		Sheet Revisions				M/M JOB NO.: 19.0281	MARTIN/MARTIN CONSULTING ENGINEERS 12499 WEST COLFAX AVENUE, LAKEWOOD, COLORADO 80215 MAIN 303.431.6100 MARTINMARTIN.COM	As Constructed	SANITARY PLAN & PROFILE 73+00 - 82+00		Project No./Code
File Name: SANITARY 73+00 - 82+00		Date:	Comments	Init.							
Horiz. Scale:		08/05/20	FOR COA APPROVAL						Designer:	DL/GP	
Unit Information		04/25/22	PLAN AMENDMENT						Detailer:	FJ/DB	
								Void:	Sheet Subset:	Subset Sheet:	13





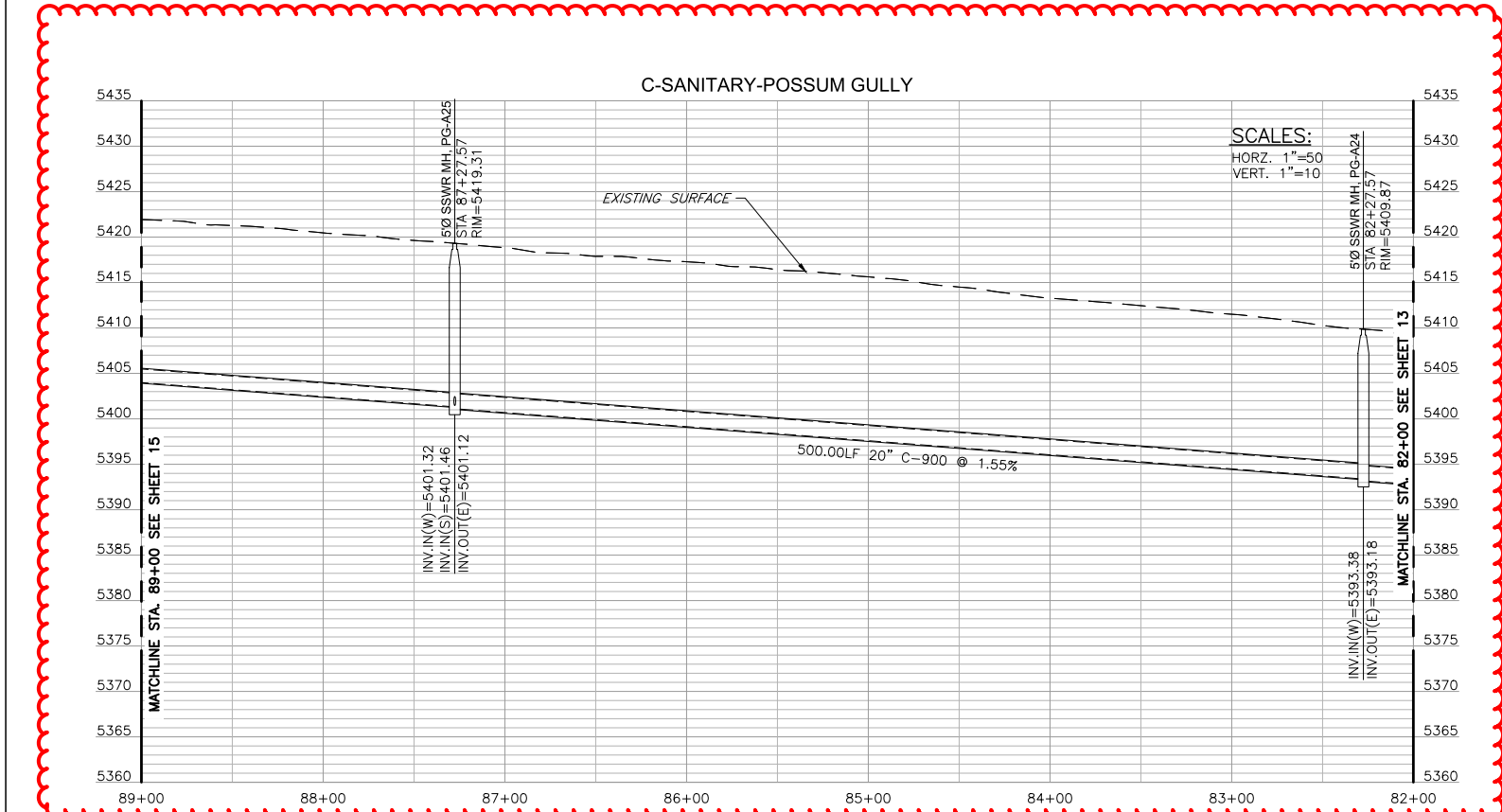
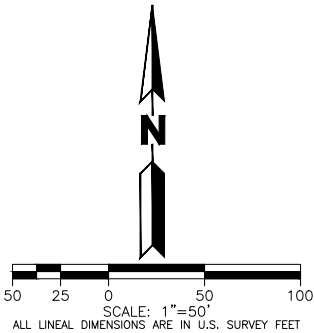
KEYMAP  
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LEGEND

EXISTING		PROPOSED
	PROPERTY LINE	
	RIGHT-OF-WAY LINE	
	SECTION LINE	
	EASEMENT	
	SANITARY SEWER	
	SANITARY MANHOLE	
	MONITOR WELL	
	DRIVE	
	DESCRIPTIONS	DRIVE



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BENCHMARK:

COA ID: 3S6508NW001

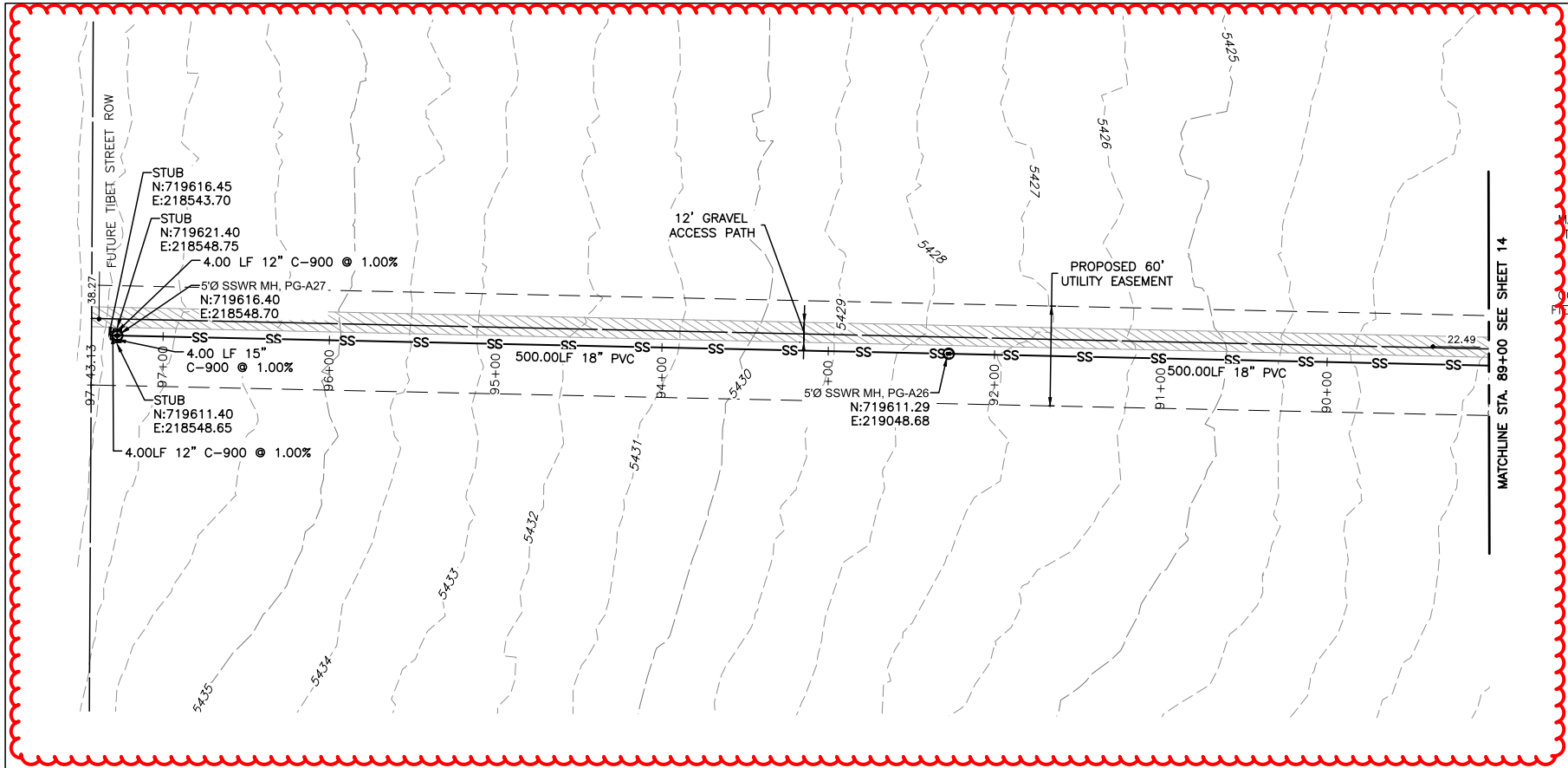
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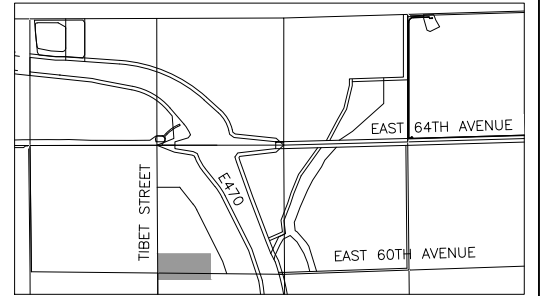
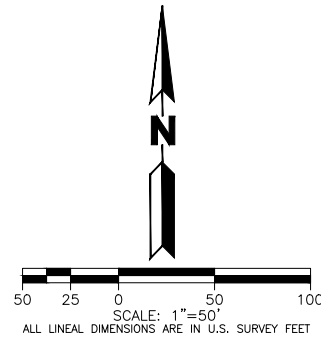


New Sheet Added

Print Date: Monday, April 25, 2022		Sheet Revisions			M/M JOB NO.: 19.0281	MARTIN/MARTIN CONSULTING ENGINEERS 12499 WEST COLFAX AVENUE, LAKEWOOD, COLORADO 80215 MAIN 303.431.6100 MARTINMARTIN.COM	As Constructed	SANITARY PLAN & PROFILE 82+00 - 89+00		Project No./Code
File Name: SANITARY 82+00 - 89+00		Date:	Comments	Init.						
Horiz. Scale:		08/05/20	FOR COA APPROVAL							
Unit Information		04/25/22	PLAN AMENDMENT							
							No Revisions:	Designer: DL/GP		
							Revised:	Detailer: FJ/DB		
							Void:	Sheet Subset:	Subset Sheet:	14



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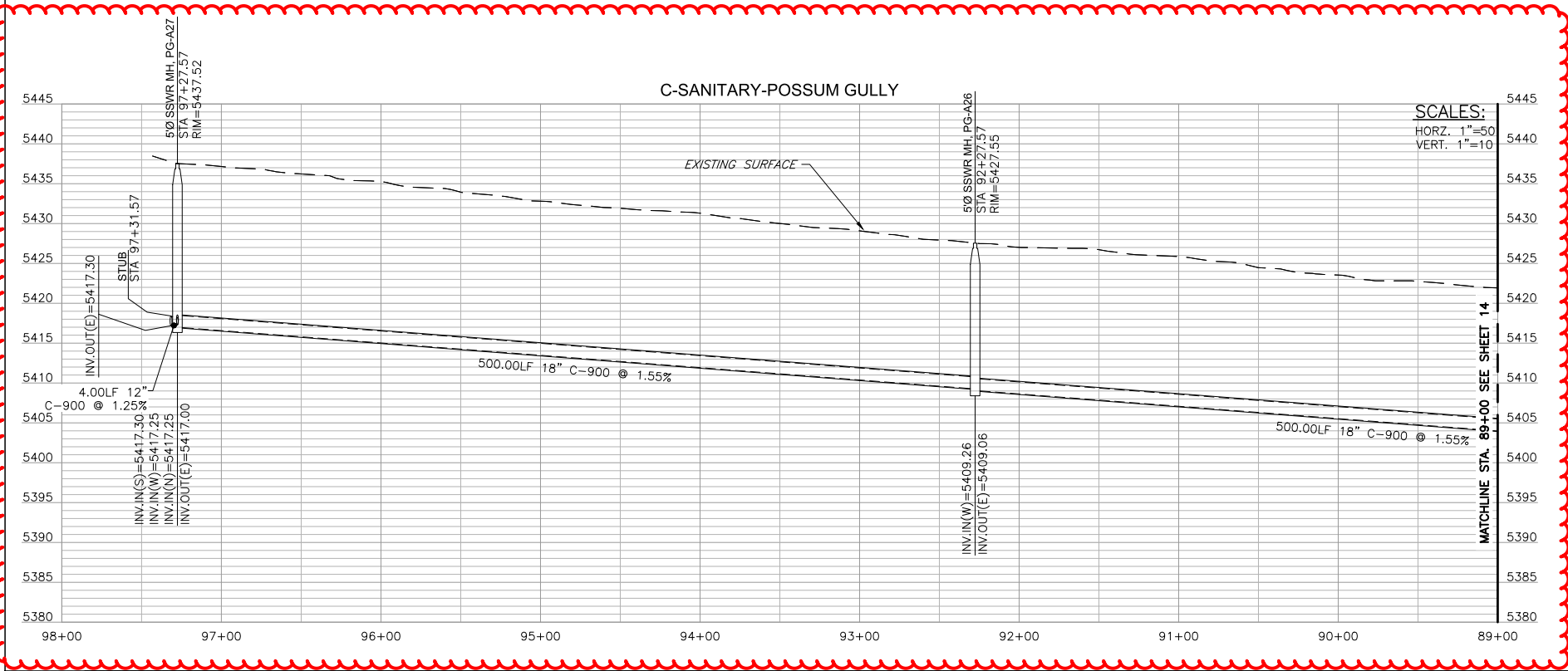
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---	EASEMENT	---
---SS---	SANITARY SEWER	SS
SS	SANITARY MANHOLE	SS
SS	MONITOR WELL	SS
SS	DRIVE	SS
SS	DRIVE	SS



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ELEVATION = 5394.58 (NAVD 1988) DATUM.



New Sheet Added

Print Date: Monday, April 25, 2022
File Name: SANITARY 89+00 - 90+00
Horiz. Scale: Vert. Scale:
Unit Information Unit Leader

Sheet Revisions		
Date:	Comments	Init.
08/05/20	FOR COA APPROVAL	
04/25/22	PLAN AMENDMENT	

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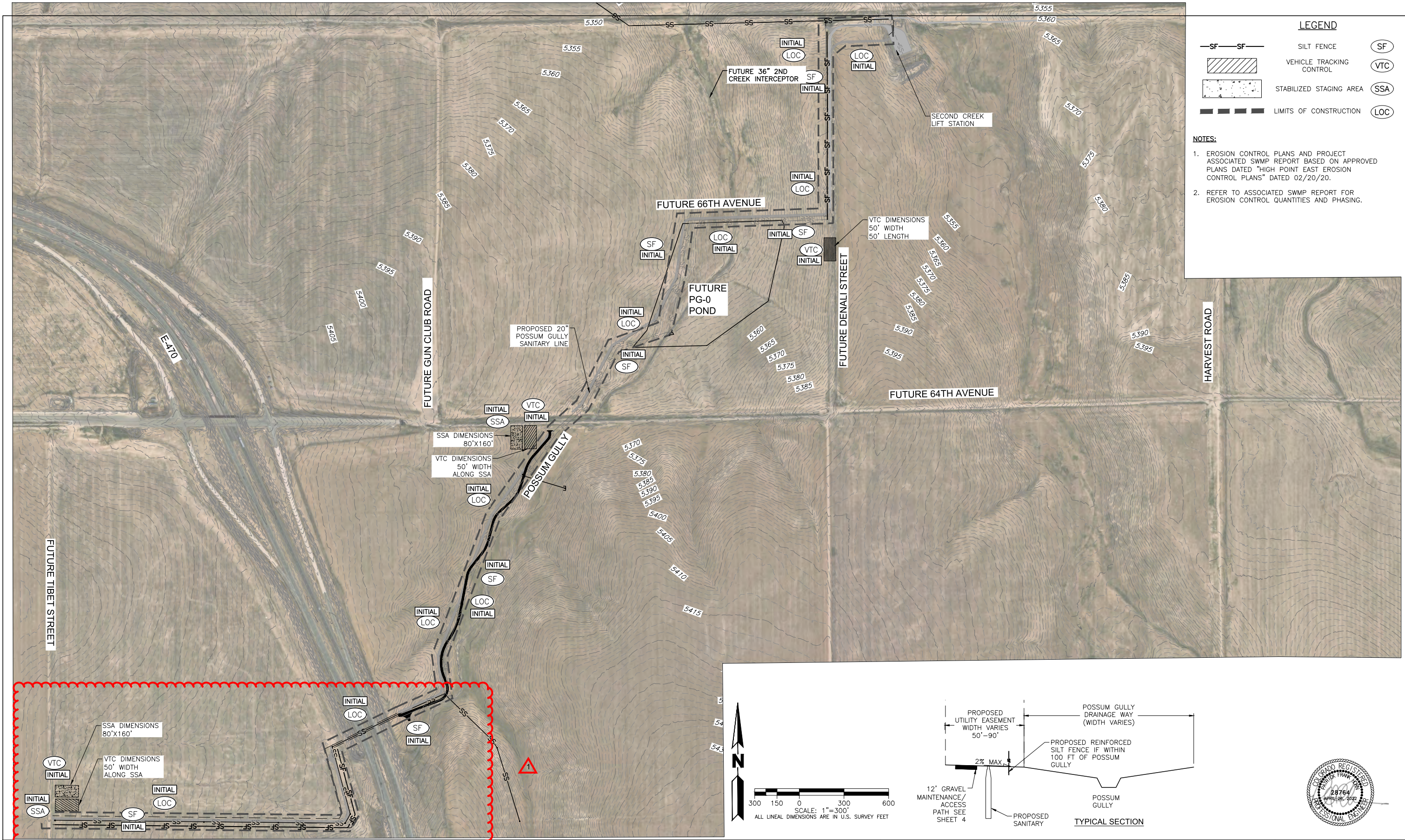
M/M JOB NO.:  
19.0281

As Constructed
No Revisions:
Revised:
Void:

SANITARY PLAN & PROFILE	
89+00 - 97+43.13	
Designer: DL/GP	
Detailer: FJ/DB	
Sheet Subset:	Subset Sheet:

Project No./Code
15





Print Date: Monday, April 25, 2022	
File Name: 16 EROSION CONTROL PLAN	
Horiz. Scale:	Vert. Scale:
Unit Information	Unit Leader

Sheet Revisions		
Date:	Comments	Init.
08/05/20	FOR COA APPROVAL	
04/25/22	PLAN AMENDMENT	



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M/M JOB NO.:  
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As Constructed		EROSION CONTROL PLAN		Project No./Code
No Revisions:		Designer: DL/GP		
Revised:		Detailer: FJ/DB		
Void:		Sheet Subset:	Subset Sheet:	16





GREEN VALLEY - AMENDMENT 1  
SANITARY SEWER GENERATION

RESIDENTIAL		
Single-Family Population Density	2.77	People per Unit
Age Restricted Population Density	2.50	People per Unit
Average Flow Generation	68	gpcpd

MIXED USE	
Unit density of 10 units/acre was assumed and equivalent population was calculated with the Single-Family residential population density of 2.77	

COMMERCIAL		
Average Flow Generation	1,500	gpd/acre
	0.0023	cfs/acre
Equivalent Population	22	capita/acre

SCHOOLS / INDUSTRIAL		
Average Flow Generation	1,200	gpd/acre
	0.0019	cfs/acre
Equivalent Population	18	capita/acre

PEAKING FACTOR			
PF = 5/(p^0.167)	Where p = Population in thousands		
Min. PF =	1.7	Max. PF =	4.0

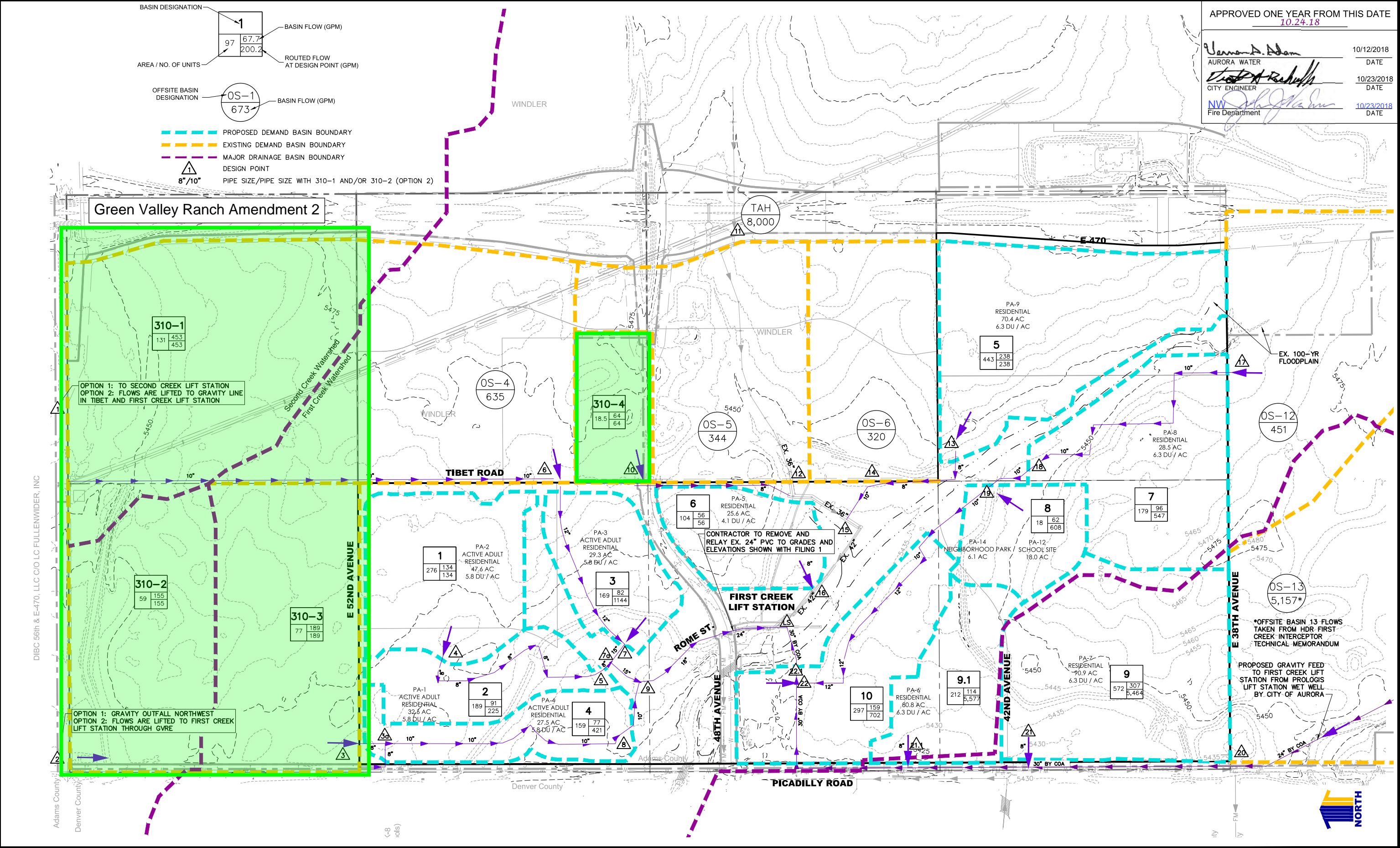
	PIPE CAPACITY (cfs) n = 0.011		
	PIPE SIZE (IN)	0.4% SLOPE	0.25% SLOPE
75 % FULL	8	0.82	0.65
	10	1.49	1.18
	12	2.43	1.92
80 % FULL	15	4.72	3.73
	18	7.67	6.07
	24	16.53	13.07
	30	29.97	23.69
	36	48.73	38.52
	42	73.50	58.11

DESIGN POINT	BASIN	LAND USE	TOTAL ACRES	DENSITY (UNITS/AC)	NO. OF LOTS	EQUIVALENT POPULATION	AVG. DAY FLOW (CFS)	AVG. DAY FLOW (GPD)	AVG. DAY FLOW (GPM)	INFILTRATION @ 10% (GPM)	PEAKING FACTOR	PEAK FLOW (GPM)	PEAK FLOW + INFILTRATION (GPM)	PEAK FLOW + INFILTRATION (CFS)	Estimated Size at 0.4% (IN)	Pipe Percent Full at 0.4% (%)	Existing Pipe Size (IN)	COMMENTS
1	Offsite Basin 310-1	Mixed Use	142.4		-	3,227	0.246	158,994	110	11.0	4.0	442	453	1.01	10	57		Offsite Basin 310-1
2	Offsite Basin 310-2	SF Residential	57.9	5.0	290	802	0.084	54,530	38	3.8	4.0	151	155	0.35	8	43		Offsite Basin 310-2
3	Offsite Basin 310-3	SF Residential	70.4	5.0	352	975	0.103	66,303	46	4.6	4.0	184	189	0.42	8	48		Offsite Basin 310-3
3a	Design Point Total (Option 2 w/ 310-2)					1,777	0.187	120,833	84	8.4	4.0	336	344	0.77	8	71		Offsite Basin 310-2 + 310-3 (see Notes 1 and 4)
4	Basin 1	SF Resid. (Age Restricted)	47.6	5.8	276	690	0.073	46,920	33	3.3	4.0	130	134	0.30	8	40		Basin 1
	Design Point Total					690	0.073	46,920	33	3.3	4.0	130	134	0.30	8	40		
5	Basin 2	SF Resid. (Age Restricted)	32.6	5.8	189	473	0.050	32,130	22	2.2	4.0	89	91	0.20	8	32		Basin 1 + 2
	Design Point Total					1,163	0.122	79,050	55	5.5	4.0	220	225	0.50	8	53		
6	Offsite Basin 4 (GVR D-6)	Mixed Use	106.5		-	2,785	0.345	222,979	155	15.5	4.0	619	635	1.41	10	72		Offsite Basin 4 (GVR D-6)
	Design Point Total (Option 2 w/ 310-1)					6,012	0.591	381,973	265	26.5	3.7	983	1,010	2.25	12	71		Offsite Basin 4 + 310-1 (see Note 2)
7	Basin 3	SF Resid. (Age Restricted)	29.3	5.8	169	423	0.044	28,730	20	2.0	4.0	80	82	0.18	8	30		Offsite Basin 4 + Basin 1 + 2 + 3
	Design Point Total					3,208	0.337	218,110	151	15.1	4.0	606	621	1.38	10	70		
	Design Point Total (Option 2 w/ 310-1)					6,435	0.677	437,546	304	30.4	3.7	1,113	1,144	2.55	15	52		
7a	Design Point Total					4,370	0.512	330,759	230	23.0	3.9	898	921	2.05	12	66		Offsite Basin 4 + Basin 1 + 2 + 3
	Design Point Total (Option 2 w/ 310-1)					7,597	0.758	489,753	340	34.0	3.6	1,212	1,246	2.78	15	54		
8	Basin 4	SF Resid. (Age Restricted)	27.5	5.8	159	398	0.042	27,030	19	1.9	4.0	75	77	0.17	8	29		Offsite Basin 310-3 + Basin 4 (see Note 4)
	Design Point Total					1,373	0.144	93,333	65	6.5	4.0	259	266	0.59	8	59		
	Design Point Total (Option 2 w/ 310-2)					2,174	0.229	147,863	103	10.3	4.0	411	421	0.94	10	54		Offsite Basin 310-2 + 310-3 + Basin 4 (see Notes 1 and 4)
9	Design Point Total					6,905	0.778	503,142	349	34.9	3.6	1,265	1,300	2.90	15	56		Design Point 5 + Design Point 7 + Design Point 8 (see Note 4)
	Design Point Total (Option 2 w/ 310-2)					7,707	0.965	623,975	433	43.3	3.6	1,541	1,584	3.53	15	64		(see Notes 1 and 4)
	Design Point Total (Option 2 w/ 310-1 & 310-2)					10,934	1.211	782,969	544	54.4	3.4	1,823	1,878	4.18	15	72		(see Notes 1, 2 and 4)
10	Offsite Basin 310-4	Commercial	18.5			407	0.043	27,676	19	1.9	4.0	77	79	0.18	8	30		Offsite Basin 310-4
11	TAH (DP 18)	Mixed Use	2,109.0			104,435	7.425	4,798,903	3333	333.3	2.3	7,667	8,000	17.82	30	55		From The Aurora Highlands (TAH) Master Utility Report
12	Offsite Basin 5 (GVR D-7)	Mixed Use	62.8			1,423	0.187	120,861	84	8.4	4.0	336	344	0.77	8	71		From Lund Green Valley Report (GVR D-7)
	Design Point Total		2,190.3			106,265	7.655	4,947,440	3436	343.6	2.3	7,881	8,225	18.32	30	56		TAH (see Note 3)
13	Basin 5	SF Residential	70.4	6.3	443	1,227	0.129	83,443	58	5.8	4.0	232	238	0.53	8	55		Basin 5
14	Offsite Basin 6 (GVR C-30)	Mixed Use	64.0			1,408	0.174	112,459	78	7.8	4.0	312	320	0.71	8	67		From Lund Green Valley Report (GVR C-30)
	Design Point Total		134.4			2,635	0.303	195,903	136	13.6	4.0	544	558	1.24	10	65		Offsite Basin 6 + Basin 5
15	Design Point Total		2,324.7			108,900	7.958	5,143,343	3572	357.2	2.3	8,160	8,517	18.98	30	57	36"	TAH + Offsite Basin 5 + 6 + Basin 5 (see Note 3)
16	Basin 6	SF Residential	25.6	4.1	104	288	0.030	19,589	14	1.4	4.0	54	56	0.12	8	25		Basin 6
	Design Point Total		2,350.3			109,188	7.988	5,162,932	3585	358.5	2.3	8,187	8,546	19.04	30	57	42"	TAH + Offsite Basin 5 + 6 + Basin 5 + 6 (see Note 3)
17	Offsite Basin 12 (GV OFS-12)	Mixed Use	87.4		-	1,981	0.245	158,348	110	11.0	4.0	440	451	1.00	10	56		Offsite Basin 12 (GV OFS-12)
18	Basin 7	SF Residential	28.5	6.3	179	496	0.052	33,716	23	2.3	4.0	94	96	0.21	8	33		Basin 7
	Design Point Total		115.9			2,477	0.297	192,064	133	13.3	4.0	534	547	1.22	10	64		Basin 7 + Offsite Basin 12
19	Basin 8	School	18.0	-	-	324	0.033	21,600	15	1.5	4.0	60	62	0.14	8	27		Basin 8
	Design Point Total		133.9			2,801	0.331	213,664	148	14.8	4.0	594	608	1.36	10	70		Basins 7+8 + Offsite Basin 12
20	Offsite Basin 13	Mixed Use		-	-							5,157	11.49	24	61	30" @ 0.15%		Offsite Basin 13
21	Basin 9	SF Residential	90.9	6.3	572	1,584	0.167	107,742	75	7.5	4.0	299	307	0.68	8	65		Basin 9
	Design Point Total											5,464	12.17	24	63	30" @ 0.15%		Basin 9 + Offsite Basin 13
21.1	Basin 9.1	SF Residential	33.6	6.3	212	587	0.062	39,932	28	2.8	4.0	111	114	0.25	8	36		Basin 9.1
	Design Point Total		125									5,577	12.43	24	64	30" @ 0.15%		
22	Basin 10	SF Residential	47.2	6.3	297	823	0.087	55,943	39	3.9	4.0	155	159	0.35	8	43		Basin 10
	Design Point Total		297.0			3,624	0.714	246,399	171	17.1	4.0	684	702	1.56	12	55		Basins 7+8+10 and Offsite Basin 12
22.1	Design Point Total											6,279	13.99	24	69	30" @ 0.15%		Basins 7+8+9+9.1+10 + Offsite Basins 12+13
LS	Design Point Total											16,702	37.21	42	64			All Basins
SITE TOTALS		SF Resid. (Age Restricted)	137.0		793	1,983	0.209	134,810	94	9.4	4.0	374	384	0.86				
		SF Residential	296.3		1807	5,005	0.465	340,367	236	23.6	3.8	903	927	2.06				
		School	18.0		-	324	0.033	21600	15	1.5	4.0	60	62	0.14				

