

FINAL UTILITY REPORT

Lot 2A – Metzler Ranch Filing No. 2
11 Kellogg Court, Castle Rock, CO 80109
Castle Rock Project No. CD24-0020

Owner/Developer:

Richard Graham
RG Investments, LLLP
6035 Erin Park Dr., Suite 101
Colorado Springs, CO 80918

September 26, 2024

Prepared by:

Kimley»Horn

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UTILITY REPORT APPROVAL BLOCK

ENGINEER'S STATEMENT

The enclosed utility report, and exhibits, were prepared by me or under my direct supervision and is correct to the best of my knowledge and belief. Said utility report has been prepared in accordance with applicable Town of Castle Rock criteria and is in conformance with the master utility plans for the affected area. I accept responsibility for any liability caused by negligent acts, errors, or omissions on my part in preparing this report.

Signature: _____
Registered Professional Engineer
State Of Colorado No. _____
(Affix Seal)

OWNER/DEVELOPER'S STATEMENT

As Owner/Developer of Land(s) identified within this report; I agree to proceed, implement and comply with all recommendations and requirements outlined herein.

Name of Developer

Authorized Signature

PROJECT LOCATION AND DESCRIPTION

The Project includes 24 paved parking spaces to be used by the existing U-Haul rental business for proper storage of their vehicles. The parking stalls will interface Kellogg Court (Privately Owned and maintained by RG Investments No. 1, LLLP, also the owner of Lot 2 of Metzler Ranch Filing No. 2. The project also proposes to plat a new lot, Lot 2A ("Property"), which is the subdivided portion of Tract B that will be adjoined with the existing Lot 2. The Property is approximately 4.70± acres total and 0.19± acres are anticipated to be disturbed.

This Final Utility Report covers the demands and design of the wastewater main extension, required by the standing Subdivision Improvement Agreement ("SIA"), for 11 Kellogg Court, Castle Rock, CO (herein referred to as "the Project/Site") as illustrated on the attached Overall Utility Plan in **Appendix A**. This report demonstrates that the proposed wastewater infrastructure for this Project will be sufficient to serve the aforementioned development. Water and wastewater mainlines will be owned and maintained by Town of Castle Rock.

SITE LOCATION

The Project is located at the proposed Lot 2A of Metzler Ranch Filing No. 2, 1st Amendment, at 11 Kellogg Court, Castle Rock, CO 80109 ("Site"). The Site is accessed from Kellogg Court, a private road (60' right-of-way), which interfaces Liggett Road. Lot 2A is bounded by proposed Tract B1 (Kellogg Court) to the north and west, Interstate 25 right-of-way to the north and east, and an unplatted lot, owned by JRW Family Limited Partnership, to the south. Also accessed from Kellogg Court, to the north and west of proposed Lot 2A is Lot 1 of Metzler Ranch Filing No. 2, the Castle Rock Water Department.

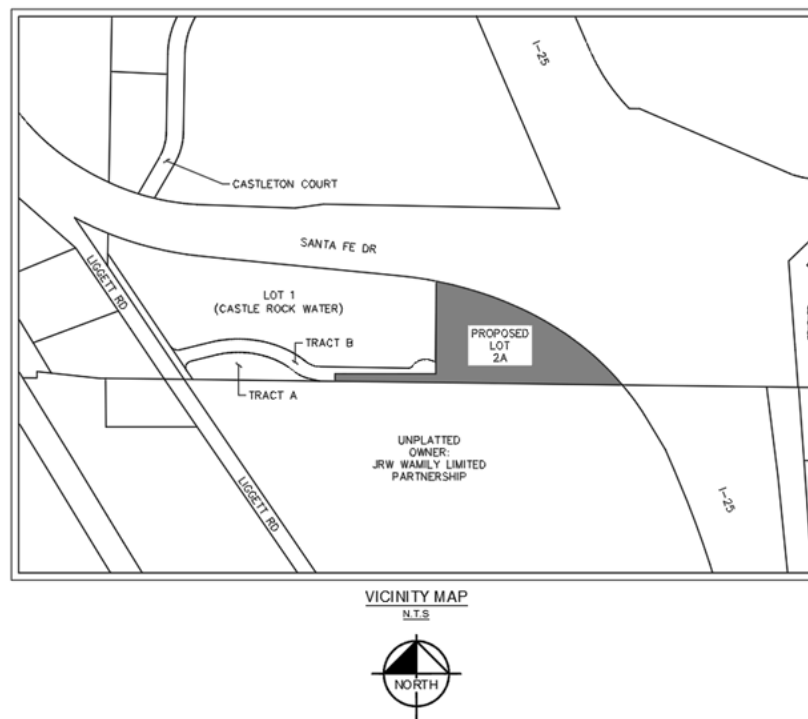


Figure 1. Vicinity Map (N.T.S.)

DESCRIPTION OF PROPERTY AND LAND USE

The Site is developed and is primarily asphalt pavement in land cover. The Lot 2A is an existing business, Castle Rock Self Storage & U-Haul. Areas that are not covered in asphalt pavement are best described as Lawns, Sandy Soil, per Table 6-3 of the USDCM Vol 1. As mentioned, the existing property, Lot 2 / proposed Lot 2A is the existing Castle Rock Self Storage and U-Haul. Users of this facility access the business via Kellogg Court, privately owned and dedicated as a public and emergency access & utility, storm drainage and waterline easement (Rec. No. 199848883). All infrastructure, asphalt, and vegetated ground cover is in good condition and do not require improvements at this time.

Site improvements include the construction of the aforementioned parking, sanitary sewer main extension, and landscaping improvements. Utility easements will be provided for utilities outside the public ROW as required by the Utility Agencies.

It is not anticipated that the development of this Site will negatively impact existing off-site infrastructure, such as utility mains, irrigation facilities, drainage ways, geologic features, or runoff patterns. No major adjacent off-site infrastructure is proposed for this development.

WATER SYSTEM

EXISTING WATER SYSTEM

The existing water system was constructed as apart of the Metzler Ranch Filing No. 2 project, designed by Inter-Mountain Engineering, Ltd., and approved by the Town of Castle Rock on July 14, 1998. The existing water system includes a 12" DIP Watermain which runs centrally within Kellogg Court. The watermain ties into the watermain in Liggett Road and dead ends at 11 Kellogg Court, the eastmost property accessed from Kellogg Court. No improvements are proposed for the existing water system with this project.

WASTEWATER SYSTEM

EXISTING WASTEWATER SYSTEM

The Town of Castle Rock operates and maintains the existing wastewater system that the Project proposes to extend. The existing wastewater main extends eastwardly within the Kellogg Court right-of-way, also known as Tract B of Metzler Ranch Filing No. 2. The main terminates directly south of the entrance to the existing Castle Rock Water Department Facility's entrance with a 4' wastewater manhole. The existing wastewater main is 8-inch PVC. Wastewater flows generated by the Castle Rock Water department, or by the Site, outfall into the existing 8-inch PVC public wastewater main located in Liggett Road. See Castle Rock GIS Utility Map in **Appendix C**.

PROPOSED WASTEWATER SYSTEM

This Project proposes to install a wastewater main within the project area connecting to the existing 8-inch PVC wastewater main within Kellogg Court to the west. An Overall Utility Plan is included in **Appendix A**. Proposed wastewater mains are 8-inch PVC and will direct wastewater flows throughout the site from the west to east. The proposed 8-inch wastewater mains are located within Tract B and Lot 2A aisle and upon approval, will be owned, operated, and maintained by the Town of Castle Rock. This Project complies with the Town's Wastewater Master Plan and subdivision improvement agreements in accomplishing the removal of all existing On-Site Wastewater Treatment Systems that have the ability to

connect to the Town's main wastewater collection system. Any future development of the existing wastewater infrastructure needed to serve this site is the responsibility of the developer.

WASTEWATER FLOWS

Wastewater flows for the Project were determined using the Colorado Department of Public Health and Environment Regulation No. 43 – On-Site Wastewater Treatment System Regulation. Regulation 43 was used to generate Average Day Wastewater Flows (ADF) in place of Town of Castle Rock Wastewater Collection Design 2018 Criteria Manual because Reg 43 provides demands per person for more specific commercial building uses. Because fixture count and wastewater flow generation factors are known, it is more appropriate to utilize Regulation 43 over the Town's general 600 gallons per day (gpd) per acre for commercial use. Table 6-2 in Regulation 43 specifies that 15 gpd should be utilized for office buildings per employee per eight-hour shift which best describes the intended use of the facility. With two employees, the resulting ADF is 30 gpd.

The peaking factor (PF) was calculated using the equation from the Town's Criteria in Section 4.4.1.2 as shown below.

$$PF = 3.65 \times [(ADF)^{-0.168}]$$

Using this equation results in a peaking factor of 20.99. The maximum allowable PF per the Castle Rock Wastewater Collection Design Criteria Manual is 5.0. Therefore, a PF of 5.0 was used. The PF multiplied by the ADF results in the peak flow rate of 150 gpd. Inflow and infiltration (I&I) allowance is 10% of the ADF resulting in an I&I value of 15 gpd. Total design flow rate is I&I plus the peak flow rate resulting in a design flow rate of 165 gpd. The table below and **Appendix B** summarizes the expected wastewater flows from the existing building.

Table 1: Wastewater Flow Rates

Service Area	Flow Units (employees)	Unit Flow Rate (MGD/unit)	Average Day Flow (MGD)
Ex. Building (1 bathroom)	2	.000015	.00003
		Peaking Factor	5
		Peak Flow (MGD)	.00015
		Inflow & Infiltration (MGD)	.000015
		Design Flow (MGD)	.000165

SUMMARY OF WASTEWATER RESULTS AND DESIGN

Per the Town's Wastewater Design Criteria, the minimum size of a wastewater main is 8-inches in diameter and must be able to convey all wastewater while maintaining a maximum flow depth of 75% of the pipe diameter (Section 4.4.2 Hydraulic Design). In addition, the minimum slope is 0.40%, minimum velocity at peak design flow is 2.0 fps, and the maximum allowable velocity shall not exceed 10 fps at 75% flow depth in the pipe.

A Bentley FlowMaster V8i analysis was conducted for the anticipated total design flow conditions on each of the proposed 8-inch wastewater main pipe segments (P-1 & P-2) within the project area. Using Manning's Formula with an "n" value of 0.011 for PVC as per the Town's Criteria, FlowMaster calculations show that at design flow the design slopes, which are larger than the minimum slope required, was not sufficient to convey flow at the minimum required velocity of 2.0 fps for the proposed 8-inch wastewater main. Not meeting the minimum velocity requirement is in part due to the extremely small amount of flow coming from the single bathroom for the Project. Similarly, the proposed wastewater main will be

connecting to an existing wastewater main so the elevation at which the proposed pipe must enter the existing manhole is at a pre-determined elevation. On the upstream end of the proposed system, the elevation is also limited by meeting a minimum cover of five feet as specified in the Town's Criteria. Therefore, between meeting cover at the upstream end, entering the existing manhole at the appropriate elevation, and meeting minimum vertical separation requirements of crossing pipes, the slope of the proposed wastewater mains has been maximized as much as possible with still meeting all other design Criteria.

Table 2, shown below, outlines the design slopes for each of the proposed wastewater main pipe segments and their resulting percent full capacity and velocity. Refer to **Appendix B** for the detailed FlowMaster calculations for each of the proposed wastewater pipe segments.

