

Preliminary Utility Report

Bella Mesa South

SDP25-0014

Prepared for:

Cardel Homes

9110 East Nichols Ave, Suite 120

Denver, CO 80112

Contact: Bryan Conway

(303) 662-8942 voice

Prepared by:



Redland

WHERE GREAT PLACES BEGIN

720.283.6783 Office
1500 West Canal Court
Littleton, Colorado 80120

REDLAND.COM

February 12, 2026

Project No. 17026.007



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: _____

Travis Frazier, P.E.

Registered Professional Engineer

State Of Colorado No. 45342

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

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General Location and Description

Introduction

This report presents an analysis of the water and wastewater requirements for the Bella Mesa South subdivision, hereafter referred to as the Site.

Site Location

The Site is a part of the East half of Section 8, Township 8 South, Range 66 West of the 6th P.M., in the Town of Castle Rock, County of Douglas, State of Colorado. See Appendix F for project Vicinity Map.

Description of Property and Land Use

The Site is roughly 8.9 acres undeveloped and located north of Mikelson Boulevard and is bounded by the Founders Village Filing 24 development to the east, and Founders Village Filing 24 Tract S to the west. Proposed development will include approximately 93 multi-family dwellings along with landscaping, associated roadways, and site infrastructure. In the current condition, native grasses and weeds cover the Site. The southern portion of the Site generally slopes to the southwest towards Mitchell Gulch. The northern portion of the Site generally slopes to the northwest towards Mitchell Gulch and Tract B of Founders Village Filing No. 24. See Appendix F for a conceptual Site utility plan.

Calculated Water Demands

This report analyzes the water system that services the Site's 93 SFE's (Single Family Equivalent). The proposed water flows for the Site have been calculated using the Town of Castle Rock Water System Design 2018 Criteria Manual. See relevant design criteria below:

Demand per SFE	260 gal/day/SFE (Multi-Family Residential)
Maximum Day Factor	MDF = 2.5
Peak Hour Factor	PHF = 5.5
Maximum Day Demand	MDD = (Domestic ADD*MDF) + Irrigation ADD
Peak Hour Demand	PHD = (Domestic ADD*PHF) + Irrigation ADD

Average Day Demands (ADD)

Average Daily Demands were calculated using 260 gpd/SFE and 60.45 SFE for the design demand, resulting in an Average Daily Demand of 16.79 gpm. For complete calculations see Appendix A.

Residential

	Gallons Per Minute (gpm)	Gallons Per Day (gpd)	Acre-ft Per Year (af/yr)
Average Daily Demand	16.79	24,180	27.08

Residential & Irrigation

	Gallons Per Minute (gpm)	Gallons Per Day (gpd)	Acre-ft Per Year (af/yr)
Average Daily Demand	22.99	33,105	37.08

Maximum Day Demands (MDD)

Using the Maximum Day Factor of 2.5, the Maximum Day Demand was calculated to be 41.98 gpm. For complete calculations see Appendix A.

Residential

	Gallons Per Minute (gpm)	Gallons Per Day (gpd)	Acre-ft Per Year (af/yr)
Maximum Daily Demand	41.98	60,451	67.71

Residential & Irrigation

	Gallons Per Minute (gpm)	Gallons Per Day (gpd)	Acre-ft Per Year (af/yr)
Maximum Daily Demand	48.18	69,379	77.71

Peak Hour Demands (PHD)

Using the Peak Hour Factor of 5.5, the Peak Hour Demand was calculated to be 92.35. For complete calculations see Appendix A.

Residential

	Gallons Per Minute (gpm)	Gallons Per Day (gpd)	Acre-ft Per Year (af/yr)
Peak Hour Demand	92.35	132,984	148.96

Residential & Irrigation

	Gallons Per Minute (gpm)	Gallons Per Day (gpd)	Acre-ft Per Year (af/yr)
Peak Hour Demand	98.55	141,912	158.96

Existing Water System

The Site has two existing 8" water main stubs, located at the southern and northeastern connections of Private Street A to Mitchell Street within the development. An existing 12" water main is located within Mitchell Street. A map of this can be found within Appendix F. Water services for the development are within the Green Zone, which is supplied by tanks 6A and 6C near Ridge Road, as designated by the Town of Castle Rock. These tanks have a capacity of 4.22 MG.

Most of the development falls within the Green Zone, except for the southwest section of the site within the drainage easement, and a small portion of the northern boundary. Both sections fall within the Red Zone. However, these areas do not require water services since housing is not planned in these areas.

The elevation range of the proposed lots is 6568' - 6583'.

Proposed Water System

Proposed Distribution System

The proposed water system for the Site will connect to existing infrastructure at two points along Mitchell Street and one point along Mikelson Boulevard. Both points on Mitchell Street are existing 8" mains, one at the southeast corner of the Site and the other located at the northeast corner. The proposed water system will also connect to the existing 16" main along Mikelson Boulevard. The proposed water system will be composed of 8" diameter PVC and will be routed throughout the Site, being looped to the three existing connection points.

The proposed water system will be constructed in one phase (Phase 1), which will serve the proposed 93 SFD lots. Three points of connection will be made with the existing water system and will serve the Site and create effective looping. Fire hydrants will be placed throughout the Site in accordance with the Castle Rock Fire Department spacing standards of 500 feet maximum.

Proposed Supply Facilities

The Site is served by the Green Zone Water Tanks 6A and 6C, with the combined capacity of 4.22 MG.

Required storage needed for the Site is based on proposed demands and is calculated below.

Storage Volume = Maximum Day Demand + Fire Flow
= (48.18gpm * 60min/hr * 24hrs) + (1000gpm * 60 min/hr * 2hrs)
= 69,380 gallons + 120,000 gallons
Storage Volume = 189,380 gallons (0.189 MG)

Dedication Requirements

To support the municipal water supply for the property, the owner must convey water rights to the Town. The Town will not grant land use approvals for any additional development until this requirement is met. Please see the Bella Mesa North and South Water Budget Letter by Redland dated October 10th, 2024 in Appendix G. The Budget Letter accounts for 82 townhome lots, with a dedication of 0.65 SFE per townhome lot. With the updated SDP Site Plan, 93 townhome lots are assumed. Based on the updated landscape plans by Redland and Denver Water's published spreadsheet, approximately 3.3 acre-feet of water will be required for irrigation. Only permanently irrigated areas were used to calculate the anticipated SFE's, which excludes areas such as native grasses. One 2" irrigation tap shall be assumed, which equates to approximately 6.67 SFE's per the Town's system development fee table. The Site will require 67.1 SFE's total, with the calculation shown below.

$$(93 \text{ lots} * 0.65 \text{ SFE}) + (1 \text{ irrigation tap} * 6.67 \text{ SFE}) = 67.1 \text{ SFE}$$

Proposed water infrastructure not located within public right-of-way will be within a dedicated utility easement for access and maintenance. Individually owned townhomes shall have a dedicated service line and meter to each dwelling unit. The minimum width of the easement is 20' for one utility, 30' for two utilities, and 40' for three utilities per the Town of Castle Rock Water System Design 2018 Criteria Manual. These will be dedicated on the final plat. Any future development of the existing water infrastructure needed to serve the Site is the responsibility of the developer.

Proposed Water System Analysis and Modeling

The proposed water analysis and modeling has been done in accordance with The Town of Castle Rock criteria. It requires the water distribution pipe system to deliver Maximum Day plus Fire Flows demand with a minimum dynamic pressure of 20 psi and a maximum velocity of 15 fps. The Town also requires the system to deliver Peak Hour demands with a minimum pressure of 35 psi and a maximum velocity of 10 fps under the same conditions. In addition, the minimum static pressure with zero demand criteria (20% tank stage) is 43 psi and the maximum static pressure with zero demand criteria (100% tank stage) is 125 psi.

Different flow models were completed and compared to the corresponding Town criteria. The models consisted of Average Day, Maximum Day, Maximum Day plus Fire Flow, Peak Hour. The minimum static pressure (20% tank stage) HGL elevation used in the model was 6805', and the maximum static pressure (100% tank stage) HGL used in the model was 6824'.

Each model contains two outputs. The first being the Junction Report, which is used to check water pressure in the model against the Town's criteria. The second is the Pipe Report,

which is used to check velocities and head loss against the Town's criteria. Full results for each scenario can be found in Appendix C.

The proposed water distribution system within the Site has met all the Town of Castle Rocks criteria. The Maximum Day plus Fire Flow minimum network pressure was modeled to be 95 psi at Junction J-3, and the maximum velocity was modeled to be 11.72 fps. This meets the Town's criteria of a minimum dynamic pressure of 20 psi and maximum velocity of 15 fps.

The Peak Hour minimum network pressure was modeled to be 96 psi at Junction J-11, and the maximum velocity was modeled to be 0.22 fps. This meets the Town's criteria of a minimum dynamic pressure of 35 psi and maximum velocity of 10 fps.

The minimum static pressure (20% tank stage) network was modeled to be 96 psi at Junction J-11. This meets the Town's criteria of a minimum static pressure of 43 psi.

The maximum static pressure (100% tank stage) network was modeled to be 110 psi at Junction J-1. This meets the Town's criteria of a maximum static pressure of 125 psi.

Calculated Wastewater Flows

This report analyzes the sanitary sewer system that services the future Site's 93 SFE's. The proposed wastewater flows for the Site have been calculated using the Town of Castle Rock Wastewater Collection Design 2018 Criteria Manual. See relevant design criteria below:

Demand per SFE	130 gal/day/SFE (Multi-Family Residential)
Peak Factor	PF = 5.0
Infiltration/Inflow	I/I = $0.10 \times \text{ADF}$
Peak Design Flow	PDF = $(\text{ADF} \times \text{PF}) + (\text{I/I})$

Average Day Wastewater Flows (ADF)

Average Daily Flows were calculated using 130 gpd/SFE and 60.45 SFE for the design basin, resulting in an Average Daily Flow of 8.40 gpm. For complete calculations see Appendix D.

	Gallons Per Minute (gpm)	Gallons Per Day (gpd)	Cubic Feet Per Second (cfs)
Average Daily Flow	8.40	12,090	0.02

Peaking Factor

A maximum peaking factor of 5.0 was used to determine a Peak Design Flow for the Site. This demand includes infiltration/inflow demands, for complete calculations see Appendix D.

Peak Design Flows (PDF)

Using the Peaking Factor of 5.0, the Peak Design Flow was calculated to be 41.98 gpm. Including Infiltration/Inflow the Peak Design Flow was calculated to be 42.82 gpm, for complete calculations see Appendix D.

	Gallons Per Minute (gpm)	Gallons Per Day (gpd)	Cubic Feet Per Second (cfs)
Peak Design Flow	41.98	60,450	0.09
Peak Design Flow w/ Infiltration	42.82	61,659	0.1

Existing Wastewater System

Existing Collection System

An existing 10" gravity sanitary sewer main lies within Mikelson Boulevard. The Site is located in the Mitchell Creek Lift Station Basin. The Site will connect and flow to an existing sanitary manhole, located near the southeast connection with Private Alley D. See Appendix F for a conceptual Site utility plan and Wastewater Master Plan Zone map.

Proposed Wastewater System

Proposed Collection System

It is anticipated that the Site will be serviced by 8" in diameter sanitary sewer mains throughout the Site. Within the Site, gravity mains will convey wastewater to the southwest.

Land Dedication Requirements

Sanitary sewer infrastructure not located within public right-of-way will be within a dedicated utility easement for access and maintenance. The minimum width of the easement is 20' per the Town of Castle Rock Wastewater Collection Design 2018 Criteria Manual. Any future development of the existing wastewater infrastructure needed to serve the Site is the responsibility of the developer.

Proposed Wastewater System Analysis and Modeling

The proposed wastewater analysis and modeling has been done in accordance with The Town of Castle Rock criteria. Hydraflow Express was used to analyze the sanitary pipe capacity and velocities for the development.