NOTE 1: For analysis purposes, Option 2 requires a lift station to convey flows from Basin 310-2 along Picadilly Rd to Design Point 3a  
NOTE 2: For analysis purposes, Option 2 requires a lift station to convey flows from Basin 310-1 along Tibet Rd to Design Point 6  
NOTE 3: There is an existing 36" or 42" sanitary sewer main in this area  
NOTE 4: Sanitary Sewer Pipe runs at 0.25% slope near and along Rome St (Design Points 7a, 8 and 9)

AVERAGE DAY FLOW for Offsite Basin 310-1 and TRIBUTARY AREA for Offsite Basins 310-2 and 310-3 taken from 310 West Master Utility Report by Calibre Engineering  
AVERAGE DAY FLOW for Offsite Basins 4, 5, 6 and 12 taken from Master Utility Report for Green Valley by The Lund Partnership, Inc. (2006)  
PEAK FLOW + INFILTRATION for Offsite Basin 13 taken from HDR First Creek Interceptor Technical Memorandum 3 provided by COA (Parcels 26 and Parcels 32-38) with peaking factor of 2.25  
AVERAGE DAY FLOW for Offsite Basin TAH taken from Master Utility Report for The Aurora Highlands by Calibre Engineering (2018)  
SITE TOTALS are flows from Green Valley - Amendment 1 only

PATH: P:\OAKWOOD GVRE DDICADD\EXHIBITS\FDP\_SS1.DWG  
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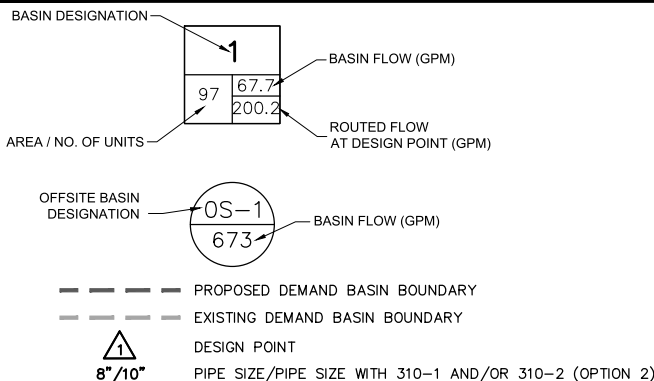


APPROVED ONE YEAR FROM THIS DATE  
10.24.18

Vernon D. Adam  
AURORA WATER  
CITY ENGINEER  
NW Fire Department

10/12/2018  
DATE  
10/23/2018  
DATE  
10/23/2018  
DATE

DATE		REVISION DESCRIPTION		Drawing Name X-FDP_SS1.dwg		Job Number Oakwood GVRE FDP F1&2		Prepared For CITY OF AURORA		Designer LMA		Drafter LMA		Checked TAJ		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		GREEN VALLEY - AMENDMENT 1 MASTER UTILITY REPORT OVERALL MAP		Sheet SS1 Date SEPTEMBER 2018		1 of 2	
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APPROVED ONE YEAR FROM THIS DATE

10.24.18

10/12/2018

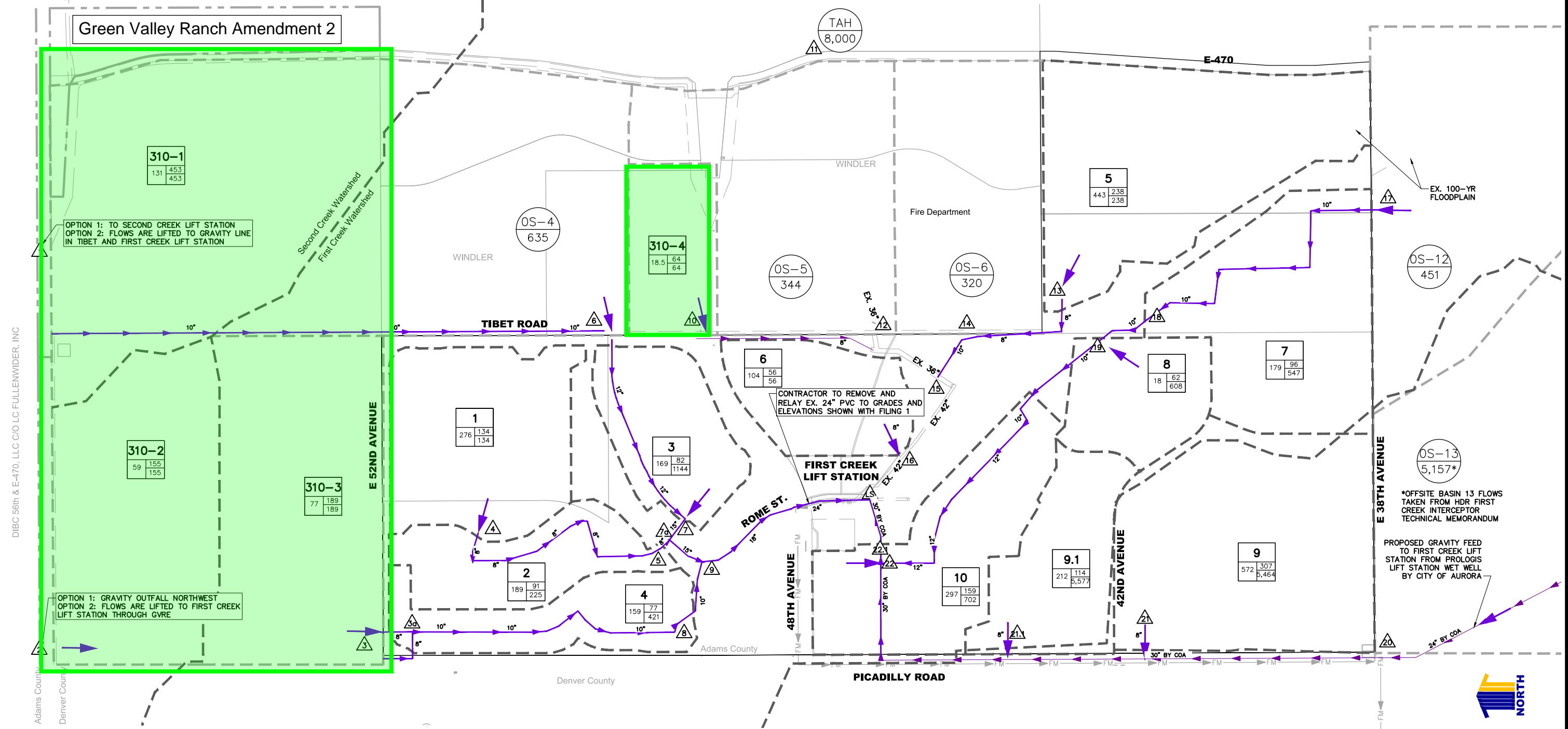
DATE

10/23/2018

DATE

10/23/2018

DATE



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DATE	REVISION	DESCRIPTION

Drawing Name  
X-FDP\_SS2.dwg

Job Number  
Oakwood GVRE FDP F1&2

Prepared For  
CITY OF AURORA

Designer  
LMA

Drafter  
LMA

Checked  
TAJ

0 200 400 800

1 inch = 400 ft. Horizontal

**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

**GREEN VALLEY - AMENDMENT 1**

**MASTER UTILITY REPORT**

**SCHEMATIC MAP**

Sheet

**SS2**

2 of 2

Date

SEPTEMBER 2018



APPROVED ONE YEAR FROM THIS DATE  
10.24.18

*Vernon D. Adam* 10/12/2018  
AURORA WATER DATE

*John J. Adams* 10/23/2018  
CITY ENGINEER DATE

*John J. Adams* 10/23/2018  
Fire Department DATE

6  
72

BASIN  
NO. OF UNITS/ACRES

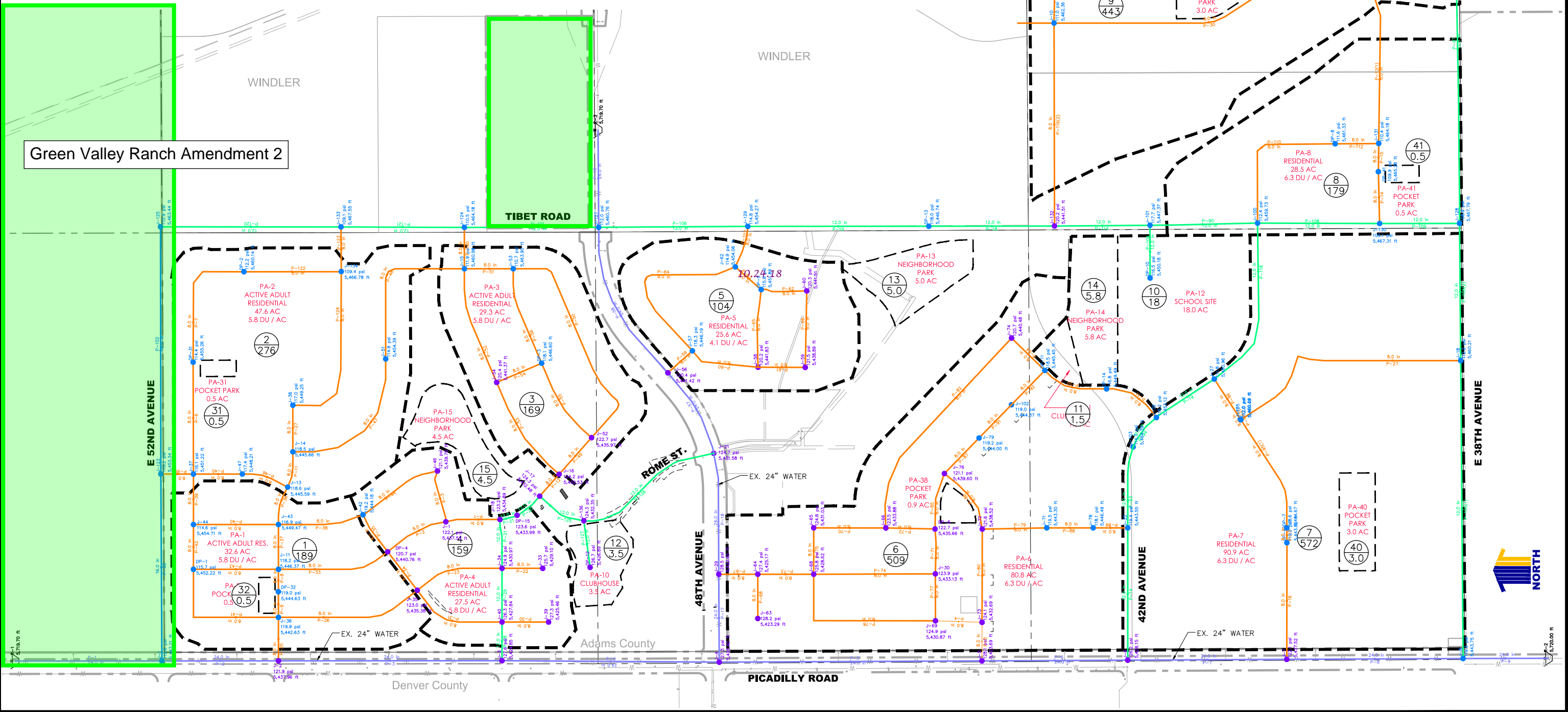
--- DEMAND BASIN BOUNDARY

Color Coding Legend  
Pipe: Diameter (in)

Orange	<= 8.0
Green	<= 12.0
Blue	<= 16.0
Purple	<= 24.0
Black	Other

Color Coding Legend  
Junction: Pressure (psi)

Orange	<= 40.0
Green	<= 60.0
Blue	<= 80.0
Purple	<= 100.0
Black	<= 120.0
Black	Other



PATH: P:\OAKWOOD GVRE DD\UTILITY\WATER\GVRE WATER MODEL\GVRE WATER MODEL.DWG  
PLOT BY: MICHAEL LOPES, PLOT DATE: 10/24/2018 10:57 AM  
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DATE		REVISION DESCRIPTION	Drawing Name GVRE Water Model.dwg		Job Number Oakwood GVRE FDP F1&2		Prepared For CITY OF AURORA		Designer LMA	Drafter LMA	Checked TAJ	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		GREEN VALLEY - AMENDMENT 1 MASTER UTILITY REPORT WATER EXHIBIT		Sheet WT1 Date AUGUST 2018	1 of 2
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APPROVED ONE YEAR FROM THIS DATE  
10.24.18

*Vernon D. Adam* 10/12/2018  
AURORA WATER DATE

*David A. Ruch* 10/23/2018  
CITY ENGINEER DATE

*NW* 10/23/2018  
Fire Department DATE

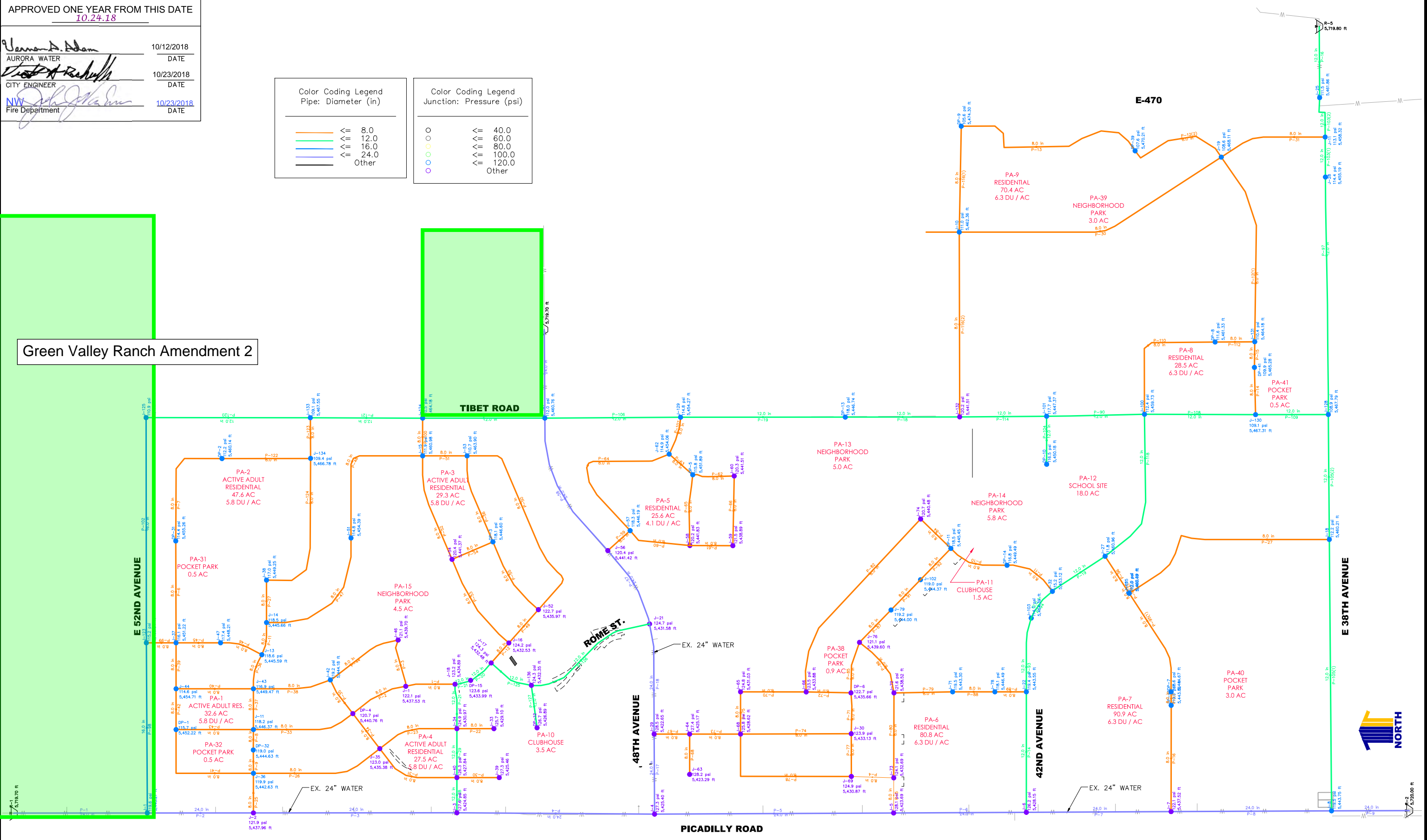
Color Coding Legend  
Pipe: Diameter (in)

- 8.0
- 12.0
- 16.0
- 24.0
- Other

Color Coding Legend  
Junction: Pressure (psi)

- 40.0
- 60.0
- 80.0
- 100.0
- 120.0
- Other

Green Valley Ranch Amendment 2



PATH: P:\OAKWOOD\GVRE\DIUTILITY\WATER\GVRE WATER MODEL\GVRE WATER MODEL.DWG  
PLOT BY: MICHAEL LOPES, PLOT DATE: 10/4/2018 10:57 AM  
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DATE	REVISION DESCRIPTION

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Prepared For CITY OF AURORA	Designer LMA
	Drafter LMA
	Checked TAJ

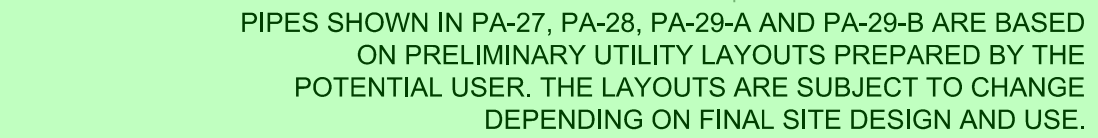
**Calibre**  
Calibre Engineering, Inc.  
9090 South Ridgeline Boulevard, Suite 105  
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www.calibre-engineering.com  
Construction Management Civil Engineering Surveying

**GREEN VALLEY - AMENDMENT 1**  
**MASTER UTILITY REPORT**  
**WATER EXHIBIT**





Sheet  
**WT2**  
Date  
AUGUST 2018





1 of 2





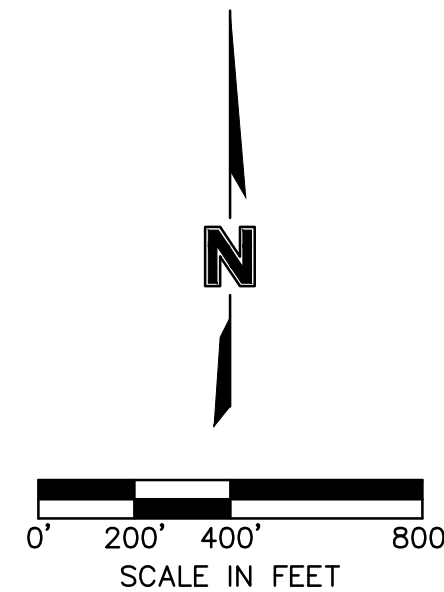
NOTE: 12" PROPOSED IN 42ND AVE. (BY  
GVRE). PICADILLY TO TIBET. 42ND AVE  
PROPOSED TO END AT TIBET

 6" WATER MAIN  
 8" WATER MAIN  
 12" WATER MAIN  
 16" WATER MAIN  
 EX. 24" WATER MAIN  
 24" WATER MAIN  
 30" WATER MAIN

	EX. 36" WATER MAIN
	36" WATER MAIN
	EXISTING WATER MAIN
	DESIGN NODE
	RESERVOIR NODE

NOTES:

1. SAMPLING STATIONS WILL BE REQUIRED. THE LOCATIONS WILL BE DETERMINED DURING DESIGN.



NAME HERE DATE  
*Wendy P. Kuhlman* 05/11/2022

06/13/2022

06/10/2022

5.18.22

06/08/2022

THT

Water Departmen

**olsson**

1525 Raleigh Street  
Suite 400  
Denver, CO 80204

TEL 303.237.2072 [www.olsson.com](http://www.olsson.com)

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[illegible]

WATER MASTER PLAN	
WINDLER MIXED USE DEVELOPMENT MASTER UTILITY PLAN	
AURORA, CO	2021

drawn by: _____
checked by: _____
approved by: _____
QA/QC by: _____
project no.: _____
drawing no.: _____
date: _____
<h1>SHEET</h1> <h2>A.1</h2>



DWG: F:\2021\02001-02500\021-02235\40-Design\AutoCAD\021-02235\_Final Plans\01-06\_MP\_Sheets\WTRW\_P\_PLANO1\_SAN\_02102235.dwg  
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T\_RW4\_PBASE\_02102235 T\_RW2\_PBASE\_02102235 T\_RW5\_PBASE\_02102235

	SECOND CREEK							
	From Node	To Node	MAP AREA CODE	Peak Flow + Infiltration (CFS)	Avg Day + Infiltration (CFS)	Pipe Size (in)	Pipe Percent Full (Peak Flow)	Avg Day Velocity (FT/S)
LINE A	A.9	A.8	PA-16	0.07	0.02	8	3%	2.1
	A.8	A.6	PA-15	0.44	0.12	8	22%	3.2
	A.7	A.6	PA-20	0.23	0.06	8	15%	2.2
	A.6	A.5	PA-18, PA-19	1.04	0.28	8	73%	3.2
	A.5	A.4	PA-1	1.33	0.36	10	61%	2.9
	A.12	A.11	PA-17	0.19	0.05	8	7%	3.2
	A.11	A.4	PA-3	0.67	0.18	8	33%	3.6
	A.4	A.3	PA-2	2.67	0.77	12	63%	4.1
	A.3	A.2.5	PA-5	2.98	0.87	12	71%	4.2
	A.2.5	A.2	Line B	3.64	1.13	15	57%	3.9
LINE B	A.2	A.1	PA-6	3.86	1.21	15	60%	4.0
	A.10	A.1	PA-7	0.20	0.05	8	10%	2.5
	B.3	B.2	PA-10, PA-11	0.58	0.16	8	23%	4.0
	B.2	B1	PA-8, PA-9	0.70	0.19	8	31%	3.9
	B1	A.2.5	PA-4	0.97	0.26	10	26%	3.9

NOTE: MINIMUM PIPE SIZE IN PLANNING AREAS (PA) SHALL BE 8-INCH

	FIRST CREEK							
	From Node	To Node	MAP AREA CODE	Peak Flow + Infiltration (CFS)	Avg Day + Infiltration (CFS)	Pipe Size (in)	Pipe Percent Full (Peak Flow)	Avg Day Velocity (FT/S)
LINE C	C.4	C.3	PA-14	0.42	0.11	8	29%	2.4
	C.3	C.2	PA-21	0.80	0.21	8	56%	2.9
LINE D	C.2	C.1	PA-22	1.24	0.33	8	53%	4.8
LINE E	D.1	EX 36"	PA-13, PK-2	0.52	0.14	8	18%	4.2
	E.1	EX 36"	PA-12	0.28	0.07	8	10%	3.5
LINE F	F.3	F.1	PA-29A, GVRE 310-1	1.20	0.32	10	66%	2.5
	F.4	F.2	PA-28	0.34	0.09	8	28%	2.0
	F.2	F.1	PA-27, PA-28	0.41	0.11	8	26%	2.6
	F.1	GVRE 12"	PA-27, PA-28, PA-29A, PA-29B, GVRE 310-1	1.76	0.50	12	59%	2.8
	F.1	EX 36"	PA-26	0.27	0.07	8	19%	2.1
LINE G	G.1	EX 36"	PA-26	0.27	0.07	8	19%	2.1
LINE H	H.1	EX 36"	PA-24	0.14	0.04	8	8%	2.0
LINE I	I.1	EX 36"	PA-23, PA-25, PK-4	0.67	0.18	8	47%	2.8

Green Valley Ranch Amendment 2

GVRE 3010-1  
0.246

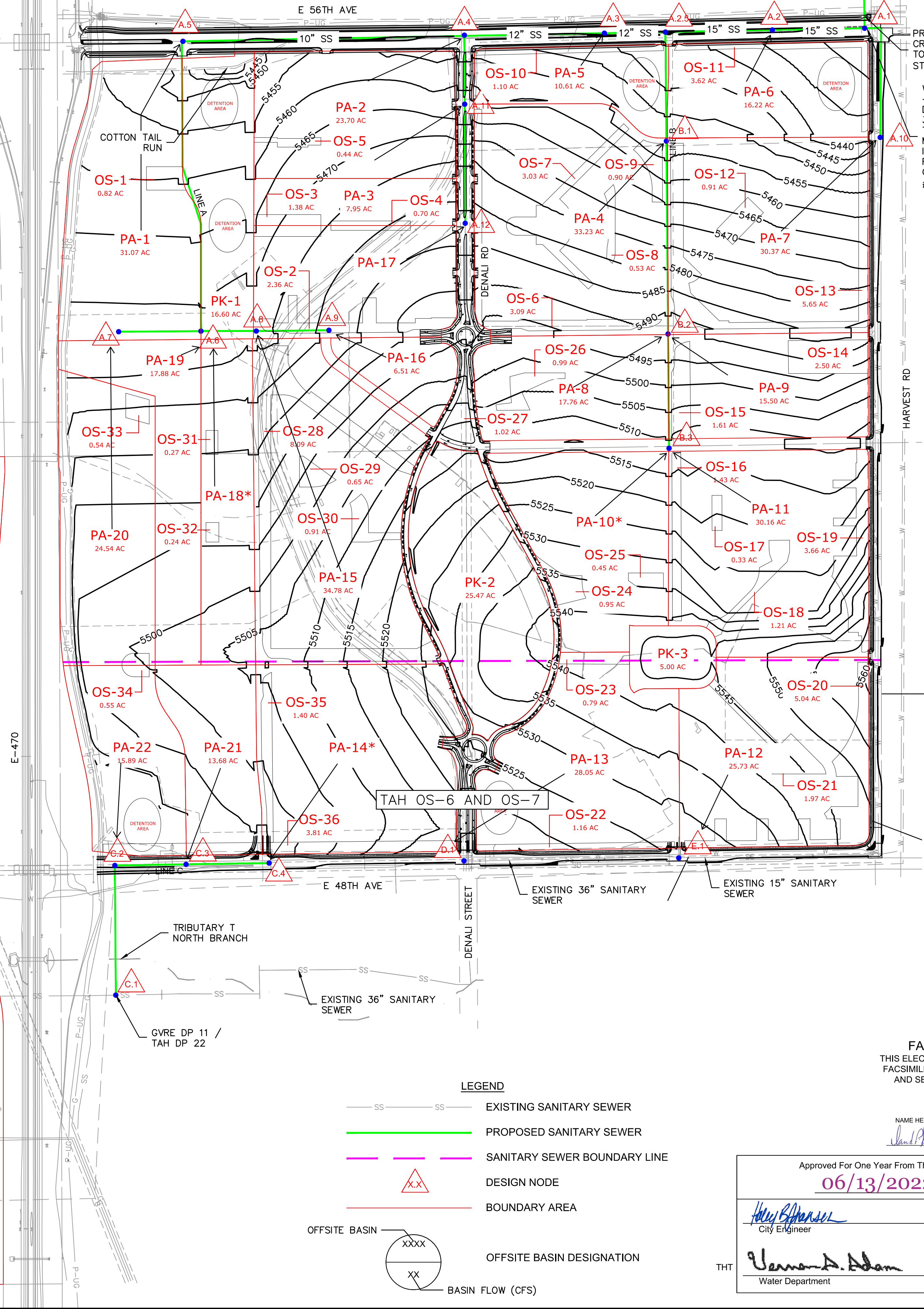
PROPOSED 10" SANITARY SEWER (BY OTHERS, GREEN VALLEY - AMENDMENT 1 218184MU1) WINDLER SHALL CONSTRUCT TO NEAREST OUTFALL IF NOT CONSTRUCTED PRIOR TO PA-28 AND 29 NEEDING SANITARY SEWER SERVICE

WINDLER PEAK FLOW + INFILTRATION AT DESIGN NODE F.1 OF 380 GPM IS LESS THAN GVRE MUR PEAK FLOW+ INFILTRATION AT GVRE NODE 6 OF 635 GPM END (#218184MU1)

PEAK FLOW + INFILTRATION AT DESIGN NODE I.1 IS 9019 GPM  
PEAK FLOW + INFILTRATION AT GVRE MUR DESIGN (#218184MU1) POINT 12 IS 8225 GPM

EXISTING 36" SANITARY SEWER TO FIRST CREEK LIFT STATION

GVRE DP 15 INCLUDES GVRE DP 13 AND 14  
PEAK FLOW + INFILTRATION WITH TAH AND WINDLER IS 9211 GPM  
PEAK FLOW + INFILTRATION AT GVRE DP15 IS 8517 GPM



PROPOSED 30" SECOND CREEK SANITARY SEWER TO SECOND CREEK LIFT STATION (BY OTHERS)

WINDLER PEAK FLOW + INFILTRATION AT DESIGN NODE A.1 OF 3.89 CFS IS LESS THAN FULENWIDER MUS PEAK FLOW + INFILTRATION AT FULENWIDER NODE T OF 4.377 EDN #220131MU1

EXISTING FORCE MAIN  
EXISTING 15" SANITARY SEWER

FACSIMILE  
THIS ELECTRONIC PLAN IS A FACSIMILE OF THE SIGNED AND SEALED PDF SET

NAME HERE DATE  
06/13/2022

Approved For One Year From This Date

06/13/2022

City Engineer  
06/10/2022  
Date  
Water Department  
06/08/2022  
Date

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REVISIONS DESCRIPTION		DATE	REV. NO.