Table 2: Wastewater Flow Analysis (Proposed System)

Pipe Segment	Size	Slope	Anticipated Design Flow	Percent Full	Velocity
	(inches)	(%)	(gpd)	(%)	(fps)
P-1	8	1.50	165	1.0	0.42
P-2	8	0.65	165	1.2	0.33

EXISTING WASTEWATER CAPACITY ANALYSIS

To understand the downstream impacts of the proposed wastewater flows on the existing infrastructure, a capacity analysis was performed on the existing wastewater main that the proposed system will connect into using a similar process as discussed in the *Summary of Wastewater Results and Design* section of this report. Flow in the existing pipe was determined using the Final Utility Report for 175 Kellogg Court, the adjacent lot that contributes flow to the existing wastewater system. This utility report for 175 Kellogg Court can be found in **Appendix D**. The design flow as determined in the aforementioned report is 6,768 gpd. This flow plus the anticipated design flow from the existing building that will be connecting into the main collection system results in a flow of 6,933 gpd. Refer to **Appendix C** for a GIS exhibit detailing the existing wastewater system in the Project area. The slope of the existing pipe is 1.97% resulting in the percent full and velocity values as shown in Table 3 for the existing pipe segment once the proposed pipes are installed.

Table 3: Wastewater Flow Analysis (Existing System)

Pipe Segment	Size	Slope	Anticipated Design Flow	Percent Full	Velocity
	(inches)	(%)	(gpd)	(%)	(fps)
EX-1	8	1.97	6933	5.2	1.52

FlowMaster calculations show that the additional design flow did not have any significant impact on the existing downstream wastewater system and that the existing infrastructure still satisfies the Town's Criteria for pipe capacity. Table 3, shown below, outlines the results of the flow analysis on the existing

wastewater pipe segments in respect to added peak flow. Refer to **Appendix C** for detailed FlowMaster calculations for each the existing wastewater pipe segment.

CONCLUSION

COMPLIANCE WITH DESIGN CRITERIA

The proposed sanitary sewer main for the Project has been designed in accordance with applicable Town Criteria. The results from the wastewater analysis detailed in this report show the proposed wastewater mains can adequately support the Project and meet the requirements of the SIA. It is worth noting that due to site constraints and a low number of employees actively using the site, the minimum wastewater flow velocity of 2.0 fps is not accomplished. These site constraints include maintaining vertical clearances to the existing storm infrastructure, connecting into the existing sanitary manhole at a set elevation, and the necessary length of pipe required to make a connection to the Site. Comparison and capacity analysis for the existing wastewater infrastructure with respect to the increased/adjusted demands do not indicate any negative impacts to the system or downstream infrastructure. Town of Castle Rock Wastewater Collection Design Criteria are satisfied during normal operational conditions.

WASTEWATER SERVICES

The calculations within this Report demonstrate the following results:

1. An 8-inch main is adequate for serving the entire Project site at the calculated slopes listed in Table 2 of this report.
2. The velocity for the wastewater mains will not meet the minimum velocity of 2.0 fps at the estimated peak flow rate and existing/calculated slopes due to existing site and design constraints.
3. The wastewater mains will operate at less than 80% pipe diameter depth at peak flow.

ENGINEER'S OPINION OF COST

METZLER RANCH PARKING LOT - SANITARY SEWER MAIN IMPROVEMENTS					
Engineer's Opinion of Probable Construction Cost					
Item No.	Item	Unit	Quantity	Unit Cost	Cost
1	Sewer Main Pipe (PVC) (8") (PUBLIC)	LF	586	\$ 84.00	\$49,224.00
2	4' Sanitary Sewer Manhole (PUBLIC)	EA	2	\$5,700.00	\$11,400.00
3	Sanitary Sewer Manhole Connection	EA	1	\$1,000.00	\$ 1,000.00
TOTAL COST					\$61,624.00

REFERENCES

Final Utility Report for Castle Rock Water Administration Building, Kiowa Engineering Corporation, April 10, 2020.

Regulation No 43 – On-site Wastewater Treatment System Regulation, Colorado Department of Public Health and Environment, 2013.

Wastewater Collection Design 2018 Criteria Manual, Town of Castle Rock, December 4, 2018.

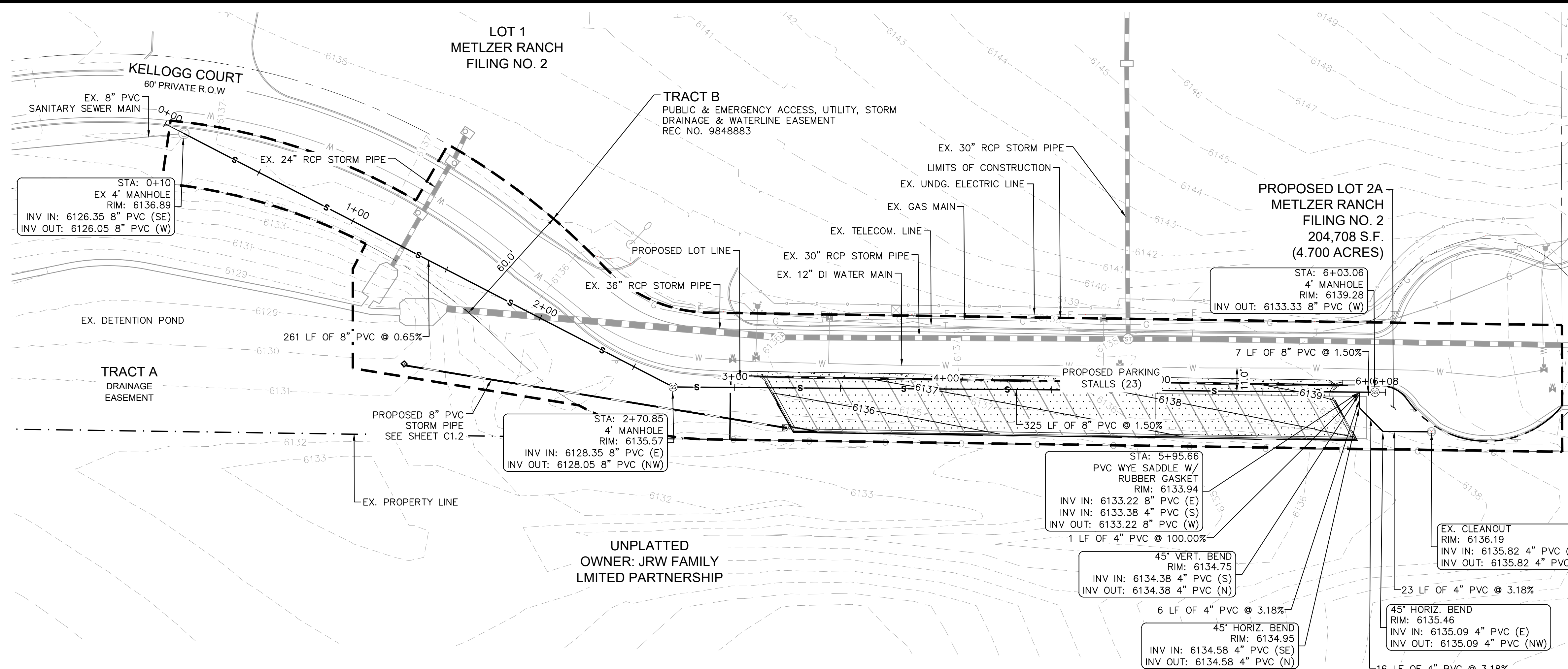
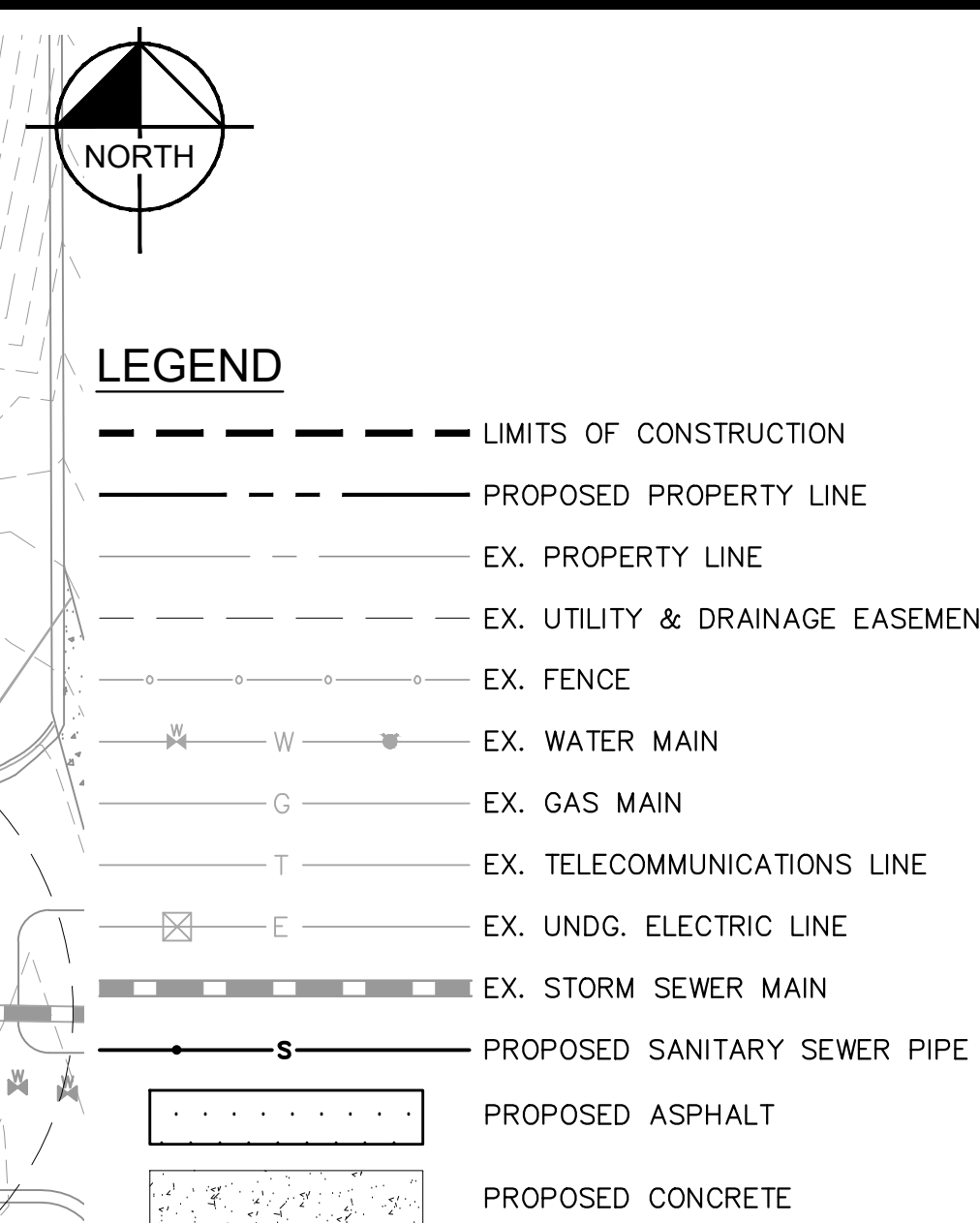
APPENDIX A

SANITARY SEWER PLAN AND PROFILE

K:\COS_Civil\196489001_Metzler Ranch Parking Lot\CAD\PlanSheets\CD\CD_SSWR_196489001.dwg Schmelbach, Ryan 9/26/2024 9:24 AM



Know what's below.
Call before you dig.