See Appendix E for results of the modeling. Design constraints considered in the model are as follows:

Manning's Coefficient (PVC)	0.011
Maximum Velocity at Peak Design Flow	10 fps
Minimum Velocity at Peak Design Flow	2 fps
Minimum Pipe Slope (8in)	0.4%
Maximum Pipe Slope (8in)	7.5%
Full Flow Capacity	75%

Average Day and Peak Design Flow scenarios were modeled to analyze the proposed pipe capacities and velocities.

Peak Design Flow was calculated to be 0.1 cfs, and the resulting pipe velocity was modeled to be 1.68 fps at a minimum pipe slope of 0.4%, which does not meet the Town's minimum velocity criteria. Minimum pipe slopes for the Site will need to be 0.7%, resulting in a pipe velocity of 2.06 fps. The pipe velocity was also modeled to be 4.13 fps at a maximum pipe slope of 7.5%, this meets the Town's maximum velocity criteria.

Potential Permitting Requirements

Permits for the proposed development will be applied for through the Town of Castle Rock and the State of Colorado, where applicable. Permits will be in place prior to the start of construction.

References

1. *Town of Castle Rock Water System Design 2018 Criteria Manual*, dated December 4, 2018.
2. *Town of Castle Rock Wastewater Collection Design 2018 Criteria Manual*, dated December 4, 2018.
3. *Town of Castle Rock, 2023 Water Master Plan*, dated 2023.
4. *Town of Castle Rock, 2022 Wastewater Master Plan*, dated 2022.
5. *Founders Village Filing 24 Final Utility Report*, dated 2005.

Appendix A – Water Demands

Bella Mesa South
Preliminary Utility Report

Redland
9/12/2025

Water Demands

Maximum Day Demand (MDD) 2.5
Peak Hour Demand (PHD) 5.5

Residential Only

Phase (SF -Residential)	Use	Dwelling Units	Area (AC)	Equivalent (SFE/DU)	SFE	Avg Day Demand (GPD/DU)	Avg Day (GPM/SFE)	Avg Day Demand (GPD)	Avg Day Demand (GPM)	Maximum Day Demand (GPM)	Peak Hour Demand (GPM)
1	SF	93	8.9	0.65	60.45	260	0.28	24,180.00	16.79	41.98	92.35
Totals:	-	93	8.9	-	60.45	-	0.28	24,180.00	16.79	41.98	92.35

*Per Town Of Castle Rock Water System Design 2018 Criteria Manual, Section 4.4.1

Irrigation

Phase	Use	Irrigated Area (AC)	Land Use Rate (GPD/AC)	Avg Day Demand (GPD)	Avg Day Demand (GPM)
1	IRR	2.38	3,750.00	8,925.00	6.20

*Per Town Of Castle Rock Water System Desing 2018 Criteria Manual, Section 4.4.1

Residential & Irrigation

Phase	Use	Avg Day Demand (GPD)	Avg Day Demand (GPM)	Maximum Day Demand (GPM)	Peak Hour Demand (GPM)
1	SF & IRR	33,105.00	22.99	48.18	98.55

*Per Town Of Castle Rock Water System Desing 2018 Criteria Manual, Section 4.4.1

MEMORANDUM

To: Castle Rock Fire and Rescue Department

Prepared By: Brooke Smetanka

Date: 10/3/2025

RE: Bella Mesa South – Required Fire Flow

Development Description

This memorandum has been prepared to confirm the required fire flow and duration for the proposed residential development, Bella Mesa South. The site is roughly 8.9 acres and undeveloped in the current condition. It is located north of Mikelson Boulevard and is bounded by the Founders Village Filing 24 development to the east, and Founders Village Filing 24 Tract S to the west. The development will include approximately 93 multi-family dwellings, along with landscaping, associated roadways, and site infrastructure.

- Building square footage:
 - This development includes townhome units in 4, 5, and 6 pack configurations. Units are separated by a fire wall.
 - The largest building within this development is 14,608 SQFT (6 pack)
 - The largest unit within that building is 2,560 SQFT
- Building construction type: V-B
- Sprinklered: Yes, 13D



Fire Flow and Required Duration (CRFD)

Fire Flow: 1000 gpm
Duration: 2 hours

Plan Review # 18684

Kevin Sullivan

Digitally signed by Kevin Sullivan
DN: C=US, E=ksullivan@crgov.com,
O="Castle Rock Fire and Rescue
Department ", CN=Kevin Sullivan
Reason: Reviewed for Compliance
Date: 2025.10.21 18:39:07-06'00'

CRFD Signature

Appendix B – Water Storage

Bella Mesa South
Preliminary Utility Report

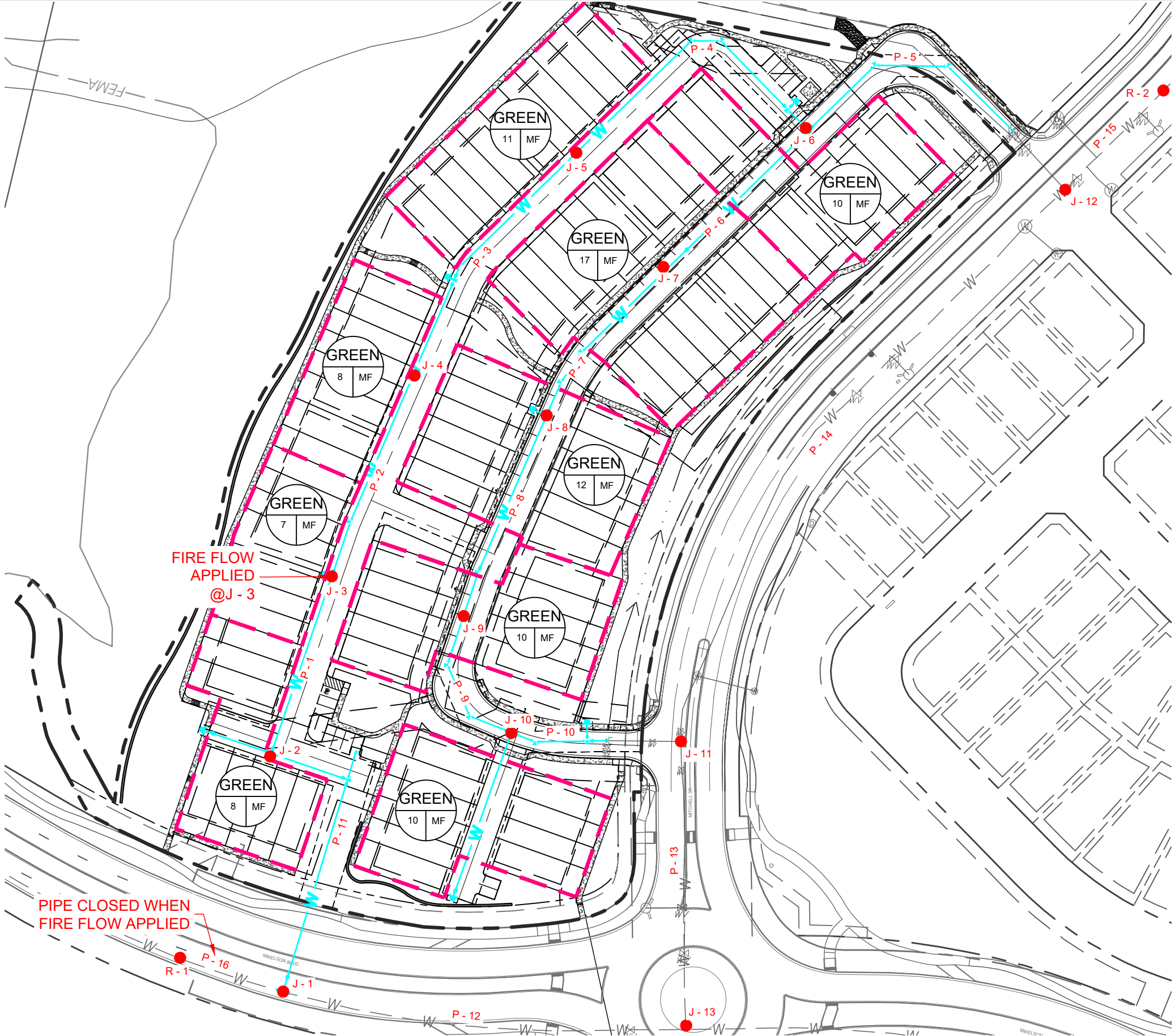
Redland
1/5/2026

Water Storage
Maximum Day Demand (MDD) 2.5

Type	Use	Dwelling Units	Area (AC)	Equivalent (SFE/DU)	SFE	Avg Day Demand (GPD/DU)	Avg Day (GPM/SFE)	Avg Day Demand (GPD)	Avg Day Demand (GPM)	Maximum Day Demand (GPM)	Total (gallons)
Bella Mesa South Fire Flow (1500 gpm @ 2 hrs)	SF	93	8.9	0.65	60.45	260	0.28	24,180.00	16.79	41.98	60,450.00 120,000.00
Totals:											180,450.00

*Per Town Of Castle Rock Water System Design 2018 Criteria Manual, Section 4.4.2

Appendix C – Water Hydraulic Analysis and Modeling



LEGEND:

UNIT COUNT

GREEN

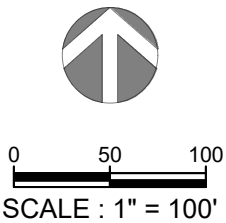
XX

MF

WATER ZONE

MULTI-FAMILY

PROPOSED WATER BASIN



BELLA MESA SOUTH
OVERALL WATER MAP
EXHIBIT

Redland
WHERE GREAT PLACES BEGIN

- Land Planning
- Construction Management
- 720.283.6783
- REDLAND.COM

DRAWING NO:
1 OF 1

PROJECT NO: 17026.007

DATE: 11/07/2025

Bella Mesa South - WaterCAD Output Tables

Static Conditions - 20%

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	6,570.21	0	6,805.00	102
J-2	6,576.36	0	6,805.00	99
J-3	6,579.10	0	6,805.00	98
J-4	6,576.08	0	6,805.00	99
J-5	6,576.18	0	6,805.00	99
J-6	6,575.59	0	6,805.00	99
J-7	6,577.06	0	6,805.00	99
J-8	6,578.81	0	6,805.00	98
J-9	6,579.52	0	6,805.00	98
J-10	6,578.80	0	6,805.00	98
J-11	6,582.43	0	6,805.00	96
J-12	6,578.92	0	6,805.00	98
J-13	6,580.68	0	6,805.00	97

Bella Mesa South - WaterCAD Output Tables

Static Conditions - 20%

FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	J-2	J-3	187	8.0	PVC	120.0	0	0.00	0.000
P-2	J-3	J-4	184	8.0	PVC	120.0	0	0.00	0.000
P-3	J-4	J-5	260	8.0	PVC	120.0	0	0.00	0.000
P-4	J-5	J-6	287	8.0	PVC	120.0	0	0.00	0.000
P-5	J-6	J-12	312	8.0	PVC	120.0	0	0.00	0.000
P-6	J-6	J-7	182	8.0	PVC	120.0	0	0.00	0.000
P-7	J-7	J-8	223	8.0	PVC	120.0	0	0.00	0.000
P-8	J-8	J-9	153	8.0	PVC	120.0	0	0.00	0.000
P-9	J-9	J-10	146	8.0	PVC	120.0	0	0.00	0.000
P-10	J-10	J-11	157	8.0	PVC	120.0	0	0.00	0.000
P-11	J-2	J-1	275	8.0	PVC	120.0	0	0.00	0.000
P-12	J-1	J-13	374	16.0	PVC	120.0	0	0.00	0.000
P-13	J-13	J-11	264	12.0	PVC	120.0	0	0.00	0.000
P-14	J-11	J-12	633	12.0	PVC	120.0	0	0.00	0.000
P-15	J-12	R-2	500	12.0	PVC	120.0	0	0.00	0.000
P-16	R-1	J-1	500	16.0	PVC	120.0	0	0.00	0.000

Bella Mesa South - WaterCAD Output Tables

Static Conditions - 20%

FlexTable: Reservoir Table

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	6,805.00	0	6,805.00
R-2	6,805.00	0	6,805.00