SANTARY SEWER MASTER PLAN  
WINDLER MIXED USE DEVELOPMENT MASTER UTILITY PLAN  
AURORA, CO  
2021

drawn by:  
checked by:  
approved by:  
QA/QC by:  
project no.:  
drawing no.:  
date:

SHEET  
B.1

olsson

1525 Raleigh Street  
Suite 400  
Denver, CO 80204

TEL 303.237.2072  
www.olsson.com

APPROVED ON 06/13/2022



223035MU1  
1900-ADAMS  
95S

# Moffit/Skydance

## Master Utility Report


*January 24, 2023*

**City of Aurora Approval Block** 02/07/2023

  
Aurora Water

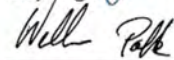
01/31/2023

Date

  
City Engineer

02/06/2023

Date

  
Fire Department

02/02/2023

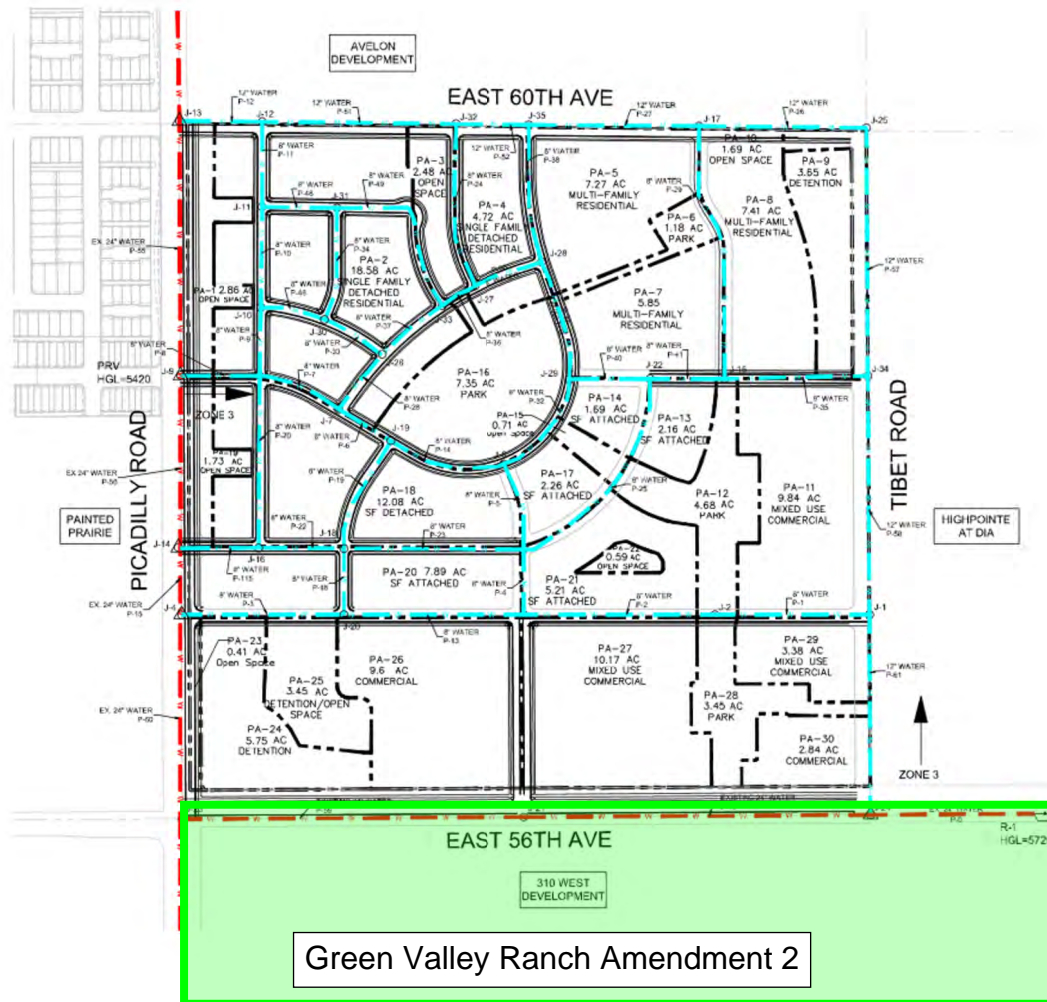
Date

PREPARED FOR:

Westside Investment Partners, Inc.  
4100 E. Mississippi Avenue, Suite 500  
Denver, Colorado 80246

PREPARED BY:

**Westwood**



APPROVED ONE YEAR FROM THIS DATE

CITY ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_  
 WATER DEPARTMENT \_\_\_\_\_ DATE \_\_\_\_\_  
 FIRE DEPARTMENT \_\_\_\_\_ DATE \_\_\_\_\_

**WL1**

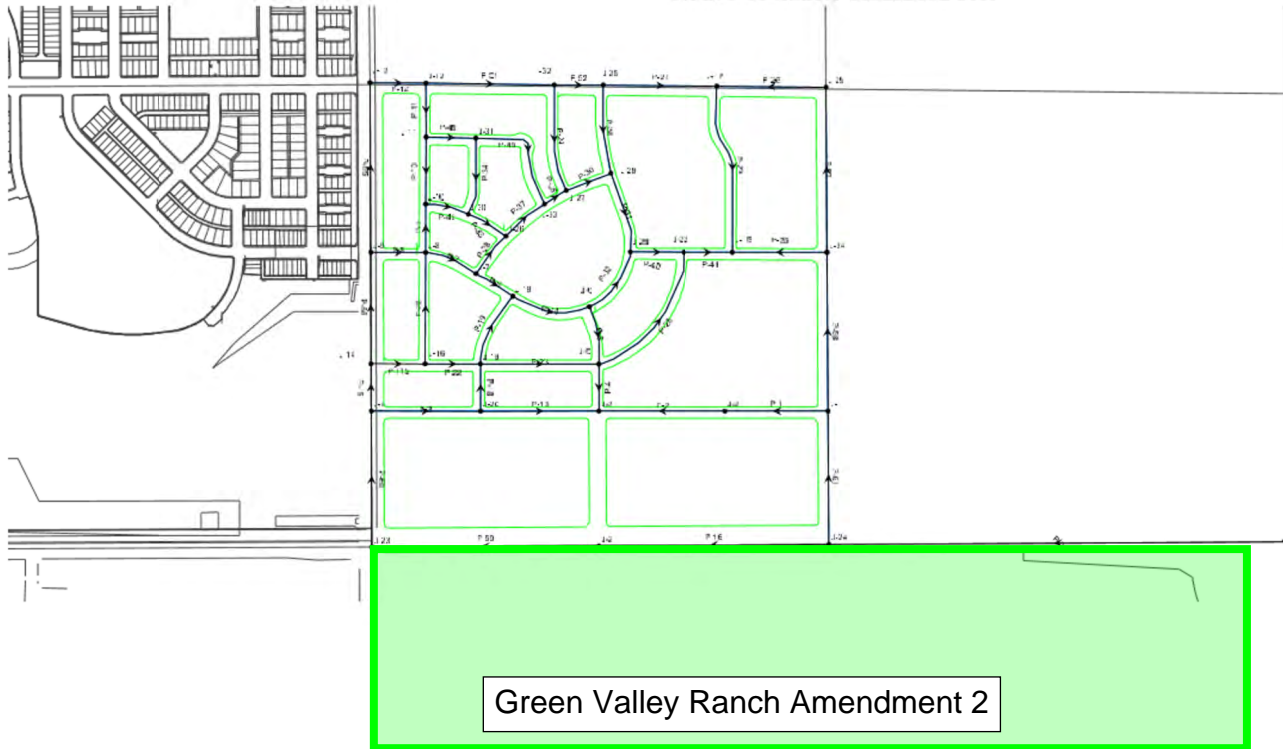
**Westwood**  
 WESTSIDE INVESTMENT PARTNERS, INC.  
 4100 EAST 148TH AVENUE, SUITE 500  
 DENVER, CO 80231  
 TEL: (303) 954-9600  
 FAX: (303) 954-9601

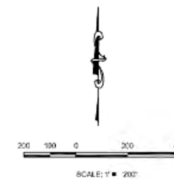
**MOSEF/SKYDANCE**  
**MASTER UTILITY REPORT**  
**WATER LAYOUT PLAN**

SCALE: AS SHOWN  
 SHEET NO: R0029250.00



**MOFFIT/SKYDANCE**  
**Scenario: AVERAGE DAY**  
**Active Scenario: AVERAGE DAY**





APPROVED ONE YEAR FROM THIS DATE	
CITY ENGINEER	DATE
WATER DEPARTMENT	DATE
FIRE DEPARTMENT	DATE

PROJECT NUMBER	SS1	DRAWN BY: AS SICHAN CHECKED BY: CJA DATE: 10/22/2009 PROJECT NO: 2009-2550-00	MOFFETTS/DANCE MASTER UTILITY REPORT SANITARY MODEL LAYOUT	WESTSIDE INVESTMENT PARTNERS, INC. 2100 S.W. 10TH AVE., SUITE 200 MIAMI, FL 33135 TEL: (305) 366-0600	 401.111.1111 www.westwood.com HIRSH/SHAW, Architects 1000 Brickell Avenue, Suite 240 Miami, FL 33131 TEL: 773.442.8226	No. _____		Revision _____	
						Date: _____	By: _____		



**MOFFIT/SKYDANCE TOWN CENTER**  
**CITY OF AURORA**  
**SANITARY SEWER PEAK ROUTING CALCULATIONS**

Design Point	Added Upstream Routing Planning Areas	Included Upstream Routing Design Pts	Design Point Loading (gpd)	Cumulative Loading (gpd)	Design Point Population (thousand)	Cumulative Population (thousand)	Cumulative Infiltration 10% (gpd)	Peaking Factor	Cumulative Peak Loading (gpd)	Cumulative Peak Loading (cfs)	Required Pipe Size (in)	Minimum Slope* (%)	Maximum Slope* (%)	Percentage Full (%)
DP-1	20% PA-18		2,034	2,034	0.030	0.030	203	4.00	8,341	0.01	8	0.4	500.0	7.4
DP-2	PA-2	1	16,576	18,610	0.244	0.274	1,861	4.00	76,301	0.12	8	0.4	53.9	24.6
DP-3	40% PA-4	1-2	1,582	20,192	0.024	0.298	2,019	4.00	82,788	0.13	8	0.4	48.8	25.6
DP-8	20% PA-4, 40% PA-5, 40% PA-7		40,332	40,332	0.594	0.594	4,033	4.00	165,360	0.26	8	0.4	27.2	36.7
DP-4	40% PA-4, OS-3	1-3, 8	89,443	149,966	1.742	2.633	14,997	4.00	614,862	0.95	12	0.4	10.5	41.2
DP-5	60% PA-5	1-4, 8, OS-3	32,865	182,832	0.484	3.117	18,283	4.00	749,609	1.16	12	0.4	9.0	46.1
DP-6	50% PA-8	1-5, 8, OS-3	27,915	210,746	0.411	3.528	21,075	4.00	864,061	1.34	12	0.4	7.9	50.2
DP-11	40% PA-18		4,069	4,069	0.060	0.060	407	4.00	16,681	0.03	8	0.4	180.0	12.5
DP-21	50% PA-17	11	1,789	5,858	0.027	0.087	586	4.00	24,018	0.04	8	0.4	140.0	14.3
DP-12	40% PA-18, 50% PA-20		11,980	11,980	0.177	0.177	1,198	4.00	49,117	0.08	8	0.4	76.6	20.1
DP-22	50% PA-17, 50% PA-21	12	7,158	19,137	0.106	0.282	1,914	4.00	78,463	0.12	8	0.4	69.6	24.6
DP-10	PA-13, PA-14, 60% PA-7	11-12, 21-22	33,415	58,410	0.471	0.840	5,841	4.00	239,483	0.37	8	0.4	20.2	44.6
DP-19	50% PA-20, 50% PA-26		15,111	15,111	0.117	0.117	1,511	4.00	61,956	0.10	8	0.4	63.4	22.5
DP-20	50% PA-26, 50% PA-27		53,140	53,140	0.564	0.564	5,314	4.00	217,874	0.34	8	0.4	21.7	42.5
DP-18		19-20		68,251		0.680	6,825	4.00	279,829	0.43	8	0.4	17.8	48.6
DP-17	50% PA-21, 50% PA-27	18-20	51,308	119,559	0.643	1.323	11,956	4.00	490,193	0.76	8	0.4	11.2	70.3
DP-OS-1	OS-1***		375,000	375,000	2.449	2.449	37,500	4.00	1,537,500	2.38	12	0.4	5.0	73.7
DP-16	PA-30	OS-1	4,260	379,260	0.000	2.449	37,926	4.00	1,554,966	2.41	15	0.4	4.9	49.9
DP-15	PA-29, 50% PA-11	17	75,076	194,635	0.922	2.244	19,464	4.00	798,004	1.23	12	0.4	8.5	47.7
DP-14	50% FW-PA-1*	15, 16	113,000	686,895	1.662	6.355	68,690	3.67	2,590,661	4.01	15	0.4	3.5	69.6
DP-9	50% PA-11, 50% PA-8	10-12, 21-22	72,364	130,775	0.957	1.796	13,077	4.00	536,176	0.83	12	0.4	11.8	38.3
DP-13		9-12, 14-22, OS-1		817,670		8.151	81,767	3.52	2,961,632	4.58	15	0.4	3.2	77.7
DP-7	OS-2	1-6, 8-22, OS-1, 3	31,268	1,059,684	0.460	12.139	105,968	3.30	3,598,082	5.57	18	0.4	2.8	62.2
OUTFALL	TOTAL OUTFALL FROM MOFFIT SITE								3,598,082	5.57	18	0.4	2.8	62.2

**Off-Site**

HP-DP-FW1	FW PA-1(50%) & 12*	DP-7 & FW-O & P*	128,000	1,187,684	1.882	2.342	12,800	4.00	4,763,536	7.37	18	0.4	2.3	77.0
HP-DP-16	HP-B2**	HP-DP-FW1*	119,000	1,306,684	1.753	4.095	11,900	3.95	5,174,843	8.01	21	0.4	2.2	60.3
HP-DP-17	HP-B3**	HP-DP-16**	48,000	1,354,684	0.724	4.819	4,800	3.85	5,213,830	8.07	21	0.4	2.2	60.6
HP-DP-19	HP-B4**	HP-DP-17 & 18**	124,000	1,478,684	1.863	6.682	12,400	3.64	5,396,188	8.35	21	0.4	2.1	62.0
HP-DP-20	HP-B5, B6, & B7**	HP-DP-15 & 19**	563,000	2,041,684	8.371	15.053	56,300	3.18	6,547,072	10.13	21	0.4	1.8	71.2
HP-DP-25	HP-B8 & B9**	HP-DP-20 & 26**	77,000	2,118,684	1.146	16.199	7,700	3.14	6,661,235	10.31	21	0.4	1.8	72.2
HP-DP-21/LS		HP-DP-25**							6,661,235	10.31	21	0.4	1.8	72.2

Refer to attached Flow Master analysis sheets for pipe calculations.

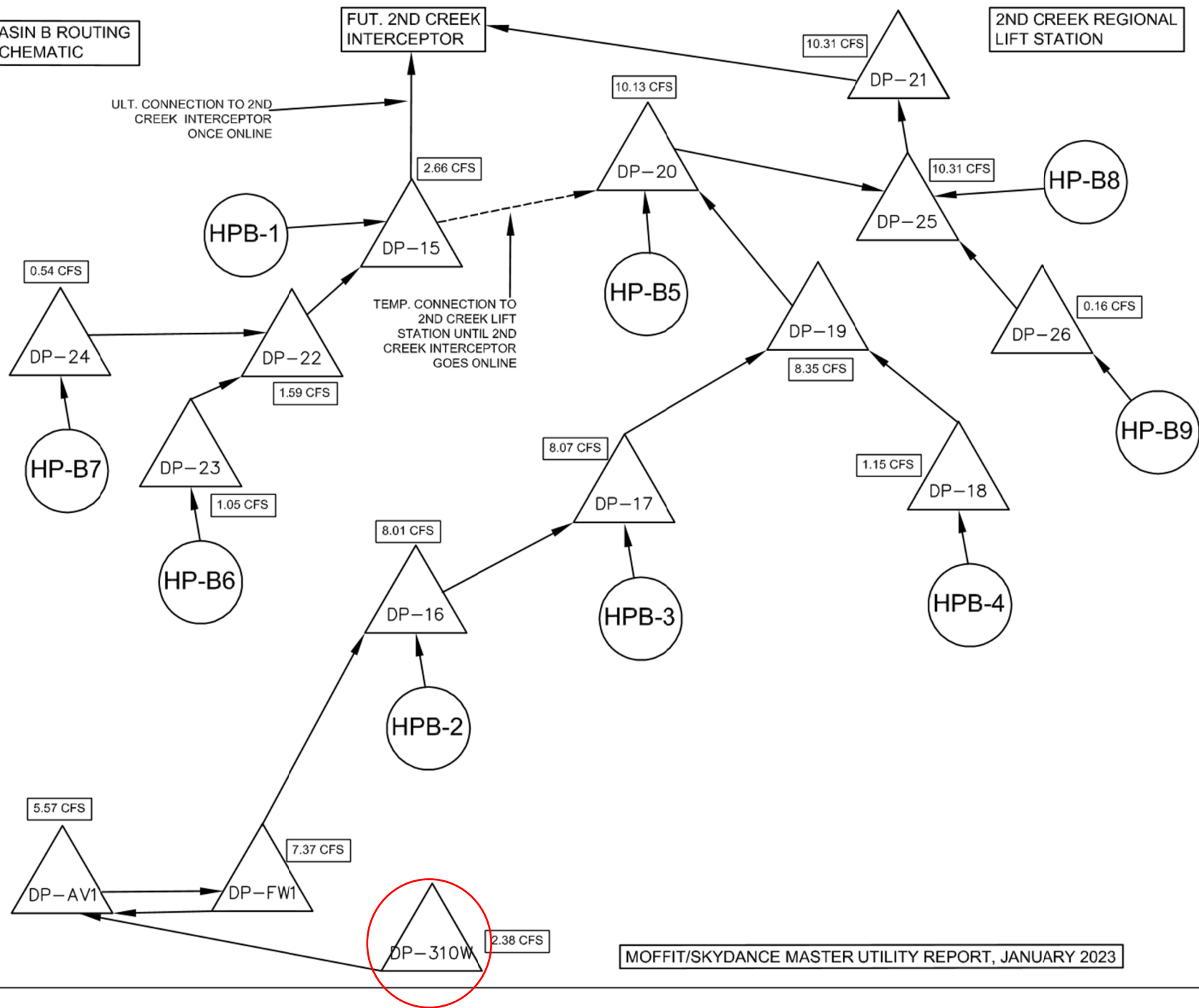
\* Fullenwider Master Utility Report by Martin/Martin, July 22, 2019 (COA #220131MU1)

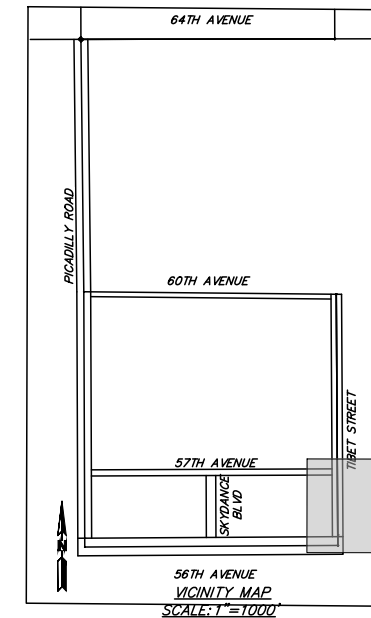
\*\* High Point at DIA-FDP Amendment No. 4-Master Utility Study Amendment

\*\*\* 310 West email from Dewberry on 4/25/22

Achieve a minimum velocity of 2.0 ft/sec and a maximum percent full capacity of 75% for pipes 12" and smaller or 80% for pipes larger than 12"

BASIN B ROUTING SCHEMATIC



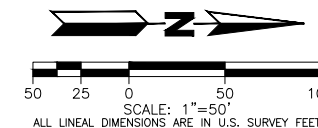


**BENCHMARK**  
COA ID: 356612NE001

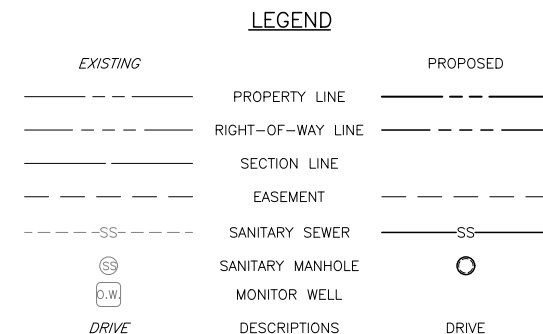
ELEVATIONS ARE BASED ON THE CITY OF  
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#64, 3/4" STEEL ROD SET IN A RANGE  
80% NEAR N.E. COR. OF BOUNDARY FENCE,  
FOR 64TH AVE. (RESERVOIR AND PUMPING  
STATION COMPLEX OF D.W.D., DENVER WATER  
2850 E. 64TH AVE, 303-628-6378).  
MONUMENT IS SOUTH OF AN ELECTRICAL  
CONTROL BOX

ELEVATION =5443.06' (NAVD1988) DATUM.

- NOTES:**
1. EXISTING CONTOURS SHOWN ARE ANTICIPATED GRADES THAT WILL BE PRESENT AT THE TIME OF SANITARY SEWER MAIN INSTALLATION BASED ON CURRENT OVERLOT GRADING OPERATIONS AND PLANNED IMPROVEMENTS.
  2. PROPOSED SANITARY SEWER PIPE SIZE BASED ON APPROVED HIGH POINT MASTER UTILITY STUDY COA#220127.
  3. ALL SANITARY SEWER MANHOLES WITH CONNECTING PIPES LARGER THAN 12 INCHES SHALL BE CONSTRUCTED WITH, OR LINED WITH, HYDROGEN SULFIDE RESISTANT MATERIALS IN ACCORDANCE WITH AURORA WATER'S STANDARDS AND SPECIFICATIONS SECTION 10.01.12 HYDROGEN SULFIDE RESISTANCE. HYDROGEN SULFIDE RESISTANT LINING SHALL BE APPLIED TO A MINIMUM THICKNESS PER MANUFACTURER'S RECOMMENDATIONS. ALL COATING MUST BE HOLIDAY TESTED FOR PROPER INSTALLATION BY A THIRD PARTY NASSCO CERTIFIED TESTER. TESTING MUST BE IN ACCORDANCE TO THE MANUFACTURER'S RECOMMENDATIONS. REFER TO AURORA STANDARDS AND SPECIFICATIONS APPENDIX B FOR APPROVED MATERIALS LIST FOR APPROVED PRODUCTS AND MANUFACTURES.
  4. ALL DISTURBANCES TO EXISTING ROADWAY, SIDEWALK, CURB OR GUTTER, INCLUDING SURFACE DAMAGE TO PAVEMENT OR STRIPING, SHALL BE REPAIRED AT THE CONTRACTORS EXPENSE. SEE SECTION 36.00 OF THE CITY OF AURORA ROADWAY DESIGN AND CONSTRUCTION SPECIFICATIONS FOR ADDITIONAL INFORMATION. ADDITIONALLY, THE PROJECT DESIGNER SHALL ADD A NOTE WITH STATIONING AND OFFSET, OR DEPICT ON THE PLAN SHEETS, THE APPROXIMATE LIMITS OF WHERE MILL AND OVERLAY WILL BE REQUIRED PER SECTION 36.00.



CALL **811** 2-BUSINESS DAYS IN ADVANCE  
BEFORE YOU DIG, GRADE OR EXCAVATE FOR  
MARKING OF UNDERGROUND MEMBER UTILITIES  
MARTIN/MARTIN ASSUMES NO RESPONSIBILITY FOR UTILITY  
LOCATIONS. THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN  
PLOTTED FROM INFORMATION PROVIDED BY THE PROJECT'S SUE  
CONSULTANT. THE ASCE (38) UTILITY QUALITY LEVEL IS AS  
INDICATED ON THE STAMPED/SIGNED SUE PLANS PREPARED BY THE  
PROJECT'S SUE CONSULTANT. IT IS, HOWEVER, THE CONTRACTORS  
RESPONSIBILITY TO FIELD VERIFY THE SIZE, MATERIAL, HORIZONTAL  
AND VERTICAL LOCATION OF ALL UTILITIES (DEPICTED OR NOT  
DEPICTED) PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.



**FACSIMILE**

This electronic plan is a facsimile of the signed and sealed PDF plan.

*[Signature]*

David M. Le  
P.E. (CO) #43827

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	Date:	Comments	Init.
	06/24/24	FOR CITY APPROVAL	M/M



**MARTIN/MARTIN**  
CONSULTING ENGINEERS

12499 WEST COLFAX AVENUE,  
LAKEWOOD, COLORADO 80215  
MAIN 303.431.6100  
MARTINMARTIN.COM

M/M JOB NO.:  
22.0858

Designer:	DML/GRP/BAM/DJB
Detailer:	JAR/DJB/BAM/GRP
Revised:	
Void:	

TIBET -SANITARY PLAN &  
PROFILE - 0+00 - 10+00

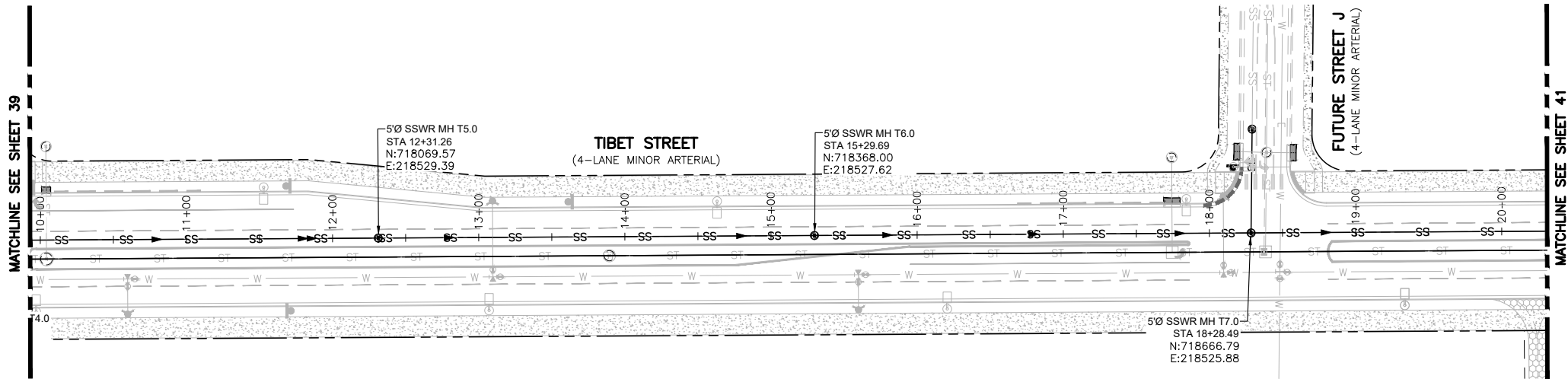
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SKY DANCE SUBDIVISION  
FILING NO. 1

	Project No./Code
	<b>C400</b>
	<b>39</b>



G:\1622\0858-SKY DANCE SUBDIVISION\PLANS\03\PHASE 1\SANITARY PLAN & PROFILE - TIBET -9+50 - 63+00.DWG (REVISION 6/20/2024 1:15:48 AM



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BENCHMARK

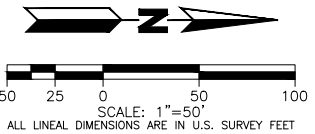
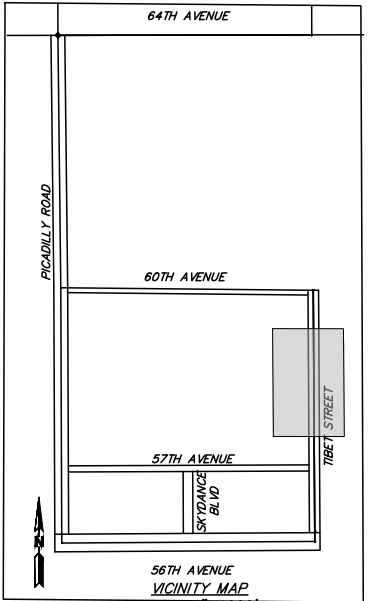
COA ID: 356612NE001

ELEVATIONS ARE BASED ON THE CITY OF AURORA, BM #356612NE001, FND D.W.D. BM #64, 3/4" STEEL ROD SET IN A RANGE BOX, NEAR N.E. COR. OF BOUNDARY FENCE, FOR 64TH AVE. (RESERVOIR AND PUMPING STATION COMPLEX OF D.W.D, DENVER WATER 2850 E. 64TH AVE, 303-628-6378), MONUMENT IS SOUTH OF AN ELECTRICAL CONTROL BOX

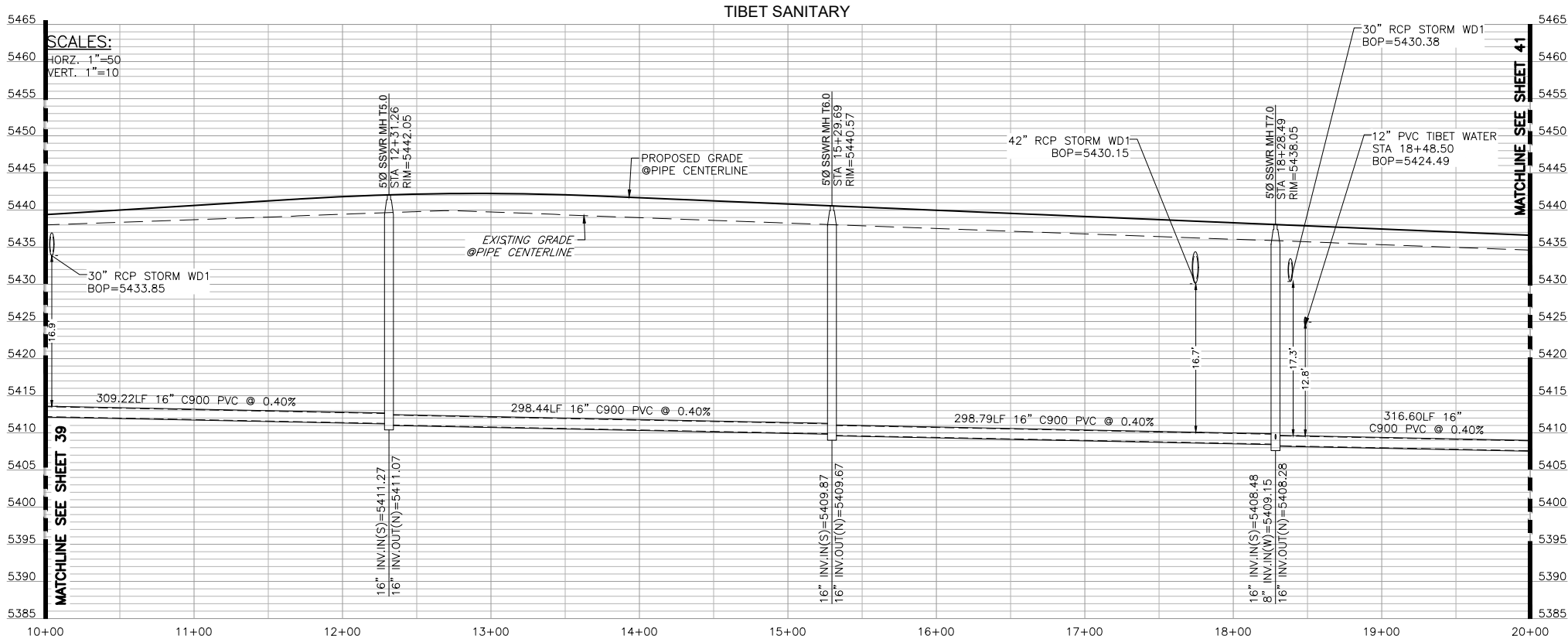
ELEVATION =5443.06' (NAVD1988) DATUM.