- NOTES**
- ALL EX. UTILITIES ARE TO REMAIN AND BE PROTECTED IN PLACE UNLESS OTHERWISE NOTED.
 - ALL "WET" UTILITY CROSSINGS SHALL MAINTAIN A VERTICAL SEPARATION OF AT LEAST 18".
 - ALL PROPOSED EASEMENTS MUST BE RECORDED PRIOR TO ISSUANCE OF CONSTRUCTION PERMITS.
 - THE MINIMUM SEPARATION BETWEEN WATERLINES, SANITARY SEWER AND STORM SEWER LIENS IS 10'.
 - THE MINIMUM SEPARATION BETWEEN WATER SERVICE LINES IS 5'.
 - THIS SITE IS LOCATED WITHIN THE TOWN OF CASTLE ROCK YELLOW PRESSURE ZONE.

- CAUTION NOTE**
- CONTRACTOR SHALL MAINTAIN 1.5' OF VERTICAL SEPARATION AT ALL WET UTILITY CROSSINGS.
 - CONTRACTOR SHALL MAINTAIN 1.0' OF VERTICAL SEPARATION AT ALL DRY UTILITY CROSSINGS.

TOWN APPROVAL BLOCK

TOWN OF CASTLE ROCK APPROVAL
PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM
DATE OF DEVELOPMENT SERVICES APPROVAL

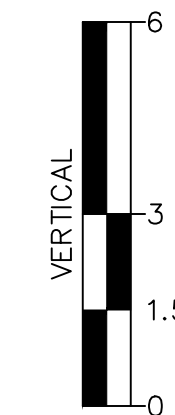
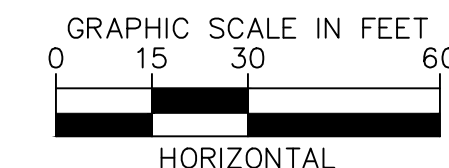
APPROVED BY: _____

DEVELOPMENT SERVICES _____ DATE: _____

PROFESSIONAL ENGINEER CERTIFICATION

I HEREBY AFFIRM THAT THESE FINAL CONSTRUCTION PLANS
WERE PREPARED UNDER MY DIRECT SUPERVISION, IN
ACCORDANCE WITH ALL APPLICABLE TOWN OF CASTLE ROCK
AND STATE OF COLORADO STANDARDS AND STATUTES,
RESPECTIVELY; AND THAT I AM FULLY RESPONSIBLE FOR ALL
DESIGN AND REVISIONS RELATIVE TO SAID PLANS.

KEVIN KOFFORD, P.E. #57234 DATE: _____



Kimley»Horn
2024 KIMLEY-HORN AND ASSOCIATES, INC.
2 N NEVADA AVE, SUITE 900
COLORADO SPRINGS, CO 80903

DESIGNED BY: RES
DRAWN BY: RES
CHECKED BY: KRK
DATE: 9/19/2024

**METZLER RANCH PARKING LOT
LOT 2A, METZLER RANCH FILING NO. 1
CONSTRUCTION DOCUMENTS
SANITARY SEWER PLAN & PROFILE**

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION

PROJECT NO.
196489001

SHEET
C1.4
SHEET 5 OF 12

APPENDIX B

WASTEWATER CALCULATIONS & FLOWMASTER REPORTS

Lot 2A - Metzler Ranch Filing No. 2

Final Utility Report

Wastewater Flow Rates			
Service Area	Flow Units (employees)	Unit Flow Rate ¹ (MGD/unit)	Average Day Flow (MGD)
Ex. Building (1 Bathroom)	2	0.000015	0.00003
Peaking Factor ²			5
Peak Flow (MGD) ³			0.00015
Inflow & Infiltration (MGD) ⁴			0.000015
Design Flow (MGD)⁵			0.000165

Notes:

¹CDPHE Reg 43 - Table 6.2 (office buildings per employee per eight-hour shift)

²Town of Castle Rock Wastewater Peaking Factor Equation (Section 4.4.1.2)

³Average Day Flow multiplied by Peaking Factor

⁴10% of Average Daily Flow

⁵Inflow & Infiltration plus Peak Flow

Worksheet for P-1

Project Description	
Friction Method	Manning
Solve For	Formula Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	1.500 %
Diameter	8.0 in
Discharge	165.00 gpd
Results	
Normal Depth	0.1 in
Flow Area	0.0 ft ²
Wetted Perimeter	0.1 ft
Hydraulic Radius	0.1 in
Top Width	0.13 ft
Critical Depth	0.1 in
Percent Full	1.0 %
Critical Slope	1.046 %
Velocity	0.42 ft/s
Velocity Head	0.00 ft
Specific Energy	0.01 ft
Froude Number	1.113
Maximum Discharge	1,215,981.52 gpd
Discharge Full	1,130,403.35 gpd
Slope Full	0.000 %
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	1.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.1 in
Critical Depth	0.1 in
Channel Slope	1.500 %
Critical Slope	1.046 %

Worksheet for P-2

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.650 %
Diameter	8.0 in
Discharge	165.00 gpd
Results	
Normal Depth	0.1 in
Flow Area	0.0 ft ²
Wetted Perimeter	0.1 ft
Hydraulic Radius	0.1 in
Top Width	0.15 ft
Critical Depth	0.1 in
Percent Full	1.2 %
Critical Slope	1.207 %
Velocity	0.33 ft/s
Velocity Head	0.00 ft
Specific Energy	0.01 ft
Froude Number	0.783
Maximum Discharge	800,457.03 gpd
Discharge Full	744,122.58 gpd
Slope Full	0.000 %
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	0.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.1 in
Critical Depth	0.1 in
Channel Slope	0.650 %
Critical Slope	1.207 %

Worksheet for EX-1

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	1.970 %
Diameter	8.0 in
Discharge	6,933.00 gpd
Results	
Normal Depth	0.4 in
Flow Area	0.0 ft ²
Wetted Perimeter	0.3 ft
Hydraulic Radius	0.3 in
Top Width	0.30 ft
Critical Depth	0.6 in
Percent Full	5.3 %
Critical Slope	0.613 %
Velocity	1.52 ft/s
Velocity Head	0.04 ft
Specific Energy	0.07 ft
Froude Number	1.744
Maximum Discharge	1,393,524.02 gpd
Discharge Full	1,295,450.79 gpd
Slope Full	0.000 %
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	5.3 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.4 in
Critical Depth	0.6 in
Channel Slope	1.970 %
Critical Slope	0.613 %

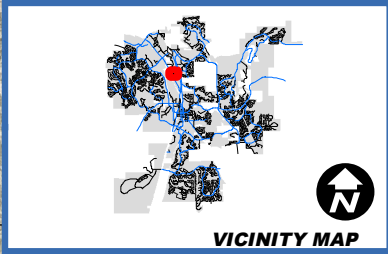


Lot 2A – Metzler Ranch Filing No. 2, Castle Rock, CO

Final Utility Report

APPENDIX C

CASTLE ROCK GIS UTILITY MAP



- Legend**
- Sanitary Sewer
 - Stormwater Conduit
 - Fiber
 - Raw Water Distribution Main
 - Water Distribution Main



1 inch = 80 feet



Disclaimer: The data presented has been compiled from various sources, each of which introduces varying degrees of inaccuracies or inconsistencies. Such discrepancies in data are inherent in supplying this product to the Town of Castle Rock. The Town of Castle Rock assumes no liability for its use or accuracy. Questions or comments regarding the cartographic composition of this map including, but not limited to, errors, omissions, corrections, and/or updates, should be directed to the Utilities Department, Town of Castle Rock, (720) 733-6900. Copyright 2024, Town of Castle Rock Utilities Mapping.

**CASTLE ROCK
UTILITIES MAP
(INTERNAL USE ONLY)**

Date: 6/13/2024

Document Path: J:\GIS\Standard Maps\10.6\11x17 LndScp.mxd

APPENDIX D

IRRIGATION SYSTEM HYDRAULIC WORKSHEET



Irrigation System Hydraulic Worksheet

Project Name: Metzler Ranch Parking Lot Date: December 6, 2024
Project Location: 11 Kellog Court, Castle Rock, Colorado 80109

Prepared by: Paul Reed Current TOCR Registration # CR24-0676

Tap Size 1.00 " Source of Pressure Existing Irrigation System
Static Water Pressure: 80 psi

Hydraulic Grade At Zone: 2 (yellow) Company RG Investments No.1 LLLP

	Ft. of Copper		Pipe Size ("	K Copper	Friction Loss (from chart)	Flow-GPM	Loss/Gain
Service Line (tap to meter):	25	LF	1.00	K Copper	0.38 /100 FT	3	0.10
Water Meter:			1.00		0.10	3	0.10
Service Line (meter to backflow):	30	LF	1.00	K Copper	0.38 /100 FT	3	0.11
Backflow:			1.00		11	3	11.00
Master Valve:			1		1.43	3	1.43

Pressure Required at Head: 37

Lateral Allowance: 3.00

Control Valve Allowance: 7.00

Mainline Allowances:							
Length of Mainline	Pipe Material	Size	Gals.				
34	LF CL200BE	1.000 "@	3	GPM	0.15 /100 FT		0.05
0	LF CL200BE	0.000 "@	3	GPM-Looped	0.00 /100 FT		0.00

Elevation: Tap elevation 6,145 High/Low: 6,135 -4.33

Green shading indicates required information you must provide

Total System requirements (PSI) 55.66

Available System Pressure (PSI) 80.00

Town of Castle Rock provides a minimum of 43 psi

Total irrigated area for tap # _____ is _____ sq. ft.



Lot 2A – Metzler Ranch Filing No. 2, Castle Rock, CO

Final Utility Report

APPENDIX E

FINAL UTILITY REPORT FOR 175 KELLOGG COURT

Utility Report
Castle Rock Water Administration Building
175 Kellogg Court
Castle Rock, Colorado
Castle Rock Project No. CD19-0045

Owner/Developer:
Castle Rock Water
175 Kellogg Court
Castle Rock, Colorado 80109



Kiowa Project No. 19023

April 10, 2020

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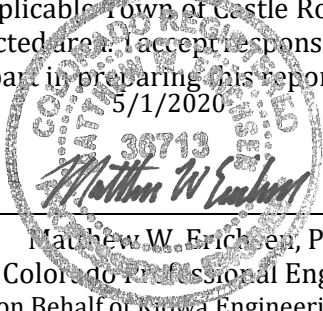
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A. Fire Flow.....	2
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STATEMENTS AND APPROVALS

ENGINEER'S STATEMENT:

The enclosed utility report, and exhibits, were prepared by me or under my direct supervision and is correct to the best of my knowledge and belief. Said utility report has been prepared in accordance with applicable Town of Castle Rock criteria and is in conformance with the master utility plans for the affected area. I accept responsibility for any liability caused by negligent acts, errors, or omissions on my part in preparing this report

5/1/2020


Matthew W. Erichsen, P.E.

State of Colorado Professional Engineer #36713
For and on Behalf of Kiowa Engineering Corporation

OWNER / DEVELOPER'S STATEMENT:

As Owner/Developer of Land(s) identified within this report; I agree to proceed, implement and comply with all recommendations and requirements outlined herein.

