

# MEADOWBROOK PARK

MEADOWBROOK PARKWAY  
EL PASO COUNTY, COLORADO

WATER RESOURCE REPORT

OCTOBER 12, 2020

Prepared by:

**Kimley»»Horn**



## TABLE OF CONTENTS

SUMMARY OF THE PROPOSED SUBDIVISION.....	3
SITE LOCATION.....	3
DESCRIPTION OF PROPERTY .....	3
INFROMATION REGARDING SUFFICEINT QUANTITY OF WATER .....	4
CALCULATION OF WATER DEMAND .....	4
CALCULATION OF QUANTITY OF WATER AVAILABLE.....	5
INFORMATION REGARDING SUFFICIENT DEPENDABLITY OF WATER SUPPLY .....	5
INFORMATION REGARDING SUFFICIENT QUALITY .....	6
PUBLIC AND RPRIVATE COMMERCIAL WATER PROVIDERS .....	6
REFERENCES .....	6
APPENDIX.....	6

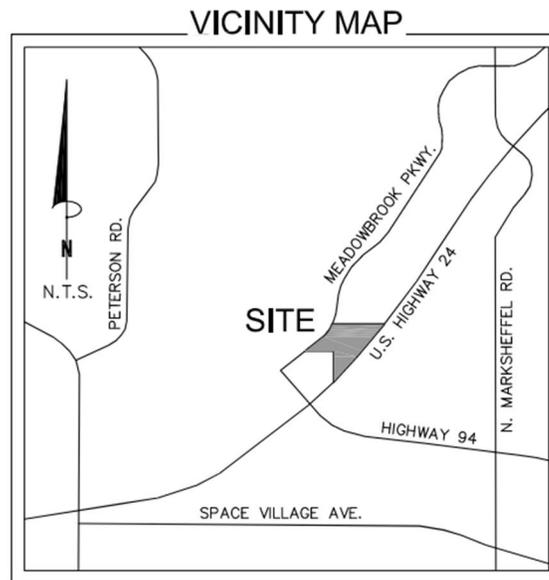
water quality- i did not see it- did i miss it?

project demands - does district have water or will they have to obtain more to serve? Look at Code revisions on County's Planning Web page for LDC 19-007  
<https://planningdevelopment.elpasoco.com/recent-amendments-l-and-development-code/>

## SUMMARY OF THE PROPOSED SUBDIVISION

### SITE LOCATION

The Site is located at the northeast corner of Meadowbrook Parkway and CO-24 and currently consists of Tract A of the 94/24 Business Park Filing No. 1 (the "Site"). More specifically, the Site is located in the southeast quarter of Section 8, Township 14 South, Range 65 West of the Sixth Principal Meridian, County of El Paso, State of Colorado. The Site is bounded by Meadowbrook Pkwy to the west, U.S. Highway 24 to the east, and existing commercial lots to the east and west. A vicinity map is provided below for reference:



### DESCRIPTION OF PROPERTY

The overall site is approximately 2.719 acres of partially undeveloped land. The site development is anticipated to consist of 70 single family homes. Roadway infrastructure proposed within the site will provide access from the Project to adjacent right-of-way and access roadways. Project access will be obtained through Meadowbrook Pkwy.

A proposed street will run through the middle of the Project with two streets connecting to Meadowbrook Pkwy to provide a loop through the site for proficient emergency access.

The existing topography generally drains from east to west. The overall site varies in elevation from a low of approximately 6322 feet to a high of approximately 6353.

There are two points of connection for proposed water service to the Site. Both connections will be made off the 12-inch line within Meadowbrook Pkwy from the northeastern and northwestern corners of the Project. Refer to **Appendix A** for an overview of the water system and points of connection.

The water design presented herein will focus on the water demands anticipated with development of the Site.

## INFORMATION REGARDING SUFFICIENT QUANTITY OF WATER

### CALCULATION OF WATER DEMAND

The water system demands were based on a formal letter of Commitment sent by the CMD for Meadowbrook Park dated September 21<sup>st</sup>, 2020. See **Appendix A** for reference.

Demand Factors/Allowed Flows:

- Domestic Annual Water Demand
  - 15.4 AF/yr
- Irrigation Annual Water Demand
  - 3.3 AF/yr
- Average Day Demand
  - 0.136 GPM per Unit

Based on this information, the domestic water demand was calculated as follows:

DOMESTIC WATER DEMAND CALCULATIONS					
Parcel	Building Type	Lot Count	Estimated Gross Floor Area	Average Day Demand	Average Day Demand
		EA	SF	GPM/Unit	GPM
Area A	Residential	13	13,835	0.136	1.8
Area B	Residential	5	5,321	0.136	0.7
Area C	Residential	8	8,514	0.136	1.1
Area D	Residential	15	15,964	0.136	2.0
Area E	Residential	13	13,835	0.136	1.8
Area F	Residential	16	17,028	0.136	2.2
<i>Total Flow Rate</i>					9.5

Section 2.6 of the Colorado Springs Utilities (CSU) standards was used to analyze the proposed water system. CSU standards and Water distribution systems design scenarios is as follows:

- Static Scenario
  - No demands on the system. Maximum pressure = 170 psi.
- Average Day Scenario
  - Average demands on the system based on conversion listed above. Minimum pressure = 50 psi.
- Fire Flow Scenario
  - fire flow demand of 3,500 gpm at each hydrant. Minimum pressure = 20 psi

Pipe Sizing Calculations:

- WaterCAD was used to size water mains.
- Minimum Diameter = 8 inches for water mains, 6 inches for hydrant laterals

The proposed water main will be tapping into existing water lines in two (2) locations. Both connections will be made off the 12-inch line within Meadowbrook Pkwy from the northeastern and northwestern corners of the Project.

The site falls within the CMD which uses groundwater for the water system. Due to the unknown pressure of the existing water system, an HGL of 6500 was used to model the connections to the existing system.

The high and low proposed finish grades for the site are approximately 6342 and 6321. The full hydraulic analysis using WaterCAD can be reviewed in **Appendix A** of this report.

The system will have an average day demand of 9.5 GPM based on the Criteria. Based on the results of the WaterCAD analysis, it is anticipated that the existing system has capacity for the proposed development.

The buildings within the development shall be constructed per the 2018 International Fire Code (IFC) and 2018 International Building Code (IBC), or most current code. The proposed buildings will require fire flows per the International Fire Code.

Water main design calculations and the WaterCAD pipe network Model are provided in **Appendix A**.

## CALCULATION OF QUANTITY OF WATER AVAILABLE

Cherokee Metro District has a “Water Provider Supplement to Water Resource Report for Meadowbrook Park” attached as a part of the Appendix. The supplemental information confirms the availability of water to service this project. This project will be served by Cherokee Metro District water mains only and does not include any groundwater sources.

With 4,443.0 AFY of exportable supply and 4,111.7 AFY of commitments, CMD has a water balance of 331.3 AFY before the subject development. After commitment of 18.7 AFY to this development, the District will have 312.6 AFY remaining for additional commitments. Below is a table showing the district's water balance with the new development.

Water Balance Before New Commitment	331.3 AFY
New Commitment: Meadowbrook Park	18.7
Water Balance Remaining	312.6 AFY

## INFORMATION REGARDING SUFFICIENT DEPENDABILITY OF WATER SUPPLY

Currently Cherokee Metro District serves approximately 7000 residential taps and 600 commercial taps in addition to bulk users in eastern El Paso County including Schriever Air Force Base and several small developments located along State Highway 94.

Cherokee Metro District water is sourced entirely from groundwater in two regions. The majority is recovered from the alluvial Upper Black Squirrel (UBS) Aquifer in eastern El Paso County via 20 wells. The remainder is sourced from two wells in deep bedrock aquifers in the northern part of the county on the “Sundance Ranch” property. Water from eight of the 20 wells in the eastern part of the county can

only be used to serve a fixed list of customers. Water for the main service area of CMD comes only from the remaining 12 wells in UBS along with the two wells at the Sundance Ranch.

The supplement to the Water Resource Report provided by Cherokee Metro District provides a description of the water supply, calculations demonstrating quantity, and evidence of water system source.

## INFORMATION REGARDING SUFFICIENT QUALITY

Cherokee Metro District uses a water system based on groundwater sources. Filtration processes are used in the water treatment facility plant to ensure water quality. Additional information is provided in the providers supplement to this Report.

## PUBLIC AND PRIVATE COMMERCIAL WATER PROVIDERS

Cherokee Metro District has a “Water Provider Supplement to Water Resource Report for Meadowbrook Park” attached as a part of the Appendix. This supplement provides content that meets or exceeds the provided content provided in this Water Resource Report.

## REFERENCES

Colorado Springs Utilities Water Line Extension & Service Standards 2019, City of Colorado Springs; July 1, 2019.

Cherokee Metropolitan District. “Water and Sewer Service to Meadowbrook Park. Commitment Letter No. 2020-11.” Letter to Kevin Kofford. 21 Sept. 2020.

## APPENDIX



# CHEROKEE METROPOLITAN DISTRICT

6250 Palmer Park Blvd., Colorado Springs, CO 80915-2842

Telephone: (719) 597-5080 Fax: (719) 597-5145

September 21<sup>st</sup>, 2020

Danny Mientka

The Equity Group

90 S. Cascade Avenue, Suite 1500

Colorado Springs, CO 80903

*Sent via email: [kevin.kofford@kimley-horn.org](mailto:kevin.kofford@kimley-horn.org)*

*Original to follow by US Mail*

Re: Water and Sewer Service to **Meadowbrook Park**  
Commitment Letter No. **2020-11**

Dear Danny Mientka,

As requested, this document will serve as a formal Letter of Commitment from the Cherokee Metropolitan District to provide municipal water and sewer services for Meadowbrook Park located at the north corner of U.S. Highway 24 and State Highway 94. The proposed location for this development is located within the District's established boundaries and therefore is eligible for service connections from the District.

Cherokee Metropolitan District staff, along with the developer, have determined that the following will be the total water demand required by this occupancy:

Type of Use	Demand (AF/yr)
Domestic	15.4
Irrigation	3.3
<b>Total</b>	<b>18.7</b>

This water commitment is hereby made exclusively for this specific development project at this site within the District. To confirm this commitment you must provide the District with a copy of the final plat approval from El Paso County Development Services within 12 months of the date of this letter. Otherwise, the District may use this allocation for other developments requesting a water commitment. If the subject project is re-platted, you must submit a new commitment request prior to submitting the re-plat to El Paso County, which may result in a recalculation of the water demand for the project.

If I may be of further assistance please contact me at your convenience.

Sincerely,



Amy Lathen  
General Manager

Cc: Peter Johnson; Water Counsel w/ encl: sent via email  
Steve Hasbrouck; Board President w/ encl: sent via email  
Kevin Brown; Jr. Engineer



# CHEROKEE METROPOLITAN DISTRICT

6250 Palmer Park Blvd., Colorado Springs, CO 80915-2842

Telephone: (719) 597-5080 Fax: (719) 597-5145

## Water Provider Supplement to Water Resource Report for Meadowbrook Park

water quality- i did not  
see it- did i miss it?

September 21<sup>st</sup>, 2020

Commitment 2020-11

This document has been prepared to satisfy El Paso County's requirement of a Water Provider's Report in support of **Meadowbrook Park** at **the north corner of U.S. Highway 24 and State Highway 94.**

## **Introduction**

Cherokee Metropolitan District (CMD) is a Title 32 special District which provides water and wastewater to an 800-acre enclave of unincorporated El Paso county surrounded by the City of Colorado Springs. Currently CMD serves approximately 7000 residential taps and 600 commercial taps in addition to bulk users in eastern El Paso County including Schriever Air Force Base and several small developments located along State Highway 94.

CMD water is sourced entirely from groundwater in two regions. The majority is recovered from the alluvial Upper Black Squirrel (UBS) Aquifer in eastern El Paso County via 20 wells. The remainder is sourced from two wells in deep bedrock aquifers in the northern part of the county on the “Sundance Ranch” property. Water from eight of the 20 wells in the eastern part of the county can only be used to serve a fixed list of customers. Water for the main service area of CMD comes only from the remaining 12 wells in UBS along with the two wells at the Sundance Ranch.

## **Calculation of Anticipated water Demand**

The subdivision will have 70 residential lots with 0.88 acres of fully irrigated common space and 1.07 acres of 60% reduced watering native grass. This development will have lots 3000 square foot lots with limited opportunities for individual landscaping. Based on similar small lot developments in the District and elsewhere, a lower presumptive water use value is used than with traditional single family subdivisions.

The District uses a presumptive use value of 0.22 Acre-Feet per Year (AFY) per Single Family Equivalent (SFE) as a conservative estimate for actual water use in these small lot developments. Actual small lot single family use is close to 0.20 AFY even in low precipitation years and this higher value includes distribution system losses. The 70 lots at 0.22 AFY per lot yields 15.4 AFY for domestic and per lot irrigation use.

Water demand for the 1.95 AFY of common space was calculated using El Paso County’s fully irrigated landscaping estimate of 2.53 feet of water per year. Applying this to the 0.88 acres of fully irrigated common space and the 1.07 acres of 60% reduced watering common space yields an irrigation use estimate of 3.3 AFY. The total for irrigation and domestic use across the development is projected to be 18.7 AFY.

## **Water Supplies**

Cherokee has eight wells (numbered 1-8) that are restricted to serving a maximum of 653 AFY to a fixed list of customers within the Upper Black Squirrel Creek Designated Basin (the Basin). Excess allocation for these wells is unavailable for new developments, even if those developments are located inside the Basin, so this water is tracked separately from CMD’s general exportable supply portfolio. Water from CMD’s other alluvial wells is exported for use

outside the UBS basin. The total annual volume available to CMD from these exportable supplies is 3,985 Acre-Feet per Year (AFY) (Table 1). The physical yield of these wells is significantly higher than their annual appropriation, allowing for flexibility in satisfying irrigation season demand.

**Table 1:** Water rights and tributary status of Exportable Wells

Well Number	Water Right (AFY)	2019 Use (AFY)	Permit Number	Aquifer	Aquifer Status
Well 9	176	132	14145-FP-R	UBS Alluvium	Tributary
Well 10	176	108	14146-FP-R	UBS Alluvium	Tributary
Well 11	244	161	6821-FP-R	UBS Alluvium	Tributary
Well 12	244	149	11198-FP	UBS Alluvium	Tributary
Well 13	1268	975	49988-F	UBS Alluvium	Tributary
Well 14	0	0	52429-F	UBS Alluvium	Tributary
Well 15*	281	145	54070-F	UBS Alluvium	Tributary
Well 16*	219	123	54069-F	UBS Alluvium	Tributary
Well 17*	175	151	63094-F	UBS Alluvium	Tributary
Well 18	225	138	16253-RFP-R	UBS Alluvium	Tributary
Well 19	95	79	20567-RFP-R	UBS Alluvium	Tributary
Well 20	400	38	4332-RFP	UBS Alluvium	Tributary
Well 21	290	0	81782-F	UBS Alluvium	Tributary
DN-4**	110	110	78315-F	Denver Aquifer	Non-Tributary
AR-1***	147.7	155	75881-F	Arapahoe Aquifer	Non-Tributary
<b>Total</b>	<b>3984.7</b>	<b>2464</b>			

\*Wells 15, 16, and 17 can produce a combined 609 AFY despite their total individual allocations equaling 675 AFY. This reduction is reflected in the total.

\*\*CMD holds additional water rights in the Denver Aquifer associated with the Sundance Ranch property but this particular well has a maximum annual recorded yield of 110 AFY

\*\*\*As of December 2019 AR-1 has 2040 AF of banked water which allows actual pumping to exceed allocation on a limited basis

CMD is developing owned water supplies to increase available water and improve flexibility in provision of summer flows. By the end of 2021, these new wells will contribute 458 AFY of capacity to the CMD system (Table 2) for a total of 4,443.0 AFY. Since 2011, actual demand from CMD customers has fallen 30-35% below commitments, partially due to some committed developments being incomplete but largely due to water saving measures undertaken by CMD customers.

**Table 2:** New water supplies slated for completion in 2021

Well Number	Water Right (AFY)	Permit Number	Aquifer	Aquifer Status
Albrecht Well	153.5	27571-FP	UBS Alluvium	Tributary
DA-1	40.3	83604-F	Dawson	Not Non-Tributary
DA-4	64.5	83603-F	Dawson	Not Non-Tributary
AR-1 Expansion	200	75881-F	Arapahoe	Non-Tributary
<b>Total</b>	<b>458.3</b>			

By the end of 2021, CMD will have a total of 4,443 AFY of exportable water supplies sourced from alluvial and deep bedrock aquifers. Further development in the Denver Basin is not planned at this time and instead CMD is focusing on acquiring new renewable supplies proximate to existing infrastructure.

## Water Commitments

CMD's water commitments stand at 4,111.7 AFY before the addition of the proposed development. These commitments are broken down below in Table 3. The Tipton and Kane commitments are related to an arrangement from the mid-2000's where developers reserved commitments on two new wells. The water from these wells is considered fully committed to these developers even if they have not yet begun the projects associated with the reserved commitments. Due to a complex legal history, the "Kane" water right was not tied to a specific physical water well but instead operates as a commitment served from CMD's general supply portfolio. The "Tipton" water right corresponds to CMD's Well 18.

**Table 3:** CMD Commitments before addition of new development

Commitments	AFY
In-District (2015)	2693
Committed Since 2015	406.7
Schriever Air Force Base	537
Kane	200
Tipton	225
Construction	25
Parks	25
<b>Total</b>	<b>4111.7</b>

## Water Balance

With 4,443.0 AFY of exportable supply and 4,111.7 AFY of commitments, CMD has a water balance of 331.3 AFY before the subject development. After commitment of 18.7 AFY to this development, the District will have 312.6 AFY remaining for additional commitments.

**Table 4:** Water balance with new development

Water Balance Before New Commitment	331.3 AFY
New Commitment: Meadowbrook Park	18.7
<b>Water Balance Remaining</b>	<b>312.6 AFY</b>

## Other Relevant District Information

### Recent Water Acquisitions/Losses

CMD has not acquired any new water rights since 2015 but has been developing owned water rights into productive wells. CMD has not engaged in any water trades nor lost any water rights in the last year. The District is not currently under contract to purchase new water rights although CMD is investigating purchases of renewable water rights proximate to its existing infrastructure on an ongoing basis.

### New Augmentation Plans

CMD is currently pursuing a replacement plan in partnership with Meridian Service Metropolitan District (MSMD) in order to claim credits for its treated water return flows and maximize the efficiency of its water supplies.

### Major System Capital Improvements

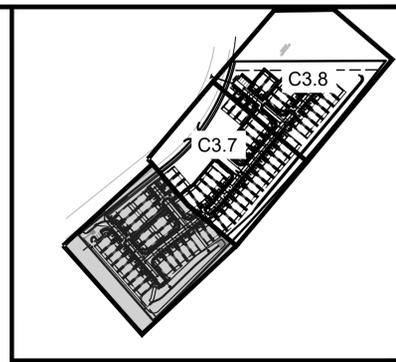
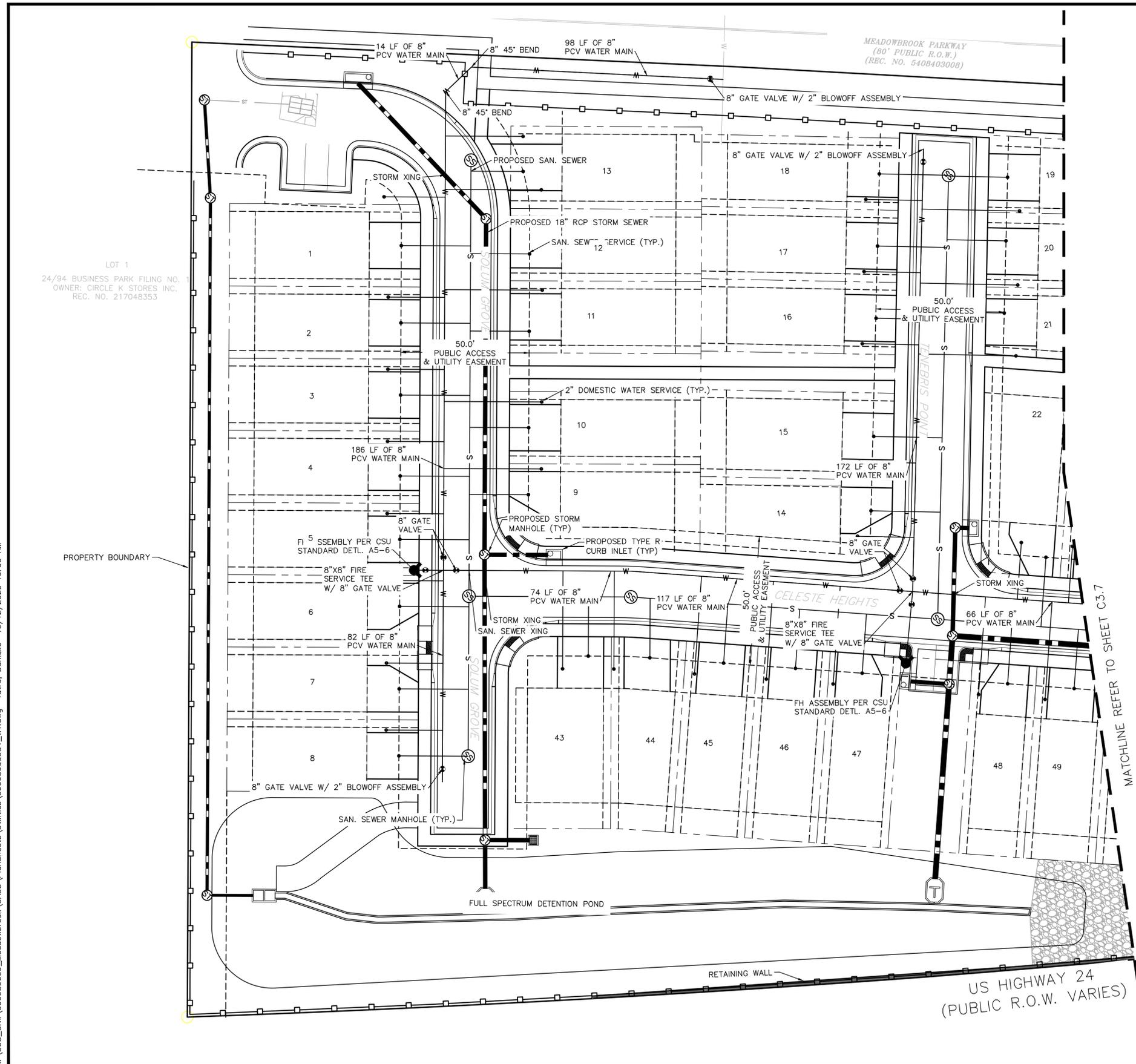
CMD has been actualizing owned water by drilling wells and beginning production on several well sites. In February of 2020 CMD brought the Sweetwater 5 well (81782-F) online after a year of planning and construction. In the next 6 months it is expected that the “Albrecht Well” (27554-FP) will be brought online providing an additional 153.5 AFY of water.

CMD is currently preparing to increase pump capacity in well AR-1 (75881-F), its only well in the Arapahoe aquifer, and to install pumps in two existing wells in the Dawson Aquifer (83603-F & 83604-F). Beyond these projects, additional well construction in the Denver Basin is not anticipated at this time, although CMD has a substantial amount of undeveloped water rights in the Denver Basin Aquifers.

Existing CMD wells have had a series of upgrades to improve quality and efficiency within in the last year. The screen and pump on Well 11 (6821-FP-R) were replaced to improve

water flow and several in-district potable water tanks have been cleaned and rehabilitated. More incremental improvements in the distribution system to improve reliability and resiliency include deeper computer integration, upgrades to treatment systems, and emergency generator refurbishment.

K:\COS\_Civil\096956009\_Meadowbrook\CADD\PlanSheets\Utilities\096956009UT\_WI.dwg Tatro, Danielle 10/12/2020 10:00 AM



**LEGEND**

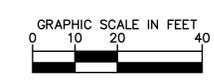
- PROPERTY LINE
- EXISTING WATER LINE & VALVE
- PROPOSED WATER LINE & VALVE
- - - LOT LINE
- PROPOSED FIRE HYDRANT
- EXISTING SANITARY SEWER LINE & MANHOLE
- PROPOSED SANITARY SEWER LINE & MANHOLE
- PROPOSED STORM SEWER LINE & MANHOLE
- PROPOSED STORM SEWER STRUCTURES

**NOTES:**

1. ALL WATER LINES TO BE BEDDED PER COLORADO SPRINGS UTILITIES SPECIFICATIONS.
2. ALL CONDITIONS SHOWN TO BE "EXISTING" OR "ASSUMED" SHALL BE VERIFIED IN THE FIELD BY THE GENERAL CONTRACTOR PRIOR TO START OF CONSTRUCTION INCLUDING BUT NOT LIMITED TO POTHOLING OF EXISTING UTILITY ELEVATIONS AT CROSSINGS AND TIE-IN LOCATIONS. ANY DISCREPANCIES SHALL BE NOTED AND SUBMITTED TO THE OWNER AND THE ENGINEER FOR REVIEW. CHANGES TO THE ORIGINAL DESIGN OF THIS PROJECT DUE TO EXISTING SITE CONDITIONS MUST BE APPROVED BY BOTH THE ENGINEER AND OWNER PRIOR TO MAKING ANY CHANGES.
3. THE HORIZONTAL DIMENSIONS BETWEEN PROPOSED UTILITY LINES MAY VARY SLIGHTLY BASED ON INSTALLED VALVES, ADAPTER, AND PUMPS.
4. ALL APPURTENANCES ON HYDRANT LATERALS SHALL BE INSTALLED WITH MJ RESTRAINTS PER CSU STANDARDS.

**CAUTION NOTE (SERVICE LINES):**

CONTRACTOR SHALL MAINTAIN 1' OF VERTICAL SEPARATION AT ALL DRY UTILITY CROSSINGS. CONTRACTOR SHALL POTHOLE ALL EXISTING UTILITY CROSSINGS TO VERIFY DEPTH AND COORDINATE WITH ENGINEER OF RECORD.



NO.	REVISION	BY	DATE	APPR.

**Kimley»Horn**  
2020 KIMLEY-HORN AND ASSOCIATES, INC.  
2 North Nevada Avenue Suite 300  
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KK  
DRAWN BY: KK  
CHECKED BY: JH  
DATE: 10/09/2020

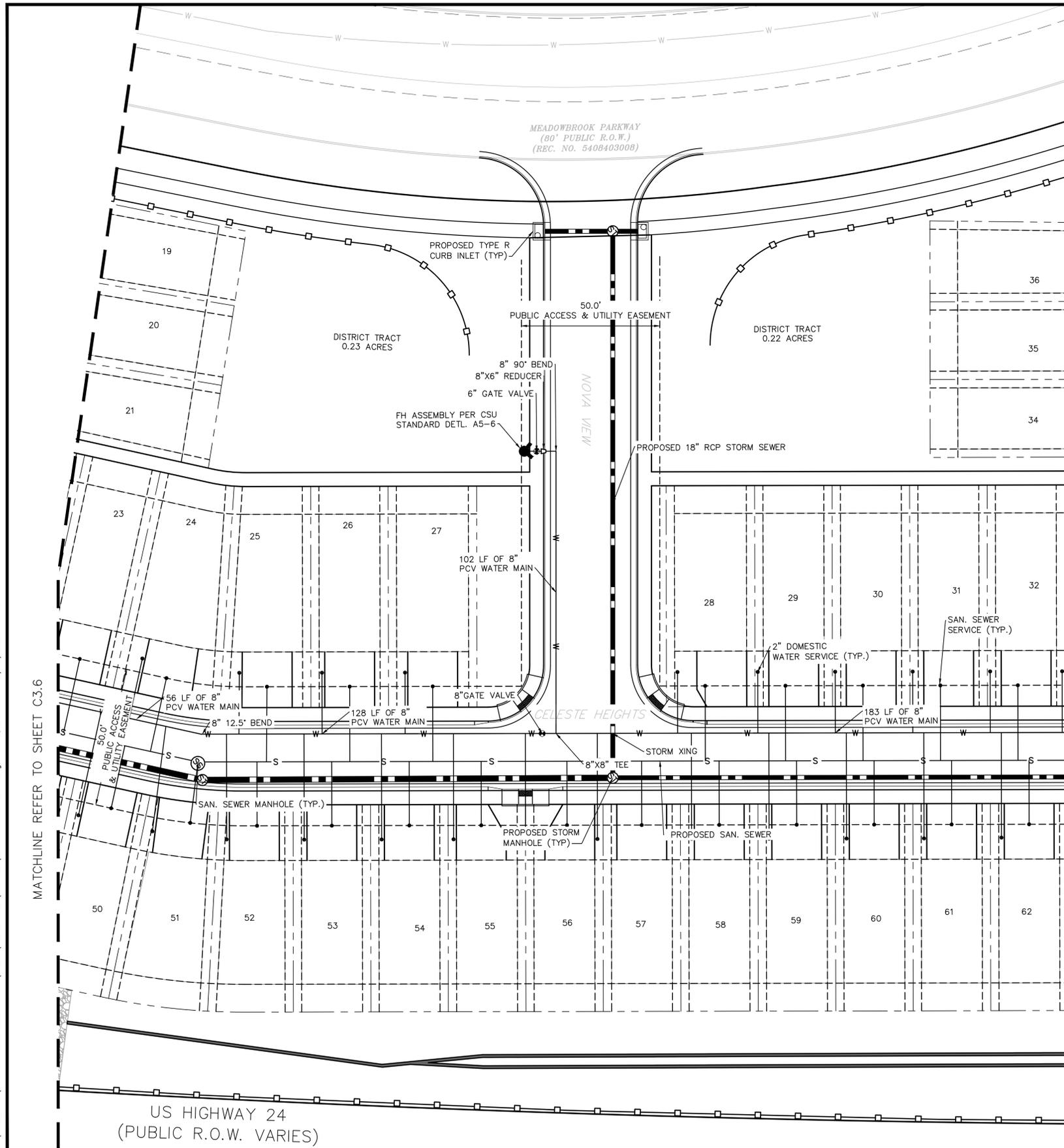
**MEADOWBROOK PARK  
EL PASO COUNTY, COLORADO  
UTILITY AND WATER SERVICE PLANS  
WATER PLAN**

PRELIMINARY  
FOR REVIEW ONLY  
NOT FOR  
CONSTRUCTION  
**Kimley»Horn**  
Kimley-Horn and Associates, Inc.

PROJECT NO.  
096956009

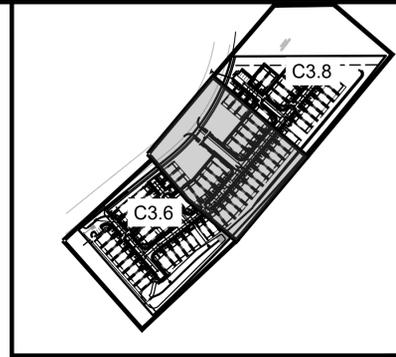
SHEET  
**C3.6**

K:\COS\_Civil\096956009\_Meadowbrook\CADD\PlanSheets\Utilities\096956009UT\_WI.dwg Tatro, Danielle 10/12/2020 10:00 AM



MATCHLINE REFER TO SHEET C3.6

MATCHLINE REFER TO SHEET C3.8



**LEGEND**

- PROPERTY LINE
- EXISTING WATER LINE & VALVE
- PROPOSED WATER LINE & VALVE
- PROPOSED FIRE HYDRANT
- EXISTING SANITARY SEWER LINE & MANHOLE
- PROPOSED SANITARY SEWER LINE & MANHOLE
- PROPOSED STORM SEWER LINE & MANHOLE
- PROPOSED STORM SEWER STRUCTURES

**NOTES:**

1. ALL WATER LINES TO BE BEDDED PER COLORADO SPRINGS UTILITIES SPECIFICATIONS.
2. ALL CONDITIONS SHOWN TO BE "EXISTING" OR "ASSUMED" SHALL BE VERIFIED IN THE FIELD BY THE GENERAL CONTRACTOR PRIOR TO START OF CONSTRUCTION INCLUDING BUT NOT LIMITED TO POTHOLING OF EXISTING UTILITY ELEVATIONS AT CROSSINGS AND TIE-IN LOCATIONS. ANY DISCREPANCIES SHALL BE NOTED AND SUBMITTED TO THE OWNER AND THE ENGINEER FOR REVIEW. CHANGES TO THE ORIGINAL DESIGN OF THIS PROJECT DUE TO EXISTING SITE CONDITIONS MUST BE APPROVED BY BOTH THE ENGINEER AND OWNER PRIOR TO MAKING ANY CHANGES.
3. THE HORIZONTAL DIMENSIONS BETWEEN PROPOSED UTILITY LINES MAY VARY SLIGHTLY BASED ON INSTALLED VALVES, ADAPTER, AND PUMPS.
4. ALL APPURTENANCES ON HYDRANT LATERALS SHALL BE INSTALLED WITH MJ RESTRAINTS PER CSU STANDARDS.

**CAUTION NOTE (SERVICE LINES):**

CONTRACTOR SHALL MAINTAIN 1' OF VERTICAL SEPARATION AT ALL DRY UTILITY CROSSINGS. CONTRACTOR SHALL POTHOLE ALL EXISTING UTILITY CROSSINGS TO VERIFY DEPTH AND COORDINATE WITH ENGINEER OF RECORD.



NO.	REVISION	BY	DATE	APPR.

**Kimley»Horn**  
2020 KIMLEY-HORN AND ASSOCIATES, INC.  
2 North Nevada Avenue Suite 300  
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KK  
DRAWN BY: KK  
CHECKED BY: JH  
DATE: 10/09/2020

**MEADOWBROOK PARK**  
EL PASO COUNTY, COLORADO  
UTILITY AND WATER SERVICE PLANS  
**WATER PLAN**

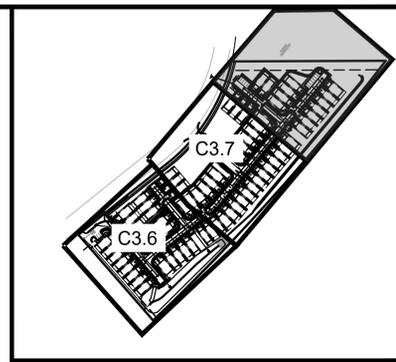
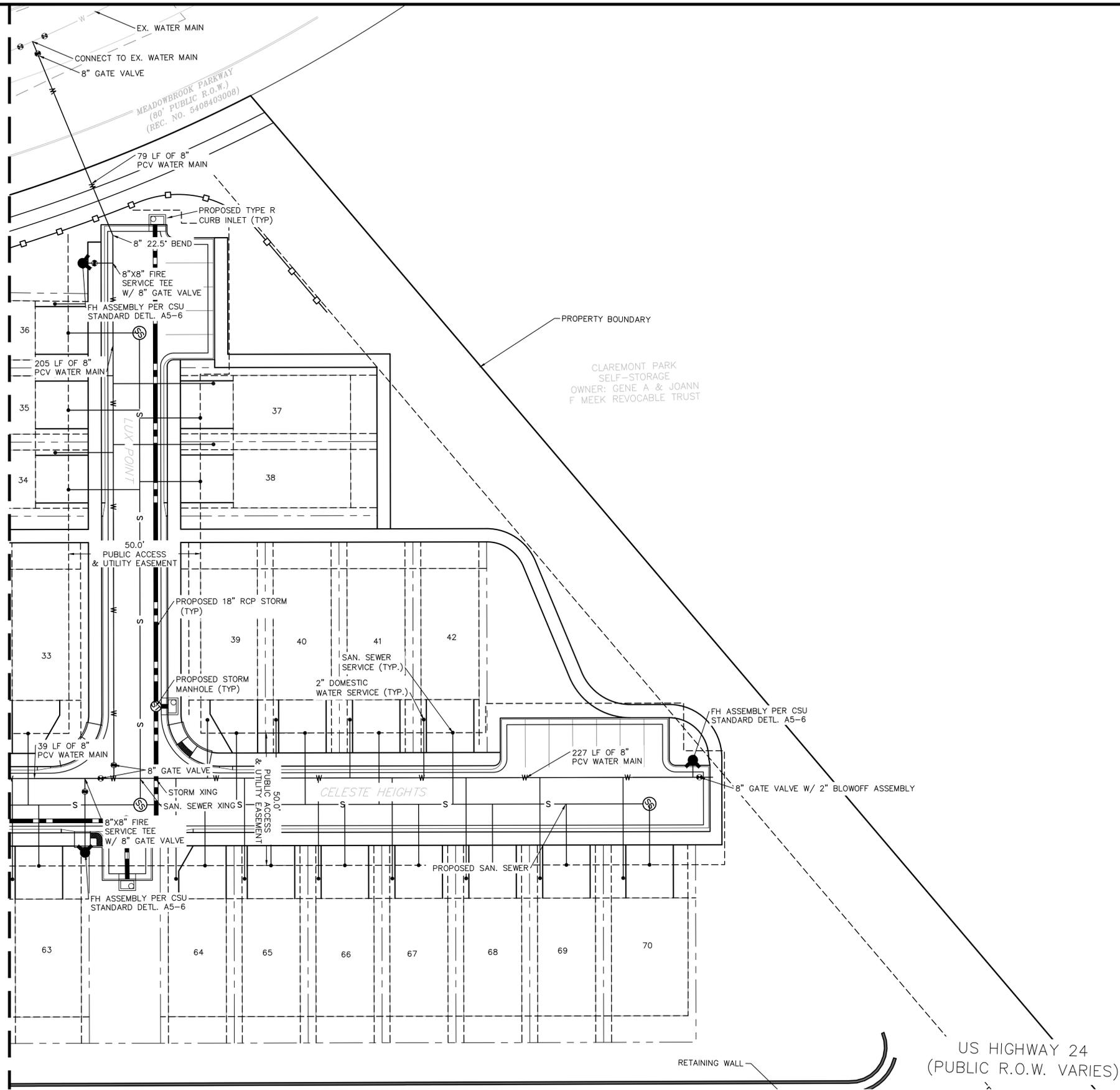
PRELIMINARY  
FOR REVIEW ONLY  
NOT FOR  
CONSTRUCTION  
**Kimley»Horn**  
Kimley-Horn and Associates, Inc.

PROJECT NO.  
096956009

SHEET  
**C3.7**

K:\COS\_civil\096956009\_Meadowbrook\CADD\PlanSheets\Utilities\096956009UT\_WI.dwg Tatro, Danielle 10/12/2020 10:00 AM

MATCHLINE REFER TO SHEET C3.7



**LEGEND**

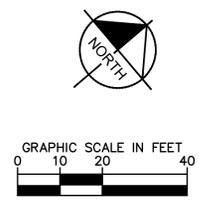
- PROPERTY LINE
- EXISTING WATER LINE & VALVE
- PROPOSED WATER LINE & VALVE
- PROPOSED FIRE HYDRANT
- EXISTING SANITARY SEWER LINE & MANHOLE
- PROPOSED SANITARY SEWER LINE & MANHOLE
- PROPOSED STORM SEWER LINE & MANHOLE
- PROPOSED STORM SEWER STRUCTURES

**NOTES:**

1. ALL WATER LINES TO BE BEDDED PER COLORADO SPRINGS UTILITIES SPECIFICATIONS.
2. ALL CONDITIONS SHOWN TO BE "EXISTING" OR "ASSUMED" SHALL BE VERIFIED IN THE FIELD BY THE GENERAL CONTRACTOR PRIOR TO START OF CONSTRUCTION INCLUDING BUT NOT LIMITED TO POTHOLING OF EXISTING UTILITY ELEVATIONS AT CROSSINGS AND TIE-IN LOCATIONS. ANY DISCREPANCIES SHALL BE NOTED AND SUBMITTED TO THE OWNER AND THE ENGINEER FOR REVIEW. CHANGES TO THE ORIGINAL DESIGN OF THIS PROJECT DUE TO EXISTING SITE CONDITIONS MUST BE APPROVED BY BOTH THE ENGINEER AND OWNER PRIOR TO MAKING ANY CHANGES.
3. THE HORIZONTAL DIMENSIONS BETWEEN PROPOSED UTILITY LINES MAY VARY SLIGHTLY BASED ON INSTALLED VALVES, ADAPTER, AND PUMPS.
4. ALL APPURTENANCES ON HYDRANT LATERALS SHALL BE INSTALLED WITH MJ RESTRAINTS PER CSU STANDARDS.

**CAUTION NOTE (SERVICE LINES):**

CONTRACTOR SHALL MAINTAIN 1' OF VERTICAL SEPARATION AT ALL DRY UTILITY CROSSINGS. CONTRACTOR SHALL POTHOLE ALL EXISTING UTILITY CROSSINGS TO VERIFY DEPTH AND COORDINATE WITH ENGINEER OF RECORD.



NO.	REVISION	BY	DATE	APPR.

**Kimley»Horn**  
2020 KIMLEY-HORN AND ASSOCIATES, INC.  
2 North Nevada Avenue Suite 300  
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KK  
DRAWN BY: KK  
CHECKED BY: JH  
DATE: 10/09/2020

**MEADOWBROOK PARK  
EL PASO COUNTY, COLORADO  
UTILITY AND WATER SERVICE PLANS  
WATER PLAN**

PRELIMINARY  
FOR REVIEW ONLY  
NOT FOR CONSTRUCTION  
**Kimley»Horn**  
Kimley-Horn and Associates, Inc.

PROJECT NO.  
096956009

SHEET  
**C3.8**

**DOMESTIC WATER DEMAND CALCULATIONS**

Parcel	Building Type	Lot Count	Estimated Gross Floor Area	Average Day Demand	Average Day Demand
		EA	SF	GPM/Unit	GPM
Area A	Residential	13	13,835	0.136	1.8
Area B	Residential	5	5,321	0.136	0.7
Area C	Residential	8	8,514	0.136	1.1
Area D	Residential	15	15,964	0.136	2.0
Area E	Residential	13	13,835	0.136	1.8
Area F	Residential	16	17,028	0.136	2.2
				<b>Total Flow Rate</b>	<b>9.5</b>

**Static Scenario**  
**Pipe Table - Time: 0.00 hours**

Label	Length (Scaled) (ft)	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	172	12.0	PVC	0	0.00	0.000
P-2	19	12.0	PVC	0	0.00	0.000
P-3	445	12.0	PVC	0	0.00	0.000
P-5	56	8.0	PVC	0	0.00	0.000
P-6	99	8.0	PVC	0	0.00	0.000
P-7	13	8.0	PVC	0	0.00	0.000
P-8	186	8.0	PVC	0	0.00	0.000
P-9	82	8.0	PVC	0	0.00	0.000
P-10	183	8.0	PVC	0	0.00	0.000
P-12	172	8.0	PVC	0	0.00	0.000
P-13	121	8.0	PVC	0	0.00	0.000
P-14	127	8.0	PVC	0	0.00	0.000
P-15	102	8.0	PVC	0	0.00	0.000
P-16	214	8.0	PVC	0	0.00	0.000
P-17	11	8.0	PVC	0	0.00	0.000
P-18	219	8.0	PVC	0	0.00	0.000
P-19	195	8.0	PVC	0	0.00	0.000
P-27	17	12.0	PVC	0	0.00	0.000
P-28	54	12.0	PVC	0	0.00	0.000
P-20	90	8.0	PVC	0	0.00	0.000
P-21	12	6.0	Ductile Iron	0	0.00	0.000
P-11	28	6.0	Ductile Iron	0	0.00	0.000
P-23	12	6.0	Ductile Iron	0	0.00	0.000
P-24	28	6.0	Ductile Iron	0	0.00	0.000
P-25	7	6.0	Ductile Iron	0	0.00	0.000
P-26	12	6.0	Ductile Iron	0	0.00	0.000
P-29	17	6.0	Ductile Iron	0	0.00	0.000
P-28	18	6.0	Ductile Iron	0	0.00	0.000
P-29	44	12.0	PVC	0	0.00	0.000
P-30	58	12.0	PVC	0	0.00	0.000

## Static Scenario

### Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	6,316.00	0	6,500.00	80
J-2	6,317.88	0	6,500.00	79
J-3	6,318.02	0	6,500.00	79
J-4	6,329.91	0	6,500.00	74
J-5	6,331.60	0	6,500.00	73
J-6	6,317.07	0	6,500.00	79
J-7	6,315.30	0	6,500.00	80
J-8	6,314.47	0	6,500.00	80
AREA A	6,315.91	0	6,500.00	80
J-10	6,316.84	0	6,500.00	79
AREA B	6,319.76	0	6,500.00	78
AREA C	6,321.79	0	6,500.00	77
AREA D	6,323.42	0	6,500.00	76
J-15	6,327.22	0	6,500.00	75
J-16	6,325.49	0	6,500.00	76
AREA E	6,331.01	0	6,500.00	73
AREA F	6,331.22	0	6,500.00	73
J-19	6,337.12	0	6,500.00	70
J-20	6,330.00	0	6,500.00	74
J-21	6,330.35	0	6,500.00	73

### Hydrant Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	6,316.25	0	6,500.00	79
H-2	6,318.00	0	6,500.00	79
H-3	6,325.82	0	6,500.00	75
H-4	6,331.36	0	6,500.00	73
H-5	6,337.45	0	6,500.00	70
H-6	6,330.00	0	6,500.00	74
H-7	6,329.57	0	6,500.00	74
H-8	6,320.14	0	6,500.00	78

### Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
94	R-1	6,500.00	<None>	0	6,500.00
95	R-2	6,500.00	<None>	0	6,500.00

**Average Day Scenario**  
**Pipe Table - Time: 0.00 hours**

Label	Length (Scaled) (ft)	Diameter (in)	Material	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	172	12.0	PVC	4	0.01	0.000
P-2	19	12.0	PVC	-1	0.00	0.000
P-3	445	12.0	PVC	-1	0.00	0.000
P-5	56	8.0	PVC	4	0.03	0.000
P-6	99	8.0	PVC	4	0.03	0.000
P-7	13	8.0	PVC	4	0.03	0.000
P-8	186	8.0	PVC	4	0.03	0.000
P-9	82	8.0	PVC	0	0.00	0.000
P-10	183	8.0	PVC	3	0.02	0.000
P-12	172	8.0	PVC	1	0.01	0.000
P-13	121	8.0	PVC	1	0.01	0.000
P-14	127	8.0	PVC	-1	0.01	0.000
P-15	102	8.0	PVC	0	0.00	0.000
P-16	214	8.0	PVC	-1	0.01	0.000
P-17	11	8.0	PVC	-3	0.02	0.000
P-18	219	8.0	PVC	0	0.00	0.000
P-19	195	8.0	PVC	-5	0.03	0.000
P-27	17	12.0	PVC	-1	0.00	0.000
P-28	54	12.0	PVC	-6	0.02	0.000
P-20	90	8.0	PVC	-5	0.03	0.000
P-21	12	6.0	Ductile Iron	0	0.00	0.000
P-11	28	6.0	Ductile Iron	0	0.00	0.000
P-23	12	6.0	Ductile Iron	0	0.00	0.000
P-24	28	6.0	Ductile Iron	0	0.00	0.000
P-25	7	6.0	Ductile Iron	0	0.00	0.000
P-26	12	6.0	Ductile Iron	0	0.00	0.000
P-29	17	6.0	Ductile Iron	0	0.00	0.000
P-28	18	6.0	Ductile Iron	0	0.00	0.000
P-29	44	12.0	PVC	6	0.02	0.000
P-30	58	12.0	PVC	4	0.01	0.000

**Average Day Scenario**  
**Junction Table - Time: 0.00 hours**

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	6,316.00	0	6,500.00	80
J-2	6,317.88	0	6,500.00	79
J-3	6,318.02	0	6,500.00	79
J-4	6,329.91	0	6,500.00	74
J-5	6,331.60	0	6,500.00	73
J-6	6,317.07	0	6,500.00	79
J-7	6,315.30	0	6,500.00	80
J-8	6,314.47	0	6,500.00	80
AREA A	6,315.91	2	6,500.00	80
J-10	6,316.84	0	6,500.00	79
AREA B	6,319.76	1	6,500.00	78
AREA C	6,321.79	1	6,500.00	77
AREA D	6,323.42	2	6,500.00	76
J-15	6,327.22	0	6,500.00	75
J-16	6,325.49	0	6,500.00	76
AREA E	6,331.01	2	6,500.00	73
AREA F	6,331.22	2	6,500.00	73
J-19	6,337.12	0	6,500.00	70
J-20	6,330.00	0	6,500.00	74
J-21	6,330.35	0	6,500.00	73

**Hydrant Table - Time: 0.00 hours**

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	6,316.25	0	6,500.00	79
H-2	6,318.00	0	6,500.00	79
H-3	6,325.82	0	6,500.00	75
H-4	6,331.36	0	6,500.00	73
H-5	6,337.45	0	6,500.00	70
H-6	6,330.00	0	6,500.00	74
H-7	6,329.57	0	6,500.00	74
H-8	6,320.14	0	6,500.00	78

**Reservoir Table - Time: 0.00 hours**

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
94	R-1	6,500.00	<None>	4	6,500.00
95	R-2	6,500.00	<None>	6	6,500.00

### Fire Flow Node FlexTable: Fire Flow Report

Label	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Pressure (Calculated Residual) (psi)	Junction w/ Minimum Pressure (Zone)
H-1	True	0	3,500	66	H-5
H-2	True	0	3,500	72	H-5
H-3	True	0	3,500	54	J-16
H-4	True	0	3,500	55	H-5
H-5	True	0	3,500	46	J-19
H-6	True	0	3,500	66	H-5
H-7	True	0	3,500	68	H-5
H-8	True	0	3,500	58	AREA C

# water reso V\_1 redlines.pdf Markup Summary 12-11-2020

dsdparsons (3)

---



**Subject:** Callout  
**Page Label:** 9  
**Author:** dsdparsons  
**Date:** 12/11/2020 2:10:36 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

water quality- i did not see it- did i miss it?

/



**Subject:** Callout  
**Page Label:** 2  
**Author:** dsdparsons  
**Date:** 12/11/2020 2:10:58 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

water quality- i did not see it- did i miss it?

/



**Subject:** Callout  
**Page Label:** 2  
**Author:** dsdparsons  
**Date:** 12/11/2020 2:14:31 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

project demands - does district have water or will they have to obtain more to serve? Look at Code revisions on County's Planning Web page for LDC 19-007  
<https://planningdevelopment.elpasoco.com/recent-amendments-land-development-code/>