BASIS OF BEARINGS:

BEARINGS ARE BASED ON AN ASSUMED BEARING OF S00°33'21"E ALONG THE EASTERLY LINE OF THE SOUTHWEST QUARTER OF SECTION 7, TOWNSHIP 3 SOUTH, RANGE 65 WEST OF THE 6TH P.M. BEING MONUMENTED AS A FOUND 3 1/4" ALUMINUM CAP PLS # 25379 IN RANGEBOX AT THE CENTER QUARTER CORNER AND A FOUND 2 1/2" ALUMINUM CAP PLS # 28285 AT THE SOUTH QUARTER CORNER.



CALL 811 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR MARKING OF UNDERGROUND MEMBER UTILITIES. MARTIN/MARTIN ASSUMES NO RESPONSIBILITY FOR UTILITY LOCATIONS. THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM INFORMATION PROVIDED BY THE PROJECT'S SUE CONSULTANT. THE ASCE (38) UTILITY QUALITY LEVEL IS AS INDICATED ON THE STAMPED/SIGNED SUE PLANS PREPARED BY THE PROJECT'S SUE CONSULTANT. IT IS, HOWEVER, THE CONTRACTORS RESPONSIBILITY TO FIELD VERIFY THE SIZE, MATERIAL, HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES (DEPICTED OR NOT DEPICTED) PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.



LEGEND

EXISTING		PROPOSED
---	PROPERTY LINE	---
---	RIGHT-OF-WAY LINE	---
---	SECTION LINE	---
---	EASEMENT	---
---	SANITARY SEWER	---
SS	SANITARY MANHOLE	SS
D.W.	MONITOR WELL	D.W.
DRIVE	DRIVE	DRIVE

FACSIMILE

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David M. Le  
P.E. (CO) #43827  
Date: 06/24/2024

Print Date: Monday, June 24, 2024
File Name: SANITARY PLAN & PROFILE - TIBET -9+50 - 63+00
Horiz. Scale: Vert. Scale:
Unit Information Unit Leader

Sheet Revisions		
Date:	Comments	Init.
06/24/24	FOR CITY APPROVAL	M/M

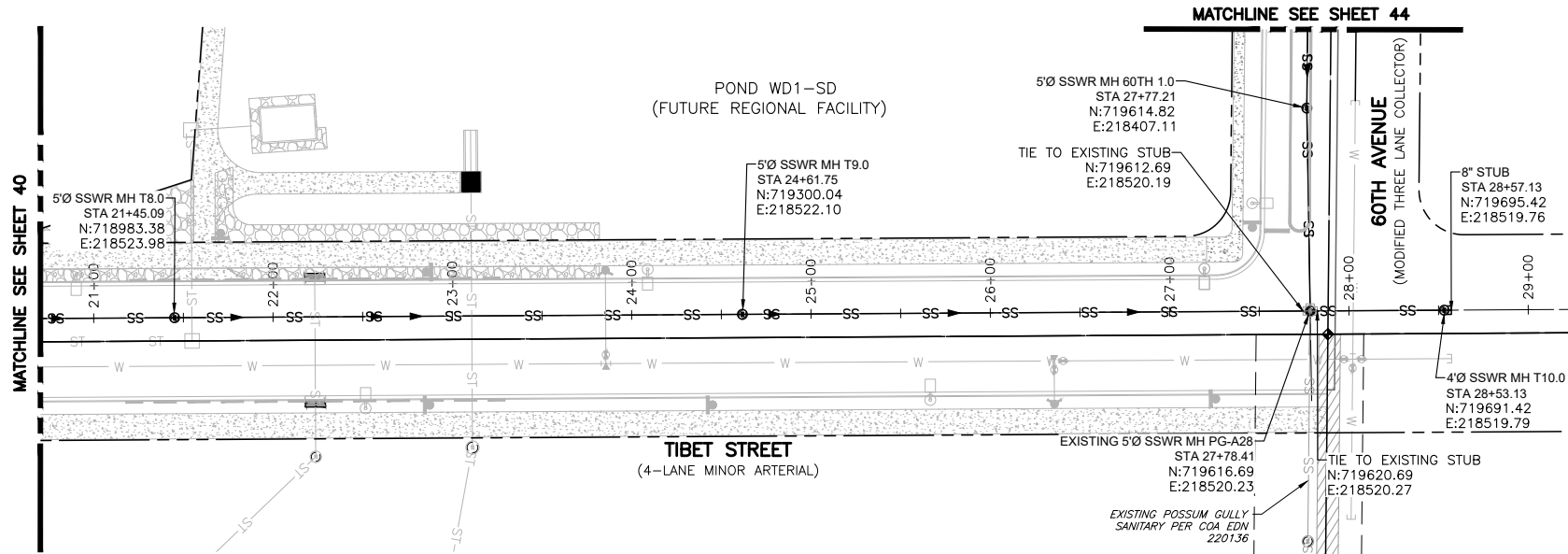
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LAKEWOOD, COLORADO 80215  
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MARTINMARTIN.COM

M/M JOB NO.:  
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Designer:	DML/GRP/BAM/DJB
Detailer:	JAR/DJB/BAM/GRP
Revised:	
Void:	

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PROFILE - 10+00 - 20+00**  
**SKY DANCE SUBDIVISION**  
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Project No./Code
C401
40



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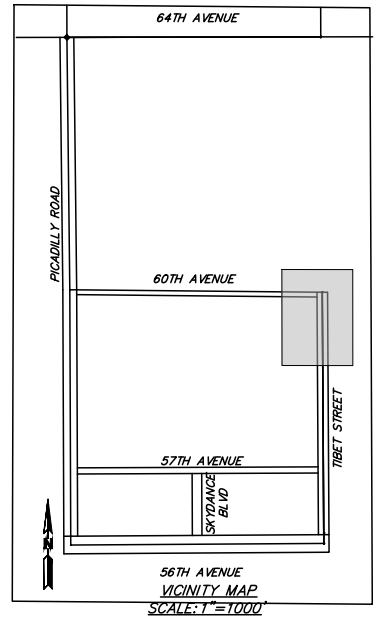
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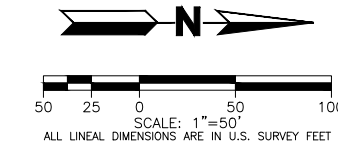
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D.W.	MONITOR WELL	
DRIVE	DRIVE	DRIVE



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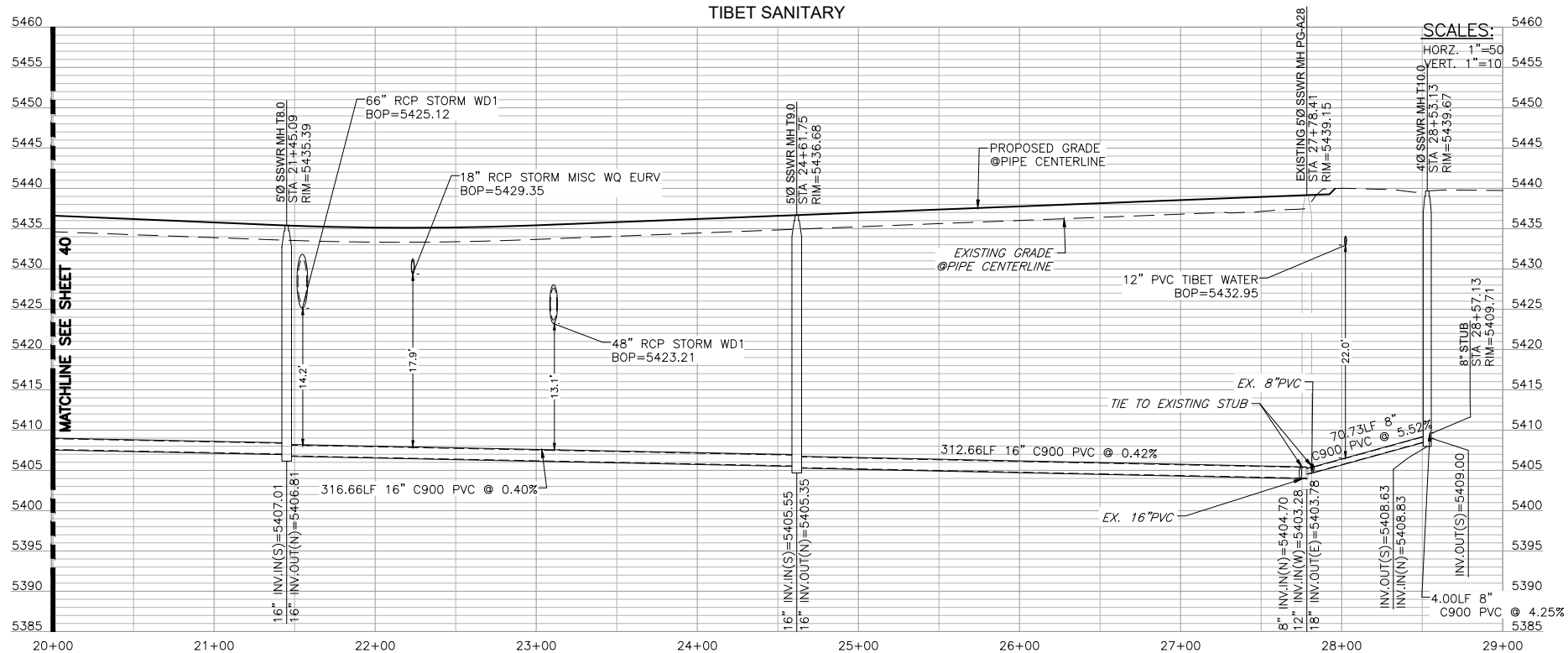
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SKY DANCE SUBDIVISION

FILING NO. 1

Project No./Code
C402
41

217021MU1  
2004-3087  
94P

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**MASTER UTILITY REPORT  
FOR  
High Point at DIA  
Starwood CPG Operations, LLC**

---

February 3, 2017

Prepared for:

Aurora Water  
15151 E. Alameda Pkwy  
Aurora, Colorado  
Phone: 303.739.7370  
Contact: Vern Adam, Engineering Services Manager

Prepared by:



6505 South Paris Street, Suite B  
Centennial, Colorado 80111  
Phone: 303-368-5601  
Fax: 303-368-5603  
Contact: Cliff Stephens, P.E.

CITY OF AURORA APPROVAL BLOCK	
 City Engineer	03/02/2017 Date
 Aurora Water Department	2/28/2017 Date
 Aurora Fire Department	3/01/2017 Date



## Sanitary Sewer Routing - Basin B

Design Point	Basin(s)	Average Daily Flow (gpd)	Cumulative Equivalent Pop	Peak Factor	Peak Flow (gpd)	Inflow and Infiltration (gpd)	Design Flow (gpd)	Design Flow (mgd)	Design Flow (cfs)	Req'd Pipe Diameter (in)
DP-21	HPB-5	120600.00								
<b>Total</b>		<b>120600.00</b>	<b>1773.53</b>	<b>4.00</b>	<b>482400.00</b>	<b>12060.00</b>	<b>494460.00</b>	<b>0.49</b>	<b>0.77</b>	<b>8.00</b>

Design Point	Basin(s)	Average Daily Flow (gpd)	Cumulative Equivalent Pop	Peak Factor	Peak Flow (gpd)	Inflow and Infiltration (gpd)	Design Flow (gpd)	Design Flow (mgd)	Design Flow (cfs)	Req'd Pipe Diameter (in)
DP-15	HPB-5	120600.00								
	HPB-1	276600.00								
<b>Total</b>		<b>397200.00</b>	<b>5841.18</b>	<b>3.72</b>	<b>1479018.78</b>	<b>39720.00</b>	<b>1518738.78</b>	<b>1.52</b>	<b>2.35</b>	<b>12.00</b>

Design Point	Basin(s)	Average Daily Flow (gpd)	Cumulative Equivalent Pop	Peak Factor	Peak Flow (gpd)	Inflow and Infiltration (gpd)	Design Flow (gpd)	Design Flow (mgd)	Design Flow (cfs)	Req'd Pipe Diameter (in)
DP-16	HPB-2	119487.60								
<b>Total</b>		<b>119487.60</b>	<b>1757.17</b>	<b>4.00</b>	<b>477950.40</b>	<b>11948.76</b>	<b>489899.16</b>	<b>0.49</b>	<b>0.76</b>	<b>8.00</b>

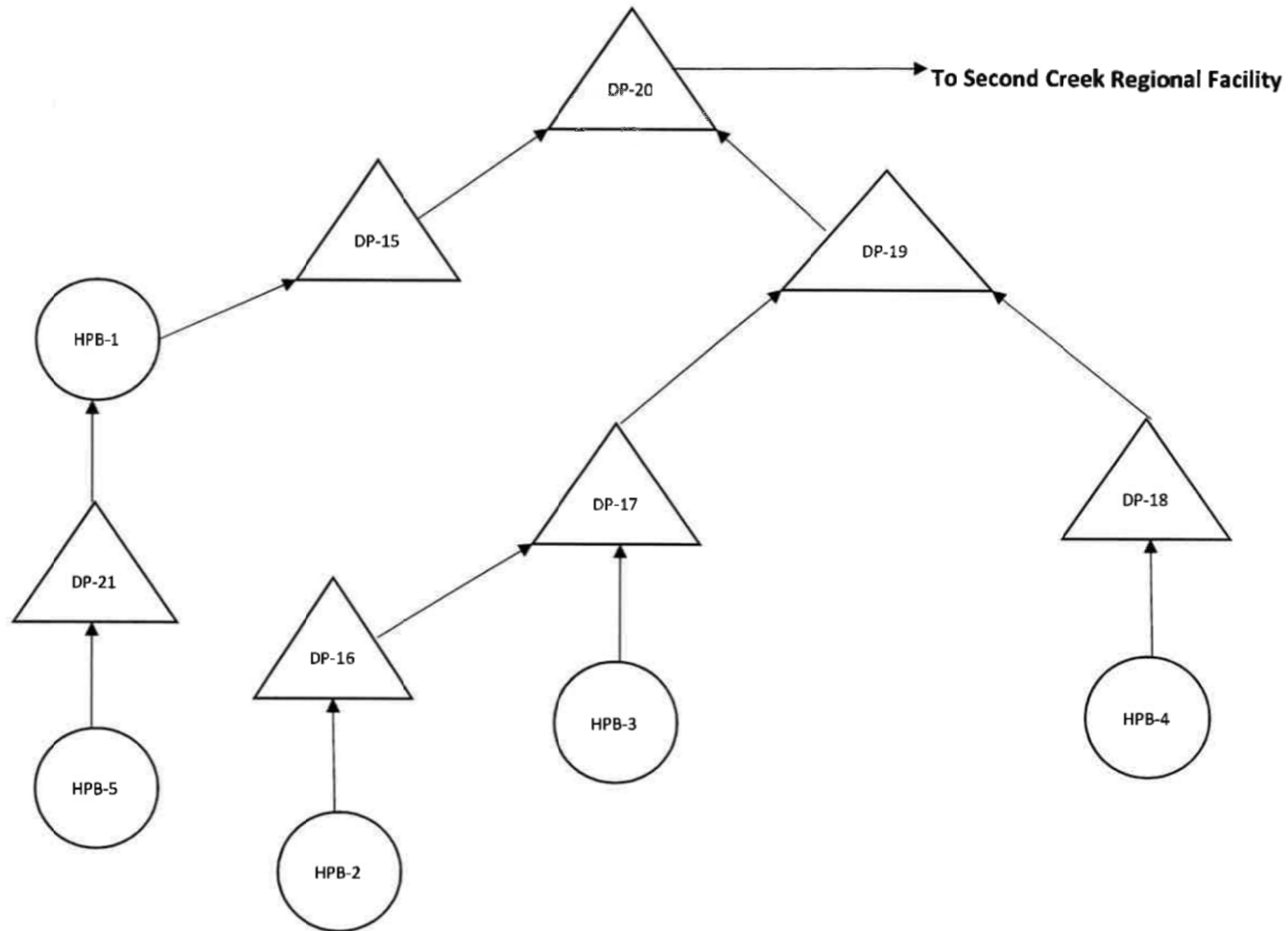
Design Point	Basin(s)	Average Daily Flow (gpd)	Cumulative Equivalent Pop	Peak Factor	Peak Flow (gpd)	Inflow and Infiltration (gpd)	Design Flow (gpd)	Design Flow (mgd)	Design Flow (cfs)	Req'd Pipe Diameter (in)
DP-17	HPB-2	119487.60								
	HPB-3	68850.00								
<b>Total</b>		<b>188337.60</b>	<b>2769.67</b>	<b>4.00</b>	<b>753350.40</b>	<b>18833.76</b>	<b>772184.16</b>	<b>0.77</b>	<b>1.19</b>	<b>12.00</b>

Design Point	Basin(s)	Average Daily Flow (gpd)	Cumulative Equivalent Pop	Peak Factor	Peak Flow (gpd)	Inflow and Infiltration (gpd)	Design Flow (gpd)	Design Flow (mgd)	Design Flow (cfs)	Req'd Pipe Diameter (in)
DP-18	HPB-4	181950.00								
Total		181950.00	2675.74	4.00	727800.00	18195.00	745995.00	0.75	1.15	12.00

Design Point	Basin(s)	Average Daily Flow (gpd)	Cumulative Equivalent Pop	Peak Factor	Peak Flow (gpd)	Inflow and Infiltration (gpd)	Design Flow (gpd)	Design Flow (mgd)	Design Flow (cfs)	Req'd Pipe Diameter (in)
DP-19	HPB-2	119487.60								
	HPB-3	68850.00								
	HPB-4	181950.00								
Total		370287.60	5445.41	3.77	1395057.54	37028.76	1432086.30	1.43	2.22	12.00

Design Point	Basin(s)	Average Daily Flow (gpd)	Cumulative Equivalent Pop	Peak Factor	Peak Flow (gpd)	Inflow and Infiltration (gpd)	Design Flow (gpd)	Design Flow (mgd)	Design Flow (cfs)	Req'd Pipe Diameter (in)
DP-20	HPB-5	120600.00								
	HPB-1	276600.00								
	HPB-2	119487.60								
	HPB-3	68850.00								
	HPB-4	181950.00								
Total		767487.60	11286.58	3.34	2560138.39	76748.76	2636887.15	2.64	4.08	15.00

## Basin B Routing Schematic





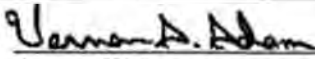
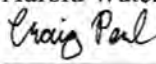
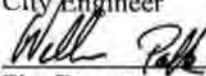


## Fulenwider– Master Utility Report

56<sup>TH</sup> AVENUE AND HARVEST ROAD  
CITY OF AURORA, COLORADO

Martin/Martin, Inc. Project No.: 19.0001

July 22, 2020

City of Aurora Approval Block		
THT		08/05/2020
	Aurora Water	Date
	 for Victor Rachael	07/31/2020
	City Engineer	Date
		07/30/2020
	Fire Department	Date

Prepared For: L. C. Fulenwider  
1125 17<sup>th</sup> Street, Suite 2500  
Denver, CO 80202  
303-295-3071

Prepared By: Martin/Martin, Inc.  
12499 West Colfax Avenue  
Lakewood, Colorado 80215  
303.431.6100

Principal-in-Charge: Patrick F. Horn, P.E. CFM  
Project Manager: David M. Le, P.E.  
Project Engineer: Gregory R. Proulx, P.E.

**FULENWIDER  
SANITARY SEWER AVERAGE FLOWS AND POPULATION**

Planning Area	Area (Ac)	Type of Development	Avg. Daily Flow/Ac (gpd/ac)	Avg. Daily Flow (MGD)	Equivalent Population /Ac	Population
PA-2	37.5	MU-COMM	1500	0.056	22	825
PA-3	48.1	MU-COMM	1500	0.072	22	1058
PA-4	81.8	MU-INDUSTIRAL	1200	0.098	18	1472
PA-5	117.4	MU-INDUSTIRAL	1200	0.141	18	2113
PA-6	84.0	MU-INDUSTIRAL	1200	0.101	18	1512
PA-7	59.7	MU-INDUSTIRAL	1200	0.072	18	1075
PA-8	16.7	MU-COMM	1500	0.025	22	367
PA-9	37.5	MU-COMM	1500	0.056	22	825
PA-10	75.4	MU-INDUSTIRAL	1200	0.090	18	1357
PA-11	1.7	LIFT STATION	1200	0.002	18	31
PA-12	12.2	XCEL SUBSTATION	1200	0.015	18	220
PA-13	5.0	N.P	SANITARY DEMANDS NOT APPLICABLE TO PARKS, OPEN SPACE, DRAINAGE CHANNEL, OR LAND ACQUISITION AREAS			
PA-14	4.0	N.P				
PA-15	4.6	2ND CREEK OPEN SPACE				
PA-16	19.7	DETENTION / OPEN SPACE				
PA-17	12.9	DETENTION / OPEN SPACE				
PA-18	3.8	DETENTION / OPEN SPACE				
PA-19	2.4	DETENTION / OPEN SPACE				
PA-20	12.5	FLOOD PLAIN				
PA-21	20.5	FLOOD PLAIN				
PA-22	15.6	FLOOD PLAIN				
PA-23	0.8	LAND ACQUISITION				
PA-24	3.4	LAND ACQUISITION				
PA-25	3.9	2ND CREEK OPEN SPACE				
PA-26	0.5	TRAILHEAD OPEN SPACE				

Planning Area	Area (Ac)	Type of Development	Dwelling Units (DU)	CAP/DU	CAP	Avg. Daily Demand gpd/CAP	Avg. Daily Flow (MGD)
PA-1	40.0	MU-RESIDENTIAL	30	2.77	3324	68	0.226



**FULENWIDER  
SANITARY SEWER PEAK FLOW CALCULATIONS**

	Node	Basins Added to System	Total Avg. Daily Flow @ Node (MGD)	Total Upstream Population	Peaking Factor = $5/p^{0.167}$	Peak Flow (MGD)	Infiltration (MGD)	Peak Flow + Infiltration (MGD)	Peak Flow + Infiltration (cfs)
4 1 2	T	OFFSITE (page 165 of WINDLER HOMSTEAD REPORT)	0.690	3,250	4.00	2.760	0.069	2.829	4.377
	S	OFFSITE from 310 West Development	0.403	5,928	3.71	1.497	0.040	1.537	2.378
	R	OFFSITE from Avelon Development	0.362	5,327	3.78	1.369	0.036	1.405	2.174
	P	50% PA-1	0.878	12,917	3.26	2.864	0.088	2.951	4.566
3	O	50% PA-1 + PA-12	1.006	14,799	3.19	3.206	0.101	3.307	5.116
	N	NODE O + PA-2	1.062	15,624	3.16	3.355	0.106	3.461	5.355
	M	PA-3	0.072	1,058	4.00	0.289	0.007	0.296	0.458
	L.1	50% PA-4 + 30% PA-5	0.091	1,370	4.00	0.365	0.009	0.375	0.579
	L	NODE L.1 + 50% PA-4	0.140	2,106	4.00	0.562	0.014	0.576	0.891
	K	OFFSITE (2nd Creek Tributary WINDLER HOMSTEAD REPORT)	3.683	54,718	2.56	9.439	0.368	9.807	15.174
	J	35% PA-5 + OFFSITE NODE K + OFFSITE NODE T	4.423	58,708	2.53	11.201	0.442	11.644	18.015
	I	PA-8	0.025	367	4.00	0.100	0.003	0.103	0.159
	H	35% PA-5 + NODE L + NODE J + NODE I	4.6	61,554	2.51	11.653	0.464	12.117	18.747
	G	35% PA-6 + NODE H	4.673	62,083	2.51	11.725	0.467	12.192	18.863
	F	PA-9	0.056	825	4.00	0.225	0.006	0.231	0.357
	E.1	30% PA-6	0.030	529	4.00	0.121	0.003	0.124	0.192
	E	OFFSITE + NODE E.1	0.030	529	4.00	0.121	0.003	0.124	0.192
	D	35% PA-6 + NODE G + NODE F	4.764	63,437	2.50	11.911	0.476	12.388	19.166
	C	50% PA-7 + NODE D	4.800	63,974	2.50	11.984	0.480	12.464	19.284
	B	PA-10	0.090	1,357	4.00	0.362	0.009	0.371	0.574
A	50% PA-7 + NODE B + NODE C + NODE N + NODE M	6.091	145,988	2.18	13.249	0.609	13.858	21.441	

<sup>1</sup> OFFSITE from 310 West 1.54 MGD based on COA email from Aurora Planning Department & Aurora Water Engineering 11/1/2019

<sup>2</sup> Offsite from Avelon Development MUS prepared by Dewberry/J3 dated 8/9/2019 currently under COA Review: DP-19 0.362 MGD & 5,327 Population - 1.84 CFS

<sup>3</sup>

OFFSITE from 2nd Creek Tributary Area meeting on 06/30/2020

<sup>4</sup> OFFSITE from Windler Homestead MUS prepared by Carter & Burgess dated 2006 (MGD & Population updated to target peak flow of 4.38 cfs based on COA email from Aurora Water Engineering also as shown in the previously reference report for the Windler Homestead MUS) OPTION 1 ALONG 56TH TO NODE K or OPTION 2 TO DENALI STREET NODE L.1

**FULENWIDER  
SANITARY SEWER ROUTING CALCULATIONS**

From Node:	To Node:	Basins Added to System	Total Flow Flow (cfs)	Required Pipe Size (in)	Minimum Slope* (%)	Maximum Slope* (%)	Percentage Full (%)
(see note below)							
T	K	OFFSITE FROM WINDLER HOMESTEAD	4.377	18	0.40	2.03	53.4
S	R	OFFSITE FROM 310 WEST (310)	2.378	12	0.40	2.87	73.7
R	O	OFFSITE FROM AVELON (AV)	2.174	12	0.40	2.87	68.6
P	O	PA-1, AV, 310	4.566	15	0.40	2.13	77.4
O	N	PA-1, PA-12, AV, 310	5.116	18	0.40	2.03	58.8
N	Q	PA-2, AV, 310	5.355	21	0.40	1.65	47.2
M	Q	PA-3	0.458	8	0.40	4.94	51.2
Q	LIFTSTATION	PA-1, PA-2, PA-3, PA-12 AV, 310	5.813	21	0.40	1.65	49.5
K	J	OFFSITE FROM WINDLER HOMESTEAD (WH)	15.174	30	0.40	1.00	49.7
J	H	PA-5, WH	18.015	30	0.40	1.00	55.1
L.1	L	PA-5	0.579	12	0.40	2.87	31.7
L	H	PA-4	0.891	12	0.40	2.87	39.9
I	H	PA-8	0.159	8	0.40	4.94	28.8
H	G	PA-4, PA-5, PA-8, WH	18.747	30	0.40	1.00	56.5
G	D	PA-4, PA-5, PA-6, PA-8, WH	18.863	30	0.40	1.00	56.7
E.1	E	PA-6	0.192	12	0.40	2.87	18.2
E	Z	OFFSITE HIGHPOINT	0.192	12	0.40	2.87	18.2
F	D	PA-9	0.357	8	0.40	4.94	44.6
D	C	PA-4, PA-5, PA-6, PA-8, PA-9, WH	19.166	30	0.40	1.00	57.3
C	A	PA-4, PA-5, PA6, PA-7, PA-8, PA-9, WH	19.284	30	0.40	1.00	57.5
B	A	PA-10	0.574	8	0.40	4.94	58.9
A	LIFTSTATION	PA-1 THROUGH PA-10 & WH, AV, 310	21.441				

\* Note:

achieve a minimum velocity of 2.0 ft/sec and a maximum percent full capacity of 75% for pipes 12" and smaller or 80% for pipes larger than 12".