Tim Friday - Castle Rock Water

Name of Developer



Authorized Signature



DEVELOPMENT SERVICES

APPROVED

By tkucewesky
on 05/06/2020

Approved CD19-0045 Final Utility Rpt.pdf
Record Document on File

I. GENERAL LOCATION AND DESCRIPTION

The Castle Rock Water Administration building project is located at the northeast corner of Kellogg Court and Liggett Road at 175 Kellogg Court in Castle Rock, Colorado. The property is located in the northwest quarter of Section 35, Township 7 South, Range 67 West of the 6th Principal Meridian. The location of the site is shown on the Vicinity Map (Figure 1). The site currently includes the existing Castle Rock Water building and temporary buildings in the area of the proposed development. The overall site includes a storage building to the east and the Operations and Maintenance building to the east. The O&M building was constructed in 2015.

The proposed development will occur in the northwest corner of the property and will include construction of a one-story building with parking lots, access drives, stormwater facilities and landscaping. The existing Castle Rock Water building will remain and the temporary buildings will be removed.

II. WATER SYSTEM AND CALCULATED WATER DEMANDS

The site is looped by existing water mains to the north (a 12-inch water main in the Highway 85 ROW), to the west (a 16-inch water main in Liggett Road), to the south (a 12-inch water main in Kellogg Court) and to the east (a 12-inch water main within the property to the east of the O&M building). The design of these water mains is shown on the construction drawings titled "Construction Plans for Metzler Ranch Filing No. 2" prepared by Inter-Mountain Engineering and dated May 4, 1998. The plans show design of the 12-inch DIP water main that loops the site from the 16-inch DIP water main in Liggett Road. The existing Admin building includes a ¾-inch water service onto the water main in Kellogg Court. It appears the existing irrigation service is tapped off this existing water service.

The site is located in the Yellow Pressure Zone as described in the "2010 Water Master Plan Update". This zone is served by Tank 12 A/B which has a total capacity of 10 MG, a normal HGL of 6343.2 and a maximum HGL of 6352.1 feet (NAVD88). The anticipated water pressure for the finished floor elevation of 6138.2 (NAVD88) is 89 psi using the normal HGL and 93 psi using the maximum HGL.

The proposed development will involve installation of two new fire hydrants, a domestic water service and fire water service. The water services and one of the proposed fire hydrants will be connected to the 12-inch water main to the north of the property in the Highway 85 ROW. The second fire hydrant will connect to the existing 16-inch water main in Liggett Road. A remote Fire Department Connection will be located near the southwest corner of the building.

For the water demand calculations, the Land Use for the proposed development is considered to be Retail/Offices with an Average Daily Demand (ADD) of 0.2 gpd/sf, based on Section 4.4.1 of the "Town of Castle Rock Water System Design Criteria Manual". This rate includes irrigation demands. The total building area is 13,269 sf. Note these calculations are an estimate of the flows.

$$\text{ADD} = 0.2 \text{ gpd/sf} \times 13,269 \text{ sf} = 2,654 \text{ gpd (1.8 gpm)}$$

$$\text{MDD (Maximum Day Demand)} = 2.5 \times \text{ADD} = 2.5 \times 2,654 \text{ gpd} = 6,635 \text{ gpd (4.6 gpm)}$$

$$\text{PHD (Peak Hour Demand)} = 5.5 \times \text{ADD} = 5.5 \times 2,654 \text{ gpd} = 14,597 \text{ gpd (10.1 gpm)}$$

The Appendix includes the irrigation demand calculations on the TOCR Irrigation System Hydraulic Worksheet and the TOCR Irrigation Chart. A separate irrigation service and meter is located to the north of the building near where the domestic and fire services tap. The highest proposed irrigation zone demand is 10 gpm.

A. FIRE FLOW

A hydrant flow test was performed on June 28, 2019. A copy of the report is included in the Appendix. The calculated flowrate was 2,014 gpm at Hydrant 2625 with a residual pressure of 84 psi at Hydrant 2626. The static pressure was 95 psi at Hydrant 2626. The building construction type will be Type IIB and will be fully sprinkled. The required fire flow for the 13,269 sf building is 1,500 gpm (2,500 gpm without reduction) after a 50% reduction for the approved sprinkler system. A confirmation Memo for Required Fire Flow is included in the Appendix from Castle Rock Fire and Rescue Department.

III. WASTEWATER SYSTEM AND FLOWS

An existing 6-inch PVC sanitary sewer is located in the parking lot to the south of the proposed building and west of the existing building. The existing sanitary sewer drains to the 8-inch PVC sanitary sewer in Kellogg Court. The proposed building wastewater service will be a 4-inch PVC pipe that will connect to the existing 6-inch sanitary main described above. The existing 6-inch sanitary sewer has a slope of 2.0% and a pipe full flow capacity of 422 gpm. For the wastewater flow calculations, the Land Use for the proposed development is considered to be Retail/Offices with an Average Daily Flow (ADF) of 0.1 gpd/sf, based on Section 4.4.1 of the "Town of Castle Rock Water System Design Criteria Manual. The total building area is 13,269 sf.

$$\begin{aligned} \text{ADF} &= 0.1 \text{ gpd/sf} \times 13,269\text{sf} = 1,327 \text{ gpd} (0.0013 \text{ MGD}) \\ \text{PF (Peaking Factor)} &= 3.65 \times \text{ADF}^{-0.168} = 3.65 \times 0.0013^{-0.168} = 11.1 > 5.0 \text{ use } 5.0 \\ \text{PDF (Peak Design Flow)} &= (\text{ADF} \times \text{PF}) + (0.1 \times \text{ADF}) = 1,327 \times 5.0 + 0.1 \times 1,327 \\ \text{PDF} &= 6,768 \text{ gpd} (0.007 \text{ MGD})(4.7 \text{ gpm}) \end{aligned}$$

IV. REFERENCES

- 1) Town of Castle Rock Wastewater Collection Design Criteria Manual dated December 2018.
- 2) Town of Castle Rock Water System Design Criteria Manual dated December 2018.
- 3) 2010 Water Master Plan Update prepared by Castle Rock Water Engineering, dated March 2011.

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APPENDIX A
Water Demands
Commercial Fixture Unit Worksheet
Irrigation System Chart and Hydraulic Chart
Pages from TOCR Water System Design Criteria Manual

COMMERCIAL FIXTURE UNIT WORKSHEET

Address of Project: 175 Kellogg Ct. Castle Rock CO, 80109
Permit #:

TYPE OF FIXTURE	NUMBER OF EXISTING FIXTURES	NUMBER OF NEW FIXTURES		WATER FIXTURE UNIT VALUE*		TOTAL FIXTURE UNITS
Clothes Washer			X		=	
Dishwasher		2	X	1.4	=	1.4
Drinking Fountain		2	X	0.25	=	0.5
Hose Bibb		2	X	5	=	10
Kitchen Sink		3	X	1.5	=	4.5
Lavatory		6	X	2	=	12
Service or Mop Basin		1	X	3	=	3
Service Sink			X		=	
Shower			X		=	
Urinal		2	X	3	=	6
Water Closet (Flush Valve)			X		=	
Water Closet (Flush Tank)		6	X	5	=	30
Recessed Wall Box		2	X	0.25	=	5
Other (Specify)			X		=	
Other (Specify)			X		=	
TOTAL WATER SUPPLY FIXTURE UNITS						72.4



TOWN OF
CASTLE ROCK
COLORADO

Point of Connection Name #VALUE!
 Point of Connection Size #VALUE!
 Controller Letter A
 Include Subsurface in Time? yes



IRRIGATION CHART

Contact Information

Registered Landscaper	See Stamp, Same Sheet
Company Name	HydrosystemsKDI
Address	860 Tabor St., Suite 200
Phone	303.980.5327
Email	See Stamp, Same Sheet
Registration #	See Stamp, Same Sheet

Zone	Hydrozone Low (5"-10") Med. (10"-15") High (>15")	Plant Type (Turf, Native, Shrubs, Perennials, Trees, Annuals, etc.)	Head Type (Rotors, Sprays, Bubblers, Drip, SDI, etc.)	Nozzle* (Nozzle/Emitter size)	App. Rate (inches/hour)	GPM (Per Zone)	Inches/Month (Peak not to exceed 6"/month or 1.5"/week)	Run Time (Minutes/ Month)	Run Time (Minutes/Day)	Water Usage (Gallons per month)
Ex: 1	High	Blue Grass	RB 1806 SAM PRS	15'	1.83	15	6	197		2951
Ex: 2	low	Buffalo Grass	Hunter I-20	3	0.4	15	1	150	15	2250
A1	Low	Native Tall Grass	Head - Rotory	R-VAN	0.61	4	1.7	165	12	661
A2	Low	Native Tall Grass	Head - Rotory	R-VAN	0.61	9	1.7	165	12	1488
A3	Low	Shrubs & Trees	Drip - Point Source	0.5gph - 1.0gph	0.50	2	2.4	288	22	576
A4	Low	Native Tall Grass	Head - Rotory	R-VAN	0.61	10	1.7	165	12	1653
A5	Low	Native Tall Grass	Head - Rotor	R-VAN	0.61	10	1.7	165	12	1653
A6	Low	Shrubs & Trees	Drip - Point Source	0.5gph - 1.0gph	0.50	3	2.4	288	22	865
A7	Low	Shrubs & Trees	Drip - Point Source	0.5gph - 1.0gph	0.50	2	2.4	288	22	576
A8	Low	Shrubs & Trees	Drip - Point Source	0.5gph - 1.0gph	0.50	4	2.4	288	22	1153
A9	Low	Shrubs & Trees	Drip - Point Source	0.5gph - 1.0gph	0.50	2	2.4	288	22	576
A10	Low	Shrubs & Trees	Drip - Point Source	0.5gph - 1.0gph	0.50	2	2.4	288	22	576
A11	Low	Shrubs & Trees	Drip - Point Source	0.5gph - 1.0gph	0.50	1	2.4	288	22	288
A12	Low	Shrubs & Trees	Drip - Point Source	0.5gph - 1.0gph	0.50	3	2.4	288	22	865
A13	Low	Shrubs & Trees	Drip - Point Source	0.5gph - 1.0gph	0.50	2	2.4	288	22	576
A14	Low	Native Tall Grass	Head - Rotor	R-VAN	0.61	6	1.7	165	12	992
A15	Low	Shrubs & Trees	Drip - Point Source	0.5gph - 1.0gph	0.50	2	2.4	288	22	576
A16	Low	Shrubs & Trees	Drip - Point Source	0.5gph - 1.0gph	0.50	3	2.4	288	22	865
Total								Min/Month	Min/cycle	Gallons/Month
								3997	301	13941

*Zones noting "Assorted" nozzles contain a mix of pop up heads from the same family, in multiple throw radii. Refer to plans & construction notes for spacing and throw of each head.

Town of Castle Rock provides a minimum of 43 psi

associated with the Town's Concept, Preliminary, and Final Development Packages are documented in Chapter 3 of these Criteria.

4.4.1. Design Demands

The tabulation below provides the Average Daily Demand (ADD) rates that shall be applied to compute the demands associated with the various types of land use within the development. Demands shall be computed for intermediate and full build-out phases of the development, and shall be assigned to the appropriate design points within the model to accurately reflect the geographical distribution of land use throughout the site.

