FINAL UTILITY REPORT
FOR
INDEPENDENCE COMMUNITY
ELBERT COUNTY, CO
CASE NO. FP-16-0005

PREPARED FOR:

CRAFT BANDERA ACQUISITION COMPANY, LLC
1787 SOUTH BROADWAY, SUITE 200
DENVER, CO 80210
PHONE: 303.601.8315
CONTACT: RANDY ROBERTS

PREPARED BY:

CORE CONSULTANTS, INC.
1950 W. LITTLETON BOULEVARD, SUITE 109
LITTLETON, CO 80120
PHONE: 303.703.4444
CONTACT: ROB HANSEN
CORE PROJECT NUMBER: 15-054

APRIL 27, 2017

CONTENTS

LIST OF APPENDICES

I. General Location and Description

A. General

The purpose of this Utility Report is to present the backbone design of the water, irrigation and wastewater distribution systems for the Independence Community. This report proposes conceptual locations and sizes for these systems and analyzes the systems for compliance with the criteria. The project is located outside of the Elbert County service area for water, irrigation and sanitary sewer. Water wells with accompanying tanks and pump infrastructure is proposed with the project. A Water Resource and Recovery Facility (WRRF) is proposed to treat sewage. The effluent from the WRRF will be stored in ponds and used for irrigation throughout the project including the residential landscaping.

B. Description of Property

The Independence Community project is located within portions of Sections 14 and 15, Township 7 South, Range 65 West of the 6th P.M., Elbert County, Colorado. The project includes approximately 1,012 acres. The site is currently used as range land and for agriculture. There is an existing homestead near Hancock Blvd and Hilltop Road. The western boundary of the site is the Douglas County and Elbert County line. Hilltop Road is the southern boundary. Undeveloped range and farm land is located to the east and north. North of the northwest corner of the project are a few estate homes. South of the property is existing residential, while West of the property is planned for development. Refer to the Vicinity Map included in Appendix A.

II. Proposed Development

A. General

Independence is a master planned community zoned for 920 single family detached lots, at least 4 neighborhood parks, a community center, a dedicated school site, dedicated sheriff site, and a dedicated fire site. The project will be developed in phases. Neighborhood 1 will include the first seven phases and will consist of the first 328 lots +/- of the project. A summary of proposed phases and associated dwelling units assumed for this report is provided below. Water & Sewer basin names are based on original phasing scheme, from the first submittal, revised phasing information has been incorporated per table 2.1.

Table 2.1 – Phasing

Phase	# Dwelling Units	Approx Ac.	
1	49	10.8	Neighborhood 1
2	50	11.1	Neighborhood 1
3	34	7.5	Neighborhood 1
4	39	7.3	Neighborhood 1
5	53	15.5	Neighborhood 1
6	58	19.4	Neighborhood 1
7	45	13.0	Neighborhood 1
8	46	38.9	
9	60	32.0	
10	140	62.4	
11	55	79.1	
12	66	60.2	
13	140	60.5	
14	25	23.1	
15	35	29.4	
16	25	47.7	
17	750 students	24	

III. Design Standards

Although the project will not be connected to Elbert County services, it is generally designed in accordance with Elbert County Standards and Specifications. It appears the Unit Water Demands for residential development in the Elbert County criteria include irrigation demands. The Independence Community project plans to provide irrigation for the residential homes with a separate irrigation system. The South Adam County Water and Sanitation District (SACWSD) Design and Construction Standards for Water and Wastewater Facilities includes separate design values for domestic water for the residential home and the irrigated areas. SACWSD criteria were reviewed and appear to

be appropriate for the project due to the separate domestic and irrigation system.

A. DOMESTIC WATER

Domestic water will not be connected to Elbert County services. SACWSD Table 3.1, shown on the following page indicates an Average Daily Water Demand (ADD) of 265 gpud for residential uses. A Max Day factor of 1.6 and a Peak Hour factor of 2.8 were used in modeling. A fire flow of 1,500 gpm was used for the Max Day + Fire Flow scenario.

TABLE 3.1 – POTABLE WATER DEMAND

Average Daily Water Demand	**Potable Demand**
Single or Multi-Family Residential	265 gpud
Commercial	730 gpgad
Industrial	790 gpgad
Schools	10 gpsd
Parks, Open Space, Irrigated Areas	n.a.
Peaking Factors, Maximum Daily Flow	Multiply Average Day Potable by:
Single or Multi-Family Residential	1.6
Commercial	1.3
Industrial	1.3
Schools	1
Parks, Open Space, Irrigated Areas	n.a.
Peaking Factors, Maximum Hourly Flow	Multiply Maximum Day Potable by:
Single or Multi-Family Residential	1.75
Commercial	1.75
Industrial	1.75
Schools	20
Parks, Open Space, Irrigated Areas	n.a.

Definitions of Units:
gpud = gallons per unit per day
gpgad = gallons per gross acre per day

gpiad = gallons per irrigated acre per day
gpsd = gallons per student per day

B. IRRIGATION

As previously mentioned the project will be using effluent from the WRRF, stored in irrigation ponds, to provide irrigation water for the entire project. The system will not be connected to Elbert County Services and will operate as an independent system. A landscape irrigation specialist and a landscape architect were consulted to determine the required demands for the project based on the planned landscaping and other project needs. It was determined a volume of about 4300 gpiad should be used. Using SACWSD Table 3.2 peaking factors this equates to 19 gpm per irrigation acre. Using the proposed project density and anticipated landscaping a value of 1.6 gpm/residential unit was used for modeling and sizing the irrigation system.

C. SANITARY SEWER

Sanitary sewer will not be connected to Elbert County Services. The proposed sanitary sewer system is designed based on "Elbert County Specifications – Section 500 – Sanitary Sewer Facilities combined with a few conservative assumptions. The Water Resource and Recovery Facility on site will be sized to adequately treat all downstream capacity from the Independence Community.

Specifically:

- Design Flow's (Average)
    - Residential – 90 gallons/capita/day
        - Assumed Density of 3.1 / Unit
    - Elementary Schools – 13 gallons/student/day
        - School projected 750 students
- Peak Flow Factor (Range 2.5-5.0)
    - Assumed 5
- Min Pipe Grade – 0.5%
- Infiltration

All proposed sanitary sewer pipes were sized for peak flows. Peak flows were determined by multiplying the average day flow by the peaking factor mentioned above to be the max of 5.

IV. Potable Water

A. Proposed Water Distribution System

The potable water system was modeled using WaterCAD software. The WaterCAD runs are included in Appendix B. A Node Map is located in Appendix A. Simulations were run for the following scenarios with the corresponding minimum allowable pressures. A summary of the results is presented on the following page in Table 1.

- Max Day
  - 40 psi minimum
- Peak Hour
  - 40 psi minimum
- Max Day + Fire Flow
  - 20 psi minimum

The entire site can be served with a single pressure zone. The booster pump system will be designed to maintain a hydraulic grade of 6790ft. Static pressures are anticipated to be between 43psi and 125psi in accordance Elbert County Criteria. All phases meet the minimum fire flow and provide two points of connection.

Table 4.1 – Potable Water Mix/Max Pressures

Scenario	Minimum Pressure		Maximum Pressure	
	Node	Pressure (PSI)	Node	Pressure (PSI)
Max Day	J-39	77	J-14	122
Peak Hour	J-39	76	J-14	122
Max Day + Fire Flow	J-39	31	J-14	117

B. Proposed Water Distribution System

a. Wells

Independence Community's initial potable water supply will be from two Denver Basin ground water wells. The two wells will be drilled into the Arapahoe and Denver aquifers. The two wells provide redundant sources for potable water and combined are expected to produce approximately 300 gpm of water. The wells pump into a Well Facility building that will contain equipment to meter the flows and add disinfectant (liquid sodium hypochlorite). An on-site diesel generator will provide emergency back-up power.

b. POTABLE STORAGE TANK

Independence Community will store its potable water in an above-grade, prefabricated concrete tank. The first tank will have a volume of 400,000 gallons, which is enough storage for maximum day demand of Filing 1 plus two hours of fire flow supply (based on 1,500 gpm). The potable storage tank will have separate inflow and outflow pipes to prevent short circuiting. A second water tank will be provided for the ultimate project buildout.

c. BOOSTER PUMP STATION

The Independence Community potable storage tank will be above-grade, but will not be an elevated tank. Consequently, it will not have the elevation required to provide adequate pressure to the entire potable water distribution system. As a result, a Booster Pump Station will be constructed to pressurize the system. The Booster Pump Station building will be combined with the Well Facility and have a bank of pumps to supply a range of flowrates, including fire flow. An on-site diesel generator will provide emergency back-up power.

V. Irrigation

A. PROPOSED IRRIGATION DISTRIBUTION SYSTEM

The irrigation system was modeled using WaterCAD software. The WaterCAD runs are included in Appendix B. A Node Map to is in Appendix A. A simulation was run for the Peak Hour scenario maintaining a minimum of 40psi. The entire site can be served with a single pressure zone. The booster pump system will be designed to maintain a hydraulic grade of 6790ft. Static pressures are anticipated to be between 43psi and 125psi. A summary of the results is presented below in Table 2.