Bella Mesa South - WaterCAD Output Tables

Static Conditions - 100%

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	6,570.21	0	6,824.00	110
J-2	6,576.36	0	6,824.00	107
J-3	6,579.10	0	6,824.00	106
J-4	6,576.08	0	6,824.00	107
J-5	6,576.18	0	6,824.00	107
J-6	6,575.59	0	6,824.00	107
J-7	6,577.06	0	6,824.00	107
J-8	6,578.81	0	6,824.00	106
J-9	6,579.52	0	6,824.00	106
J-10	6,578.80	0	6,824.00	106
J-11	6,582.43	0	6,824.00	105
J-12	6,578.92	0	6,824.00	106
J-13	6,580.68	0	6,824.00	105

Bella Mesa South - WaterCAD Output Tables

Static Conditions - 100%

FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	J-2	J-3	187	8.0	PVC	120.0	0	0.00	0.000
P-2	J-3	J-4	184	8.0	PVC	120.0	0	0.00	0.000
P-3	J-4	J-5	260	8.0	PVC	120.0	0	0.00	0.000
P-4	J-5	J-6	287	8.0	PVC	120.0	0	0.00	0.000
P-5	J-6	J-12	312	8.0	PVC	120.0	0	0.00	0.000
P-6	J-6	J-7	182	8.0	PVC	120.0	0	0.00	0.000
P-7	J-7	J-8	223	8.0	PVC	120.0	0	0.00	0.000
P-8	J-8	J-9	153	8.0	PVC	120.0	0	0.00	0.000
P-9	J-9	J-10	146	8.0	PVC	120.0	0	0.00	0.000
P-10	J-10	J-11	157	8.0	PVC	120.0	0	0.00	0.000
P-11	J-2	J-1	275	8.0	PVC	120.0	0	0.00	0.000
P-12	J-1	J-13	374	16.0	PVC	120.0	0	0.00	0.000
P-13	J-13	J-11	264	12.0	PVC	120.0	0	0.00	0.000
P-14	J-11	J-12	633	12.0	PVC	120.0	0	0.00	0.000
P-15	J-12	R-2	500	12.0	PVC	120.0	0	0.00	0.000
P-16	R-1	J-1	500	16.0	PVC	120.0	0	0.00	0.000

Bella Mesa South - WaterCAD Output Tables

Static Conditions - 100%

FlexTable: Reservoir Table

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	6,824.00	0	6,824.00
R-2	6,824.00	0	6,824.00

Bella Mesa South - WaterCAD Output Tables

Average Day Conditions

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	6,570.21	0	6,805.00	102
J-2	6,576.36	1	6,805.00	99
J-3	6,579.10	1	6,805.00	98
J-4	6,576.08	1	6,805.00	99
J-5	6,576.18	2	6,805.00	99
J-6	6,575.59	2	6,805.00	99
J-7	6,577.06	3	6,805.00	99
J-8	6,578.81	2	6,805.00	98
J-9	6,579.52	2	6,805.00	98
J-10	6,578.80	2	6,805.00	98
J-11	6,582.43	0	6,805.00	96
J-12	6,578.92	0	6,805.00	98
J-13	6,580.68	0	6,805.00	97

Bella Mesa South - WaterCAD Output Tables

Average Day Conditions

FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	J-2	J-3	187	8.0	PVC	120.0	4	0.02	0.000
P-2	J-3	J-4	184	8.0	PVC	120.0	2	0.01	0.000
P-3	J-4	J-5	260	8.0	PVC	120.0	1	0.01	0.000
P-4	J-5	J-6	287	8.0	PVC	120.0	-1	0.01	0.000
P-5	J-6	J-12	312	8.0	PVC	120.0	-5	0.03	0.000
P-6	J-6	J-7	182	8.0	PVC	120.0	3	0.02	0.000
P-7	J-7	J-8	223	8.0	PVC	120.0	-1	0.00	0.000
P-8	J-8	J-9	153	8.0	PVC	120.0	-3	0.02	0.000
P-9	J-9	J-10	146	8.0	PVC	120.0	-5	0.03	0.000
P-10	J-10	J-11	157	8.0	PVC	120.0	-6	0.04	0.000
P-11	J-2	J-1	275	8.0	PVC	120.0	-5	0.03	0.000
P-12	J-1	J-13	374	16.0	PVC	120.0	5	0.01	0.000
P-13	J-13	J-11	264	12.0	PVC	120.0	5	0.01	0.000
P-14	J-11	J-12	633	12.0	PVC	120.0	-1	0.00	0.000
P-15	J-12	R-2	500	12.0	PVC	120.0	-7	0.02	0.000
P-16	R-1	J-1	500	16.0	PVC	120.0	10	0.02	0.000

Bella Mesa South - WaterCAD Output Tables Peak Hour Conditions

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	6,570.21	0	6,805.00	102
J-2	6,576.36	8	6,804.99	99
J-3	6,579.10	7	6,804.99	98
J-4	6,576.08	8	6,804.99	99
J-5	6,576.18	11	6,804.99	99
J-6	6,575.59	10	6,804.99	99
J-7	6,577.06	17	6,804.99	99
J-8	6,578.81	12	6,804.99	98
J-9	6,579.52	10	6,804.99	98
J-10	6,578.80	10	6,804.99	98
J-11	6,582.43	0	6,805.00	96
J-12	6,578.92	0	6,805.00	98
J-13	6,580.68	0	6,805.00	97

Bella Mesa South - WaterCAD Output Tables

Peak Hour Conditions

FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	J-2	J-3	187	8.0	PVC	120.0	20	0.13	0.000
P-2	J-3	J-4	184	8.0	PVC	120.0	13	0.08	0.000
P-3	J-4	J-5	260	8.0	PVC	120.0	5	0.03	0.000
P-4	J-5	J-6	287	8.0	PVC	120.0	-6	0.04	0.000
P-5	J-6	J-12	312	8.0	PVC	120.0	-30	0.19	0.000
P-6	J-6	J-7	182	8.0	PVC	120.0	14	0.09	0.000
P-7	J-7	J-8	223	8.0	PVC	120.0	-3	0.02	0.000
P-8	J-8	J-9	153	8.0	PVC	120.0	-15	0.09	0.000
P-9	J-9	J-10	146	8.0	PVC	120.0	-25	0.16	0.000
P-10	J-10	J-11	157	8.0	PVC	120.0	-35	0.22	0.000
P-11	J-2	J-1	275	8.0	PVC	120.0	-28	0.18	0.000
P-12	J-1	J-13	374	16.0	PVC	120.0	29	0.05	0.000
P-13	J-13	J-11	264	12.0	PVC	120.0	29	0.08	0.000
P-14	J-11	J-12	633	12.0	PVC	120.0	-6	0.02	0.000
P-15	J-12	R-2	500	12.0	PVC	120.0	-36	0.10	0.000
P-16	R-1	J-1	500	16.0	PVC	120.0	56	0.09	0.000

Bella Mesa South - WaterCAD Output Tables

Max Day Conditions

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	6,570.21	0	6,805.00	102
J-2	6,576.36	4	6,805.00	99
J-3	6,579.10	3	6,805.00	98
J-4	6,576.08	4	6,805.00	99
J-5	6,576.18	5	6,805.00	99
J-6	6,575.59	5	6,805.00	99
J-7	6,577.06	8	6,805.00	99
J-8	6,578.81	5	6,805.00	98
J-9	6,579.52	5	6,805.00	98
J-10	6,578.80	5	6,805.00	98
J-11	6,582.43	0	6,805.00	96
J-12	6,578.92	0	6,805.00	98
J-13	6,580.68	0	6,805.00	97

Bella Mesa South - WaterCAD Output Tables

Max Day Conditions

FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	J-2	J-3	187	8.0	PVC	120.0	9	0.06	0.000
P-2	J-3	J-4	184	8.0	PVC	120.0	6	0.04	0.000
P-3	J-4	J-5	260	8.0	PVC	120.0	2	0.01	0.000
P-4	J-5	J-6	287	8.0	PVC	120.0	-3	0.02	0.000
P-5	J-6	J-12	312	8.0	PVC	120.0	-14	0.09	0.000
P-6	J-6	J-7	182	8.0	PVC	120.0	6	0.04	0.000
P-7	J-7	J-8	223	8.0	PVC	120.0	-1	0.01	0.000
P-8	J-8	J-9	153	8.0	PVC	120.0	-7	0.04	0.000
P-9	J-9	J-10	146	8.0	PVC	120.0	-11	0.07	0.000
P-10	J-10	J-11	157	8.0	PVC	120.0	-16	0.10	0.000
P-11	J-2	J-1	275	8.0	PVC	120.0	-13	0.08	0.000
P-12	J-1	J-13	374	16.0	PVC	120.0	13	0.02	0.000
P-13	J-13	J-11	264	12.0	PVC	120.0	13	0.04	0.000
P-14	J-11	J-12	633	12.0	PVC	120.0	-3	0.01	0.000
P-15	J-12	R-2	500	12.0	PVC	120.0	-16	0.05	0.000
P-16	R-1	J-1	500	16.0	PVC	120.0	26	0.04	0.000

Bella Mesa South - WaterCAD Output Tables
Max Day + Fire Flow Conditions
P-16 Closed & FF Applied @ J-3

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Velocity of Maximum Pipe (ft/s)
J-1	6,570.21	0	6,799.32	99	9.97
J-2	6,576.36	1	6,795.15	95	13.65
J-3 (FF APPLIED)	6,579.10	1,500	6,792.32	92	12.42
J-4	6,576.08	1	6,794.16	94	11.62
J-5	6,576.18	2	6,796.77	95	12.25
J-6	6,575.59	2	6,799.66	97	10.50
J-7	6,577.06	3	6,799.74	96	9.97
J-8	6,578.81	2	6,799.85	96	9.97
J-9	6,579.52	2	6,799.92	95	9.97
J-10	6,578.80	2	6,799.99	96	9.97
J-11	6,582.43	0	6,800.07	94	9.97
J-12	6,578.92	0	6,801.83	96	9.97
J-13	6,580.68	0	6,799.52	95	9.97

Bella Mesa South - WaterCAD Output Tables
Max Day + Fire Flow Conditions
P-16 Closed & FF Applied @ J-3

FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	J-2	J-3 (FF APPLIED)	187	8.0	PVC	120.0	834	5.32	0.015
P-2	J-3 (FF APPLIED)	J-4	184	8.0	PVC	120.0	-666	4.25	0.010
P-3	J-4	J-5	260	8.0	PVC	120.0	-668	4.26	0.010
P-4	J-5	J-6	287	8.0	PVC	120.0	-670	4.28	0.010
P-5	J-6	J-12	312	8.0	PVC	120.0	-547	3.49	0.007
P-6	J-6	J-7	182	8.0	PVC	120.0	-124	0.79	0.000
P-7	J-7	J-8	223	8.0	PVC	120.0	-127	0.81	0.000
P-8	J-8	J-9	153	8.0	PVC	120.0	-130	0.83	0.000
P-9	J-9	J-10	146	8.0	PVC	120.0	-131	0.84	0.000
P-10	J-10	J-11	157	8.0	PVC	120.0	-133	0.85	0.001
P-11	J-2	J-1	275	8.0	PVC	120.0	-835	5.33	0.015
P-12	J-1	J-13	374	16.0	PVC	120.0	-835	1.33	0.001
P-13	J-13	J-11	264	12.0	PVC	120.0	-835	2.37	0.002
P-14	J-11	J-12	633	12.0	PVC	120.0	-968	2.75	0.003
P-15	J-12	R-2	500	12.0	PVC	120.0	-1,516	4.30	0.006
P-16	R-1	J-1	500	16.0	PVC	120.0	(N/A)	(N/A)	(N/A)

Bella Mesa South - WaterCAD Output Tables
Max Day + Fire Flow Conditions
P-16 Closed & FF Applied @ J-3

FlexTable: Reservoir Table

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	6,805.00	0	6,805.00
R-2	6,805.00	1,516	6,805.00

Appendix D – Wastewater Flows

Wastewater Flow

Peaking Factor:

Peak Hour (PHD) 5.0

Phase (SF -Residential)	Use	Dwelling Units	Acres (AC)	Equivalent (SFE/DU)	SFE	Avg Day (GPD/DU)	Avg Day (GPD)	Avg Day (GPM)	Peak Design (GPM)	Peak Design (GPD)	Peak Design Including I/I (GPM)	Peak Design Including I/I (GPD)
1	SF	93	8.9	0.65	60.45	130	12,090.00	8.40	41.98	60,450.00	42.82	61,659.00
Totals:	-	93	8.9	-	60.45	-	12,090.00	8.40	41.98	60,450.00	42.82	61,659.00

*Per Town Of Castle Rock Wastewater Collection Design 2018 Criteria Manual, Section 4.4.1

Appendix E – Wastewater Hydraulic Modeling

Channel Report

Bella Mesa South - Avg Day - 8in Sanitary Main @ 0.4%

Circular

Diameter (ft) = 0.67

Invert Elev (ft) = 100.00

Slope (%) = 0.40

N-Value = 0.011

Calculations

Compute by: Known Q

Known Q (cfs) = 0.02

Highlighted

Depth (ft) = 0.07

Q (cfs) = 0.020

Area (sqft) = 0.02

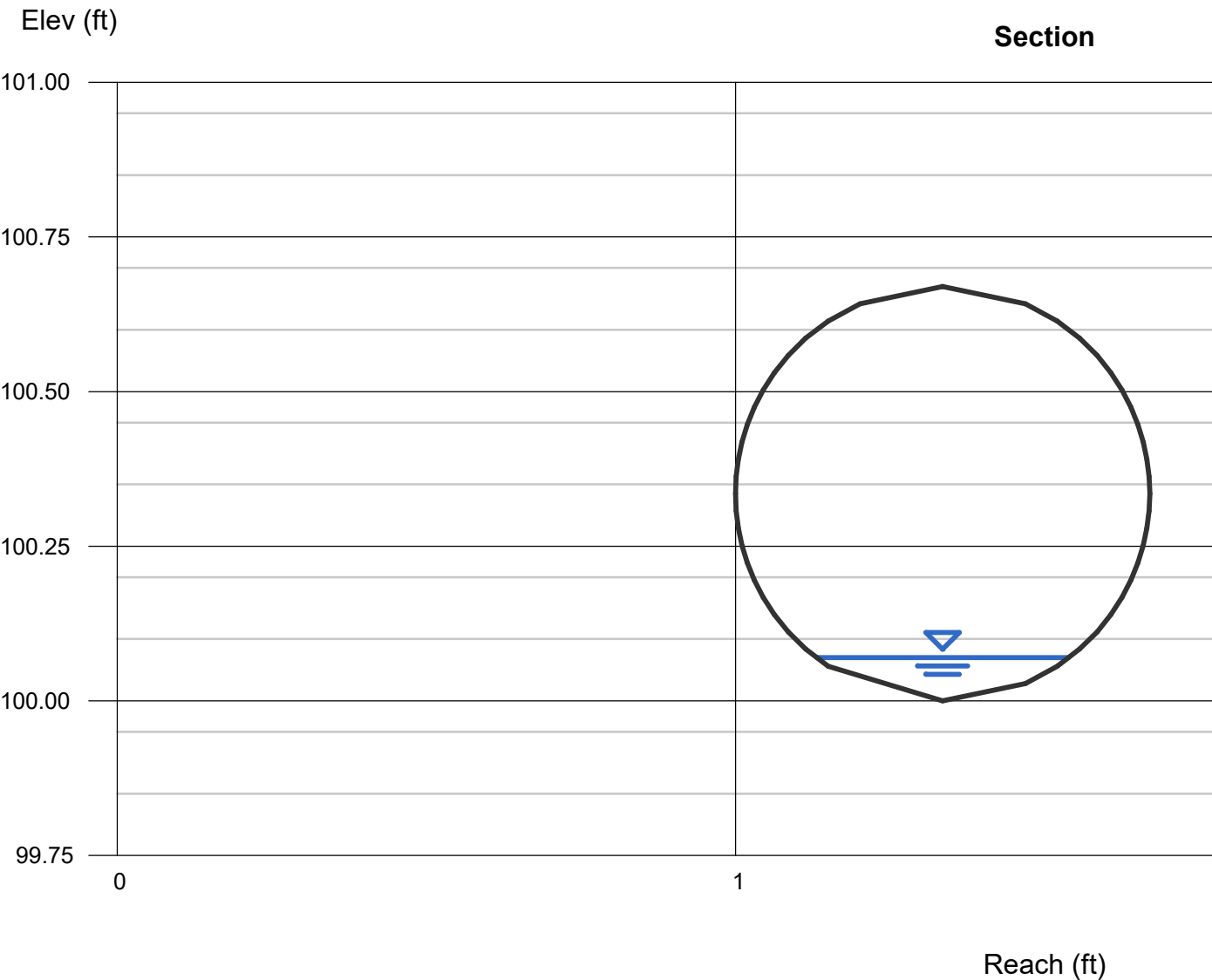
Velocity (ft/s) = 1.01

Wetted Perim (ft) = 0.44

Crit Depth, Yc (ft) = 0.07

Top Width (ft) = 0.41

EGL (ft) = 0.09



Channel Report

Bella Mesa South - Avg Day - 8in Sanitary Main @ 7.5%

Circular

Diameter (ft) = 0.67

Invert Elev (ft) = 100.00

Slope (%) = 7.50

N-Value = 0.011

Calculations

Compute by: Known Q

Known Q (cfs) = 0.02

Highlighted

Depth (ft) = 0.04

Q (cfs) = 0.020

Area (sqft) = 0.01

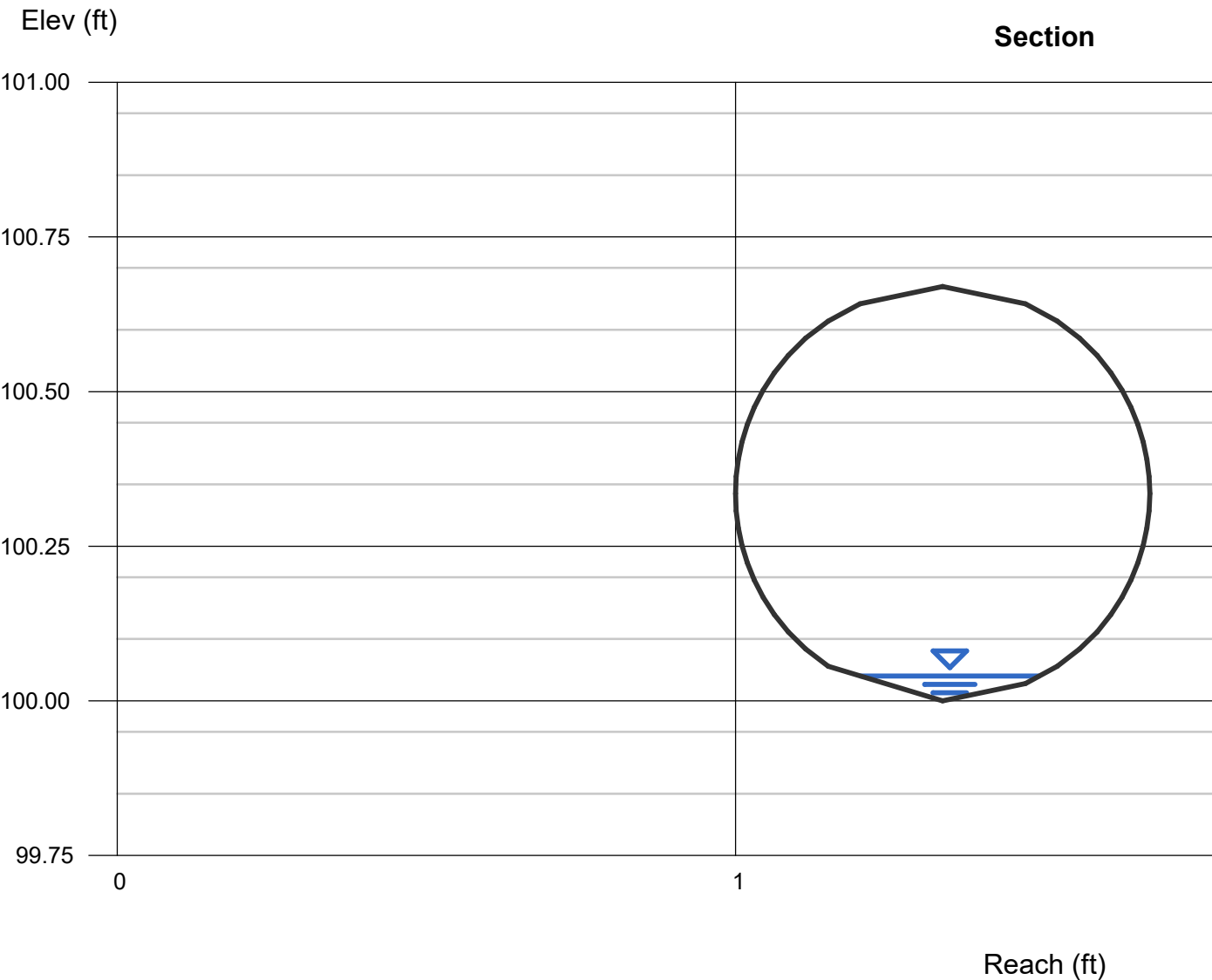
Velocity (ft/s) = 2.31

Wetted Perim (ft) = 0.33

Crit Depth, Yc (ft) = 0.07

Top Width (ft) = 0.32

EGL (ft) = 0.12



Channel Report

Bella Mesa South - Peak Design - 8in Sanitary Main @ 0.4%

Circular

Diameter (ft) = 0.67

Invert Elev (ft) = 100.00

Slope (%) = 0.40

N-Value = 0.011

Calculations

Compute by: Known Q

Known Q (cfs) = 0.10

Highlighted

Depth (ft) = 0.15

Q (cfs) = 0.100

Area (sqft) = 0.06

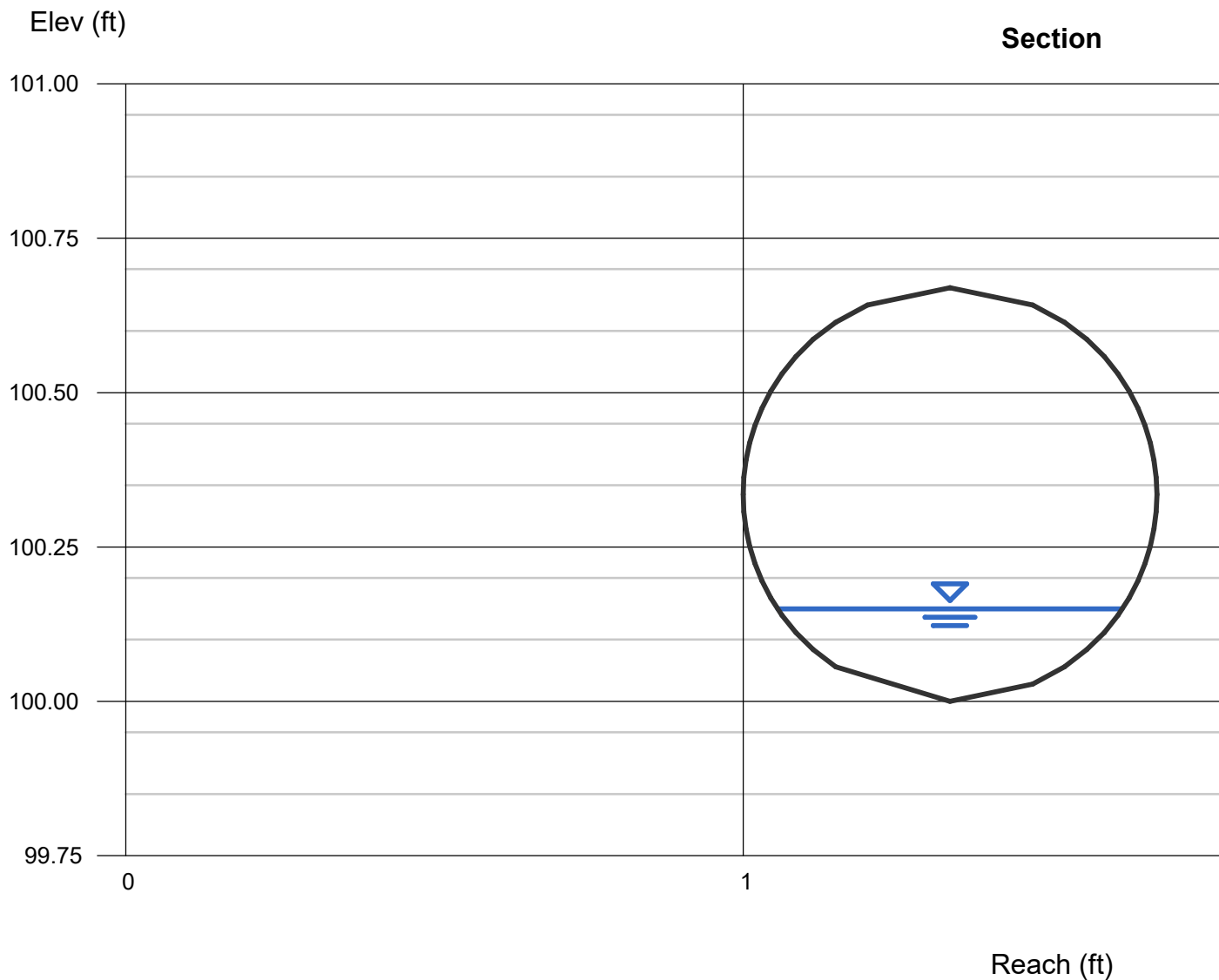
Velocity (ft/s) = 1.68

Wetted Perim (ft) = 0.66

Crit Depth, Yc (ft) = 0.15

Top Width (ft) = 0.56

EGL (ft) = 0.19



Channel Report

Bella Mesa South - Peak Design - 8in Sanitary Main @ 0.7%

Circular

Diameter (ft) = 0.67

Invert Elev (ft) = 100.00

Slope (%) = 0.70

N-Value = 0.011

Calculations

Compute by: Known Q

Known Q (cfs) = 0.10

Highlighted

Depth (ft) = 0.13

Q (cfs) = 0.100

Area (sqft) = 0.05

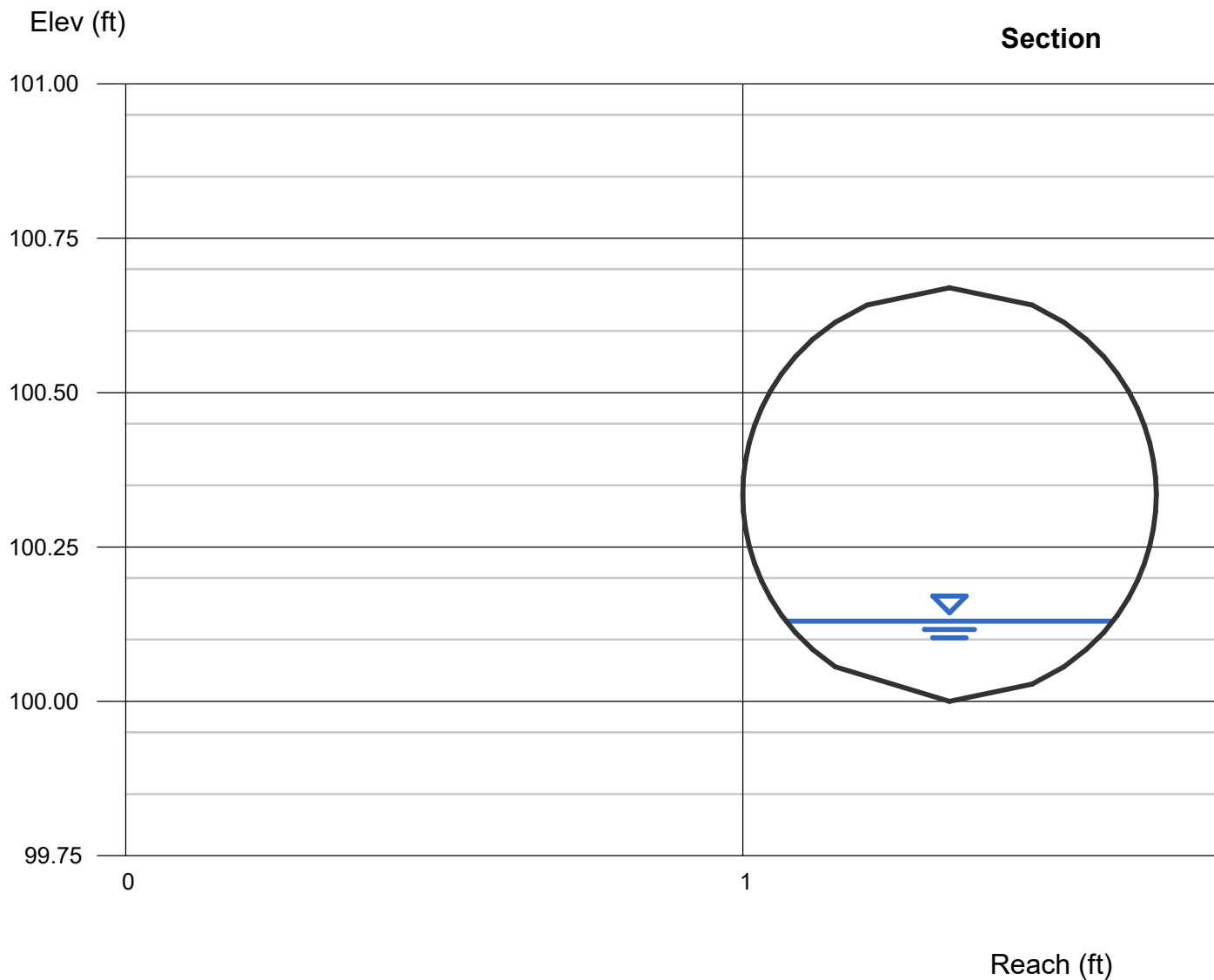
Velocity (ft/s) = 2.06

Wetted Perim (ft) = 0.61

Crit Depth, Yc (ft) = 0.15

Top Width (ft) = 0.53

EGL (ft) = 0.20



Channel Report

Bella Mesa South - Peak Design - 8in Sanitary Main @ 7.5%

Circular

Diameter (ft) = 0.67

Invert Elev (ft) = 100.00

Slope (%) = 7.50

N-Value = 0.011

Calculations

Compute by: Known Q

Known Q (cfs) = 0.10

Highlighted

Depth (ft) = 0.08

Q (cfs) = 0.100

Area (sqft) = 0.02

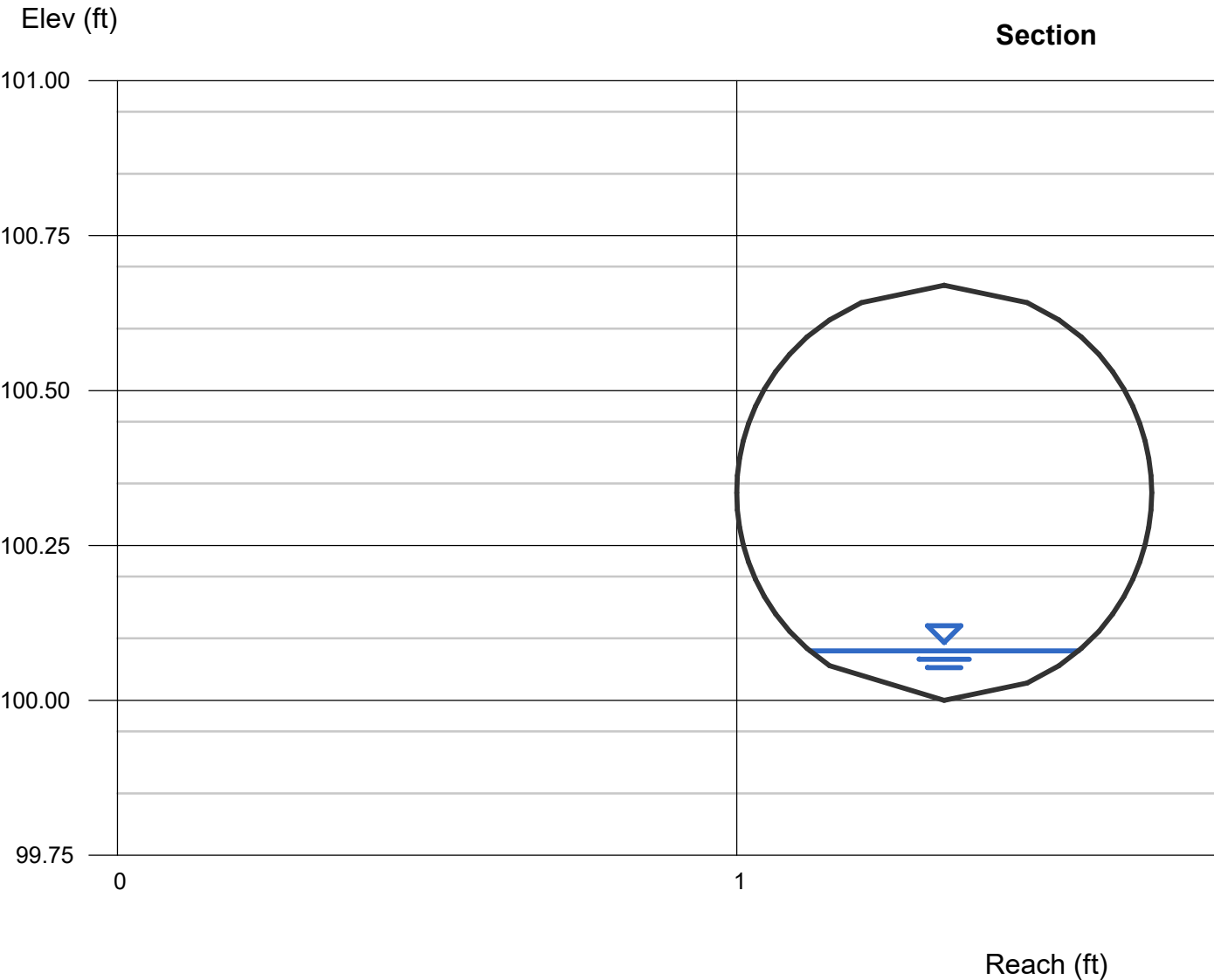
Velocity (ft/s) = 4.13

Wetted Perim (ft) = 0.48

Crit Depth, Yc (ft) = 0.15

Top Width (ft) = 0.44

EGL (ft) = 0.35



Appendix F – Maps and Plans



0 1000 2000
SCALE : 1" = 2000'