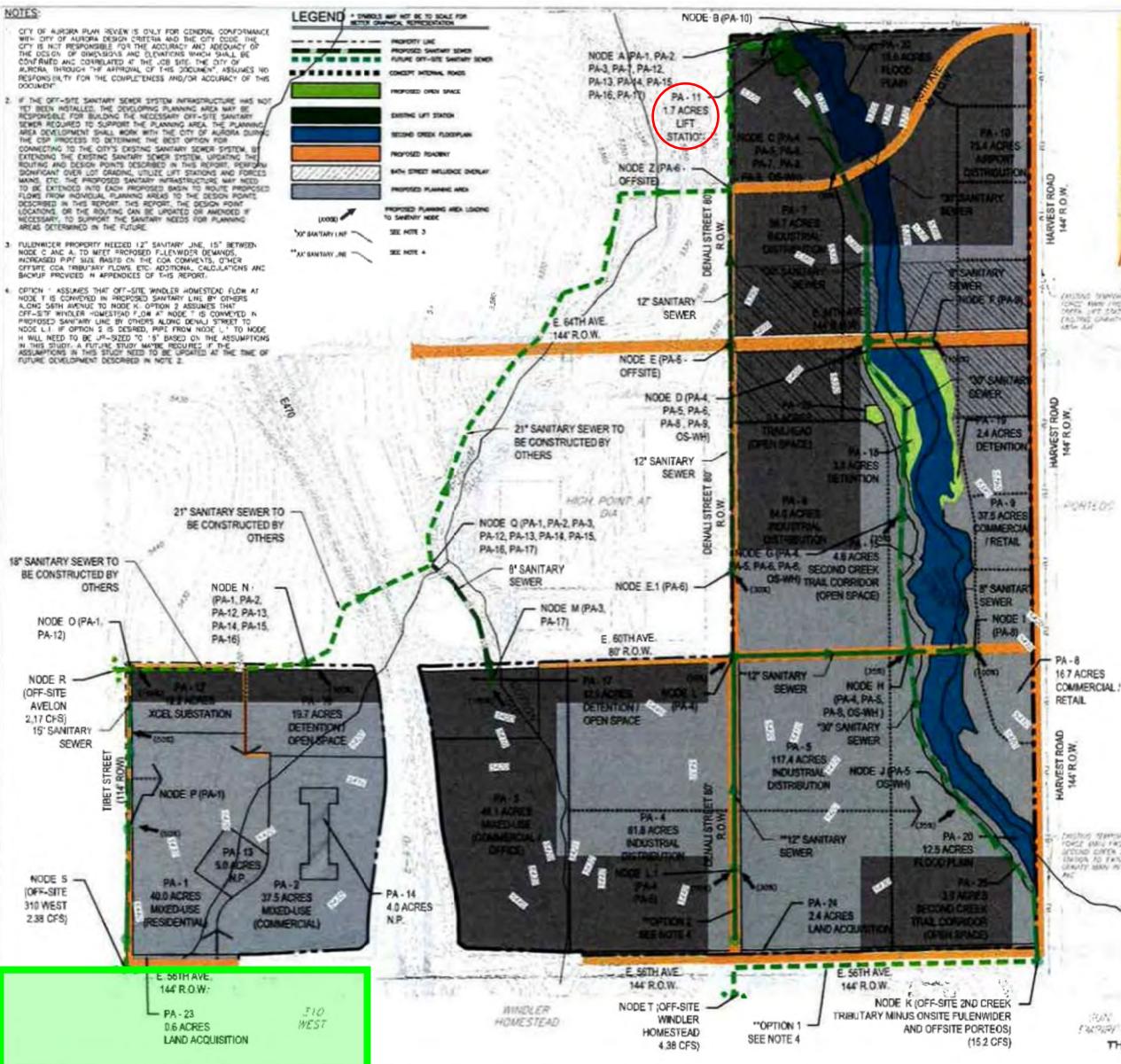


## NOTES

1. 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 CORRECTED BY THE USER. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.
2. IF THE OFF-SITE SANITARY SEWER SYSTEM INFRASTRUCTURE HAS NOT YET BEEN INSTALLED, THE DEVELOPING PLANNING AREA MAY BE RESPONSIBLE FOR BUILDING THE NECESSARY OFF-SITE SANITARY SEWER REQUIRED TO SUPPORT THE PLANNING AREA. THE PLANNING AREA DEVELOPMENT SHALL WORK WITH THE CITY OF AURORA DURING THE CIP PROCESS TO DETERMINE THE BEST OPTION FOR CONNECTING TO THE CITY'S EXISTING SANITARY SEWER SYSTEM. BY EXTENDING THE EXISTING SANITARY SEWER SYSTEM, UPDATING THE ROUTING AND DESIGN POINTS DESCRIBED IN THIS REPORT, PERFORM CONFORMANCE OVER LIFT STATIONS, UTILITY LIFT STATIONS AND FORCED MAINS, ETC. THE PROPOSED SANITARY INFRASTRUCTURE MAY NEED TO BE EXTENDED INTO EACH PROPOSED BASIN TO ROUTE PROPOSED FLOWS FROM INDIVIDUAL PLANNING AREAS TO THE DESIGN POINTS DESCRIBED IN THIS REPORT. THE DESIGN POINT LOCATIONS OR THE ROUTING CAN BE UPDATED OR AMENDED IF NECESSARY TO SUPPORT THE SANITARY NEEDS FOR PLANNING AREAS DETERMINED IN THE FUTURE.
3. FULENWIDER PROPERTY NEEDED 12" SANITARY LINE 15' BETWEEN NODE C AND A TO MEET PROPOSED FULENWIDER DEMANDS. PROPOSED 15' SIDE RADIUS ON THE COR CORNER, OTHER OFFSITE CDA TRIBUTARY FLOWS, ETC. ADDITIONAL CALCULATIONS AND BACKUP PROVIDED IN APPENDICES OF THIS REPORT.
4. OPTION 1 ASSUMES THAT OFF-SITE WINDLER HOMESTEAD FLOW AT NODE I IS CONVERTED IN PROPOSED SANITARY LINE BY CHIMNEY ALONG 56TH AVENUE TO NODE K. OPTION 2 ASSUMES THAT OFF-SITE WINDLER HOMESTEAD FLOW AT NODE I IS CONVERTED IN PROPOSED SANITARY LINE BY CHIMNEY ALONG DENALI STREET TO NODE L. IF OPTION 2 IS DESIRED, FLOW FROM NODE L TO NODE H WILL NEED TO BE UP-SIZED TO 18" BASED ON THE ASSUMPTIONS IN THIS STUDY. A FUTURE STUDY MAY REQUIRE THAT THE ASSUMPTIONS IN THIS STUDY NEED TO BE UPDATED AT THE TIME OF FUTURE DEVELOPMENT DESCRIBED IN NOTE 2.

## LEGEND

- PROPOSED LINE  
PROPOSED SANITARY SEWER  
EXISTING OFF-SITE SANITARY SEWER  
CONCEPT INTERNAL ROAD  
PROPOSED OPEN SPACE  
EXISTING LIFT STATION  
EXISTING CREEK FLOODPLAIN  
PROPOSED ROADWAY  
WITH STREET INCLUDE OVERLAY  
PROPOSED PLANNING AREA  
PROPOSED PLANNING AREA LEADING TO SANITARY NODE  
SEE NOTE 3  
SEE NOTE 4
- 10" SANITARY LINE  
12" SANITARY LINE  
15" SANITARY LINE



FROM Node	TO Node	Pack Flow + Inflow Rate (MGD)	Pack Flow + Inflow Rate (MGD)	Required Pipe Size (in)	Pipe Percent Full
T	K	7.57	7.57	18	52.4
S	R	1.54	2.58	12	13.7
M	O	1.43	2.57	12	66.4
R	O	2.05	4.17	18	77.4
O	N	3.31	2.12	18	56.3
N	O	3.40	5.36	21	47.2
M	O	3.20	3.40	18	51.2
Q	LIFT STATION	3.10	5.61	21	49.5
L	L	0.37	0.56	12	31.7
L	N	0.56	0.89	12	20.8
K	J	0.81	15.57	30	49.7
J	N	10.64	18.01	30	55.1
I	H	0.13	0.16	8	27.8
H	I	12.12	16.73	30	56.5
IS	D	0.16	1.00	31	56.7
F	O	0.23	0.58	8	44.6
B.1	K	0.12	0.19	12	18.2
E	J	0.12	0.19	12	18.2
O	O	12.38	18.17	30	57.3
C	A	12.48	15.35	30	57.0
B	A	0.37	0.11	8	14.5
A	LIFT STATION	15.86	21.44		

1. OFFSITE Node 210 West 154 NCD based on CDA input from Aurora Planning Department & Aurora Water Engineering 11/10/2018
2. Offsite from Aurora Development MUD prepared by Chertkovs 12/10/2018 currently under CDA Review (DP 19-0302 MUD & 1321 Planets)
3. OFFSITE from 2nd Creek Tributary App meeting on 06/05/2020 and updated 2nd Creek Tributary App also included in Appendix A
4. OFFSITE from Winder Homestead MUD prepared by Carter & Burgess under 1000 ASCE & 1000 ASCE updated to target peak flow of 4.28 cfs based on CDA input from Aurora Water Engineering and on flow in the previously submitted report for the Winder Homestead MUD. OPTION 1 ALONG WITH TO NODE K OR OPTION 2 TO DENALI STREET NODE L 1

CITY OF AURORA APPROVAL BLOCK

Craig Paul  
City Engineer  
DATE 07/31/2020

Victor Rachal  
Fire Department  
DATE 07/30/2020

Victor Rachal  
Aurora Water Department  
DATE 06/05/2020

## FULENWIDER

## MASTER UTILITY PLAN (SANITARY)

NO.	DATE	BY	REVISION
1	07/31/2020	CRAIG PAUL	ISSUED FOR PERMIT
2	07/30/2020	VICTOR RACHAL	DESIGN BY
3	06/05/2020	VICTOR RACHAL	DESIGN BY
4	06/05/2020	VICTOR RACHAL	DESIGN BY
5	06/05/2020	VICTOR RACHAL	DESIGN BY
6	06/05/2020	VICTOR RACHAL	DESIGN BY
7	06/05/2020	VICTOR RACHAL	DESIGN BY
8	06/05/2020	VICTOR RACHAL	DESIGN BY
9	06/05/2020	VICTOR RACHAL	DESIGN BY
10	06/05/2020	VICTOR RACHAL	DESIGN BY

MUS-S

APPROVED ON 08/05/2020





## High Point at DIA - FDP Amendment No. 4 – Master Utility Study Amendment

64<sup>TH</sup> AVENUE AND PICADILLY ROAD  
CITY OF AURORA, COLORADO

Martin/Martin, Inc. Project No.: 19.0397

May 11, 2020

City of Aurora Approval Block		
07/29/2020		
CWB	<u>Vernon A. Adam</u>	07/23/2020
	Aurora Water	Date
	<u>Craig Paul</u> for Victor Rachael	07/28/2020
	City Engineer	Date
	<u>Will Paul</u>	07/27/2020
	Life Safety	Date

Prepared For: Westside Investment Partners, Inc.  
4100 East Mississippi Avenue, Suite 500  
Glendale, Colorado 80246  
Attn: Kevin Smith

Prepared By: Martin/Martin, Inc.  
12499 West Colfax Avenue  
Lakewood, Colorado 80215  
303.431.6100

Principal-in-Charge: Pat Horn, P.E.  
Project Manager: Jeff White, P.E.  
Project Engineer: Gregory R. Proulx, P.E.

**BASIN B ROUTING**

<b>Design Point</b>	<b>Basins Added to System</b>	<b>Total Avg. Daily Flow @ Node (MGD)</b>	<b>Total Upstream Population</b>	<b>Peaking Factor = <math>5/p^{0.167}</math></b>	<b>Peak Flow (MGD)</b>	<b>Infiltration (MGD)</b>	<b>Peak Flow + Infiltration (MGD)</b>	<b>Peak Flow + Infiltration (cfs)</b>
DP-24	HP-B7	0.085	1,249	4.00	0.339	0.008	0.348	0.538
DP-23	HP-B6	0.166	2,441	4.00	0.664	0.017	0.681	1.053
DP-22	DP-23 + DP-24	0.251	3,690	4.00	1.003	0.025	1.028	1.591
DP-15	DP-22+ HP-B1	0.462	6,856	3.63	1.675	0.046	1.721	2.663
1 DP-FW1	Offsite flow from Fulerwider MUS Report Node Q (INCLUDES DP-AV1 & DP-310W)	1.134	16,682	3.13	3.544	0.113	3.657	5.813
2 DP-AV1	Offsite flow from Avelon MUS Report DP-19	0.362	5,327	3.78	1.369	0.036	1.405	2.174
3 DP-310W	Offsite flow from 310 West MUS Report DP-1	0.403	5,928	3.71	1.497	0.040	1.537	2.378
DP-16	HP-B2 + DP-FW1	1.253	18,435	3.07	3.849	0.125	3.975	6.336
DP-17	DP-16 + HP-B3	1.301	19,159	3.05	3.974	0.130	4.104	6.535
DP-18	HP-B4	0.124	1,863	4.00	0.497	0.012	0.509	0.788
DP-19	DP-17 + DP-18	1.426	21,022	3.01	4.286	0.143	4.429	7.038
DP-20	DP-15 + DP-19 + HP-B5	1.989	29,393	2.84	5.654	0.199	5.853	9.242
DP-26	HP-B9	0.025	370	4.00	0.101	0.003	0.103	0.160
DP-25	DP-20 + DP-26 + HP-B8	2.066	30,539	2.82	5.837	0.207	6.044	9.537

<sup>1</sup> Offsite from Fulerwider MUS prepared by Martin/Martin Inc., dated 05/2020 currently under COA Review. Node Q-5,813 CFS

<sup>2</sup> Offsite from Avelon Development MUS prepared by Dewberry/J3 dated 8/9/2019 currently under COA Review. DP-19 0.362 MGD & 5,327 Population

<sup>3</sup> Offsite from 310 West Development MUS prepared by Calibre Engineering Inc., dated 10/2017 currently under COA Review. DP-1 0.444 MGD & 5,928 Population

**HIGH POINT  
SANITARY SEWER ROUTING CALCULATIONS  
BASIN A**

From Design Point:	To Design Point:	Basins Added to System	Total Flow Flow (cfs)	Required Pipe Size (in)	Minimum Slope* (%)	Maximum Slope* (%)	Percentage Full** (%)
(see note below)							
DP-6	DP-7	OS-2 FROM AVELON	0.641	12	0.40	2.87	33.4
DP-7	DP-8	HP-A6	2.119	15	0.40	2.13	46.2
DP-8	DP-9	RV4	2.819	15	0.40	2.13	54.9
DP-9	DP-10	RV3	2.963	15	0.40	2.13	56.6
DP-10	DP-12	OS-1 FROM PAINTED PRAIRIE	4.493	15	0.40	2.13	76.3
DP-11	DP-12	RV2	1.313	12	0.40	2.87	49.5
DP-12	DP-13	OS-1 FROM PAINTED PRAIRIE & RV2	5.403	15	0.60	2.13	75.1
DP-13	DP-14	HP-A3	5.722	15	0.60	2.13	79.2
DP-14	LIFT STATION	RV1	6.314	15	0.70	2.13	80.8
DP-2	DP-3	HP-A4	0.471	12	0.40	2.87	28.4
DP-3	DP-4	HP-A2	0.925	12	0.40	2.87	40.8
DP-1	DP-5	HP-A5	0.831	8	0.40	4.94	74.7
DP-4	DP-5	HP-A1	1.207	12	0.40	2.87	47.1
DP-5	LIFT STATION		1.961	12	0.40	2.87	61.3

\* Note: Minimum slopes were determined as the greater of 0.40% as required by the City of Aurora or the slope required to achieve a minimum velocity of 2.0 ft/sec and a maximum percent full capacity of 75% for pipes 12" and smaller or 80% for pipes larger than 12".

Maximum slopes were determined based on a velocity of 10 ft/sec for full or half pipe conditions.

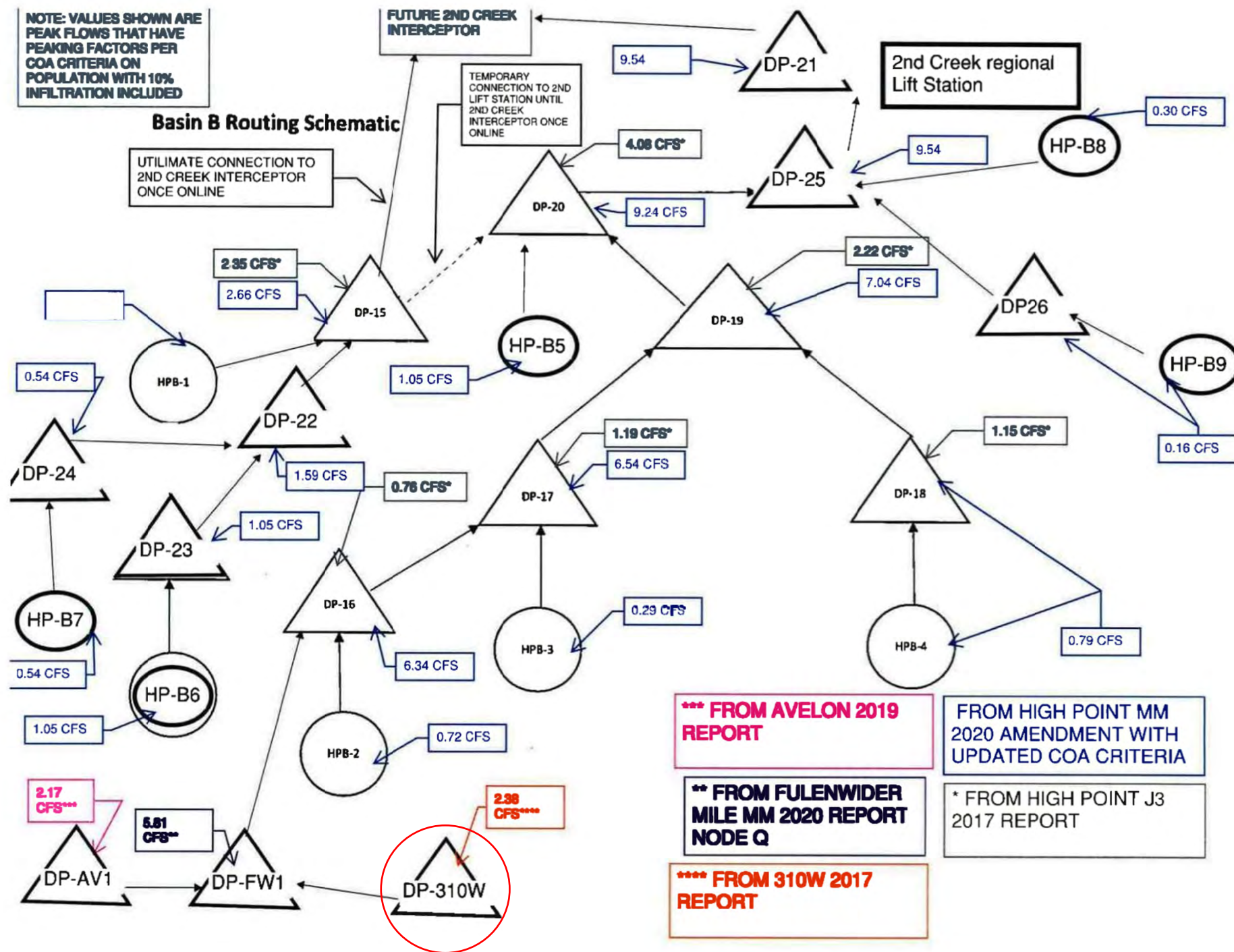
Refer to attached Flow Master analysis sheets for slope calculations

\*\*Pipes exceeding 80% full were designed to previous City of Aurora Criteria for pipes which was 90% full for pipes larger than 12". Also these lines were constructed at greater than the minimum slope to increase capacity and Painted Prairie MUS comment from COA that proposed 15" parallel line to be constructed.



NOTE: VALUES SHOWN ARE  
PEAK FLOWS THAT HAVE  
PEAKING FACTORS PER  
COA CRITERIA ON  
POPULATION WITH 10%  
INFILTRATION INCLUDED

## Basin B Routing Schematic



\*\*\* FROM AVELON 2019  
REPORT

\*\* FROM FULENWIDER  
MILE MM 2020 REPORT  
NODE Q

\*\*\*\* FROM 310W 2017  
REPORT

FROM HIGH POINT MM  
2020 AMENDMENT WITH  
UPDATED COA CRITERIA

\* FROM HIGH POINT J3  
2017 REPORT



220127

PLOT DATE: Monday, May 11, 2020 2:08 PM LAST SAVED: 07/29/2020  
DRAWING LOCATION: O:\SCHLAPPE\18-0397-Amp Point FDP Amendment\Amp Point Utility\Sanitary High Point Sanitary Tanking.dwg

**COA BENCHMARK:**  
CITY OF AURORA BENCHMARK COA ID 355611 (MSD) (OLD BENCHMARK ID AD-0754) BEING A 3" BRASS DISK ON 30" STEEL PIPE IN CONCRETE SET ON SOUTH SIDE OF 64TH AVE. IN E-W 3" STRAND BARBED WIRE FENCE, 3' WEST OF BENCHMARK IS 4" HIGH 2" YELLOW COLORED PIPE VICINITY OF THE N 1/2 CORNER SECTION 11, T2S 16N. ELEVATION=544.508 NAVD 83

**LEGEND**

BASIN BOUNDARY  
PROPOSED SANITARY SEWER  
PROPOSED OFF-SITE SANITARY SEWER  
EXISTING SANITARY SEWER  
PROPOSED FUTURE 2ND CREEK  
SANITARY SEWER INTERCEPTOR MAN

**DESIGN POINT**  
SANITARY BASIN

**NOTES:**

- 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.
- IF THE OFF-SITE SANITARY SEWER SYSTEM INFRASTRUCTURE HAS NOT YET BEEN INSTALLED, THE DEVELOPER PLANNING AREA WILL BE RESPONSIBLE FOR BUILDING THE NECESSARY OFF-SITE SANITARY SEWER REQUIRED TO SUPPORT THE PLANNING AREA. THE PLANNING AREA DEVELOPMENT SHALL WORK WITH THE CITY OF AURORA DURING THE CSP PROCESS TO DETERMINE THE BEST OPTION FOR CONNECTING TO THE CITY'S EXISTING SANITARY SEWER SYSTEM, BY EXTENDING THE EXISTING SANITARY SEWER SYSTEM, UPDATING THE ROUTING AND DESIGN POINTS, OR BUILDING A NEW SANITARY SEWER SYSTEM OVER JOINT DRAINAGE. IN THIS REPORT, PROPOSED SANITARY SEWER JOINT DRAINAGE, UTILIZE LIFT STATIONS AND FORCES MAINS, ETC. THE PROPOSED SANITARY INFRASTRUCTURE MAY NEED TO BE EXTENDED INTO EACH PROPOSED BASIN TO ROUTE PROPOSED FLOWS FROM INDIVIDUAL PLANNING AREAS TO THE DESIGN POINTS DESCRIBED IN THIS REPORT. THIS REPORT THE DESIGN POINT LOCATIONS, ON THE ROUTING CAN BE UPDATED OR AMENDED IF NECESSARY, TO SUPPORT THE SANITARY NEEDS FOR PLANNING AREAS DETERMINED IN THE FUTURE.
- DASHED CONNECTION FROM DP 15 TO DP 20 UTILIZED FOR INTERIM CONDITION AND DASHED BUILD OUT UNTIL THE 2ND CREEK INTERCEPTOR IS COMPLETED AND ONLINE. INITIAL DEVELOPMENT CAN UTILIZE INTERIM CONNECTION UNTIL CAPACITY OF THE INTERCEPTOR OF DP 20 IS EXCEEDED.

**BASIN A SUMMARY TABLE:**

From Design Point	To Design Point	Peak Flow + Interceptor (MGD)	Peak Flow + Interceptor (cfs)	Required Pipe Size (in)	Min Pipe Slope (%)	Pipe Percent Full
DP-6	DP-7	0.474	0.647	12	0.40	33.4%
DP-7	DP-8	1.370	2.119	15	0.40	46.2%
DP-8	DP-9	1.822	2.819	15	0.40	54.9%
DP-9	DP-10	1.915	2.903	15	0.40	56.0%
DP-10	DP-17	2.934	4.493	15	0.40	76.3%
DP-17	DP-12	0.848	1.313	12	0.40	48.5%
DP-12	DP-13	3.480	5.403	15	0.60	75.1%
DP-13	DP-14	3.096	4.722	15	0.60	76.2%
DP-14	LIFT STATION	4.084	6.314	15	0.90	86.6%
DP-3	DP-5	0.356	0.471	12	0.40	28.4%
DP-5	DP-4	0.586	0.825	12	0.40	40.8%
DP-4	DP-5	0.557	0.831	8	0.40	14.7%
DP-5	DP-6	0.780	1.162	8	0.40	22.1%
DP-6	LIFT STATION	1.234	1.902	12	0.40	61.3%

1. CSD 2 utility to DP 28 from Aurora Development MUS prepared by Densmore/J3 dated 08/2019 at 10' MSD & 1.143 population per acre (14.13).

2. RW1 from Riverside Village MUS prepared by J3 dated 02/20/2017, COA #21702, 0.15 MSD & 20.9 acres of 22 equivalent population per acre (1962) plus 800 units at 2.77 people per unit (2216) = 2278 population.

3. RW3 from Riverside Village MUS prepared by J3 dated 02/20/2017, COA #21702, 0.09 MSD & 14.3 acres of 22 equivalent population per acre (42) population.

4. CSD 1 from Planned Prairie MUS, prepared by CUL approved 04/15/2022, design points A, F, & I, 1.33 MSD.

5. RW2 from Riverside Village MUS prepared by J3 dated 02/20/2017, COA #21702, 0.21 MSD & 1900 units at 2.77 people per unit (5073) population.

6. RW4 from Riverside Village MUS prepared by J3 dated 02/20/2017, COA #21702, 0.14 MSD & 800 units at 2.77 people per unit (1962) plus 801 units of 22 equivalent population per acre (793) = 2202 population.

\*Flow according to RW1 flow were designed to generate City of Aurora Criteria for pipes which meet 90% full for pipes larger than 12". Also these flows were consolidated at greater than the minimum slope to maintain capacity and Planned Prairie MUS comment from COA that proposed 15' pocket line to be constructed.

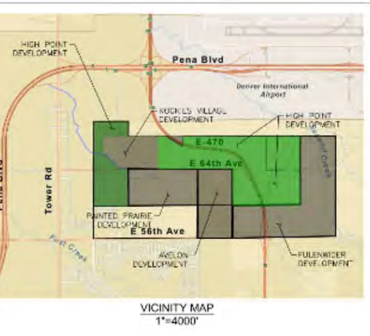
**BASIN B SUMMARY TABLE:**

From Design Point	To Design Point	Peak Flow + Interceptor (MGD)	Peak Flow + Interceptor (cfs)	Required Pipe Size (in)	Min Pipe Slope (%)	Pipe Percent Full
DP-18	DP-22	0.25	0.34	12	0.40	30.3%
DP-22	DP-23	0.68	1.05	12	0.40	43.7%
DP-23	DP-15	1.03	1.59	12	0.40	59.7%
DP-15	DP-17	4.10	6.34	21	0.40	82.1%
DP-17	DP-19	4.22	6.54	21	0.40	83.1%
DP-19	DP-18	0.51	0.79	12	0.40	41.2%
DP-18	DP-20	1.72	2.66	15	0.40	53%
DP-20	DP-21	4.55	7.04	21	0.40	85.9%
DP-21	DP-25	5.97	9.24	24	0.40	106.6%
DP-25	DP-26	6.10	9.16	21	0.40	86%
DP-26	DP-21	6.16	9.54	21	0.00	66%

1. Station from Lincoln 1600, prepared by Martin/Martin Inc. dated 02/20/2019 currently under COA Review. Made 04.815 CFS.

2. Station from Aurora Development MUS prepared by Densmore/J3 dated 08/2019 currently under COA Review. DP 19 at 10' MSD & 1.51 population.

3. Station from 3/10/2019 Development MUS prepared by Densmore/J3 dated 08/2019 currently under COA Review. DP 1 at 10' MSD & 5.508 Population.



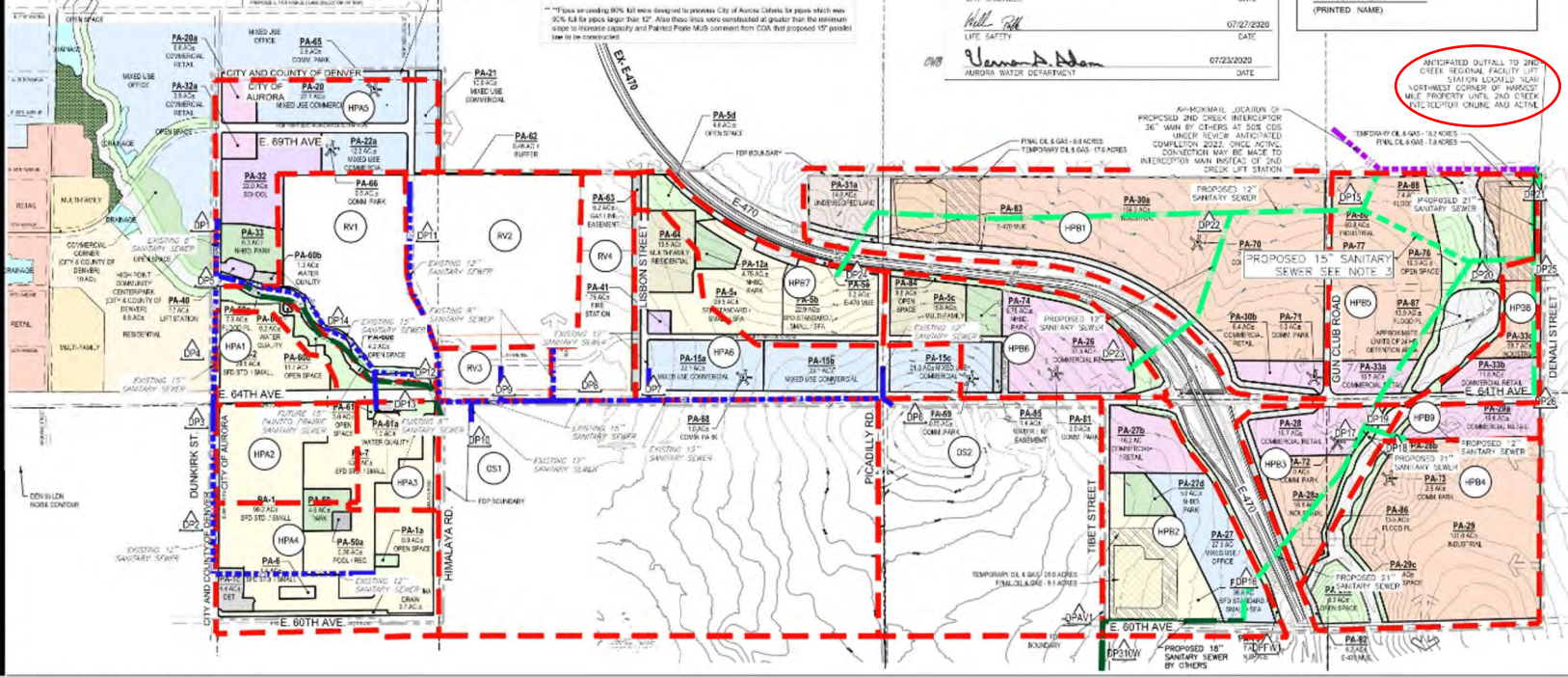
**CITY OF AURORA APPROVAL BLOCK**

CITY ENGINEER: *Bill J. ...* DATE: 07/27/2020  
LIFE SAFETY: *Vernon A. ...* DATE: 07/23/2020  
AURORA WATER DEPARTMENT

**SIGNATURES:**  
DATE: 05/1/2020  
PATRICK E. HORN (PRINTED NAME)

**APPROVAL BLOCK:**  
APPROVAL LOCATIONS OF PROPOSED 12" SANITARY SEWER BY OTHERS AT SITE CDS UNDER REVIEW AND ANTICIPATED COMPLETION 2022. ONCE ACTING INTERCEPTOR MAIN INSTALLED, 2ND CREEK LIFT STATION.