Land Use	Typical ADD/Unit	Typical SFEs/Unit
Single Family Residential and Duplexes	400 gpd/dwelling unit	1.00/dwelling unit
Multi-Family Residential (Townhomes and	260 gpd/dwelling unit	0.65/dwelling unit
Retail/Offices	0.2 gpd/SF	0.0005/SF
Hotels/Motels	75 gpd/room	0.19/room
Restaurants	3.0 gpd/SF	0.0075/SF
Car Washes	5,000 gpd/facility	12.5/facility
Industrial / Other Commercial	1,200 gpd/acre	3.0/acre
Institutional	800 gpd/acre	2.0/acre
Rates for Typical Douglas County		
School Sizes:		
Elementary (10 ac, 675 students)	3,375 gpd/school	8.44/school
Middle (25 ac, 850 students)	8,500 gpd/school	21.25/school
High (50 ac, 1,700 students)	17,000 gpd/school	42.50/school
Rates for Alternate School Sizes:		
Elementary – Domestic	5 gpd/student	0.013/student
Middle – Domestic	10 gpd/student	0.025/student
High – Domestic	10 gpd/student	0.025/student
Elementary Schools – Irrigation	3,000 gpd/total acreage	7.5/total acreage
Middle Schools – Irrigation	5,250 gpd/total acreage	13.1/total acreage
High Schools – Irrigation	4,400 gpd/total acreage	11.0/total acreage
Churches	600 gpd/church	1.5/church
Gym/Fitness Center	0.5 gpd/SF	0.00125 SFE/SF
Irrigated Land (Sports Fields and School Sites Excluded)	3,750 gpd/ irrigated acre	9.38/acre

4.4.1.1 Water System Average Daily Demands (ADD)

Notes:

- (1) All tabulated ADD rates include irrigation demands with the exception of multi-family residential, car washes, gyms/fitness centers, and schools.
- (2) Irrigation demands shall be in accordance with the Irrigation Plan approved by Castle Rock Water and hours of irrigation shall comply with the latest edition of the Town's Water Use Management Plan. Irrigation demands in this Table are for planning purposes only. Peak irrigation rates for 'Irrigated Land' and 'School Irrigation' categories tabulated above shall be in accordance with the approved Irrigation Plan, and shall not be based on the peaking factors identified in the section below.
- (3) The "Irrigated Land" rate identified above may be higher for active sports fields (e.g., irrigated fields within parks) as determined by the approved Irrigation Plan.
- (4) School sizes in this table are for planning purposes, per the Douglas County School District. Regarding design flows for schools, planned school sizes shall be confirmed with the Douglas County School District and documented in the Utility Report. The tabulated rates shown above shall be applied as appropriate, depending on the information provided by the School District.
- (5) Reasonable engineering judgment shall be used in determining the estimated ADD for commercial, industrial and institutional sites. Individual evaluation and justification, including fixture unit counts, shall be provided when the proposed use is not specifically represented in the table above, or when the proposed demands will be inconsistent with the tabulated values. For example, each car wash's unique operating plan, including recycling of wash water, shall be considered. Justification of all non-residential demands shall be addressed in the Utility Report.

4.4.1.2 Demand Factors

Once the ADD has been computed in accordance with the demand rates tabulated above, Maximum Day Demands (MDD) and Peak Hour Demands (PHD) shall be computed by multiplying the ADD by the following factors:

Maximum Day Demand/Average Day Demand:	2.5	MDD/ADD
Peak Hour Demand/Average Day Demand:	5.5	PHD/ADD

Peaking factors are not applied to irrigation ADD demands. Max Day Demand and Peak Hour Demand are calculated by multiplying the ADD demand by the demand factors. If the site's irrigation demands are calculated using the table in section 4.4.1, the irrigation ADD is added to the calculated MDD and PHD, computed as follows:

$$\begin{aligned}\text{MDD} &= \text{Domestic ADD} \times \text{Maximum Day Factor} + \text{Irrigation ADD} \\ \text{PHD} &= \text{Domestic ADD} \times \text{Peak Hour Factor} + \text{Irrigation ADD}\end{aligned}$$

4.4.1.3 Fire Flows

Fire flows shall conform to the latest edition of the International Fire Code (IFC) and shall be confirmed by the Town's Fire Department, as described in section 3.6.XII of

this criteria. A 50 percent reduction in required fire flow may be allowed for approved residential sprinkler systems, and a 75 percent reduction may be allowed for approved commercial sprinkler systems at the discretion of the Town of Castle Rock Fire Chief. The minimum fire flow for the water distribution system is 1,500 gpm, unless otherwise approved by the Fire Department.

4.4.2 Storage Requirements

The required storage volume associated with a particular development shall be computed as follows:

$$\text{Storage Volume (MG)} = \text{Maximum Day Demand (MG)} + \text{Fire Flow (MG)}$$

Example Calculation:

Based on an assumed 1500 gpm two-hour fire and an MDD rate of 75 gpm, the storage requirement would be:

75 gpm x 60 min/hr x 24 hrs =	108,000 gallons
+ 1500 gpm x 60 min/hr x 2 hrs =	<u>180,000 gallons</u>
Total required storage =	288,000 gallons (0.288 MG)

Based on the computed storage volume, Castle Rock Water will evaluate whether the development is compatible with the location and magnitude of the existing and master-planned storage volume within the pressure zone, or if additional storage must be considered to provide the appropriate level of service to the development. Due to hydraulic constraints and limitations within the service area, fire storage within the pressure zone may need to be duplicated as determined by Castle Rock Water.

4.4.3 Minimum Hydraulic Performance Criteria

All mains shall be sized to provide for domestic, irrigation and fire protection demands to all points in the development without violating the pressure, velocity, and headloss criteria set forth herein. The proposed network shall be evaluated by the engineer under the hydraulic conditions stipulated in the following table using an approved hydraulic network analysis model. In some cases, the Town may require the oversizing of certain mains based on required master-planned sizes associated with the overall Town system. Recovery costs of such oversizing shall be in accordance with the Town Municipal Code, and pursuant to applicable executed agreements.

Hydraulic Condition	Pressure (psi)
Minimum static pressure with zero demand (20% tank stage)	43
Maximum static pressure with zero demand (100% tank stage)	125
Minimum dynamic pressures (based on 20% tank stage):	
Max Daily Demand + fire flow (see note below)	20
Peak Hour Demand (see note below)	35

Note: Pressure and Velocity criteria listed above for the MDD plus fire flow and PHD conditions shall be satisfied with one critical distribution loop out of service.

4.4.3.1 Operating Pressures and Pressure Zone Characteristics

The required operating pressures listed above apply to pressures within the mains, and shall be satisfied in accordance with the general pressure zone elevation data tabulated below (Vertical Datum NAVD 88).

Pressure Zone Designation	Max HGL Elev.	Top Elev. Served	Low Elev. Served
1 (Orange)	6192	6072	5915
2 (Yellow)	6352	6230	6065
3a (Blue-east)	6508	6389	6221
3b (Blue-west)	6523	6399	6236
4 (Purple)	6594	6474	6308
5 (Red)	6680	6557	6393
6 (Green)	6824	6700	6537

Notes: (1) Elevations shown above are general guidelines. Engineer shall contact Castle Rock Water to confirm the appropriate numbers for a specific site. (2) Pressure evaluations in areas served solely by PRVs shall be based on the PRV settings, as provided by Castle Rock Water.

4.4.3.2 Assumed Pressures at Existing System Connections

Primary distribution and transmission mains between the supplying storage tank and

APPENDIX B
Water Storage
Confirmation Memo for Required Fire Flow

Castle Rock Fire and Rescue Department

300 Perry Street - Castle Rock, CO 80104

(303) 660-1066

PLAN REVIEW

PROJECT LOCATION 175 Kellogg Court	PROJECT # 3765
PROJECT DESCRIPTION PRE19-0019 - New CRW customer Service and Admin Bldg - 175 Kellogg Ct -	OCCUPANCY ID 1343
AREA INVOLVED IN ENTIRE PROJECT PRE19-0019 - New CRW customer Service and Admin Bldg - 175 Kellogg Ct -	ALTERNATE ID

PERMIT # 8667	PERMIT DESCRIPTION Fire Flow Evaluation		
AREA AFFECTED BY THIS PERMIT TOCR Water Admin Building - 175 Kellogg - FIRE FLOW EVALUATION - Fire :		SQUARE FEET	VALUE OF WORK
CONTACT NAME	NOTIFY BY	NOTIFY AT	
REASON FOR SUBMITTAL Review Only	PLAN REVIEWER ryoung	SUBMITTED 12/18/2019	COMPLETED 12/19/2019

CONTRACTOR N/A (ID 3373)	BUSINESS PHONE	FAX NUMBER
STREET ADDRESS	CITY, STATE, ZIP	
E-MAIL ADDRESS	STATE LICENSE NUMBER	

CASTLE ROCK FIRE AND RESCUE DEPARTMENT

** PLAN REVIEW LETTER **

<< PLEASE READ THE FOLLOWING CAREFULLY >>

On 12-19-2019 a review was conducted on the submitted FIRE FLOW requirements for the New ADMIN Building, located on 175 Kellogg. The following comments pertain to the project:

CODE USED IN REVIEW:

The submitted plans have been reviewed for compliance to the 2018 edition of the International Fire Code (IFC).

REVIEW COMMENTS:

INFORMATION ON THE PROJECT:

The project consists of a new 13,269 square foot office building that will be fully sprinkler protected. From the information currently known to the fire department the following comments pertain to the required fire flows:

The proposed building is a 1-Story, 13,269 square foot building, constructed of Type II-B construction, with a full NFPA 13 Fire Sprinkler system. The base required fire flow as noted in the 2018 IFC - Table B105.1, would be: 2,500 gpm, the code provides an allowance for sprinkler systems, and based on the knowledge of this building the fire department will allow a 50% reduction bringing the required fire flow to: 1,500 gpm for a duration of 2-Hours

FINAL FIRE FLOW REQUIRED:

2012 International Fire Code (IFC), Appendix B, as amended by the Town of Castle Rock requires a MINIMUM fire flow requirement of 1,500 gpm @ 20 psi for a duration of 2-hours. This



fire flow shall be from 1 fire hydrants within 225 feet of the structure.

BUILDING INFORMATION:

Type of Construction: The proposed project is shown as being located in a building of **II-B**.

Occupancy Classification: The proposed occupancy classification for this project has been reviewed for compliance with the 2012 IFC and IBC. The occupancy classification of the project is shown as being a **Group "B" Occupancy**.

ACTION TAKEN BY THE FIRE DEPARTMENT:

Approval of the above fire flow is based on the information known to the fire department as of the date of this review, as the result of additional information or inspections if the fire flow changes, corrective action may be required.

Should you have any questions please feel free to contact me.

Rick L. Young - Fire Prevention Officer - RYoung@crgov.com

DATE RECEIVED	BY:		
DATE FEE PAID 12/19/2019	PLAN REVIEW FEE 0.00	CHECK #	RECEIPT #

PICKED UP BY	COMPANY	DATE
--------------	---------	------



Memorandum

To: Rick Young, Castle Rock Fire and Rescue Department
From: Matthew Erichsen, P.E.
Date: December 18, 2019
Project: Castle Rock Water Admin Building
Subject: Required Fire Flow

The Castle Rock Water Administration Building project involves the construction of a new one story building on the property at 175 Kellogg Court. The proposed building will be located in the northwest corner of the existing site. The development will include installation of two new fire hydrants near the proposed building and installation of a fire service line to the proposed building. A remote fire department connection will be located near the southwest corner of the building and near a proposed fire hydrant. This memo is being sent to verify the fire flow requirements for the building.