TABLE 5.1 – IRRIGATION MIX/MAX PRESSURES

Scenario	Minimum Pressure		Maximum Pressure	
	Node	Pressure (PSI)	Node	Pressure (PSI)
Peak Hour	J-39	76	J-14	122

B. PROPOSED IRRIGATION DISTRIBUTION SYSTEM

a. IRRIGATION WATER SUPPLY

Independence Community's irrigation water supply is the treated effluent from the WRRF. Under the Colorado Department of Public Health and Environment's Regulation 84, treated effluent can be used for irrigation of open spaces, parks, and single-family residences. All of the treated effluent from the WRRF will be used for irrigation. It is possible that in the early stages of Neighborhood 1 and during extreme drought conditions, there will not be

enough treated effluent produced at the WRRF. Supplemental irrigation water will be provided by the potable water wells. There is enough pumping capacity and decreed water rights in the wells to supply water to both the potable and irrigation systems.

b. Irrigation Storage Reservoirs

Irrigation water supply from the WRRF is fairly consistent throughout the year. However, irrigation demand peaks in the summer and is non-existent in the winter. Irrigation storage reservoirs will be constructed to account for the imbalance of supply and demand. Initially, Independence Community will have two reservoirs with a total volume of approximately 50 acre-feet and is sufficient for Filing 1. The reservoirs will not be jurisdictional and have either a clay or synthetic liner to prevent leakage. The area surrounding the reservoirs will be graded so that run-off will not flow into the reservoirs. Additional reservoirs will be added to meet the needs of the planned 920 lots. It is estimated 140ac-ft of storage will be required.

c. Irrigation Pump Station

An Irrigation Pump Station will be constructed to provide adequate pressure to the irrigation distribution system. The Irrigation Pump Station building will withdraw treated effluent from the reservoirs and pumped into the separate irrigation system. The Irrigation Pump Station will have a screen to remove small particles that clog irrigation heads and nozzles. The irrigation water will be disinfected with sodium hypochlorite prior to being pumped into the distribution system.

VI. Sanitary Sewer

A. Proposed Wastewater Collection System

The sanitary sewer system was sized using Elbert County Design Standards. A Sewer Map can be found in Appendix A graphically showing the sewer collections system design. The eastern portion of the project gravity drains to the WRRF. The western portion of the site will require two pump stations to convey flow to the WRRF.

The peak flows for the sanitary sewer system are 2.512 cfs and can be found in the Sanitary Sewer Calculations in Appendix D2.

B. Proposed Wastewater Facilities

The Independence Community Water and Sanitation District (District or IWSD; currently in formation process) will provide water, irrigation, and sanitary sewer services to the development.

The main purpose of the WRRF will be to provide sanitary sewer service for the proposed Independence Community development in Elbert County. The Independence Community WRRF will further treat the wastewater to meet Regulation 84, Category 3 effluent limits and provide reclaimed domestic wastewater for irrigation of lawns and landscapes at open spaces, parks, and residential properties. Phase 1 of the Independence Community WRRF will have a capacity of 0.15 million gallons per day (MGD) and can provide treatment for up to 538 single family equivalents (SFEs). Phase 2 will have a capacity of 0.30 MGD and can provide treatment for up to 1,045 SFEs, which covers the 920 homes and other community features mentioned above.

The proposed Independence Community WRRF will consist of headworks (influent flow monitoring and influent fine screen), sequencing batch reactors (SBRs), post equalization (post-EQ) basin, effluent pump station, effluent filtration, ultraviolet light disinfection reactor (UV reactor), effluent flow monitoring, and an aerobic digester. Treated effluent will be directed via gravity to reclaimed water storage reservoirs for eventual reuse in the irrigation system. Additionally, the facility will utilize supervisory control and data acquisition (SCADA) systems to operate, monitor, and record functions at the facility. Odor control measures will also be employed at the Headworks/Filtration Building, and the entire facility will be connected to a backup power supply (i.e. generator).

The Independence Community WRRF will consist of a series of treatment processes as described in this paragraph. Raw wastewater will first enter a headworks building with influent flow monitoring and an influent fine screen, and the latter will remove any large debris. The screened wastewater will then flow to one of two SBR basins for secondary/biological treatment. The SBR treatment process will degrade organics, remove nitrogen, and sequester phosphorus in the waste activated sludge (WAS). Clarified effluent from the SBR basins will flow via gravity to the post-EQ basin. The post-EQ basin serves to attenuate high flow rates from the decant of the SBR basins and peak hour/day flow rates through the facility. Clarified effluent will be pumped from the post-EQ basin to the cloth media disk filters for further removal of remaining suspended solids. Filtered effluent will then flow via gravity through the UV reactor to inactivate pathogens and other microorganisms. The disinfected/treated effluent will then flow via gravity through effluent flow monitoring to the reclaimed water storage reservoirs. WAS from the SBR basins will be pumped to an aerobic digester for further degradation of organics and stabilization of biosolids prior to disposal off site.

A preliminary engineering report (PER) has been submitted to the Colorado Department of Public Health and Environment (CDPHE) and is currently under review. When CDPHE approves the PER, the process design report (PDR) for the facility will be completed. The PDR will detail every aspect of the facility,

including site layout, equipment selections, and compliance with the State of Colorado Design Criteria for Domestic Wastewater Treatment Works. The facility will also be designed in accordance with Elbert County building code.

VII. Conclusions

A. Compliance with Master Plan

The proposed water and wastewater layouts presented in the report provide systems which are in substantial conformance with Elbert County guidelines.

B. Variances

No variances associated with the proposed water and wastewater design are being requested.

VIII. References

A. Elbert County Specifications – Section 400 – Water

B. Elbert County Specifications – Section 500 – Sanitary Sewer Facilities

C. South Adam County Water and Sanitation District Design and Construction Standards for Water and Wastewater Facilities

Computer Programs:

D. Bentley WaterCAD V8i SELECTseries 5, 2013 Bentley Systems, Incorporated.

E. Excel by Microsoft, Inc.

APPENDIX A
MAPS

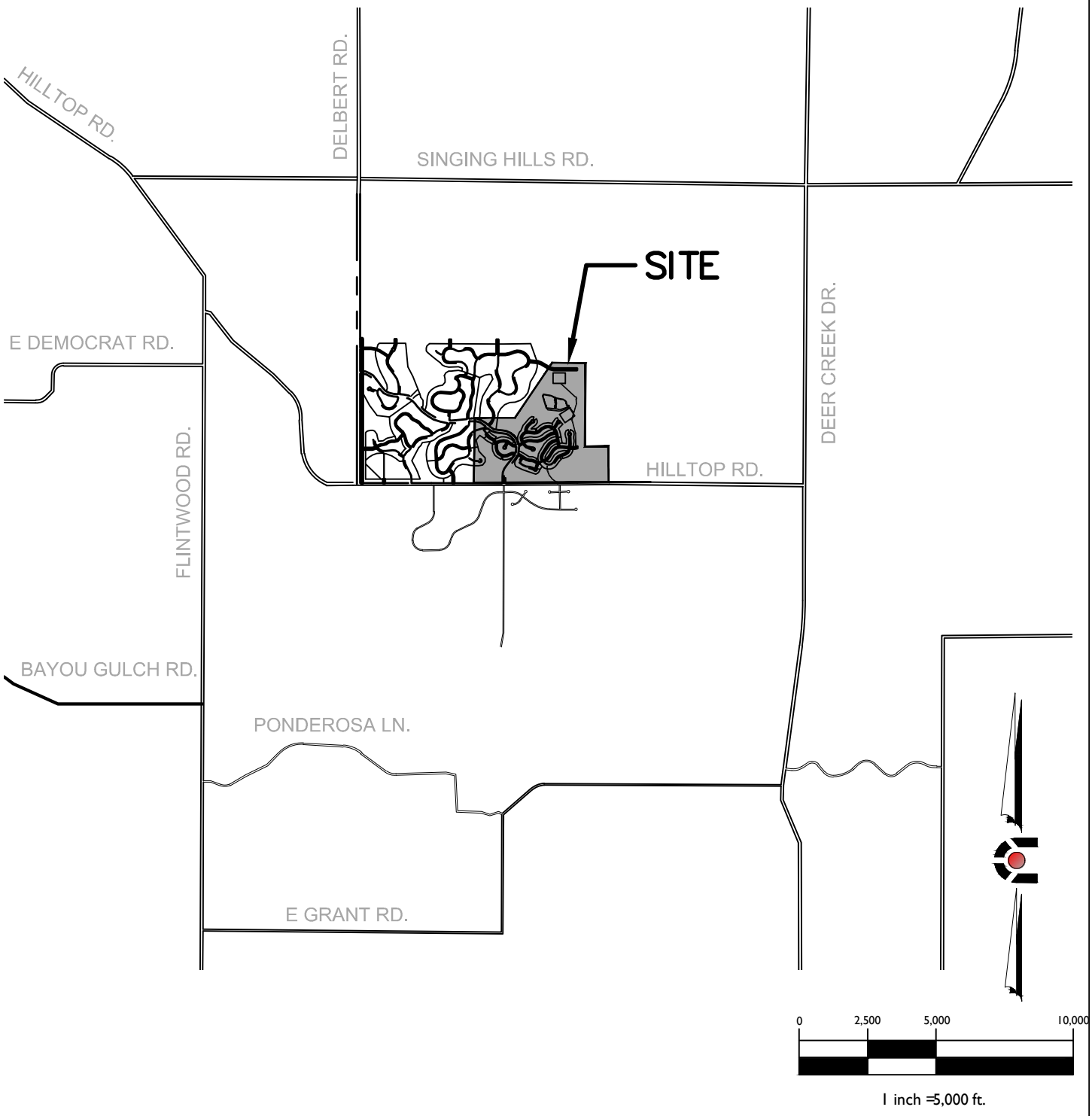
A1-VICINITY MAP

A2-WATER SIMULATION NODE MAP

A3-POTABLE WATER SUPPLY MAP

A4-IRRIGATION SUPPLY MAP

A5-SEWER MAP



CORE CONSULTANTS

INDEPENDENCE – PLANNING AREA 1
VICINITY MAP

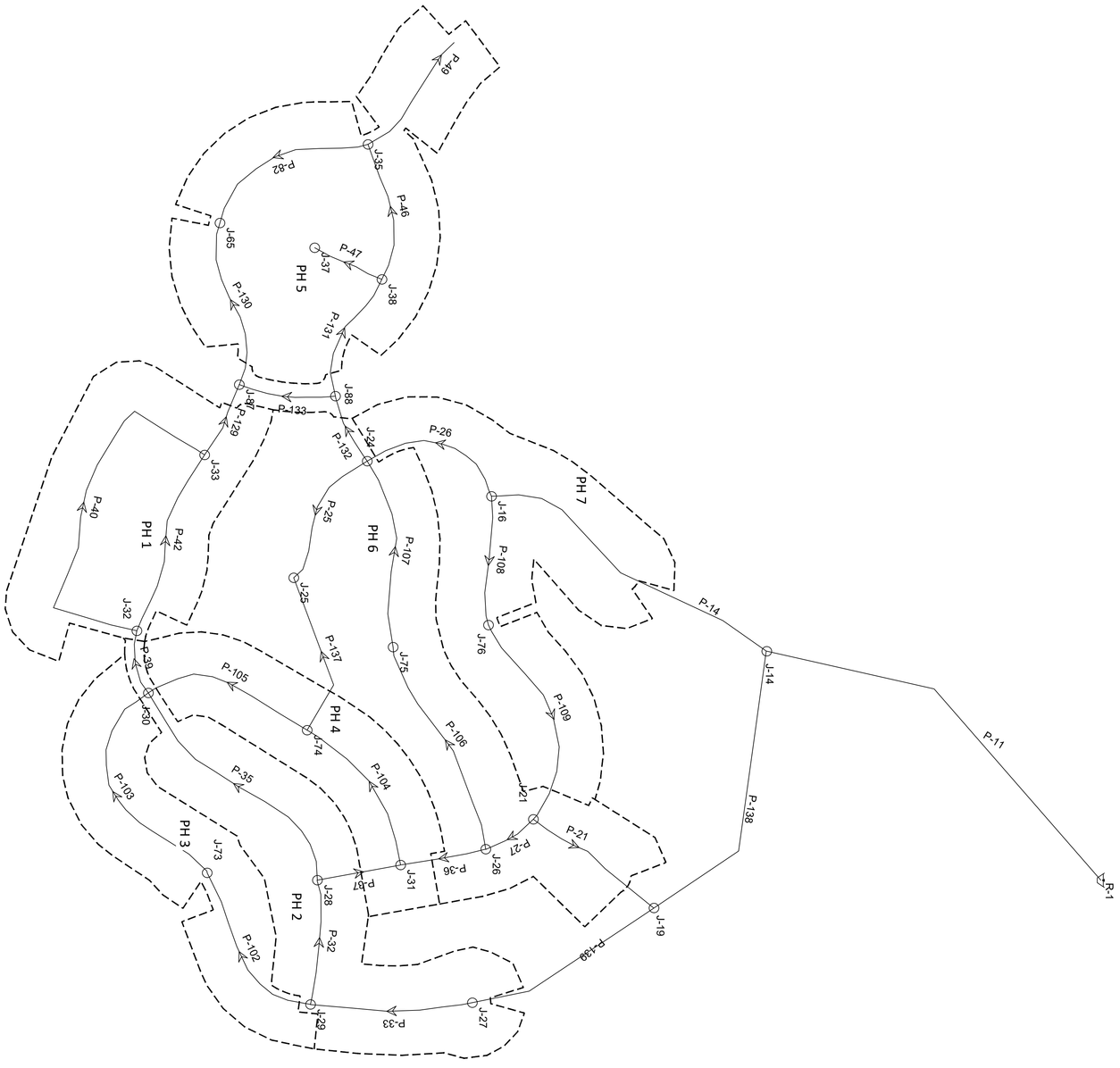
SHEET NUMBER
A1
OF 1 SHEETS

PREPARED FOR: CRAFT COMPANIES, LLC

DATE SUBMITTED: 04/27/2017

JOB NUMBER
15-054

FINAL WATER NODE MAP



LEGEND

PHASE BOUNDARY

PIPE JUNCTION

1 INCH = 200 Feet

0 200 400

INDEPENDENCE

FINAL WATER NODE MAP

ELBERT COUNTY, CO

REVISIONS			
#	DESCRIPTION	DATE	BY

Know what's below. Call before you dig. 811

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

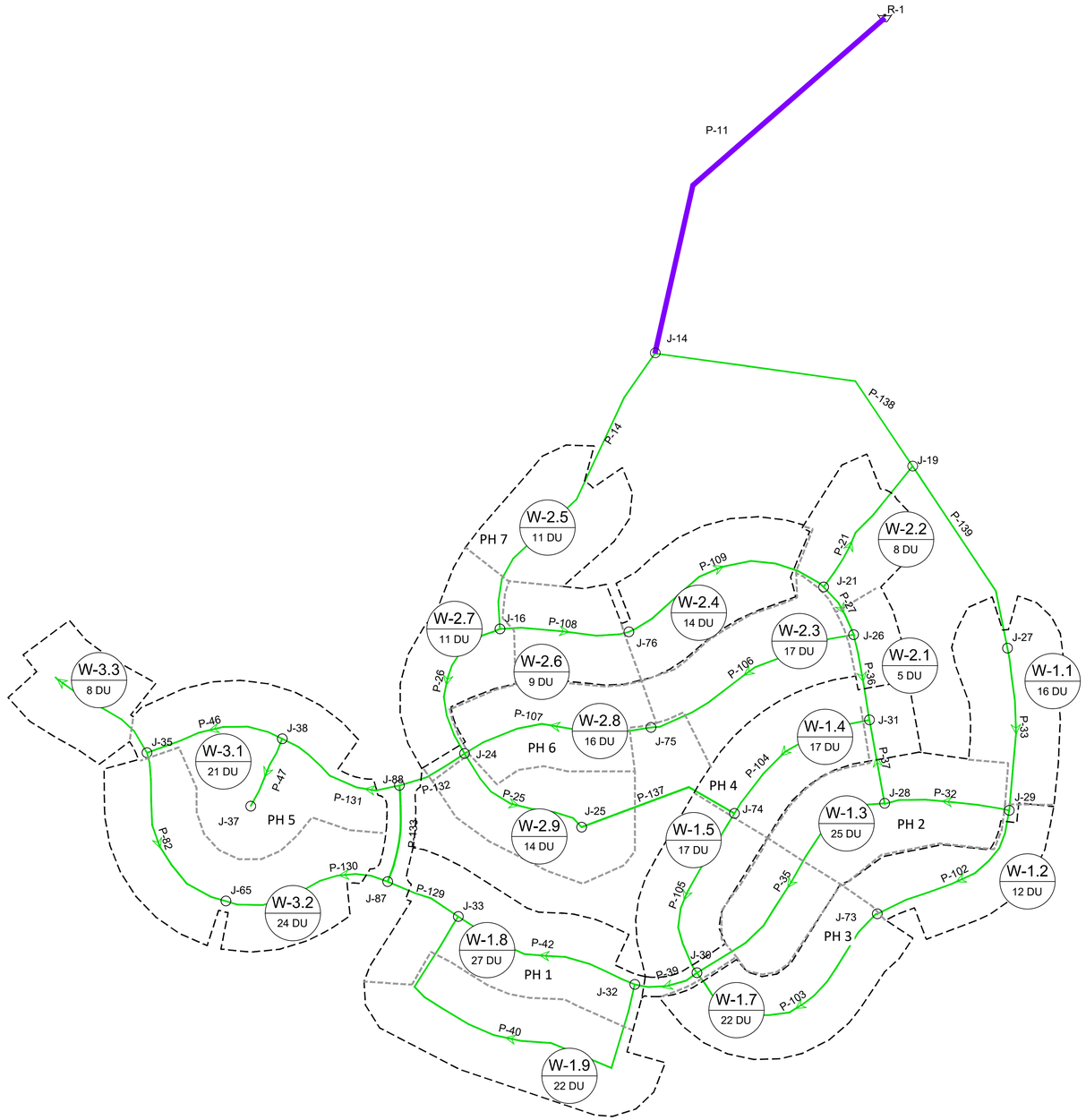
CORE ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS (HORIZONTAL AND VERTICAL). THE EXISTING UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION. IT IS, HOWEVER, THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES.

