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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

Prepared for:

**Oakwood Homes**

18655 Green Valley Ranch Blvd  
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Prepared by:



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**CITY OF AURORA APPROVAL BLOCK**

City Engineer	Date
Aurora Water Department	Date
Aurora Fire Department	Date

**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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Jason Margraf, PE,  
Licensed Professional Engineer  
State of Colorado  
No. 37782

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Date

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## **APPENDIX A – FIGURES and SUPPORTING DOCUMENTS**

Vicinity Map  
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Amendment 1 and Amendment 2 Exhibit  
City of Aurora A310 Effluent Email  
City of Aurora Sanitary Sewer Email  
Fulenwider Master Utility Maps  
Fulenwider Trunk Main (Phase 1)  
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GVRE Master Utility Maps  
Windler Master Utility Maps  
Skydance Master Utility Maps

## **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**

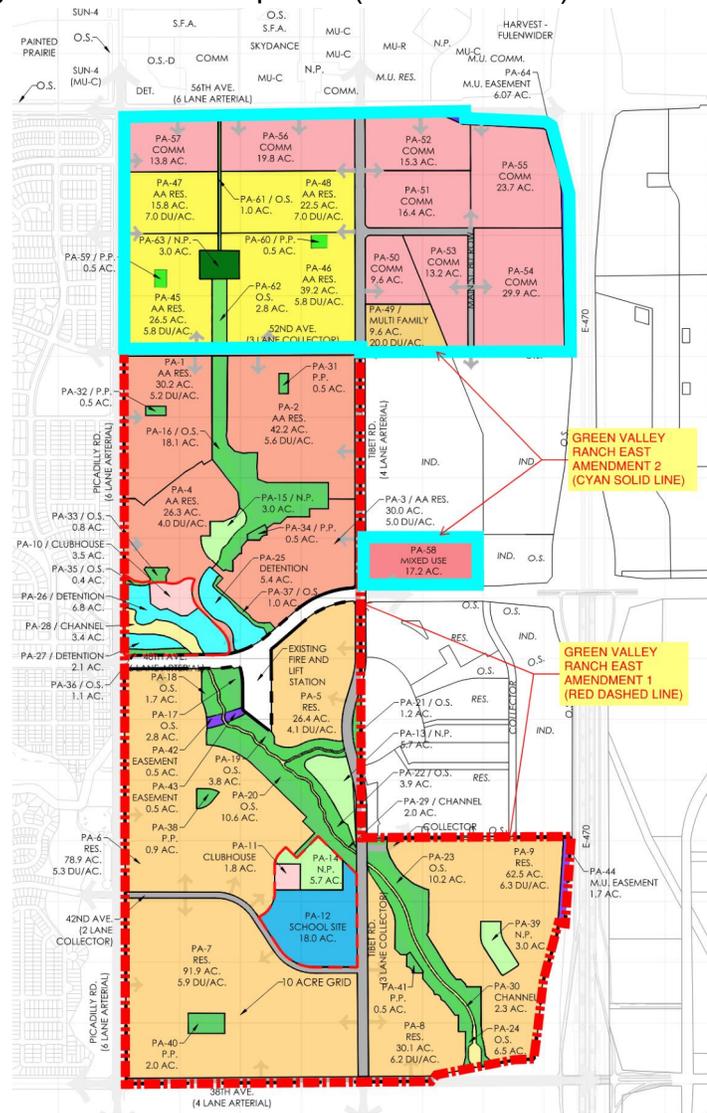
Sanitary Sewer Design Flows  
Sanitary Sewer Routing  
Sanitary Routing Schematic  
Sanitary Sewer FlowMaster Calculations

**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 Green Valley Master Plan Amendment 2. 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 Study (MUS) 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 that report. The majority of the planning areas within Amendment 1 are constructed, under construction, or are 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 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 that 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 56<sup>th</sup> Avenue intersection and is bound by 56<sup>th</sup> 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 6<sup>th</sup> Principal Meridian in the City of Aurora, County of Adams, State of Colorado.

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

The property comprises approximately 289.1 acres with a mix of proposed uses including residential, multi-family, and commercial with associated amenities, parks and open spaces. The residential uses 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 products. 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 within the 40s are a residential use, while PAs within the 50s are commercial. 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 (under construction) and Planning Area 2 (future filing) are directly south of 52<sup>nd</sup> Avenue and east of Tibet Road. The Windler development is south of the Project along the projected 52<sup>nd</sup> Avenue alignment 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 56<sup>th</sup> Avenue and is within the Master Plan process with the City of Aurora at the time of this report. Finally, a portion of the Fullenwider Development consisting of the southeast quarter section of Section 12 is north of 56<sup>th</sup> Avenue and is within the Master Plan process with the City of Aurora. E-470 and the associated 56<sup>th</sup> 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 56<sup>th</sup> Avenue along the entirety of the Site 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 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 is being developed within Tibet Road as a

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portion of the Green Valley Ranch East Development and will provide a 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 Amendment 1 and provides additional connection opportunities. The existing 24-inch PVC water main within Picadilly is not anticipated to be available for connection at the direction of Aurora Water due to the increased potential of pipe damage during the construction process. However, during the development of the individual planning areas, Aurora Water will be consulted to determine if this direction still applies. The Site is located within pressure Zone 3.

Sanitary: The Site is located within three separate tributaries as previously identified within the Green Valley Ranch East Amendment 1 Master Utility Report. That Report created four basins to correspond with those tributaries, as follows: Basin 310-1 which is tributary to the Second Creek Lift Station approximately two miles downstream of the Site. Basin 310-2 which is tributary to the Painted Prairie Development, and Basins 310-3 and 310-4 which are tributary to the First Creek lift station within the Green Valley Ranch East subdivision. Due to serviceability issues within the Painted Prairie Development, Aurora Water has required downstream development within Sky Dance, Fullenwider, and High Point to accommodate the effluent from the 310-2 basin. It is understood that 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 with Aurora Water on this topic. Consistent with this direction, Fullenwider has designed and constructed 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 construction was recently completed at the time of this report. Phase II of the sanitary trunk main was in the design and review process with the City of Aurora at the time of this report and generally extends from the Phase I terminus to the future intersection of Tibet Road and 60<sup>th</sup> Avenue. Future Phases of this trunk main will be extended south down the Tibet Road alignment to the Tibet Road and 56<sup>th</sup> Avenue intersection to service this Site. This extension(s) will occur by others as a portion of downstream development or Oakwood 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 that benefit. Please see the additional discussion within the Sanitary System Plan section.

As a portion of the Green Valley Ranch East Amendment 1 development two sanitary sewer connection points are planned for the Site. An 8-inch sanitary sewer stub is designed and under construction at the time of this report at the general location of the Green Valley Ranch East Filing No. 5 roadway connection to 52<sup>nd</sup> Avenue. Additionally, a 10-inch sanitary sewer main is being designed within Tibet Road and will be available for connection at the Tibet Road and 52<sup>nd</sup> Avenue intersection.

## **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 A Master*

*Planned Community Master Utility Study*, dated July 2021 by CVL a Westwood team (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). In addition, two construction plan sets were reference to support this report, as follows: *20" Possum Gully Sanitary Sewer Construction Documents*, approval date of August 7, 2020 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**

### **i. 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

### **ii. 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.

### **iii. 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	7.8	4

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**d. Fire Flow Demand Requirements**

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

<b>Use Classification</b>	<b>Fire Flow Demand</b>
Residential	1500 gpm for 2 hours
Commercial/Multifamily	2500 gpm for 2 hours
Industrial	3500 gpm for 3 hours

**e. Minimum Pressure Requirements**

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

**C. Sanitary Sewer Design Criteria**

**a. 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 the 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.

**b. 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 pipes shall not exceed 75% of capacity for pipes 12 inches or smaller and 90% 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 ten feet per second.

**WATER SYSTEM PLAN**

**A. General Concept**

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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 transmission main within 56<sup>th</sup> Avenue and the proposed 12-inch diameter main within Tibet Road at the intersection with 52<sup>nd</sup> Avenue, and 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. Additionally, an 8-inch main is provided within the Main Street section within the Commercial areas and within the Residential Planning Areas to ensure serviceability. The remainder of the on-site distribution mains will be 8 inches in diameter. The water system was modeled by implementing the Bentley WaterGEMS CONNECT Edition Update 3 program with results for the modeled scenarios presented within the Appendix.

## **B. Specific Details**

The system was modeled with three 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 headloss 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 5470. Topography along the perimeter of the Site varies from approximately 5435 at the northwest corner, approximately 5443 at the southwest corner, approximately 5445 at the northeast corner, approximately 5460 at the Tibet Road Green Valley Ranch East Amendment 1 connection and approximately 5485 at the southeast corner. The Second Creek portion of the Site has topography that generally runs 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. Scenarios modeled output is presented within the Appendix for review. Since all surrounding, regional water mains are existing or being constructed by adjacent developments, it is assumed that no contribution or construction of those systems is required. Therefore, no off-site water improvements are contemplated herein.

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 the Appendix of this report.

<b>Model Results Summary</b>	
Maximum Pressure	122 psi (Junction J-32 Avg. Daily Demand)
Minimum Residual Pressure	91 psi (Junction J-8 & J-15, Fire Flow)
Peak Hour Maximum Pipe Velocity (8-12 inches)	2.39 fps, 2.00 ft/1000 ft Headloss, Pipes P-24(2)(1) & P-49
Peak Hour Maximum Pipe Velocity (16-24 inches)	0.94 fps, 0 ft/1000 ft Headloss, Pipe 51

## **SANITARY SYSTEM PLAN**

### **A. General Concept**

The proposed Site sanitary sewer infrastructure has been sized to service the planned 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 Amendment 1 Master Utility Study, Reference 3. That 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 Wastershed portion of the Site west of proposed Tibet Road will be serviced via this connection. The multi-family 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 gravity main was sized as a portion of Reference 3 to accept effluent from Basins 310-1 and 310-2, which far exceeds the contributing flow from PA-49. The Green Valley – Amendment 1 MUR planned for the sanitary servicing of PA-58, known as Basin 310-4 within the Amendment 1 MUR. The sanitary connection point for PA-58 is approved and under construction with Tibet Phase 2.

The northwest corner of the Site that was identified within Reference 3 to outfall to the Painted Prairie subdivision (Option 1 of that report). However, through conversations with Aurora Water, it has been determined that Painted Prairie did not extend a sanitary main to provide for the outfall of the Site. As such, Aurora Water determined that the preferred solution for the basin identified as 310-2 was to gravity drain to a sanitary main that is 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 Appendix. The first phase of the downstream trunk main within the Second Creek tributary is constructed at the time of this Report. The second phase of the trunk main described as the extension from the first phase terminus east to the future intersection of Tibet Road and 60<sup>th</sup> Avenue is under design and review

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at the time of this report. However, the timing of the second phase of construction is not currently known. The timing extension of this sanitary trunk main south along Tibet Road alignment to its intersection with 56<sup>th</sup> Avenue (Phase 3) has yet to be determined. In the event that this system is not available at the time of the development of the planning areas within the Site tributary to Second Creek, and consistent with Option 2 previously presented within Reference 3; the areas tributary to the Second Creek lift station may be lifted, via a temporary lift station within the Site to the gravity sanitary sewer system within Tibet Road at the Green Valley Ranch East Amendment 1 boundary. Reimbursement for this transmission main (Option 1) may be requested under the guidelines of the City of Aurora Municipal Code.

Additionally, two sanitary sewer servicing options were evaluated for Planning Areas 47 and 48 to provide flexibility of service. Specifically, PA47 and P48 were evaluated routed directly to the main within Tibet Road to minimize impact to the commercial planning areas north of those areas. This solution would minimize the encumbrance to the commercial planning areas. The second option routes the two planning areas through the commercial areas, which provides the developer the option should the commercial planning areas be phased ahead of PA47 and PA48, potentially providing cost savings, if selected. Both routing options are presented within the Appendix, don't impact the anticipated sanitary sizing, and the selected routing will be determined at the time of site plan for the impacted planning areas.

#### **IV. CONCLUSIONS**

The utility plan provided in this report 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.

#### **V. REFERENCES**

1. *Water, Sanitary Sewer & Storm Drainage Infrastructure Standards & Specifications*, Aurora Water, September 2019.
2. *Moffit A Master Planned Community Master Utility Study*, dated July 2021 by CVL a Westwood team
3. *Green Valley – Amendment 1 Master Utility Report*, dated Revised September 2018 by Calibre
4. *Master Utility Report Windler Homestead*, dated 2<sup>nd</sup> Revision: January 2004 by Carter & Burgess, Inc.
5. *20" Possum Gully Sanitary Sewer Construction Documents*, approval date of August 7, 2020 by Martin/Martin Consulting Engineers
6. *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.
7. *Windler Master Utility Study Aurora, CO, Rev. October 2021 by Olsson*

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

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E 64TH AVE

PAINTED PRAIRIE  
E 60TH AVE

CITY OF AURORA

SKY DANCE

FULENWIDER

**SITE**

E 56TH AVE

MAXWELL PL

CITY AND COUNTY OF DENVER

PICADILLY RD

E 52ND AVE

WINDLER DEVELOPMENT

E470

GREEN VALLEY RANCH EAST FILING 5

GREEN VALLEY RANCH EAST DEVELOPMENT

GREEN VALLEY RANCH BLVD

FIRST CREEK

TIBET RD

E 48TH AVE

BRANDENBURG PARCEL

**SITE**

GREEN VALLEY RANCH EAST FILING 6  
TRIBUTARY T PHASE 1

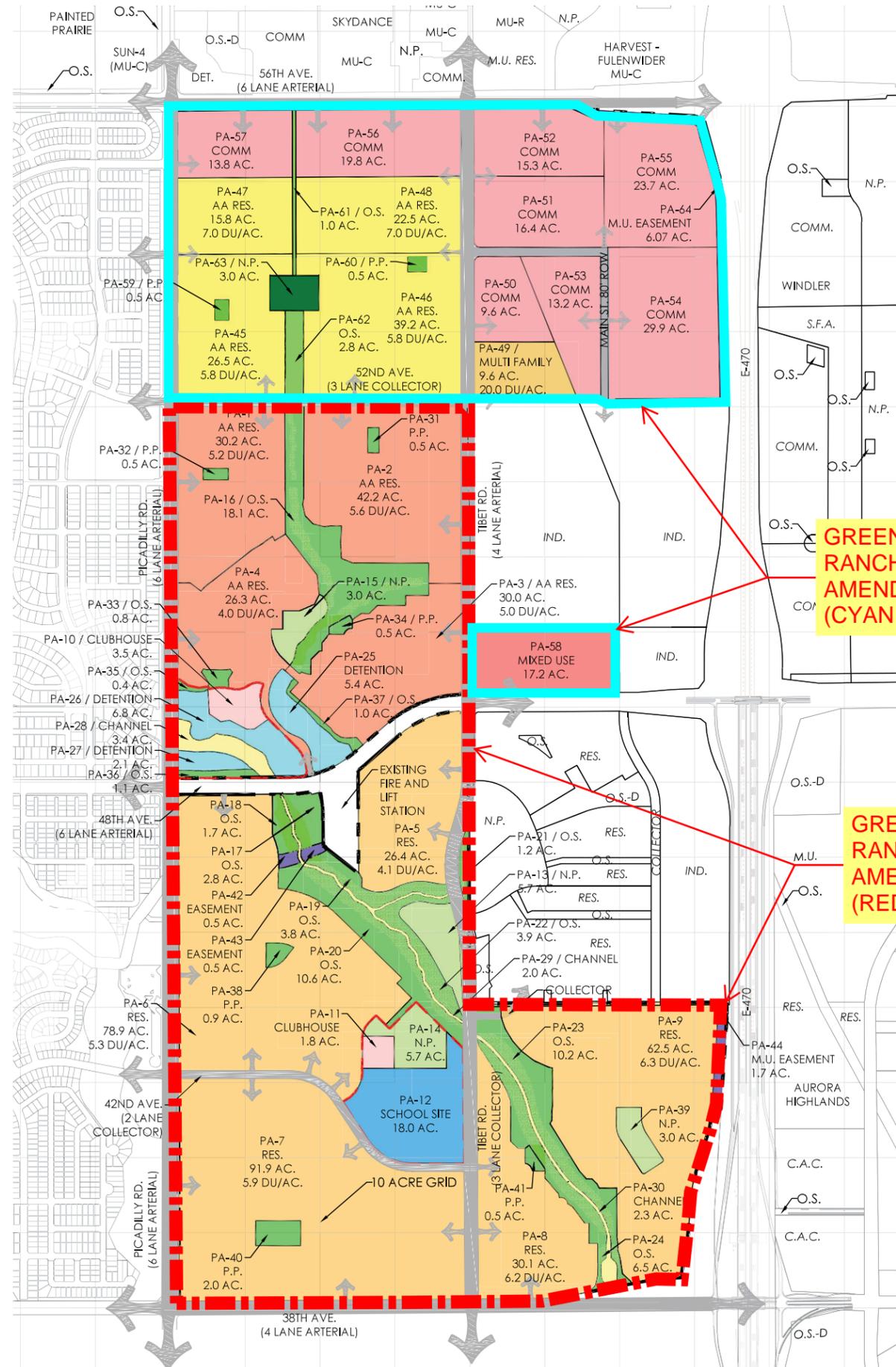
E 38TH AVE

GREEN VALLEY RANCH EAST FILING 7

**VICINITY MAP**

SCALE: 1"=2000'

**TAB 8.4**

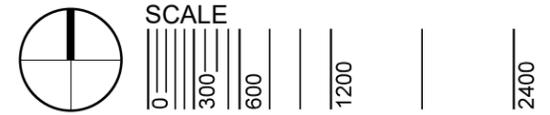


**LEGEND**

- 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
  - MULTI FAMILY RESIDENTIAL
  - MIXED USE
  - NAC BOUNDARY
- O.S. = OPEN SPACE  
 N.P. = NEIGHBORHOOD PARK  
 P.P. = POCKET PARK  
 RES. = RESIDENTIAL

**GREEN VALLEY RANCH EAST AMENDMENT 2 (CYAN SOLID LINE)**

**GREEN VALLEY RANCH EAST AMENDMENT 1 (RED DASHED LINE)**



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

Project Title:  
**Green Valley 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												
Planning Area	Use	Acre	Units	DU/acre	Non-Residential		Residential		Total			
					Loading (gpd/acre)	Pop Equivelant/acre	Loading (gpd/cap)	Population/Unit	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
	<b>Total</b>	<b>161.90</b>						<b>Total</b>	<b>327,079.90</b>	<b>227.14</b>	<b>32,707.99</b>	<b>4804.622</b>

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



**From:** Tran, Anthony "Tony" <atran@auroragov.org>  
**Sent:** Thursday, October 31, 2019 1:03 PM  
**To:** Greg Proulx <GProulx@martinmartin.com>  
**Cc:** Ballard, Casey <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

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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)

---

**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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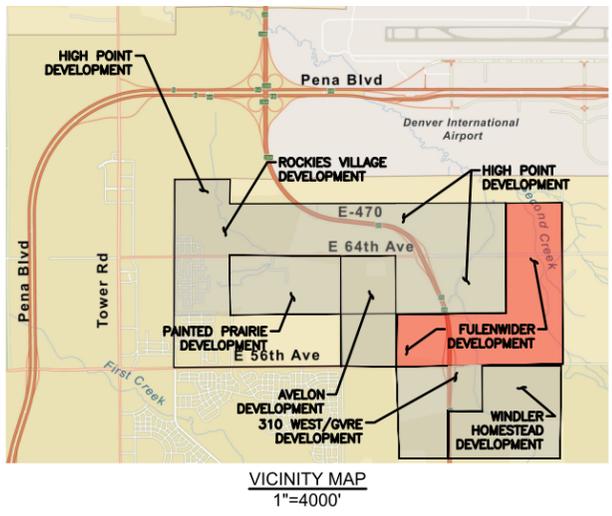
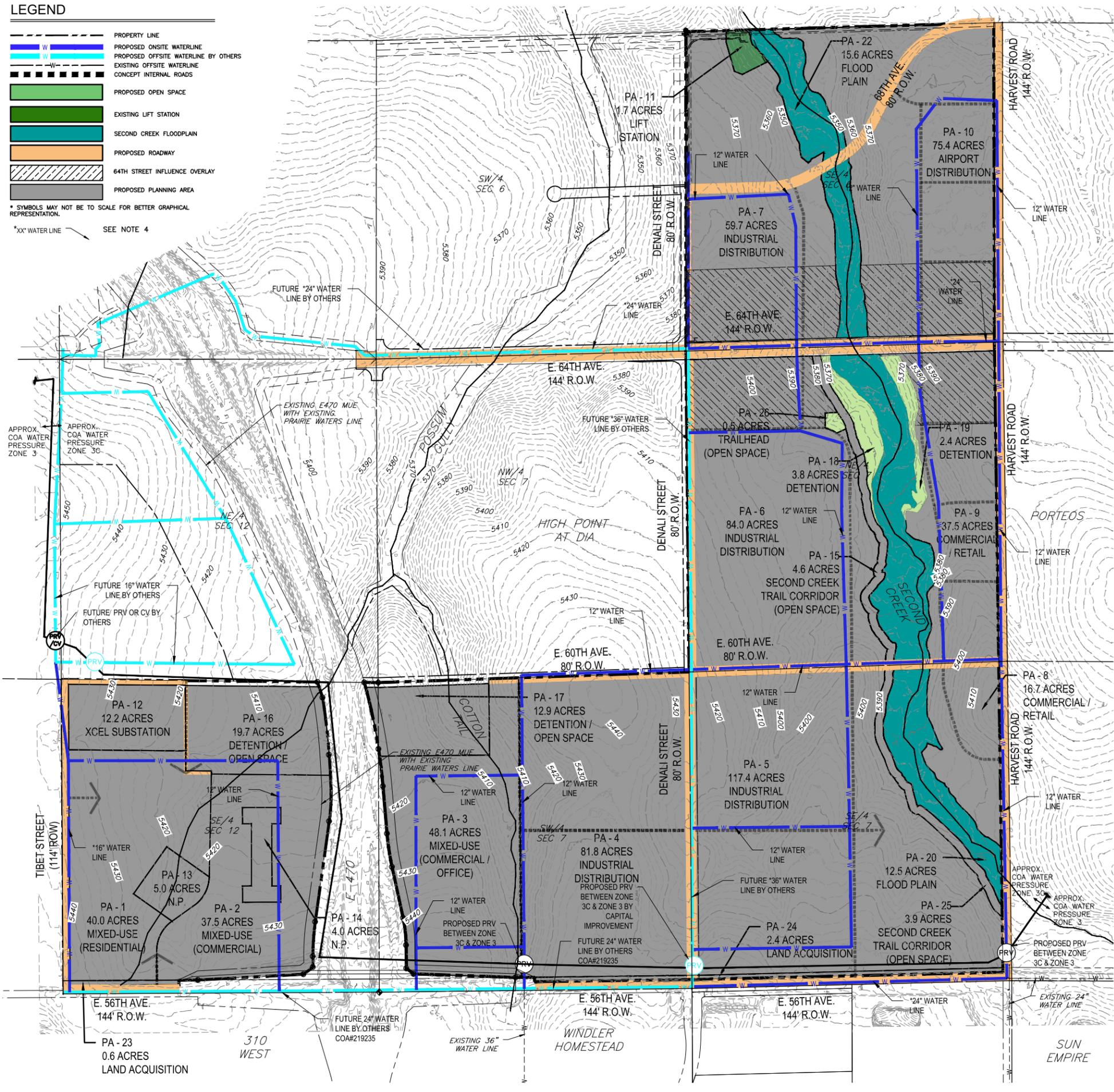