Building Area: 13,269 sf

Building Construction Type: Type IIB

Building Sprinkled: Fully sprinkled

Required Fire Flow: 1,500 gpm for 2 hours (after 50% reduction of 2,500 gpm)

Required minimum number hydrants: 1 hydrant

Rick L. Young - Deputy Fire Marshal

Town of Castle Rock Fire and Rescue Department

CASTLE ROCK FIRE & RESCUE DEPARTMENT



These plans have been reviewed and accepted subject to any/all corrections in compliance with the International Fire Code as amended and adopted by the Town of Castle Rock.

Comments and corrections will be in the attached plan review letter and/or marked on the plans.

All projects are subject to changes in the field in accordance with the current codes and ordinances.

Completed by: *Rick L. Young*

ICC Cert #: 0632915-67

DFS Fire Suppression #: 91-147

DFS Fire Insp. III / Plan Examiner # 07-180107

APPENDIX C
Water Hydraulic Analysis and Modeling
Fire Hydrant Flow Test Result



TOWN OF CASTLE ROCK FIRE FLOW TEST FORM

6/28/2019

Cameron Lewis

Extreme Fire Protection

Phone: 303-349-8645

Email Address: cameronl@extremefp.com

Project Name:

Project Location: Hwy 85 & Liggett Rd.

Address: 2807 US Hwy 85

F F11-2019
P _____

Test Conducted By:

Ken/Avery

Start Time

11:42

End Time

11:45

Pressure Hydrant

Hydrant ID	FH	2626	
Pre-test Static Pressure (Ps1)		95	psi
Residual Pressure (Pr)		84	psi
Post-test Static Pressure (Ps2)		96	psi
Flowing Hydrant			
Hydrant ID	FH	2625	
Orifice Side (D)		4.5	in
Main Size (Dp)		16	in
Calculated Flowrate (Qr)		2014	gpm
Estimated Volume Discharged (Q)		6042	gallons

Notes:



1 inch = 334 feet

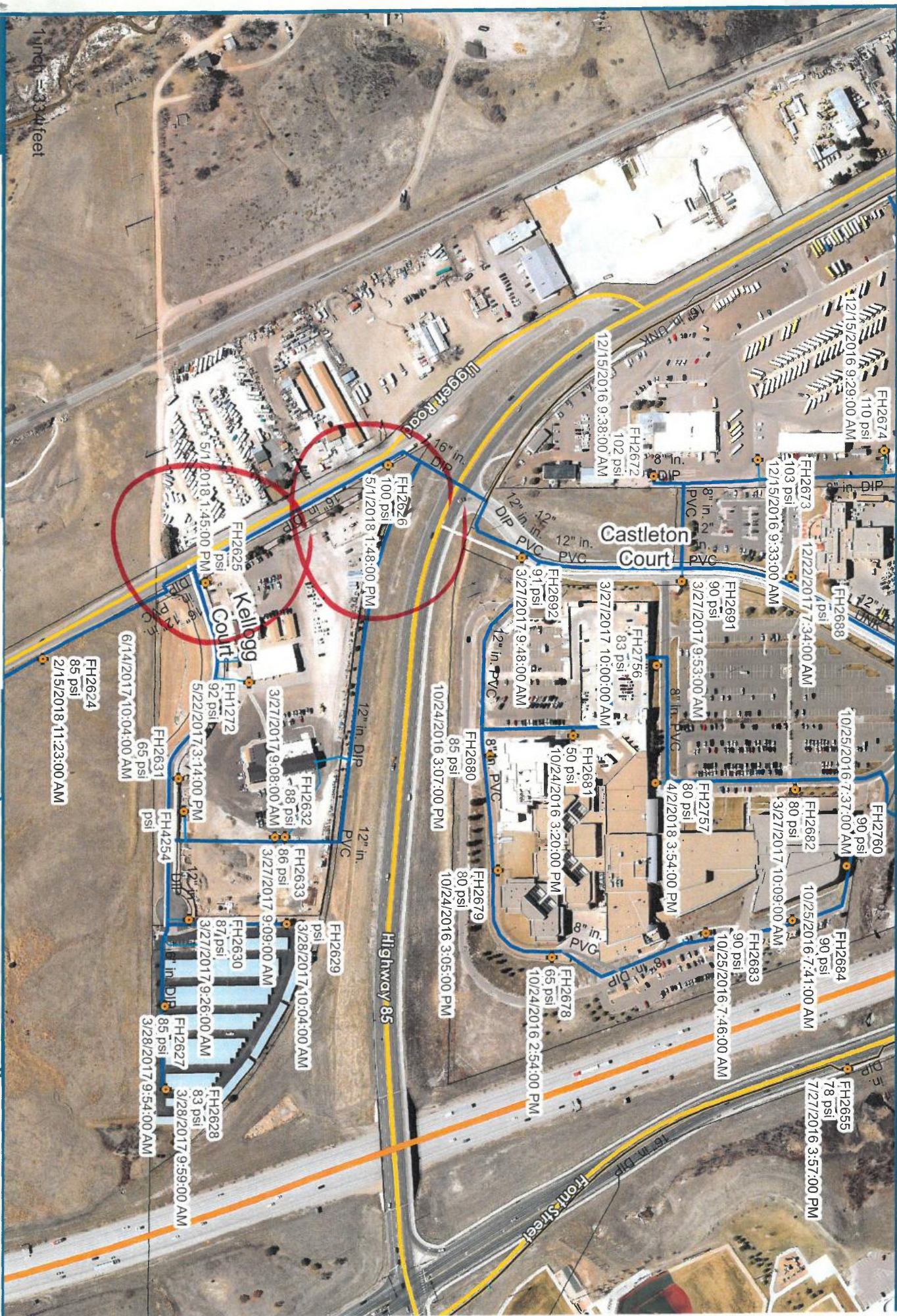


Legend

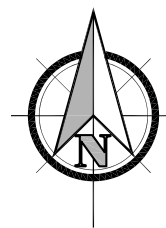
- Sanitary Sewer
- Stormwater Conduit
- Fiber



Disclaimer: The data presented has been compiled from various sources, each of which introduces varying degrees of inaccuracies or inconsistencies. Such discrepancies in data are inherent and in supplying this product the Town of Castle Rock assumes no liability for its use or accuracy. Questions or comments regarding the cartographic composition of this map including, but not limited to, errors, omissions, corrections, and/or updates, should be directed to the Utilities Department, Town of Castle Rock, (720) 733-0097. Copyright 2012, Town of Castle Rock Utilities Mapping.