INITIAL PLAN
RESUBMITTAL 12/7/2017
DESIGNED BY: JF
DRAWN BY: JF
CHECKED BY: RH

JOB NO.
15-054

SHEET
A2
OF

CORE CONSULTANTS
CIVIL ENGINEERING
DEVELOPMENT CONSULTING
LAND SURVEYING
303.703.4444
1950 W. Littleton Blvd., Ste. 109
Littleton, CO 80120



FINAL WATER SUPPLY MAP

CIVIL ENGINEERING
DEVELOPMENT CONSULTING
LAND SURVEYING
303.703.4444
1950 W. Littleton Blvd., Ste. 109
Littleton, CO 80120

CORE CONSULTANTS

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

CORE ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS. CONTRACTOR MUST FIELD VERIFY ALL EXISTING UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION. IT IS HOWEVER, THE RESPONSIBILITY OF THE CONTRACTOR TO ASCERTAIN THE LOCATION OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES.

Know what's below. Call before you dig. 811

REVISIONS

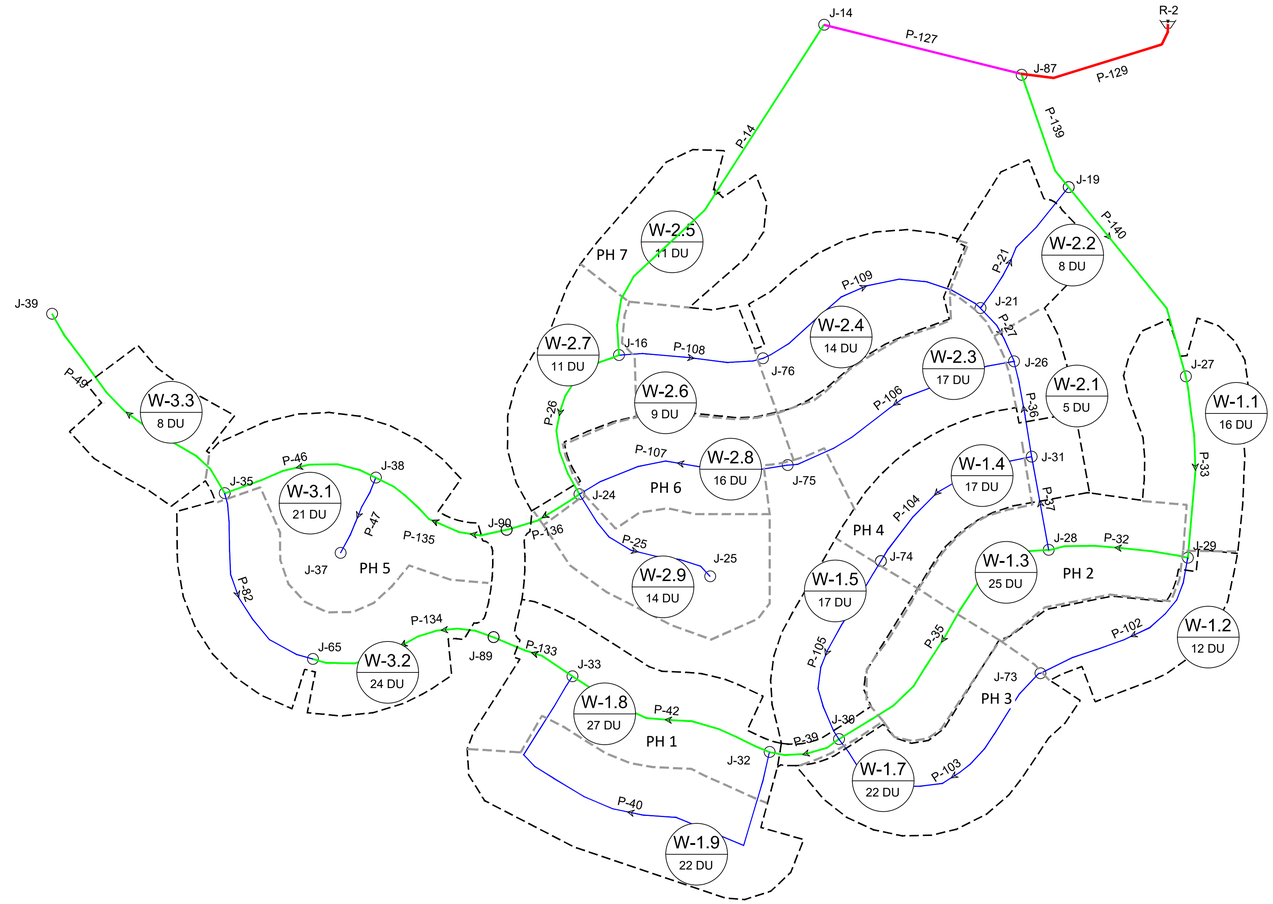
#	DESCRIPTION	DATE	BY

INDEPENDENCE
POTABLE WATER SUPPLY MAP
ELBERT COUNTY, CO

INITIAL PLAN
RELEASE: 04/27/2017
DESIGNED BY: JF
DRAWN BY: JF
CHECKED BY: RH

JOB NO.
15-054

SHEET
A3 OF



FINAL IRRIGATION SUPPLY MAP

LEGEND

- W-X.X / XX DU — DRAINAGE BASIN # / UNITS IN BASIN
- PHASE BOUNDARY
- BASIN BOUNDARY
- 4" RE-USE WATER LINE
- 6" RE-USE WATER LINE
- 8" RE-USE WATER LINE
- 10" RE-USE WATER LINE
- 12" RE-USE WATER LINE

CIVIL ENGINEERING
DEVELOPMENT CONSULTING
LAND SURVEYING
303.703.4444
1950 W. Littleton Blvd., Ste. 109
Littleton, CO 80120