**ANTICIPATED OUTFALL TO 2ND CREEK REGIONAL FACILITY LIFT STATION LOCATED NEAR NORTHWEST CORNER OF HARVEST MILE PROPERTY UNTIL 2ND CREEK INTERCEPTOR ONLINE AND ACTIVE.**



**MARTIN/MARTIN**  
CITY OF AURORA, COLORADO  
18-0397-Amp Point FDP Amendment  
18-0397-Amp Point FDP Amendment

**HIGH POINT AT DIA FDP AMENDMENT NO. 4**  
**MASTER UTILITY STUDY**  
SANITARY BASIN MAP

**Job Number:** 18-0397  
**Project Manager:** JAWHAR AGARWAL  
**Design By:** G. PROULX  
**Drawn By:** G. PROULX  
**Principal in Charge:** P. HORN

**Sheet Number:** SS

No.	Issue / Revision	Date
1	ISSUED FOR CDR REVIEW	06/27/19
2	FOR CDR COMMENTS	07/10/19
3	FOR CDR COMMENTS	07/10/19
4	FOR CDR COMMENTS	07/10/19
5	FOR CDR COMMENTS	07/10/19
6	FOR CDR COMMENTS	07/10/19

APPROVED ON 07/29/2020

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## **APPENDIX B – Water System Calculations**

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TABLE 1: ON-SITE WATER DEMANDS

Planning Area	Max # of Units	Residential People/Units	Total People	Non-residential Acreage	Use	Demand (GPD/Acre)	Avg. Daily Demand (GPD)	Avg. Daily Demand (GPM)	Max. Daily Demand (GPD)	Max. Daily Demand (GPM)	Max. Hour Demand (GPD)	Max. Hour Demand (GPM)	Node(s)
PA-45							67987.00	47.21	190363.60	132.20	280426.50	194.74	J-5, J-6, J-8
	222	2.77	617		AA Residential		62317.00	43.28	174487.60	121.17	280426.50	194.74	
				3.15	PA-56 & 1/2 of PA-58 & PA-59	1800	5670.00	3.94	15876.00	11.03	N/A	N/A	
PA-46							91735.00	63.70	256858.00	178.37	384052.50	266.70	J-4, J-7, J-11, J-15, J-16
	305	2.77	845		AA Residential		85345.00	59.27	238966.00	165.95	384052.50	266.70	
				3.55	PA-57, PA-64 & 1/2 of PA-58, PA-59,	1800	6390.00	4.44	17892.00	12.43	N/A	N/A	
PA-47							35450.00	24.62	99260.00	68.93	159525.00	110.78	J-4, J-5, J-6
	90	2.77	250	5	Mixed Use	1500	32750.00	22.74	91700.00	63.68	147375.00	102.34	
				1.5	1/2 of PA-68	1800	2700.00	1.88	7560.00	5.25	12150.00	8.44	
PA-48							116405.00	80.84	325934.00	226.34	523822.50	363.77	J-3, J-4, J-7, J-17, J-18, J-19
	290	2.77	805	13.2	Mixed Use	1500	101105.00	70.21	283094.00	196.59	454972.50	315.95	
				8.5	PA-61, PA-67, & 1/2 PA-68	1800	15300.00	10.63	42840.00	29.75	68850.00	47.81	
PA-49							105224.00	73.07	294627.20	204.60	421668.00	292.83	J-15, J-16, J-17, J-18, J-19, J-21
	218	2.77	604	21.8	Mixed Use	1500	93704.00	65.07	262371.20	182.20	421668.00	292.83	
				6.4	1/2 of PA-60	1800	11520.00	8.00	32256.00	22.40	N/A	N/A	
PA-50							258013.00	179.18	722436.40	501.69	1000273.50	694.63	J-22, J-23, J-24
	517	2.77	1433	51.7	Mixed Use	1500	222283.00	154.36	622392.40	432.22	1000273.50	694.63	
				19.85	PA-62, PA-65, 1/2 of PA-60 & 63	1800	35730.00	24.81	100044.00	69.48	N/A	N/A	
PA-51					Mixed Use	1500	44362.00	30.81	124213.60	86.26	199629.00	138.63	J-20, J-25, J-27, J-28
	77	2.77	212	15.3			33323.00	23.14	93304.40	64.79	125248.50	86.98	
PA-52					Mixed Use	1500	27833.00	19.33	77932.40	54.12	125248.50	86.98	J-25
	48	2.77	133	9.6	1/2 of PA 63	1800	5490.00	3.81	15372.00	10.68	N/A	N/A	
				3.05									
PA-53							26250.00	18.23	73500.00	51.04	118125.00	82.03	J-2, J-20
	0	0	0	17.5	Commercial	1500	26250.00	18.23	73500.00	51.04	118125.00	82.03	
PA-54							40950.00	28.44	114660.00	79.63	184275.00	127.97	J-2, J-3, J-6
	0	0	0	27.3	Commercial	1500	40950.00	28.44	114660.00	79.63	184275.00	127.97	
PA-55													
	258	2.77	715	17.2	Mixed Use	1500	98015.00	68.07	274442.00	190.58	441067.50	306.30	

Green Valley Master Plan Amendment 2

Color Coding Legend

Pipe: Diameter (in)

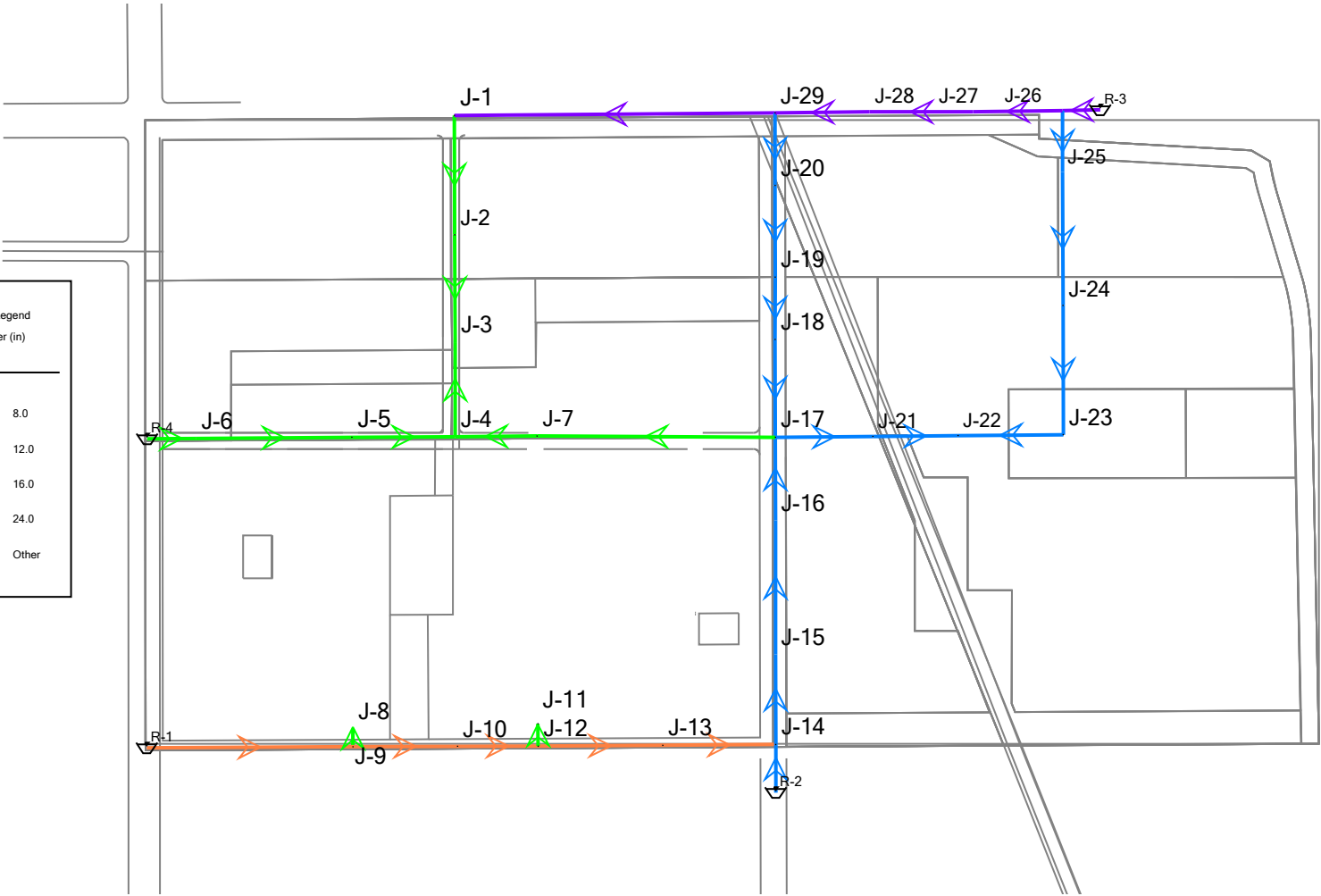
<= 8.0

<= 12.0

<= 16.0

<= 24.0

Other



Average Daily

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
152	R-3	5,720.00	334	5,720.00
177	R-1	5,720.00	61	5,720.00
187	R-2	5,720.00	88	5,720.00
228	R-4	5,720.00	86	5,720.00



Average Daily Junction Table - Time: 0.00 hours								
ID	Label	Elevation (ft)	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Fire Flow (Needed) (gpm)	Flow (Total Available) (gpm)
40	J-18	5,452.26	<Collection: 1 item>	26	5,719.97	116	2,500	(N/A)
42	J-20	5,440.19	<Collection: 1 item>	17	5,719.98	121	2,500	(N/A)
49	J-17	5,457.80	<Collection: 1 item>	26	5,719.96	113	2,500	(N/A)
79	J-6	5,446.97	<Collection: 1 item>	38	5,719.97	118	2,500	(N/A)
83	J-19	5,447.44	<Collection: 1 item>	26	5,719.97	118	2,500	(N/A)
96	J-8	5,450.68	<Collection: 1 item>	16	5,720.00	117	1,500	(N/A)
102	J-10	5,449.85	<Collection: 0 items>	0	5,720.00	117	1,500	(N/A)
105	J-16	5,461.44	<Collection: 1 item>	25	5,719.97	112	2,500	(N/A)
108	J-15	5,463.80	<Collection: 1 item>	25	5,719.98	111	2,500	(N/A)
114	J-13	5,456.27	<Collection: 0 items>	0	5,720.00	114	1,500	(N/A)
153	J-26	5,435.37	<Collection: 0 items>	0	5,720.00	123	2,500	(N/A)
155	J-29	5,440.06	<Collection: 0 items>	0	5,720.00	121	2,500	(N/A)
168	J-3	5,449.22	<Collection: 1 item>	13	5,719.93	117	2,500	(N/A)
170	J-4	5,453.48	<Collection: 1 item>	34	5,719.93	115	2,500	(N/A)
174	J-9	5,451.50	<Collection: 0 items>	0	5,720.00	116	1,500	(N/A)
179	J-12	5,452.44	<Collection: 0 items>	0	5,720.00	116	1,500	(N/A)
183	J-14	5,458.50	<Collection: 0 items>	0	5,720.00	113	2,500	(N/A)
213	J-2	5,444.58	<Collection: 1 item>	23	5,719.93	119	2,500	(N/A)
215	J-1	5,444.26	<Collection: 0 items>	0	5,719.99	119	2,500	(N/A)
225	J-11	5,451.72	<Collection: 1 item>	13	5,720.00	116	1,500	(N/A)
230	J-23	5,449.90	<Collection: 1 item>	0	5,719.96	117	2,500	(N/A)
233	J-5	5,451.85	<Collection: 1 item>	24	5,719.94	116	2,500	(N/A)
236	J-7	5,456.21	<Collection: 1 item>	26	5,719.93	114	2,500	(N/A)
239	J-21	5,459.19	<Collection: 1 item>	12	5,719.96	117	2,500	(N/A)
242	J-22	5,455.43	<Collection: 1 item>	90	5,719.95	114	2,500	(N/A)
245	J-24	5,448.43	<Collection: 1 item>	90	5,719.96	117	2,500	(N/A)
248	J-25	5,438.30	<Collection: 1 item>	31	5,719.98	122	2,500	(N/A)
251	J-28	5,435.72	<Collection: 1 item>	8	5,720.00	123	2,500	(N/A)
254	J-27	5,432.40	<Collection: 1 item>	8	5,720.00	121	2,500	(N/A)

Average Daily  
Pipe Table - Time: 0.00 hours

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen- Williams C	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)
P-19	411	J-17	J-18	12.0	PVC	150.0	0.000	-56	0.16	0.009
P-20	261	J-18	J-19	12.0	PVC	150.0	0.000	-82	0.23	0.019
P-21	385	J-19	J-20	12.0	PVC	150.0	0.000	-107	0.30	0.030
P-18	349	J-16	J-17	12.0	PVC	150.0	0.000	71	0.20	0.014
P-17	563	J-15	J-16	12.0	PVC	150.0	0.000	96	0.27	0.025
P-5	205	R-4	J-6	8.0	PVC	150.0	0.000	86	0.55	0.150
P-29	158	R-3	J-26	24.0	Steel	140.0	0.000	334	0.24	0.009
P-3	398	J-3	J-4	8.0	PVC	150.0	0.000	0	0.00	0.000
P-10	75	J-8	J-9	8.0	PVC	150.0	0.000	-16	0.10	0.007
P-11	440	J-9	J-10	16.0	PVC	150.0	0.000	45	0.07	0.001
P-9	867	R-1	J-9	16.0	PVC	150.0	0.000	61	0.10	0.003
P-12	339	J-10	J-12	16.0	PVC	150.0	0.000	45	0.07	0.001
P-14	524	J-12	J-13	16.0	PVC	150.0	0.000	32	0.05	0.001
P-14	476	J-13	J-14	16.0	PVC	150.0	0.000	32	0.05	0.001
P-16	379	J-15	J-14	12.0	PVC	150.0	0.000	-121	0.34	0.039
P-15	202	R-2	J-14	12.0	PVC	150.0	0.000	88	0.25	0.022
P-2	451	J-3	J-2	8.0	PVC	150.0	0.000	-13	0.09	0.004
P-1	501	J-2	J-1	8.0	PVC	150.0	0.000	-37	0.42	0.125
P-33	1,348	J-1	J-29	24.0	Steel	140.0	0.000	-37	0.03	0.000
P-22	305	J-20	J-29	12.0	PVC	150.0	0.000	-124	0.35	0.042
P-13	94	J-12	J-11	8.0	PVC	150.0	0.000	13	0.08	0.005
P-4	434	J-4	J-5	8.0	PVC	150.0	0.000	-24	0.15	0.013
P-5	657	J-5	J-6	8.0	PVC	150.0	0.000	-48	0.31	0.051
P-7	344	J-4	J-7	8.0	PVC	150.0	0.000	-10	0.07	0.003
P-8	1,002	J-7	J-17	8.0	PVC	150.0	0.000	-37	0.23	0.031
P-23	411	J-21	J-17	12.0	PVC	150.0	0.000	-64	0.18	0.012
P-24	358	J-21	J-22	12.0	PVC	150.0	0.000	52	0.15	0.008
P-25	442	J-22	J-23	12.0	PVC	150.0	0.000	-37	0.11	0.004
P-26	543	J-23	J-24	12.0	PVC	150.0	0.000	-37	0.11	0.004
P-27	560	J-24	J-25	12.0	PVC	150.0	0.000	-127	0.36	0.043
P-28	257	J-25	J-26	12.0	PVC	150.0	0.000	-158	0.45	0.064
P-32	397	J-28	J-29	24.0	Steel	140.0	0.000	161	0.11	0.002
P-30	377	J-26	J-27	24.0	Steel	140.0	0.000	176	0.13	0.004
P-31	435	J-27	J-28	24.0	Steel	140.0	0.000	169	0.12	0.002

Max Daily Junction Table - Time: 0.00 hours								
ID	Label	Elevation (ft)	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Fire Flow (Needed) (gpm)	Flow (Total Available) (gpm)
40	J-18	5,452.26	<Collection: 1 item>	72	5,719.73	116	2,500	(N/A)
42	J-20	5,440.19	<Collection: 1 item>	47	5,719.87	121	2,500	(N/A)
49	J-17	5,457.80	<Collection: 1 item>	72	5,719.70	113	2,500	(N/A)
79	J-6	5,446.97	<Collection: 1 item>	107	5,719.79	118	2,500	(N/A)
83	J-19	5,447.44	<Collection: 1 item>	72	5,719.77	118	2,500	(N/A)
96	J-8	5,450.68	<Collection: 1 item>	44	5,719.98	117	1,500	(N/A)
102	J-10	5,449.85	<Collection: 0 items>	0	5,719.98	117	1,500	(N/A)
105	J-16	5,461.44	<Collection: 1 item>	70	5,719.74	112	2,500	(N/A)
108	J-15	5,463.80	<Collection: 1 item>	70	5,719.85	111	2,500	(N/A)
114	J-13	5,456.27	<Collection: 0 items>	0	5,719.97	114	1,500	(N/A)
153	J-26	5,435.37	<Collection: 1 item>	22	5,719.99	123	2,500	(N/A)
155	J-29	5,440.06	<Collection: 0 items>	0	5,719.97	121	2,500	(N/A)
168	J-3	5,449.22	<Collection: 1 item>	38	5,719.51	117	2,500	(N/A)
170	J-4	5,453.48	<Collection: 1 item>	96	5,719.51	115	2,500	(N/A)
174	J-9	5,451.50	<Collection: 0 items>	0	5,719.98	116	1,500	(N/A)
179	J-12	5,452.44	<Collection: 0 items>	0	5,719.97	116	1,500	(N/A)
183	J-14	5,458.50	<Collection: 0 items>	0	5,719.97	113	2,500	(N/A)
213	J-2	5,444.58	<Collection: 1 item>	65	5,719.52	119	2,500	(N/A)
215	J-1	5,444.26	<Collection: 0 items>	0	5,719.96	119	2,500	(N/A)
225	J-11	5,451.72	<Collection: 1 item>	36	5,719.97	116	1,500	(N/A)
230	J-23	5,449.90	<Collection: 1 item>	251	5,719.61	117	2,500	(N/A)
233	J-5	5,451.85	<Collection: 1 item>	67	5,719.55	116	2,500	(N/A)
236	J-7	5,456.21	<Collection: 1 item>	73	5,719.51	114	2,500	(N/A)
239	J-21	5,459.19	<Collection: 1 item>	34	5,719.64	117	2,500	(N/A)
242	J-22	5,455.43	<Collection: 1 item>	251	5,719.61	114	2,500	(N/A)
245	J-24	5,448.43	<Collection: 1 item>	86	5,719.72	117	2,500	(N/A)
248	J-25	5,438.30	<Collection: 0 items>	0	5,719.91	122	2,500	(N/A)
251	J-28	5,435.72	<Collection: 1 item>	0	5,719.97	123	2,500	(N/A)
254	J-27	5,432.40	<Collection: 1 item>	22	5,719.98	121	2,500	(N/A)



Max Daily										
Pipe Table - Time: 0.00 hours										
Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen- Williams C	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)
P-19	411	J-17	J-18	12.0	PVC	150.0	0.000	-184	0.52	0.084
P-20	261	J-18	J-19	12.0	PVC	150.0	0.000	-256	0.73	0.157
P-21	385	J-19	J-20	12.0	PVC	150.0	0.000	-328	0.93	0.246
P-18	349	J-16	J-17	12.0	PVC	150.0	0.000	223	0.63	0.120
P-17	563	J-15	J-16	12.0	PVC	150.0	0.000	293	0.83	0.200
P-5	205	R-4	J-6	8.0	PVC	150.0	0.000	245	1.56	1.035
P-29	158	R-3	J-26	24.0	Steel	140.0	0.000	907	0.64	0.062
P-3	398	J-3	J-4	8.0	PVC	150.0	0.000	2	0.01	0.000
P-10	75	J-8	J-9	8.0	PVC	150.0	0.000	-44	0.28	0.046
P-11	440	J-9	J-10	16.0	PVC	150.0	0.000	135	0.22	0.012
P-9	867	R-1	J-9	16.0	PVC	150.0	0.000	179	0.29	0.020
P-12	339	J-10	J-12	16.0	PVC	150.0	0.000	135	0.22	0.012
P-14	524	J-12	J-13	16.0	PVC	150.0	0.000	100	0.16	0.007
P-14	476	J-13	J-14	16.0	PVC	150.0	0.000	100	0.16	0.007
P-16	379	J-15	J-14	12.0	PVC	150.0	0.000	-363	1.03	0.298
P-15	202	R-2	J-14	12.0	PVC	150.0	0.000	263	0.75	0.164
P-2	451	J-3	J-2	8.0	PVC	150.0	0.000	-40	0.25	0.036
P-1	501	J-2	J-1	8.0	PVC	150.0	0.000	-105	1.19	0.878
P-33	1,348	J-1	J-29	24.0	Steel	140.0	0.000	-105	0.07	0.001
P-22	305	J-20	J-29	12.0	PVC	150.0	0.000	-375	1.06	0.315
P-13	94	J-12	J-11	8.0	PVC	150.0	0.000	36	0.23	0.031
P-4	434	J-4	J-5	8.0	PVC	150.0	0.000	-71	0.45	0.105
P-5	657	J-5	J-6	8.0	PVC	150.0	0.000	-138	0.88	0.357
P-7	344	J-4	J-7	8.0	PVC	150.0	0.000	-23	0.15	0.014
P-8	1,002	J-7	J-17	8.0	PVC	150.0	0.000	-97	0.62	0.186
P-23	411	J-21	J-17	12.0	PVC	150.0	0.000	-239	0.68	0.137
P-24	358	J-21	J-22	12.0	PVC	150.0	0.000	205	0.58	0.104
P-25	442	J-22	J-23	12.0	PVC	150.0	0.000	-46	0.13	0.007
P-26	543	J-23	J-24	12.0	PVC	150.0	0.000	-297	0.84	0.206
P-27	560	J-24	J-25	12.0	PVC	150.0	0.000	-383	1.09	0.330
P-28	257	J-25	J-26	12.0	PVC	150.0	0.000	-383	1.09	0.330
P-32	397	J-28	J-29	24.0	Steel	140.0	0.000	480	0.34	0.020
P-30	377	J-26	J-27	24.0	Steel	140.0	0.000	502	0.36	0.022
P-31	435	J-27	J-28	24.0	Steel	140.0	0.000	480	0.34	0.019

Max Hour

Junction Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Fire Flow (Needed) (gpm)	Flow (Total Available) (gpm)
40	J-18	5,452.26	<Collection: 1 item>	109	5,719.34	116	2,500	(N/A)
42	J-20	5,440.19	<Collection: 1 item>	76	5,719.68	121	2,500	(N/A)
49	J-17	5,457.80	<Collection: 1 item>	109	5,719.24	113	2,500	(N/A)
79	J-6	5,446.97	<Collection: 1 item>	166	5,719.51	118	2,500	(N/A)
83	J-19	5,447.44	<Collection: 1 item>	109	5,719.44	118	2,500	(N/A)
96	J-8	5,450.68	<Collection: 1 item>	65	5,719.95	117	1,500	(N/A)
102	J-10	5,449.85	<Collection: 0 items>	0	5,719.95	117	1,500	(N/A)
105	J-16	5,461.44	<Collection: 1 item>	102	5,719.35	112	2,500	(N/A)
108	J-15	5,463.80	<Collection: 1 item>	102	5,719.64	111	2,500	(N/A)
114	J-13	5,456.27	<Collection: 0 items>	0	5,719.93	114	1,500	(N/A)
153	J-26	5,435.37	<Collection: 1 item>	35	5,719.98	123	2,500	(N/A)
155	J-29	5,440.06	<Collection: 0 items>	0	5,719.92	121	2,500	(N/A)
168	J-3	5,449.22	<Collection: 1 item>	61	5,718.84	117	2,500	(N/A)
170	J-4	5,453.48	<Collection: 1 item>	151	5,718.84	115	2,500	(N/A)
174	J-9	5,451.50	<Collection: 0 items>	0	5,719.96	116	1,500	(N/A)
179	J-12	5,452.44	<Collection: 0 items>	0	5,719.94	116	1,500	(N/A)
183	J-14	5,458.50	<Collection: 0 items>	0	5,719.92	113	2,500	(N/A)
213	J-2	5,444.58	<Collection: 1 item>	105	5,718.87	119	2,500	(N/A)
215	J-1	5,444.26	<Collection: 0 items>	0	5,719.92	119	2,500	(N/A)
225	J-11	5,451.72	<Collection: 1 item>	53	5,719.93	116	1,500	(N/A)
230	J-23	5,449.90	<Collection: 1 item>	347	5,716.96	116	2,500	(N/A)
233	J-5	5,451.85	<Collection: 1 item>	102	5,718.95	116	2,500	(N/A)
236	J-7	5,456.21	<Collection: 1 item>	114	5,718.85	114	2,500	(N/A)
239	J-21	5,459.19	<Collection: 1 item>	49	5,717.92	116	2,500	(N/A)
242	J-22	5,455.43	<Collection: 1 item>	347	5,716.99	113	2,500	(N/A)
245	J-24	5,448.43	<Collection: 1 item>	122	5,717.74	117	2,500	(N/A)
248	J-25	5,438.30	<Collection: 0 items>	0	5,719.28	122	2,500	(N/A)
251	J-28	5,435.72	<Collection: 1 item>	0	5,719.94	123	2,500	(N/A)
254	J-27	5,432.40	<Collection: 1 item>	35	5,719.96	121	2,500	(N/A)

Max Hour

Pipe Table - Time: 0.00 hours

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen- Williams C	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)
P-19	411	J-17	J-18	12.0	PVC	150.0	0.000	-321	0.91	0.236
P-20	261	J-18	J-19	12.0	PVC	150.0	0.000	-430	1.22	0.407
P-21	385	J-19	J-20	12.0	PVC	150.0	0.000	-540	1.53	0.619
P-18	349	J-16	J-17	12.0	PVC	150.0	0.000	385	1.09	0.332
P-17	563	J-15	J-16	12.0	PVC	150.0	0.000	487	1.38	0.513
P-5	205	R-4	J-6	8.0	PVC	150.0	0.000	386	2.46	2.397
P-29	158	R-3	J-26	24.0	Steel	140.0	0.000	1,266	0.90	0.117
P-3	398	J-3	J-4	8.0	PVC	150.0	0.000	2	0.01	0.000
P-10	75	J-8	J-9	8.0	PVC	150.0	0.000	-65	0.41	0.085
P-11	440	J-9	J-10	16.0	PVC	150.0	0.000	219	0.35	0.029
P-9	867	R-1	J-9	16.0	PVC	150.0	0.000	284	0.45	0.047
P-12	339	J-10	J-12	16.0	PVC	150.0	0.000	219	0.35	0.029
P-14	524	J-12	J-13	16.0	PVC	150.0	0.000	166	0.26	0.017
P-14	476	J-13	J-14	16.0	PVC	150.0	0.000	166	0.26	0.017
P-16	379	J-15	J-14	12.0	PVC	150.0	0.000	-589	1.67	0.731
P-15	202	R-2	J-14	12.0	PVC	150.0	0.000	424	1.20	0.397
P-2	451	J-3	J-2	8.0	PVC	150.0	0.000	-63	0.40	0.082
P-1	501	J-2	J-1	8.0	PVC	150.0	0.000	-168	1.90	2.083
P-33	1,348	J-1	J-29	24.0	Steel	140.0	0.000	-168	0.12	0.003
P-22	305	J-20	J-29	12.0	PVC	150.0	0.000	-615	1.75	0.791
P-13	94	J-12	J-11	8.0	PVC	150.0	0.000	53	0.34	0.057
P-4	434	J-4	J-5	8.0	PVC	150.0	0.000	-118	0.75	0.267
P-5	657	J-5	J-6	8.0	PVC	150.0	0.000	-220	1.40	0.847
P-7	344	J-4	J-7	8.0	PVC	150.0	0.000	-31	0.20	0.023
P-8	1,002	J-7	J-17	8.0	PVC	150.0	0.000	-145	0.93	0.393
P-23	411	J-21	J-17	12.0	PVC	150.0	0.000	-451	2.88	3.209
P-24	358	J-21	J-22	12.0	PVC	150.0	0.000	402	2.57	2.595
P-25	442	J-22	J-23	12.0	PVC	150.0	0.000	55	0.35	0.065
P-26	543	J-23	J-24	12.0	PVC	150.0	0.000	-292	1.87	1.437
P-27	560	J-24	J-25	12.0	PVC	150.0	0.000	-414	2.64	2.736
P-28	257	J-25	J-26	12.0	PVC	150.0	0.000	-414	2.64	2.736
P-32	397	J-28	J-29	24.0	Steel	140.0	0.000	783	0.56	0.048
P-30	377	J-26	J-27	24.0	Steel	140.0	0.000	817	0.58	0.052
P-31	435	J-27	J-28	24.0	Steel	140.0	0.000	783	0.56	0.048



Fire Flow

Junction Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Fire Flow (Needed) (gpm)	Flow (Total Available) (gpm)
40	J-18	5,452.26	<Collection: 1 item>	72	5,719.80	116	2,500	3,572
42	J-20	5,440.19	<Collection: 1 item>	47	5,719.89	121	2,500	3,547
49	J-17	5,457.80	<Collection: 1 item>	72	5,719.78	113	2,500	3,572
79	J-6	5,446.97	<Collection: 1 item>	94	5,719.84	118	2,500	3,594
83	J-19	5,447.44	<Collection: 1 item>	72	5,719.83	118	2,500	3,572
96	J-8	5,450.68	<Collection: 1 item>	44	5,719.98	117	1,500	3,544
102	J-10	5,449.85	<Collection: 0 items>	0	5,719.98	117	1,500	3,500
105	J-16	5,461.44	<Collection: 1 item>	70	5,719.81	112	2,500	3,570
108	J-15	5,463.80	<Collection: 1 item>	70	5,719.89	111	2,500	3,570
114	J-13	5,456.27	<Collection: 0 items>	0	5,719.98	114	1,500	3,500
153	J-26	5,435.37	<Collection: 1 item>	22	5,719.99	123	2,500	3,522
155	J-29	5,440.06	<Collection: 0 items>	0	5,719.97	121	2,500	3,500
168	J-3	5,449.22	<Collection: 1 item>	64	5,719.65	117	2,500	3,564
170	J-4	5,453.48	<Collection: 1 item>	96	5,719.64	115	2,500	3,596
174	J-9	5,451.50	<Collection: 0 items>	0	5,719.99	116	1,500	3,500
179	J-12	5,452.44	<Collection: 0 items>	0	5,719.98	116	1,500	3,500
183	J-14	5,458.50	<Collection: 0 items>	0	5,719.97	113	2,500	3,500
213	J-2	5,444.58	<Collection: 1 item>	52	5,719.75	119	2,500	3,552
215	J-1	5,444.26	<Collection: 0 items>	0	5,719.96	119	2,500	3,500
225	J-11	5,451.72	<Collection: 1 item>	36	5,719.98	116	1,500	3,536
230	J-23	5,449.90	<Collection: 1 item>	167	5,719.75	117	2,500	3,667
233	J-5	5,451.85	<Collection: 1 item>	67	5,719.67	116	2,500	3,567
236	J-7	5,456.21	<Collection: 1 item>	73	5,719.64	114	2,500	3,573
239	J-21	5,459.19	<Collection: 1 item>	34	5,719.76	113	2,500	3,534
242	J-22	5,455.43	<Collection: 1 item>	167	5,719.75	114	2,500	3,667
245	J-24	5,448.43	<Collection: 1 item>	86	5,719.81	117	2,500	3,586
248	J-25	5,438.30	<Collection: 0 items>	0	5,719.94	122	2,500	3,500
251	J-28	5,435.72	<Collection: 1 item>	22	5,719.97	123	2,500	3,522
254	J-27	5,432.40	<Collection: 1 item>	22	5,719.98	124	2,500	3,522