APPENDIX D
Maps and Plans
 Vicinity Map
 Town Utility Map
 Overall Utility Plan



SCALE: NTS

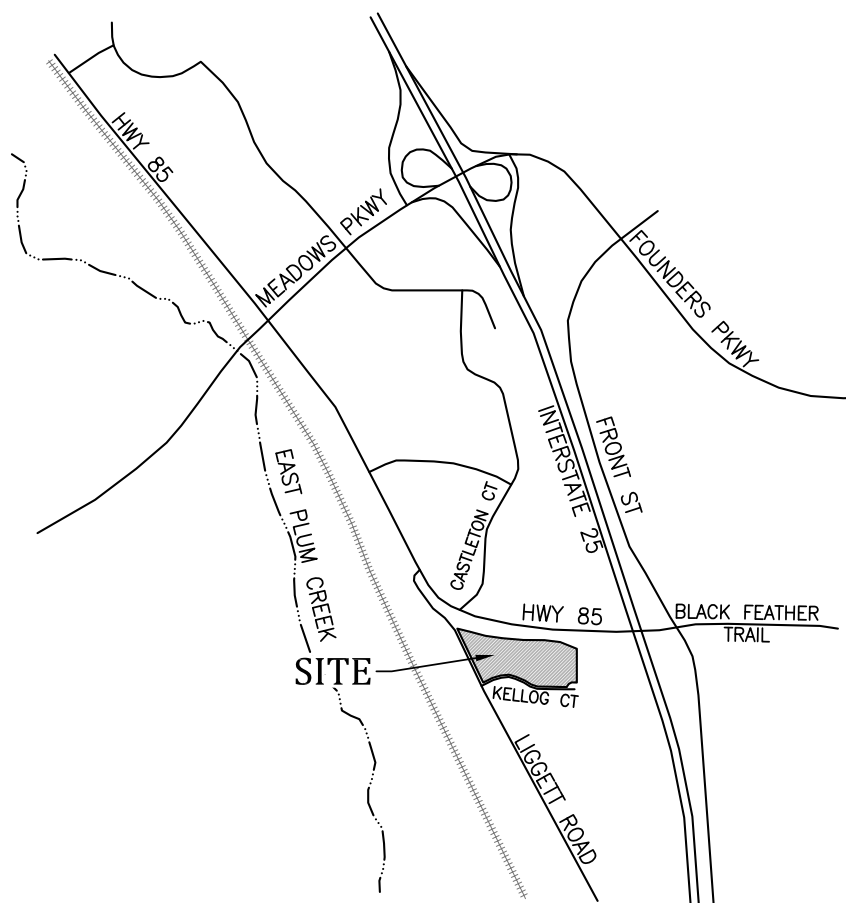
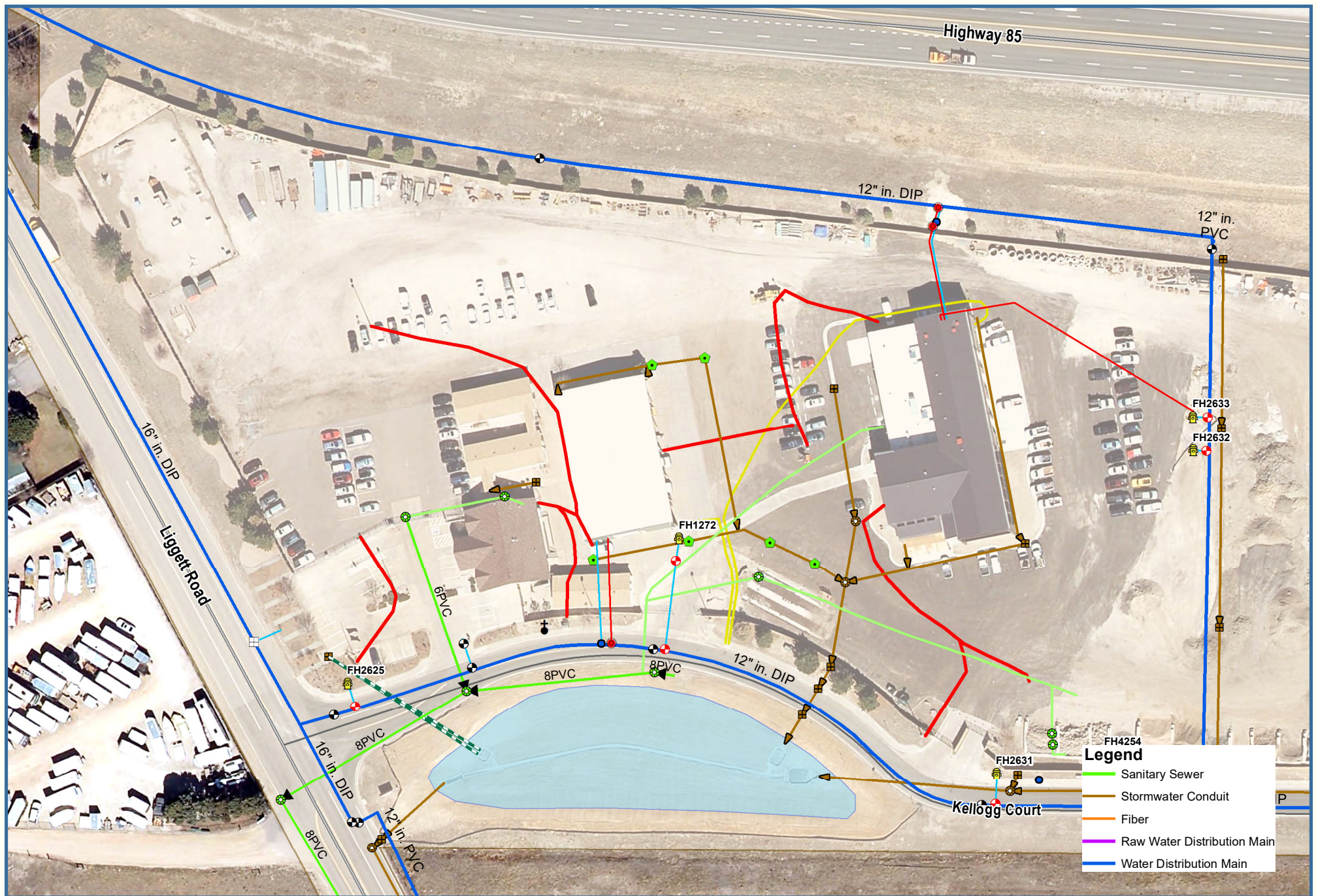
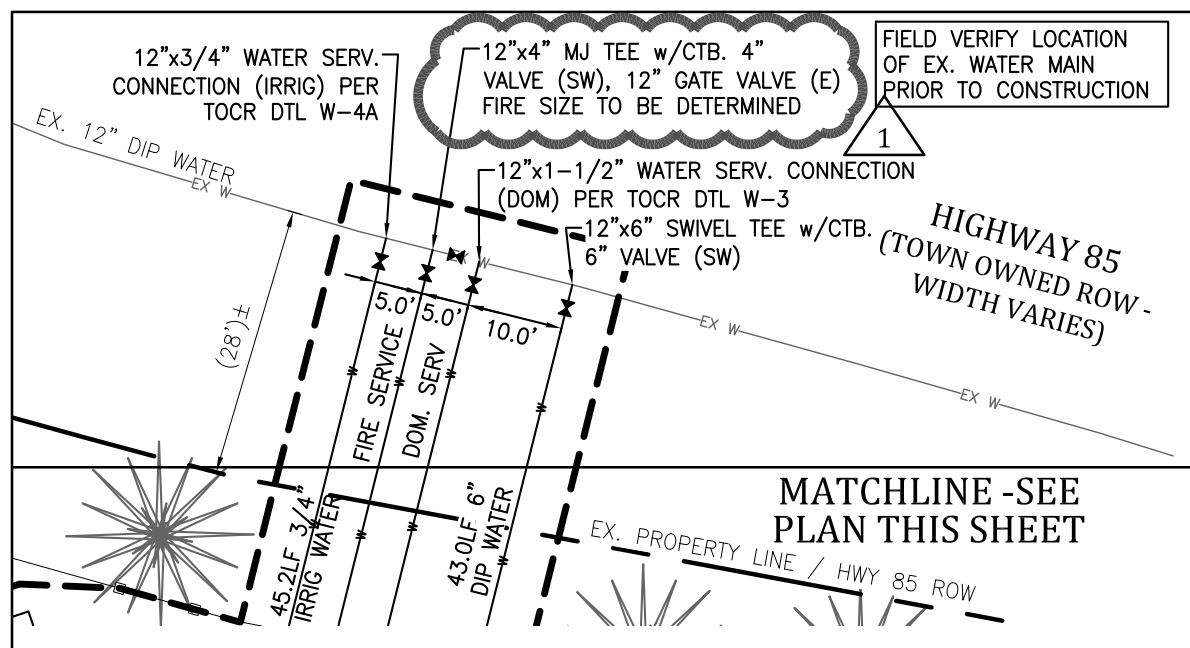
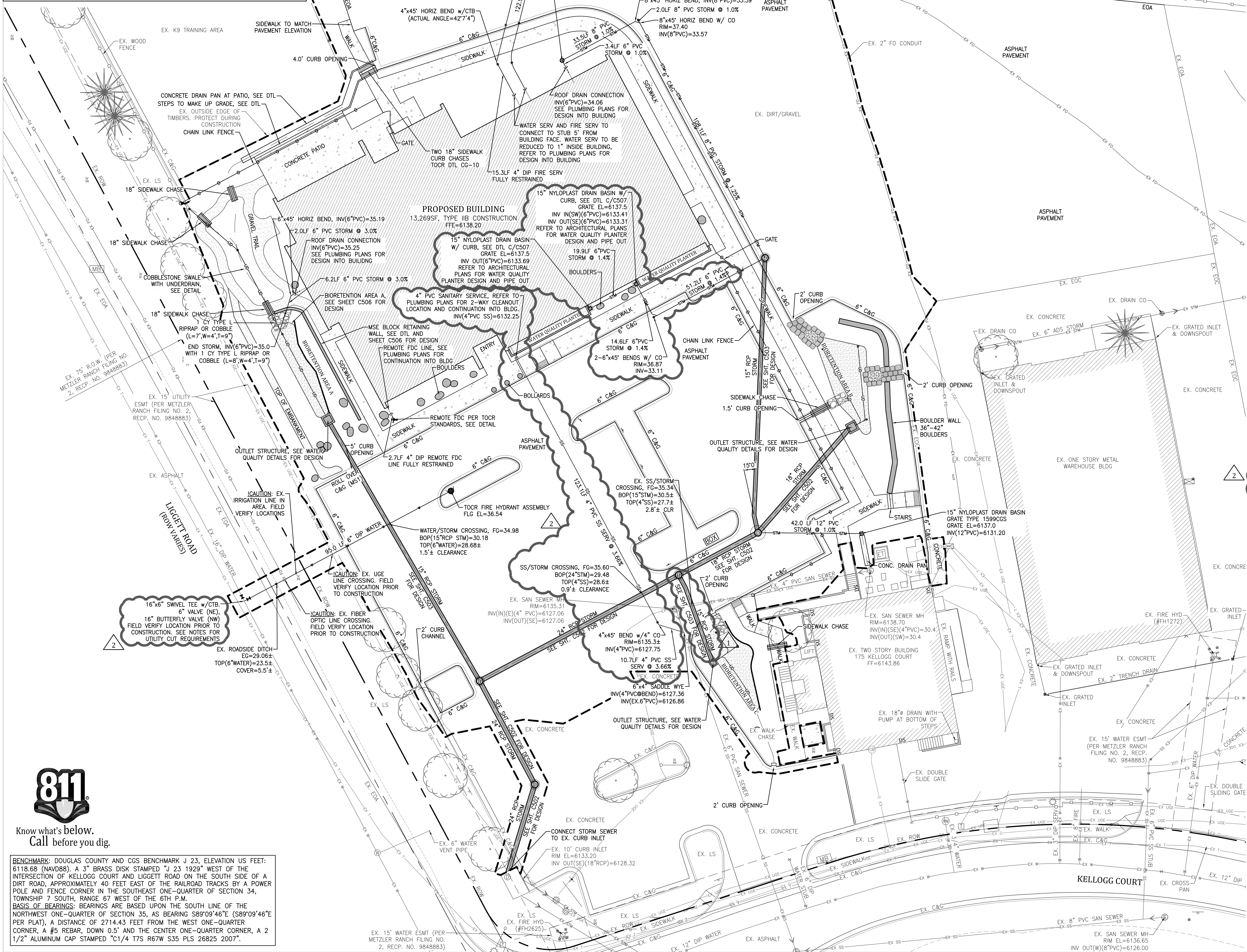


FIGURE 1
VICINITY MAP
CASTLE ROCK WATER ADMINISTRATION BUILDING





MATCHLINE - SEE PLAN THIS SHEET



LEGEND	
	PROPOSED BUILDING
	EXISTING BUILDING TO REMAIN
	EXISTING FIRE HYDRANT
	EXISTING WATER VALVE
	EXISTING SANITARY SEWER MANHOLE
	EXISTING STORM SEWER MANHOLE
	EXISTING GRATED INLET
	EXISTING LIGHT POLE
	LIGHTPOLE, SEE SITE LIGHTING PLAN FOR LAYOUT
	PROPOSED ELECTRIC TRANSFORMER
	UTILITY TESTHOLE LOCATION
	EXISTING OR PROPOSED PROPERTY LINE
	EXISTING EASEMENT
	PROPOSED EASEMENT
	EXISTING CHAIN LINK FENCE
	PROPOSED 8' HIGH CHAIN LINK FENCE WITH TOP RAIL PER CDOT M-607-2
	EXISTING WATER LINE
	EXISTING SANITARY SEWER & FLOW DIRECTION
	EXISTING STORM SEWER
	EXISTING UNDERGROUND ELECTRIC LINE
	EXISTING UNDERGROUND TELEPHONE LINE
	EXISTING FIBER OPTIC LINE
	EXISTING GAS LINE
	PROPOSED SANITARY SERVICE AND CLEAN OUT
	PROPOSED WATER LINE OR SERVICE AND VALVE
	PROPOSED WATER LINE, THRUST BLOCK & MJ RSTNS
	PROPOSED FIRE HYDRANT
	PROPOSED WATER METER
	UTILITY CAP/PLUG OR INTERFACE
	PROPOSED SANITARY SEWER AND MANHOLE
	PROPOSED STORM SEWER PIPE AND MANHOLE
	PROPOSED BIORETENTION OUTLET STRUCTURE

- NOTES:**
- ALL WATER AND SANITARY SEWER WORK SHALL BE IN ACCORDANCE WITH THE TOWN OF CASTLE ROCK STANDARDS AND DETAILS.
 - REFER TO NOTE SHEET FOR UTILITY NOTES.
 - UTILITY INTERFACE BETWEEN SITE AND BUILDING DESIGN INTERFACE IS 5.0'-FT AWAY FROM BUILDING FACE, UNLESS OTHERWISE NOTED. REFER TO MECHANICAL/PLUMBING DRAWINGS FOR DESIGN OF UTILITY FROM INTERFACE TO THE BUILDING. SITE UTILITY CONTRACTOR TO COORDINATE WITH BUILDING UTILITY/PLUMBING CONTRACTOR ON THE EXACT LOCATION OF UTILITIES INTO THE BUILDING PRIOR TO CONSTRUCTION.
 - CONTRACTOR SHALL PROVIDE A MINIMUM SEVENTY-TWO (72) HOUR NOTICE TO, AND OBTAIN APPROVAL FROM: OPERATIONS, TOWN OF CASTLE ROCK UTILITIES DEPARTMENT, (720) 733-6000, PRIOR TO MAKING ANY CONNECTIONS/TIE-INS TO EXISTING WATER, SANITARY SEWER, AND/OR STORM SEWER SYSTEMS.
 - CONTRACTOR SHALL NOTIFY THE TOWN OF CASTLE ROCK UTILITIES DEPARTMENT OF ANY WORK THAT REQUIRES SHUTDOWN OR INTERRUPTION OF SERVICE OF EXISTING WATER MAINS THREE WEEKS PRIOR TO THE PROPOSED SHUTDOWN OR INTERRUPTION UNLESS OTHERWISE APPROVED BY THE UTILITIES DEPARTMENT.
 - EDC: THE PIPE TO THE FDC SHALL TERMINATE WITH A 5-INCH STORZ FITTING WITH PERMANENTLY ATTACHED CAP, AND A 22-30 DEGREE ELBOW TO DIRECT THE STORZ HALFWAY BETWEEN HORIZONTAL AND THE GROUND. REFER TO THE FDC DETAIL. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
 - REFER TO CRFD LIFE SAFETY DIVISION GUIDELINE, FIRE DEPARTMENT CONNECTIONS (FDC) FOR REQUIREMENTS.
 - FDC AND FIRE WATER PIPE TO BE FULLY RESTRAINED.
 - PROJECT IS LOCATED IN THE YELLOW PRESSURE ZONE. EXISTING NORMAL WATER MAIN PRESSURE: 91 PSI +/- (NORMAL HGL=6343 AND MAXIMUM HGL=6352).
 - FIRE FLOW TEST COMPLETED ON JUNE 28, 2019. STATIC PRESSURE: 95 PSI. RESIDUAL PRESSURE: 84 PSI.
 - ALL UTILITY CUTS WITHIN THE PUBLIC ROW ARE TO BE FILLED WITH FLOWABLE FILL, EDGE-MILL PERIMETER OF SAW-CUT, MATCH EXISTING ASPHALT DEPTH. COORDINATE WITH PUBLIC WORKS INSPECTOR.