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LEGEND

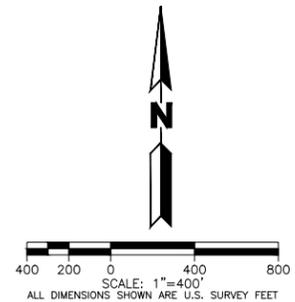
- PROPERTY LINE
  - PROPOSED ONSITE WATERLINE
  - PROPOSED OFFSITE WATERLINE BY OTHERS
  - EXISTING OFFSITE WATERLINE
  - CONCEPT INTERNAL ROADS
  - PROPOSED OPEN SPACE
  - EXISTING LIFT STATION
  - SECOND CREEK FLOODPLAIN
  - PROPOSED ROADWAY
  - 64TH STREET INFLUENCE OVERLAY
  - PROPOSED PLANNING AREA
- \* 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		
<i>Craig Paul</i> CITY ENGINEER	for Victor Rachael	07/31/2020 DATE
<i>Will Palk</i> FIRE DEPARTMENT		07/30/2020 DATE
<i>Yanna D. Adam</i> 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. LE & G. PROULX  
Design By: G. PROULX  
Drawn By: G. PROULX  
Principal in Charge: P. HORN

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Sheet Number:

MUS-W

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303.431.6100 MARTINMARTIN.COM

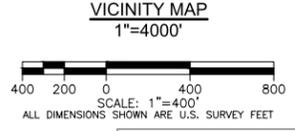
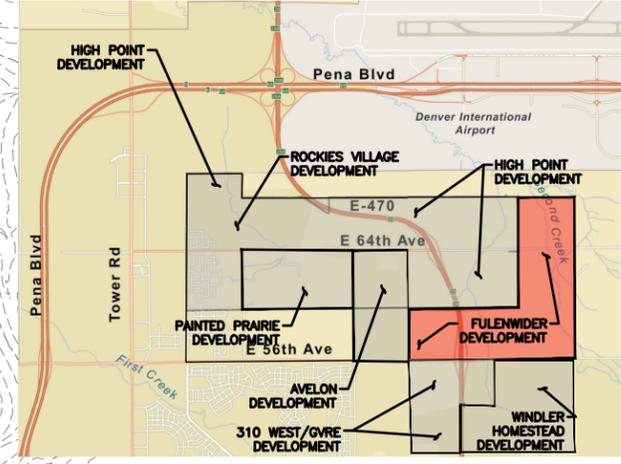
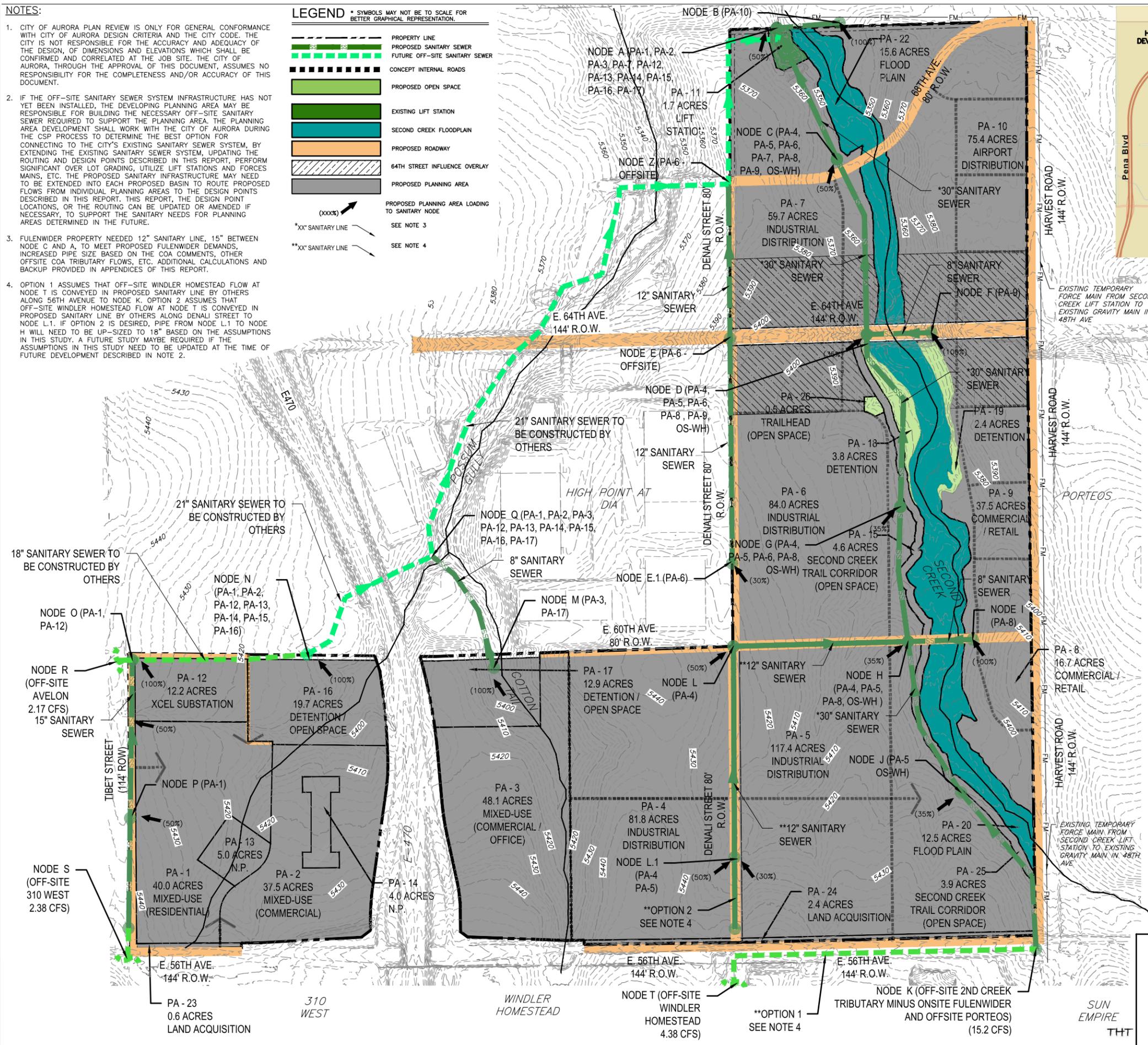
PLOT DATE: Wednesday, July 22, 2020 1:28 PM LAST SAVED BY: GPROULX  
DRAWING LOCATION: G:\HORN\19.0001-Harvest Mile FDP\PLANS\FDP\WATER\WDP WATER.dwg

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



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 DATE: 07/29/2020  
 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	2.83	4.38	18	53.4
1	S	1.54	2.38	12	73.7
2	R	1.41	2.17	12	68.6
	P	2.95	4.57	15	77.4
	O	3.31	5.12	18	58.8
	N	3.46	5.36	21	47.2
	M	0.30	0.46	8	51.2
	Q	3.76	5.81	21	49.5
	L1	0.37	0.58	12	31.7
	L	0.58	0.89	12	39.9
3	K	9.81	15.17	30	49.7
	J	11.64	18.01	30	55.1
	I	0.10	0.16	8	28.8
	H	12.12	18.75	30	56.5
	G	12.19	18.86	30	56.7
	F	0.23	0.36	8	44.6
	E.1	0.12	0.19	12	18.2
	E	0.12	0.19	12	18.2
	D	12.39	19.17	30	57.3
	C	12.46	19.28	30	57.5
	B	0.37	0.57	8	58.9
	A	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 for Victor Rachael 07/31/2020  
 CITY ENGINEER DATE

Will Pahl 07/30/2020  
 FIRE DEPARTMENT DATE

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

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FULENWIDER MASTER UTILITY PLAN (SANITARY)

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

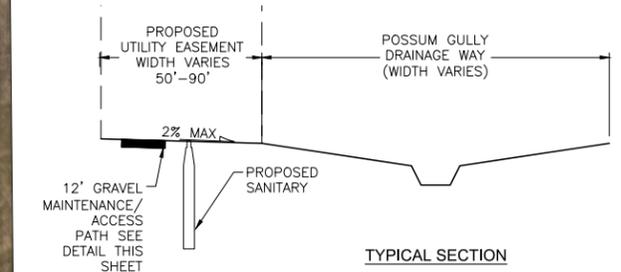
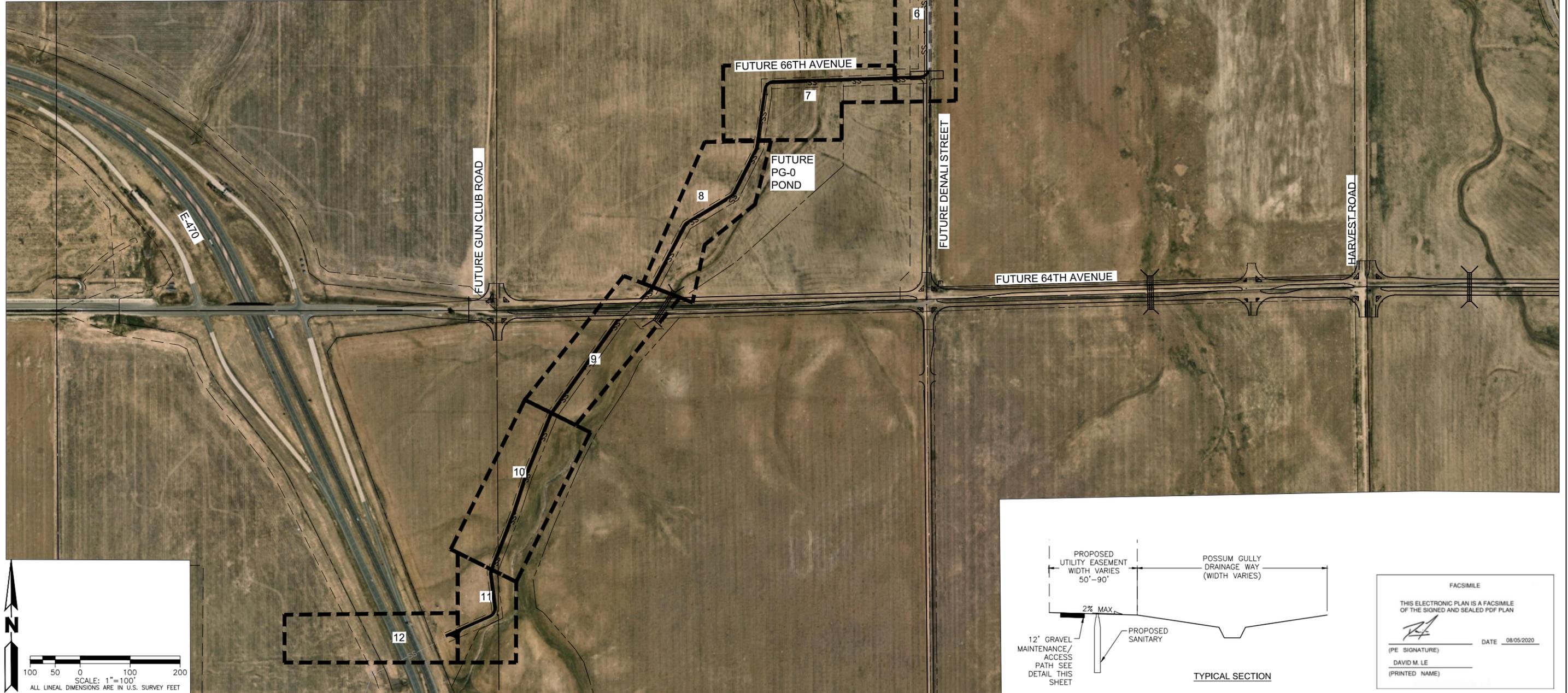
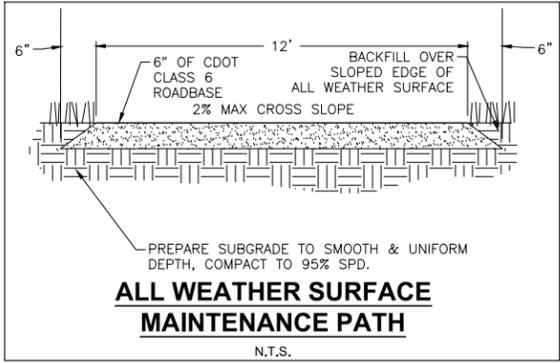
Job Number: 19.0001  
 Project Manager: D. LE & G. PROULX  
 Design By: G. PROULX  
 Drawn By: G. PROULX  
 Principal in Charge: P. HORN

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*DAVID M. LE*

(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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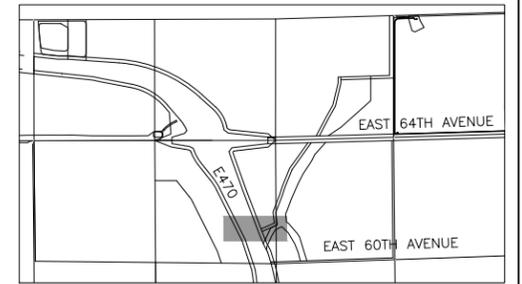
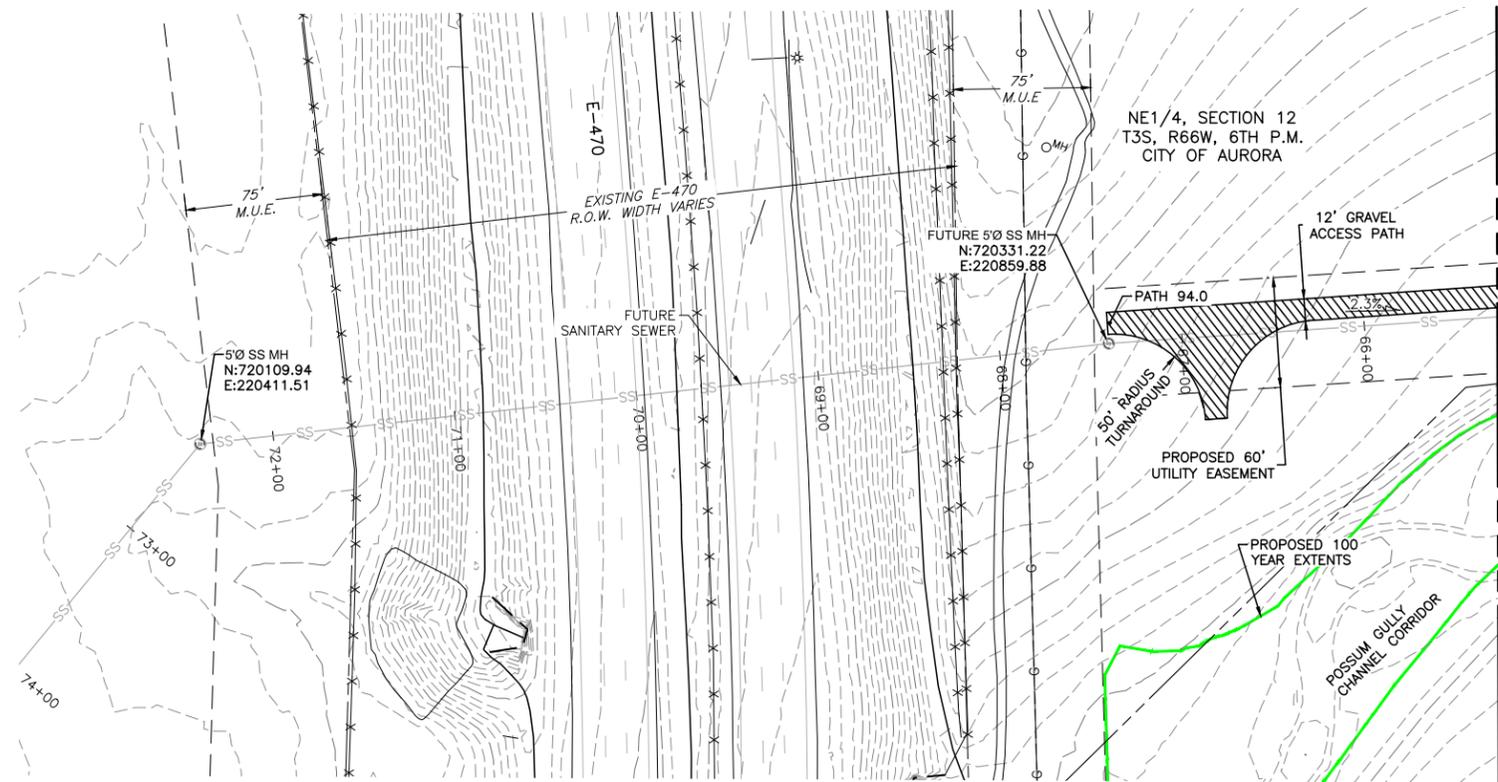
M/M JOB NO.:  
19.0281

As Constructed
No Revisions:
Revised:
Void:

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

Project No./Code
4

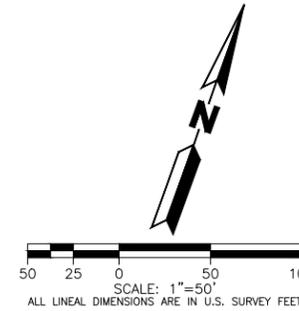




KEYMAP  
SCALE: 1"=2000'

**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
- CONTRACTOR TO RESTORE DISTURBED AREA BACK TO EXISTING GRADE AND VEGETATION TO EXISTING CONDITION PRIOR TO CONSTRUCTION.
- 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	
SANITARY SEWER	
SANITARY MANHOLE	
MONITOR WELL	
DRIVE	
DESCRIPTIONS	DRIVE



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

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**BASIS OF BEARINGS:**

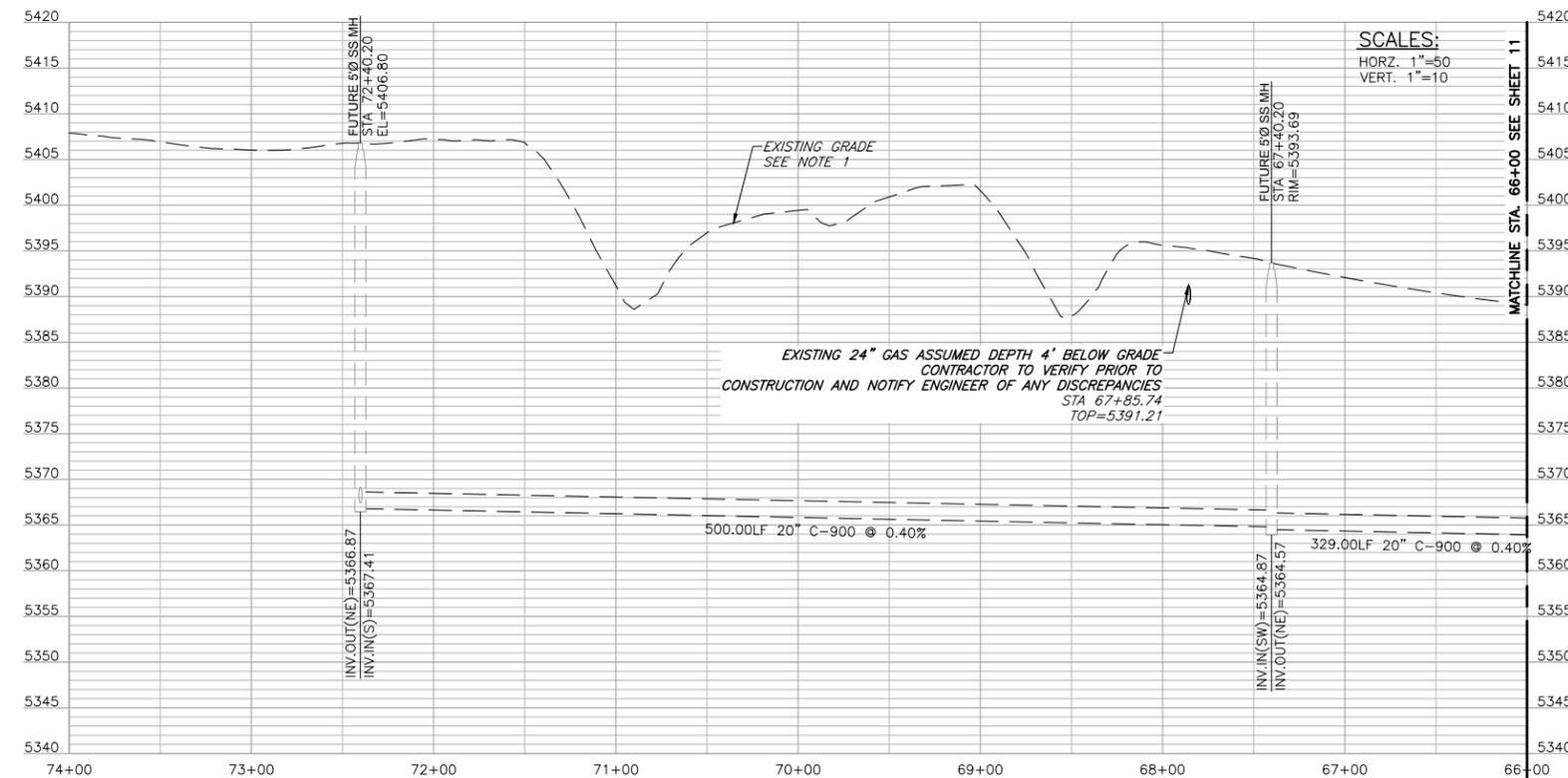
BEARINGS ARE BASED ON AN ASSUMED BEARING OF S00°33'21"E ALONG THE EASTERLY LINE OF THE SOUTHWEST QUARTER OF SECTION 7, TOWNSHIP 3 SOUTH, RANGE 65 WEST OF THE 6TH P.M. BEING MONUMENTED AS A FOUND 3 1/4" ALUMINUM CAP PLS # 25379 IN RANGEBOX AT THE CENTER QUARTER CORNER AND A FOUND 2 1/2" ALUMINUM CAP PLS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



SCALES:  
HORZ. 1"=50'  
VERT. 1"=10'

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	

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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:

SANITARY PLAN & PROFILE	
<b>66+00 - 73+00</b>	
Designer:	DL/GP
Detailer:	DB
Sheet Subset:	Subset Sheet:

Project No./Code
<b>12</b>

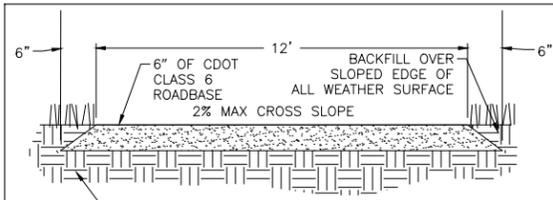
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(PE SIGNATURE)                      DATE 08/05/2020

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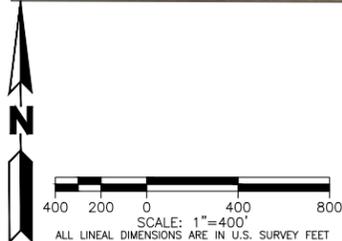
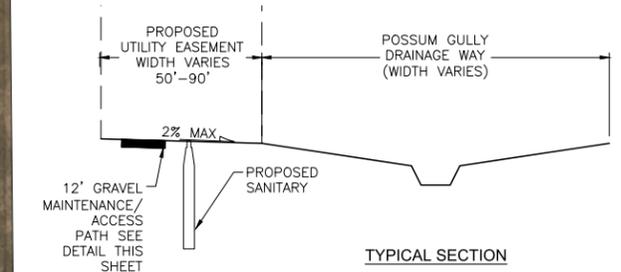
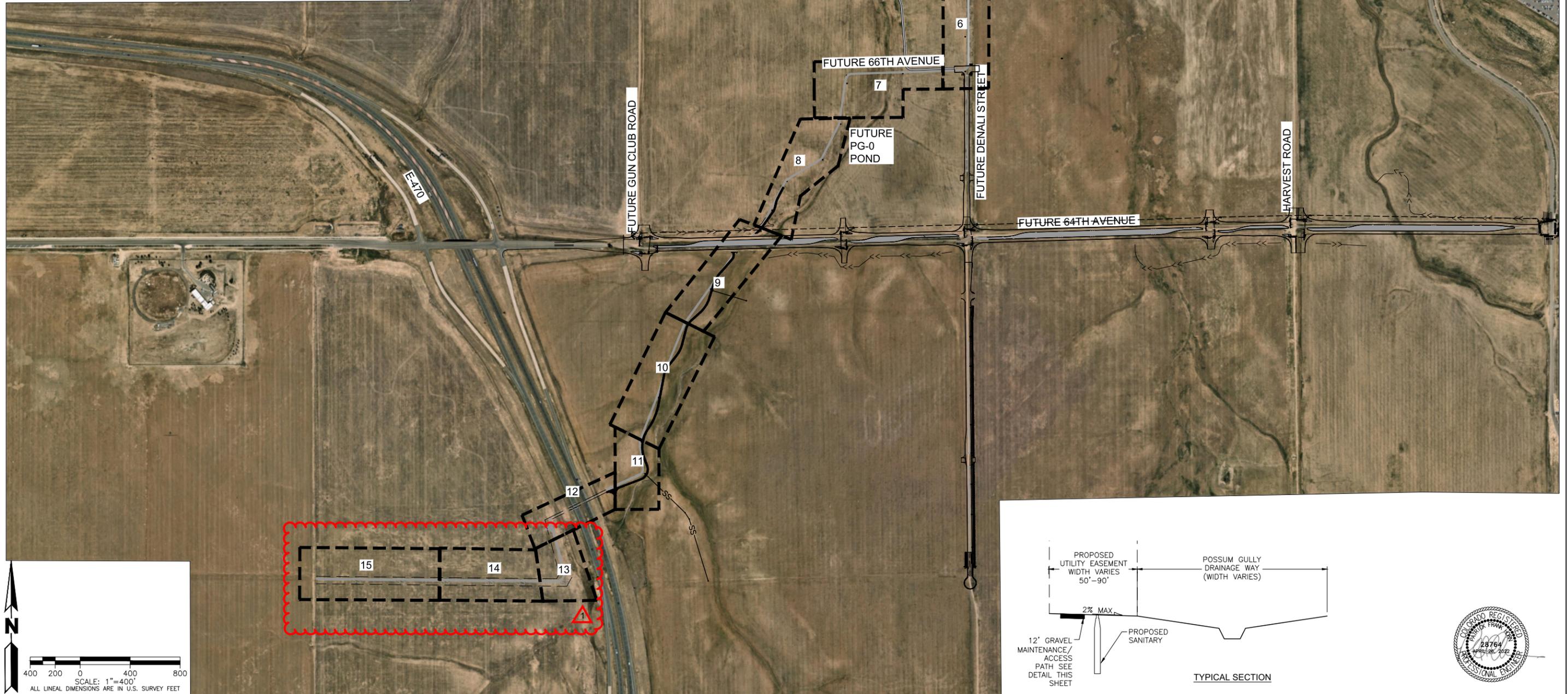




PREPARE SUBGRADE TO SMOOTH & UNIFORM DEPTH, COMPACT TO 95% SPD.

**ALL WEATHER SURFACE MAINTENANCE PATH**

N.T.S.



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	

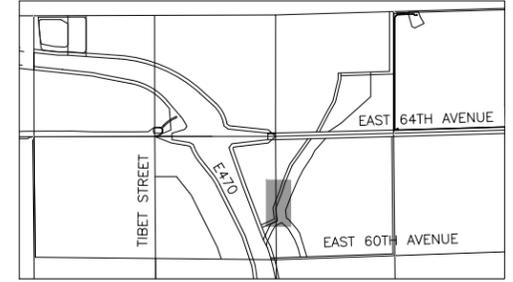
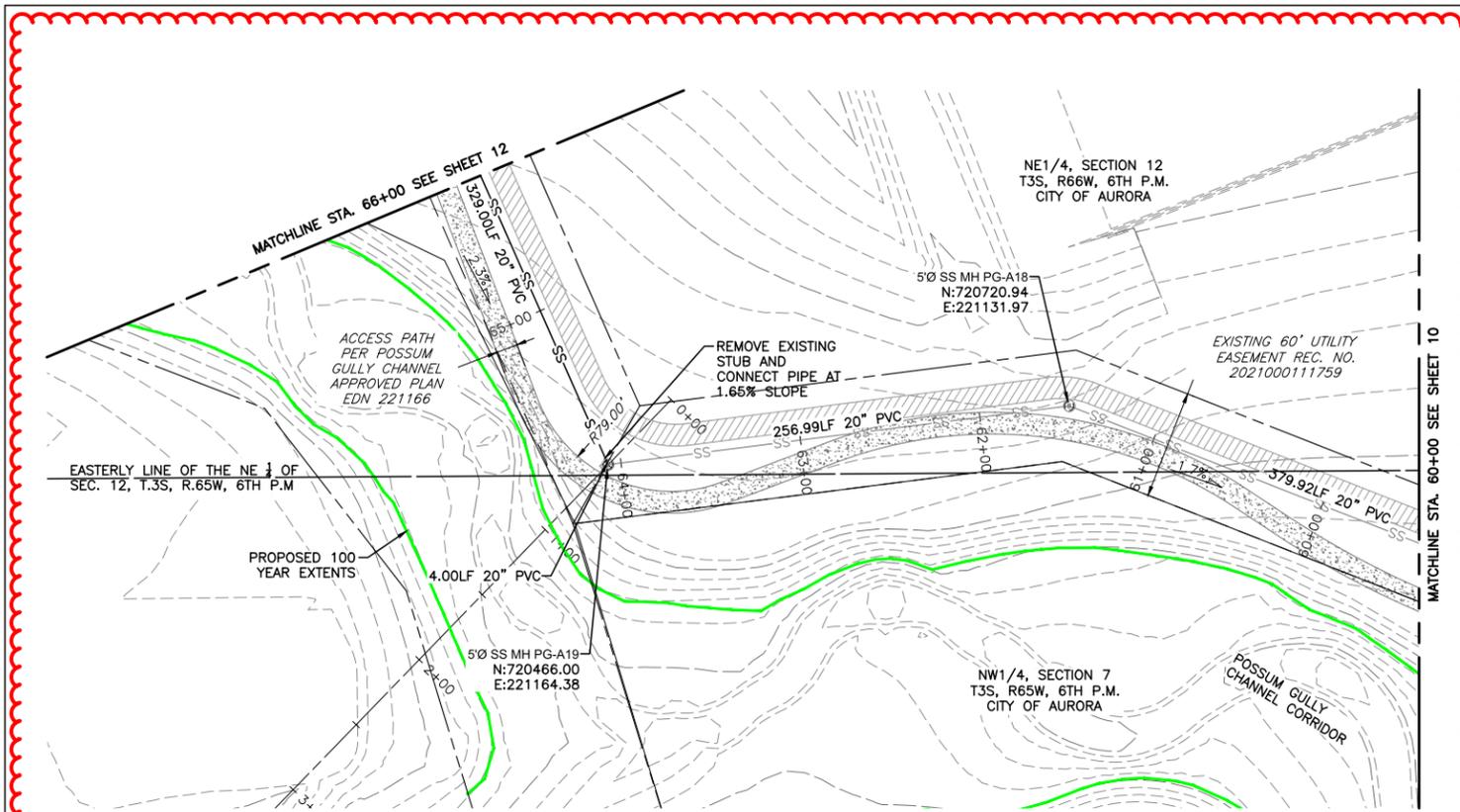
**MARTIN/MARTIN**  
CONSULTING ENGINEERS  
12499 WEST COLFAX AVENUE,  
LAKEWOOD, COLORADO 80215  
MAIN 303.431.6100  
MARTINMARTIN.COM

M/M JOB NO.:  
19.0281

As Constructed
No Revisions:
Revised:
Void:

<b>OVERALL UTILITY PLAN</b>	
Designer:	DL/GP
Detailer:	FJ/DB
Sheet Subset:	Subset Sheet:

Project No./Code
4



KEYMAP  
SCALE: 1"=2000'

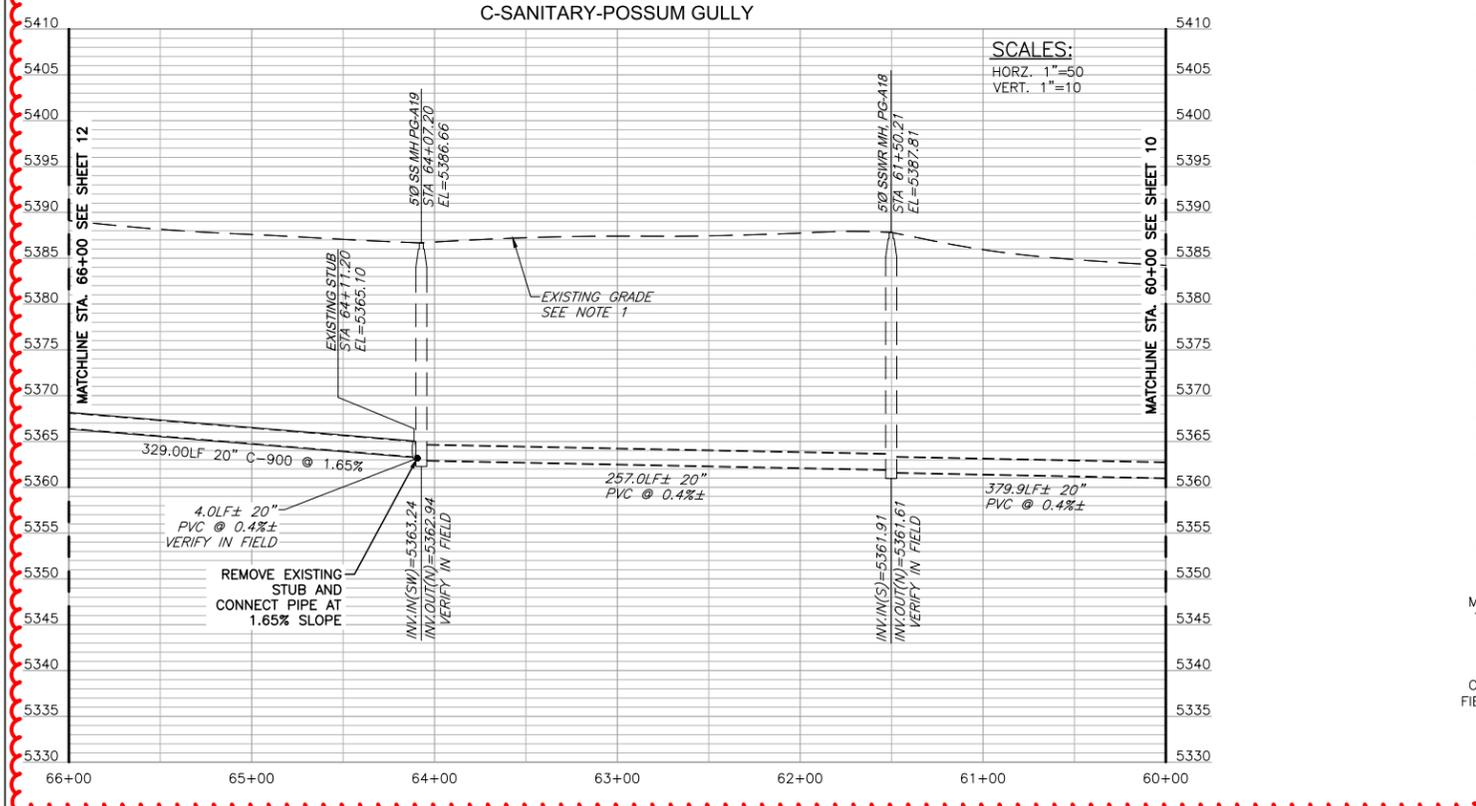
- NOTES:**
- EXISTING CONTOURS SHOWN ARE ANTICIPATED GRADES THAT WILL BE PRESENT AT TIME OF SANITARY SEWER MAIN INSTALLATION BASED ON CURRENT OVERLOT GRADING OPERATIONS AND PLANNED IMPROVEMENTS
  - CONTRACTOR TO RESTORE DISTURBED AREA BACK TO EXISTING GRADE AND VEGETATION TO EXISTING CONDITION PRIOR TO CONSTRUCTION.
  - 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**

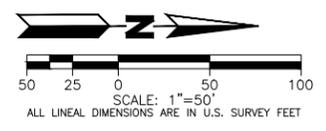
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SS	SS
SS	SS
OW	OW
DRIVE	DRIVE

**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 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.



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	
04/25/22	PLAN AMENDMENT	

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LAKEWOOD, COLORADO 80215  
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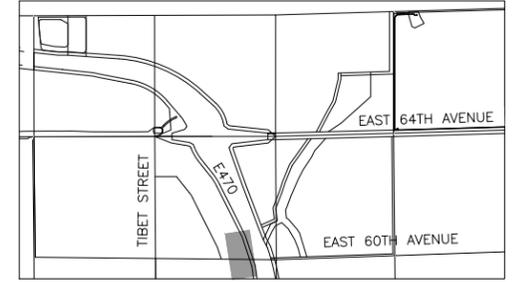
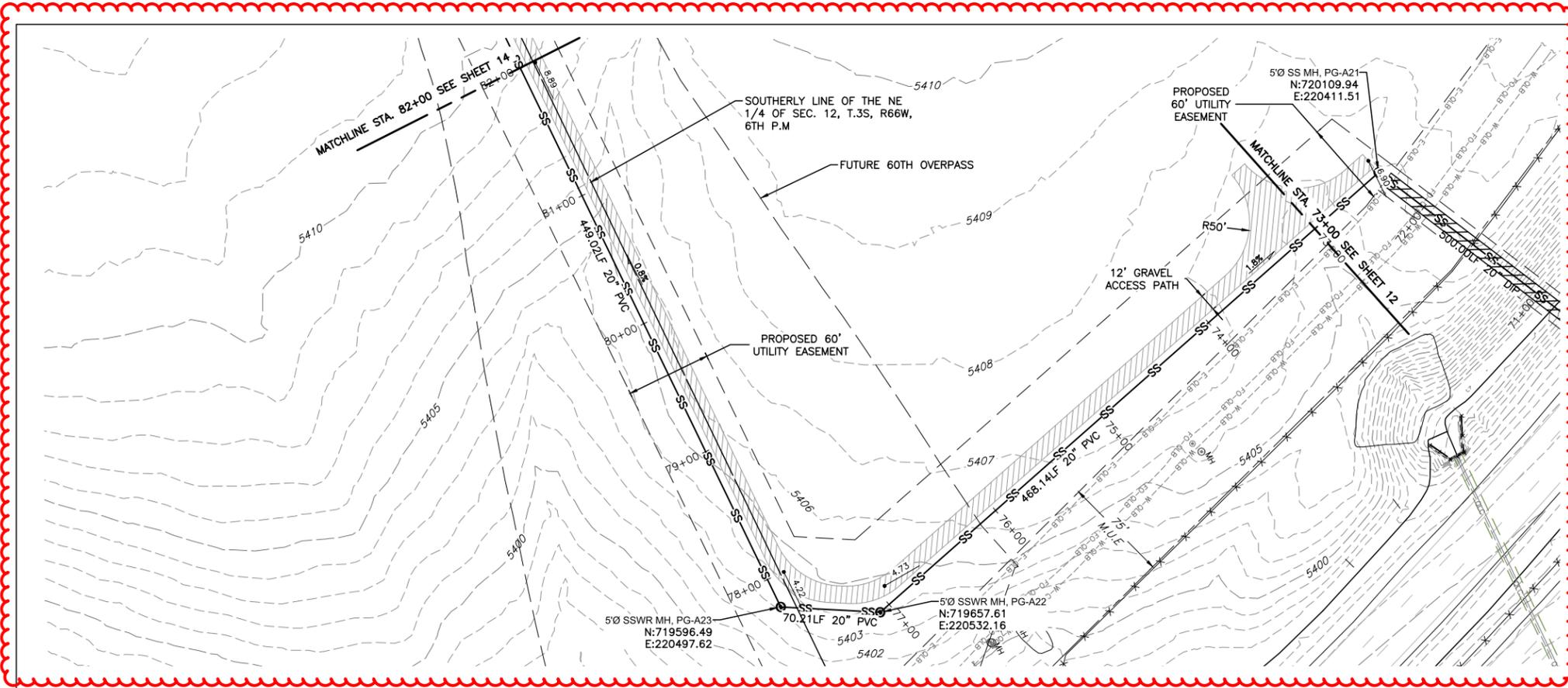
M/M JOB NO.:  
19.0281

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No Revisions:
Revised:
Void:

SANITARY PLAN & PROFILE	
60+00 - 66+00	
Designer: DL/GP	
Detailer: FJ/DB	
Sheet Subset:	Subset Sheet:

Project No./Code
11

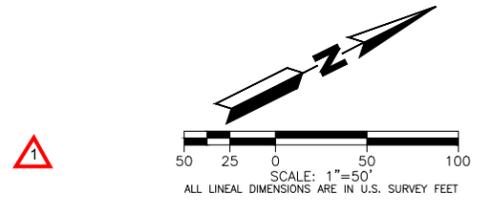
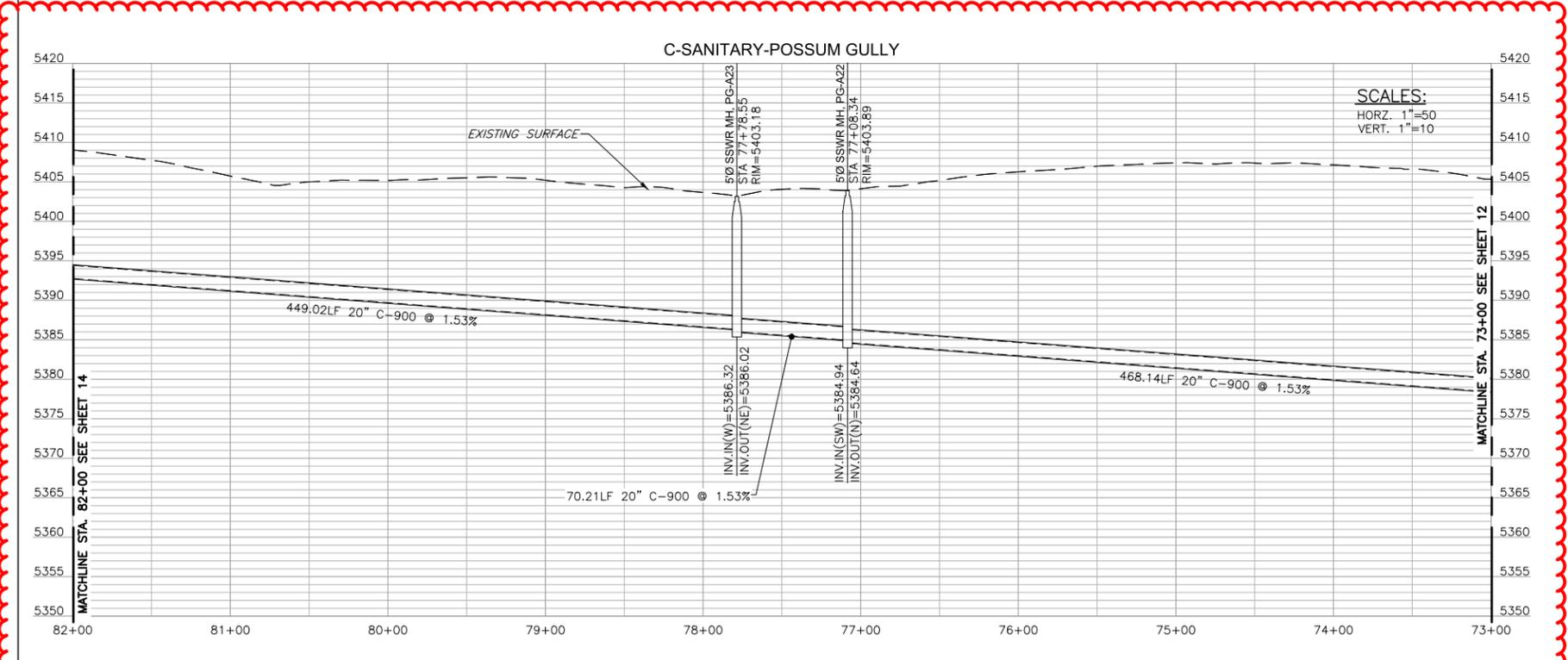




- NOTES:**
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**LEGEND**

EXISTING	PROPOSED
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SS	SS
⊙	⊙
⊙	⊙
DRIVE	DRIVE
DESCRIPTIONS	DRIVE



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

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New Sheet Added

Print Date: Monday, April 25, 2022

File Name: SANITARY 73+00 - 82+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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CONSULTING ENGINEERS

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MAIN 303.431.6100  
MARTINMARTIN.COM

M/M JOB NO.:  
19.0281

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Revised:

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**SANITARY PLAN & PROFILE**  
**73+00 - 82+00**

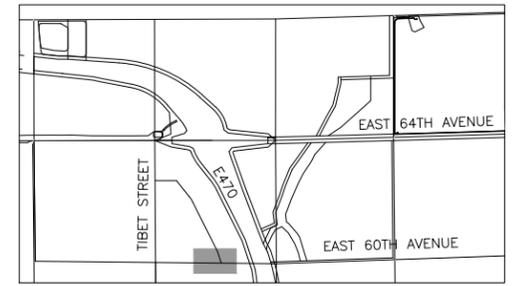
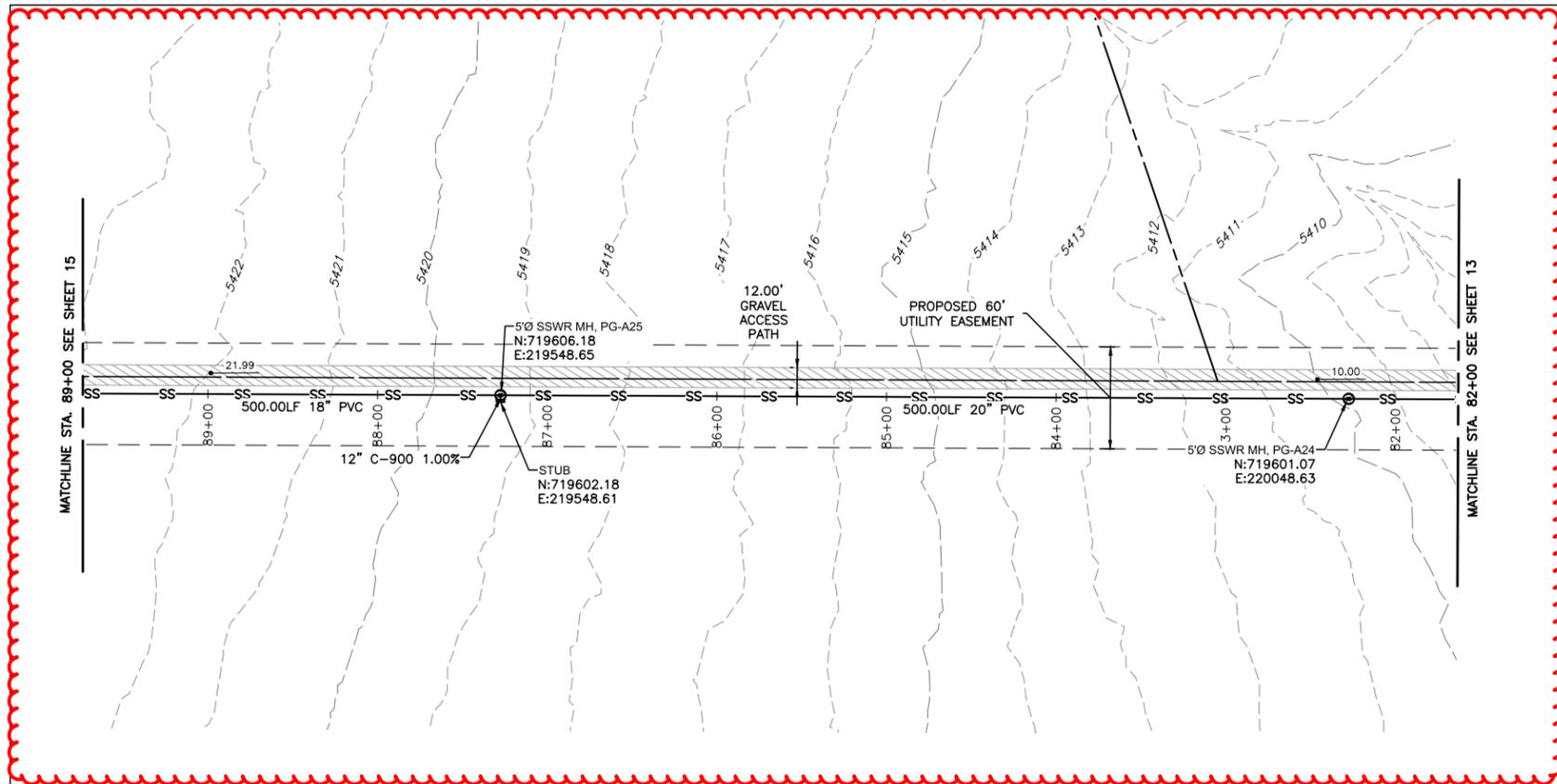
Designer: DL/GP

Detailer: FJ/DB

Sheet Subset:                      Subset Sheet:

Project No./Code

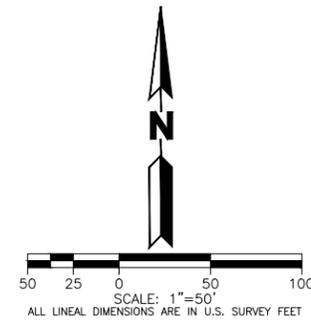
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KEYMAP  
SCALE: 1"=2000'

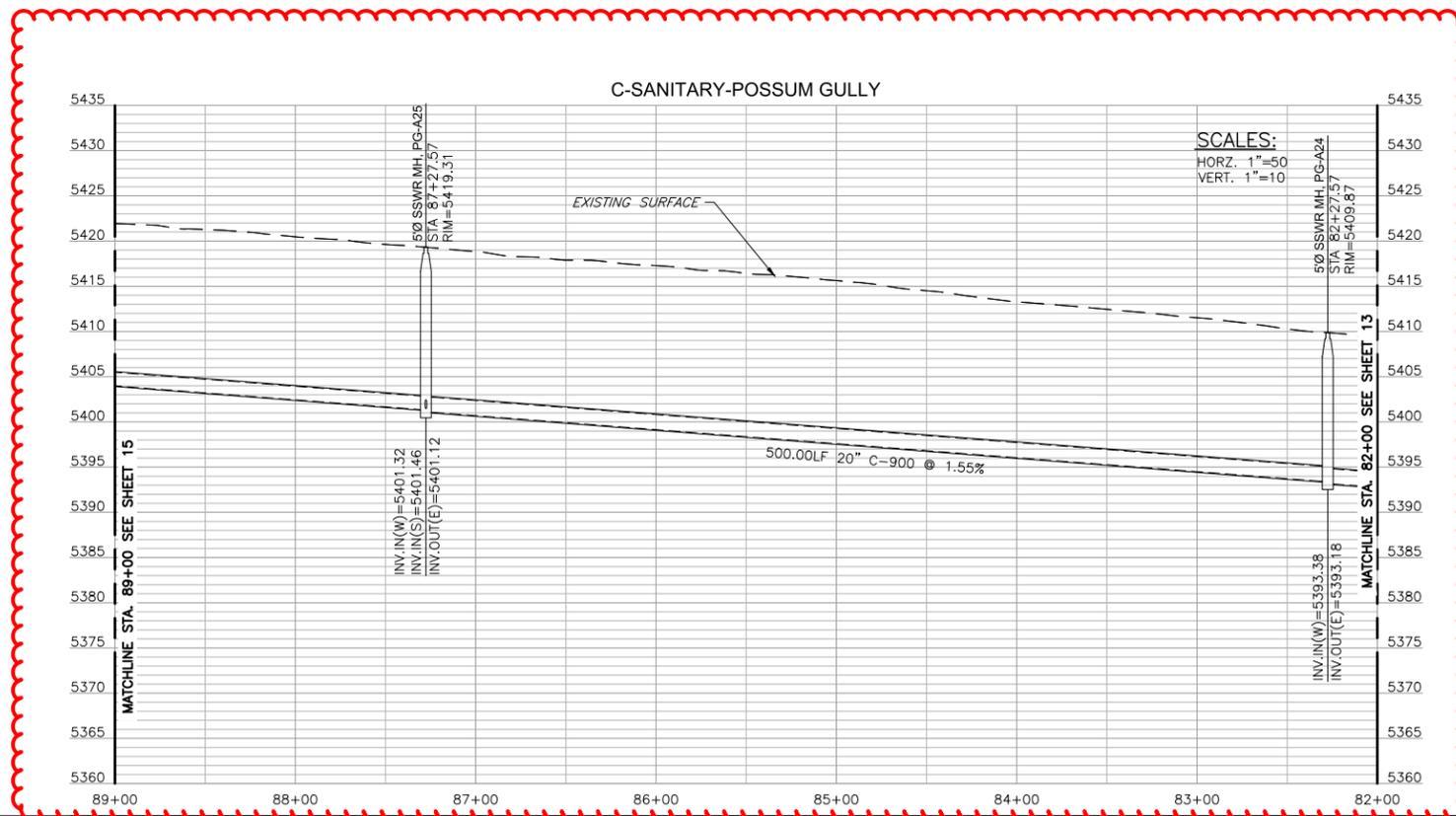
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**LEGEND**

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



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ELEVATION = 5394.58 (NAVD 1988) DATUM.



New Sheet Added

Print Date: Monday, April 25, 2022

File Name: SANITARY 82+00 - 89+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	

**MARTIN/MARTIN**  
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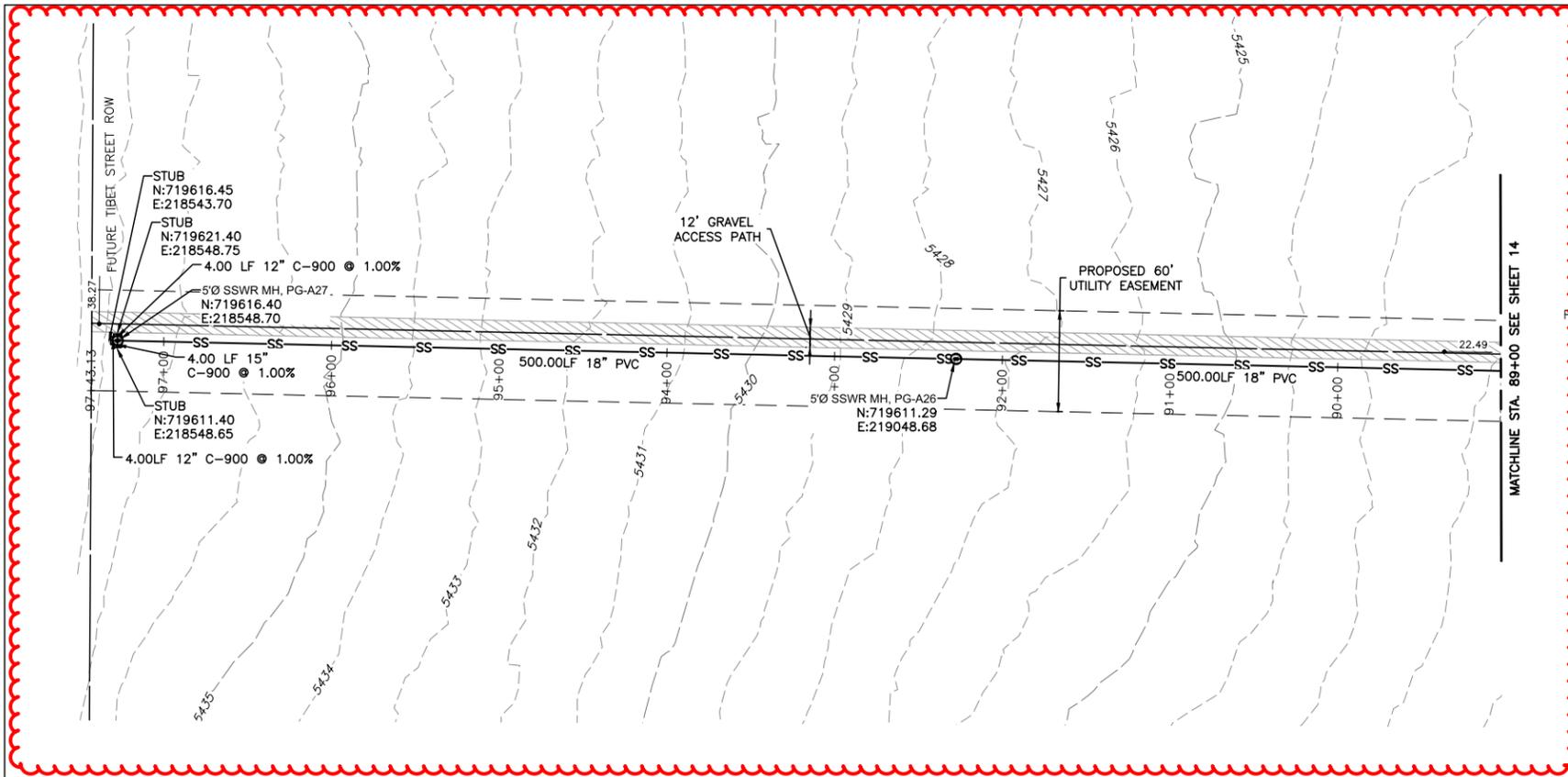
12499 WEST COLFAX AVENUE,  
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MAIN 303.431.6100  
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M/M JOB NO.:  
19.0281

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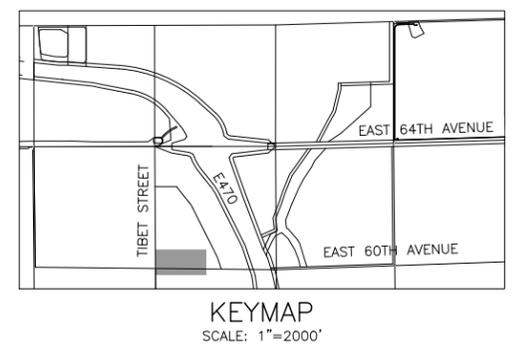
<b>SANITARY PLAN &amp; PROFILE</b>	
<b>82+00 - 89+00</b>	
Designer: DL/GP	
Detailer: FJ/DB	
Sheet Subset:	Subset Sheet:

Project No./Code
14

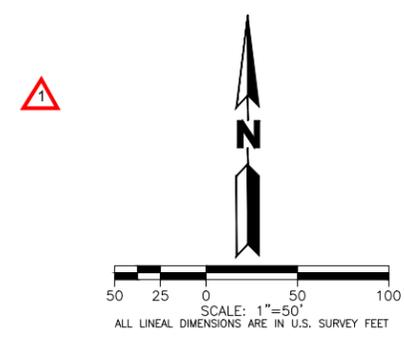


**COLORADO 811**  
 KNOW WHAT'S BELOW. CALL BEFORE YOU DIG.

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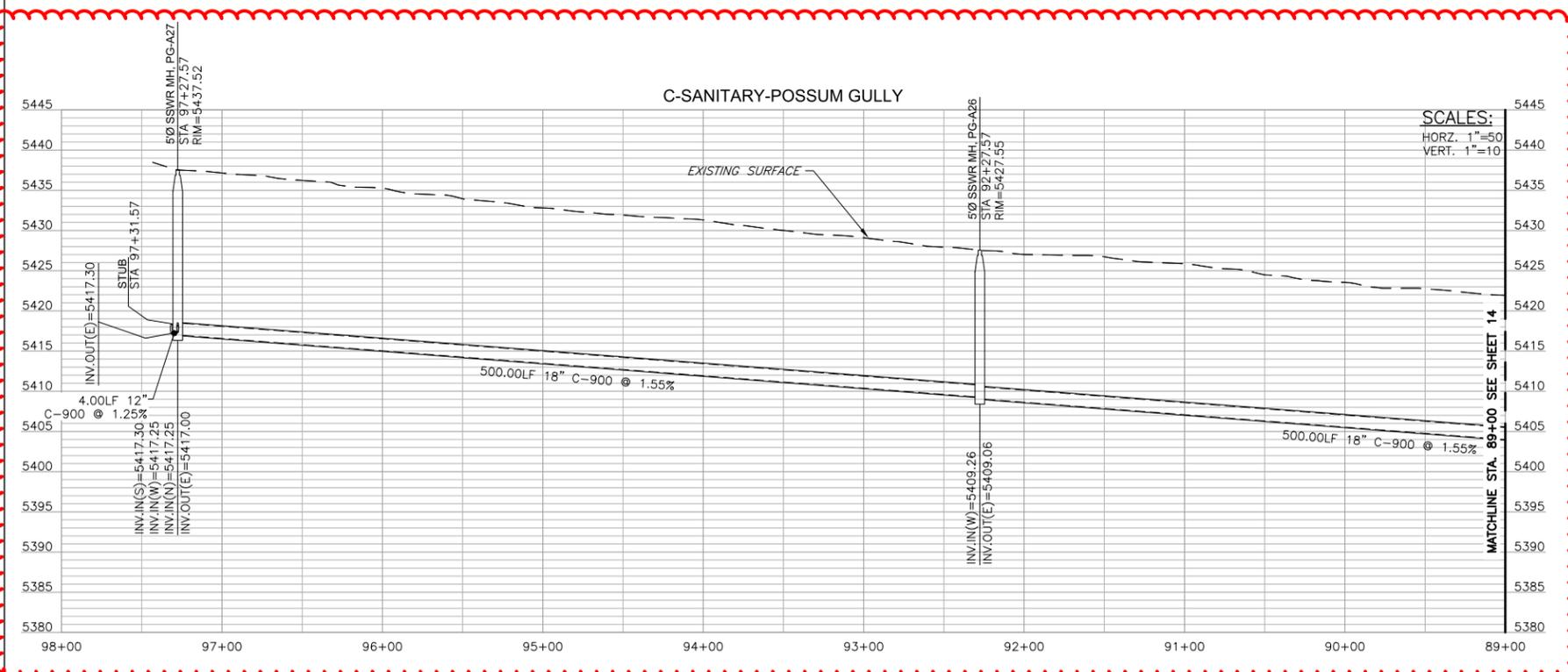


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**LEGEND**

EXISTING	PROPOSED
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SS	SS
SM	SM
MW	MW
DRIVE	DRIVE
DESCRIPTIONS	DRIVE



**BASIS OF BEARINGS:**  
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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	

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

M/M JOB NO.:  
 19.0281

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No Revisions:
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**SANITARY PLAN & PROFILE**  
**89+00 - 97+43.13**

Designer: DL/GP  
 Detailer: FJ/DB  
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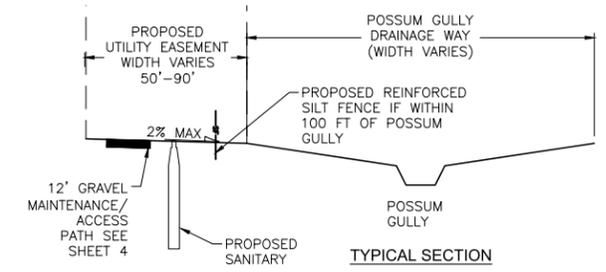
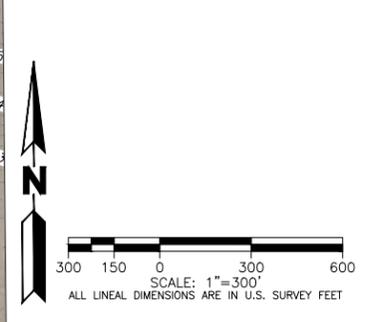
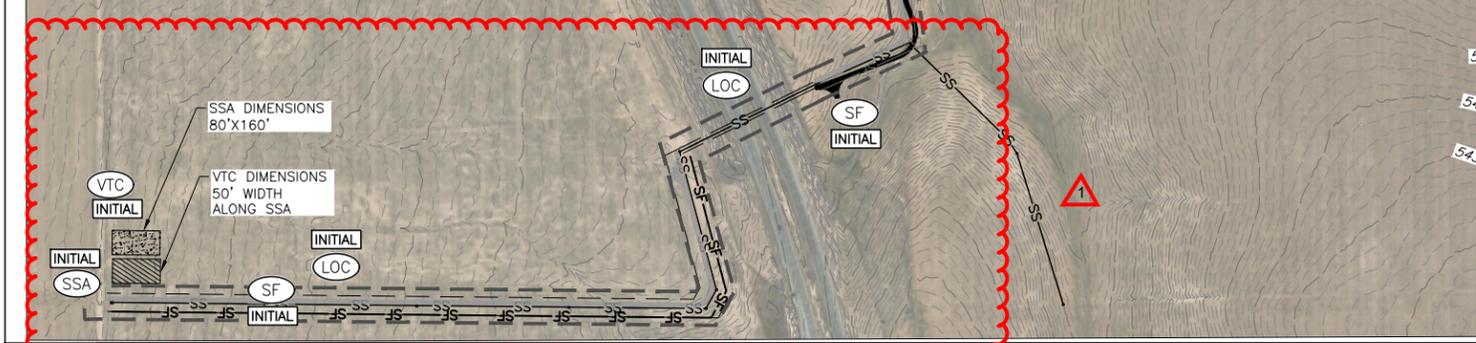
Project No./Code
15



**LEGEND**

- SILT FENCE
- VEHICLE TRACKING CONTROL
- STABILIZED STAGING AREA
- LIMITS OF CONSTRUCTION
- SILT FENCE
- VEHICLE TRACKING CONTROL
- STABILIZED STAGING AREA
- LIMITS OF CONSTRUCTION

- NOTES:**
1. EROSION CONTROL PLANS AND PROJECT ASSOCIATED SWMP REPORT BASED ON APPROVED PLANS DATED "HIGH POINT EAST EROSION CONTROL PLANS" DATED 02/20/20.
  2. REFER TO ASSOCIATED SWMP REPORT FOR EROSION CONTROL QUANTITIES AND PHASING.



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.:  
19.0281

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No Revisions:
Revised:
Void:

**EROSION CONTROL PLAN**

Designer: DL/GP

Detailer: FJ/DB

Sheet Subset:                      Subset Sheet:

Project No./Code
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
Equivalent Population	0.0023	cfs/acre
Equivalent Population	22	capita/acre

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

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

	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	<b>Design Point Total (Option 2 w/ 310-2)</b>					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
	<b>Design Point Total</b>					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
	<b>Design Point Total</b>					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)
	<b>Design Point Total (Option 2 w/ 310-1)</b>					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
	<b>Design Point Total</b>					3,208	0.337	218,110	151	15.1	4.0	606	621	1.38	10	70		
	<b>Design Point Total (Option 2 w/ 310-1)</b>					6,435	0.677	437,546	304	30.4	3.7	1,113	1,144	2.55	15	52		
7a	<b>Design Point Total</b>					4,370	0.512	330,759	230	23.0	3.9	898	921	2.05	12	66		Offsite Basin 4 + Basin 1 + 2 + 3
	<b>Design Point Total (Option 2 w/ 310-1)</b>					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)
	<b>Design Point Total</b>					1,373	0.144	93,333	65	6.5	4.0	259	266	0.59	8	59		Offsite Basin 310-2 + 310-3 + Basin 4 (see Notes 1 and 4)
	<b>Design Point Total (Option 2 w/ 310-2)</b>					2,174	0.229	147,863	103	10.3	4.0	411	421	0.94	10	54		
9	<b>Design Point Total</b>					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)
	<b>Design Point Total (Option 2 w/ 310-2)</b>					7,707	0.965	623,975	433	43.3	3.6	1,541	1,584	3.53	15	64		(see Notes 1 and 4)
	<b>Design Point Total (Option 2 w/ 310-1 &amp; 310-2)</b>					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)
	<b>Design Point Total</b>					2,190.3	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)
	<b>Design Point Total</b>					134.4	0.303	195,903	136	13.6	4.0	544	558	1.24	10	65		Offsite Basin 6 + Basin 5
15	<b>Design Point Total</b>					2,324.7	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
	<b>Design Point Total</b>					2,350.3	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
	<b>Design Point Total</b>					115.9	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
	<b>Design Point Total</b>					133.9	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
	<b>Design Point Total</b>											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
	<b>Design Point Total</b>					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
	<b>Design Point Total</b>					297.0	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	<b>Design Point Total</b>											6,279	13.99	24	69	30" @ 0.15%		Basins 7+8+9+10 + Offsite Basins 12+13
LS	<b>Design Point Total</b>											16,702	37.21	42	64			All Basins
<b>SITE TOTALS</b>		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

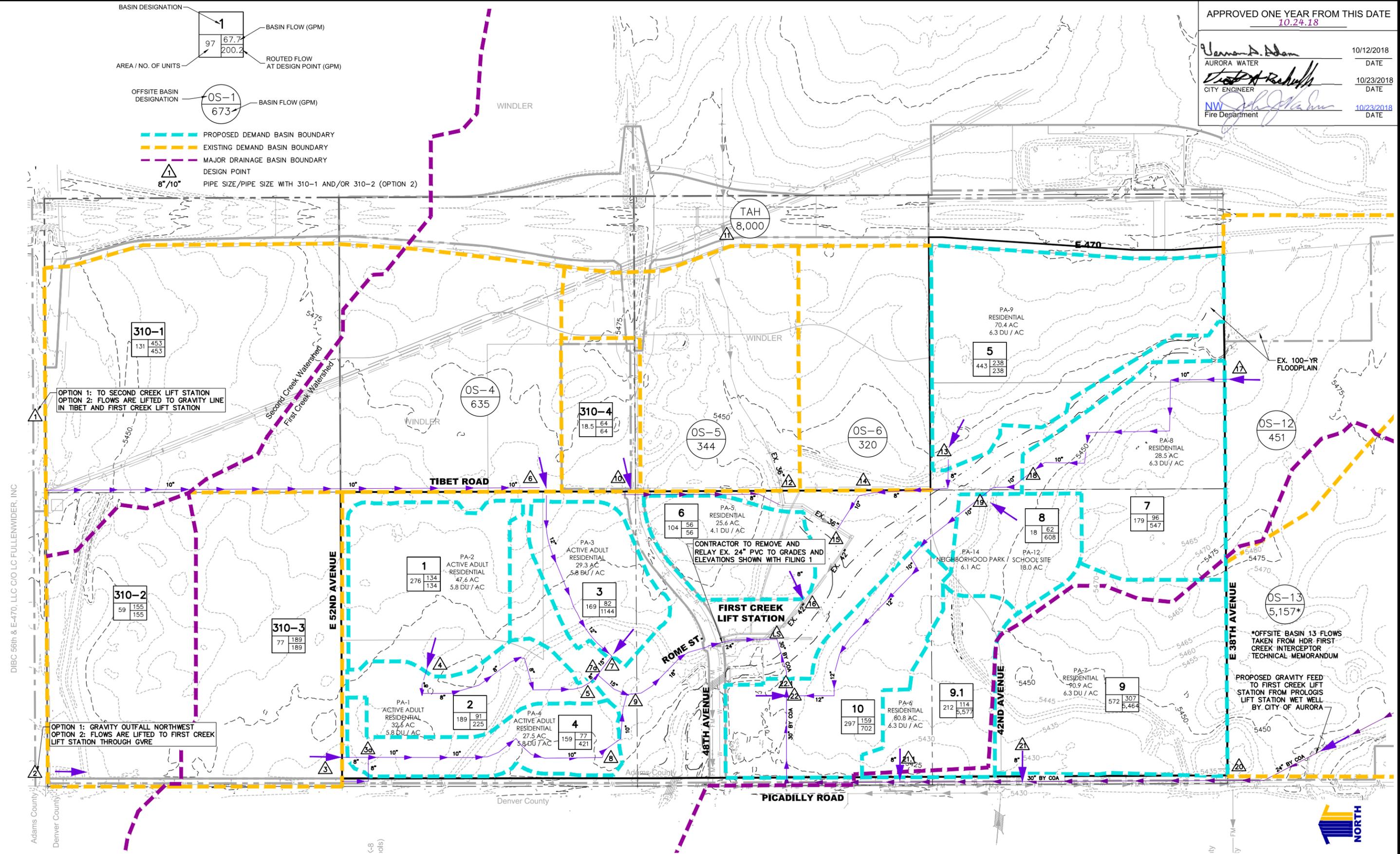
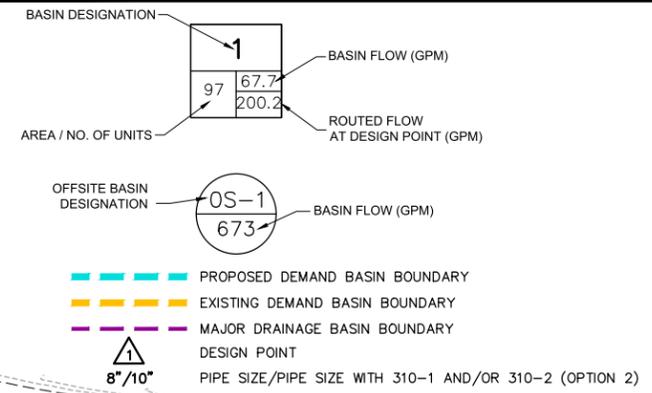
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APPROVED ONE YEAR FROM THIS DATE  
10.24.18

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

*Scott A. Rebeck* 10/23/2018  
CITY ENGINEER DATE

*NW [Signature]* 10/23/2018  
Fire Department 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
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**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**

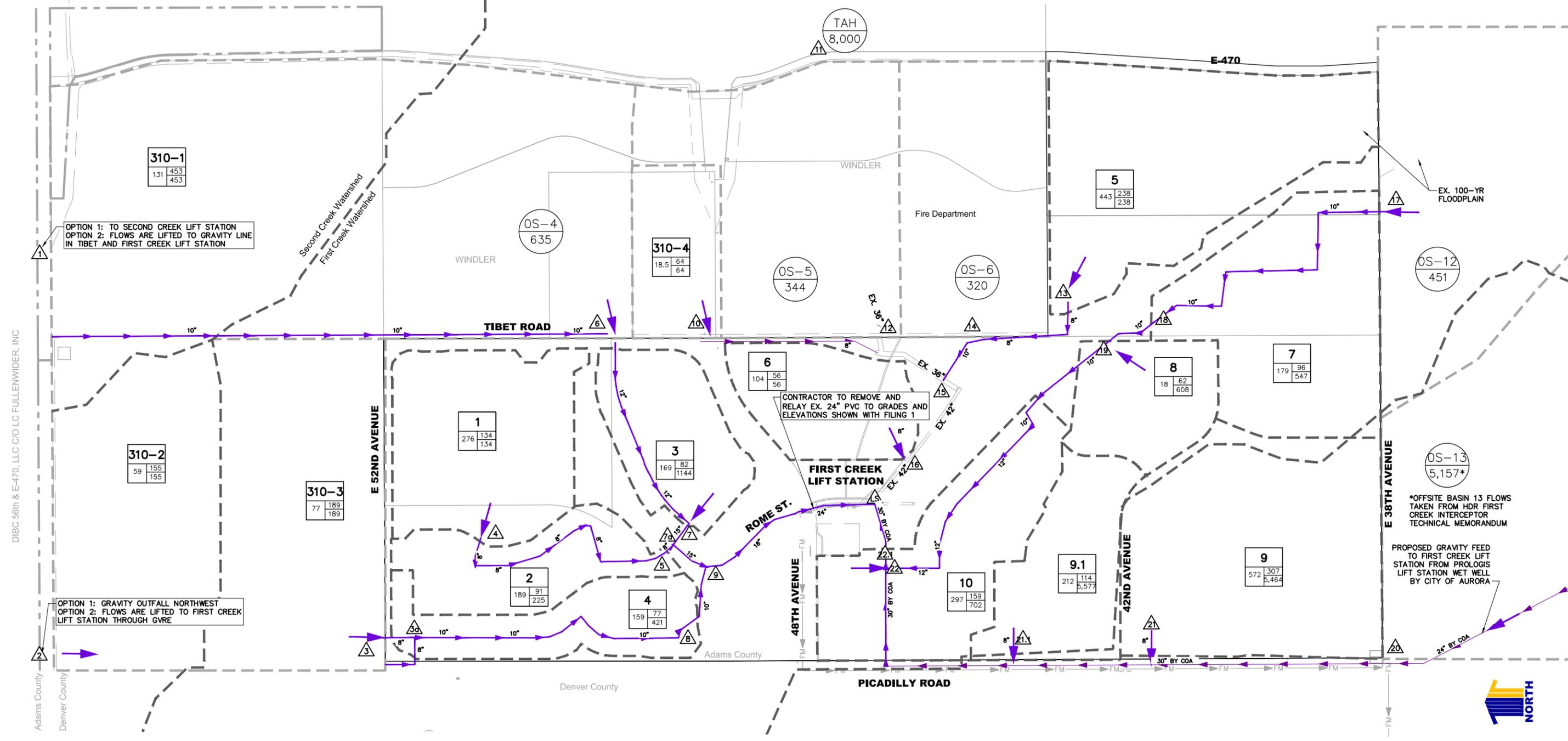
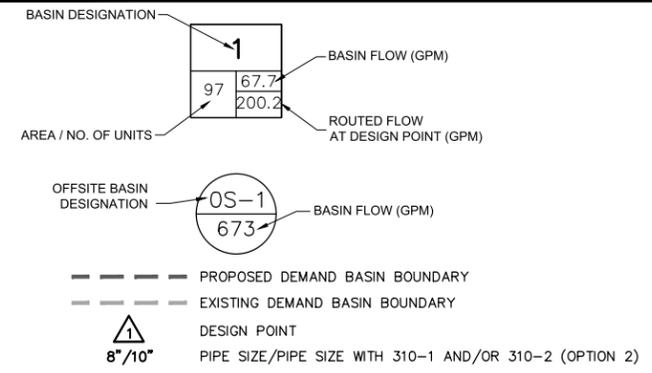
Sheet	1 of 2
Date	SEPTEMBER 2018

APPROVED ONE YEAR FROM THIS DATE  
10.24.18

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

*Justin A. Reubels* 10/23/2018  
 CITY ENGINEER DATE

*NWJ* 10/23/2018  
 Fire Department DATE



OPTION 1: TO SECOND CREEK LIFT STATION  
 OPTION 2: FLOWS ARE LIFTED TO GRAVITY LINE IN TIBET AND FIRST CREEK LIFT STATION

OPTION 1: GRAVITY OUTFALL NORTHWEST  
 OPTION 2: FLOWS ARE LIFTED TO FIRST CREEK LIFT STATION THROUGH GVRE

CONTRACTOR TO REMOVE AND RELAY EX. 24\"/>

\*OFFSITE BASIN 13 FLOWS TAKEN FROM HDR FIRST CREEK INTERCEPTOR TECHNICAL MEMORANDUM

PROPOSED GRAVITY FEED TO FIRST CREEK LIFT STATION FROM PROLOGIS LIFT STATION WET WELL BY CITY OF AURORA

PATH: P:\OAKWOOD\GVRE\DDICADD\EXHIBITS\FDP\_SS2.DWG  
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 XREFS: 20WPJT, 30PUT, W-Lotting Plan, 20Base, X-PIP Exhibits-PA, 30BASE, W-floodplain, 00EUT, 00EMA.

DATE	REVISION DESCRIPTION

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Job Number Oakwood GVRE FDP F1&2		1 inch = 400 ft. Horizontal	
Prepared For CITY OF AURORA	Designer LMA	Drafter LMA	Checked TAJ

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**GREEN VALLEY - AMENDMENT 1**  
**MASTER UTILITY REPORT**  
**SCHEMATIC MAP**

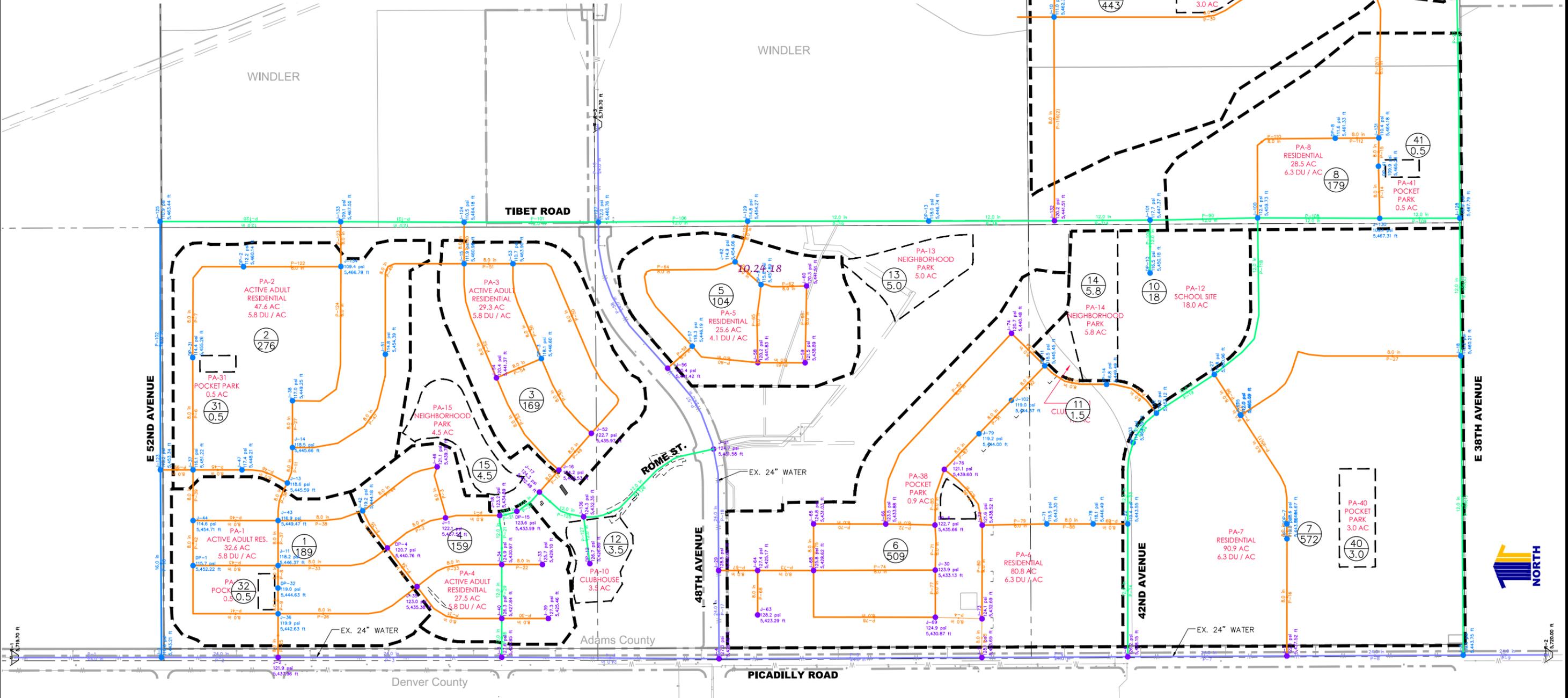
APPROVED ONE YEAR FROM THIS DATE  
10.24.18

*Vernon A. Adam* 10/12/2018  
AURORA WATER DATE  
*John A. Adams* 10/23/2018  
CITY ENGINEER DATE  
*NW* 10/23/2018  
Fire Department DATE

6 BASIN  
72 NO. OF UNITS/ACRES

--- DEMAND BASIN BOUNDARY

Color Coding Legend Pipe: Diameter (in)		Color Coding Legend Junction: Pressure (psi)	
Orange	8.0	Yellow	40.0
Green	12.0	Light Green	60.0
Blue	16.0	Dark Green	80.0
Purple	24.0	Light Blue	100.0
Black	Other	Dark Blue	120.0
		Black	Other



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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	



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

Sheet	1
of	2
Date	AUGUST 2018











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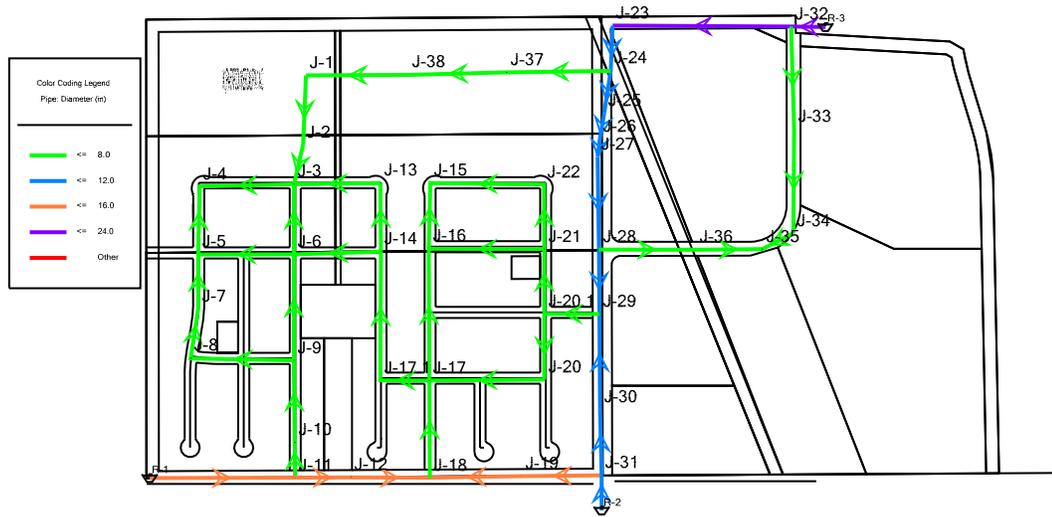
## **APPENDIX B – Water System Calculations**

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TABLE 1: ON-SITE WATER DEMANDS

Planning Area	Max # of SFD/SFD 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	154	2.77	426	3.4	AA Residential PA-59 & 1/2 of PA-62 & PA-63	1800	49146.00	34.13	137608.80	95.56	193617.00	134.46	J-5, J-6, J-8, J-9
							43026.00	29.88	120472.80	83.66	193617.00	134.46	
							6120.00	4.25	17136.00	11.90	N/A	N/A	
PA-46	227	2.77	630	3.4	AA Residential PA-60 & 1/2 of PA-62 & PA-63	1800	69750.00	48.44	195300.00	135.63	286335.00	198.84	J-16, J-17, J-20, J-21
							63630.00	44.19	178164.00	123.73	286335.00	198.84	
							6120.00	4.25	17136.00	11.90	N/A	N/A	
PA-47	111	2.77	307	0.25	AA Residential 1/4 of PA-61	1800	31457.00	21.85	88079.60	61.17	139531.50	96.90	J-3, J-4, J-5, J-6
							31007.00	21.53	86819.60	60.29	139531.50	96.90	
							450.00	0.31	1260.00	0.88	N/A	N/A	
PA-48	158	2.77	437	0.25	AA Residential 1/4 of PA-61	1800	44587.00	30.96	124843.60	86.70	198616.50	137.93	J-13, J-14, J-15, J-22
							44137.00	30.65	123583.60	85.82	198616.50	137.93	
							450.00	0.31	1260.00	0.88	N/A	N/A	
PA-49	192	2.77	532		MF Residential		53732.00	37.31	150449.60	104.48	241794.00	167.91	J-30, J-31
PA-50				9.6	Commercial	1500	14400.00	10.00	40320.00	28.00	64800.00	45.00	J-28, J-29
PA-51				16.4	Commercial	1500	24600.00	17.08	68880.00	47.83	110700.00	76.88	J-26, J-28, J-33, J-34
PA-52				15.3	Commercial	1500	22950.00	15.94	64260.00	44.63	103275.00	71.72	J-23, J-24, J-32, J-33
PA-53				13.2	Commercial	1500	19800.00	13.75	55440.00	38.50	89100.00	61.88	J-36, J-35
PA-54				29.9	Commercial	1500	44850.00	31.15	125580.00	87.21	201825.00	140.16	J-34, J-35
PA-55				23.7	Commercial	1500	35550.00	24.69	99540.00	69.13	159975.00	111.09	J-32, J-33
PA-56				19.8	Commercial	1500	30150.00	20.94	84420.00	58.63	133650.00	92.81	J-1, J-24, J-26
				0.25	Commercial 1/4 of PA-61	1800	29700.00	20.63	83160.00	57.75	133650.00	92.81	
							450.00	0.31	1260.00	0.88	N/A	N/A	
PA-57				13.8	Commercial	1500	21150.00	14.69	59220.00	41.13	93150.00	64.69	J-1, J-2
				0.25	Commercial 1/4 of PA-61	1800	20700.00	14.38	57960.00	40.25	93150.00	64.69	
							450.00	0.31	1260.00	0.88	N/A	N/A	

# Green Valley Master Plan Amendment 2



**Average Daily  
Junction Table - Time: 0.00 hours**

Label	Elevation (ft)	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-27	5,451.53	<Collection: 0 items>	0	5,719.98	116
J-25	5,448.23	<Collection: 0 items>	0	5,719.98	118
J-24	5,446.24	<Collection: 2 items>	18	5,719.98	118
J-34	5,450.49	<Collection: 2 items>	20	5,719.96	117
J-28	5,459.37	<Collection: 2 items>	9	5,719.97	113
J-16	5,460.94	<Collection: 1 item>	24	5,719.90	112
J-6	5,460.06	<Collection: 2 items>	28	5,719.86	112
J-3	5,450.53	<Collection: 1 item>	11	5,719.86	117
J-26	5,450.58	<Collection: 2 items>	18	5,719.98	117
J-2	5,449.35	<Collection: 1 item>	15	5,719.86	117
J-10	5,457.17	<Collection: 0 items>	0	5,719.96	114
J-33	5,443.60	<Collection: 3 items>	21	5,719.97	120
J-12	5,457.77	<Collection: 0 items>	0	5,719.99	113
J-29	5,464.77	<Collection: 1 item>	5	5,719.97	110
J-30	5,467.49	<Collection: 1 item>	19	5,719.98	109
J-19	5,461.89	<Collection: 0 items>	0	5,719.99	112
J-9	5,452.08	<Collection: 1 item>	17	5,719.88	116
J-8	5,457.91	<Collection: 1 item>	17	5,719.87	113
J-7	5,461.52	<Collection: 0 items>	0	5,719.86	112
J-5	5,453.98	<Collection: 2 items>	28	5,719.86	115
J-21	5,467.57	<Collection: 1 item>	24	5,719.90	109
J-20	5,457.66	<Collection: 1 item>	24	5,719.91	113
J-17	5,451.08	<Collection: 1 item>	24	5,719.91	116
J-1	5,446.52	<Collection: 2 items>	29	5,719.87	118
J-32	5,437.32	<Collection: 2 items>	16	5,720.00	122
J-23	5,442.87	<Collection: 1 item>	4	5,720.00	120
J-15	5,456.01	<Collection: 1 item>	15	5,719.90	114
J-22	5,462.94	<Collection: 1 item>	15	5,719.90	111
J-4	5,445.33	<Collection: 1 item>	11	5,719.86	119
J-13	5,455.47	<Collection: 1 item>	15	5,719.86	114
J-14	5,459.83	<Collection: 1 item>	15	5,719.87	113
J-11	5,460.00	<Collection: 0 items>	0	5,719.99	112
J-18	5,458.80	<Collection: 0 items>	0	5,719.99	113
J-31	5,464.96	<Collection: 1 item>	19	5,719.99	110
J-20.1	5,461.46	<Collection: 0 items>	0	5,719.92	112
J-17.1	5,448.26	<Collection: 0 items>	0	5,719.90	118
J-35	5,453.31	<Collection: 2 items>	22	5,719.96	115
J-36	5,461.70	<Collection: 1 item>	7	5,719.96	112
J-37	5,453.87	<Collection: 0 items>	0	5,719.94	115
J-38	5,451.88	<Collection: 0 items>	0	5,719.91	116

**Average Daily  
Pipe Table - Time: 0.00 hours**

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-5	247	J-25	J-24	12.0	PVC	150.0	-71	0.20	0.000
P-3(2)	534	J-28	J-27	12.0	PVC	150.0	-52	0.15	0.000
P-25	405	J-6	J-3	8.0	PVC	150.0	9	0.05	0.000
P-4(1)	101	J-27	J-26	12.0	PVC	150.0	-52	0.15	0.000
P-4(2)	154	J-26	J-25	12.0	PVC	150.0	-71	0.20	0.000
P-29	235	J-3	J-2	8.0	PVC	150.0	-11	0.07	0.000
P-21(2)	598	J-33	J-34	8.0	PVC	150.0	26	0.16	0.000
P-3(1)(2)	372	J-29	J-28	12.0	PVC	150.0	-19	0.06	0.000
P-3(1)(1)(2)	553	J-30	J-29	12.0	PVC	150.0	74	0.21	0.000
P-24(2)(1)	473	J-10	J-9	8.0	PVC	150.0	88	0.56	0.000
P-24(2)(2)	611	J-9	J-6	8.0	PVC	150.0	37	0.24	0.000
P-31	597	J-9	J-8	8.0	PVC	150.0	35	0.22	0.000
P-32	290	J-8	J-7	8.0	PVC	150.0	17	0.11	0.000
P-33	313	J-7	J-5	8.0	PVC	150.0	17	0.11	0.000
P-34	554	J-5	J-6	8.0	PVC	150.0	-12	0.08	0.000
P-22(2)	669	J-21	J-16	8.0	PVC	150.0	10	0.07	0.000
P-23(1)	760	J-16	J-17	8.0	PVC	150.0	-26	0.17	0.000
P-36	665	J-20	J-17	8.0	PVC	150.0	11	0.07	0.000
P-27(2)	399	J-1	J-2	8.0	PVC	150.0	26	0.16	0.000
P-37	199	R-3	J-32	24.0	Steel	140.0	209	0.15	0.000
P-38	1,032	J-32	J-23	24.0	Steel	140.0	147	0.10	0.000
P-39	262	J-23	J-24	12.0	PVC	150.0	143	0.41	0.000
P-40	595	J-32	J-33	8.0	PVC	150.0	46	0.29	0.000
P-42	379	J-16	J-15	8.0	PVC	150.0	12	0.08	0.000
P-43	658	J-15	J-22	8.0	PVC	150.0	-3	0.02	0.000
P-44	373	J-22	J-21	8.0	PVC	150.0	-19	0.12	0.000
P-45	393	J-5	J-4	8.0	PVC	150.0	2	0.01	0.000
P-46	547	J-4	J-3	8.0	PVC	150.0	-9	0.06	0.000
P-47	499	J-3	J-13	8.0	PVC	150.0	-1	0.01	0.000
P-28(2)	504	J-14	J-6	8.0	PVC	150.0	12	0.07	0.000
P-48	395	J-13	J-14	8.0	PVC	150.0	-16	0.10	0.000
P-49	205	J-10	J-11	8.0	PVC	150.0	-88	0.56	0.000
P-50	324	J-11	J-12	16.0	PVC	150.0	50	0.08	0.000
P-51	842	R-1	J-11	16.0	PVC	150.0	138	0.22	0.000
P-52	456	J-12	J-18	16.0	PVC	150.0	50	0.08	0.000
P-53	531	J-18	J-19	16.0	PVC	150.0	-33	0.05	0.000
P-54	561	J-17	J-18	8.0	PVC	150.0	-83	0.53	0.000
P-55	462	J-19	J-31	16.0	PVC	150.0	-33	0.05	0.000
P-57	378	J-30	J-31	12.0	PVC	150.0	-92	0.26	0.000
P-58	203	R-2	J-31	12.0	PVC	150.0	144	0.41	0.000
P-35(1)	374	J-21	J- 20.1	8.0	PVC	150.0	-53	0.34	0.000
P-35(2)	379	J-20.1	J-20	8.0	PVC	150.0	35	0.22	0.000
P-59	318	J-29	J- 20.1	8.0	PVC	150.0	88	0.56	0.000
P-60	284	J-17	J- 17.1	8.0	PVC	150.0	43	0.28	0.000

**Average Daily  
Pipe Table - Time: 0.00 hours**

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-61	743	J-17.1	J-14	8.0	PVC	150.0	43	0.28	0.000
P-8(1)	202	J-34	J-35	8.0	PVC	150.0	6	0.04	0.000
P-8(2)(1)	384	J-35	J-36	8.0	PVC	150.0	-17	0.11	0.000
P-8(2)(2)	561	J-36	J-28	8.0	PVC	150.0	-24	0.15	0.000
P-41(1)	602	J-24	J-37	8.0	PVC	150.0	54	0.35	0.000
P-41(2)(1)	569	J-37	J-38	8.0	PVC	150.0	54	0.35	0.000
P-41(2)(2)	593	J-38	J-1	8.0	PVC	150.0	54	0.35	0.000

**Max Daily  
Junction Table - Time: 0.00 hours**

Label	Elevation (ft)	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-27	5,451.53	<Collection: 0 items>	0	5,719.84	116
J-25	5,448.23	<Collection: 0 items>	0	5,719.86	118
J-24	5,446.24	<Collection: 2 items>	51	5,719.89	118
J-34	5,450.49	<Collection: 2 items>	56	5,719.74	116
J-28	5,459.37	<Collection: 2 items>	26	5,719.81	113
J-16	5,460.94	<Collection: 1 item>	68	5,719.31	112
J-6	5,460.06	<Collection: 2 items>	78	5,719.09	112
J-3	5,450.53	<Collection: 1 item>	31	5,719.08	116
J-26	5,450.58	<Collection: 2 items>	51	5,719.85	116
J-2	5,449.35	<Collection: 1 item>	41	5,719.09	117
J-10	5,457.17	<Collection: 0 items>	0	5,719.71	114
J-33	5,443.60	<Collection: 3 items>	58	5,719.81	120
J-12	5,457.77	<Collection: 0 items>	0	5,719.93	113
J-29	5,464.77	<Collection: 1 item>	14	5,719.81	110
J-30	5,467.49	<Collection: 1 item>	52	5,719.87	109
J-19	5,461.89	<Collection: 0 items>	0	5,719.92	112
J-9	5,452.08	<Collection: 1 item>	48	5,719.21	116
J-8	5,457.91	<Collection: 1 item>	48	5,719.10	113
J-7	5,461.52	<Collection: 0 items>	0	5,719.09	111
J-5	5,453.98	<Collection: 2 items>	78	5,719.07	115
J-21	5,467.57	<Collection: 1 item>	68	5,719.32	109
J-20	5,457.66	<Collection: 1 item>	68	5,719.40	113
J-17	5,451.08	<Collection: 1 item>	68	5,719.39	116
J-1	5,446.52	<Collection: 2 items>	80	5,719.13	118
J-32	5,437.32	<Collection: 2 items>	46	5,719.99	122
J-23	5,442.87	<Collection: 1 item>	11	5,719.98	120
J-15	5,456.01	<Collection: 1 item>	43	5,719.30	114
J-22	5,462.94	<Collection: 1 item>	43	5,719.30	111
J-4	5,445.33	<Collection: 1 item>	31	5,719.07	118
J-13	5,455.47	<Collection: 1 item>	43	5,719.08	114
J-14	5,459.83	<Collection: 1 item>	43	5,719.10	112
J-11	5,460.00	<Collection: 0 items>	0	5,719.93	112
J-18	5,458.80	<Collection: 0 items>	0	5,719.92	113
J-31	5,464.96	<Collection: 1 item>	52	5,719.93	110
J-20.1	5,461.46	<Collection: 0 items>	0	5,719.47	112
J-17.1	5,448.26	<Collection: 0 items>	0	5,719.31	117
J-35	5,453.31	<Collection: 2 items>	63	5,719.74	115
J-36	5,461.70	<Collection: 1 item>	19	5,719.76	112
J-37	5,453.87	<Collection: 0 items>	0	5,719.63	115
J-38	5,451.88	<Collection: 0 items>	0	5,719.38	116

**Max Daily**  
**Pipe Table - Time: 0.00 hours**

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-5	247	J-25	J-24	12.0	PVC	150.0	-197	0.56	0.000
P-3(2)	534	J-28	J-27	12.0	PVC	150.0	-146	0.42	0.000
P-25	405	J-6	J-3	8.0	PVC	150.0	24	0.15	0.000
P-4(1)	101	J-27	J-26	12.0	PVC	150.0	-146	0.42	0.000
P-4(2)	154	J-26	J-25	12.0	PVC	150.0	-197	0.56	0.000
P-29	235	J-3	J-2	8.0	PVC	150.0	-31	0.20	0.000
P-21(2)	598	J-33	J-34	8.0	PVC	150.0	71	0.46	0.000
P-3(1)(2)	372	J-29	J-28	12.0	PVC	150.0	-54	0.15	0.000
P-3(1)(1)(2)	553	J-30	J-29	12.0	PVC	150.0	206	0.59	0.000
P-24(2)(1)	473	J-10	J-9	8.0	PVC	150.0	248	1.58	0.001
P-24(2)(2)	611	J-9	J-6	8.0	PVC	150.0	103	0.66	0.000
P-31	597	J-9	J-8	8.0	PVC	150.0	97	0.62	0.000
P-32	290	J-8	J-7	8.0	PVC	150.0	49	0.31	0.000
P-33	313	J-7	J-5	8.0	PVC	150.0	49	0.31	0.000
P-34	554	J-5	J-6	8.0	PVC	150.0	-34	0.21	0.000
P-22(2)	669	J-21	J-16	8.0	PVC	150.0	29	0.19	0.000
P-23(1)	760	J-16	J-17	8.0	PVC	150.0	-73	0.47	0.000
P-36	665	J-20	J-17	8.0	PVC	150.0	29	0.19	0.000
P-27(2)	399	J-1	J-2	8.0	PVC	150.0	72	0.46	0.000
P-37	199	R-3	J-32	24.0	Steel	140.0	587	0.42	0.000
P-38	1,032	J-32	J-23	24.0	Steel	140.0	412	0.29	0.000
P-39	262	J-23	J-24	12.0	PVC	150.0	401	1.14	0.000
P-40	595	J-32	J-33	8.0	PVC	150.0	129	0.82	0.000
P-42	379	J-16	J-15	8.0	PVC	150.0	34	0.22	0.000
P-43	658	J-15	J-22	8.0	PVC	150.0	-9	0.06	0.000
P-44	373	J-22	J-21	8.0	PVC	150.0	-52	0.33	0.000
P-45	393	J-5	J-4	8.0	PVC	150.0	4	0.03	0.000
P-46	547	J-4	J-3	8.0	PVC	150.0	-26	0.17	0.000
P-47	499	J-3	J-13	8.0	PVC	150.0	-2	0.01	0.000
P-28(2)	504	J-14	J-6	8.0	PVC	150.0	33	0.21	0.000
P-48	395	J-13	J-14	8.0	PVC	150.0	-46	0.29	0.000
P-49	205	J-10	J-11	8.0	PVC	150.0	-248	1.58	0.001
P-50	324	J-11	J-12	16.0	PVC	150.0	140	0.22	0.000
P-51	842	R-1	J-11	16.0	PVC	150.0	388	0.62	0.000
P-52	456	J-12	J-18	16.0	PVC	150.0	140	0.22	0.000
P-53	531	J-18	J-19	16.0	PVC	150.0	-93	0.15	0.000
P-54	561	J-17	J-18	8.0	PVC	150.0	-233	1.49	0.001
P-55	462	J-19	J-31	16.0	PVC	150.0	-93	0.15	0.000
P-57	378	J-30	J-31	12.0	PVC	150.0	-259	0.73	0.000
P-58	203	R-2	J-31	12.0	PVC	150.0	404	1.15	0.000
P-35(1)	374	J-21	J-20.1	8.0	PVC	150.0	-149	0.95	0.000
P-35(2)	379	J-20.1	J-20	8.0	PVC	150.0	97	0.62	0.000
P-59	318	J-29	J-20.1	8.0	PVC	150.0	247	1.57	0.001
P-60	284	J-17	J-17.1	8.0	PVC	150.0	122	0.78	0.000

**Max Daily**  
**Pipe Table - Time: 0.00 hours**

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-61	743	J-17.1	J-14	8.0	PVC	150.0	122	0.78	0.000
P-8(1)	202	J-34	J-35	8.0	PVC	150.0	16	0.10	0.000
P-8(2)(1)	384	J-35	J-36	8.0	PVC	150.0	-47	0.30	0.000
P-8(2)(2)	561	J-36	J-28	8.0	PVC	150.0	-66	0.42	0.000
P-41(1)	602	J-24	J-37	8.0	PVC	150.0	152	0.97	0.000
P-41(2)(1)	569	J-37	J-38	8.0	PVC	150.0	152	0.97	0.000
P-41(2)(2)	593	J-38	J-1	8.0	PVC	150.0	152	0.97	0.000

**Max Hour  
Junction Table - Time: 0.00 hours**

Label	Elevation (ft)	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-27	5,451.53	<Collection: 0 items>	0	5,719.64	116
J-25	5,448.23	<Collection: 0 items>	0	5,719.69	117
J-24	5,446.24	<Collection: 2 items>	80	5,719.74	118
J-34	5,450.49	<Collection: 2 items>	89	5,719.40	116
J-28	5,459.37	<Collection: 2 items>	42	5,719.58	113
J-16	5,460.94	<Collection: 1 item>	99	5,718.50	111
J-6	5,460.06	<Collection: 2 items>	116	5,718.02	112
J-3	5,450.53	<Collection: 1 item>	48	5,718.01	116
J-26	5,450.58	<Collection: 2 items>	81	5,719.66	116
J-2	5,449.35	<Collection: 1 item>	65	5,718.01	116
J-10	5,457.17	<Collection: 0 items>	0	5,719.38	113
J-33	5,443.60	<Collection: 3 items>	93	5,719.55	119
J-12	5,457.77	<Collection: 0 items>	0	5,719.84	113
J-29	5,464.77	<Collection: 1 item>	23	5,719.57	110
J-30	5,467.49	<Collection: 1 item>	84	5,719.70	109
J-19	5,461.89	<Collection: 0 items>	0	5,719.83	112
J-9	5,452.08	<Collection: 1 item>	67	5,718.31	115
J-8	5,457.91	<Collection: 1 item>	67	5,718.07	113
J-7	5,461.52	<Collection: 0 items>	0	5,718.03	111
J-5	5,453.98	<Collection: 2 items>	116	5,717.99	114
J-21	5,467.57	<Collection: 1 item>	99	5,718.53	109
J-20	5,457.66	<Collection: 1 item>	99	5,718.72	113
J-17	5,451.08	<Collection: 1 item>	99	5,718.69	116
J-1	5,446.52	<Collection: 2 items>	127	5,718.10	118
J-32	5,437.32	<Collection: 2 items>	73	5,719.99	122
J-23	5,442.87	<Collection: 1 item>	18	5,719.95	120
J-15	5,456.01	<Collection: 1 item>	69	5,718.48	114
J-22	5,462.94	<Collection: 1 item>	69	5,718.48	111
J-4	5,445.33	<Collection: 1 item>	48	5,717.99	118
J-13	5,455.47	<Collection: 1 item>	69	5,718.01	114
J-14	5,459.83	<Collection: 1 item>	69	5,718.05	112
J-11	5,460.00	<Collection: 0 items>	0	5,719.85	112
J-18	5,458.80	<Collection: 0 items>	0	5,719.83	113
J-31	5,464.96	<Collection: 1 item>	84	5,719.84	110
J-20.1	5,461.46	<Collection: 0 items>	0	5,718.87	111
J-17.1	5,448.26	<Collection: 0 items>	0	5,718.51	117
J-35	5,453.31	<Collection: 2 items>	101	5,719.40	115
J-36	5,461.70	<Collection: 1 item>	31	5,719.45	112
J-37	5,453.87	<Collection: 0 items>	0	5,719.18	115
J-38	5,451.88	<Collection: 0 items>	0	5,718.65	115

**Max Hour**  
**Pipe Table - Time: 0.00 hours**

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-5	247	J-25	J-24	12.0	PVC	150.0	-307	0.87	0.000
P-3(2)	534	J-28	J-27	12.0	PVC	150.0	-226	0.64	0.000
P-25	405	J-6	J-3	8.0	PVC	150.0	42	0.27	0.000
P-4(1)	101	J-27	J-26	12.0	PVC	150.0	-226	0.64	0.000
P-4(2)	154	J-26	J-25	12.0	PVC	150.0	-307	0.87	0.000
P-29	235	J-3	J-2	8.0	PVC	150.0	-40	0.26	0.000
P-21(2)	598	J-33	J-34	8.0	PVC	150.0	112	0.71	0.000
P-3(1)(2)	372	J-29	J-28	12.0	PVC	150.0	-75	0.21	0.000
P-3(1)(1)(2)	553	J-30	J-29	12.0	PVC	150.0	318	0.90	0.000
P-24(2)(1)	473	J-10	J-9	8.0	PVC	150.0	374	2.39	0.002
P-24(2)(2)	611	J-9	J-6	8.0	PVC	150.0	160	1.02	0.000
P-31	597	J-9	J-8	8.0	PVC	150.0	147	0.94	0.000
P-32	290	J-8	J-7	8.0	PVC	150.0	80	0.51	0.000
P-33	313	J-7	J-5	8.0	PVC	150.0	80	0.51	0.000
P-34	554	J-5	J-6	8.0	PVC	150.0	-49	0.32	0.000
P-22(2)	669	J-21	J-16	8.0	PVC	150.0	44	0.28	0.000
P-23(1)	760	J-16	J-17	8.0	PVC	150.0	-111	0.71	0.000
P-36	665	J-20	J-17	8.0	PVC	150.0	45	0.29	0.000
P-27(2)	399	J-1	J-2	8.0	PVC	150.0	105	0.67	0.000
P-37	199	R-3	J-32	24.0	Steel	140.0	914	0.65	0.000
P-38	1,032	J-32	J-23	24.0	Steel	140.0	636	0.45	0.000
P-39	262	J-23	J-24	12.0	PVC	150.0	618	1.75	0.001
P-40	595	J-32	J-33	8.0	PVC	150.0	204	1.31	0.001
P-42	379	J-16	J-15	8.0	PVC	150.0	56	0.36	0.000
P-43	658	J-15	J-22	8.0	PVC	150.0	-13	0.08	0.000
P-44	373	J-22	J-21	8.0	PVC	150.0	-82	0.52	0.000
P-45	393	J-5	J-4	8.0	PVC	150.0	13	0.09	0.000
P-46	547	J-4	J-3	8.0	PVC	150.0	-35	0.22	0.000
P-47	499	J-3	J-13	8.0	PVC	150.0	-1	0.01	0.000
P-28(2)	504	J-14	J-6	8.0	PVC	150.0	47	0.30	0.000
P-48	395	J-13	J-14	8.0	PVC	150.0	-70	0.45	0.000
P-49	205	J-10	J-11	8.0	PVC	150.0	-374	2.39	0.002
P-50	324	J-11	J-12	16.0	PVC	150.0	218	0.35	0.000
P-51	842	R-1	J-11	16.0	PVC	150.0	592	0.94	0.000
P-52	456	J-12	J-18	16.0	PVC	150.0	218	0.35	0.000
P-53	531	J-18	J-19	16.0	PVC	150.0	-135	0.21	0.000
P-54	561	J-17	J-18	8.0	PVC	150.0	-352	2.25	0.002
P-55	462	J-19	J-31	16.0	PVC	150.0	-135	0.21	0.000
P-57	378	J-30	J-31	12.0	PVC	150.0	-402	1.14	0.000
P-58	203	R-2	J-31	12.0	PVC	150.0	620	1.76	0.001
P-35(1)	374	J-21	J-20.1	8.0	PVC	150.0	-225	1.44	0.001
P-35(2)	379	J-20.1	J-20	8.0	PVC	150.0	145	0.92	0.000
P-59	318	J-29	J-20.1	8.0	PVC	150.0	370	2.36	0.002
P-60	284	J-17	J-17.1	8.0	PVC	150.0	186	1.19	0.001

**Max Hour**  
**Pipe Table - Time: 0.00 hours**

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-61	743	J-17.1	J-14	8.0	PVC	150.0	186	1.19	0.001
P-8(1)	202	J-34	J-35	8.0	PVC	150.0	22	0.14	0.000
P-8(2)(1)	384	J-35	J-36	8.0	PVC	150.0	-79	0.50	0.000
P-8(2)(2)	561	J-36	J-28	8.0	PVC	150.0	-109	0.70	0.000
P-41(1)	602	J-24	J-37	8.0	PVC	150.0	231	1.48	0.001
P-41(2)(1)	569	J-37	J-38	8.0	PVC	150.0	231	1.48	0.001
P-41(2)(2)	593	J-38	J-1	8.0	PVC	150.0	231	1.48	0.001

**Fire Flow**  
**Junction Table - Time: 0.00 hours**

Label	Elevation (ft)	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-27	5,451.53	<Collection: 0 items>	0	5,719.84	116
J-25	5,448.23	<Collection: 0 items>	0	5,719.86	118
J-24	5,446.24	<Collection: 2 items>	51	5,719.89	118
J-34	5,450.49	<Collection: 2 items>	56	5,719.74	116
J-28	5,459.37	<Collection: 2 items>	26	5,719.81	113
J-16	5,460.94	<Collection: 1 item>	68	5,719.31	112
J-6	5,460.06	<Collection: 2 items>	78	5,719.09	112
J-3	5,450.53	<Collection: 1 item>	31	5,719.08	116
J-26	5,450.58	<Collection: 2 items>	51	5,719.85	116
J-2	5,449.35	<Collection: 1 item>	41	5,719.09	117
J-10	5,457.17	<Collection: 0 items>	0	5,719.71	114
J-33	5,443.60	<Collection: 3 items>	58	5,719.81	120
J-12	5,457.77	<Collection: 0 items>	0	5,719.93	113
J-29	5,464.77	<Collection: 1 item>	14	5,719.81	110
J-30	5,467.49	<Collection: 1 item>	52	5,719.87	109
J-19	5,461.89	<Collection: 0 items>	0	5,719.92	112
J-9	5,452.08	<Collection: 1 item>	48	5,719.21	116
J-8	5,457.91	<Collection: 1 item>	48	5,719.10	113
J-7	5,461.52	<Collection: 0 items>	0	5,719.09	111
J-5	5,453.98	<Collection: 2 items>	78	5,719.07	115
J-21	5,467.57	<Collection: 1 item>	68	5,719.32	109
J-20	5,457.66	<Collection: 1 item>	68	5,719.40	113
J-17	5,451.08	<Collection: 1 item>	68	5,719.39	116
J-1	5,446.52	<Collection: 2 items>	80	5,719.13	118
J-32	5,437.32	<Collection: 2 items>	46	5,719.99	122
J-23	5,442.87	<Collection: 1 item>	11	5,719.98	120
J-15	5,456.01	<Collection: 1 item>	43	5,719.30	114
J-22	5,462.94	<Collection: 1 item>	43	5,719.30	111
J-4	5,445.33	<Collection: 1 item>	31	5,719.07	118
J-13	5,455.47	<Collection: 1 item>	43	5,719.08	114
J-14	5,459.83	<Collection: 1 item>	43	5,719.10	112
J-11	5,460.00	<Collection: 0 items>	0	5,719.93	112
J-18	5,458.80	<Collection: 0 items>	0	5,719.92	113
J-31	5,464.96	<Collection: 1 item>	52	5,719.93	110
J-20.1	5,461.46	<Collection: 0 items>	0	5,719.47	112
J-17.1	5,448.26	<Collection: 0 items>	0	5,719.31	117
J-35	5,453.31	<Collection: 2 items>	63	5,719.74	115
J-36	5,461.70	<Collection: 1 item>	19	5,719.76	112
J-37	5,453.87	<Collection: 0 items>	0	5,719.63	115
J-38	5,451.88	<Collection: 0 items>	0	5,719.38	116

**Fire Flow**  
**Pipe Table - Time: 0.00 hours**

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-5	247	J-25	J-24	12.0	PVC	150.0	-197	0.56	0.000
P-3(2)	534	J-28	J-27	12.0	PVC	150.0	-146	0.42	0.000
P-25	405	J-6	J-3	8.0	PVC	150.0	24	0.15	0.000
P-4(1)	101	J-27	J-26	12.0	PVC	150.0	-146	0.42	0.000
P-4(2)	154	J-26	J-25	12.0	PVC	150.0	-197	0.56	0.000
P-29	235	J-3	J-2	8.0	PVC	150.0	-31	0.20	0.000
P-21(2)	598	J-33	J-34	8.0	PVC	150.0	71	0.46	0.000
P-3(1)(2)	372	J-29	J-28	12.0	PVC	150.0	-54	0.15	0.000
P-3(1)(1)(2)	553	J-30	J-29	12.0	PVC	150.0	206	0.59	0.000
P-24(2)(1)	473	J-10	J-9	8.0	PVC	150.0	248	1.58	0.001
P-24(2)(2)	611	J-9	J-6	8.0	PVC	150.0	103	0.66	0.000
P-31	597	J-9	J-8	8.0	PVC	150.0	97	0.62	0.000
P-32	290	J-8	J-7	8.0	PVC	150.0	49	0.31	0.000
P-33	313	J-7	J-5	8.0	PVC	150.0	49	0.31	0.000
P-34	554	J-5	J-6	8.0	PVC	150.0	-34	0.21	0.000
P-22(2)	669	J-21	J-16	8.0	PVC	150.0	29	0.19	0.000
P-23(1)	760	J-16	J-17	8.0	PVC	150.0	-73	0.47	0.000
P-36	665	J-20	J-17	8.0	PVC	150.0	29	0.19	0.000
P-27(2)	399	J-1	J-2	8.0	PVC	150.0	72	0.46	0.000
P-37	199	R-3	J-32	24.0	Steel	140.0	587	0.42	0.000
P-38	1,032	J-32	J-23	24.0	Steel	140.0	412	0.29	0.000
P-39	262	J-23	J-24	12.0	PVC	150.0	401	1.14	0.000
P-40	595	J-32	J-33	8.0	PVC	150.0	129	0.82	0.000
P-42	379	J-16	J-15	8.0	PVC	150.0	34	0.22	0.000
P-43	658	J-15	J-22	8.0	PVC	150.0	-9	0.06	0.000
P-44	373	J-22	J-21	8.0	PVC	150.0	-52	0.33	0.000
P-45	393	J-5	J-4	8.0	PVC	150.0	4	0.03	0.000
P-46	547	J-4	J-3	8.0	PVC	150.0	-26	0.17	0.000
P-47	499	J-3	J-13	8.0	PVC	150.0	-2	0.01	0.000
P-28(2)	504	J-14	J-6	8.0	PVC	150.0	33	0.21	0.000
P-48	395	J-13	J-14	8.0	PVC	150.0	-46	0.29	0.000
P-49	205	J-10	J-11	8.0	PVC	150.0	-248	1.58	0.001
P-50	324	J-11	J-12	16.0	PVC	150.0	140	0.22	0.000
P-51	842	R-1	J-11	16.0	PVC	150.0	388	0.62	0.000
P-52	456	J-12	J-18	16.0	PVC	150.0	140	0.22	0.000
P-53	531	J-18	J-19	16.0	PVC	150.0	-93	0.15	0.000
P-54	561	J-17	J-18	8.0	PVC	150.0	-233	1.49	0.001
P-55	462	J-19	J-31	16.0	PVC	150.0	-93	0.15	0.000
P-57	378	J-30	J-31	12.0	PVC	150.0	-259	0.73	0.000
P-58	203	R-2	J-31	12.0	PVC	150.0	404	1.15	0.000
P-35(1)	374	J-21	J-20.1	8.0	PVC	150.0	-149	0.95	0.000
P-35(2)	379	J-20.1	J-20	8.0	PVC	150.0	97	0.62	0.000
P-59	318	J-29	J-20.1	8.0	PVC	150.0	247	1.57	0.001
P-60	284	J-17	J-17.1	8.0	PVC	150.0	122	0.78	0.000

**Fire Flow**  
**Pipe Table - Time: 0.00 hours**

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-61	743	J-17.1	J-14	8.0	PVC	150.0	122	0.78	0.000
P-8(1)	202	J-34	J-35	8.0	PVC	150.0	16	0.10	0.000
P-8(2)(1)	384	J-35	J-36	8.0	PVC	150.0	-47	0.30	0.000
P-8(2)(2)	561	J-36	J-28	8.0	PVC	150.0	-66	0.42	0.000
P-41(1)	602	J-24	J-37	8.0	PVC	150.0	152	0.97	0.000
P-41(2)(1)	569	J-37	J-38	8.0	PVC	150.0	152	0.97	0.000
P-41(2)(2)	593	J-38	J-1	8.0	PVC	150.0	152	0.97	0.000

### Fire Flow Node FlexTable: Fire Flow Report

Label	Fire Flow (Needed) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)
J-27	2,500	2,500	3,500	20	113	108	J-21	108	J-21
J-25	2,500	2,500	3,500	20	115	108	J-21	108	J-21
J-24	2,500	2,551	3,551	20	117	108	J-21	108	J-21
J-34	2,500	2,556	3,556	20	94	97	J-35	97	J-35
J-28	2,500	2,526	3,526	20	110	107	J-21	107	J-21
J-16	1,500	1,568	3,568	20	92	94	J-21	94	J-21
J-6	1,500	1,578	3,578	20	97	98	J-7	98	J-7
J-3	1,500	1,531	3,531	20	100	99	J-6	99	J-6
J-26	2,500	2,551	3,551	20	114	108	J-21	108	J-21
J-2	2,500	2,541	3,541	20	96	100	J-7	100	J-7
J-10	1,500	1,500	3,500	20	105	106	J-7	106	J-7
J-33	2,500	2,558	3,558	20	102	104	J-34	104	J-34
J-12	2,500	2,500	3,500	20	112	108	J-21	108	J-21
J-29	2,500	2,514	3,514	20	108	107	J-21	107	J-21
J-30	1,500	1,552	3,552	20	107	108	J-21	108	J-21
J-19	2,500	2,500	3,500	20	111	108	J-21	108	J-21
J-9	1,500	1,548	3,548	20	100	99	J-7	99	J-7
J-8	1,500	1,548	3,548	20	88	91	J-7	91	J-7
J-7	1,500	1,500	3,500	20	87	92	J-8	92	J-8
J-5	1,500	1,578	3,578	20	94	93	J-7	93	J-7
J-21	1,500	1,568	3,568	20	91	94	J-22	94	J-22
J-20	1,500	1,568	3,568	20	98	102	J-21	102	J-21
J-17	1,500	1,568	3,568	20	108	103	J-21	103	J-21
J-1	2,500	2,580	3,580	20	92	99	J-38	99	J-38
J-32	2,500	2,546	3,546	20	122	109	J-21	109	J-21
J-23	2,500	2,511	3,511	20	119	109	J-21	109	J-21
J-15	1,500	1,543	3,543	20	87	91	J-22	91	J-22
J-22	1,500	1,543	3,543	20	84	92	J-21	92	J-21
J-4	1,500	1,531	3,531	20	95	96	J-7	96	J-7
J-13	1,500	1,543	3,543	20	92	98	J-14	98	J-14
J-14	1,500	1,543	3,543	20	96	99	J-13	99	J-13

### Fire Flow Node FlexTable: Fire Flow Report

Label	Fire Flow (Needed) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)
J-11	2,500	2,500	3,500	20	112	108	J-21	108	J-21
J-18	2,500	2,500	3,500	20	112	108	J-21	108	J-21
J-31	2,500	2,552	3,552	20	110	108	J-21	108	J-21
J-20.1	2,500	2,500	3,500	20	102	100	J-21	100	J-21
J-17.1	2,500	2,500	3,500	20	103	104	J-21	104	J-21
J-35	2,500	2,563	3,563	20	94	98	J-34	98	J-34
J-36	2,500	2,519	3,519	20	94	101	J-35	101	J-35
J-37	2,500	2,500	3,500	20	96	101	J-38	101	J-38
J-38	2,500	2,500	3,500	20	90	100	J-1	100	J-1

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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	26.5	154	5.8	426	188.36	28950.93				
	<b>TOTAL</b>						28950.93		0.00	28950.93	
PA-46	RESIDENTIAL	39.2	227	5.8	630	188.36	42833.06		0		
	<b>TOTAL</b>						42833.06		0.00	42833.06	
PA-47	RESIDENTIAL	15.8	111	7	307	188.36	20832.62		0		
	<b>TOTAL</b>						20832.62		0.00	20832.62	
PA-48	RESIDENTIAL	22.5	158	7	437	188.36	29666.70		0		
	<b>TOTAL</b>						29666.70		0.00	29666.70	
PA-49	RESIDENTIAL	9.6	192	20	532	188.36	36165.12		0		
	<b>TOTAL</b>						36165.12		0.00	36165.12	
PA-50	COMMERCIAL	9.6	0	0	0	0	0.00	1500	14400		
	<b>TOTAL</b>						0.00		14400.00	14400.00	
PA-51	COMMERCIAL	16.4	0	0	0	0	0.00	1500	24600		
	<b>TOTAL</b>						0.00		24600.00	24600.00	
PA-52	COMMERCIAL	15.3	0	0	0	0	0.00	1500	22950		
	<b>TOTAL</b>						0.00		22950.00	22950.00	
PA-53	COMMERCIAL	13.2	0	0	0	0	0.00	1500	19800		
	<b>TOTAL</b>						0.00		19800.00	19800.00	
PA-54	COMMERCIAL	29.9	0	0	0	0	0.00	1500	44850		
	<b>TOTAL</b>						0.00		44850.00	44850.00	
PA-55	COMMERCIAL	23.7	0	0	0	0	0.00	1500	35550		
	<b>TOTAL</b>						0.00		35550.00	35550.00	
PA-56	COMMERCIAL	19.8	0	0	0	0	0.00	1500	29700		
	<b>TOTAL</b>						0.00		29700.00	29700.00	
PA-57	COMMERCIAL	13.8	0	0	0	0	0.00	1500	20700		
	<b>TOTAL</b>						0.00		20700.00	20700.00	
Brandenburg Parel PA-58 <sup>3</sup>	COMMERCIAL	17.2	0	0	0	0	0.00	1500	25800		
	<b>TOTAL</b>						0.00		25800.00	25800.00	

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 October 2021, by Olsson

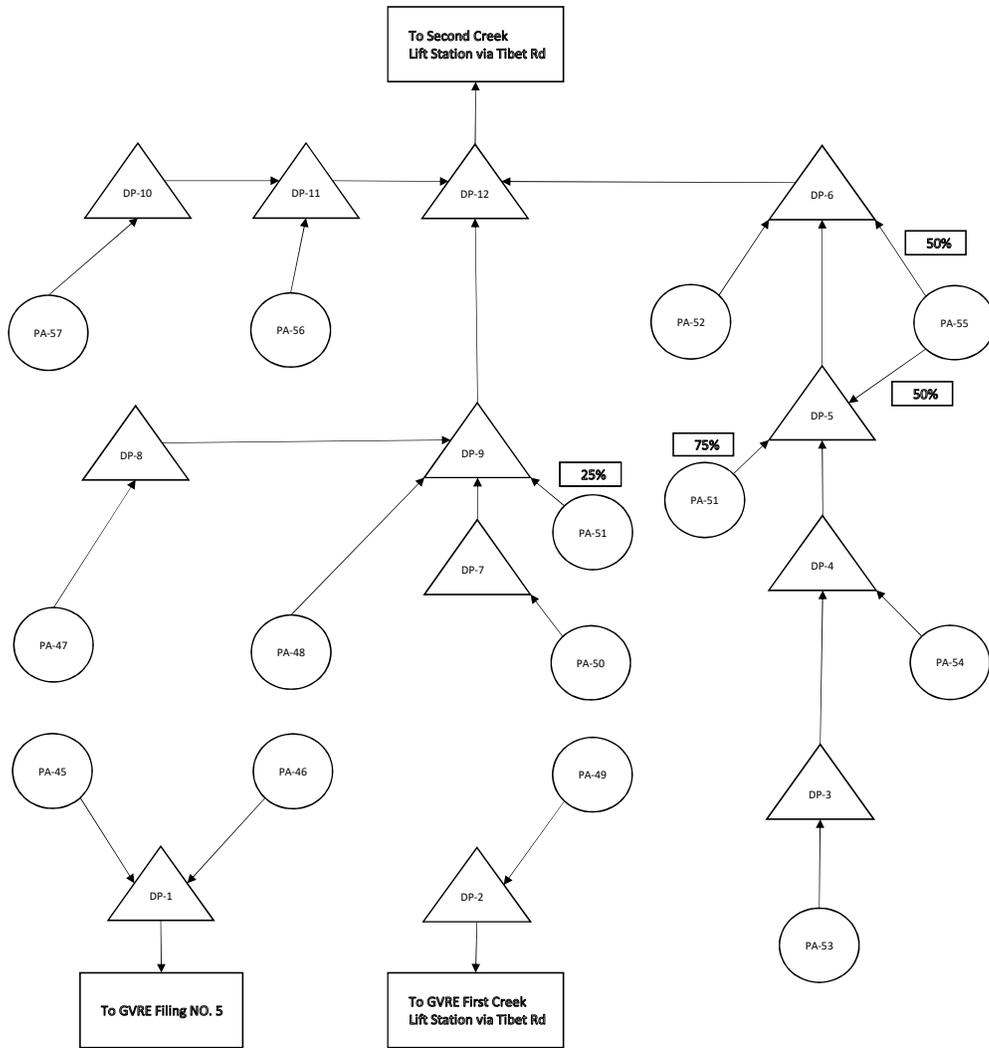
3. Basin accounted for within the Green Valley Ranch East Amendment 1 Master Utility Report as Basin 310-4. That Study estimated the gpd at 27,676

**TABLE 2: SANITARY SEWER ROUTING**

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)	Velocity (ft/s)	Depth of Flow (in)	Depth of Ratio (Percent)	
DP-1	PA-45 PA-46	28950.93 42833.06	425.75 629.90												
<b>Total</b>		<b>71784.00</b>	<b>1055.65</b>	4.95	<b>4.00</b>	<b>287135.98</b>	<b>7178.40</b>	<b>294314.38</b>	<b>0.29</b>	<b>0.46</b>	<b>8.00</b>	<b>0.4%</b>	<b>2.60</b>	<b>4.0</b>	<b>50%</b>
DP-2	PA-49	36165.12	531.84												
<b>Total</b>		<b>36165.12</b>	<b>531.84</b>	5.56	<b>4.00</b>	<b>144660.48</b>	<b>3616.51</b>	<b>148276.99</b>	<b>0.15</b>	<b>0.23</b>	<b>8.00</b>	<b>0.4%</b>	<b>2.16</b>	<b>2.8</b>	<b>35%</b>
DP-3	PA-53	19800.00	291.18												
<b>Total</b>		<b>19800.00</b>	<b>291.18</b>	6.14	<b>4.00</b>	<b>79200.00</b>	<b>1980.00</b>	<b>81180.00</b>	<b>0.08</b>	<b>0.13</b>	<b>8.00</b>	<b>0.6%</b>	<b>2.13</b>	<b>1.8</b>	<b>23%</b>
DP-4	DP-3 PA-54	19800.00 44850.00	291.18 659.56												
<b>Total</b>		<b>64650.00</b>	<b>950.74</b>	5.04	<b>4.00</b>	<b>258600.00</b>	<b>6465.00</b>	<b>265065.00</b>	<b>0.27</b>	<b>0.41</b>	<b>8.00</b>	<b>0.4%</b>	<b>2.53</b>	<b>3.8</b>	<b>48%</b>
DP-5	DP-4 75% PA-51 50% PA-55	64650.00 18450.00 17775.00	950.74 271.32 261.40												
<b>Total</b>		<b>100875.00</b>	<b>1483.46</b>	4.68	<b>4.00</b>	<b>403500.00</b>	<b>10087.50</b>	<b>413587.50</b>	<b>0.41</b>	<b>0.64</b>	<b>8.00</b>	<b>0.4%</b>	<b>2.81</b>	<b>5.0</b>	<b>63%</b>
DP-6	DP-5 PA-52 50% PA-55	100875.00 22950.00 17775.00	1483.46 337.50 261.40												
<b>Total</b>		<b>141600.00</b>	<b>2082.35</b>	4.42	<b>4.00</b>	<b>566400.00</b>	<b>14160.00</b>	<b>580560.00</b>	<b>0.58</b>	<b>0.90</b>	<b>10.00</b>	<b>0.4%</b>	<b>3.07</b>	<b>5.3</b>	<b>53%</b>
DP-7	PA-50	14400.00	211.76												
<b>Total</b>		<b>14400.00</b>	<b>211.76</b>	6.48	<b>4.00</b>	<b>57600.00</b>	<b>1440.00</b>	<b>59040.00</b>	<b>0.06</b>	<b>0.09</b>	<b>8.00</b>	<b>0.7%</b>	<b>2.02</b>	<b>1.5</b>	<b>19%</b>
DP-8	PA-47	20832.62	306.36												
<b>Total</b>		<b>20832.62</b>	<b>306.36</b>	6.09	<b>4.00</b>	<b>83330.46</b>	<b>2083.26</b>	<b>85413.73</b>	<b>0.09</b>	<b>0.13</b>	<b>8.00</b>	<b>0.6%</b>	<b>2.13</b>	<b>1.8</b>	<b>23%</b>
DP-9	DP-7 DP-8 PA-48 25% PA-51	14400.00 20832.62 29666.70 6150.00	211.76 306.36 436.28 90.44												
<b>Total</b>		<b>71049.32</b>	<b>1044.84</b>	4.96	<b>4.00</b>	<b>284197.26</b>	<b>7104.93</b>	<b>291302.20</b>	<b>0.29</b>	<b>0.45</b>	<b>8.00</b>	<b>0.4%</b>	<b>2.59</b>	<b>4.0</b>	<b>50%</b>
DP-10	PA-57	20700.00	304.41												
<b>Total</b>		<b>20700.00</b>	<b>304.41</b>	6.10	<b>4.00</b>	<b>82800.00</b>	<b>2070.00</b>	<b>84870.00</b>	<b>0.08</b>	<b>0.13</b>	<b>8.00</b>	<b>0.6%</b>	<b>2.13</b>	<b>1.8</b>	<b>23%</b>
DP-11	DP-10 PA-56	20700.00 29700.00	304.41 436.76												
<b>Total</b>		<b>50400.00</b>	<b>741.18</b>	5.26	<b>4.00</b>	<b>201600.00</b>	<b>5040.00</b>	<b>206640.00</b>	<b>0.21</b>	<b>0.32</b>	<b>8.00</b>	<b>0.4%</b>	<b>2.37</b>	<b>3.3</b>	<b>41%</b>
DP-12	DP-6 DP-9 DP-11	141600.00 71049.32 50400.00	2082.35 1044.84 741.18												
<b>Total</b>		<b>263049.32</b>	<b>3868.37</b>	3.99	<b>3.99</b>	<b>1049276.54</b>	<b>26304.93</b>	<b>1075581.47</b>	<b>1.08</b>	<b>1.66</b>	<b>10.00</b>	<b>0.5%</b>	<b>3.80</b>	<b>7.5</b>	<b>75%</b>
<b>PA-47, PA-48 Servicing Alternative (Through Commercial PA 56 AND PA 57)</b>															
DP-11	PA-47 PA-48 PA-57 PA-56	20832.62 29666.70 20700.00 29700.00	306.36 436.28 304.41 436.76												
<b>Total</b>		<b>100899.32</b>	<b>1483.81</b>	4.68	<b>4.00</b>	<b>403597.26</b>	<b>10089.93</b>	<b>413687.20</b>	<b>0.41</b>	<b>0.64</b>	<b>8.00</b>	<b>0.4%</b>	<b>2.81</b>	<b>5.0</b>	<b>63%</b>
<b>Option #2 (Lift to GVRE First Creek Lift Station)</b>															
DP-2	DP-12 PA-49	263049.32 36165.12	3868.37 531.84												
<b>Total</b>		<b>299214.44</b>	<b>4400.21</b>	3.90	<b>3.90</b>	<b>1168133.42</b>	<b>29921.44</b>	<b>1198054.87</b>	<b>1.20</b>	<b>1.85</b>	<b>10.00</b>	<b>0.4%</b>	<b>3.34</b>	<b>9.3</b>	<b>93%</b>

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



## A310 DP1

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	0.46 cfs

---

Results	
Normal Depth	4.0 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	50.5 %
Critical Slope	0.005 ft/ft
Velocity	2.60 ft/s
Velocity Head	0.11 ft
Specific Energy	0.44 ft
Froude Number	0.890
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	52.7 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.0 in
Critical Depth	3.8 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

# A310 DP1

Notes:

PA-45 & PA-46

## 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	0.23 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	32.4 %
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

## **A310 DP2**

Notes:

PA-49

## A310 DP3

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.006 ft/ft
Diameter	8.0 in
Discharge	0.13 cfs
Results	
Normal Depth	1.8 in
Flow Area	0.1 ft <sup>2</sup>
Wetted Perimeter	0.7 ft
Hydraulic Radius	1.1 in
Top Width	0.56 ft
Critical Depth	2.0 in
Percent Full	23.1 %
Critical Slope	0.005 ft/ft
Velocity	2.13 ft/s
Velocity Head	0.07 ft
Specific Energy	0.22 ft
Froude Number	1.138
Maximum Discharge	1.19 cfs
Discharge Full	1.11 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	23.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.8 in
Critical Depth	2.0 in
Channel Slope	0.006 ft/ft
Critical Slope	0.005 ft/ft

## **A310 DP3**

Notes:

PA-53

## A310 DP4

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	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	3.8 in
Critical Depth	3.6 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

## **A310 DP4**

Notes:

PA-53 & PA-54

## 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	8.0 in
Discharge	0.64 cfs

---

Results	
Normal Depth	5.0 in
Flow Area	0.2 ft <sup>2</sup>
Wetted Perimeter	1.2 ft
Hydraulic Radius	2.3 in
Top Width	0.65 ft
Critical Depth	4.5 in
Percent Full	62.2 %
Critical Slope	0.005 ft/ft
Velocity	2.81 ft/s
Velocity Head	0.12 ft
Specific Energy	0.54 ft
Froude Number	0.833
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	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	5.0 in
Critical Depth	4.5 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

## **A310 DP5**

Notes:

PA-53, PA-54, 50% of PA-52 and 50% of PA-55

## A310 DP6

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	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	5.3 in
Critical Depth	5.0 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

## **A310 DP6**

Notes:

PA-53, PA-54, 75% PA-51, PA-52, & PA-55

## A310 DP7

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

---

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.007 ft/ft
Diameter	8.0 in
Discharge	0.09 cfs

---

Results	
Normal Depth	1.5 in
Flow Area	0.0 ft <sup>2</sup>
Wetted Perimeter	0.6 ft
Hydraulic Radius	0.9 in
Top Width	0.52 ft
Critical Depth	1.6 in
Percent Full	18.5 %
Critical Slope	0.005 ft/ft
Velocity	2.02 ft/s
Velocity Head	0.06 ft
Specific Energy	0.19 ft
Froude Number	1.213
Maximum Discharge	1.29 cfs
Discharge Full	1.19 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	18.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.5 in
Critical Depth	1.6 in
Channel Slope	0.007 ft/ft
Critical Slope	0.005 ft/ft

## **A310 DP7**

Notes:

PA-50

## A310 DP8

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

---

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.006 ft/ft
Diameter	8.0 in
Discharge	0.13 cfs

---

Results	
Normal Depth	1.8 in
Flow Area	0.1 ft <sup>2</sup>
Wetted Perimeter	0.7 ft
Hydraulic Radius	1.1 in
Top Width	0.56 ft
Critical Depth	2.0 in
Percent Full	23.1 %
Critical Slope	0.005 ft/ft
Velocity	2.13 ft/s
Velocity Head	0.07 ft
Specific Energy	0.22 ft
Froude Number	1.138
Maximum Discharge	1.19 cfs
Discharge Full	1.11 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	23.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.8 in
Critical Depth	2.0 in
Channel Slope	0.006 ft/ft
Critical Slope	0.005 ft/ft

## **A310 DP8**

Notes:

PA-47

## 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	8.0 in
Discharge	0.45 cfs
Results	
Normal Depth	4.0 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	3.8 in
Percent Full	49.9 %
Critical Slope	0.005 ft/ft
Velocity	2.59 ft/s
Velocity Head	0.10 ft
Specific Energy	0.44 ft
Froude Number	0.892
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	42.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.0 in
Critical Depth	3.8 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

## **A310 DP9**

Notes:

PA-47, PA-48, PA-50, & 25% PA-51

## A310 DP10

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

---

Input Data	
Roughness Coefficient	0.011
Channel Slope	0.006 ft/ft
Diameter	8.0 in
Discharge	0.13 cfs

---

Results	
Normal Depth	1.8 in
Flow Area	0.1 ft <sup>2</sup>
Wetted Perimeter	0.7 ft
Hydraulic Radius	1.1 in
Top Width	0.56 ft
Critical Depth	2.0 in
Percent Full	23.1 %
Critical Slope	0.005 ft/ft
Velocity	2.13 ft/s
Velocity Head	0.07 ft
Specific Energy	0.22 ft
Froude Number	1.138
Maximum Discharge	1.19 cfs
Discharge Full	1.11 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	23.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.8 in
Critical Depth	2.0 in
Channel Slope	0.006 ft/ft
Critical Slope	0.005 ft/ft

## **A310 DP10**

Notes:

PA-57

## 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	0.32 cfs

---

Results	
Normal Depth	3.3 in
Flow Area	0.1 ft <sup>2</sup>
Wetted Perimeter	0.9 ft
Hydraulic Radius	1.7 in
Top Width	0.66 ft
Critical Depth	3.1 in
Percent Full	41.1 %
Critical Slope	0.005 ft/ft
Velocity	2.37 ft/s
Velocity Head	0.09 ft
Specific Energy	0.36 ft
Froude Number	0.920
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	3.3 in
Critical Depth	3.1 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

## **A310 DP11**

Notes:

PA-56 & PA-57

## A310 DP11-Alternative

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	0.64 cfs
Results	
Normal Depth	5.0 in
Flow Area	0.2 ft <sup>2</sup>
Wetted Perimeter	1.2 ft
Hydraulic Radius	2.3 in
Top Width	0.65 ft
Critical Depth	4.5 in
Percent Full	62.2 %
Critical Slope	0.005 ft/ft
Velocity	2.81 ft/s
Velocity Head	0.12 ft
Specific Energy	0.54 ft
Froude Number	0.833
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	37.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.0 in
Critical Depth	4.5 in
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

## **A310 DP11-Alternative**

Notes:

This alternative looks at routing PA-47 and PA-48 north through the commercial planning areas of PA-56 and PA-57.

## A310 DP12-MIN

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	1.66 cfs
Results	
Normal Depth	8.3 in
Flow Area	0.5 ft <sup>2</sup>
Wetted Perimeter	1.9 ft
Hydraulic Radius	3.0 in
Top Width	0.62 ft
Critical Depth	6.9 in
Percent Full	83.3 %
Critical Slope	0.006 ft/ft
Velocity	3.42 ft/s
Velocity Head	0.18 ft
Specific Energy	0.88 ft
Froude Number	0.683
Maximum Discharge	1.76 cfs
Discharge Full	1.64 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	37.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.3 in
Critical Depth	6.9 in
Channel Slope	0.004 ft/ft
Critical Slope	0.006 ft/ft

## **A310 DP12-MIN**

Notes:

PA-47, PA-48, PA-50, PA-51, PA-52, PA-53, PA-54, PA-55, PA-56, & PA-57

Evaluate a potential 10" sanitary sewer downstream constructed to a minimum slope of 0.4%.

## A310 DP12-Design

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.005 ft/ft
Diameter	10.0 in
Discharge	1.66 cfs
Results	
Normal Depth	7.5 in
Flow Area	0.4 ft <sup>2</sup>
Wetted Perimeter	1.7 ft
Hydraulic Radius	3.0 in
Top Width	0.73 ft
Critical Depth	6.9 in
Percent Full	74.7 %
Critical Slope	0.006 ft/ft
Velocity	3.80 ft/s
Velocity Head	0.22 ft
Specific Energy	0.85 ft
Froude Number	0.864
Maximum Discharge	1.97 cfs
Discharge Full	1.83 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	68.7 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.5 in
Critical Depth	6.9 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

## **A310 DP12-Design**

Notes:

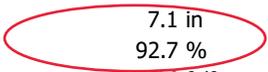
PA-47, PA-48, PA-50, PA-51, PA-52, PA-53, PA-54, PA-55, PA-56, & PA-57

Evaluate a potential 10" downstream sanitary sewer constructed to a design slope to maintain velocity and depth ratio.

## A310 DP2 First Creek LS Alt

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	1.85 cfs
Results	
Normal Depth	9.3 in
Flow Area	0.5 ft <sup>2</sup>
Wetted Perimeter	2.2 ft
Hydraulic Radius	2.9 in
Top Width	0.43 ft
Critical Depth	7.1 in
Percent Full	92.7 %
Critical Slope	0.006 ft/ft
Velocity	3.34 ft/s
Velocity Head	0.17 ft
Specific Energy	0.95 ft
Froude Number	0.532
Maximum Discharge	1.76 cfs
Discharge Full	1.64 cfs
Slope Full	0.005 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	37.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	9.3 in
Critical Depth	7.1 in
Channel Slope	0.004 ft/ft
Critical Slope	0.006 ft/ft

Exceeds design requirements.



Understood, however; this would be a temporary situation only until the downstream, gravity system is available to service the site. This has also been updated to the new uses proposed within the site.

## A310 DP2 First Creek LS Alt

### Notes:

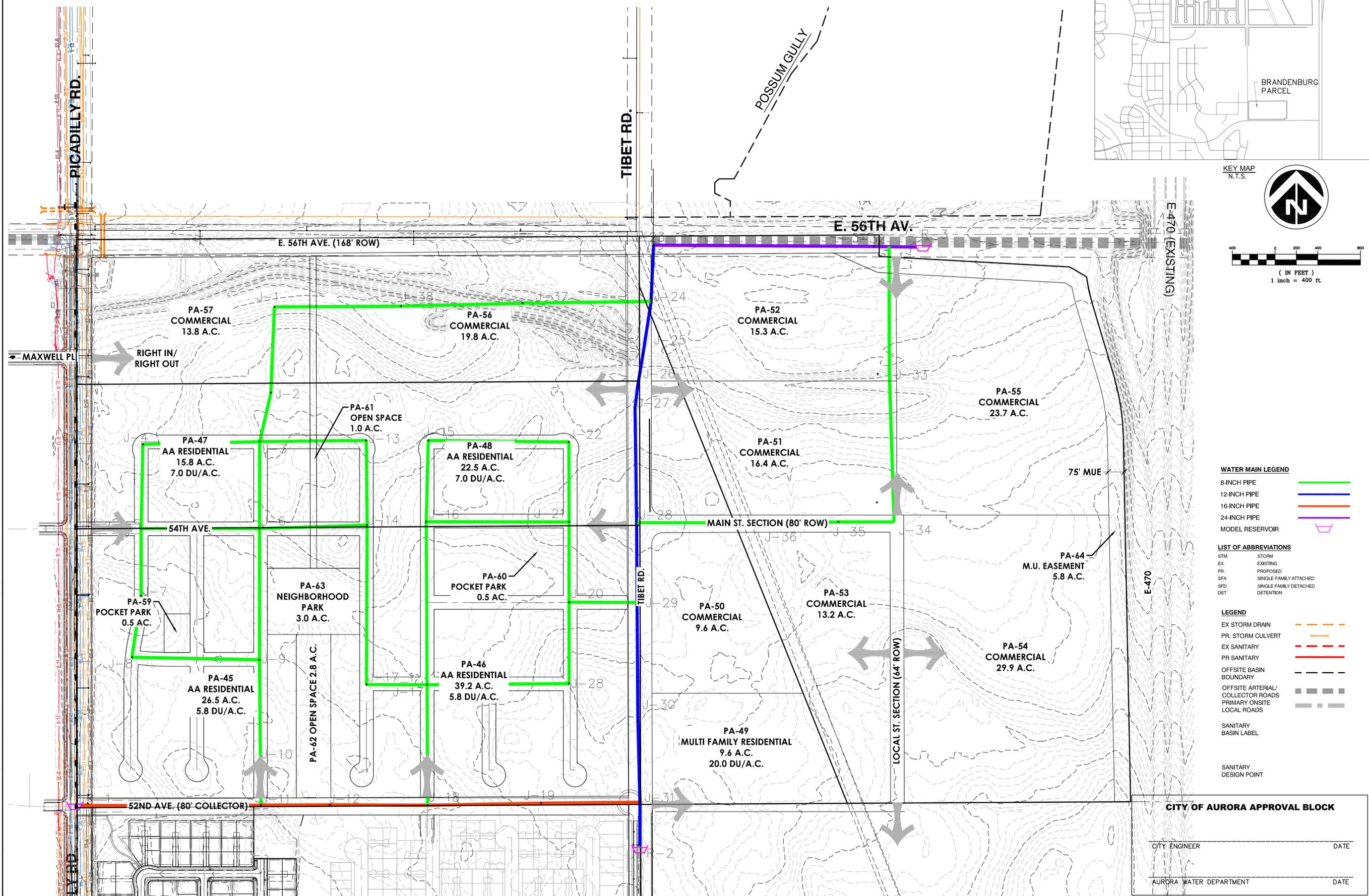
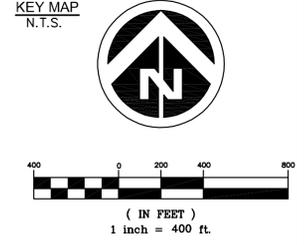
This alternative evaluates "Option 2", which is a temporary lift station pumping effluent to DP 2 for conveyance via the existing 10" gravity sanitary sewer main within Tibet to the First Creek Lift Station within the Green Valley Ranch Subdivision. This would be a temporary condition until the gravity main north of 56th Avenue to the Second Creek Lift Station is constructed.



Please remove this option 2. This is not an option.

We continue to request keeping this option within the report for two reasons, 1) to allow for the potential of the site to be serviced should the downstream entities not allow for the construction of the gravity main and 2) to be consistent with the previously approved GVRE MUR.

# GREEN VALLEY MASTER PLAN AMENDMENT 2



- WATER MAIN LEGEND**
- 8-INCH PIPE —
  - 12-INCH PIPE —
  - 16-INCH PIPE —
  - 24-INCH PIPE —
  - MODEL RESERVOIR ◡

- LIST OF ABBREVIATIONS**
- STM. STORM
  - EX. EXISTING
  - PR. PROPOSED
  - SFA SINGLE FAMILY ATTACHED
  - SFD SINGLE FAMILY DETACHED
  - DET DETENTION

- LEGEND**
- EX STORM DRAIN - - -
  - PR. STORM CULVERT - - -
  - EX SANITARY - - -
  - PR SANITARY - - -
  - OFFSITE BASIN BOUNDARY - - -
  - OFFSITE ARTERIAL/ COLLECTOR ROADS - - -
  - PRIMARY ONSITE LOCAL ROADS - - -
  - SANITARY BASIN LABEL - - -
  - SANITARY DESIGN POINT - - -

**Dewberry**  
 Dewberry Engineers Inc.  
 8100 East Maplewood Avenue, Suite 160  
 Greenwood Village, CO 80111  
 303.368.5601  
 Contact: Jason D. Margraf, PE  
 Email: jdmargraf@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	Description
3	05/23/2022	SECOND SUBMITTAL - UPDATE
2	03/01/2022	FIRST SUBMITTAL - UPDATE
1	12/22/2021	FIRST SUBMITTAL

**PRELIMINARY  
 NOT FOR  
 CONSTRUCTION**

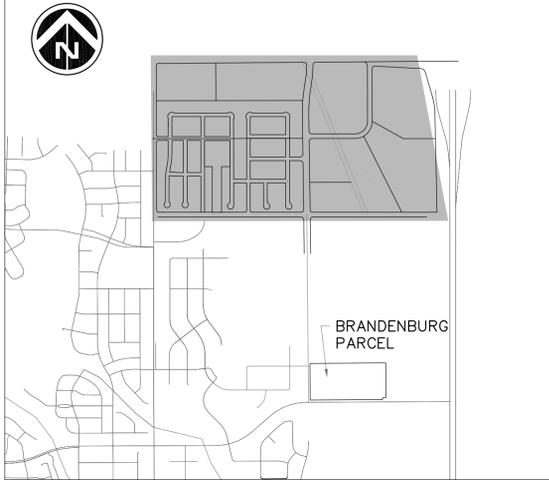
**Project Number:** 50145755  
**Designed By:** JDM  
**Checked By:** JDM  
**Sheet Number:** 1 OF 1

**CITY OF AURORA APPROVAL BLOCK**

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

J:\DEWBERRY\OAKWOOD HOMES\310 PARCEL PLAN SETS\MASTER PLAN\MASTER UTILITY\WATER EXHIBIT.DWG 5/17/2022 9:59 PM MARGRAF, JASON D.

# GREEN VALLEY MASTER PLAN AMENDMENT 2



**Dewberry**  
 Dewberry Engineers Inc.  
 8100 East Maplewood Avenue, Suite 160  
 Greenwood Village, CO 80111  
 Contact: Jason D. Margraf, PE  
 Email: jdmargraf@dewberry.com

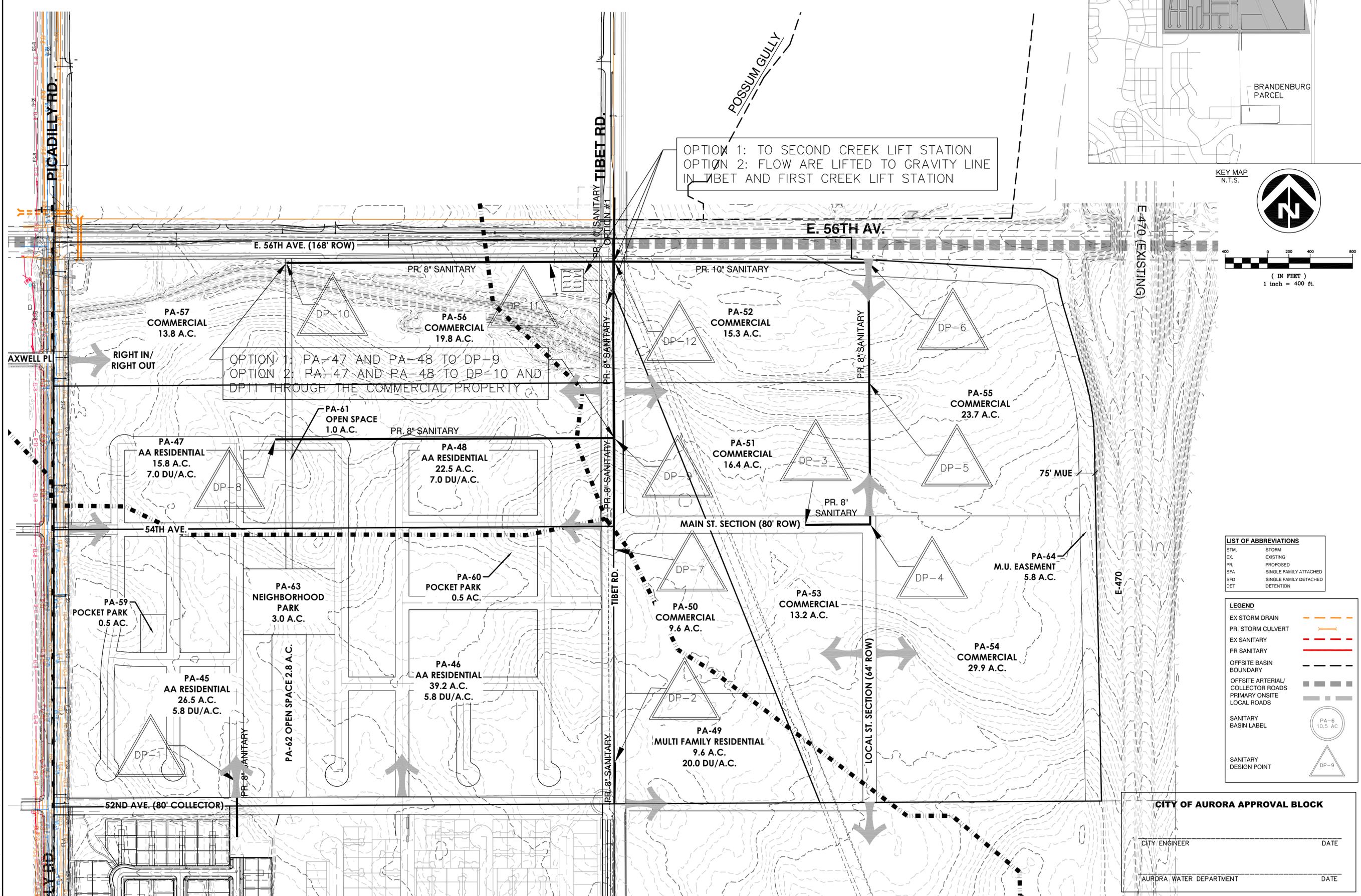
**GREEN VALLEY MASTER PLAN AMENDMENT 2**  
**MASTER UTILITY STUDY**  
**SANITARY SEWER MODELING EXHIBIT**

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

No.	Date	Description
3	05/23/2022	SECOND SUBMITTAL - UPDATE
2	03/01/2022	FIRST SUBMITTAL - UPDATE
1	12/22/2021	FIRST SUBMITTAL

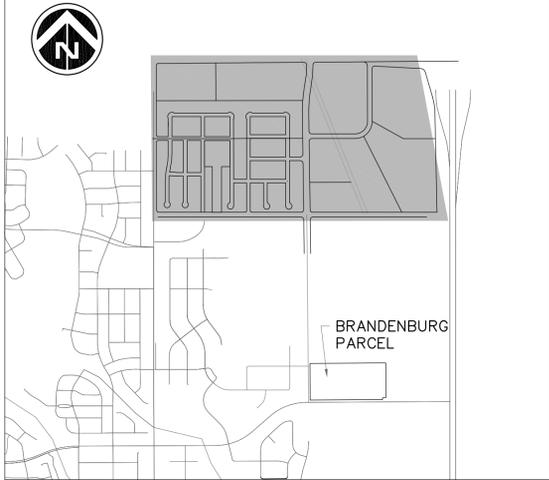
**PRELIMINARY**  
**NOT FOR**  
**CONSTRUCTION**

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



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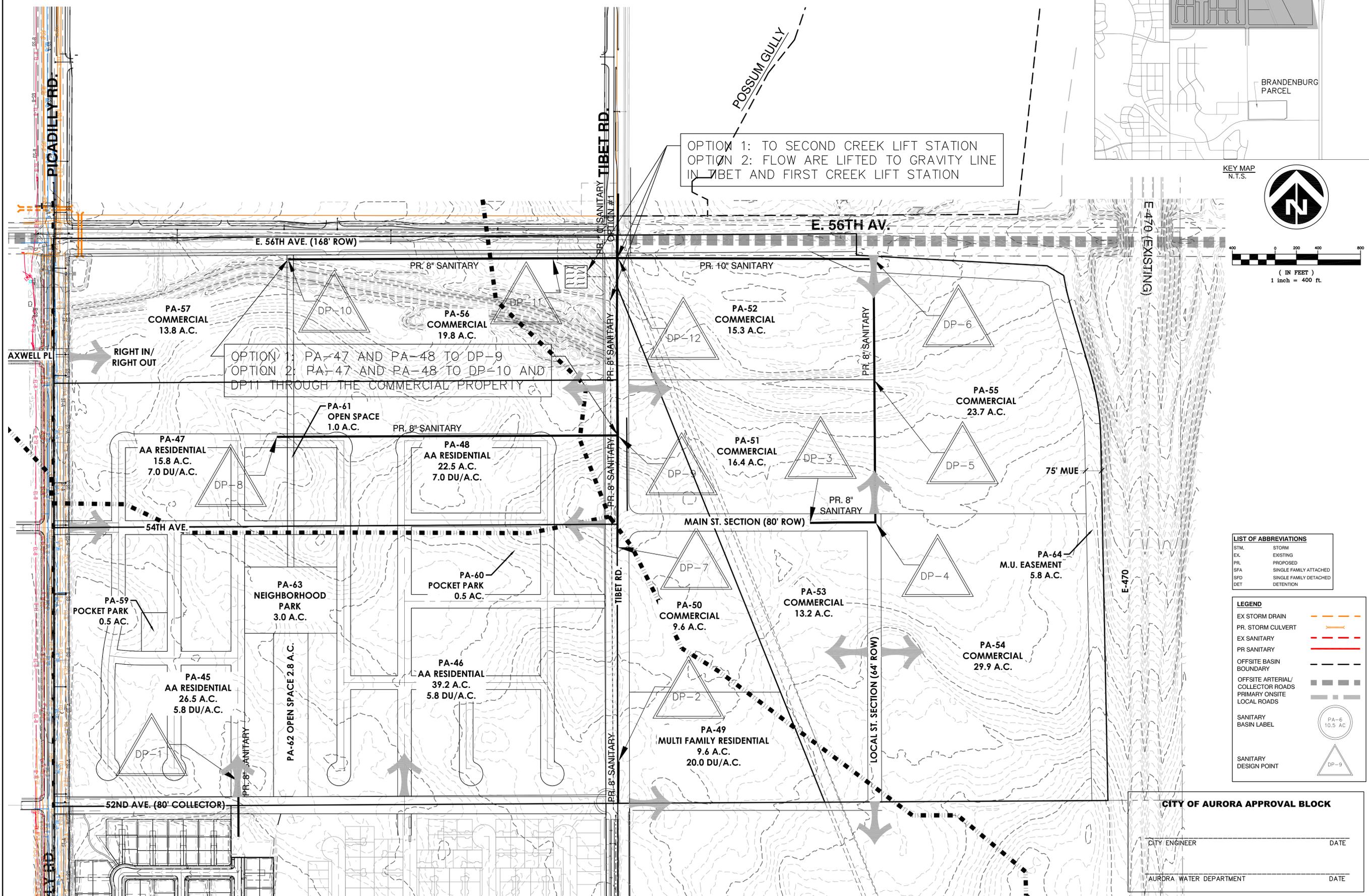
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**MASTER UTILITY STUDY**  
**SANITARY SEWER MODELING EXHIBIT**

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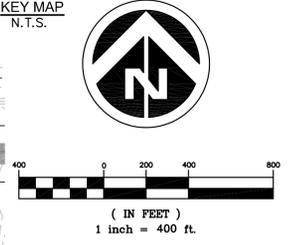
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**Sheet Number:** 1 OF 1



OPTION 1: TO SECOND CREEK LIFT STATION  
 OPTION 2: FLOW ARE LIFTED TO GRAVITY LINE IN TIBET AND FIRST CREEK LIFT STATION

OPTION 1: PA-47 AND PA-48 TO DP-9  
 OPTION 2: PA-47 AND PA-48 TO DP-10 AND DP-11 THROUGH THE COMMERCIAL PROPERTY



**LIST OF ABBREVIATIONS**

STM.	STORM
EX.	EXISTING
PR.	PROPOSED
SFA	SINGLE FAMILY ATTACHED
SFD	SINGLE FAMILY DETACHED
DET	DETENTION

**LEGEND**

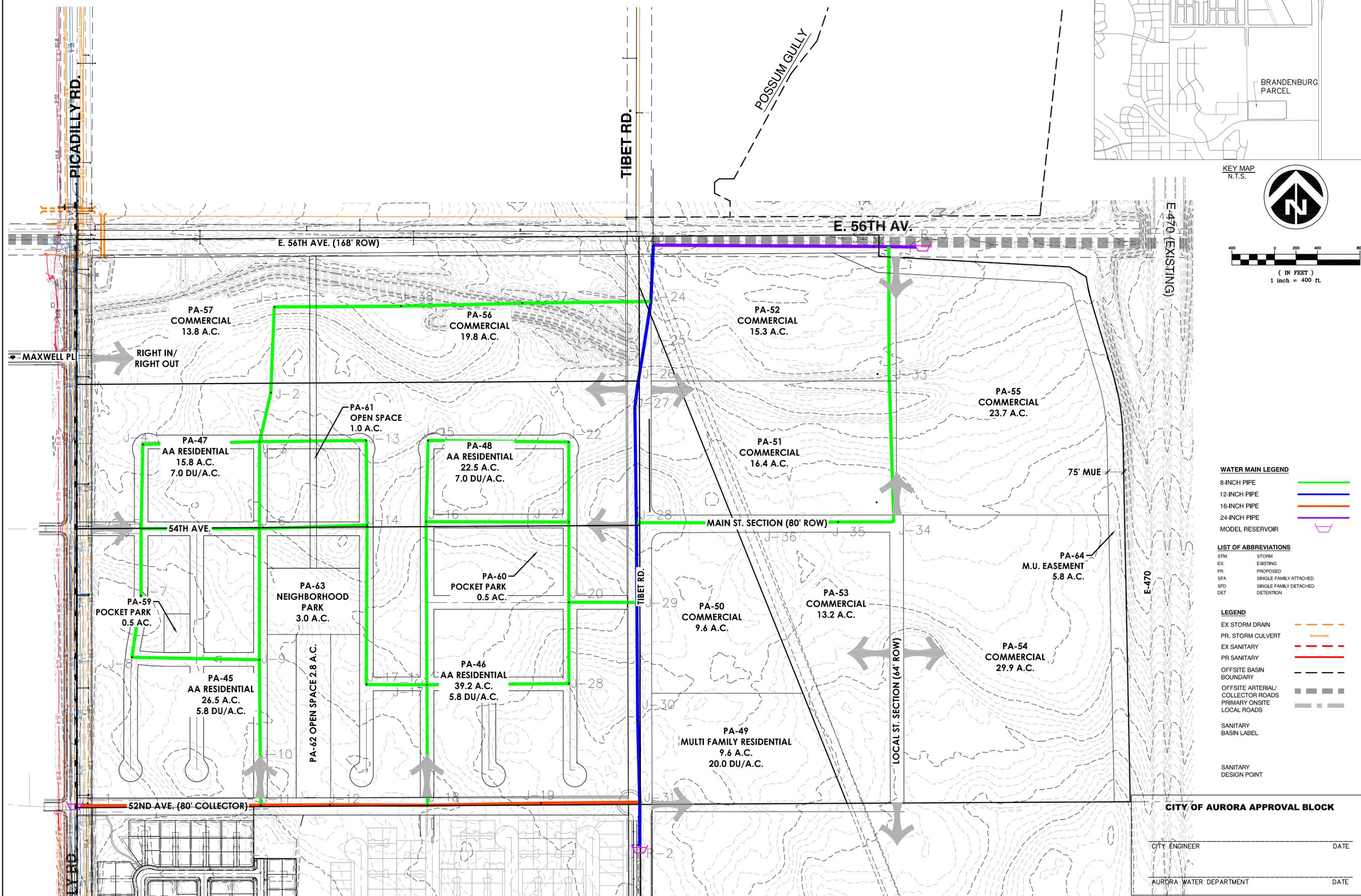
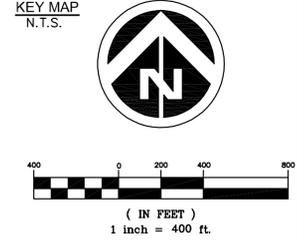
EX STORM DRAIN	---
PR. STORM CULVERT	---
EX SANITARY	---
PR SANITARY	---
OFFSITE BASIN BOUNDARY	---
OFFSITE ARTERIAL/ COLLECTOR ROADS	---
PRIMARY ONSITE LOCAL ROADS	---
SANITARY BASIN LABEL	PA-6 10.5 AC
SANITARY DESIGN POINT	DP-9

**CITY OF AURORA APPROVAL BLOCK**

CITY ENGINEER	DATE
AURORA WATER DEPARTMENT	DATE

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# GREEN VALLEY MASTER PLAN AMENDMENT 2



- WATER MAIN LEGEND**
- 8-INCH PIPE —
  - 12-INCH PIPE —
  - 16-INCH PIPE —
  - 24-INCH PIPE —
  - MODEL RESERVOIR ◡

- LIST OF ABBREVIATIONS**
- STM. STORM
  - EX. EXISTING
  - PR. PROPOSED
  - SFA SINGLE FAMILY ATTACHED
  - SFD SINGLE FAMILY DETACHED
  - DET DETENTION

- LEGEND**
- EX STORM DRAIN - - -
  - PR. STORM CULVERT - - -
  - EX SANITARY - - -
  - PR SANITARY - - -
  - OFFSITE BASIN BOUNDARY - - -
  - OFFSITE ARTERIAL/ COLLECTOR ROADS - - -
  - PRIMARY ONSITE LOCAL ROADS - - -
  - SANITARY BASIN LABEL - - -
  - SANITARY DESIGN POINT - - -

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

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**DOCUMENT AMENDMENTS**

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

**CITY OF AURORA APPROVAL BLOCK**

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