CORE CONSULTANTS

REVISIONS

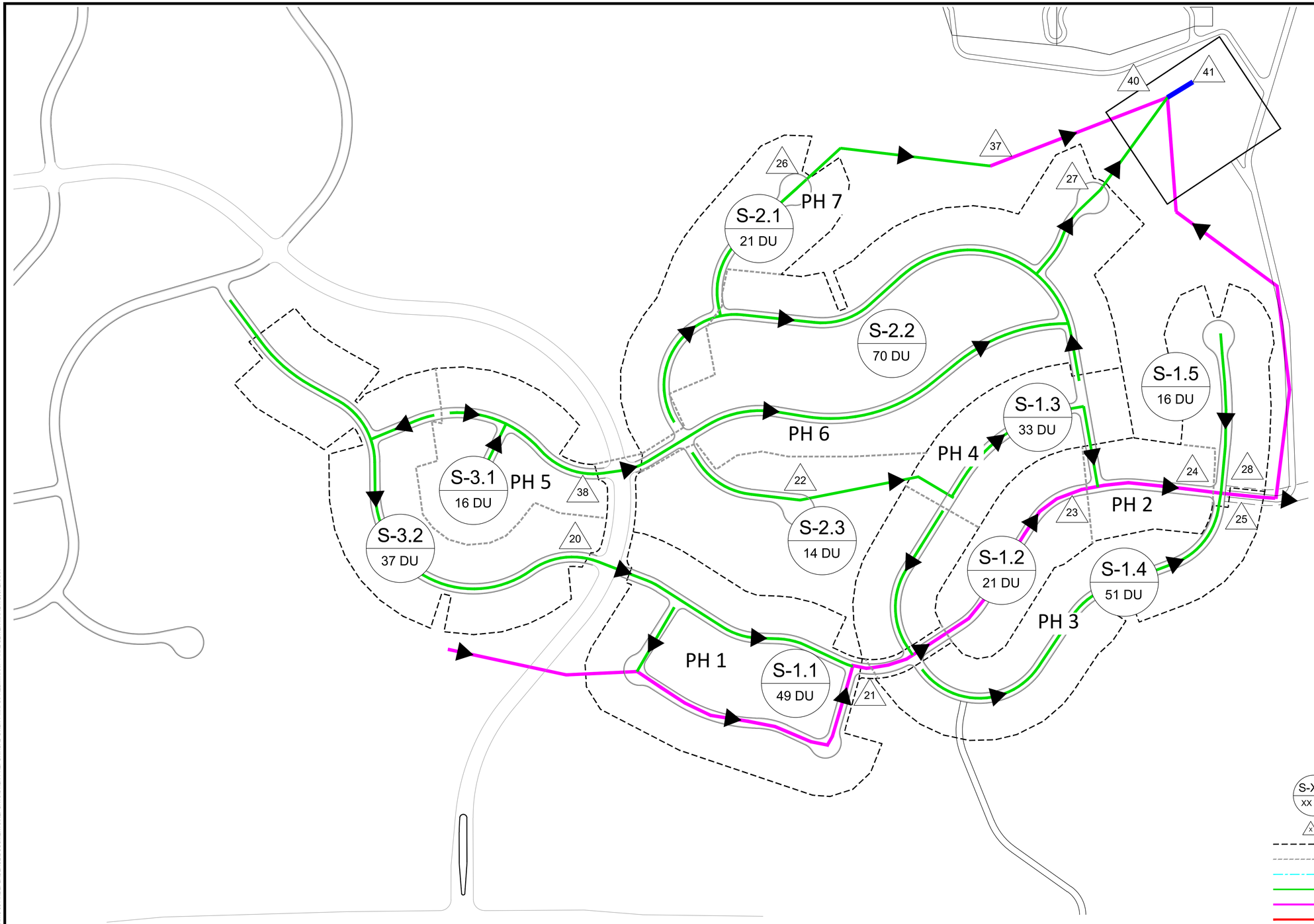
#	DESCRIPTION	DATE	BY

INDEPENDENCE
IRRIGATION SUPPLY MAP
ELBERT COUNTY, CO

INITIAL PLAN
RELEASE: 04/27/2017
DESIGNED BY: JF
DRAWN BY: JF
CHECKED BY: RH

JOB NO.
15-054

SHEET
A4 OF



FINAL SANITARY SEWER MAP

CIVIL ENGINEERING
DEVELOPMENT CONSULTING
LAND SURVEYING
303.703.4444
1950 W. Littleton Blvd., Ste. 109
Littleton, CO 80120

CORE CONSULTANTS

REVISIONS

#	DESCRIPTION	DATE	BY

FINAL SANITARY SEWER MAP
ELBERT COUNTY, CO

INITIAL PLAN
RELEASE: 04/27/2017
DESIGNED BY: JF
DRAWN BY: JF
CHECKED BY: RH

JOB NO.
15-054

SHEET
A5 OF

APPENDIX B

WATER SYSTEM CALCULATIONS (FINAL)

B1-WATER DEMAND TABLE

OUTPUT REPORTS: (JUNCTION, PIPE, RESERVOIR)

B2-MAX DAY

B5-PEAK HOUR

B8-MAX DAY + FIRE FLOW

POTABLE WATER DEMANDS						
Demand Area	Units	WaterCAD Junction	Average Daily Demand (gpd)	Average Daily Demand (gpm)	Max Day Demand (gpm)	Peak Hour Demand (gpm)
1.1	16	J-27	4,240	2.9	4.7	8.2
1.2	12	J-29	3,180	2.2	3.5	6.2
1.3	25	J-28	6,625	4.6	7.4	12.9
1.4	17	J-31	4,505	3.1	5.0	8.8
1.5	17	J-74	4,505	3.1	5.0	8.8
1.6	12	J-30	3,180	2.2	3.5	6.2
1.7	22	J-73	5,830	4.0	6.5	11.3
1.8	27	J-32	7,155	5.0	8.0	13.9
1.9	22	J-33	5,830	4.0	6.5	11.3
2.1	5	J-26	1,325	0.9	1.5	2.6
2.2	8	J-19	2,120	1.5	2.4	4.1
2.3	17	J-75	4,505	3.1	5.0	8.8
2.4	14	J-21	3,710	2.6	4.1	7.2
2.5	11	J-14	2,915	2.0	3.2	5.7
2.6	9	J-76	2,385	1.7	2.7	4.6
2.7	11	J-16	2,915	2.0	3.2	5.7
2.8	16	J-24	4,240	2.9	4.7	8.2
2.9	14	J-25	3,710	2.6	4.1	7.2
3.1	21	J-37	5,565	3.9	6.2	10.8
3.2	24	J-65	6,360	4.4	7.1	12.4
3.3	8	J-35	2,120	1.5	2.4	4.1

Final - Max Day Flow
Junction Report

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-14	6507.71	3.2	6789.93	122
J-16	6561.89	3.2	6789.81	99
J-19	6514.53	2.4	6789.81	119
J-21	6523.68	5.3	6789.8	115
J-24	6579.94	4.7	6789.78	91
J-25	6566.79	4.1	6789.78	96
J-26	6527.03	2.4	6789.79	114
J-27	6521.69	4.7	6789.79	116
J-28	6520.27	6.5	6789.78	117
J-29	6516.29	3.5	6789.78	118
J-30	6532.51	3.5	6789.78	111
J-31	6527.47	5	6789.78	113
J-32	6540.39	8	6789.78	108
J-33	6563.36	6.5	6789.78	98
J-35	6588.91	2.4	6789.77	87
J-37	6593.1	6.2	6789.77	85
J-38	6590.19	0	6789.77	86
J-39	6612.85	7.1	6789.77	77
J-65	6580.56	7.1	6789.77	91
J-73	6523.18	6.5	6789.78	115
J-74	6530.13	5	6789.78	112
J-75	6555.52	5	6789.78	101
J-76	6547.83	2.9	6789.8	105
J-87	6572.25	0	6789.78	94
J-88	6581.42	0	6789.78	90

Final - Max Day Flow
Pipe Report

Label	Length (Scaled) (ft)	Start Node	Stop Node	Dia (in)	Flow (gpm)	Velocity (ft/s)	Hydraulic Grade (Start) (ft)	Hydraulic Grade (Stop) (ft)	Headloss Gradient (ft/ft)	Headloss (ft)
P-11	1168	R-1	J-14	12	105.2	0.3	6790	6789.93	0	0.07
P-14	1118	J-14	J-16	8	47.8	0.3	6789.93	6789.81	0	0.12
P-21	418	J-21	J-19	8	-27.1	0.17	6789.8	6789.81	0	0.02
P-25	456	J-24	J-25	8	8.7	0.06	6789.78	6789.78	0	0
P-26	487	J-24	J-16	8	-31	0.2	6789.78	6789.81	0	0.02
P-27	179	J-21	J-26	8	32.5	0.21	6789.8	6789.79	0	0.01
P-32	394	J-28	J-29	8	-6.6	0.04	6789.78	6789.78	0	0
P-33	510	J-29	J-27	8	-20.1	0.13	6789.78	6789.79	0	0.01
P-35	824	J-30	J-28	8	-7.5	0.05	6789.78	6789.78	0	0
P-36	271	J-26	J-31	8	20.2	0.13	6789.79	6789.78	0	0.01
P-37	265	J-31	J-28	8	7.4	0.05	6789.78	6789.78	0	0
P-39	205	J-30	J-32	8	14.8	0.09	6789.78	6789.78	0	0
P-40	1206	J-32	J-33	8	2.8	0.02	6789.78	6789.78	0	0
P-42	599	J-33	J-32	8	-4	0.03	6789.78	6789.78	0	0
P-46	443	J-35	J-38	8	-6.6	0.04	6789.77	6789.77	0	0
P-47	233	J-38	J-37	8	6.2	0.04	6789.77	6789.77	0	0
P-49	710	J-35	J-39	8	7.1	0.05	6789.77	6789.77	0	0
P-82	576	J-65	J-35	8	2.9	0.02	6789.77	6789.77	0	0
P-102	563	J-29	J-73	8	10	0.06	6789.78	6789.78	0	0
P-103	761	J-73	J-30	8	3.5	0.02	6789.78	6789.78	0	0
P-104	535	J-31	J-74	8	7.7	0.05	6789.78	6789.78	0	0
P-105	554	J-74	J-30	8	7.3	0.05	6789.78	6789.78	0	0
P-106	705	J-26	J-75	8	9.9	0.06	6789.79	6789.78	0	0
P-107	605	J-75	J-24	8	4.9	0.03	6789.78	6789.78	0	0
P-108	405	J-16	J-76	8	13.6	0.09	6789.81	6789.8	0	0
P-109	696	J-76	J-21	8	10.7	0.07	6789.8	6789.8	0	0
P-129	247	J-33	J-87	8	0.3	0	6789.78	6789.78	0	0
P-130	530	J-87	J-65	8	10	0.06	6789.78	6789.77	0	0
P-131	417	J-38	J-88	8	-12.8	0.08	6789.77	6789.78	0	0
P-132	229	J-88	J-24	8	-22.5	0.14	6789.78	6789.78	0	0.01
P-133	307	J-87	J-88	8	-9.7	0.06	6789.78	6789.78	0	0
P-137	522	J-25	J-74	8	4.6	0.03	6789.78	6789.78	0	0
P-138	832	J-14	J-19	8	54.2	0.35	6789.93	6789.81	0	0.11
P-139	625	J-19	J-27	8	24.8	0.16	6789.81	6789.79	0	0.02

Material: PVC
Hazen Williams: 100

Final - Max Day Flow
Reservoir Report

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	6790	105.2	6790

Final - Peak Hour Flow
Junction Report

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-14	6507.71	5.7	6789.79	122
J-16	6561.89	5.7	6789.46	98
J-19	6514.53	4.1	6789.48	119
J-21	6523.68	9.3	6789.43	115
J-24	6579.94	8.2	6789.39	91
J-25	6566.79	7.2	6789.39	96
J-26	6527.03	4.1	6789.41	114
J-27	6521.69	8.2	6789.42	116
J-28	6520.27	11.3	6789.39	116
J-29	6516.29	6.2	6789.39	118
J-30	6532.51	6.2	6789.38	111
J-31	6527.47	8.8	6789.39	113
J-32	6540.39	13.9	6789.37	108
J-33	6563.36	11.3	6789.37	98
J-35	6588.91	4.1	6789.36	87
J-37	6593.1	10.8	6789.36	85
J-38	6590.19	0	6789.36	86
J-39	6612.85	12.4	6789.35	76
J-65	6580.56	12.4	6789.36	90
J-73	6523.18	11.3	6789.38	115
J-74	6530.13	8.8	6789.38	112
J-75	6555.52	8.8	6789.39	101
J-76	6547.83	5.2	6789.44	105
J-87	6572.25	0	6789.37	94
J-88	6581.42	0	6789.38	90

Final - Peak Hour Flow
Pipe Report

Label	Length (Scaled) (ft)	Start Node	Stop Node	Dia (in)	Flow (gpm)	Velocity (ft/s)	Hydraulic Grade (Start) (ft)	Hydraulic Grade (Stop) (ft)	Headloss Gradient (ft/ft)	Headloss (ft)
P-11	1168	R-1	J-14	12	184	0.52	6790	6789.79	0	0.21
P-14	1118	J-14	J-16	8	83.5	0.53	6789.79	6789.46	0	0.33
P-21	418	J-21	J-19	8	-47.4	0.3	6789.43	6789.48	0	0.04
P-25	456	J-24	J-25	8	15.2	0.1	6789.39	6789.39	0	0.01
P-26	487	J-24	J-16	8	-54	0.34	6789.39	6789.46	0	0.06
P-27	179	J-21	J-26	8	56.7	0.36	6789.43	6789.41	0	0.03
P-32	394	J-28	J-29	8	-11.5	0.07	6789.39	6789.39	0	0
P-33	510	J-29	J-27	8	-35.1	0.22	6789.39	6789.42	0	0.03
P-35	824	J-30	J-28	8	-13.1	0.08	6789.38	6789.39	0	0.01
P-36	271	J-26	J-31	8	35.3	0.23	6789.41	6789.39	0	0.02
P-37	265	J-31	J-28	8	12.9	0.08	6789.39	6789.39	0	0
P-39	205	J-30	J-32	8	25.7	0.16	6789.38	6789.37	0	0.01
P-40	1206	J-32	J-33	8	4.8	0.03	6789.37	6789.37	0	0
P-42	599	J-33	J-32	8	-7	0.04	6789.37	6789.37	0	0
P-46	443	J-35	J-38	8	-11.6	0.07	6789.36	6789.36	0	0
P-47	233	J-38	J-37	8	10.8	0.07	6789.36	6789.36	0	0
P-49	710	J-35	J-39	8	12.4	0.08	6789.36	6789.35	0	0.01
P-82	576	J-65	J-35	8	4.9	0.03	6789.36	6789.36	0	0
P-102	563	J-29	J-73	8	17.4	0.11	6789.39	6789.38	0	0.01
P-103	761	J-73	J-30	8	6.1	0.04	6789.38	6789.38	0	0
P-104	535	J-31	J-74	8	13.5	0.09	6789.39	6789.38	0	0.01
P-105	554	J-74	J-30	8	12.7	0.08	6789.38	6789.38	0	0
P-106	705	J-26	J-75	8	17.3	0.11	6789.41	6789.39	0	0.01
P-107	605	J-75	J-24	8	8.5	0.05	6789.39	6789.39	0	0
P-108	405	J-16	J-76	8	23.8	0.15	6789.46	6789.44	0	0.01
P-109	696	J-76	J-21	8	18.6	0.12	6789.44	6789.43	0	0.01
P-129	247	J-33	J-87	8	0.5	0	6789.37	6789.37	0	0
P-130	530	J-87	J-65	8	17.3	0.11	6789.37	6789.36	0	0.01
P-131	417	J-38	J-88	8	-22.4	0.14	6789.36	6789.38	0	0.01
P-132	229	J-88	J-24	8	-39.2	0.25	6789.38	6789.39	0	0.02
P-133	307	J-87	J-88	8	-16.8	0.11	6789.37	6789.38	0	0
P-137	522	J-25	J-74	8	8	0.05	6789.39	6789.38	0	0
P-138	832	J-14	J-19	8	94.8	0.61	6789.79	6789.48	0	0.31
P-139	625	J-19	J-27	8	43.3	0.28	6789.48	6789.42	0	0.06

Material: PVC
Hazen Williams: 100

Final - Peak Hour Flow
Reservoir Report

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	6790	184	6790

Final - Max Day + Fire Flow
Junction Report

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-14	6507.71	3.2	6778.44	117
J-16	6561.89	3.2	6758.46	85
J-19	6514.53	2.4	6760.48	106
J-21	6523.68	5.3	6757.58	101
J-24	6579.94	4.7	6752.61	75
J-25	6566.79	4.1	6752.86	81
J-26	6527.03	2.4	6755.56	99
J-27	6521.69	4.7	6757.35	102
J-28	6520.27	6.5	6754.42	101
J-29	6516.29	3.5	6754.84	103
J-30	6532.51	3.5	6752.77	95
J-31	6527.47	5	6754.48	98
J-32	6540.39	8	6750.64	91
J-33	6563.36	6.5	6748.34	80
J-35	6588.91	2.4	6728.79	61
J-37	6593.1	6.2	6737.69	63
J-38	6590.19	0	6737.69	64
J-39	6612.85	1507.1	6683.75	31
J-65	6580.56	7.1	6737.62	68
J-73	6523.18	6.5	6753.93	100
J-74	6530.13	5	6753.17	97
J-75	6555.52	5	6753.95	86
J-76	6547.83	2.9	6758.13	91
J-87	6572.25	0	6745.9	75
J-88	6581.42	0	6746.19	71

Final - Max Day + Fire Flow
Pipe Report

Label	Length (Scaled) (ft)	Start Node	Stop Node	Dia (in)	Flow (gpm)	Velocity (ft/s)	Hydraulic Grade (Start) (ft)	Hydraulic Grade (Stop) (ft)	Headloss Gradient (ft/ft)	Headloss (ft)
P-11	1168	R-1	J-14	12	1605.2	4.55	6790	6778.44	0.01	11.56
P-14	1118	J-14	J-16	8	760.4	4.85	6778.44	6758.46	0.018	19.98
P-21	418	J-21	J-19	8	-456.2	2.91	6757.58	6760.48	0.007	2.9
P-25	456	J-24	J-25	8	-116.2	0.74	6752.61	6752.86	0.001	0.25
P-26	487	J-24	J-16	8	-613.6	3.92	6752.61	6758.46	0.012	5.85
P-27	179	J-21	J-26	8	591.7	3.78	6757.58	6755.56	0.011	2.02
P-32	394	J-28	J-29	8	-166.7	1.06	6754.42	6754.84	0.001	0.42
P-33	510	J-29	J-27	8	-378.3	2.41	6754.84	6757.35	0.005	2.5
P-35	824	J-30	J-28	8	-233.4	1.49	6752.77	6754.42	0.002	1.65
P-36	271	J-26	J-31	8	338.4	2.16	6755.56	6754.48	0.004	1.08
P-37	265	J-31	J-28	8	73.2	0.47	6754.48	6754.42	0	0.06
P-39	205	J-30	J-32	8	566.4	3.62	6752.77	6750.64	0.01	2.13
P-40	1206	J-32	J-33	8	227.1	1.45	6750.64	6748.34	0.002	2.3
P-42	599	J-33	J-32	8	-331.3	2.11	6748.34	6750.64	0.004	2.3
P-46	443	J-35	J-38	8	-809.6	5.17	6728.79	6737.69	0.02	8.9
P-47	233	J-38	J-37	8	6.2	0.04	6737.69	6737.69	0	0
P-49	710	J-35	J-39	8	1507.1	9.62	6728.79	6683.75	0.063	45.04
P-82	576	J-65	J-35	8	699.9	4.47	6737.62	6728.79	0.015	8.83
P-102	563	J-29	J-73	8	208.1	1.33	6754.84	6753.93	0.002	0.91
P-103	761	J-73	J-30	8	201.6	1.29	6753.93	6752.77	0.002	1.16
P-104	535	J-31	J-74	8	260.2	1.66	6754.48	6753.17	0.002	1.31
P-105	554	J-74	J-30	8	134.9	0.86	6753.17	6752.77	0.001	0.4
P-106	705	J-26	J-75	8	250.8	1.6	6755.56	6753.95	0.002	1.62
P-107	605	J-75	J-24	8	245.8	1.57	6753.95	6752.61	0.002	1.34
P-108	405	J-16	J-76	8	143.7	0.92	6758.46	6758.13	0.001	0.33
P-109	696	J-76	J-21	8	140.8	0.9	6758.13	6757.58	0.001	0.55
P-129	247	J-33	J-87	8	551.9	3.52	6748.34	6745.9	0.01	2.44
P-130	530	J-87	J-65	8	707	4.51	6745.9	6737.62	0.016	8.28
P-131	417	J-38	J-88	8	-815.8	5.21	6737.69	6746.19	0.02	8.5
P-132	229	J-88	J-24	8	-970.9	6.2	6746.19	6752.61	0.028	6.43
P-133	307	J-87	J-88	8	-155	0.99	6745.9	6746.19	0.001	0.29
P-137	522	J-25	J-74	8	-120.3	0.77	6752.86	6753.17	0.001	0.31
P-138	832	J-14	J-19	8	841.6	5.37	6778.44	6760.48	0.022	17.96
P-139	625	J-19	J-27	8	383	2.44	6760.48	6757.35	0.005	3.14