Fire Flow

Pipe Table - Time: 0.00 hours

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen- Williams C	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)
P-19	411	J-17	J-18	12.0	PVC	150.0	0.000	-130	0.37	0.044
P-20	261	J-18	J-19	12.0	PVC	150.0	0.000	-202	0.57	0.101
P-21	385	J-19	J-20	12.0	PVC	150.0	0.000	-274	0.78	0.175
P-18	349	J-16	J-17	12.0	PVC	150.0	0.000	173	0.49	0.076
P-17	563	J-15	J-16	12.0	PVC	150.0	0.000	243	0.69	0.141
P-5	205	R-4	J-6	8.0	PVC	150.0	0.000	211	1.35	0.785
P-29	158	R-3	J-26	24.0	Steel	140.0	0.000	845	0.60	0.056
P-3	398	J-3	J-4	8.0	PVC	150.0	0.000	37	0.24	0.032
P-10	75	J-8	J-9	8.0	PVC	150.0	0.000	-44	0.28	0.046
P-11	440	J-9	J-10	16.0	PVC	150.0	0.000	118	0.19	0.009
P-9	867	R-1	J-9	16.0	PVC	150.0	0.000	162	0.26	0.016
P-12	339	J-10	J-12	16.0	PVC	150.0	0.000	118	0.19	0.010
P-14	524	J-12	J-13	16.0	PVC	150.0	0.000	82	0.13	0.005
P-14	476	J-13	J-14	16.0	PVC	150.0	0.000	82	0.13	0.004
P-16	379	J-15	J-14	12.0	PVC	150.0	0.000	-313	0.89	0.227
P-15	202	R-2	J-14	12.0	PVC	150.0	0.000	231	0.66	0.128
P-2	451	J-3	J-2	8.0	PVC	150.0	0.000	-101	0.65	0.202
P-1	501	J-2	J-1	8.0	PVC	150.0	0.000	-153	0.98	0.434
P-33	1,348	J-1	J-29	24.0	Steel	140.0	0.000	-153	0.11	0.002
P-22	305	J-20	J-29	12.0	PVC	150.0	0.000	-321	0.91	0.237
P-13	94	J-12	J-11	8.0	PVC	150.0	0.000	36	0.23	0.026
P-4	434	J-4	J-5	8.0	PVC	150.0	0.000	-50	0.32	0.055
P-5	657	J-5	J-6	8.0	PVC	150.0	0.000	-117	0.75	0.264
P-7	344	J-4	J-7	8.0	PVC	150.0	0.000	-9	0.06	0.003
P-8	1,002	J-7	J-17	8.0	PVC	150.0	0.000	-83	0.53	0.139
P-23	411	J-21	J-17	12.0	PVC	150.0	0.000	-149	0.42	0.057
P-24	358	J-21	J-22	12.0	PVC	150.0	0.000	115	0.33	0.035
P-25	442	J-22	J-23	12.0	PVC	150.0	0.000	-53	0.15	0.008
P-26	543	J-23	J-24	12.0	PVC	150.0	0.000	-220	0.62	0.118
P-27	560	J-24	J-25	12.0	PVC	150.0	0.000	-306	0.87	0.218
P-28	257	J-25	J-26	12.0	PVC	150.0	0.000	-306	0.87	0.216
P-32	397	J-28	J-29	24.0	Steel	140.0	0.000	474	0.34	0.020
P-30	377	J-26	J-27	24.0	Steel	140.0	0.000	517	0.37	0.022
P-31	435	J-27	J-28	24.0	Steel	140.0	0.000	496	0.35	0.020

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## **APPENDIX C – Sanitary Sewer Calculations**

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TABLE 1: SANITARY SEWER DEMANDS										
BASIN CHARACTERISTICS			RESIDENTIAL <sup>1</sup>					NON-RESIDENTIAL		TOTAL
BASIN	LAND USE	AREA (ACRES)	MAXIMUM NO. UNITS	DENSITY (unit/acre)	POPULATION	AVERAGE DAILY FLOW PER UNIT (gpd)	AVERAGE FLOW (gpd)	AVERAGE DAILY FLOW PER ACRE	AVERAGE FLOW (gpd)	TOTAL AVERAGE SEWAGE FLOW (gpd)
PA-45	RESIDENTIAL	27.8	222	8	617	188.36	41891.26			
	<b>TOTAL</b>						41891.26	0.00		41891.26
PA-46	RESIDENTIAL	38.1	305	8	845	188.36	57412.13	0		
	<b>TOTAL</b>						57412.13	0.00		57412.13
PA-47	MIXED USE	5	90	18	250	188.36	16952.40	1500	7500	
	<b>TOTAL</b>						16952.40	7500.00		24452.40
PA-48	MIXED USE	13.2	290	22	805	188.36	54699.74	1500	19800	
	<b>TOTAL</b>						54699.74	19800.00		74499.74
PA-49	MIXED USE	21.8	218	10	604	188.36	41062.48	1500	32700	
	<b>TOTAL</b>						41062.48	32700.00		73762.48
PA-50	MIXED USE	51.7	517	10	1433	188.36	97382.12	1500	77550	
	<b>TOTAL</b>						97382.12	77550.00		174932.12
PA-51	MIXED USE	15.3	77	5	212	188.36	14409.54	1500	22950	
	<b>TOTAL</b>						14409.54	22950.00		37359.54
PA-52	MIXED USE	9.6	48	5	133	188.36	9041.28	1500	14400	
	<b>TOTAL</b>						9041.28	14400.00		23441.28
PA-53	COMMERCIAL	17.5					0.00	1500	26250	
	<b>TOTAL</b>						0.00	26250.00		26250.00
PA-54	COMMERCIAL	27.3					0.00	1500	40950	
	<b>TOTAL</b>						0.00	40950.00		40950.00
Brandenburg Parcel PA-55 <sup>3</sup>	MIXED USE	17.2	258	15	715	188.36	48596.88	1500	25800	
	<b>TOTAL</b>						48596.88	25800.00		74396.88

1. Residential based on 68 gallons per capita per day, 2.77 people per residence

2. Windler Homestead Sanitary not tributary to Aurora 310 per Windler Master Utility Report, Revised June 22, by Olsson

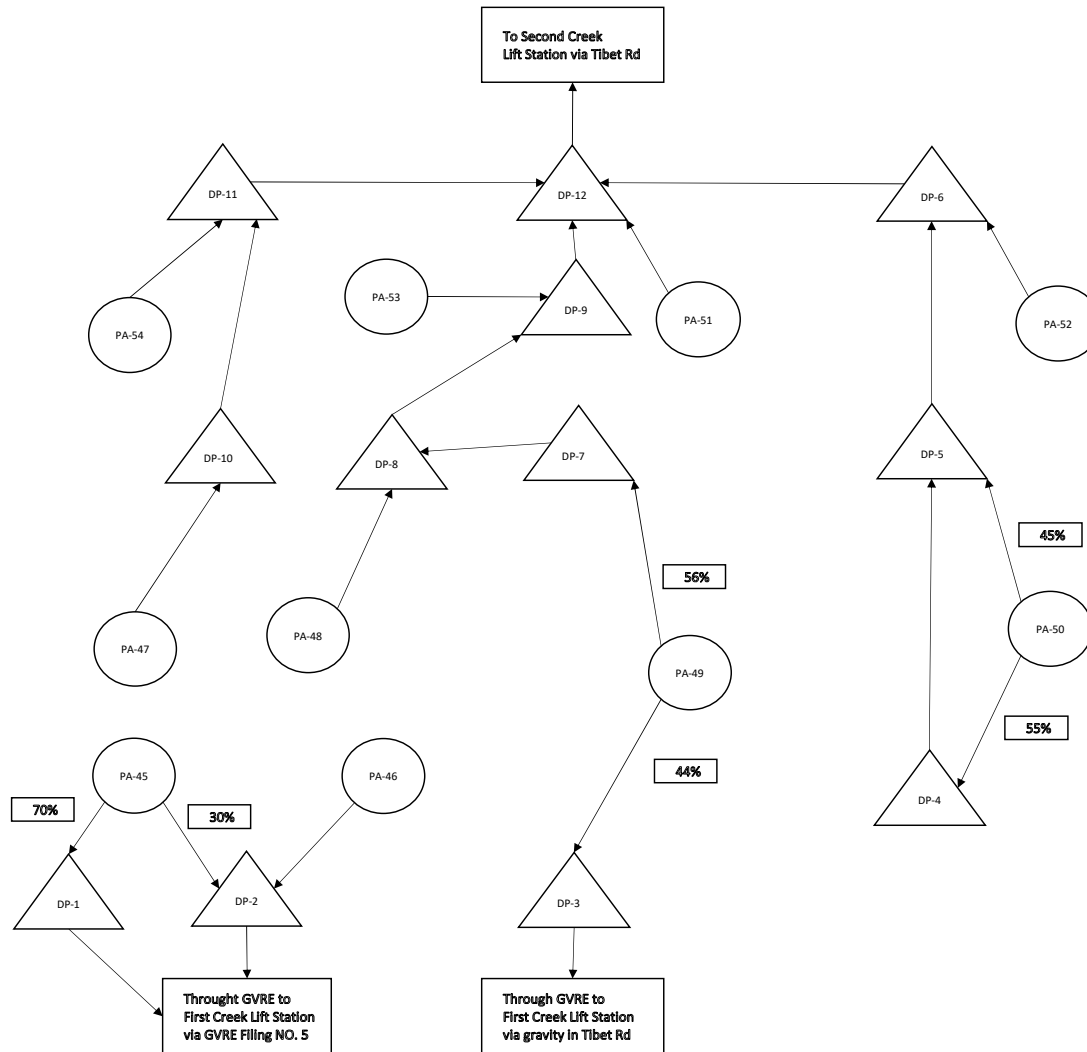
3. Basin accounted for within the Green Valley Ranch East Amendment 1 Master Utility Report as Basin 310-4. That Study estimated the gpd at 27,676

**TABLE 2: SANITARY SEWER ROUTING**

TABLE 2: SANITARY SEWER ROUTING															
Design Point	Basin(s)	Average Daily Flow (gpd)	Cumulative Equivalent Pop <sup>1</sup>		Peak Factor	Peak Flow (gpd)	Inflow and Infiltration (gpd)	Design Flow (gpd)	Design Flow (mgd)	Design Flow (cfs)	Req'd Pipe Diameter (in)	Req'd PipeSlope (Percent)	Velocity (ft/s)	Depth of Flow (in)	Depth of Ratio (Percent)
DP-1	70% PA-45	29323.88	431.23												
Total		29323.88	431.23	5.75	4.00	117295.54	2932.39	120227.93	0.12	0.19	8.00	0.4%	2.05	2.5	31%
DP-2	PA-46	57412.13	844.30												
	30% PA-45	12567.38	184.81												
Total		69979.51	1029.11	4.98	4.00	279918.03	6997.95	286915.98	0.29	0.44	8.00	0.4%	2.57	3.9	49%
DP-3	44% PA-49	32455.49	477.29												
Total		32455.49	477.29	5.66	4.00	129821.96	3245.55	133067.51	0.13	0.21	8.00	0.4%	2.11	2.6	33%
DP-4	55% PA-50	96212.67	1414.89												
Total		96212.67	1414.89	4.72	4.00	384850.66	9621.27	394471.93	0.39	0.61	8.00	0.4%	2.78	4.8	60%
DP-5	DP-4	96212.67	1414.89												
	45% PA-50	78719.45	1157.64												
Total		174932.12	2572.53	4.27	4.00	699728.48	17493.21	717221.69	0.72	1.11	10.00	0.4%	3.23	6.0	60%
DP-6	DP-5	174932.12	2572.53												
	PA-52	23441.28	344.72												
Total		198373.40	2917.26	4.18	4.00	793493.60	19837.34	813330.94	0.81	1.26	10.00	0.4%	3.31	6.6	66%
DP-7	56% PA-49	41306.99	607.46												
Total		41306.99	607.46	5.43	4.00	165227.96	4130.70	169358.65	0.17	0.23	8.00	0.4%	2.16	2.8	35%
DP-8	PA-48	74499.74	1095.58												
	DP-7	41306.99	607.46												
Total		115806.73	1703.04	4.57	4.00	463226.93	11580.67	474807.60	0.47	0.73	8.00	0.4%	2.88	5.5	69%
DP-9	DP-7	41306.99	607.46												
	DP-8	115806.73	1703.04												
	PA-53	26250.00	386.03												
Total		142056.73	2089.07	4.42	4.00	568226.93	14205.67	582432.60	0.58	0.90	10.00	0.4%	3.07	5.3	53%
DP-10	PA-47	24452.40	359.59												
Total		24452.40	359.59	5.93	4.00	97809.60	2445.24	100254.84	0.10	0.16	8.00	0.5%	2.11	2.3	29%
DP-11	DP-10	24452.40	359.59												
	PA-54	40950.00	602.21												
Total		65402.40	961.80	5.03	4.00	261609.60	6540.24	268149.84	0.27	0.41	8.00	0.4%	2.53	3.8	48%
DP-12	DP-6	198373.40	2917.26												
	DP-9	142056.73	2089.07												
	DP-11	65402.40	961.80												
	PA-51	37359.54	549.41												
Total		443192.07	6517.53	3.66	3.66	1620354.78	44319.21	1664673.99	1.66	2.58	15.00	0.4%	4.00	7.8	52%
*Note: Aurora Water won't allow 12" pipe to exceed 75% flow depth															

1. Cumulative Equivalent Population = Total Average Daily Flow at a design point ÷ 68 gallons per person per day

## Green Valley Master Plan Amendment 2 Routing Schematic





## Worksheet for A310 DP1

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	8.0 in
Discharge	0.19 cfs
Results	
Normal Depth	2.5 in
Flow Area	0.1 ft <sup>2</sup>
Wetted Perimeter	0.8 ft
Hydraulic Radius	1.4 in
Top Width	0.62 ft
Critical Depth	2.4 in
Percent Full	31.1 %
Critical Slope	0.005 ft/ft
Velocity	2.05 ft/s
Velocity Head	0.07 ft
Specific Energy	0.27 ft
Froude Number	0.932
Maximum Discharge	0.97 cfs
Discharge Full	0.90 cfs
Slope Full	0.000 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	35.3 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.5 in
Critical Depth	2.4 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

## Worksheet for A310 DP2

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	8.0 in
Discharge	0.44 cfs
Results	
Normal Depth	3.9 in
Flow Area	0.2 ft <sup>2</sup>
Wetted Perimeter	1.0 ft
Hydraulic Radius	2.0 in
Top Width	0.67 ft
Critical Depth	3.7 in
Percent Full	49.2 %
Critical Slope	0.005 ft/ft
Velocity	2.57 ft/s
Velocity Head	0.10 ft
Specific Energy	0.43 ft
Froude Number	0.895
Maximum Discharge	0.97 cfs
Discharge Full	0.90 cfs
Slope Full	0.001 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	39.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.9 in
Critical Depth	3.7 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

## Worksheet for A310 DP3

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	8.0 in
Discharge	0.21 cfs
Results	
Normal Depth	2.6 in
Flow Area	0.1 ft <sup>2</sup>
Wetted Perimeter	0.8 ft
Hydraulic Radius	1.5 in
Top Width	0.63 ft
Critical Depth	2.5 in
Percent Full	32.8 %
Critical Slope	0.005 ft/ft
Velocity	2.11 ft/s
Velocity Head	0.07 ft
Specific Energy	0.29 ft
Froude Number	0.930
Maximum Discharge	0.97 cfs
Discharge Full	0.90 cfs
Slope Full	0.000 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	19.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.6 in
Critical Depth	2.5 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft



## Worksheet for A310 DP4

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	8.0 in
Discharge	0.61 cfs
Results	
Normal Depth	4.8 in
Flow Area	0.2 ft <sup>2</sup>
Wetted Perimeter	1.2 ft
Hydraulic Radius	2.2 in
Top Width	0.65 ft
Critical Depth	4.4 in
Percent Full	60.2 %
Critical Slope	0.005 ft/ft
Velocity	2.78 ft/s
Velocity Head	0.12 ft
Specific Energy	0.52 ft
Froude Number	0.844
Maximum Discharge	0.97 cfs
Discharge Full	0.90 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	54.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.8 in
Critical Depth	4.4 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

## Worksheet for A310 DP5

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	10.0 in
Discharge	1.11 cfs
Results	
Normal Depth	6.0 in
Flow Area	0.3 ft <sup>2</sup>
Wetted Perimeter	1.5 ft
Hydraulic Radius	2.8 in
Top Width	0.82 ft
Critical Depth	5.6 in
Percent Full	60.4 %
Critical Slope	0.005 ft/ft
Velocity	3.23 ft/s
Velocity Head	0.16 ft
Specific Energy	0.66 ft
Froude Number	0.875
Maximum Discharge	1.76 cfs
Discharge Full	1.64 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	6.0 in
Critical Depth	5.6 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

## Worksheet for A310 DP6

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	10.0 in
Discharge	1.26 cfs
Results	
Normal Depth	6.6 in
Flow Area	0.4 ft <sup>2</sup>
Wetted Perimeter	1.6 ft
Hydraulic Radius	2.9 in
Top Width	0.79 ft
Critical Depth	6.0 in
Percent Full	65.8 %
Critical Slope	0.005 ft/ft
Velocity	3.31 ft/s
Velocity Head	0.17 ft
Specific Energy	0.72 ft
Froude Number	0.842
Maximum Discharge	1.76 cfs
Discharge Full	1.64 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	36.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.6 in
Critical Depth	6.0 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft



## Worksheet for A310 DP7

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	8.0 in
Discharge	0.23 cfs
Results	
Normal Depth	2.8 in
Flow Area	0.1 ft <sup>2</sup>
Wetted Perimeter	0.8 ft
Hydraulic Radius	1.5 in
Top Width	0.63 ft
Critical Depth	2.7 in
Percent Full	34.4 %
Critical Slope	0.005 ft/ft
Velocity	2.16 ft/s
Velocity Head	0.07 ft
Specific Energy	0.30 ft
Froude Number	0.929
Maximum Discharge	0.97 cfs
Discharge Full	0.90 cfs
Slope Full	0.000 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	31.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.8 in
Critical Depth	2.7 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

## Worksheet for A310 DP8

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	8.0 in
Discharge	0.47 cfs
Results	
Normal Depth	4.1 in
Flow Area	0.2 ft <sup>2</sup>
Wetted Perimeter	1.1 ft
Hydraulic Radius	2.0 in
Top Width	0.67 ft
Critical Depth	3.8 in
Percent Full	51.2 %
Critical Slope	0.005 ft/ft
Velocity	2.61 ft/s
Velocity Head	0.11 ft
Specific Energy	0.45 ft
Froude Number	0.887
Maximum Discharge	0.97 cfs
Discharge Full	0.90 cfs
Slope Full	0.001 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	35.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.1 in
Critical Depth	3.8 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

## Worksheet for A310 DP9

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	10.0 in
Discharge	0.90 cfs
Results	
Normal Depth	5.3 in
Flow Area	0.3 ft <sup>2</sup>
Wetted Perimeter	1.4 ft
Hydraulic Radius	2.6 in
Top Width	0.83 ft
Critical Depth	5.0 in
Percent Full	52.9 %
Critical Slope	0.005 ft/ft
Velocity	3.07 ft/s
Velocity Head	0.15 ft
Specific Energy	0.59 ft
Froude Number	0.913
Maximum Discharge	1.76 cfs
Discharge Full	1.64 cfs
Slope Full	0.001 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	42.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.3 in
Critical Depth	5.0 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft



## Worksheet for A310 DP10

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.005 ft/ft
Diameter	8.0 in
Discharge	0.16 cfs
Results	
Normal Depth	2.2 in
Flow Area	0.1 ft <sup>2</sup>
Wetted Perimeter	0.7 ft
Hydraulic Radius	1.2 in
Top Width	0.59 ft
Critical Depth	2.2 in
Percent Full	26.9 %
Critical Slope	0.005 ft/ft
Velocity	2.11 ft/s
Velocity Head	0.07 ft
Specific Energy	0.25 ft
Froude Number	1.041
Maximum Discharge	1.09 cfs
Discharge Full	1.01 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	26.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.2 in
Critical Depth	2.2 in
Channel Slope	0.005 ft/ft
Critical Slope	0.005 ft/ft

## Worksheet for A310 DP11

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	8.0 in
Discharge	0.41 cfs
Results	
Normal Depth	3.8 in
Flow Area	0.2 ft <sup>2</sup>
Wetted Perimeter	1.0 ft
Hydraulic Radius	1.9 in
Top Width	0.67 ft
Critical Depth	3.6 in
Percent Full	47.3 %
Critical Slope	0.005 ft/ft
Velocity	2.53 ft/s
Velocity Head	0.10 ft
Specific Energy	0.41 ft
Froude Number	0.901
Maximum Discharge	0.97 cfs
Discharge Full	0.90 cfs
Slope Full	0.001 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	64.2 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.8 in
Critical Depth	3.6 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

## Worksheet for A310 DP12

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	15.0 in
Discharge	2.58 cfs
Results	
Normal Depth	7.8 in
Flow Area	0.6 ft <sup>2</sup>
Wetted Perimeter	2.0 ft
Hydraulic Radius	3.8 in
Top Width	1.25 ft
Critical Depth	7.7 in
Percent Full	52.0 %
Critical Slope	0.004 ft/ft
Velocity	4.00 ft/s
Velocity Head	0.25 ft
Specific Energy	0.90 ft
Froude Number	0.981
Maximum Discharge	5.19 cfs
Discharge Full	4.83 cfs
Slope Full	0.001 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	48.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.8 in
Critical Depth	7.7 in
Channel Slope	0.004 ft/ft
Critical Slope	0.004 ft/ft

TABLE 2: 2nd CREEK SANITARY SEWER ROUTING

Design Point	Basin(s)	Average Daily Flow (gpd)	Cumulative Equivalent Pop <sup>1</sup>		Peak Factor	Peak Flow (gpd)	Inflow and Infiltration (gpd)	Design Flow (gpd)	Design Flow (mgd)	Design Flow (cfs)	Req'd Pipe Diameter (in)	Req'd Pipe Slope (Percent) <sup>2</sup>	Velocity (ft/s)	Depth of Flow (in)	Depth of Ratio (Percent)
SD-DP-16	GV-DP-10	443192.07	6517.53	3.66	3.66	1620354.78	44319.21	1664673.99	1.66	2.58	15.00	0.4%	4.00	7.8	52%
	SD-DP-16	4260.00	62.65	7.94	4.00	17040.00	426.00	17466.00	0.02	0.03	8.00	1.8%	2.02	0.7	9%
<b>Total</b>		<b>447452.07</b>	<b>6580.18</b>	3.65	<b>3.65</b>	<b>1633318.37</b>	<b>44745.21</b>	<b>1678063.58</b>	<b>1.68</b>	<b>2.60</b>	<b>16.00</b>	<b>0.4%</b>	<b>4.01</b>	<b>7.6</b>	<b>48%</b>
SD-DP-14	SD-DP-16	447452.07	6580.18	3.65	3.65	1633318.37	44745.21	1678063.58	1.68	2.60	15.00	0.4%	4.01	7.6	51%
	SD-DP-15	194635.00	2862.28	4.19	4.00	778540.00	19463.50	798003.50	0.80	1.23	12.00	0.4%	3.32	5.7	48%
	50% HP/FW-PA-1	113016.00	1662.00	4.59	4.00	452064.00	11301.60	463365.60	0.46	0.72	8.00	0.4%	2.62	4.1	51%
<b>Total</b>		<b>755103.07</b>	<b>11104.46</b>	3.34	<b>3.34</b>	<b>2525679.21</b>	<b>75510.31</b>	<b>2601189.51</b>	<b>2.60</b>	<b>4.02</b>	<b>16.00</b>	<b>0.4%</b>	<b>4.44</b>	<b>9.9</b>	<b>62%</b>
SD-DP-13	SD-DP-14	755103.07	11104.46	3.34	3.34	2525679.21	75510.31	2601189.51	2.60	4.02	15.00	0.4%	4.44	9.9	66%
	SD-DP-9	130775.00	1923.16	4.48	4.00	523100.00	13077.50	536177.50	0.54	0.83	12.00	0.4%	3.00	4.6	38%
<b>Total</b>		<b>885878.07</b>	<b>13027.62</b>	3.26	<b>3.26</b>	<b>2885104.15</b>	<b>88587.81</b>	<b>2973691.95</b>	<b>2.97</b>	<b>4.60</b>	<b>16.00</b>	<b>0.4%</b>	<b>4.57</b>	<b>10.8</b>	<b>68%</b>
SD-DP-7	SD-DP-13	885878.07	13027.62	3.26	3.26	2885104.15	88587.81	2973691.95	2.97	4.60	16.00	0.4%	4.57	10.8	68%
	AV-OS-2	31280.00	460.00	5.69	4.00	125120.00	3128.00	128248.00	0.13	0.20	8.00	0.4%	2.08	2.6	33%
	SD-DP-6	210746.00	3099.21	4.14	4.00	842984.00	21074.60	864058.60	0.86	1.34	12.00	0.4%	3.40	6.0	50%
<b>Total</b>		<b>1127904.07</b>	<b>16586.82</b>	3.13	<b>3.13</b>	<b>3528106.66</b>	<b>112790.41</b>	<b>3640897.07</b>	<b>3.64</b>	<b>5.63</b>	<b>18.00</b>	<b>0.4%</b>	<b>4.83</b>	<b>11.3</b>	<b>63%</b>
HP-DP-FW1	SD-DP-7	1127904.07	16586.82	3.13	3.13	3528106.66	112790.41	3640897.07	3.64	5.63	18.00	0.4%	4.83	11.3	63%
	50% HP/FW-PA-1	113016.00	1662.00	4.59	4.00	452064.00	11301.60	463365.60	0.46	0.72	8.00	0.4%	2.87	5.4	68%
	HP/FW-PA-12	15000.00	220.59	6.44	4.00	60000.00	1500.00	61500.00	0.06	0.10	8.00	0.7%	2.08	1.6	20%
<b>Total</b>		<b>1255920.07</b>	<b>18469.41</b>	3.07	<b>3.07</b>	<b>3858640.69</b>	<b>125592.01</b>	<b>3984232.70</b>	<b>3.98</b>	<b>6.16</b>	<b>20.00</b>	<b>0.4%</b>	<b>4.97</b>	<b>11.1</b>	<b>56%</b>
HP-DP-16	HP-DP-FW1	1255920.07	18469.41	3.07	3.07	3858640.69	125592.01	3984232.70	3.98	6.16	20.00	0.4%	4.97	11.1	56%
	HP-B2	119204.00	1753.00	4.55	4.00	476816.00	11920.40	488736.40	0.49	0.76	8.00	0.4%	2.90	5.6	70%
<b>Total</b>		<b>1375124.07</b>	<b>20222.41</b>	3.03	<b>3.03</b>	<b>4161383.90</b>	<b>137512.41</b>	<b>4298896.31</b>	<b>4.30</b>	<b>6.65</b>	<b>20.00</b>	<b>0.4%</b>	<b>5.05</b>	<b>11.6</b>	<b>58%</b>
HP-DP-17	HP-DP-16	1375124.07	20222.41	3.03	3.03	4161383.90	137512.41	4298896.31	4.30	6.65	20.00	0.4%	5.05	11.6	58%
	HP-B3	49232.00	724.00	5.28	4.00	196928.00	4923.20	201851.20	0.20	0.31	8.00	0.4%	2.35	3.2	40%
<b>Total</b>		<b>1424356.07</b>	<b>20946.41</b>	3.01	<b>3.01</b>	<b>4285122.71</b>	<b>142435.61</b>	<b>4427558.32</b>	<b>4.43</b>	<b>6.85</b>	<b>20.00</b>	<b>0.4%</b>	<b>5.09</b>	<b>11.8</b>	<b>59%</b>
HP-DP-19	HP-DP-17	1424356.07	20946.41	3.01	3.01	4285122.71	142435.61	4427558.32	4.43	6.85	20.00	0.4%	5.09	11.8	59%
	HP-DP-18	126684.00	1863.00	4.51	4.00	506736.00	12668.40	519404.40	0.52	0.80	8.00	0.4%	2.92	5.9	74%
<b>Total</b>		<b>1551040.07</b>	<b>22809.41</b>	2.97	<b>2.97</b>	<b>4600319.20</b>	<b>155104.01</b>	<b>4755423.21</b>	<b>4.76</b>	<b>7.36</b>	<b>20.00</b>	<b>0.4%</b>	<b>5.17</b>	<b>12.4</b>	<b>62%</b>
HP-DP-20	HP-DP-19	1551040.07	22809.41	2.97	2.97	4600319.20	155104.01	4755423.21	4.76	7.36	20.00	0.4%	5.17	12.4	62%
	HP-DP-15	466208.00	6856.00	3.63	3.63	1690152.53	46620.80	1736773.33	1.74	2.69	15.00	0.4%	4.04	8.0	53%
	HP-B5	103020.00	1515.00	4.66	4.00	412080.00	10302.00	422382.00	0.42	0.65	8.00	0.4%	2.81	5.0	63%
<b>Total</b>		<b>2120268.07</b>	<b>31180.41</b>	2.82	<b>2.82</b>	<b>5968737.88</b>	<b>212026.81</b>	<b>6180764.69</b>	<b>6.18</b>	<b>9.56</b>	<b>20.00</b>	<b>0.4%</b>	<b>5.41</b>	<b>15.1</b>	<b>76%</b>
HP-DP-25 (To Lift Station)	HP-DP-20	2120268.07	31180.41	2.82	2.82	5968737.88	212026.81	6180764.69	6.18	9.56	20.00	0.4%	5.41	15.1	76%
	HP-DP-26	25160.00	370.00	5.90	4.00	100640.00	2516.00	103156.00	0.10	0.16	8.00	0.5%	2.11	2.2	28%
	HP-B8	52768.00	776.00	5.22	4.00	211072.00	5276.80	216348.80	0.22	0.33	8.00	0.4%	2.39	3.3	41%
<b>Total</b>		<b>2198196.07</b>	<b>32326.41</b>	2.80	<b>2.80</b>	<b>6150923.52</b>	<b>219819.61</b>	<b>6370743.13</b>	<b>6.37</b>	<b>9.86</b>	<b>20.00</b>	<b>0.4%</b>	<b>5.42</b>	<b>15.5</b>	<b>78%</b>

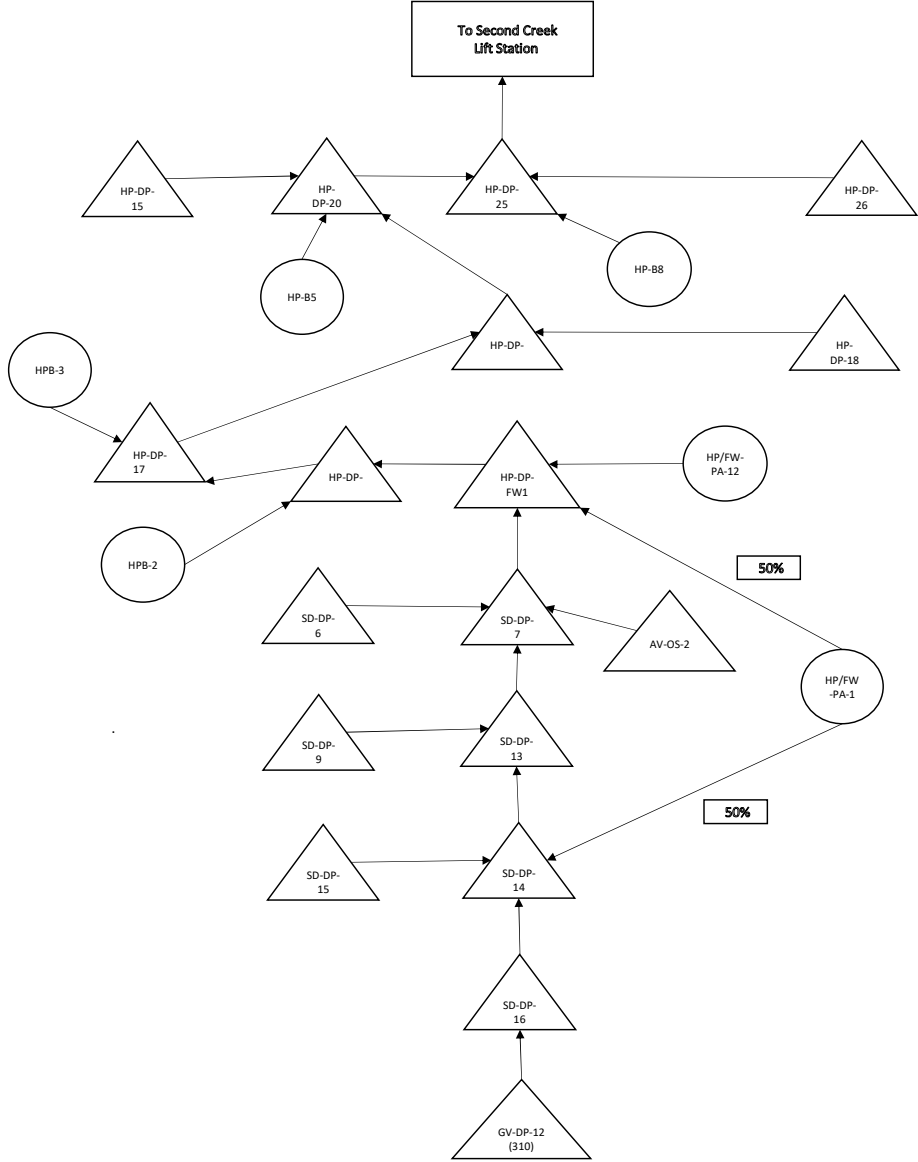
Design Point &amp; Basin Abbreviations: GV - Green Valley (Aurora 310); AV - Avelon; FW - Fuluwider (Harvest Mile); HP - High Point; SD - Moffit/Skydance (South portion of Avelon)

1. Cumulative Equivalent Population = Total Average Daily Flow at a design point ÷ 68 gallons per person per day

2. Actual design slopes of downstream infrastructure may be higher than amount shown. This merely shows the minimum slope required to achieve sufficient velocity with flow depths in compliance to City of Aurora requirements.