BELLA MESA SOUTH

VICINITY MAP



Redland
WHERE GREAT PLACES BEGIN

720.283.6783
REDLAND.COM

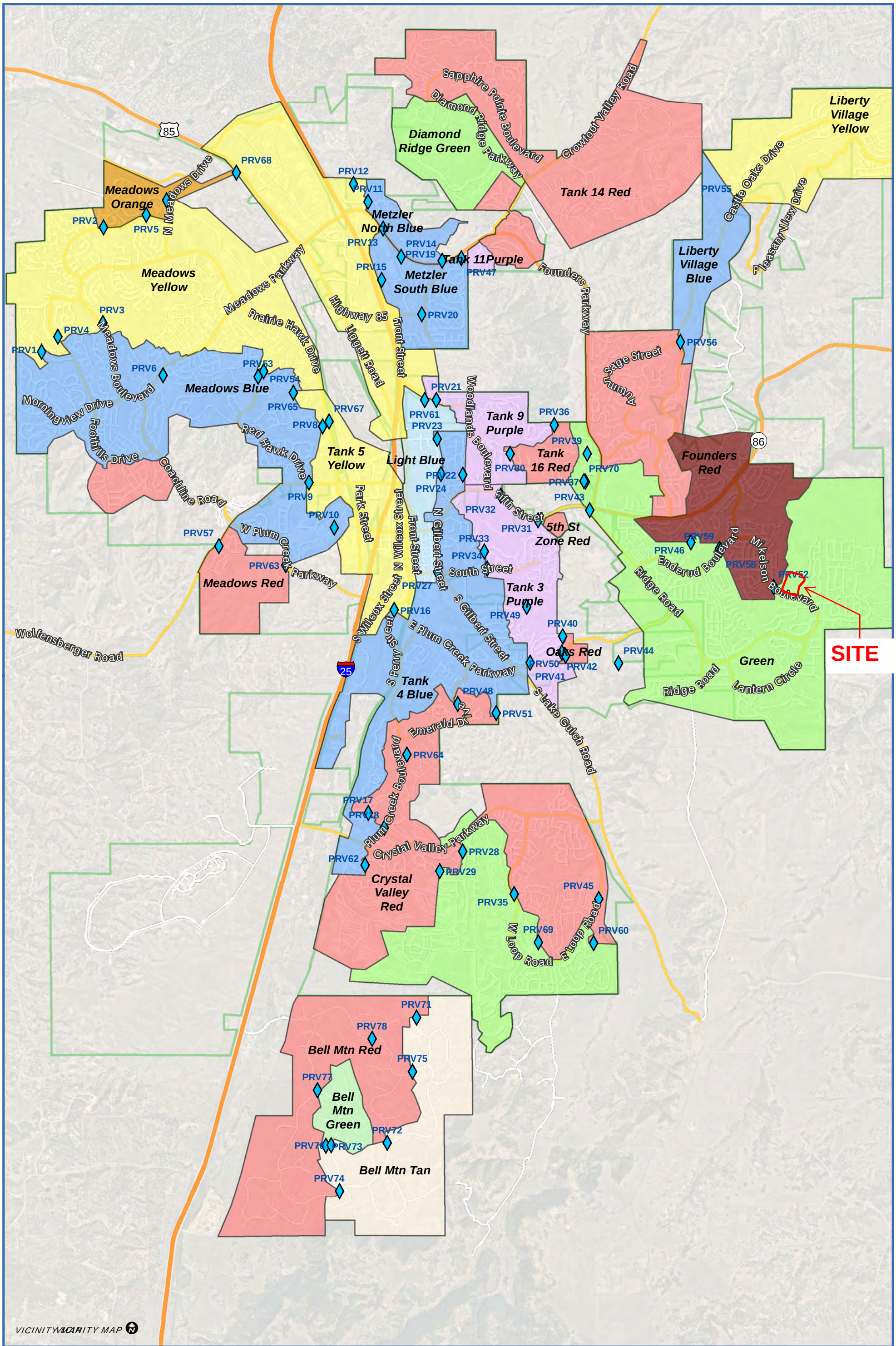
▪ Land Planning ▪ Landscape Architecture
▪ Civil Engineering ▪ Construction Management

PROJECT NO: 17026.007

DATE: 05/08/2025

DRAWING NO:

VIC



VICINITY MAP



0 1,950 3,900 7,800 11,700 Feet

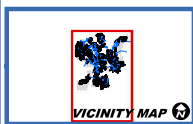
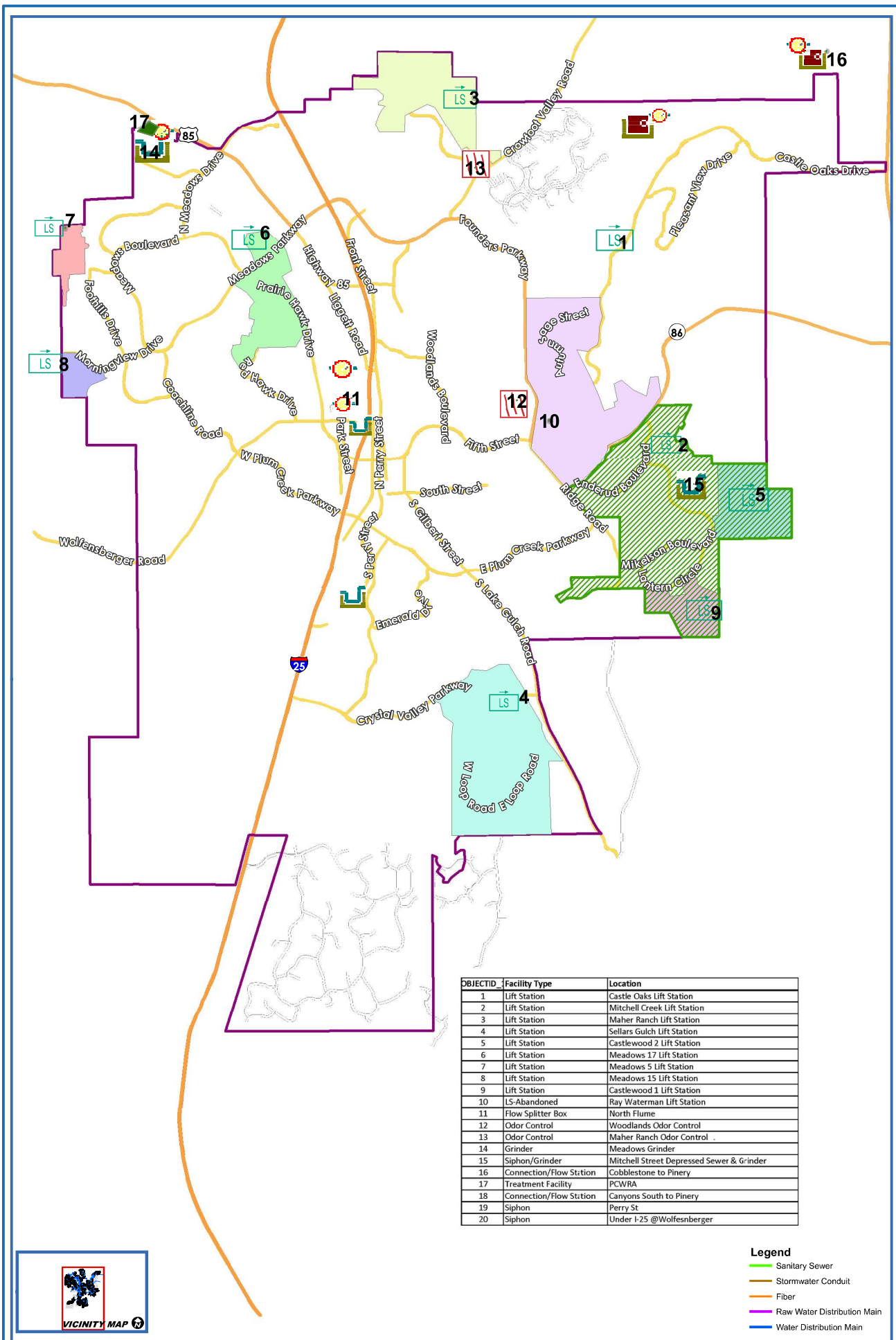
1 inch = 3,833 feet



Date: 3/9/2023 Document Path: J:\GIS\Standard Maps\10.6\11x17 Portrait.mxd

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CASTLE ROCK WATER
FIGURE 2.7
PRESSURE ZONES AND PRVs



0 2,350 4,700 9,400 14,100 Feet
1 inch = 4,667 feet

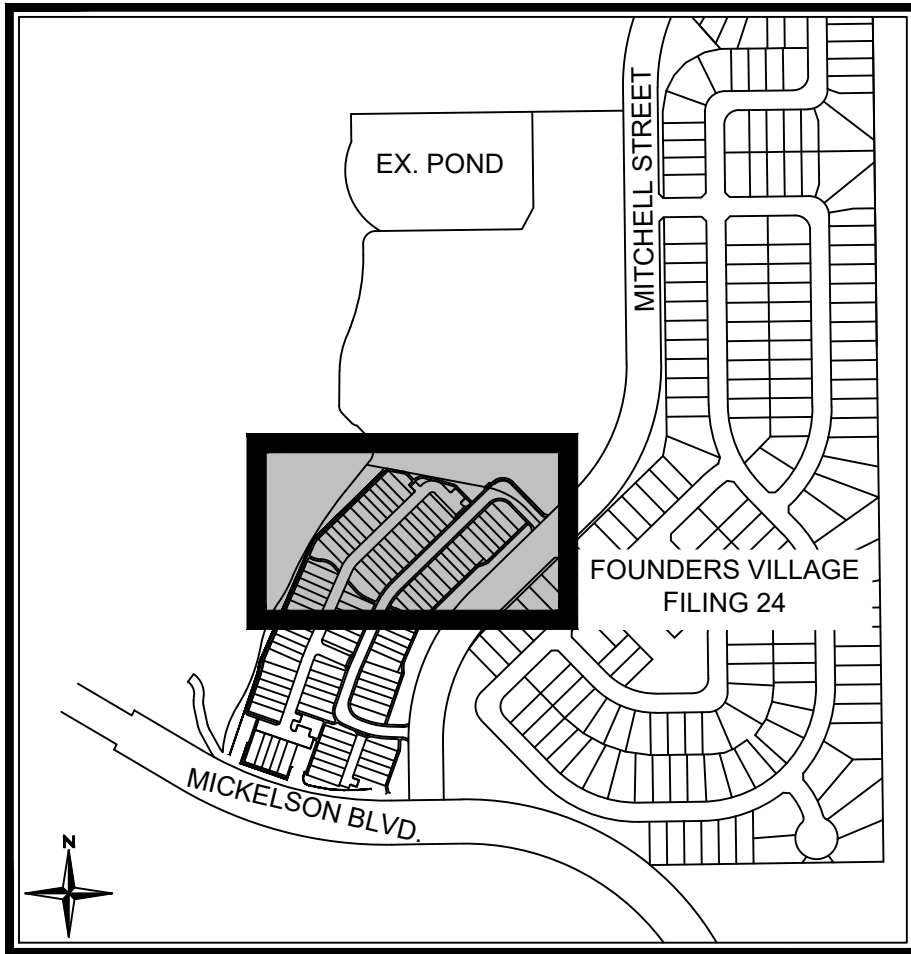


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**Castle Rock Water
WWMP
Figure 2.1**

SITE DEVELOPMENT PLAN
BELLA MESA SOUTH

LOCATED IN THE SOUTHEAST QUARTER SECTION 8, TOWNSHIP 8 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
TOWN OF CASTLE ROCK, COUNTY OF DOUGLAS, STATE OF COLORADO.
TOWN OF CASTLE ROCK PROJECT NUMBER SDP25-0014



KEY MAP
N.T.S.

EXISTING LEGEND

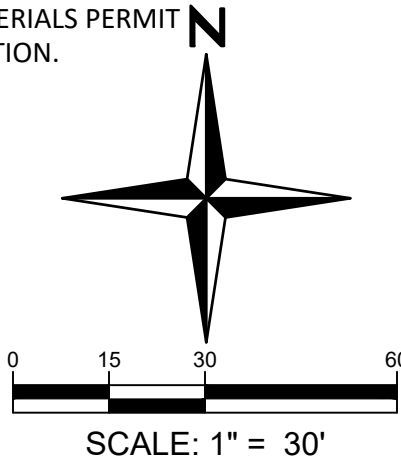
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- EXISTING R.O.W.
- EXISTING LOT LINE
- EXISTING EASEMENT
- SECTION LINE
- ROAD CENTERLINE
- EDGE OF PAVEMENT
- CURB AND GUTTER
- CONCRETE
- FENCE
- RETAINING WALL
- EXISTING WATERLINE
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING ELECTRIC LINE
- EXISTING GAS LINE
- EXISTING OVERHEAD ELECTRIC LINE

PROPOSED LEGEND

- PROPOSED PROPERTY LINE
- PROPOSED R.O.W.
- PROPOSED LOT LINE
- PROPOSED SETBACK
- PROPOSED EASEMENT
- PROPOSED UTILITY EASEMENT
- PROPOSED ROAD CENTERLINE
- PROPOSED CURB AND GUTTER (CATCH)
- PROPOSED CURB AND GUTTER (SPILL)
- PROPOSED SIDEWALK
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATER LINE
- PROPOSED MANHOLE w/ DIA. (FT.)
- PROPOSED INLET
- PROPOSED FLARED END SECTION
- PROPOSED WATER BEND
- PROPOSED WATER CROSS
- PROPOSED WATER TEE
- PROPOSED WATER REDUCER
- PROPOSED WATER VALVE
- PROPOSED FIRE HYDRANT
- PROPOSED PLUG/CAP
- PROPOSED RETAINING WALL
- TRACT BOUNDARY
- PROPOSED SWALE LINE

UTILITY NOTES

- THIS SITE IS LOCATED WITHIN THE TOWN OF CASTLE ROCK GREEN WATER PRESSURE ZONE.
- ALL PROPOSED EASEMENTS MUST BE RECORDED PRIOR TO ISSUANCE OF CONSTRUCTION PERMITS.
- ALL UTILITY EASEMENTS FOR WATER AND WASTEWATER LINES SHALL BE FOR THE EXCLUSIVE USE OF THE TOWN SO THAT ACCESS AND MAINTENANCE MAY BE PERFORMED.
- THE MINIMUM SEPARATION BETWEEN WATERLINES, SANITARY SEWER AND STORM SEWER LINES IS 10 FEET.
- THE MINIMUM SEPARATION BETWEEN WATER SERVICE LINES IS 5 FEET.
- ANY TIE-IN, CROSSING OR LOWERING OF TOWN CRITICAL INFRASTRUCTURE WILL REQUIRE A TIME AND MATERIALS PERMIT (TMU) WITH FEES REQUIRED PRIOR TO CONSTRUCTION.



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REDLAND.COM
LAND PLANNING
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT

NOT FOR
CONSTRUCTION

PROJECT NO.	DATE	NO.	NOTES
SDP17026.007	05/02/2025	1	FIRST SUBMITTAL
	09/17/2025	2	SECOND SUBMITTAL
	11/02/2025	3	THIRD SUBMITTAL
	1/13/2026	4	FOURTH SUBMITTAL

BELLA MESA SOUTH
SITE DEVELOPMENT PLAN
UTILITY PLAN

SHEET

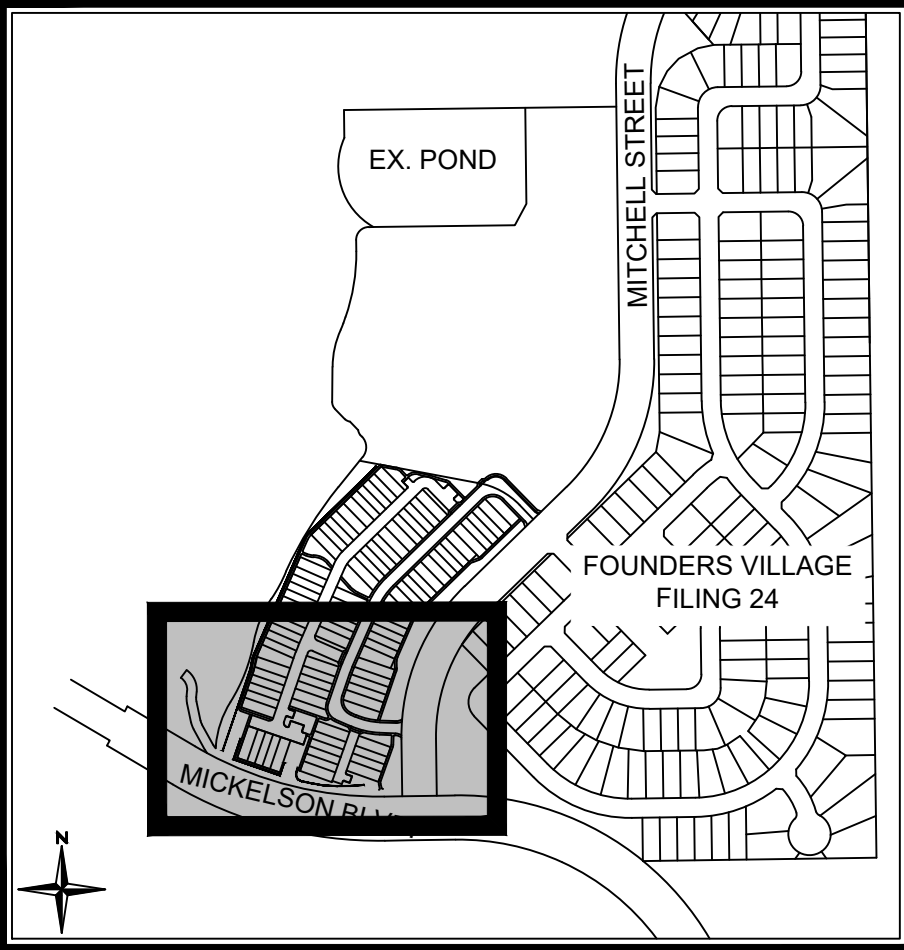
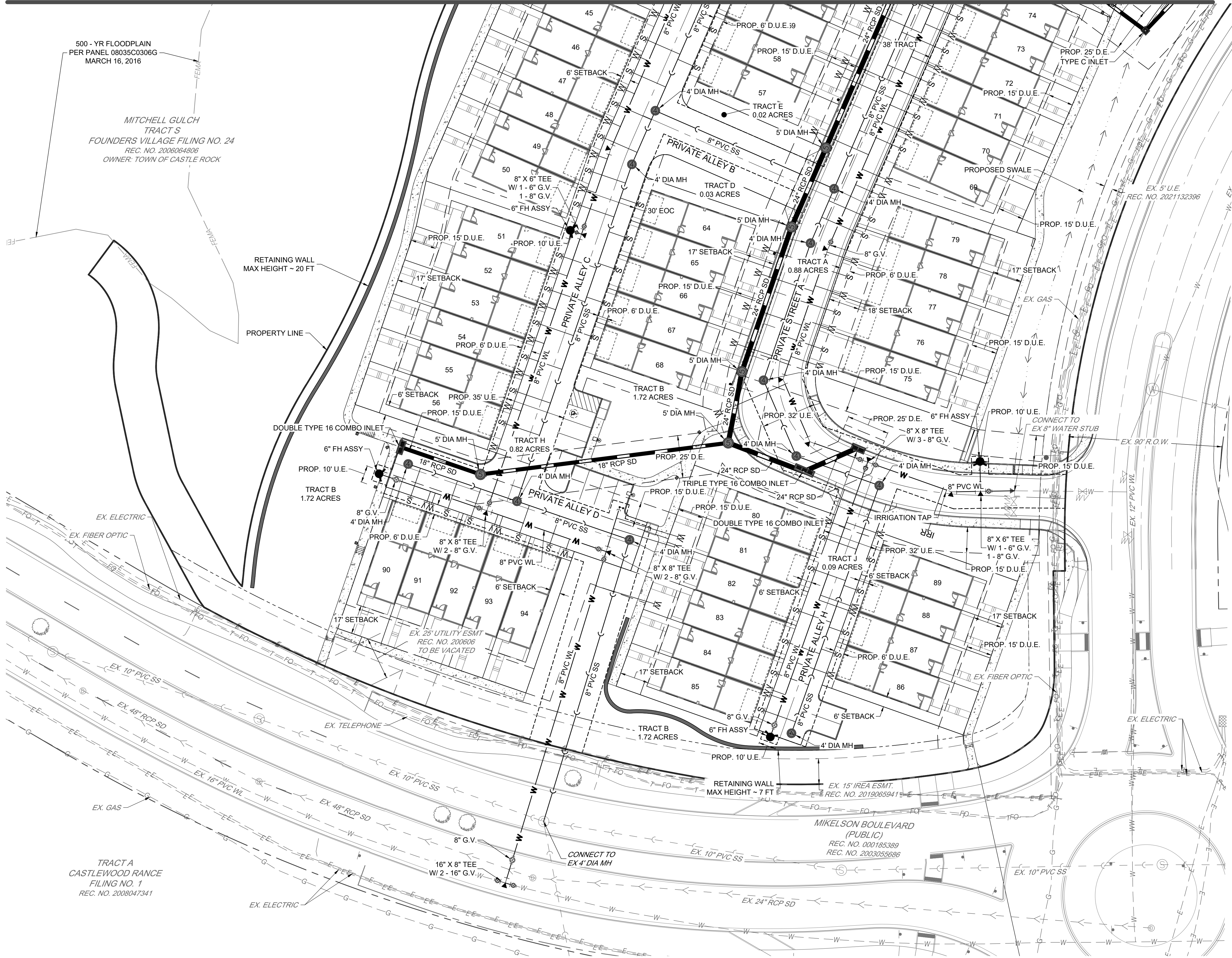
9 OF 31

I:\2017\17026 - Bella Mesa\CAD\Sheet Sets\17026.007 - SDP\17026.007 - Utility Plan.dwg tab: 9 OF 31 UTILITY PLAN Jun 12, 2026 - 10:45am barnetanka

SITE DEVELOPMENT PLAN
BELLA MESA SOUTH

LOCATED IN THE SOUTHEAST QUARTER SECTION 8, TOWNSHIP 8 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
TOWN OF CASTLE ROCK, COUNTY OF DOUGLAS, STATE OF COLORADO.
TOWN OF CASTLE ROCK PROJECT NUMBER SDP25-0014

MATCHLINE - SEE SHEET NO. 9 OF 31



KEY MAP
N.T.S.

EXISTING LEGEND

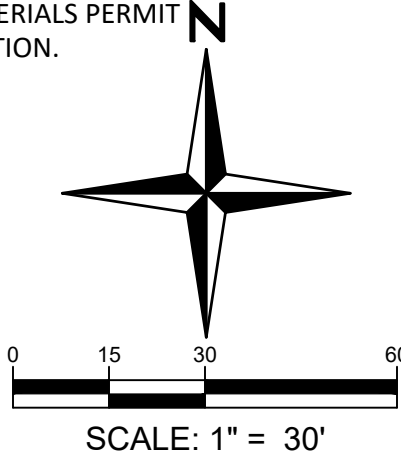
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- EXISTING R.O.W.
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- SECTION LINE
- ROAD CENTERLINE
- EDGE OF PAVEMENT
- CURB AND GUTTER
- CONCRETE
- FENCE
- RETAINING WALL
- EXISTING WATERLINE
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING ELECTRIC LINE
- EXISTING GAS LINE
- EXISTING OVERHEAD ELECTRIC LINE

PROPOSED LEGEND

- PROPOSED PROPERTY LINE
- PROPOSED R.O.W.
- PROPOSED LOT LINE
- PROPOSED SETBACK
- PROPOSED EASEMENT
- PROPOSED UTILITY EASEMENT
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- PROPOSED INLET
- PROPOSED FLARED END SECTION
- PROPOSED WATER BEND
- PROPOSED WATER CROSS
- PROPOSED WATER TEE
- PROPOSED WATER REDUCER
- PROPOSED WATER VALVE
- PROPOSED FIRE HYDRANT
- PROPOSED PLUG/CAP
- PROPOSED RETAINING WALL
- TRACT BOUNDARY
- PROPOSED SWALE LINE

UTILITY NOTES

- THIS SITE IS LOCATED WITHIN THE TOWN OF CASTLE ROCK GREEN WATER PRESSURE ZONE.
- ALL PROPOSED EASEMENTS MUST BE RECORDED PRIOR TO ISSUANCE OF CONSTRUCTION PERMITS.
- ALL UTILITY EASEMENTS FOR WATER AND WASTEWATER LINES SHALL BE FOR THE EXCLUSIVE USE OF THE TOWN SO THAT ACCESS AND MAINTENANCE MAY BE PERFORMED.
- THE MINIMUM SEPARATION BETWEEN WATERLINES, SANITARY SEWER AND STORM SEWER LINES IS 10 FEET.
- THE MINIMUM SEPARATION BETWEEN WATER SERVICE LINES IS 5 FEET.
- ANY TIE-IN, CROSSING OR LOWERING OF TOWN CRITICAL INFRASTRUCTURE WILL REQUIRE A TIME AND MATERIALS PERMIT (TMU) WITH FEES REQUIRED PRIOR TO CONSTRUCTION.



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CONSTRUCTION MANAGEMENT

NOT FOR
CONSTRUCTION

PROJECT NO.	DATE	NO.	NOTES
SDP25-0014	09/17/2025	1	FIRST SUBMITTAL
	09/17/2025	2	SECOND SUBMITTAL
	11/02/2025	3	THIRD SUBMITTAL
	11/13/2026	4	FOURTH SUBMITTAL

BELLA MESA SOUTH
SITE DEVELOPMENT PLAN
UTILITY PLAN

SHEET

Appendix G – Water Budget Letter

MEMORANDUM

To: John V. Hill, Sara Dieringer, Bryan Conway

Prepared By: Mike Pietschmann, P.E.

Date: Revised, October 10, 2024

RE: Bella Mesa North and Bella Mesa South – Water Budget

Below is a breakdown of the approximate water demand/dedication requirements that may be needed for the Bella Mesa North (Sunset Point) project and Bella Mesa South (Founder's Village 24 West – townhomes) project. The below SFE amounts are subject to change based on the final unit count and the landscape/irrigation design that is selected for the projects as they progress during the design phase.

SFE Summary Table

Project Name or Description	SFE
Bella Mesa North	549
Bella Mesa South	60
Mickelson/Mitchell Roundabout	4
Total SFE's Needed for Bella Mesa	613
SFE Credit per Development Agreement	276.2
Remaining SFE Amount to Purchase	336.8

Bella Mesa North (293 acre Parcel) – Assumptions

- A total of 525 single-family detached lots are anticipated to be developed.
- A dedication of 1 SFE per single-family lot is required per Section 4.4.1 of the Town of Castle Rock's Water System Design Criteria Manual.
- The Landscape Summary Table on Sheet 38 of 88 of the Sunset Point SDP prepared by Norris Design, dated 07/15/2022 was used for determining the irrigated landscape area for all common area open space tracts on the project.
- The only change we made from the Landscape Summary Table was to increase the "Turf (Texas Hybrid Bluegrass)" from 12,402 SF (0.28 acres) to 65,340 SF (1.5 acres). A total of 0.28 acres of turf area for 525 lots seems slightly low. By adding 1.22 acres of additional turf area, it increased the total annual water demand requirement by 3.3 acre-feet.
- Denver Water's published spreadsheet was used for determining the approximate water budget (acre-feet) based on the 3 types of plantings (turf, native, shrubs & tree beds) shown on the SDP.
- We assumed seven 1-1/2" irrigation taps for the Bella Mesa North project. This is extremely conceptual as no design has been completed on the irrigation system by any

consultant to date. More accurate size and number of irrigation taps will be determined as design progresses. This was used to determine the approximate number of SFE's needed per Castle Rock Water's system development fees. We are currently confirming with Castle Rock that the SFE's shown on their system development table is what they will require for each irrigation tap size.

Bella Mesa North (293 acre Parcel) – Water Dedication Requirements

- A total of 525 Single-Family Equivalent's (SFE's) will be required to serve the 525 lots anticipated for the Bella Mesa North project.
- Based on the conceptual landscape plans prepared by others and Denver Water's spreadsheet, a total of approximately 24.2 acre-feet of water will be required for irrigation. This may increase or decrease as Redland coordinates and prepares the landscape & irrigation plans for Cardel Homes.
- Using the assumption of seven 1-1/2" taps, this would equate to approximately 23.31 SFE's for irrigation taps per the Town's system development fee table.
- Therefore, the total amount of SFE's need to serve both on lot and irrigated common area open space for the Bella Mesa North project is approximately 549 SFE's.

Bella Mesa South (9 acre Parcel) – Assumptions

- The PD allows for a maximum of 196 multi-family units for the Bella Mesa South parcel. The most current conceptual site plan for the parcel yields approximately 82 units, which is what we assumed for the below calculations.
- A dedication of 0.65 SFE per townhome lot is required per Section 4.4.1 of the Town of Castle Rock's Water System Design Criteria Manual.
- The Landscape Summary Table on Sheet 8 of 16 of the Avilla Founders Village SDP prepared by Norris Design, dated 12/02/2021 for the site (NexMetro's submittal) was used for determining the irrigated landscape area for all common area open space tracts on the project.
- Denver Water's published spreadsheet was used for determining the approximate water dedication requirement (acre-feet) based on the 3 types of plantings (turf, native, shrubs & tree beds) shown.
- We assumed one 2" irrigation tap for the project. This is extremely conceptual as no design has been complete on the irrigation system by any consultant to date. More accurate size and number of irrigation taps will be determined as design progresses. This was used to determine the approximate number of SFE's needed per Castle Rock Water's system development fees. We are currently confirming with Castle Rock that SFE's shown on their system development table is what they will require for each irrigation tap size.

Bella Mesa South (9 acre Parcel) – Water Dedication Requirements

- A total of 82 townhome lots was assumed based on the current conceptual site plan. This would equate to the need for an additional 53.3 SFE's. If you were able to achieve the maximum density of 196 units, which is not feasible for a townhome product on this parcel, this would equate to 127.4 SFE's.
- Based on the conceptual landscape plans prepared by others and Denver Water's spreadsheet, a total of approximately 4.5 acre-feet of water will be required for

irrigation. This may increase or decrease as Redland coordinates and prepares the landscape plans for Cardel Homes.

- Using the assumption of one 2" tap as stated above, this would equate to approximately 6.67 SFE's for the irrigation tap per the Town's system development fee table.
- Therefore, the total amount of SFE's need to serve both on lot and irrigated common area open space for the Bella Mesa South project is approximately 60 SFE's. This would increase if more than 82 townhome lots are able to be achieved.

Overall Summary

Based on the above assumptions and information, we estimate the minimum number of Single-Family Equivalent's (SFE's) necessary to develop the Bella Mesa North and South parcels are:

- Bella Mesa North – 549 SFE's: This includes 525 SFE's for the water taps to each lot, and approximately an additional 23.31 SFE's for the irrigation taps serving the common area open space tracts.
- Bella Mesa South – 60 SFE's: This includes 53.3 SFE's for the water taps to each lot, and approximately an additional 6.67 SFE's for the irrigation taps serving the common area open space tracts.
- Mitchell & Mikelson Right-of-Ways – approximately 4.0 SFE's will be necessary for the Mickelson & Mitchell right-of-ways for landscape irrigation purposes. This is based on a 1-1/2" irrigation tap being needed to serve this area.

This equates to a minimum of 613 SFE's suggested to be available for the project based on the level of design completed to date. It should also be noted that the project currently has a credit of 276.2 SFE's available to it as outlined in the approved development agreement. Therefore, approximately an additional 336.8 SFE's remain to be acquired in order to adequately serve the project.

Please note the above is approximate and may be subject to change based on the final number of lots and type/amount of landscaping chosen for the development.

WATER BUDGET	
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PROJECT NAME:	Bella Mesa North- Approximate Landscape Water Budget	SUBMITTED BY:	DATE: 9/23/2024
TAP SIZE:			
TAP ELEVATION:			
ADDRESS:			
LEGAL DESCRIPTION:			

DESCRIPTION	IRRIGATED ACRES	MONTH	HISTORICAL ET	PLANT COEFFICIENT(Kc)	PLANT WATER REQUIREMENT	AVERAGE PRECIPITATION	EFFECTIVE PRECIPITATION	SYSTEM EFFICIENCIES	TOTAL WATER REQUIREMENT(IN.)	WEEKLY WATER REQUIREMENT (IN.)	MONTHLY WATER REQUIREMENT (IN.)
PLANT TYPE:	1.50	APRIL	2.26	0.88	1.99	0	0.00	90%	2.21	0.51	89.520
BLUEGRASS		MAY	5.73	0.88	5.04	0	0.00	90%	5.60	1.29	228.969
		JUNE	6.64	0.88	5.84	0	0.00	90%	6.49	1.50	263.014
		JULY	7.27	0.88	6.40	0	0.00	90%	7.11	1.64	287.969
		AUGUST	5.87	0.88	5.17	0	0.00	90%	5.74	1.32	232.514
		SEPTEMBER	4.45	0.88	3.92	0	0.00	90%	4.35	1.00	176.267
		OCTOBER	1.6	0.88	1.41	0	0.00	90%	1.56	0.36	63.377
OPERATING PERIOD-HRS./DAY	8.0	TOTALS	33.82		29.76	0	0.00	TOTAL	33.07	TOTAL	1,339.629
DAYS/WEEK	6.0									ACRE FEET/YR	4.1
DAYS/MONTH	26.0									PEAK SEASON GPM	23

DESCRIPTION	IRRIGATED ACRES	MONTH	HISTORICAL ET	PLANT COEFFICIENT	PLANT WATER REQUIREMENT	AVE. RAINFALL	EFFECTIVE RAINFALL	SYSTEM EFFICIENCIES	TOTAL WATER REQUIREMENT(IN.)	WEEKLY WATER REQUIREMENT (IN.)	MONTHLY WATER REQUIREMENT (IN.)
PLANT TYPE:	1.00	APRIL	2.26	0.5	1.13	0	0.00	90%	1.26	0.29	33.909
MAY			5.73	0.5	2.87	0	0.00	90%	3.18	0.73	85.973
JUNE			6.64	0.5	3.32	0	0.00	90%	3.69	0.85	99.627
JULY			7.27	0.5	3.64	0	0.00	90%	4.04	0.93	109.079
AUGUST			5.87	0.5	2.94	0	0.00	90%	3.26	0.75	88.073
SEPTEMBER			4.45	0.5	2.23	0	0.00	90%	2.47	0.57	66.768
OCTOBER			1.6	0.5	0.80	0	0.00	90%	0.89	0.21	24.006
OPERATING PERIOD-HRS./DAY	8.0	TOTALS	33.82		16.91	0	0.00	TOTAL	18.79	TOTAL	507.435
DAYS/WEEK	6.0									ACRE FEET/YR	1.6
MONTH	26.0									PEAK SEASON GPM	9

DESCRIPTION	IRRIGATED ACRES	MONTH	HISTORICAL ET	PLANT COEFFICIENT	PLANT WATER REQUIREMENT	AVE. RAINFALL	EFFECTIVE RAINFALL	SYSTEM EFFICIENCIES	TOTAL WATER REQUIREMENT(IN.)	WEEKLY WATER REQUIREMENT (IN.)	MONTHLY WATER REQUIREMENT (IN.)
PLANT TYPE:	15.46	APRIL	2.26	0.3	0.68	0	0.00	70%	0.97	0.22	404.409
NATIVE GRASS		MAY	5.73	0.3	1.72	0	0.00	70%	2.46	0.57	1,025,338
		JUNE	6.64	0.3	1.99	0	0.00	70%	2.85	0.66	1,188,175
		JULY	7.27	0.3	2.18	0	0.00	70%	3.12	0.72	1,300,908
		AUGUST	5.87	0.3	1.76	0	0.00	70%	2.52	0.58	1,050,389
		SEPTEMBER	4.45	0.3	1.34	0	0.00	70%	1.91	0.44	796,292
		OCTOBER	1.6	0.3	0.48	0	0.00	70%	0.69	0.16	286,307
OPERATING PERIOD-HRS./DAY	8.0	TOTALS	33.82		10.15	0	0.00	TOTAL	14.49	TOTAL	6,051,818
DAYS/WEEK	6.0									ACRE FEET/YR	18.6
DAYS/MONTH	26.0									PEAK SEASON GPM	105

MINIMUM REQUIRED SYSTEM EFFICIENCIES:

Drip irrigation - 90%

Rotor irrigation - 70%

Spray head irrigation: 65%

April & October ET = 1/2 Monthly Value

ET data from Denver Water weather stations (Average 2003-2008)

PROJECT TOTALS

IRRIGATED ACRES	18.0
GALLONS/YEAR	7,898,883
ACRE FEET/YEAR	24.2
PEAK SEASON GPM	137

WATER BUDGET											
PROJECT NAME:		Bella Mesa South - Approximate Landscape Water Budget					SUBMITTED BY:			DATE: 9/23/2024	
TAP SIZE:											
TAP ELEVATION:											
ADDRESS:											
LEGAL DESCRIPTION:											