Material: PVC
Hazen Williams: 100

Final - Max Day + Fire Flow
Reservoir Report

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	6790	1605.2	6790

APPENDIX C

IRRIGATION / WATER RE-USE SYSTEM CALCULATIONS

C1 – IRRIGATION DEMAND TABLE

OUTPUT REPORTS: (JUNCTION, PIPE)

C2-PEAK HOUR

REUSE WATER DEMANDS					
Demand Area	Units	WaterCAD Junction	Average Daily Demand (gpd)	Average Daily Demand (gpm)	Peak Hour Demand (gpm)
1.1	16	J-27	1,640	1.1	7.3
1.2	12	J-29	1,230	0.9	5.5
1.3	22	J-28	2,255	1.6	10.0
1.4	17	J-31	1,742	1.2	7.7
1.5	17	J-74	1,742	1.2	7.7
1.6	12	J-30	1,230	0.9	5.5
1.7	22	J-73	2,255	1.6	10.0
1.8	27	J-32	2,767	1.9	12.3
1.9	22	J-33	2,255	1.6	10.0
2.1	8	J-26	820	0.6	3.6
2.2	8	J-19	820	0.6	3.6
2.3	17	J-75	1,742	1.2	7.7
2.4	18	J-21	1,845	1.3	8.2
2.5	11	J-14	1,127	0.8	5.0
2.6	10	J-76	1,025	0.7	4.6
2.7	11	J-16	1,127	0.8	5.0
2.8	16	J-24	1,640	1.1	7.3
2.9	14	J-25	1,435	1.0	6.4
3.1	21	J-37	2,152	1.5	9.6
3.2	24	J-65	2,460	1.7	10.9
3.3	8	J-35	820	0.6	3.6

Final - Irrigation Peak Hour Flow
Junction Report

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-14	6507.71	5	6789.89	122.1
J-16	6561.89	5	6789.62	98.5
J-19	6514.53	3.6	6789.82	119.1
J-21	6523.68	8.2	6789.56	115
J-24	6579.94	7.3	6789.53	90.7
J-25	6566.79	6.4	6789.5	96.4
J-26	6527.03	3.6	6789.51	113.6
J-27	6521.69	7.3	6789.65	115.9
J-28	6520.27	10	6789.49	116.5
J-29	6516.29	5.5	6789.54	118.2
J-30	6532.51	5.5	6789.43	111.2
J-31	6527.47	7.7	6789.47	113.4
J-32	6540.39	12.3	6789.42	107.7
J-33	6563.36	10	6789.41	97.8
J-35	6588.91	3.6	6789.45	86.8
J-37	6593.1	9.6	6789.44	84.9
J-38	6590.19	0	6789.47	86.2
J-39	6612.85	10.9	6789.43	76.4
J-40	6595.15	0	6789.42	84.1
J-63	6580	9.6	6789.41	90.6
J-64	6569.14	8.7	6789.4	95.3
J-65	6580.56	10.9	6789.41	90.4
J-73	6523.18	10	6789.43	115.2
J-74	6530.13	7.7	6789.43	112.2
J-75	6555.52	7.7	6789.5	101.2
J-76	6547.83	4.6	6789.58	104.6
J-87	6512.96	0	6789.94	119.8
J-89	6572.25	0	6789.41	94
J-90	6581.42	0	6789.51	90

Final - Irrigation Peak Hour Flow
Pipe Report

Label	Length (Scaled) (ft)	Start Node	Stop Node	Dia (in)	Flow (gpm)	Velocity (ft/s)	Hydraulic Grade (Start) (ft)	Hydraulic Grade (Stop) (ft)	Headloss Gradient (%)	Headloss (ft)
P-14	1118	J-14	J-16	8	74.7	0.48	6789.89	6789.62	0.024	0.27
P-21	419	J-21	J-19	4	-19.7	0.5	6789.56	6789.82	0.06	0.25
P-25	456	J-24	J-25	4	6.4	0.16	6789.53	6789.5	0.007	0.03
P-26	487	J-24	J-16	8	-62.4	0.4	6789.53	6789.62	0.017	0.08
P-27	179	J-21	J-26	4	14.2	0.36	6789.56	6789.51	0.033	0.06
P-32	394	J-28	J-29	8	-54.2	0.35	6789.49	6789.54	0.013	0.05
P-33	510	J-29	J-27	8	-70.4	0.45	6789.54	6789.65	0.022	0.11
P-35	824	J-30	J-28	8	-38.2	0.24	6789.43	6789.49	0.007	0.06
P-36	271	J-26	J-31	4	8.3	0.21	6789.51	6789.47	0.012	0.03
P-37	265	J-31	J-28	4	-6	0.15	6789.47	6789.49	0.007	0.02
P-39	205	J-30	J-32	8	32.3	0.21	6789.43	6789.42	0.005	0.01
P-40	1206	J-32	J-33	4	2	0.05	6789.42	6789.41	0.001	0.01
P-42	599	J-33	J-32	8	-18	0.11	6789.41	6789.42	0.002	0.01
P-46	443	J-35	J-38	8	-33.7	0.22	6789.45	6789.47	0.006	0.02
P-47	233	J-38	J-37	4	9.6	0.25	6789.47	6789.44	0.016	0.04
P-49	710	J-35	J-39	8	23.8	0.15	6789.45	6789.43	0.003	0.02
P-50	975	J-39	J-40	8	12.9	0.08	6789.43	6789.42	0.001	0.01
P-80	507	J-63	J-64	8	3.3	0.02	6789.41	6789.4	0	0
P-82	576	J-65	J-35	4	-6.3	0.16	6789.41	6789.45	0.007	0.04
P-83	909	J-64	J-65	8	-5.4	0.03	6789.4	6789.41	0	0
P-101	343	J-63	J-40	6	-12.9	0.15	6789.41	6789.42	0.004	0.01
P-102	563	J-29	J-73	4	10.7	0.27	6789.54	6789.43	0.02	0.11
P-103	761	J-73	J-30	4	0.7	0.02	6789.43	6789.43	0	0
P-104	534	J-31	J-74	4	6.6	0.17	6789.47	6789.43	0.008	0.04
P-105	555	J-74	J-30	4	-1.1	0.03	6789.43	6789.43	0	0
P-106	705	J-26	J-75	4	2.3	0.06	6789.51	6789.5	0.001	0.01
P-107	605	J-75	J-24	4	-5.4	0.14	6789.5	6789.53	0.005	0.03
P-108	405	J-16	J-76	4	7.3	0.19	6789.62	6789.58	0.01	0.04
P-109	696	J-76	J-21	4	2.7	0.07	6789.58	6789.56	0.002	0.01
P-127	548	J-14	J-87	10	-79.7	0.33	6789.89	6789.94	0.009	0.05
P-129	358	R-2	J-87	12	180.7	0.51	6790	6789.94	0.017	0.06
P-133	247	J-33	J-89	8	10	0.06	6789.41	6789.41	0.001	0
P-134	530	J-89	J-65	8	10	0.06	6789.41	6789.41	0.001	0
P-135	417	J-38	J-90	8	-43.3	0.28	6789.47	6789.51	0.009	0.04
P-136	229	J-90	J-24	8	-43.3	0.28	6789.51	6789.53	0.009	0.02
P-139	283	J-87	J-19	8	101	0.64	6789.94	6789.82	0.042	0.12
P-140	626	J-19	J-27	8	77.7	0.5	6789.82	6789.65	0.026	0.16

Material: PVC
Hazen Williams: 100

APPENDIX D

WASTEWATER SYSTEM CALCULATIONS

D1- SANITARY SEWER CALCS

SANITARY SEWER

PROJECT: Independence
Filing 1: Neighborhood 1

COMPUTATION SHEET

COMPUTED BY: JRF
Sheet: D1

PROJECTED FLOW DETERMINATION																							SEWER DESIGN			
DESIGN POINT				RESIDENTIAL								COMMERCIAL/INDUSTRIAL						TOTAL FLOW			INFILTRATION				Min	n
																					10%			Pipe Size (in)	0.50	0.013
Design Point Location	Contributing Flows	Design Point From	Design Point To	Zoning	No. of Units	Density (PPU)	Population Incremental	Population Cumulative Total	Flow Factor (GPCD)	Average Flow (cfs)	Cumulative Average Flow (cfs)	Zoning/Use	Area (Acres)	Area Bldg. (sf)	Flow Factor (GPAD)	Average Flow (cfs)	Cumulative Average Flow (cfs)	Total Cum. Average Flow (cfs)	Peak Flow Factor	Cumulative Peak Flow (cfs)	Cumulative Infiltration (cfs)	Total Peak Sewage Flow (cfs)	Required Capacity (cfs) (Flow/0.86)		Pipe Slope (ft/100 ft)	Capacity (cfs) @ 80% depth	Comments
					a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	s	t	u	v	w	
							a*b			c*e								g+m	5	n*o	p*10%	p+q	s/0.86			Manning's	
S-9.2	NA	10	11	SF	54	3.1	167	167	90	0.023	0.023							0.023	5	0.117	0.012	**0.128**	0.149	8	0.50	0.849	
S-10.1	S-9.2	11	P2	SF	53	3.1	164	332	90	0.023	0.046							0.046	5	0.231	0.023	**0.254**	0.295	8	0.50	0.849	
S-10.2	NA	12	9	SF	20	3.1	62	62	90	0.009	0.009							0.009	5	0.043	0.004	**0.047**	0.055	8	0.50	0.849	
S-13	NA	14	9	School	1	750	750	750	13	0.015	0.015							0.015	5	0.075	0.008	**0.083**	0.096	8	0.50	0.849	
Y	(S(10.2,13)	9	P2					812			0.024							0.024	5	0.119	0.012	**0.130**	0.152	8	0.50	0.849	
S-11	NA	13	P2	SF	21	3.1	65	65	90	0.009	0.009							0.009	5	0.045	0.005	**0.050**	0.058	8	0.50	0.849	
P2	S(10.1,Y,11)	P2	15	SF		3.1		1209			0.079							0.079	5	0.395	0.039	**0.434**	0.505				
P2 (Pumping Factor)											0.079							0.079	5	0.397	0.040	**0.436**	0.507	4	Force Main		Pump Fact mult to Col g
S-9.1	P2	15	16	SF	46	3.1	143	1351	90	0.020	0.099							0.099	5	0.496	0.050	**0.546**	0.634	8	0.50	0.849	
S-4.1	S-9.1	16	17	SF	31	3.1	96	1448	90	0.013	0.113							0.113	5	0.563	0.056	**0.619**	0.720	8	0.50	0.849	
S-4.2	S-4.1	17	18	SF	16	3.1	50	1497	90	0.007	0.119							0.119	5	0.597	0.060	**0.657**	0.764	10	0.50	1.540	
S-4.3	S-4.2	18	19	SF	16	3.1	50	1547	90	0.007	0.126							0.126	5	0.632	0.063	**0.695**	0.808	10	0.50	1.540	
S-5.2	NA	18	19	SF	16	3.1	50	50	90	0.007	0.007							0.007	5	0.035	0.003	**0.038**	0.044	8	0.50	0.849	
S-4.4	S(4.3,5.2)	19	39	SF	23	3.1	71	1668	90	0.010	0.143							0.143	5	0.716	0.072	**0.788**	0.916	10	0.50	1.540	
S-5.1	NA	38	39	SF	28	3.1	87	87	90	0.012	0.012							0.012	5	0.060	0.006	**0.066**	0.077	8	0.50	0.849	
S-5.3	S(4.4,5.1)	39	21	SF	19	3.1	59	1813	90	0.008	0.164							0.164	5	0.818	0.082	**0.899**	1.046	10	0.50	1.540	
S-3.1	NA	38	21	SF	16	3.1	50	50	90	0.007	0.007							0.007	5	0.035	0.003	**0.038**	0.044	8	0.50	0.849	
S-2.3	NA	22	25	SF	14	3.1	43	43	90	0.006	0.006							0.006	5	0.030	0.003	**0.033**	0.039	8	0.50	0.849	
S-3.2	NA	20	21	SF	37	3.1	115	115	90	0.016	0.016							0.016	5	0.080	0.008	**0.088**	0.102	9	0.50	1.163	
S-1.1	S(3.2,5.3)	21	23	SF	49	3.1	152	2080	90	0.021	0.201							0.201	5	1.003	0.100	**1.104**	1.283	10	0.50	1.540	
S-1.2	S(1.1)	23	28	SF	21	3.1	65	2145	90	0.009	0.210							0.210	5	1.049	0.105	**1.153**	1.341	10	0.50	1.540	
S-1.3	S(1.2)	24	28	SF	33	3.1	102	2247	90	0.014	0.224							0.224	5	1.120	0.112	**1.232**	1.432	10	0.50	1.540	
S-1.4	S(2.3)	25	28	SF	51	3.1	158	202	90	0.022	0.028							0.028	5	0.140	0.014	**0.154**	0.179	8	0.50	0.849	
S-1.5	S(1.3,1.4)	28	40	SF	16	3.1	50	2498	90	0.007	0.259							0.259	5	1.295	0.129	**1.424**	1.656	10	0.60	1.687	
S-2.2	S(3.1)	27	40	SF	70	3.1	217	267	90	0.030	0.037							0.037	5	0.186	0.019	**0.204**	0.237	8	0.50	0.849	
S-12	NA	31	P1	SF	19	3.1	59	59	90	0.008	0.008							0.008	5	0.041	0.004	**0.045**	0.052	8	0.50	0.849	
S-7.3	NA	30	P1	SF	25	3.1	78	78	90	0.011	0.011							0.011	5	0.054	0.005	**0.059**	0.069	8	0.50	0.849	
P1	S(7.3,12)	P1	32	SF		3.1		136	90		0.019							0.019	5	0.095	0.009	**0.104**	0.121	8	0.50	0.849	
P1 (Pumping Factor)											0.048							0.048	5	0.238	0.024	**0.262**	0.304	4	Force Main		Pump Fact mult to Col g
S-6	P1	32	33	SF	110	3.1	341	477	90	0.047	0.095							0.095	5	0.475	0.048	**0.523**	0.608	8	0.50	0.849	
S-7.2	S-6	33	34	SF	38	3.1	118	595	90	0.016	0.111							0.111	5	0.557	0.056	**0.613**	0.713	8	0.50	0.849	
S-7.1	S-7.2	34	35	SF	50	3.1	155	750	90	0.022	0.133							0.133	5	0.665	0.067	**0.732**	0.851	10	0.50	1.540	
S-8.2	S-7.1	35	36	SF	16	3.1	50	800	90	0.007	0.140							0.140	5	0.700	0.070	**0.770**	0.895	10	0.50	1.540	
S-8.1	S-8.2	36	37	SF	27	3.1	84	884	90	0.012	0.152							0.152	5	0.758	0.076	**0.834**	0.970	10	0.50	1.540	
S-2.1	NA	26	37	SF	21	3.1	65	65	90	0.009	0.009							0.009	5	0.045	0.005	**0.050**	0.058	8	0.50	0.849	
X	S(2.1,8.1)	37	40	SF				949			0.161							0.161	5	0.804	0.080	**0.884**	1.028	10	0.50	1.540	
Plant	S(1.5,2.2,X)	40	41	SF				3714			0.457							0.457	5	2.284	0.228	**2.512**	2.921	15	0.50	4.541	

PS1	Pumping Factor
15	Min Storage
0.104	Q in (cfs)
46.9	Q in gpm
703.3	Gallons
4	Inch FM
3	FPS
0.262	Q out (cfs)
117.5	Q (gpm)
6.0	Drawdown Time
2.51	Pumping Factor
0.26	Design Flow

PS2	Pumping Factor
15	Min Storage
0.434	Q in (cfs)
195.0	Q in gpm
2924.3	Gallons
4	Inch FM
5	FPS
0.436	Q out (cfs)
195.9	Q (gpm)
14.9	Drawdown Time
1.00	Pumping Factor
0.44	Design Flow