2nd Creek Routing Schematic



## Worksheet for SD-DP-16

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	16.0 in
Discharge	2.60 cfs
Results	
Normal Depth	7.6 in
Flow Area	0.6 ft <sup>2</sup>
Wetted Perimeter	2.0 ft
Hydraulic Radius	3.9 in
Top Width	1.33 ft
Critical Depth	7.6 in
Percent Full	47.2 %
Critical Slope	0.004 ft/ft
Velocity	4.01 ft/s
Velocity Head	0.25 ft
Specific Energy	0.88 ft
Froude Number	1.012
Maximum Discharge	6.17 cfs
Discharge Full	5.73 cfs
Slope Full	0.001 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	47.2 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.6 in
Critical Depth	7.6 in
Channel Slope	0.004 ft/ft
Critical Slope	0.004 ft/ft

## Worksheet for SD-DP-14

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	16.0 in
Discharge	4.02 cfs
Results	
Normal Depth	9.9 in
Flow Area	0.9 ft <sup>2</sup>
Wetted Perimeter	2.4 ft
Hydraulic Radius	4.5 in
Top Width	1.30 ft
Critical Depth	9.6 in
Percent Full	61.7 %
Critical Slope	0.004 ft/ft
Velocity	4.44 ft/s
Velocity Head	0.31 ft
Specific Energy	1.13 ft
Froude Number	0.938
Maximum Discharge	6.17 cfs
Discharge Full	5.73 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	64.2 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	9.9 in
Critical Depth	9.6 in
Channel Slope	0.004 ft/ft
Critical Slope	0.004 ft/ft

## Worksheet for SD-DP-13

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	16.0 in
Discharge	4.60 cfs
Results	
Normal Depth	10.8 in
Flow Area	1.0 ft <sup>2</sup>
Wetted Perimeter	2.6 ft
Hydraulic Radius	4.7 in
Top Width	1.25 ft
Critical Depth	10.2 in
Percent Full	67.8 %
Critical Slope	0.005 ft/ft
Velocity	4.57 ft/s
Velocity Head	0.32 ft
Specific Energy	1.23 ft
Froude Number	0.895
Maximum Discharge	6.17 cfs
Discharge Full	5.73 cfs
Slope Full	0.003 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	55.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	10.8 in
Critical Depth	10.2 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft



## Worksheet for SD-DP-7

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	18.0 in
Discharge	5.63 cfs
Results	
Normal Depth	11.3 in
Flow Area	1.2 ft <sup>2</sup>
Wetted Perimeter	2.7 ft
Hydraulic Radius	5.1 in
Top Width	1.45 ft
Critical Depth	11.0 in
Percent Full	62.6 %
Critical Slope	0.004 ft/ft
Velocity	4.83 ft/s
Velocity Head	0.36 ft
Specific Energy	1.30 ft
Froude Number	0.951
Maximum Discharge	8.45 cfs
Discharge Full	7.85 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	43.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	11.3 in
Critical Depth	11.0 in
Channel Slope	0.004 ft/ft
Critical Slope	0.004 ft/ft

## Worksheet for HP-DP-FW1

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	20.0 in
Discharge	6.16 cfs
Results	
Normal Depth	11.1 in
Flow Area	1.2 ft <sup>2</sup>
Wetted Perimeter	2.8 ft
Hydraulic Radius	5.3 in
Top Width	1.66 ft
Critical Depth	11.1 in
Percent Full	55.4 %
Critical Slope	0.004 ft/ft
Velocity	4.97 ft/s
Velocity Head	0.38 ft
Specific Energy	1.31 ft
Froude Number	1.012
Maximum Discharge	11.19 cfs
Discharge Full	10.40 cfs
Slope Full	0.001 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	55.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	11.1 in
Critical Depth	11.1 in
Channel Slope	0.004 ft/ft
Critical Slope	0.004 ft/ft

## Worksheet for HP-DP-16

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	20.0 in
Discharge	6.65 cfs
Results	
Normal Depth	11.6 in
Flow Area	1.3 ft <sup>2</sup>
Wetted Perimeter	2.9 ft
Hydraulic Radius	5.5 in
Top Width	1.64 ft
Critical Depth	11.6 in
Percent Full	58.1 %
Critical Slope	0.004 ft/ft
Velocity	5.05 ft/s
Velocity Head	0.40 ft
Specific Energy	1.37 ft
Froude Number	0.996
Maximum Discharge	11.19 cfs
Discharge Full	10.40 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	43.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	11.6 in
Critical Depth	11.6 in
Channel Slope	0.004 ft/ft
Critical Slope	0.004 ft/ft

## Worksheet for HP-DP-17

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	20.0 in
Discharge	6.85 cfs
Results	
Normal Depth	11.8 in
Flow Area	1.3 ft <sup>2</sup>
Wetted Perimeter	2.9 ft
Hydraulic Radius	5.5 in
Top Width	1.64 ft
Critical Depth	11.8 in
Percent Full	59.2 %
Critical Slope	0.004 ft/ft
Velocity	5.09 ft/s
Velocity Head	0.40 ft
Specific Energy	1.39 ft
Froude Number	0.990
Maximum Discharge	11.19 cfs
Discharge Full	10.40 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	43.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	11.8 in
Critical Depth	11.8 in
Channel Slope	0.004 ft/ft
Critical Slope	0.004 ft/ft



## Worksheet for HP-DP-19

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	20.0 in
Discharge	7.36 cfs
Results	
Normal Depth	12.4 in
Flow Area	1.4 ft <sup>2</sup>
Wetted Perimeter	3.0 ft
Hydraulic Radius	5.6 in
Top Width	1.62 ft
Critical Depth	12.2 in
Percent Full	62.1 %
Critical Slope	0.004 ft/ft
Velocity	5.17 ft/s
Velocity Head	0.41 ft
Specific Energy	1.45 ft
Froude Number	0.971
Maximum Discharge	11.19 cfs
Discharge Full	10.40 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	43.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	12.4 in
Critical Depth	12.2 in
Channel Slope	0.004 ft/ft
Critical Slope	0.004 ft/ft

## Worksheet for HP-DP-20

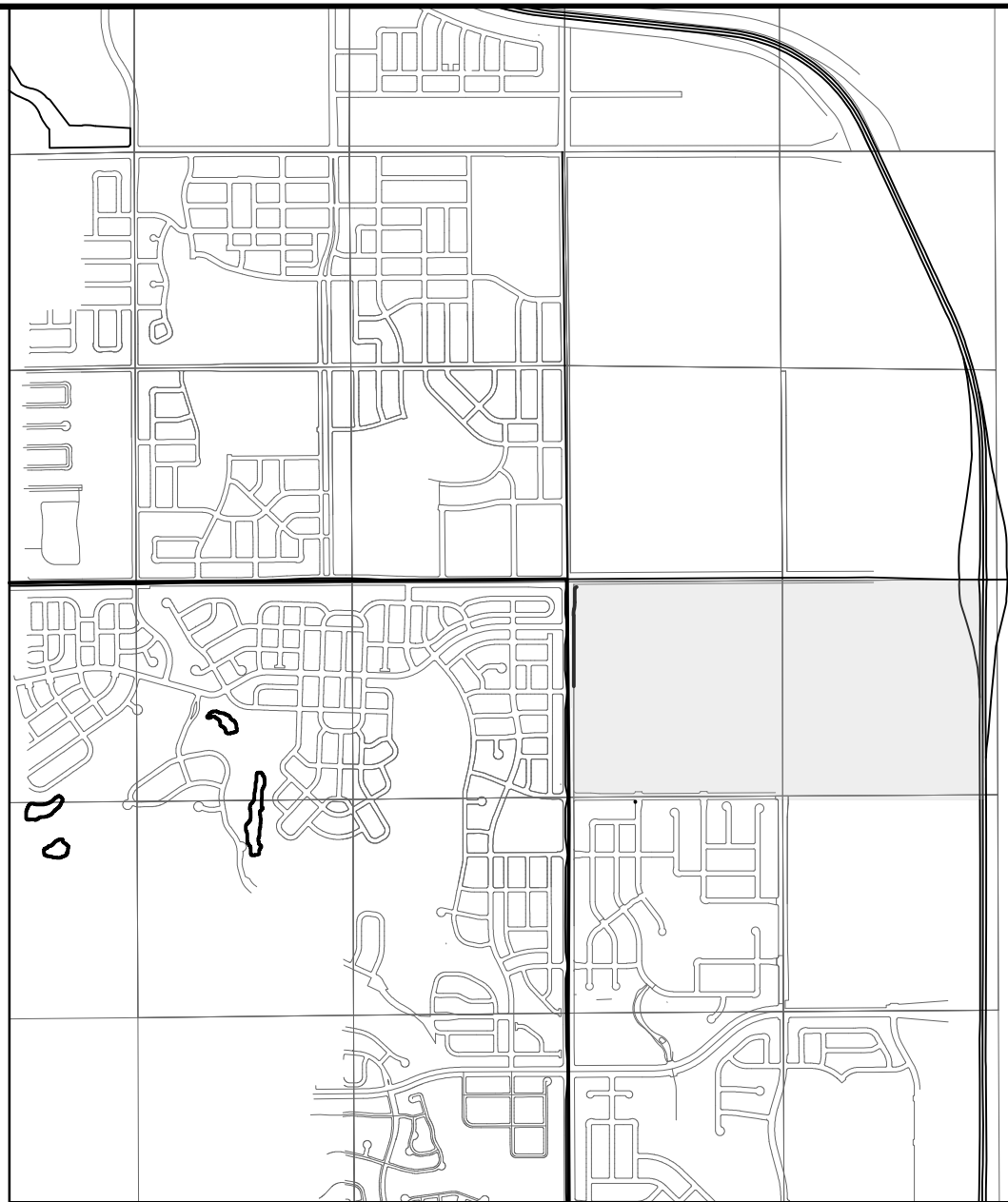
Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	20.0 in
Discharge	9.56 cfs
Results	
Normal Depth	15.1 in
Flow Area	1.8 ft <sup>2</sup>
Wetted Perimeter	3.5 ft
Hydraulic Radius	6.0 in
Top Width	1.43 ft
Critical Depth	14.0 in
Percent Full	75.5 %
Critical Slope	0.005 ft/ft
Velocity	5.41 ft/s
Velocity Head	0.45 ft
Specific Energy	1.71 ft
Froude Number	0.858
Maximum Discharge	11.19 cfs
Discharge Full	10.40 cfs
Slope Full	0.003 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	43.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	15.1 in
Critical Depth	14.0 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

## Worksheet for HP-DP-25

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.004 ft/ft
Diameter	20.0 in
Discharge	9.86 cfs
Results	
Normal Depth	15.5 in
Flow Area	1.8 ft <sup>2</sup>
Wetted Perimeter	3.6 ft
Hydraulic Radius	6.1 in
Top Width	1.39 ft
Critical Depth	14.2 in
Percent Full	77.7 %
Critical Slope	0.005 ft/ft
Velocity	5.42 ft/s
Velocity Head	0.46 ft
Specific Energy	1.75 ft
Froude Number	0.835
Maximum Discharge	11.19 cfs
Discharge Full	10.40 cfs
Slope Full	0.004 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	43.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	15.5 in
Critical Depth	14.2 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft



GREEN VALLEY MASTER PLAN AMENDMENT 2



**Dewberry**  
Dewberry Engineers Inc.  
2011 Cherry Street, Suite 206  
Louisville, CO 80027  
720.975.0177  
Contact: Kenneth S. Cecil, P.E., CFM  
Email: kcecil@dewberry.com

GREEN VALLEY MASTER PLAN AMENDMENT 2  
MASTER UTILITY STUDY  
WATER MAIN MODELING EXHIBIT

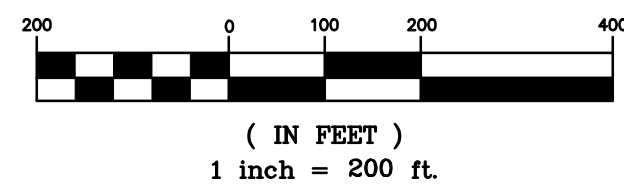
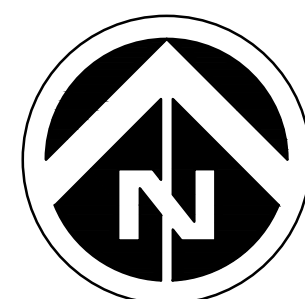
Client Information  
OAKWOOD HOMES  
18655 GREEN VALLEY  
RANCH BLVD  
DENVER, CO 80249  
Tel: 303-486-8734  
Contact: DAVID CARRO

No.	Date	Document
8	05/17/2024	SEVENTH SUBMITTAL
7	01/26/2024	SIXTH SUBMITTAL
6	10/23/2023	FIFTH SUBMITTAL
5	04/14/2023	FOURTH SUBMITTAL
4	12/22/2022	THIRD SUBMITTAL
3	05/24/2022	SECOND SUBMITTAL
2	03/01/2022	FIRST SUBMITTAL - UPDATE
1	12/22/2021	FIRST SUBMITTAL

PRELIMINARY  
NOT FOR  
CONSTRUCTION

Project Number:  
50145755  
Designed By: JWS  
Checked By: JDM  
Sheet Number: 1 OF 1

KEY MAP  
N.T.S.

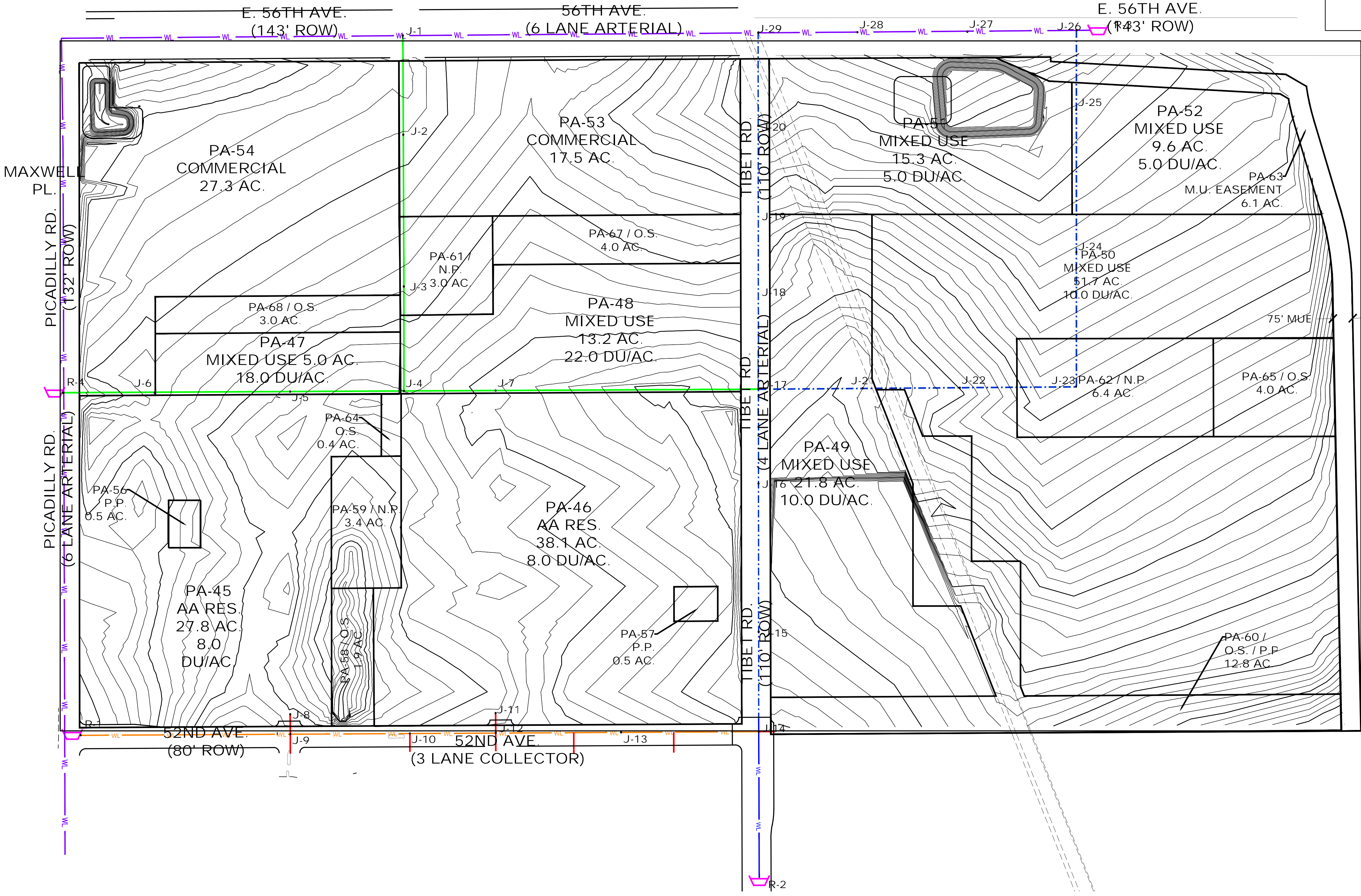


WATER MAIN LEGEND

- 8-INCH PIPE
- 12-INCH PIPE
- 16-INCH PIPE
- 24-INCH PIPE
- MODEL RESERVOIR
- EX. 8-INCH PIPE
- EX. 12-INCH PIPE
- EX. 16-INCH PIPE
- EX. 24-INCH PIPE

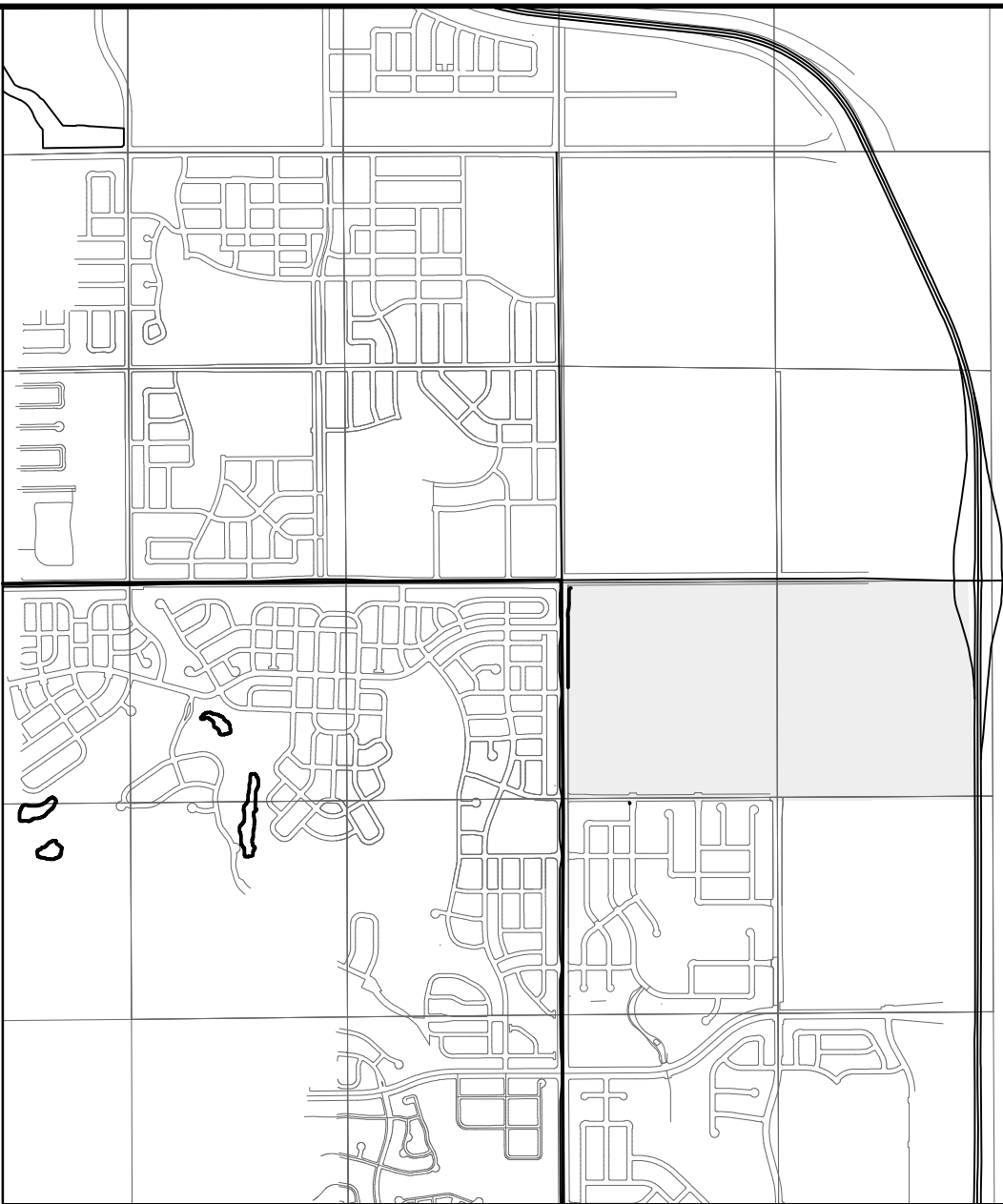
CITY OF AURORA APPROVAL BLOCK

CITY ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_  
AURORA WATER DEPARTMENT \_\_\_\_\_ DATE \_\_\_\_\_





GREEN VALLEY MASTER PLAN AMENDMENT 2



**Dewberry**  
Dewberry Engineers Inc.  
2011 Cherry Street, Suite 206  
Louisville, CO 80027  
720.975.0177  
Contact: Kenneth S. Cecil, P.E., CFM  
Email: kcecil@dewberry.com

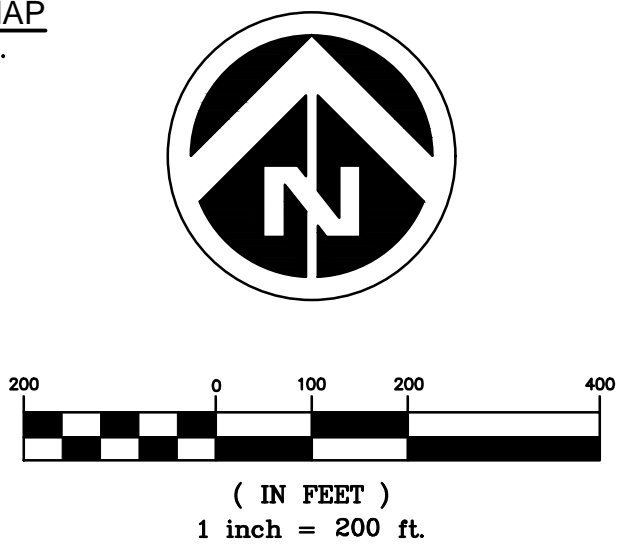
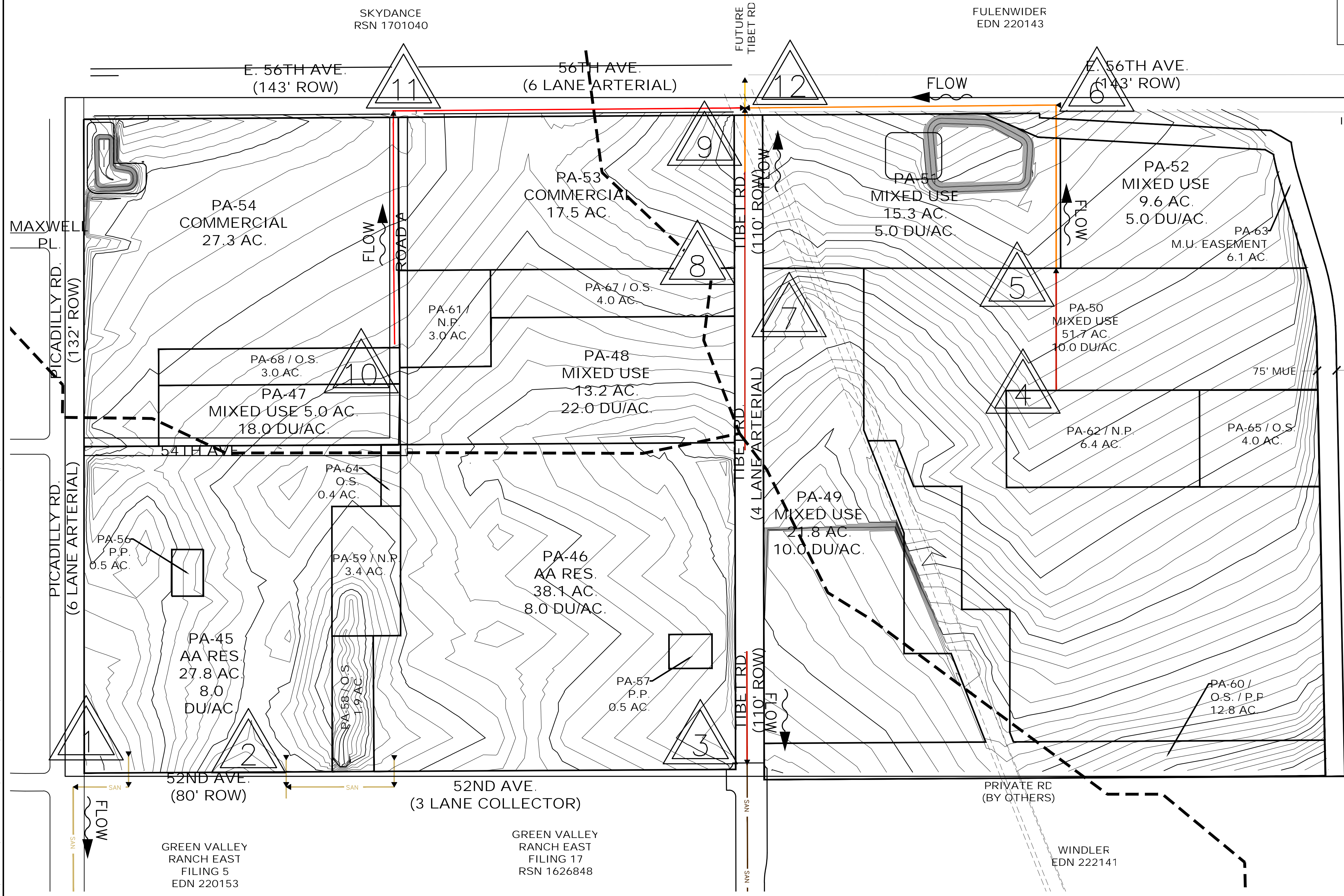
GREEN VALLEY MASTER PLAN AMENDMENT 2  
MASTER UTILITY STUDY  
SANITARY SEWER MODELING EXHIBIT

Client Information  
OAKWOOD HOMES  
18655 GREEN VALLEY  
RANCH BLVD  
DENVER, CO 80249  
Tel: 303-486-8734  
Contact: DAVID CARRO

DOCUMENT AMENDMENTS	
No.	Date
8	05/17/2024
7	01/26/2024
6	10/23/2023
5	04/14/2023
4	12/22/2022
3	05/24/2022
2	03/01/2022
1	12/22/2021

PRELIMINARY  
NOT FOR  
CONSTRUCTION

Project Number: 50145755  
Designed By: JDM  
Checked By: JWS  
Sheet Number: 1 OF 1



CITY OF AURORA APPROVAL BLOCK

CITY ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_

AURORA WATER DEPARTMENT \_\_\_\_\_ DATE \_\_\_\_\_

I:\DEWBERRY\OAKWOOD HOMES\310 PARCEL\PLAN SETS\MASTER UTILITY\SAN EXHIBIT W BASIN BND\SYSDWG 11/19/2024 1:34 PM SMITH, JOSHUA