BUILDING FIRE FLOW INFORMATION	
BLDG CONSTRUCTION TYPE:	II-B
FIRE SPRINKLER SYSTEM:	YES
BUILDING FIRE AREA:	13,269 sf
FIRE FLOW REQUIRED:	1,500gpm @ 20psi Residual (ASSUMES 50% FIRE FLOW REDUCTION FOR SPRINKLERS)
MIN # OF HYDRANTS:	1

PROFESSIONAL ENGINEER CERTIFICATION

I hereby affirm that these final construction plans were prepared under my direct supervision, in accordance with all applicable Town of Castle Rock and State of Colorado standards and statutes, respectively; and that I am fully responsible for all design and revisions relative to said plans.

TOWN OF CASTLE ROCK APPROVAL

PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

Approved By: _____ Date: _____

Development Services _____ Date: _____

811

Know what's below.
Call before you dig.

BENCHMARK: DOUGLAS COUNTY AND CGS BENCHMARK J 23, ELEVATION US FEET: 6118.68 (NAV888). A 3" BRASS DISK STAMPED "J 23 1929" WEST OF THE INTERSECTION OF KELLOGG COURT AND LIGGETT ROAD ON THE SOUTH SIDE OF A DIRT ROAD, APPROXIMATELY 40 FEET EAST OF THE RAILROAD TRACKS BY A POWER POLE AND FENCE CORNER IN THE SOUTHEAST ONE-QUARTER OF SECTION 34, TOWNSHIP 7 SOUTH, RANGE 67 WEST OF THE 6TH P.M. BASIS OF BEARINGS: BEARINGS ARE BASED UPON THE SOUTH LINE OF THE NORTHWEST ONE-QUARTER OF SECTION 35, AS BEARING S89°09'46"E (S89°09'46"E PER PLAT), A DISTANCE OF 2714.43 FEET FROM THE WEST ONE-QUARTER CORNER, A #5 REBAR, DOWN 0.5' AND THE CENTER ONE-QUARTER CORNER, A 2 1/2" ALUMINUM CAP STAMPED "C1/4 17S R67W S35 PL5 26825 2007".

102 E. Moreno Avenue
Colorado Springs, CO 80903
719.473.7063
www.hbaa.com

Kiowa Engineering Corporation

7175 West Jefferson Avenue, Suite 2200
Lakewood, Colorado 80235
(303) 852-0359

CASTLE ROCK WATER

175 Kellogg Court
Castle Rock, CO 80109

issue / revision	date:
ASI 1 - N Parking	Apr. 10, 2020
Building Dept.	Mar. 17, 2020
Addendum #3	Feb. 20, 2020
Addendum #2	Feb. 19, 2020
Const. Docs	Jan. 31, 2020
Design Develop	Oct. 15, 2019
Schematic Design	Aug 30, 2019

job #	description
Kiowa #19023	EL5
HB&A #163-17	MWE

Utility Plan

C501

9
OF 25 SHTS

APPENDIX E
TOCR Final Utility Report Checklist



Final Utility Report Checklist

The Final Utility Report must be in conformance with the latest Town of Castle Rock Water and Wastewater System Design Criteria Manuals, available on the Town's website.

For the Final Utility Report, the Preliminary Utility Report and associated hydraulic modeling shall be thoroughly updated to reflect the final design and layout of all water/wastewater system facilities and mains since the approval of the Site Development Plan (SDP), and as now shown on the Construction Drawings (CDs). The Final Utility Report shall describe adherence to the Preliminary Utility Report or describe deviations, and shall resolve any outstanding issues regarding the Town's ability to serve the development. As applicable, hydraulic modeling shall be provided for both the initial phase of development represented on the CDs, and for full build-out of the overall site. The Final Utility Report shall include a discussion of applicable SCADA requirements.

The following outline sets forth the **required minimum** content to be provided in the Final Utility Report that shall be submitted with the CDs. This report must be prepared by, or the report preparation supervised by a registered Professional Engineer licensed in Colorado. A copy of this checklist must be submitted with the Final Utility Report.

Please check off the following items to assure your report is complete. Appropriate notations shall be provided with the checklist. For example, if a specific item is not addressed or not applicable, an explanation needs to be provided.

Included	N/A	
		TITLE SHEET
✓		A. Name of Project, including legal name of development
✓		B. Address
✓		C. Owner
✓		D. Developer
✓		E. Engineer
✓		F. Submittal date and revision dates as applicable
✓		APPROVAL BLOCK SHEET (Available on Town's website)
✓		TABLE OF CONTENTS
		PROJECT LOCATION AND DESCRIPTION
✓		A. Site Location
✓		B. Description of Property and Land Use
		CALCULATED WATER DEMANDS
✓		A. Average Day Demands (ADD)
✓		B. Max Day Demands (MDD)

Final Utility Report – Formatting Checklist

Included	N/A	
		CALCULATED WATER DEMANDS (CONT.)
✓		C. Peak Hour Demands (PHD)
		D. Irrigation Demands
		EXISTING WATER SYSTEM
✓		A. Existing Distribution System
✓		B. Existing Supply Facilities
		PROPOSED WATER SYSTEM
✓		A. Proposed Distribution System
✓		B. Proposed Supply Facilities
✓		C. Required Fire Flows
	✓	D. Land Dedication Requirements
		PROPOSED WATER SYSTEM ANALYSIS AND MODELING
	✓	A. Hydraulic Models
	✓	B. Hydraulic Modeling Scenarios
	✓	C. Hydraulic Modeling Output and Required Schematics
✓		D. Fire Flow Test Results
		CALCULATED WASTEWATER FLOWS
✓		A. Average Day Wastewater Flows (ADF)
✓		B. Peaking Factor (PF)
✓		C. Peak Design Flows (PDF)
		EXISTING WASTEWATER SYSTEM
✓		A. Existing Collection System
		PROPOSED WASTEWATER SYSTEM
✓		A. Proposed Collection System
✓		B. Proposed Wastewater Facilities
	✓	C. Land Dedication Requirements
	✓	PROPOSED WASTEWATER SYSTEM ANALYSIS AND MODELING
	✓	A. Hydraulic Models
	✓	B. Hydraulic Modeling Scenarios
	✓	C. Hydraulic Modeling Output and Required Schematics
	✓	POTENTIAL SUBDIVISION IMPROVEMENTS AGREEMENT (SIA) ITEMS
	✓	POTENTIAL PERMITTING REQUIREMENTS
✓		REFERENCES

Final Utility Report – Formatting Checklist

Included	N/A	
		APPENDICES
✓		Appendix A — Water Demands
✓		Water Fixture Unit Counts and Tap/Meter Sizing Calculations
✓		Irrigation Demands
✓		Hydraulic Worksheet(s) and Irrigation Chart(s)
✓		Appendix B — Water Storage
✓		Confirmation Memo for Required Fire Flow
✓		Appendix C — Water Hydraulic Analysis and Modeling
✓		Fire Flow Test Results
See Report Text		Appendix D — Wastewater Flows
	✓	Appendix E — Wastewater Hydraulic Modeling
✓		Appendix F — Maps and Plans
✓		A. Vicinity Map
✓		B. Utility Map(s) provided by the Utilities Department
✓		C. Overall Utility Plan from the CDs
	✓	D. Water/Wastewater Utility Plan(s)

Notes/Comments:



Lot 2A – Metzler Ranch Filing No. 2, Castle Rock, CO

Final Utility Report

APPENDIX F

FINAL UTILITY REPORT CHECKLIST



Final Utility Report Checklist

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		B. Address
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		D. Developer
		E. Engineer
		F. Submittal date and revision dates as applicable
		APPROVAL BLOCK SHEET (Available on Town's website)
		TABLE OF CONTENTS
		PROJECT LOCATION AND DESCRIPTION
		A. Site Location
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		A. Average Day Demands (ADD)
		B. Max Day Demands (MDD)

Final Utility Report – Formatting Checklist

Included	N/A	
		CALCULATED WATER DEMANDS (CONT.)
		C. Peak Hour Demands (PHD)
		D. Irrigation Demands
		EXISTING WATER SYSTEM
		A. Existing Distribution System
		B. Existing Supply Facilities
		PROPOSED WATER SYSTEM
		A. Proposed Distribution System
		B. Proposed Supply Facilities
		C. Required Fire Flows
		D. Land Dedication Requirements
		PROPOSED WATER SYSTEM ANALYSIS AND MODELING
		A. Hydraulic Models
		B. Hydraulic Modeling Scenarios
		C. Hydraulic Modeling Output and Required Schematics
		D. Fire Flow Test Results
		CALCULATED WASTEWATER FLOWS
		A. Average Day Wastewater Flows (ADF)
		B. Peaking Factor (PF)
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		EXISTING WASTEWATER SYSTEM
		A. Existing Collection System
		PROPOSED WASTEWATER SYSTEM
		A. Proposed Collection System
		B. Proposed Wastewater Facilities
		C. Land Dedication Requirements
		PROPOSED WASTEWATER SYSTEM ANALYSIS AND MODELING
		A. Hydraulic Models
		B. Hydraulic Modeling Scenarios
		C. Hydraulic Modeling Output and Required Schematics
		POTENTIAL SUBDIVISION IMPROVEMENTS AGREEMENT (SIA) ITEMS
		POTENTIAL PERMITTING REQUIREMENTS
		REFERENCES

Final Utility Report – Formatting Checklist

Included	N/A	
		APPENDICES
		Appendix A — Water Demands
		Water Fixture Unit Counts and Tap/Meter Sizing Calculations
		Irrigation Demands
		Hydraulic Worksheet(s) and Irrigation Chart(s)
		Appendix B — Water Storage
		Confirmation Memo for Required Fire Flow
		Appendix C — Water Hydraulic Analysis and Modeling
		Fire Flow Test Results
		Appendix D — Wastewater Flows
		Appendix E — Wastewater Hydraulic Modeling
		Appendix F — Maps and Plans
		A. Vicinity Map
		B. Utility Map(s) provided by the Utilities Department
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Notes/Comments: