Copper Environmental
Consulting, LLC

406 East Park Avenue, Suite 2
Anaconda, Montana 59711
(406) 563-2700
Fax: (406) 563-2701

May 2, 2014

Ms. Connie Ternes Daniels, Chief Executive
Anaconda Deer Lodge County
800 Main Street
Anaconda, MT 59711

RE: FINAL - Mill Creek Tax Increment Financing Industrial District (TIFID) Preliminary Engineering Report (PER)

Dear Ms. Daniels:

Attached please find the Final Mill Creek TIFID PER for Anaconda-Deer Lodge County (ADLC) use and distribution. The Final Mill Creek TIFID PER was developed per Copper Environmental Consultants' (CEC) July 2, 2013 Services Agreement and Scope of Work with ADLC. The Final Mill Creek TIFID PER incorporates information received from ADLC and City of Anaconda representatives, and direction received from ADLC at various planning and TIFID Board meetings in July, August, September and October 2013 and March 2014.

As requested by ADLC, the following are attached for ADLC's use and distribution:

- Three (3) printed copies via 3-Ring Binder; and
- Three (3) CDs with the complete Mill Creek TIFID PER via PDF file (within each binder)

Please contact me via phone at (406) 599-6612 or email at mike.mahon@copperenv.com if you have any questions.

Sincerely,

Michael Mahon, P.E.
Principal Engineer

Attachments: DRAFT Mill Creek TIFID PER (3, 3-Ring Binders and 3, CDs/PDF files)

Copper Environmental
Consulting, LLC

Final

Preliminary Engineering Report Mill Creek Tax Increment Financing Industrial District (TIFID)

MONTANA
MICHAEL C. MAHON
12127PE
LICENSED
PROFESSIONAL ENGINEER

Prepared for:

Anaconda-Deer Lodge County
800 S. Main St.
Anaconda, MT 59711

Prepared by:

Copper Environmental Consulting, LLC
406 East Park Avenue, Suite 2
Anaconda, Montana 59711
Phone: (406) 563-2700
www.copperenv.com

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MILL CREEK TIFID

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

Anaconda Deer Lodge County (ADLC) has requested that Copper Environmental, LLC (CEC) assess the Mill Creek TIFID located south of Highway 1, along Mill Creek Road (Route 569) east of the former Anaconda Company smelter site for industrial development. ADLC is specifically interested in understanding what improvements may be required to access and aid in the future development, thereby attracting potential developers and tenants.

The Mill Creek TIFID is approximately 750 acres with highway and rail access along the eastern boundary of Anaconda, Montana. Highway 1 runs to the north and Mill Creek Road (Route 569) runs along the western portion of the property. The Mill Creek TIFID sits in a United States Environmental Protection Agency (USEPA) Superfund site associated with the now defunct Anaconda Company smelter. The Anaconda Company's former smelter site is located to the west. Northwestern Energy's Dave Gates Generating Station (DGGS) and the 36-inch diameter Silver Lake Pipeline are located along the northern boundary. The Mill Creek TIFID is bisected by Mill Creek, running from the southwest corner and exiting in the area's northeast corner. There are currently no water, wastewater or stormwater facilities located on the Mill Creek TIFID; however, water and wastewater connections were constructed in 2010 through 2012 within the northwest corner of the Mill Creek TIFID, providing connection to existing Anaconda water and wastewater systems. Large electric transmission lines bisect the Mill Creek TIFID in many locations, leading to/from the DGGS and substation.

The Mill Creek TIFID is intended to serve as a gateway into the Mill Creek area, and provide access for light and heavy industrial development, providing economic growth potential for the Anaconda community. In order to facilitate development, water, wastewater, and stormwater and site access systems need to be constructed.

1.2 Alternatives Evaluated and Selected

The following provides a brief summary of water, wastewater and stormwater system alternatives evaluated, screened and selected in this PER.

1.2.1 Water System Alternatives

Water system alternatives are evaluated in detail in Sections 3.0 and 4.0. Water system alternatives evaluated included the following.

- Alternative 1: Connect to City of Anaconda Water System.
- Alternative 2: Construct an On-Site Water System.
- Alternative 3: Connect to the Silver Lake Pipeline.
- Alternative 4: No Action.

Alternatives 2, 3 and 4 were eliminated from consideration. Alternative 1: Connect to City of Anaconda Water System selected as the preferred alternative and evaluated in detail in Section 5.0 and shown on Figure 16. Alternative 1 proposed system characteristics, for total development on ADLC and Atlantic Richfield properties, are summarized below.

Proposed Water System Characteristics

System Characteristic	Information/Assumptions
ADLC Property System:	
Water Mains	20,400 ft. of 10-inch PVC piping.
Fire System Hydrants	27 hydrants spaced every 500 ft. along system.
Irrigation Area (1)	Assumes maximum of 31 acres within ADLC property.
System Valves	27 valves.
Air Relief Valves	5 air relief valves.
Stream Crossings	6 crossings across Mill Creek and tributary channels.
Road/Rail Crossings	5 crossings across Mill Creek Road/access roads/rail.
Utility Crossings	5 crossings across utility pipelines.
Pump Station (2)	Assume one station to boost fire/irrigation flows.
Atlantic Richfield Property System:	
Water Mains	2,300 ft. of 10-inch and 13,300 ft. of 8-inch PVC piping.
Fire System Hydrants	28 hydrants, spaced every 500 ft. along system.
System Valves	24 valves.
Air Relief Valves	2 air relief valves.
Irrigation Area	Assumes maximum of 45 acres within Atlantic Richfield property.
Stream Crossings	2 crossings across Mill Creek and tributary channels.
Road/Rail Crossings	10 crossings across Mill Creek Road and access roads.
Utility Crossings	6 crossings across utility pipelines.
Total System Demand	86,400 gpd Maximum Daily; 631,000 gpd Summer Peak.

Notes:

(1) Irrigation Area assumes an estimated acreage per parcel that will be landscaped and require irrigation during summer months (i.e., May through September).

(2) Pump Station is estimated based on required flows/pressures fire/irrigation flows for full Mill Creek TIFID development; the size and number of stations will need to be verified during detailed design.

The estimated costs to implement this alternative are listed below and further detailed in Appendix G.

Water System Preferred Alternative Cost Summary

Item	ADLC Property	Atlantic Richfield Property	Subtotals
Water System Direct Costs (1)	$2,816,361	$1,769,368	$4,585,729
Indirect Costs (2)	$985,726	$619,279	$1,524,505
Direct and Indirect Subtotal	***$3,802,087***	***$2,388,647***	***$6,190,734***
Contingency (15% Direct and Indirect)	$570,313	$358,297	$928,610
Construction Cost Subtotal	***$4,372,400***	***$2,746,944***	***$7,119,344***
Present Value O&M (i=6%, n=20 years)	***$37,277***	***$54,482***	***$91,759***
Total Estimated Costs	**$4,409,678**	**$2,801,426**	**$7,211,104**

Notes:

(1) Water System Direct Costs include construction items, and are itemized in Appendix G.

(2) Water System Indirect Costs include engineering, permitting, mobilization/demobilization, quality assurance/control, surveying, construction stormwater management, management/administration, traffic control and taxes and bonds and are applied as direct percentages of direct costs, as shown in Appendix G.

NOTE: The Silver Lake Pipeline may be a viable water source alternative if future development requires industrial water, or as an alternative for fire/irrigation water supply; however, given the unknown future development needs this PER focuses on construction of one, separate distribution system connected to City of Anaconda water only.

1.2.2 Wastewater System Alternatives

Wastewater system alternatives are evaluated in detail in Sections 3.0 and 4.0. Wastewater system alternatives evaluated included the following.

- Alternative 1: Connect to City of Anaconda Wastewater Collection System.
- Alternative 2: Construct an On-Site Wastewater Treatment System.
- Alternative 3: Install Individual Septic Tanks and Drain Fields.
- Alternative 4: No Action.

Alternatives 2, 3 and 4 were eliminated from consideration. Alternative 1: Connect to City of Anaconda Wastewater System selected as the preferred alternative and evaluated in detail in Section 5.0 and shown on Figure 17. Alternative 1 proposed system characteristics, for total development on ADLC and Atlantic Richfield properties, are summarized below.

Proposed Wastewater System Characteristics

System Characteristic	Information/Assumptions
ADLC Property System:	
Gravity Sewer Lines	12,100 ft. of 8-inch PVC.
Manholes	40 manholes spaced every 400 ft. along system.
Stream Crossings	3 crossings across Mill Creek and tributary channels.

System Characteristic	Information/Assumptions
Road/Rail Crossings	7 crossings across Mill Creek Road/access roads/rail.
Utility Crossings	5 crossings across utility pipelines.
Atlantic Richfield Property System:	
Gravity Sewer Lines	14,900 ft. of 8-inch PVC.
Manholes	47 manholes spaced every 400 ft. along system.
Stream Crossings	2 crossings across Mill Creek and tributary channels.
Road/Rail Crossings	14 crossings across Mill Creek Road/access roads/rail.
Utility Crossings	6 crossings across utility pipelines.
Force Main/Lift Station: (1)	
Force Main	6,025 ft. of 3-inch PVC.
Minimum Force Main Velocity	2 fps.
Peak Hourly Flow to Lift Station	36.4 gpm for 41 lots at 1,280 gpm each (after 3.2 peaking factor is applied)
Average Daily Flow to Lift Station	11.4 gpm for 41 lots at 400 gpm each.
Lift Station Pumps (2)	2 x 7.5 hp, 3,450 RPM, 3 inch NPT, 44 gpm Submersible Grinder Pumps with rail systems.
Total System Flows	92,200 gpd.

Notes:

(1) The lift station will be construction on Atlantic Richfield property to convey wastewater via force main through Atlantic Richfield and ADLC properties to the MCIC connection, See Figure 17.

(2) Only one pump is required to transfer wastewater flow to the MCIC connection; however two pumps are specified as required for system redundancy.

The estimated costs to implement this alternative are listed below and further detailed in Appendix G.

Wastewater System Preferred Alternative Cost Summary

Item	ADLC Property	Atlantic Richfield Property	Subtotals
Wastewater System Direct Costs (1)	$1,784,640	$2,722,305	$4,556,945
Indirect Costs (2)	$624,624	$970,307	$1,594,931
Direct and Indirect Subtotal	***$2,409,264***	***$3,742,612***	***$6,151,876***
Contingency (15% Direct and Indirect)	$361,390	$561,392	$922,781
Construction Cost Subtotal	***$2,770,654***	***$4,304,004***	***$7,074,657***
Present Value O&M (i=6%, n=20 years)	***$51,615***	***$143,374***	***$194,989***
Total Estimated Costs	**$2,822,268**	**$4,447,378**	**$7,269,646**

Notes:

(1) Wastewater System Direct Costs include construction items, and are itemized in Appendix G.

(2) Wastewater System Indirect Costs include engineering, permitting, mobilization/demobilization, quality assurance/control, surveying, construction stormwater management, management/administration, traffic control and taxes and bonds and are applied as direct percentages of direct costs, as shown in Appendix G.

1.2.3 Stormwater System Alternatives

Stormwater system alternatives are evaluated in detail in Sections 3.0 and 4.0. Stormwater system alternatives evaluated included the following.

- Alternative 1: Connect to City of Anaconda Stormwater Collection System.
- Alternative 2: Construct an On-Site Stormwater Collection System.
- Alternative 4: No Action.

Alternatives 1 4 were eliminated from consideration. Alternative 2: Construct an On-Site Stormwater Collection System is evaluated in detail in Section 5.0 and shown on Figure 19. Alternative 2 proposed system characteristics, for total development within the Mill Creek TIFID, are provided below.

Proposed Stormwater System Characteristics

System Characteristic	Information/Assumptions
Assumed Discharge Outfalls (1)	10 outfalls: 3 to Mill Creek; 7 to tributary drainages
New Graded Road Ditch Channels	Trapezoidal channels, 3:1 and 2:1 sideslopes, 2 ft. bottom width.
	33,000 ft. of channels; armored with 3 to 6 inch D_{50} riprap or equivalent protection.
Crossing Structures (Culverts)	17 road/stream/drainage crossing CMP culverts.
Water Retention/Attenuation (2)	40 acre-feet (100 year, 24 hr. storm volume)

Notes:

(1) The proposed stormwater drainage system is preliminary and highly dependent upon the actual and final layout of the Mill Creek TIFID development and size/type of industries.

(2) Water retention includes retention of the entire volume of the 100 year, 24 hr. storm event for all drainage basins combined; however, each basin may have single or multiple retention basins based on final design. Retention basins will be designed to discharge at the pre-development, 2 year, 24 hr. discharge rate per basin outfall. Detailed estimated retention requirements per basin are summarized in Appendix J.

The estimated costs to implement this alternative are listed below and further detailed in Appendix G.

Stormwater System Preferred Alternative Cost Summary

Item	ADLC Property	Atlantic Richfield Property	Subtotals
Stormwater System Direct Costs (1)	$466,537	$452,359	$918,896
Indirect Costs (2)	$163,288	$158,326	$321,614
Direct and Indirect Subtotal	***$629,825***	***$610,684***	***$1,240,510***
Contingency (15% Direct and Indirect)	$94,474	$91,603	$186,076
Construction Cost Subtotal	***$724,299***	***$702,287***	***$1,426,586***
Present Value O&M (i=6%, n=20 years)	***$41,292***	***$61,938***	***$103,229***
Total Estimated Costs	**$765,591**	**$764,225**	**$1,529,815**

Notes:

(1) Direct Costs include construction items, and are itemized in Appendix G.

(2) Indirect Costs include engineering, permitting, mobilization/demobilization, quality assurance/control, surveying, construction stormwater management, management/administration, traffic control and taxes and bonds and are applied as direct percentages of direct costs, as shown in Appendix G.

1.2.4 Proposed General Access Improvements

In order to provide general access to and within the Mill Creek TIFID, the proposed access road and railroad spur locations are provided on Figure 15. A detailed summary of land development assumptions, including road and railroad right of ways are provided in Appendix F. The following provides a summary of the proposed general access improvements.

Proposed General Access Improvements

System Characteristic	Information/Assumptions
Access Roads (Gravel Roads)	Approximately 1.94 miles (ADLC properties) and 2.96 miles (Atlantic Richfield properties).
Railroad Spurs (1)	Approximately 7,440 ft. (ADLC properties) and 5,240 ft. (Atlantic Richfield Properties).

Notes:

(1) Includes development of rail spurs into various property locations as shown. Spurs delineation and extent are conceptual, and do not include complete analysis of the rail system traffic, required number of switches, and complete evaluation of grade control.

The estimated costs to for general access construction are listed below and further detailed in Appendix G.

Site Preparation/Access Roads/Railroad Spur System
Preferred Alternative Cost Summary

Item	ADLC Property	Atlantic Richfield Property	Subtotals
Site Preparation/Roads/Rail Spur Direct Costs (1)	$2,238,562	$2,184,825	$4,423,387
Indirect Costs (2)	$783,497	$764,689	$1,548,186
Direct and Indirect Subtotal	***$3,022,059***	***$2,949,514***	***$5,971,573***
Contingency (15% Direct and Indirect)	$453,309	$442,427	$895,736
Construction Cost Subtotal	***$3,475,367***	***$3,391,941***	***$6,867,309***
Present Value O&M (i=6%, n=20 years)	***$83,157***	***$123,302***	***$206,459***
Total Estimated Costs	**$3,558,524**	**$3,515,243**	**$7,073,767**

Notes:
(1) Direct Costs include construction items, and are itemized in Appendix G.
(2) Indirect Costs include engineering, permitting, mobilization/demobilization, quality assurance/control, surveying, construction stormwater management, management/administration, traffic control and taxes and bonds and are applied as direct percentages of direct costs, as shown in Appendix G.

1.3 Implementation

The following summarizes the costs for construction of all proposed alternatives and improvements for the Mill Creek TIFID, both on ADLC and Atlantic Richfield properties.

Proposed Mill Creek TIFID Development
Total Cost Summary

Item	ADLC Property	Atlantic Richfield Property	Subtotals
Direct Costs (1)			
Site Preparation/Roads/Rail Spur	$2,238,562	$2,184,825	$4,423,387
Water System	$2,816,361	$1,769,368	$4,585,729
Wastewater System	$1,784,640	$2,772,305	$4,556,945
Stormwater System	$466,537	$452,359	$918,896
Indirect Costs (2)	$2,557,135	$2,512,600	$5,069,735
Direct and Indirect Subtotal	***$9,863,235***	***$9,691,457***	***$19,554,692***
Contingency (15% Direct and Indirect)	$1,479,485	$1,453,719	$2,933,204
Construction Cost Subtotal	***$11,342,720***	***$11,145,176***	***$22,487,896***
Present Value O&M (i=6%, n=20 years)	***$213,341***	***$383,095***	***$596,436***
Total Estimated Costs	**$11,556,061**	**$11,528,271**	**$23,084,332**

Notes:
(1) Direct Costs include construction items, and are itemized in Appendix G.
(2) Indirect Costs include engineering, permitting, mobilization/demobilization, quality assurance/control, surveying, construction stormwater management, management/administration, traffic control and taxes and bonds and are applied as direct percentages of direct costs, as shown in Appendix G.

CEC understands that construction of all proposed water, wastewater, stormwater and site access infrastructure improvements for the entire Mill Creek TIFID exceeds the current TIFID budget. However, ADLC can develop the Mill Creek TIFID in phases as funding and potential developers become available. ADLC could elect to focus first on development within ADLC properties, and then Atlantic Richfield properties.

1.4 Selective Development Example

The proposed site-wide Mill Creek TIFID Development is extensive, and may be cost prohibitive to approach as one construction project. Therefore, a phased approach to development is anticipated, based on incremental future development interest in select sections of the Mill Creek TIFID properties. A selective hypothetical development example within the ADLC property is shown on Figure 20. This development example represents a total developed area of 73 acres which is approximately half of the total proposed ADLC developed area (i.e., 155 acres). In order to further decrease costs, railroad spur and water system pump station (for fire and irrigation flows) construction and could be removed and assigned as a responsibility of the developer, as desired. Therefore, focusing development only on this example area, costs may become reasonable for development within existing TIFID budgets. Table 18 summarizes the total costs to provide all services (except railroad spurs and water system pump station) to this portion of the TIFID.

Mill Creek TIFID Selective Development Example

Item	Parcels 1-9 and 12-16 (1)
Site Preparation/Access Roads Direct Costs (2)	$292,187
Water System Direct Costs (2)	$766,177
Wastewater System Direct Costs (2)	$430,470
Stormwater System Direct Costs (2)	$184,531
Indirect Costs (3)	$585,678
Direct and Indirect Subtotal	***$2,259,043***
Contingency (15% Direct and Indirect)	$338,856
Construction Cost Subtotal	***$2,597,899***
Present Value O&M (i=6%, n=20 years)	***$106,670***
Total Estimated Costs	**$2,704,569**

Notes:

(1) Mill Creek TIFID Selective development parcels are shown on Figure 20.

(2) Direct Costs include construction items, and are itemized in Appendix G.

(3) Indirect Costs include engineering, permitting, mobilization/demobilization, quality assurance/control, surveying, construction stormwater management, management/administration, traffic control and taxes and bonds and are applied as direct percentages of direct costs, as shown in Appendix G.

CEC understands that currently, ADLC has not secured developers or tenants for development of properties within the Mill Creek TIFID. Therefore, given that the type and extent of future industrial development within the Mill Creek TIFID is currently unknown, ADLC may select to

perform phased development within the Mill Creek TIFID, or reserve TIFID funds to target development/support of serious and committed developers only. This latter option may provide the most efficient and accurate application of TIFID funds, once detailed industrial developer requirements and plans are known.

2.0 PROBLEM DEFINITION

This section describes the physical characteristics of the Mill Creek Tax Increment Financial Industrial District (Mill Creek TIFID), evaluates existing water, storm water and wastewater facilities, and describes/quantifies deficiencies in these systems as they relate to Mill Creek TIFID development.

2.1 Introduction

Anaconda Deer Lodge County (ADLC) has requested that Copper Environmental, LLC (CEC) assess the Mill Creek TIFID located South of Highway 1, along Mill Creek Road (Route 569) east of the former Anaconda Company smelter site as shown on Figure 1. ADLC is proposing to subdivide the Mill Creek TIFID into parcels suitable for potential industrial development.

This preliminary engineering report (PER) was prepared in accordance with, and following the format of, the Uniform Preliminary Engineering Report criteria and outline established by the Water, Wastewater and Solid Waste Action Coordination Team (W_2ASACT). The following are state and federal members of W_2ASACT:

- Montana Board of Investments/INTERCAP Program (INTERCAP);
- Montana Department of Commerce Community Development Block Grant (CDBG) Program;
- Montana Department of Commerce Treasure State Endowment Program (TSEP);
- Montana Department of Environmental Quality State Revolving Fund (SRF) Loan Programs;
- Montana Department of Natural Resources and Conservation/Renewable Resource Grant and Loan (RRGL) Program and State Revolving Fund (SRF) Loan Programs; and
- U.S. Department of Agriculture/Rural Development (RD) Programs.

2.2 Planning Area and Existing/Potential Service Area

The Planning Area for this project consists of The Mill Creek TIFID, encompassing surrounding access roads and railroad as shown on Figure 1. This section includes discussion regarding Planning Area and Existing/Potential Service Area locations and physical characteristics.

2.2.1 Location

The Mill Creek TIFID property delineation is provided on Figures 1 and 2. The Mill Creek TIFID is approximately 750 acres with highway and rail access along the eastern boundary of Anaconda, Montana. Highway 1 runs to the north and Mill Creek Road (Route 569) runs along the western portion of the property. The Anaconda Company's former smelter site is located to the west. Northwestern Energy's Dave Gates Generating Station (DGGS) and the 36-inch diameter Silver

Lake Pipeline are located along the northern boundary. The Mill Creek TIFID is bisected by Mill Creek, running from the southwest corner and exiting in the area's northeast corner. The Mill Creek TIFID legal description generally includes the following.

1. S17, T04 N, R10 W, Remainder tract comprising of 369.939 acres (owned by ARCO Environmental Remediation LLC).
2. S18, T04 N, R10 W, POR S2SE4, POR SE4SW4 comprising of 87.04 acres (owned by ARCO Environmental Remediation LLC).
3. S18, T04 N, R10 W, C.O.S. 193B, Parcel 1, Parcel G Mill Creek tract 1 comprising of 291.573 acres (owned by Anaconda-Deer Lodge County).
4. S18, T04 N, R10 W, C.O.S. 193B, Parcel 2 Parcel G Mill Creek tract 2 comprising 5.430 acres (owned by Anaconda-Deer Lodge County).
5. S18 T04 N, R10 W, C.O.S. 193B, Parcel 3 Parcel G Mill Creek Parcel tract 3 comprising of 4.077 acres (owned by Anaconda-Deer Lodge County).

2.2.2 Physical Characteristics of the Area

This section includes discussion regarding the physical characteristics of the Mill Creek TIFID area, including land use, topography, geology, soil types, climate, surface water, groundwater, floodplains and wetlands.

2.2.2.1. Land Use

General land use categories within the Mill Creek TIFID are shown on Figure 3. The USGS Land Use database lists the land use within the Mill Creek TIFID as primarily brush rangeland and mine/quarry land. Past mining in the area and current remediation practices have left ground within areas of the Mill Creek TIFID disturbed, including several locations of scattered and stockpiled debris.

2.2.2.2. Topography

Mill Creek TIFID topography is provided on Figure 4. The project area is located within a small valley that surrounds Mill Creek. The surrounding valley drops from 5,300 ft. in the southwest corner to 5,100 ft. at the northeast corner of the property. The western boundary encompasses a sharp rise to 6,300 ft. where the former Anaconda Company smelter was located. The southern boundary of the site includes a steep rise from 5,320 ft. to over 5,440 ft.

2.2.2.3. Geology

The Mill Creek TIFID subsurface geology is provided on Figure 5. The geological units present in the project area, based on review of the Montana Bureau of Mines and Geology's Geologic Map of the Butte 18 X 28 Quadrangle are described as follows:

Qs – Surficial Sedimentary Deposits (Pleistocene and Holocene). Alluvium fan and terrace gravel, gravel deposits on pediment surfaces, and landslide and travertine deposits (Pleistocene and Holocene); till, glacial lake, and outwash deposits (Pleistocene).

Ts- Sedimentary deposits and rocks (Eocene through Pliocene). Fan and gravel deposits on pediment surfaces (Pliocene); conglomerate, sandstone, mudstone, and volcanic ash beds (Eocene, Oilgocene, or Miocene).

2.2.2.4. Soil Types

A soil map of the project area is provided as Figure 6. The Natural Resources Conservation Service (NRCS) soil survey was reviewed to determine the soil types and characteristics found within the Mill Creek TIFID. The soil types (with NRCS soil number noted) found within the project area includes the following.

Beaverell cobbly loam (232B): 1 to 4 percent slopes, severely impacted,

Beaverell cobbly loam (232E): 15 to 35 percent slopes, severely impacted with water.

Blossberg loam (1834B): 0 to 4 percent slopes, rarely flooded, moderately impacted.

Cetrack loam (934B): 0 to 4 percent slopes, moderately impacted.

Beaverell cobbly loam (432B): 0 to 4 percent slopes, moderately impacted.

Danvers-Roy complex (1446E): 15 to 35 percent slopes, moderately impacted.

Danvers-Roy complex (1446D): 8 to 15 percent slopes, moderately impacted.

The Mill Creek TIFID sits in a United States Environmental Protection Agency (USEPA) Superfund site associated with the now defunct Anaconda Company smelter. The Superfund program is a federal program responsible for investigation and cleanup of unregulated hazardous substances and is part of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The Superfund site east of Anaconda contains hazardous wastes and environmental impacts from the operation of the smelter. This includes areas of tailings deposition and groundwater contamination. Extensive soils contamination is also found north and south of the smelter area on the east end of town. Waste material from the smelter was also used for the construction of the existing railroad bed, and can be found along the railroad right-of way within, and adjacent to city limits. Various soils remediation (e.g., cover soil placement, soil tilling with lime and removal) within the area have been performed as part of ongoing USEPA and Atlantic Richfield remedial actions. Completed and planned soil remedial action efforts within the Mill Creek TIFID are shown on Figures 7 and 8, respectively. See Section 2.2.3.2 for more details regarding the Superfund site and remedial actions within the Mill Creek TIFID.

2.2.2.5. Climate

Based on Western Regional Climate Center (WRCC) Period of Record General Climate Summary for Temperature, from 1894 to 2012, the following summarizes the daily average and extreme temperatures per season in Anaconda.

Table 1 – Anaconda Temperature Data

Season (Months)	Range	Temperature
Spring (April – June)	Average Daily High	54.1° F
	Average Daily Low	28.6° F
	Daily Extreme High	91° F
	Daily Extreme Low	-21° F
Summer (July – September)	Average Daily High	77.6° F
	Daily Extreme High	102° F
	Daily Extreme Low	23° F
	Average Daily Low	45.2° F
Fall (October – December)	Average Daily High	56.5° F
	Daily Extreme High	97° F
	Daily Extreme Low	-22° F
	Average Daily Low	30.4° F
Winter (January – March)	Average Daily High	35.8° F
	Daily Extreme High	65° F
	Daily Extreme Low	-38° F
	Average Daily Low	14.9° F

Based on WRCC Period of Record Monthly Climate Summary for Precipitation from 1982 through 2005, The Average Annual Total Precipitation for Anaconda is 14.04 inches, and Average Annual Snowfall is 72.3 inches.

2.2.2.6. Surface Water

The Mill Creek TIFID lies within the Upper Clark Fork Watershed. Warm Springs Creek runs to the north of the project site and Mill Creek [i.e., Lower Mill Creek, Montana Department of Environmental Quality (MDEQ) Waterbody ID MT76G002_052] runs directly through the Mill Creek TIFID eventually discharging into Silver Bow Creek.

MDEQ has established water use classification and related water quality standards for waterbodies in Montana. Montana waterbodies are classified according to the present and future beneficial uses that they should be capable of supporting. Mill Creek is classified as Class B-1. The designated beneficial uses for Class B-1 are listed as follows (MDEQ, 2011):

- Drinking, culinary, and food processing (conventional treatment);
- Fishes (salmonid) and associated aquatic life (growth);
- Fishes (salmonid) and associated aquatic life (propagation);
- Bathing, swimming, recreation (plus aesthetics via general prohibitions);
- Agricultural water supply; and
- Industrial water supply.

MDEQ has responsibility under Sections 401 of the Clean Water Act (33 U.S.C. 121 B 1376) and the Montana Water Quality Act (75-5-101 M.C.A., et seq.) to monitor and assess the quality of Montana's surface waters and set Total Maximum Daily Loads (TDMLs) for each pollutant entering a body of water. TMDLs are established for streams or lakes that fail to meet certain standards for water quality and limit the amount of each pollutant a body of water can receive without violating water quality standards. Draft Upper Clark Fork River Tributaries Sediment, Metals, and Temperature TMDLs and Framework for Water Quality Restoration was developed by MDEQ and submitted to the USEPA for approval (MEDQ 2010). TMDLs for Mill Creek are in the process of being approved and will play a role in the establishment of any new discharge to the creek in the future.

The Clean Water Act requires states, territories and authorized tribes to submit impaired waters lists for USEPA approval every two years (even numbered years). These lists of impaired and threatened waters are called "303(d) lists". The 2012 Section 303(d) list of impaired waters for Montana lists Lower Mill Creek (Waterbody ID MT76G002_052) as Water Quality Category 5 (i.e., One or more uses are impaired and a TMDL is required). Impairment information for Lower Mill Creek includes metals contamination via contaminated sediments/mill tailings, noting aluminum, arsenic, cadmium, copper, iron, lead and zinc as probable causes, and impairment to agricultural, aquatic and drinking water use. MDEQ's 2012 Water Quality Information report for Lower Mill Creek is provided in Appendix A.

The United States Army Corps of Engineers (ACOE) was contacted via correspondence dated 7/22/13. ACOE provided response via correspondence dated 8/29/13 (See Appendix B). ACOE noted that any construction work that includes placement of fill material within jurisdictional waters (i.e., areas below the ordinary high water mark of stream channels, lakes or ponds and wetlands adjacent to these waters) would require a 404 Permit from ACOE.

2.2.2.7. Groundwater

Groundwater wells within the Mill Creek TIFID are shown on Figure 9. According to the Montana Groundwater Information Center (GWIC) database at the Bureau of Mines and Geology, there are 33 domestic wells recorded within the Mill Creek TIFID within T04N, R10W, Sections 18 and 19. These wells have an average depth of 75 ft., ranging from 15 to 251 ft. Static water levels in the area average approximately 27 ft., ranging from 6 to 115 ft. Water

yields average 19 gallons per minute (gpm), ranging from 1 to 65 gpm. Ground water quality is documented within the GWIC database for multiple wells in the area.

Safe and adequate drinking water supplies are not available to the east of Anaconda due to the ongoing effects of past smelter operations. The Superfund site to the east of town also limits municipal options for water sources and wastewater disposal in Anaconda, due to extensive soil and groundwater contamination found at the site. An agreement with the USEPA and Atlantic Richfield prohibits water from infiltrating the subsurface and development of wells to access groundwater.

2.2.2.8. Floodplains

Federal Management Agency (FEMA) floodplain maps have been published for this area. The Zone A floodplain boundary within the Mill Creek TIFID area generally follows the Mill Creek stream banks as shown on Figure 10. Zone A floodplain boundaries are approximated based on historical flood data and do not include surveyed cross sections or detailed hydrology and hydraulic analysis. Floodplain information for the Mill Creek TIFID is discussed in detail in Section 2.2.3.3.

2.2.2.9. Wetlands

A search in the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory revealed several areas of known wetlands within the Mill Creek TIFID area, primarily along Mill Creek within the Zone A floodplain boundary. USFWS delineated Wetland areas are shown on Figure 11 and are discussed in detail in Section 2.2.3.4.

2.2.3 Environmental Resources Present

To evaluate the environmental impact of each alternative, CEC completed the Uniform Environmental Checklist and contacted the following agencies regarding their assessment on the environmental resources present within and potential environmental impacts of the Mill Creek TIFID project.

- Montana Department of Environmental Quality;
- U.S. Fish and Wildlife Service;
- Montana Natural Heritage Program;
- U.S. Army Corps of Engineers;
- Department of Natural Resources and Conservation;
- The State Historic Preservation Office;
- Montana Department of Fish, Wildlife & Parks; and
- United States Environmental Protection Agency.

The completed Uniform Environmental Checklist and agency request/response correspondence are provided in Appendix B. This section provides discussion of key elements from the Uniform Environmental Checklist.

2.2.3.1. Biological Resources

The Montana Rivers Information System lists eight fish species that may be present in Warm Springs Creek, including Brook Trout, Brown Trout, Bull Trout, and Westslope Cutthroat Trout. The information system also lists four fish species that may be present in Mill Creek, including Brook Trout, Brown Trout, Mountain Whitefish, and Rainbow Trout.

The Montana Natural Heritage Program (MNHP) was contacted via online data request dated 8/20/13. MNHP provided response via email dated 8/21/13 (See Appendix B). MNHP noted observance of four Species of Concern that may occur within the vicinity of the Mill Creek TIFID. These species included the Great Blue Heron, Clark's Nutcracker, Westslope Cutthroat Trout, and Hoary Bat. No plant species of special concern were identified in the area.

The U.S. Fish and Wildlife Service (USFWS) was contacted via correspondence dated 7/22/13. USFWS provided response via correspondence dated 7/31/13 (See Appendix B). The USFWS noted Threatened and Endangered species that have been reported in the area include the Gray Wolf, Bull Trout, and the Canada Lynx. Sensitive species include the Wolverine, the Fischer, and the Westslope Cutthroat Trout. No plant species of special concern have been identified in the area. The USFWS confirmed the proposed project would not cause adverse effects to vegetation, wildlife, or threatened, endangered or candidate species or critical habitat resources.

2.2.3.2. Hazardous Facilities

The Mill Creek TIFID is located within the Anaconda Regional Waste, Water and Soils (ARWWS) Operable Unit of the Smelter Hill National Priorities List Site. The five principal contaminants of concern are arsenic, cadmium, copper, lead and zinc. Of these contaminants, arsenic is of most concern. The established action limits (i.e., allowable surface concentrations before remediation measures are initiated) for arsenic are 1,000 milligrams/kilogram (mg/kg) for open space and 500 mg/kg for industrial and commercial applications.

As summarized in the 2008 Anaconda Deer Lodge Reuse Report (Wickstrom, 2008) and noted in the U.S. EPA Region VIII's, 1999 'Five Year Review Report, Second Five-Year Review for Anaconda Company Smelter site, Anaconda Deer Lodge County' (U.S. EPA, 1999),

> "A portion of the Mill Creek development area was originally the site of the town of Mill Creek. Residents of the town were relocated and their homes demolished as part of the Superfund cleanup. Although building debris was removed from the property, the foundations were buried in place. The exact location of the

> buried foundations will need to be identified so that they can be removed if necessary. In addition to the buried foundations, contaminated soils are present in the area and will require clean soil, pavement or building structures to cap the waste in place."

Reclamation activities that have occurred over the past several years within the Mill Creek TIFID include capping of waste materials, removal of contaminated soils, and soil treatment via tilling of surficially contaminated soils with lime. The proposed alignments for water, sewer and stormwater lines will cross through areas that have been reclaimed using these methods, as shown on Figures 7 and 8.

The United States Environmental Protection Agency (USEPA) was contacted via correspondence dated 7/22/13. USEPA provided response via correspondence dated 7/24/13 (See Appendix B). The USEPA confirmed that the project was part of the Smelter Hill National Priorities List Site and as such, proposed construction activities are required to be reviewed and approved following the ADLC development permit system. While the specific construction requirements will be specified through the system, it is anticipated that the following general practices will be required (RPA, 2008):

- Stripping and sampling of the uppermost soil layer;
- On-site disposal of contaminated soils that exceed the established action limit concentrations; and
- Off-site disposal of waste materials that are classified as excess excavation.

Additional measures, such as off-site disposal of all waste materials encountered during excavation and importing clean fill materials are possible, but subject to the results of the development permit system.

2.2.3.3. Floodplains

The Montana Department of Natural Resources and Conservation (DNRC) State Floodplain Coordinator was contacted via correspondence dated 7/22/13. DNRC provided response via correspondence dated 7/30/13 (See Appendix B). The DNRC confirmed that portions of the project are located in an Approximate Zone A special flood hazard area associated with Mill Creek. The DNRC noted that any new development that may occur within the Zone A special flood hazard area will need to be coordinated with ADLC Floodplain Coordinator. A floodplain development permit from the ADLC Floodplain Coordinator must be obtained prior to any construction within the floodplain.

Water & Environmental Technologies (WET) was contracted by Northwestern Energy (NWE) to determine the boundary and base flood elevation of Mill Creek immediately south of NWE's generating station in preparation for planned expansion work (WET, 2013). WET performed

detailed survey, hydrology and hydraulic analysis to extend the Zone A floodplain in this area. The floodplain extension area is shown on Figure 10.

2.2.3.4. Wetlands

A search in the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory revealed several areas of known wetlands within the Mill Creek TIFID area, primarily along Mill Creek within the Zone A floodplain boundary. Wetland areas are shown on Figure 11. The Montana Natural Heritage Program (MNHP) was contacted via online data request dated 8/20/13. MNHP provided response via email dated 8/21/13 (See Appendix B). The MNHP confirmed USFWS notification of several areas of known wetlands along Mill Creek, including:

- Freshwater Emergent Wetland;
- Freshwater Scrub-Shrub Wetland;
- Riparian Scrub-Shrub; and
- Riparian Forested.

Detailed information regarding wetland locations and types found within the Mill Creek TIFID are provided in the MNHP report found in Appendix B.

2.2.3.5. Historical/Cultural Resources

The Montana State Historic Preservation Office (SHPO) was contacted on 7/22/13 for information regarding previous cultural resource surveys completed within and around the Mill Creek TIFID and for a listing of previously recorded historical and archeological sites in the project area. SHPO responded via correspondence dated 7/22/13 (See Appendix B) and noted there are 33 recorded cultural resource sites in and proximal to the Mill Creek TIFID area. There have also been previously conducted cultural resources inventories in the area. Based on the potential ground disturbance, there may be a potential for an impact to cultural properties. Therefore, SHPO recommended that a cultural resource inventory be performed for this project prior to construction activities.

2.2.3.6. Socio-Economic/Environmental Justice Issues

This project will cause no disproportionate increases in environmental or public health needs for minority and low-income persons in the Anaconda area.

2.2.4 Growth Areas and Population Trends

Regional population projections completed by the Montana Department of Commerce (MDOC) in 2013 estimate that Deer Lodge County will have a population change of +13% between 2010 and 2030. 2010 Census population data indicates that Deer Lodge County had a population of 9,298 residents and the Anaconda census county division (CCD) had a population of 7,734

residents (or approximately 83% of Deer Lodge County total population). MDOC projects Deer Lodge County's population at 10,500 residents in the year 2030. A summary of 2010 U.S. Census and MDOC population projections through 2033 is presented in Table 2.

Table 2 – Deer Lodge County Population Data

	2010 Population (1)	2020 Projected Population (2)	2030 Projected Population (2)	2033 Projected Population (3)	2010 – 2033 % Change
Deer Lodge County	9,298	9,614	10,500	10,700	+15%
Anaconda CCD	7,734	7,997	8,733	8,899	+15%

Notes:

1. 2010 Population based on official 2010 U.S. Census data.
2. Deer Lodge County 2020 and 2030 Projected Population based on 2010 U.S. Census projections. Anaconda CCD projected populations based on Deer Lodge County projection percentages.
3. Deer Lodge County 2033 Projected Population calculated using U.S. Census projection of 332 person growth from 2030 to 2035, interpolated to estimate an approximate 200 person increase from 2030 to 2033. Anaconda CCD population estimated based on the same percentage increase calculated for Deer Lodge County.

2.3 Evaluation of Existing Facilities

This section provides information regarding existing water, wastewater and stormwater facilities operated and maintained by the City of Anaconda.

2.3.1 Existing Water System

The Anaconda water system was constructed by the Anaconda Company before the turn of the 20th century. ADLC eventually inherited and assumed ownership of the water system in the early 1990's. Since this time, ADLC has completed multiple water system upgrade projects. These projects included upgrading system supply wells, installing new chlorination facilities, constructing a new 3.5 MG storage tank and multiple water main replacements. A schematic layout of Anaconda's existing water system is provided on Figure 12.

2.3.1.1. Existing Water Demand and Reserve Capacity

Total water demand is measured in two locations in the Anaconda Water System: 1) between the system supply wells and storage tank; and 2) between the storage tank and the water distribution system prior to any water demand from the system.

The Anaconda Water Department maintains daily records of the amount of water pumped from the six production wells to the 3.5 million gallon water storage tank. Records for a 5-year period from November 1, 2009 through April 9, 2013 were used to evaluate existing overall demand

throughout the system (See Appendix C). The total existing system demand determined from water production records is as follows:

- Annual Average Daily Demand= 2.06 MGD.
- Average Winter Demand (October through April) = 1.64 MGD.
- Average Summer Demand (May through September) = 2.67 MGD.
- Maximum Peak Daily Demand = 4.46 MGD.

The Anaconda Water System is supplied by six groundwater wells located near the east end of North Cable Road, shown on Figure 12. Based on discussions with the Anaconda Water Department, water is currently pumped at a maximum rate of approximately 5.0 million gallons per day (MGD). Anaconda has water rights to 7.9 million gallons per day; however, the maximum amount of water that can be pumped out of Anaconda's wells is the design well capacity of 4,600 gallons per minute (gpm) (i.e., 6.62 MGD). Therefore, based on the design well capacity and historical flow records, the ADLC Water System reserve capacity can be calculated to be:

- Annual Average Daily Reserve = 4.56 MGD.
- Average Winter Reserve (October through April) = 4.98 MGD.
- Average Summer Reserve (May through September) = 3.95 MGD.
- Maximum Peak Daily Reserve = 2.16 MGD.

2.3.1.2. Source Water Protection

The Anaconda Water Department has a Source Water Protection Plan in place.

2.3.1.3. Treatment

The Anaconda Water System is treated via chlorine disinfection of the water pumped from the system wells to the storage tank. Chlorination equipment is housed in the control building located on the west end of town. According to the Anaconda Water Department, water system treatment is functioning properly. Copies of the latest system sanitary survey and water quality tests are provided in Appendix C.

2.3.1.4. Storage

Anaconda's Water System storage consists of a 3.5 MG underground concrete storage tank, located on the west side of town as shown on Figure 12. Records from November 1, 2009 through April 9, 2013 indicate the tank stored an average of approximately 3.0 MG, with the maximum daily tank volume noted at 3.5 MG (See Appendix C).

2.3.1.5. Pump Stations and other Infrastructure

Anaconda Water System's six production wells were installed in 1994. The water system includes two pump stations to boost pressure to high terrain areas. One station is located on Juniper St., lifting water up into the Marcus Daly subdivision on the hillside south of town. The second pump station is on Poplar St. and 5th St. and it was installed in 2010 in order to boost pressure into the Sunnyside development. According to the Anaconda Water Department, the water system production wells and lift stations are functioning properly.

2.3.1.6. Distribution System

The existing water distribution system consists of water mains from 6-inch to 20-inch diameter. Much of the existing distribution system is over 100 years old. ADLC continues to replace leaking water mains.

The Mill Creek Industrial Complex PER (MCIC PER) (RPA, 2008) provided initial water/wastewater designs for a 300 acre portion of the Mill Creek TIFID area (i.e., the MCIC). As part of the MCIC, approximately 14,250 ft., 6-inch water main was constructed in 2012 starting approximately 1.5 miles east of Anaconda along the south side of Highway 1, extending along Highway 1, turning south along Mill Creek Road and terminating just inside the Mill Creek TIFID boundary, south of the Butte, Anaconda, & Pacific Railway. The 6-inch water main is not currently in use, and was constructed for future system tie-in upon development of the MCIC.

2.3.1.7. Utilization of Water Meters

The City of Anaconda Water Department noted that there are approximately 3,000 water users, of which approximately 700 are on metered accounts. The majority of water customers in Anaconda are on a flat rate schedule. Anaconda requires a meter be installed on all new construction. Also, Anaconda has a voluntary metering program in which residents can receive a water meter for a small fee. The remaining cost of the meter and installation is paid by ADLC.

2.3.1.8. Operational and Management Practices and Capabilities

The Anaconda Water Department currently has three Certified Water Operators who perform operation and maintenance duties throughout the water system. It is anticipated that the existing Anaconda Water Department staff would be able to handle the additional operation and maintenance requirements of the proposed Mill Creek TIFID development.

2.3.2 Existing Wastewater System

ADLC owns and operates a municipal wastewater collection and treatment system serving the City of Anaconda and the immediate surrounding area. On-site wastewater disposal systems are not allowed within the service area, and connection to the municipal wastewater system is

required by law for all residents and operating businesses. There are currently no wastewater facilities within the Mill Creek TIFID.

The existing City of Anaconda wastewater collection and treatment system consists of a gravity flow collection system, pre-treatment system for removal of grit and debris, an aerated lagoon treatment system, holding/ infiltration pond (HIP) complex (two holding ponds and five infiltration/percolation ponds), and land application/disposal areas. Wastewater generated in the service area flows by gravity to a subsurface collection system, then to the Anaconda wastewater pre-treatment plant. After pretreatment, wastewater flows to the aerated lagoons for treatment and to the HIP complex for land application or infiltration. The existing system is shown on Figure 13, with system design criteria summarized on Table 3.

Table 3 – Anaconda Existing Wastewater System Design Criteria (1)

Design Item	Criteria
Design Year	2005
Design Year Population	11,500
Summer Average Design Daily Flow (May – Sept.)	3.0 MGD
Winter Average Design Flow (Oct. – April)	2.5 MGD
Peak Hourly Design Flow	4.6 MGD
BOD_5 Loading Capacity	1,995 lb/day
TSS Loading Capacity	2,500 lb/day
Number and Size of Aeration Cells	Two Cells, 6 Acres Each
Call 1 Maximum Liquid Depth	17.7 ft.
Cell 1 Liquid Depth to Toe of Slope	17.0 ft.
Cell 2 Maximum Liquid Depth	17.7 ft.
Cell 2 Liquid Depth to Toe of Slope	17.0 ft.
Freeboard	3.0 ft.
Liner	Hypalon Membrane
Approximate Cell Surface Area When Full	6.0 acres/cell
Approximate Volume of Aerated Water	50 MG
Detention Time at Average Daily Flow (3 MGD)	20 days

Notes:

(1) Anaconda Existing Wastewater System Data from Mill Creek Industrial Complex PER (RPA, 2008) and East Yards PER (DOWL/HKM, 2011), Operation and Maintenance Manual (TD&H, 1985), and the facility's constructed drawings (TD&H, 1983), and was verified by review of Anaconda inspection reporting, provided in Appendix C.

2.3.2.1. Existing Flows and Reserve Capacity

Anaconda existing wastewater flows are metered with a recorder at the inlet to the aerated lagoon treatment facility. Wastewater flows are recorded daily. Daily records from April 1,

2012 through August 7, 2013 are provided in Appendix D. Annual and seasonal average and maximum flows from the 2012/2013 data are as follows.

- Annual Average Daily Flow = 0.85 MGD.
- Average Winter Flow (October through April, 2012) = 0.68 MGD.
- Average Summer Flow (May through September, 2012 and 2013) = 0.98 MGD.
- Maximum Daily Flow = 1.36 MGD.

Based on the information provided above, the following provides the existing hydraulic and organic loading of the wastewater treatment system.

- Design Maximum Daily Flow = 0.98 MGD (based on Average Summer Flow).
- BOD_5 Loading (0.2 lbs/capita/day) = 1,780 lbs/day.
- TSS Loading (0.22 lbs/capita/day) = 1,958 lbs/day.

Typically, at least two years of previous flow records are recommended to determine design parameters for wastewater system expansion (MDEQ, 2012); however, complete and reliable records are limited for the Anaconda system. Previous evaluations by DOWL/HKM (DOWL/HKM, 2011 and DOWL/HKM, 2012) considered the latest complete set of annual flow records from 2002 and projected estimated design maximum daily flow for winter and summer seasons, based on 2000 Census population estimates, projections and estimates of infiltration and inflow. The evaluations provided the following estimates.

- Design Maximum Daily Flow (Winter) = 1.69 MGD.
- Design Maximum Daily Flow (Summer) = 1.94 MGD.

While DOWL/HKM estimates are significantly greater than rates observed in the 2012/2013 data (which is expected, given the extensive collection system upgrades completed since 2002), the estimates provide a conservative high range including estimates of infiltration and inflow. Therefore, based on the evaluations/data above, the estimated wastewater system reserve hydraulic capacity and organic loading assuming 2033 population projections include the following.

- **Reserve Hydraulic Capacity** = 3.0 MGD (Table 3) – 0.98 to 1.94 MGD (Design Maximum Daily Flow) = **2.05 to 1.06 MGD.**
- **Reserve BOD_5 Loading** = 1,995 lbs/day (Table 3) – 1,780 lbs/day (estimated above) = **215 lbs/day = 1,075 people.**
- **Reserve TSS Loading** = 2,500 lbs/day (Table 3) – 1,958 lbs/day (estimated above) = **542 lbs/day = 2,463 people.**

2.3.2.2. Treatment

Wastewater from the collection system outfall pipeline flows eastward by gravity to the City of Anaconda's pretreatment facility located just west of the intersection of MT Highways 1 and 48. Pretreatment of the collected wastewater occurs to remove solids (grit) and debris. This is accomplished at the Anaconda pretreatment facility by a mechanical rotating filter screen; screenings wash unit and solids dewatering/compacting device. After pretreatment, the wastewater flows by gravity to a two-cell, aerated treatment lagoon system located at the same site.

2.3.2.3. Lift Stations

There are two lift stations within the City of Anaconda wastewater collection system. Both were built in 2010. The first lift station serves the CCCS correctional facility located approximately 0.9 miles northeast of the Anaconda WWTP on Highway 48. The second lift station serves the MCIC, located at the intersection of Mill Creek Road and Highway 1, approximately 1.8 miles southeast of the WWTP.

The CCCS lift station serves a correctional facility with 120 existing beds and 120 planned for the future. The design report (DOWL/HKM, 2009) indicates an average design flow of 19 gpm and a peak design flow of 111 gpm for the lift station. Per the City of Anaconda, there are no known problems with the CCCS lift station at this time.

The MCIC collection system and lift station was designed to serve the MCIC (RPA, 2008). The MCIC was subdivided into individual parcels suitable for commercial and industrial uses, with an estimated wastewater generation at 6,000 gpd for the MCIC and 43,000 to 65,000 gpd from the DGGS for a total design flow of 50 gpm and a peak design flow of 309 gpm (RPA, 2008). Per the City of Anaconda, there are no known problems with the MCIC lift station at this time.

The DGGS is the only industrial customer discharging to the WWTP at the present time. The DGGS consists of three, 50 MW generators driven by six combustion turbine engines. High purity demineralized water is injected in each turbine's combustion chamber to reduce peak flame temperatures and thermal NOX formation. Raw water supply to the DGGS is supplied from the 34-inch Silver Lake Water System pipeline. Raw water at the DGGS is demineralized using a four step process: 1) multimedia filtration, 2) membrane bag filtration, 3) reverse osmosis (RO) and 4) electronic deionization. Approximately 20 percent of the water entering the reverse osmosis units is rejected and discharged to the sanitary sewer. Periodic back flushing of the multi-media filtration units is also required and is also discharged to the sanitary sewer. Water discharged to the sanitary sewer at the DGGS is not metered and ADLC does not presently charge the DGGS for sewer usage (RPA, 2008).

2.3.2.4. Collection System

The wastewater collection system in Anaconda consists of conventional, gravity flow sewers that range from six to 18 inches in diameter and two lift stations (see Section 2.3.2.3). Older gravity lines are made of vitrified clay with more modern additions to the collection system made of concrete or PVC pipe materials. Sewer mains tend to follow street or alley alignments within the Anaconda service area. Flow within the collection system generally goes from west to east following valley topography. Major trunk lines generally follow street alignments, with the major trunk line following 4th Street. Manholes are generally provided at one block intervals and range in construction from modern pre-cast concrete to hand built brick manholes.

As part of the MCIC, an approximately 5,700 ft. 8-inch PVC gravity main delivers collected wastewater to a lift station wet well located on the north side of Highway 1 at Mill Creek Road. From the lift station, collected wastewater is pumped via an 8,200 foot long 6-inch diameter PVC force main to a manhole located south of the pretreatment facility where it joins the main 24-inch outfall line from Anaconda prior to entering the filter screen at the WWTP. The collection system extension was constructed in 2010 to service future development of the MCIC/Mill Creek TIFID, and the DGGS.

The ADLC staff indicates the system to be in an overall adequate condition. Per the City of Anaconda, regular operation and maintenance activities include weekly system inspection and collection system cleaning on a five-year cycle. Copies of the latest system Comprehensive Performance Evaluation and inspection reporting are provided in Appendix D.

2.3.2.5. Regulatory Compliance

There are currently no known regulatory or compliance issues associated with the City of Anaconda's wastewater collection system. Per MDEQ and USEPA, the Anaconda wastewater system is considered a non-discharging facility and has never had a discharge permit. The current facility consists of a two-cell aerated lagoon system with a constant discharge to an 18-inch diameter outfall line, where it flows approximately 1.75 miles northeast via gravity to the HIP facility.

2.3.2.6. Operational and Management Practices and Capabilities

The Anaconda Wastewater Department currently has one full time certified wastewater treatment operator and additional Anaconda City staff as needed perform system operation and maintenance. It is anticipated that the existing Anaconda Wastewater Department staff would be able to handle the additional operation and maintenance requirements of the proposed Mill Creek TIFID development.

2.3.3 Existing Stormwater System

There is no existing stormwater system on the Mill Creek TIFID property. Currently, surface water is managed on the undeveloped property by a series of existing drainage ditches, earthen berms and diversions to prevent water run-on, and minimize sediment discharge to Mill Creek.

2.3.3.1. Collection System

The City of Anaconda's storm drain system is shown on Figure 14. The nearest connection point to the existing system is approximately three miles northwest of the Mill Creek TIFID.

2.3.3.2. Hydraulic Loading

Stormwater runoff currently exceeds the capacity of the Anaconda storm drain system; however, it is assumed that stormwater collection and management will be contained within the Mill Creek TIFID area and will not directly contribute to the existing Anaconda storm drain system. This assumes that runoff from surrounding, higher elevation properties are managed via supplemental structures (i.e., existing berms, ditches and channels). The proposed development of the Mill Creek TIFID includes open public land and light and/or heavy industrial property. The post-developed peak discharge from the site will be limited to no more than exists under pre-developed conditions for the full range of storm frequencies (2-year through 100-year). Therefore, the Mill Creek TIFID project is anticipated to have no detrimental effects on Anaconda's storm drain system or surrounding drainages to the Mill Creek TIFID.

2.3.3.3. Pumping Stations

No storm water pumping/lift stations exist in Anaconda.

2.3.3.4. Storage/Detention

Currently no storm water detention is incorporated into the existing ADLC stormwater system. However, the post-developed runoff from the proposed Mill Creek TIFID development will be limited to no more than exists under pre-developed conditions for the full range of storm frequencies (2-year through 100-year). This will be accomplished via limiting source runoff and attenuating peak flows via detention basins.

2.3.3.5. Operational and Management Practices and Capabilities

Operation and maintenance of the Anaconda stormwater system is the responsibility of the Anaconda Road Department, a division of the joint ADLC government. It is anticipated that the existing Anaconda Road Department staff would be able to handle the additional operation and maintenance requirements of the proposed Mill Creek TIFID development.

2.3.4 Financial Status of Existing Systems

This section provides information regarding existing system rates, annual operating and maintenance (O&M) costs, monthly usage categories and revenue received. Water and wastewater system rate schedules and system budget reports are provided in Appendix E.

2.3.4.1. Water System

The ADLC water system includes metered and flat rate structures for both residential and commercial properties. The ADLC water system rate structures are summarized and provided in Appendix E. The annual projected O&M budget for the Anaconda water system is summarized in Table 4 below.

Table 4 – Anaconda Water System Budget Summary (2009 – 2014) (1)

Budget Category	2010 – 2011	2011 – 2012	2012 – 2013	2013 - 2014
Total Revenue	**$2,549,761.00**	**$1,898,465.00**	**$3,515,958.00**	**$3,592,082.00**
Expenses:				
Labor	$308,349.00	$327,205.00	$339,239.00	$338,572.00
Expenses	$108,926.00	$72,910.00	$158,577.00	$208,000.00
Utilities	$92,018.00	$94,953.00	$115,000.00	$115,000.00
Construction (2)	$1,414,430.00	$0.00	$2,554,521.00	$2,577,082.00
Debt/Depreciation (3)	$393,300.00	$710,920.00	$392,500.00	$0.00
Total Expenses	**$2,317,023.00**	**$1,205,988.00**	**$3,559,837.00**	**$3,283,654.00**

Notes:

(1) Anaconda Water System Budget information provided by ADLC via reporting dated 8/8/13, 9/24/13 and 3/4/14.

(2) Construction for 2013-214 includes $100,000 for Construction and $2,477,082.00 for NRD Groundwater Improvements.

(3) Debt retirement was completed in June 2013 for new storage tank, well and transmission main construction in 1992.

2.3.4.2. Wastewater System

The ADLC wastewater system is currently charged on a “per-unit” fee for residential units ($21/unit, with residential units typically charged for three units per year), with commercial use charged according to water use. The annual projected O&M budget for the Anaconda wastewater system is summarized in Table 5 below.

Table 5 – Anaconda Wastewater System Budget Summary (2009 – 2014) (1)

Budget Category	2010 – 2011	2011 – 2012	2012 – 2013	2013 - 2014
Total Revenue	**$248,815.00**	**$530,159.00**	**$251,603.00**	**$680,626.00**
Expenses:				
Labor	$187,136.00	$179,040.00	$61,214.00	$66,898.00
Expenses	$33,320.00	$74,647.00	$98,950.00	$57,526.00
Utilities	$51,528.00	$54,844.00	$52,000.00	$55,000.00
Construction	$0.00	$0.00	$0.00	$0.00
Debt/Depreciation	$0.00	$206,480.00	$0.00	$0.00
Total Expenses	**$271,984.00**	**$515,011.00**	**$212,164.00**	**$179,424.00**

Notes:

(1) Anaconda Wastewater System Budget information provided by ADLC via reporting dated 8/8/13, 9/24/13 and 3/4/14.

2.3.4.3. Stormwater System

The City of Anaconda's Stormwater System is funded from the General Fund and has not been analyzed as part of this PER.

2.3.4.4. Total Equivalent Dwelling Unit (EDU) Calculation

The Equivalent Dwelling Unit (EDU) computation is required in order for the W_2ASACT funding agencies to evaluate financial need in a consistent manner. One EDU is considered to be the level of water service provided to a typical residential dwelling for a single family. Multiple family units, and commercial and industrial users, are assigned a greater number of EDU's since they are served by a larger service connection and utilize a greater amount of water.

The latest EDU calculation was per DOWL/HKM's West Valley Sewer Extension PER - for the 2010 fiscal year (July 09 – June 10), Anaconda had 3,453 residential sewer hook-ups and 114 commercial sewer hookups. The average number of units per commercial or non-residential enterprise in 2010 was approximately 12 (i.e., 1,359 units billed ÷ 114 costumers = 12 units/customer). Therefore, the total EDUs were calculated as:

2010 ADLC EDU's = 3,453 residential customers + (1,359 commercial units ÷ 3 units/residential customer) = 3,906 EDUs. (DOWL/HKM, 2012)

2.4 Need for Project and Problems to be Solved

The need for the Mill Creek TIFID project is driven by growth. This PER has been developed to further the economic development and health of Anaconda, while successfully reusing lands

impacted by past mining activities. This project is not anticipated to resolve any health and safety, system O&M or other unresolved problems in Anaconda.

2.5 General Design Requirements for Improvements

The proposed Mill Creek TIFID development plan is provided on Figure 15. Based on discussions with ADLC representatives and the layout of the Mill Creek TIFID, the area was divided into 72, approximately five acre parcels for a total of 382 acres of developed land. Parcels were delineated such that ADLC and Atlantic Richfield property could be developed independently (i.e., parcels do not extend across property boundaries). Several factors were assessed regarding parcel delineation, access road alignment and right-of-way, and railroad spur location/alignment. All Mill Creek TIFID development and parcel delineation assumptions and a complete summary of all proposed parcels (including associated development assumptions) are provided in Appendix F. Some of the main assumptions regarding development included the following.

- Parcels were not delineated within the Zone A floodplain boundary.
- Parcels were not delineated within a steep sloped area located along the southern boundary of the Mill Creek TIFID. Specialized development may be viable in this area given further investigation; however this area was not considered for development as part of this PER.
- There are several areas of heavy vegetation and established wetland areas within the Mill Creek TIFID. These areas are assumed to be maintained as open/park areas.
- There are several existing drainage ditches throughout the Mill Creek TIFID. These were assumed to be maintained as-is.
- Many overhead utility power lines run through the Mill Creek TIFID. These were delineated as utility corridors and assumed that development would not extend into these utility right-of-ways.

2.5.1 Water System

The actual development of the Mill Creek TIFID is unknown at this time; however, the proposed development plan assumes that 72, five acre parcels will add an average daily demand of 400 gallons per day (gpd) and maximum daily demand of 1,200 gpd per parcel for maximum total daily flow requirements of 86,400 gpd (assumes a peaking factor of 3.0). The proposed water distribution system calculates capacity for potable water distribution and adequate fire flow capacity in accordance with ADLC and International Fire Code requirements. The water demand may significantly increase during the summer months (i.e., May through September) if portions of the Mill Creek TIFID are irrigated. Assuming 20% of the property (i.e., approximately one acre per parcel) is irrigated, water demand may increase by 544,600 gpd. Modifications to the City of Anaconda's water system will be subject to the requirements of MDEQ Circular DEQ 1. A pumping station will be required to boost fire/irrigation flows within

the new system. New water system construction will be subject to Montana Public Works Standard Specifications guidelines.

2.5.2 Wastewater System

The actual development of the Mill Creek TIFID is unknown at this time; however, the proposed development plan assumes that 72, five acre parcels will convey 100% of the estimated water demand, including a peaking factor of 3.2, resulting in maximum daily wastewater flow requirements of 1,280 gpd per parcel or 92,160 gpd for the Mill Creek TIFID. The proposed wastewater collection system will also require the construction of a lift station within the eastern, downgradient Atlantic Richfield properties in order to deliver wastewater flow to the return force main. Modifications to the City of Anaconda's wastewater system will be subject to the requirements of MDEQ Circular DEQ 2. New water system construction will be subject to Montana Public Works Standard Specifications guidelines.

2.5.3 Stormwater System

The Mill Creek TIFID is approximately three miles from the nearest City of Anaconda stormwater system connection; however, the existing City of Anaconda system is above capacity based on discussions with ADLC. Therefore, the Mill Creek TIFID properties should be developed such that post-development runoff is limited to no more than pre-development conditions. This PER evaluated runoff conditions for 2, 10 and 100 year, 24 hr. storm events in order to evaluate conditions in accordance with MDEQ Circular DEQ 8. The proposed stormwater system will include armored road ditches, culverts, site grading and lined detention ponds in order to convey and attenuate post-development run-off into various discharge points along Mill Creek and associated tributary drainages. Modifications to the stormwater system will be subject to the requirements of MDEQ Circular DEQ 8. New water system construction will be subject to Montana Public Works Standard Specifications guidelines.

3.0 ALTERNATIVE SCREENING

This section describes and briefly evaluates available alternatives for water, wastewater and stormwater system development within the Mill Creek TIFID. Selected alternatives, deemed viable for further consideration, are discussed in detail in Section 4.0 Alternative Analysis.

3.1 Water System

The Mill Creek TIFID currently does not have a water supply and distribution system on-site. As part of the MCIC, a an approximately 14,250 ft., 6-inch water main was constructed in 2012 starting approximately 1.5 miles east of Anaconda along the south side of Highway 1, extending along Highway 1, turning south along Mill Creek Road and terminating just inside the Mill Creek TIFID boundary, south of the Butte, Anaconda, & Pacific Railway. The 6-inch water main is not currently in use, and was constructed for future system tie-in upon development of the MCIC.

The alternatives evaluated to provide the Mill Creek TIFID with potable and fire system water include the following, and are discussed in the following sections.

- Alternative 1: Connect to City of Anaconda Water System.
- Alternative 2: Construct an On-Site Water System.
- Alternative 3: Connect to the Silver Lake Pipeline.
- Alternative 4: No Action.

3.1.1 Alternative 1: Connect to City of Anaconda Water System

This alternative would include extending the existing MCIC water main into the Mill Creek TIFID and creating looped transmission lines within ADLC and Atlantic Richfield properties, as shown on Figure 16. Alternative 1 is viable and is retained for further consideration.

3.1.2 Alternative 2: Construct an On-Site Water System

This alternative would include the installation and development of on-site water wells and associated pumping, distribution and treatment systems. However, an agreement with the USEPA and Atlantic Richfield prohibits water from infiltrating the subsurface and development of wells to access groundwater; therefore, this alternative has been eliminated from further consideration as part of this PER.

3.1.3 Alternative 3: Connect to the Silver Lake Pipeline

The Silver Lake Pipeline runs along the northern boundary of the Mill Creek TIFID, as shown on Figure 16. The Silver Lake Pipeline is non-potable and would require on-site treatment for use as potable water, and may be directly used as fire system water. This alternative has been previously evaluated in detail as a potable water source, including direct filtration/pressure filters and membrane filtration treatment technologies (RPA, 2008). This alternative was removed from consideration for a potable water source, given high costs of construction and operations and maintenance (O&M), and therefore was eliminated as a preferred alternative (RPA, 2008). While the Silver Lake Pipeline may be a viable option for irrigation, industrial and/or fire system water, such an option would be constructed as a separate distribution system. The Silver Lake Pipeline may be a viable water source alternative if future development requires industrial water, or as an alternative for fire/irrigation water supply; however, given the unknown future development needs this PER focuses on construction of one, separate distribution system connected to City of Anaconda water only. Therefore, this alternative has been eliminated from further consideration as part of this PER.

3.1.4 Alternative 4: No Action

This alternative would not provide potable, fire or irrigation water to the Mill Creek TIFID, limiting its development; therefore, this alternative has been eliminated from further consideration as part of this PER.

3.2 Wastewater System

The Mill Creek TIFID currently does not have a wastewater system on-site. As part of the MCIC, an approximately 5,700 ft. 8-inch PVC gravity main delivers collected wastewater to a lift station wet well located on the north side of Highway 1 at Mill Creek Road. From the lift station, collected wastewater is pumped via an 8,200 foot long 6-inch diameter PVC force main to a manhole located south of the pretreatment facility where it joins the main 24-inch outfall line from Anaconda prior to entering the filter screen at the WWTP. The collection system extension was constructed in 2010 to service future development of the MCIC/Mill Creek TIFID, and the DGGS.

The alternatives evaluated to provide the Mill Creek TIFID with a wastewater system include the following, and are discussed in the following sections.

- Alternative 1: Connect to City of Anaconda Wastewater Collection System.
- Alternative 2: Construct an On-Site Wastewater Treatment System.
- Alternative 3: Install Individual Septic Tanks and Drain Fields.
- Alternative 4: No Action.

3.2.1 Alternative 1: Connect to City of Anaconda Wastewater Collection System

This alternative would include extending new wastewater collection systems from the MCIC 8-inch connection into the Mill Creek TIFID within ADLC and Atlantic Richfield properties, as shown on Figure 17. Alternative 1 is viable and is retained for further consideration.

3.2.2 Alternative 2: Construct an On-Site Wastewater Treatment System

This alternative would include construction of an on-site collection and treatment system. The treatment system would be a mechanical plant, facultative with aerated lagoons or a packaged system. This alternative has been previously screened as part of the MCIC PER, based on the difficulty in obtaining a new discharge permit and unknown future development needs (RPA, 2008). Therefore, this alternative has been eliminated from further consideration as part of this PER.

3.2.3 Alternative 3: Install Individual Septic Tanks and Drain Fields.

This alternative would require the construction of a septic tank/drainfield system on each parcel. Discharge of treated wastewater would be directly to groundwater. However, an agreement with the USEPA and Atlantic Richfield prohibits water from infiltrating the subsurface, precluding the use of on-site septic systems; therefore, this alternative has been eliminated from further consideration as part of this PER.

3.2.4 Alternative 4: No Action

This alternative would not provide a wastewater collection system for the Mill Creek TIFID, limiting its development; therefore, this alternative has been eliminated from further consideration as part of this PER.

3.3 Stormwater System

The Mill Creek TIFID currently does not have a stormwater collection system on-site. Stormwater run-on is managed by existing berms and ditches, located throughout the area. Stormwater from the Mill Creek TIFID eventually discharges to Mill Creek or small tributary ditches within the area.

The alternatives evaluated to provide the Mill Creek TIFID with a stormwater collection system include the following, and are discussed in the following sections.

- Alternative 1: Connect to City of Anaconda Stormwater Collection System.
- Alternative 2: Construct an On-Site Stormwater Collection System.
- Alternative 4: No Action.

3.3.1 Alternative 1: Connect to City of Anaconda Stormwater Collection System

This alternative would include construction of an on-site collection system that is tied to the existing Anaconda Stormwater Collection System. Based on conversations with ADLC and City of Anaconda employees, the existing Anaconda stormwater system routinely exceeds capacity during runoff events. The nearest tie-in to the existing Anaconda storm drain is approximately three miles from the Mill Creek TIFID, located immediately east of the intersection of East 5th Street and Jackson Street. Therefore, given the limitations of the existing collection system, large distance from an existing storm drain tie-in, and proximity to Mill Creek, this alternative has been eliminated from further consideration as part of this PER.

3.3.2 Alternative 2: Construct an On-Site Stormwater Collection System

This alternative would include construction of an on-site collection system within the ADLC and Atlantic Richfield properties that would minimize sediment transport and eventually convey

water for discharge into Mill Creek, as shown on Figures 18 and 19. Alternative 2 is viable and is retained for further consideration.

3.3.3 Alternative 3: No Action

This alternative would not provide a stormwater management system for the Mill Creek TIFID, limiting its development; therefore, this alternative has been eliminated from further consideration as part of this PER.

4.0 ALTERNATIVE ANALYSIS

This section further describes and evaluates selected alternatives for water, wastewater and stormwater system development within the Mill Creek TIFID. Preferred alternatives, selected for further consideration, are discussed in detail in Section 5.0 Detailed Description of Preferred Alternatives.

4.1 Water System

Alternative 1: Connect to City of Anaconda Water System was the only viable water system alternative chosen in Section 3.0, therefore, a comparative alternative analysis was not performed. Water System Alternative 1 is evaluated and discussed in detail in Section 5.0.

4.1.1 Description

Alternative 1 includes extending the existing MCIC 6-inch water main into the Mill Creek TIFID and creating 8 to 10-inch looped transmission lines within ADLC and Atlantic Richfield properties. The proposed water system would provide potable, fire and irrigation water. The system will require a pump station to boost flows for fire and irrigation water. Industrial water would be provided via a separate pipeline, possibly from the existing Anaconda water system or the Silver Lake Pipeline, depending on the water volume and quality demand. Since development requiring specific industrial water sources have not been identified at this time, industrial water distribution alternatives and costs have not been evaluated in this PER.

4.1.2 Schematic Layout

The proposed Mill Creek TIFID water system is shown on Figure 16. The system includes looped distribution within ADLC and Atlantic Richfield properties, including approximately 20,400 ft. of 10-inch PVC piping for ADLC property parcels, and 13,300 ft. of 8-inch PVC piping and 2,300 ft. of 10-inch PVC piping for Atlantic Richfield property parcels. The proposed water system layout is preliminary, dependent upon final layout of industrial subdivision during the subdivision platting and approval process.

4.1.3 Operational Requirements

The Anaconda Water Department will be responsible for O&M of the proposed water system. Operational requirements for the proposed system should be minimal. It is not anticipated that additional staff or equipment should be required for the Anaconda Water Department to assume responsibility of the proposed water system.

4.1.4 Energy Requirements

This alternative will require 3-phase power to operate the lift station, if desired for fire and irrigation flow. There are no other power requirements associated with this option.

4.1.5 Regulatory Compliance and Permits

The City of Anaconda's existing water system is in compliance with all applicable regulations and all permits are in place. The proposed water system would meet MDEQ's Circular DEQ 1 requirements and standards. Installation of piping will be subject to the minimum material and installation guidelines per Montana Public Works Standard Specifications.

Water system installation will require multiple stream crossings, including excavation and backfill within waterways and existing wetland areas. Construction may require the following permits, discussed in detail in the Uniform Environmental Checklist provided in Appendix B.

- ADLC Floodplain Development Permit.
- MFWP 123SPA Stream Protection Permit.
- US ACOE 404 Permit.
- MDEQ 318 Authorization.
- MDEQ Stormwater Discharge General Permit.

4.1.6 Land Requirements

The proposed water system is on ADLC (approximately 155 developed acres) and Atlantic Richfield (approximately 227 developed acres) property. ADLC would need to enter into an agreement with, or acquire property from, Atlantic Richfield in order to develop Atlantic Richfield property parcels. The proposed water system is designed to deliver water first to ADLC property and then to Atlantic Richfield property (i.e., water distribution on Atlantic Richfield property will be dependent on ADLC property development).

4.1.7 Environmental Considerations

There should be no significant long-term environmental impacts as a result of this alternative. There may be short term impacts caused by construction activities, such as sediment, dust and

noise generation; however, construction will be required to follow best management practices to minimize and mitigate dust and noise impacts and minimize sediment deposition into nearby waterways.

Contaminated soils will be encountered during construction, as discussed in Section 2.2.3.2. The location and quantity of contaminated soils will be determined as accurately as possible during construction, and will be mitigated via an action plan developed in conjunction with ADLC and Atlantic Richfield to determine the appropriate method of removal, disposal and remediation as needed.

4.1.8 Construction Problems

No significant construction problems are anticipated with construction of the proposed water system. Temporary road and railroad closures may be required to construct associated crossings. Temporary water diversions may be required to dewater and facilitate creek/ditch crossings.

4.1.9 Cost Estimate

Table 6 summarizes estimated water system construction costs, annual O&M costs, and associated present worth analysis. Cost Estimate details are provided in Appendix G.

Table 6 – Water System Preferred Alternative Cost Summary

Item	ADLC Property	Atlantic Richfield Property	Subtotals
Water System Direct Costs (1)	$2,816,361	$1,769,368	$4,585,729
Indirect Costs (2)	$985,726	$619,279	$1,524,505
Direct and Indirect Subtotal	***$3,802,087***	***$2,388,647***	***$6,190,734***
Contingency (15% Direct and Indirect)	$570,313	$358,297	$928,610
Construction Cost Subtotal	***$4,372,400***	***$2,746,944***	***$7,119,344***
Present Value O&M (i=6%, n=20 years)	***$37,277***	***$54,482***	***$91,759***
Total Estimated Costs	**$4,409,678**	**$2,801,426**	**$7,211,104**

Notes:
(1) Water System Direct Costs include construction items, and are itemized in Appendix G.
(2) Water System Indirect Costs include engineering, permitting, mobilization/demobilization, quality assurance/control, surveying, construction stormwater management, management/administration, traffic control and taxes and bonds and are applied as direct percentages of direct costs, as shown in Appendix G.

4.2 Wastewater System

Alternative 1: Connect to City of Anaconda Wastewater System was the only viable wastewater system alternative chosen in Section 3.0, therefore, a comparative alternative analysis was not

performed. Wastewater System Alternative 1 is evaluated and discussed in detail in Section 5.0.

4.2.1 Description

This alternative would include extending new wastewater collection systems from the MCIC 8-inch connection into the Mill Creek TIFID within ADLC and Atlantic Richfield properties. The on-site wastewater collection system on ADLC property will include gravity transmission lines leading to the MCIC connection. The Atlantic Richfield wastewater collection system will include gravity transmission lines leading to a lift station that would pump wastewater via a 3-inch PVC force main to the MCIC connection. Both systems discharge to the MCIC connection, which eventually discharges to the ADCL Wastewater Treatment Plant, approximately 2.5 miles north of the Mill Creek TIFID.

4.2.2 Schematic Layout

The proposed Mill Creek TIFID wastewater collection system is shown on Figure 17. The system includes gravity transmission lines within ADLC and Atlantic Richfield properties. The ADLC system will include approximately 12,100 ft. of 8-inch PVC piping for gravity transmission lines. The Atlantic Richfield system will include 14,900 ft. of 8-inch PVC piping for gravity transmission lines, 6,025 ft. of 3-inch PVC piping for the force main and a lift station located in the northeast corner of Atlantic Richfield's property. The proposed wastewater collection system layout is preliminary, dependent upon final layout of industrial subdivision during the subdivision platting and approval process.

4.2.3 Operational Requirements

The Anaconda Wastewater Department will be responsible for O&M of the proposed water system. A lift station is required to service parcels located on Atlantic Richfield property. Operational requirements of the existing ADLC WWTP would not change; however, the lift station will require routine inspection, cleaning and maintenance. It is not anticipated that additional staff or equipment should be required for the Anaconda Wastewater Department to assume responsibility of the proposed wastewater collection system.

4.2.4 Energy Requirements

This alternative will require 3-phase power to operate the lift station. There are no other power requirements associated with this option.

4.2.5 Regulatory Compliance and Permits

The City of Anaconda's existing wastewater system is in compliance with all applicable regulations and all permits are in place. The proposed wastewater collection system would

meet MDEQ's Circular DEQ 2 requirements and standards. Installation of piping will be subject to the minimum material and installation guidelines per Montana Public Works Standard Specifications.

Wastewater system installation will require multiple stream crossings, including excavation and backfill within waterways and existing wetland areas. Construction may require the following permits, discussed in detail in the Uniform Environmental Checklist provided in Appendix B.

- ADLC Floodplain Development Permit.
- MFWP 123SPA Stream Protection Permit.
- US ACOE 404 Permit.
- MDEQ 318 Authorization.
- MDEQ Stormwater Discharge General Permit.

4.2.6 Land Requirements

The proposed wastewater collection systems are on ADLC (approximately 155 developed acres) and Atlantic Richfield (approximately 227 developed acres) property. ADLC would need to enter into an agreement with, or acquire property from, Atlantic Richfield in order to develop Atlantic Richfield property parcels. The proposed ADLC and Atlantic Richfield property wastewater collection systems are designed collect and transmit wastewater to the MCIC connection independent of each other.

4.2.7 Environmental Considerations

There should be no significant long-term environmental impacts as a result of this alternative. There may be short term impacts caused by construction activities, such as sediment, dust and noise generation; however, construction will be required to follow best management practices to minimize and mitigate dust and noise impacts and minimize sediment deposition into nearby waterways.

Contaminated soils will be encountered during construction, as discussed in Section 2.2.3.2. The location and quantity of contaminated soils will be determined as accurately as possible during construction, and will be mitigated via an action plan developed in conjunction with ADLC and Atlantic Richfield to determine the appropriate method of removal, disposal and remediation as needed.

4.2.8 Construction Problems

No significant construction problems are anticipated with construction of the proposed water system. Temporary road and railroad closures may be required to construct associated

crossings. Temporary water diversions may be required to dewater and facilitate creek/ditch crossings.

4.2.9 Cost Estimate

Table 7 summarizes estimated wastewater collection system construction costs, annual O&M costs, and associated present worth analysis. Cost Estimate details are provided in Appendix G.

Table 7 – Wastewater Collection System Preferred Alternative Cost Summary

Item	ADLC Property	Atlantic Richfield Property	Subtotals
Wastewater System Direct Costs (1)	$1,784,640	$2,722,305	$4,556,945
Indirect Costs (2)	$624,624	$970,307	$1,594,931
Direct and Indirect Subtotal	***$2,409,264***	***$3,742,612***	***$6,151,876***
Contingency (15% Direct and Indirect)	$361,390	$561,392	$922,781
Construction Cost Subtotal	***$2,770,654***	***$4,304,004***	***$7,074,657***
Present Value O&M (i=6%, n=20 years)	***$51,615***	***$143,374***	***$194,989***
Total Estimated Costs	**$2,822,268**	**$4,447,378**	**$7,269,646**

Notes:

(1) Wastewater System Direct Costs include construction items, and are itemized in Appendix G.

(2) Wastewater System Indirect Costs include engineering, permitting, mobilization/demobilization, quality assurance/control, surveying, construction stormwater management, management/administration, traffic control and taxes and bonds and are applied as direct percentages of direct costs, as shown in Appendix G.

4.3 Stormwater System

Alternative 2: Construct an Onsite Stormwater Collection System was the only viable stormwater system alternative chosen in 3.0, therefore, a comparative alternative analysis was not performed. Stormwater System Alternative 2 is evaluated and discussed in detail in Section 5.0.

4.3.1 Description

This alternative would include constructing stormwater conveyance and retention structures, such as armored road ditches, culverts and detention ponds, to attenuate and discharge post-development stormwater runoff at no greater than pre-development flowrates at existing discharge locations.

4.3.2 Schematic Layout

The estimated existing Mill Creek stormwater drainage system is shown on Figure 18. The proposed Mill Creek TIFID stormwater management system post-development is shown on Figure 19.

The system includes approximately 25,000 ft. of riprap armored channels, 11 road/stream/drainage crossings (corrugated metal culverts) and 40 acre-ft. of water retention requirements, distributed across 14 drainage basins/sub-basins on the Mill Creek TIFID property. The proposed stormwater drainage system layout is preliminary, dependent upon final layout of industrial subdivision during the subdivision platting and approval process.

4.3.3 Operational Requirements

The ADLC Road Department would be responsibility for operation and maintenance of the Mill Creek TIFID stormwater drainage system. Operational requirements for the proposed system would consist of routine inspections, grading of channels to remove sediment and repair erosion, dewater/remove sediment from detention basins and inspect and repair detention basin liner systems. It is not anticipated that additional staff or equipment should be required for the ADLC Road Department to assume responsibility of the proposed stormwater drainage system.

4.3.4 Energy Requirements

There are no direct energy requirements for this alternative.

4.3.5 Regulatory Compliance and Permits

There are currently now stormwater discharge permits in place for the Mill Creek TIFID properties. The proposed stormwater collection system would meet MDEQ's Stormwater Discharge General Permit requirements and MDEQ's Circular DEQ 8. Installation of piping, ponds or channels will be subject to the minimum material and installation guidelines per Montana Public Works Standard Specifications.

The stormwater collection system installation will require channel enhancement work, including potential excavation and backfill within waterways and existing wetland areas. Construction may require the following permits, discussed in detail in the Uniform Environmental Checklist provided in Appendix B.

- ADLC Floodplain Development Permit.
- MFWP 123SPA Stream Protection Permit.
- US ACOE 404 Permit.
- MDEQ 318 Authorization.
- MDEQ Stormwater Discharge General Permit.

4.3.6 Land Requirements

The proposed stormwater collection systems are on ADLC (approximately 155 developed acres) and Atlantic Richfield (approximately 227 developed acres) property. ADLC would need to enter into an agreement with, or acquire property from, Atlantic Richfield in order to develop Atlantic Richfield property parcels. The proposed ADLC and Atlantic Richfield property stormwater collection systems are designed collect and transmit stormwater for eventual discharge to Mill Creek independent of each other.

4.3.7 Environmental Considerations

There should be no significant long-term environmental impacts as a result of this alternative. There may be short term impacts caused by construction activities, such as sediment, dust and noise generation; however, construction will be required to follow best management practices to minimize and mitigate dust and noise impacts and minimize sediment deposition into nearby waterways.

Contaminated soils will be encountered during construction, as discussed in Section 2.2.3.2. The location and quantity of contaminated soils will be determined as accurately as possible during construction, and will be mitigated via an action plan developed in conjunction with ADLC and Atlantic Richfield to determine the appropriate method of removal, disposal and remediation as needed.

4.3.8 Construction Problems

No significant construction problems are anticipated with construction of the proposed stormwater collection system. Temporary water diversions may be required to dewater and facilitate creek/ditch crossings.

4.3.9 Cost Estimate

Table 8 summarizes estimated stormwater collection system construction costs, annual O&M costs, and associated present worth analysis. Cost Estimate details are provided in Appendix G.

Table 8 – Stormwater Collection System Preferred Alternative Cost Summary

Item	ADLC Property	Atlantic Richfield Property	Subtotals
Stormwater System Direct Costs (1)	$466,537	$452,359	$918,896
Indirect Costs (2)	$163,288	$158,326	$321,614
Direct and Indirect Subtotal	***$629,825***	***$610,684***	***$1,240,510***
Contingency (15% Direct and Indirect)	$94,474	$91,603	$186,076
Construction Cost Subtotal	***$724,299***	***$702,287***	***$1,426,586***
Present Value O&M (i=6%, n=20 years)	***$41,292***	***$61,938***	***$103,229***
Total Estimated Costs	**$765,591**	**$764,225**	**$1,529,815**

Notes:

(1) Stormwater System Direct Costs include construction items, and are itemized in Appendix G.

(2) Stormwater System Indirect Costs include engineering, permitting, mobilization/demobilization, quality assurance/control, surveying, construction stormwater management, management/administration, traffic control and taxes and bonds and are applied as direct percentages of direct costs, as shown in Appendix G.

4.4 Selection of Preferred Alternatives

This section summarizes the selected preferred water, wastewater and stormwater systems for the Mill Creek TIFID.

4.4.1 Water System

Alternative 1: Connect to City of Anaconda Water System was the only viable water system alternative chosen. The alternative includes creation of looped systems on ADLC and Atlantic Richfield properties, connected to the existing MCIC 6-inch water main located in the northern part of the Mill Creek TIFID. The proposed water system will supply potable, fire and irrigation system water; however it will require a pump station to boost fire and irrigation water flows. Section 5.0 provides details regarding the preferred alternative technical feasibility, environmental impacts and mitigation, financial feasibility, public health and safety, and O&M considerations.

4.4.2 Wastewater System

Alternative 1: Connect to City of Anaconda Wastewater System was the only viable wastewater system alternative chosen. This alternative would include extending new wastewater collection systems from the MCIC 8-inch connection into the Mill Creek TIFID within ADLC and Atlantic Richfield properties. The on-site wastewater collection system on ADLC property will include gravity transmission lines leading to the MCIC connection. The Atlantic Richfield wastewater collection system will include gravity transmission lines leading to a lift station that would pump wastewater via a 3-inch PVC force main to the MCIC connection. Both systems discharge to the MCIC connection, which eventually discharges to the ADLC Wastewater Treatment Plant, approximately 2.5 miles from the Mill Creek TIFID. Section 5.0 provides details regarding the

preferred alternative technical feasibility, environmental impacts and mitigation, financial feasibility, public health and safety, and O&M considerations.

4.4.3 Stormwater Collection System

Alternative 2: Construct an Onsite Stormwater Collection System was the only viable stormwater system alternative chosen. This alternative includes construction of stormwater conveyance and retention structures, such as armored road ditches, culverts and detention ponds, to attenuate and discharge post-development stormwater runoff at no greater than pre-development flowrates at existing discharge locations. Section 5.0 provides details regarding the preferred alternative technical feasibility, environmental impacts and mitigation, financial feasibility, public health and safety, and O&M considerations.

5.0 DETAILED DESCRIPTION OF PREFERRED ALTERNATIVES

This section provides a detailed description of each of the preferred alternatives selected for water, wastewater and stormwater systems, including discussion relating to general access improvements. The Discussion includes site location and characteristics, operational requirements, impact on existing facilities, design criteria, environmental impacts and mitigation, public health and safety and costs summary.

5.1 Water System

Alternative 1: Connect to City of Anaconda Water System was the alternative chosen in Section 4.0 and is discussed in detail below.

5.1.1 Site Location and Characteristics

The proposed water system location and layout is provided on Figure 16. The proposed water system is designed to provide potable and fire system flows for both ADLC and Atlantic Richfield properties within the Mill Creek TIFID. Water will be distributed via a looped system, designed to first supply water to ADLC properties, and then Atlantic Richfield properties (i.e., the Atlantic Richfield water system is dependent on the ADLC water system construction and operation). A detailed summary of water system modeling, including methods, assumptions and results are provided in Appendix H.

The following provides a summary of the proposed water system characteristics:

Table 9 – Proposed Water System Characteristics

System Characteristic	Information/Assumptions
ADLC Property System:	
Water Mains	20,400 ft. of 10-inch PVC piping.
Fire System Hydrants	27 hydrants spaced every 500 ft. along system.
Irrigation Area (1)	Assumes maximum of 31 acres within ADLC property.
System Valves	27 valves.
Air Relief Valves	5 air relief valves.
Stream Crossings	6 crossings across Mill Creek and tributary channels.
Road/Rail Crossings	5 crossings across Mill Creek Road/access roads/rail.
Utility Crossings	5 crossings across utility pipelines.
Pump Station (2)	Assume one station to boost fire/irrigation flows.
Atlantic Richfield Property System:	
Water Mains	2,300 ft. of 10-inch and 13,300 ft. of 8-inch PVC piping.
Fire System Hydrants	28 hydrants, spaced every 500 ft. along system.
System Valves	24 valves.
Air Relief Valves	2 air relief valves.
Irrigation Area	Assumes maximum of 45 acres within Atlantic Richfield property.
Stream Crossings	2 crossings across Mill Creek and tributary channels.
Road/Rail Crossings	10 crossings across Mill Creek Road and access roads.
Utility Crossings	6 crossings across utility pipelines.
Total System Demand	86,400 gpd Maximum Daily; 631,000 gpd Summer Peak.

Notes:

(1) Irrigation Area assumes an estimated acreage per parcel that will be landscaped and require irrigation during summer months (i.e., May through September).

(2) Pump Station is estimated based on required flows/pressures fire/irrigation flows for full Mill Creek TIFID development; the size and number of stations will need to be verified during detailed design.

5.1.2 Operational Requirements

The proposed water system would be constructed as an extension of the existing City of Anaconda Water System and would therefore be operated and maintained by the Anaconda Water Company. The proposed system will require additional system monitoring and inspection, consistent with the existing system. The proposed system, once constructed, will need to be tested (chlorine and coliform testing) before commissioned. It is not anticipated that additional staff will be required to operate and maintain the new system.

5.1.3 Impact on Existing Facilities

The Mill Creek TIFID proposed water system will have minimal impact on the existing City of Anaconda water system. The additional demands of the Mill Creek TIFID development were modeled to verify that system pressure will be maintained at no less than 20 psi per connection and provide adequate fire supply per ADLC and International Fire Code regulations.

5.1.4 Design Criteria

The proposed Mill Creek TIFID water system evaluation was based on design criteria presented in MDEQ Circular DEQ 1 and other previous PER's developed for the Mill Creek and nearby properties. The following provides a summary of the proposed water system design criteria and assumptions, including water supply, treatment, storage, pumping stations, distribution/layout, hydraulic calculations and water meters.

5.1.4.1. Water Supply

The Mill Creek TIFID proposed water system was designed to meet the following main design criteria.

- Potable water system should maintain a minimum normal working pressure of 35 psi.
- Potable water system should maintain a minimum pressure under all flow conditions of 20 psi.
- Potable water system maximum working pressure should be approximately 60 to 80 psi.
- Fire system flow should maintain a flowrate of 1,500 gpm for 2 hours at each parcel location. This is a minimum demand assuming that each industry building has fire sprinkler systems installed. The final fire system flow demand will be based on actual building size and location.
- Fire system hydrants spaced at every 500 ft. along the distribution system.

5.1.4.2. Treatment

The Mill Creek TIFID water system water will be treated within the existing Anaconda Water Department chlorine treatment system. No additional treatment is anticipated to supply the Mill Creek TIFID water system.

5.1.4.3. Storage

The following provides a summary of the main water storage/volume assumptions used for the proposed water system design.

- The Mill Creek TIFID includes 72 lots, of which are estimated 25 employees per lot with an average daily use of 16 gpd per employee.
- Assumes maximum daily flow peaking factor of 3.0.

Based on the assumptions above, the proposed water system demand was calculated as follows.

- Average Daily Demand: 28,800 gpd.

- Maximum Daily Demand: 86,400 gpd.

Assuming that a maximum of 20% of the development parcels will be landscaped and require irrigation, during the summer months (i.e. May through September), increased demand was calculated based on average rainfall per month and estimated water requirements per month for a maximum increase of approximately 544,600 gpd. Therefore, during summer irrigation, maximum demand may increase to approximately 631,000 gpd, depending on the extent of landscaped property.

As discussed in Section 2.3.1.1, based on the design well capacity and historical flow records, the ADLC Water System reserve capacity can be calculated to be:

- Annual Average Daily Reserve = 4.56 MGD.
- Average Winter Reserve (October through April) = 4.98 MGD.
- Average Summer Reserve (May through September) = 3.95 MGD.
- Maximum Peak Daily Reserve = 2.16 MGD.

Therefore, based on the calculated capacity values above, it appears that the existing City of Anaconda reserve capacity (most conservative: 2.16 MGD) can meet the Mill Creek TIFID maximum summer seasonal demand of 631,000 gpd and maximum daily demand of 86,400 gpd.

5.1.4.4. Pumping Stations

The proposed water system, connected to the City of Anaconda water system, can provide potable water distribution on both ADLC and Atlantic Richfield properties within the Mill Creek TIFID without the need of pumping stations. However, in order to provide full fire and irrigation flows to all parcels throughout both properties, at least one pump station will be required to boost flows/pressures. The pumps will be installed in a pump station facility that will meet MDEQ Circular DEQ 2 requirements.

5.1.4.5. Water Meters

Anaconda requires a meter be installed on all new water system construction. A minimum of 72 meters will be installed upon full Mill Creek TIFID development build-out.

5.1.5 Environmental Impacts and Mitigation

There should be no significant long-term environmental impacts as a result of this alternative. Contaminated soils will be encountered during construction. The amount and location of the contaminated soils will be determined more accurately during detailed design. During

alternative construction, an action plan will be developed in conjunction with ADLC and Atlantic Richfield to determine proper mitigation methods.

5.1.6 Public Health and Safety

There should be no significant impacts to public health and safety as a result of this alternative.

5.1.7 Cost Summary

Estimated water system construction, operation and maintenance and present worth analysis costs are summarized on Table 10. A detailed summary of cost estimate methods, assumptions and itemized results are provided in Appendix G.

Table 10 – Water System Preferred Alternative Cost Summary

Item	ADLC Property	Atlantic Richfield Property	Subtotals
Water System Direct Costs (1)	$2,816,361	$1,769,368	$4,585,729
Indirect Costs (2)	$985,726	$619,279	$1,524,505
Direct and Indirect Subtotal	***$3,802,087***	***$2,388,647***	***$6,190,734***
Contingency (15% Direct and Indirect)	$570,313	$358,297	$928,610
Construction Cost Subtotal	***$4,372,400***	***$2,746,944***	***$7,119,344***
Present Value O&M (i=6%, n=20 years)	***$37,277***	***$54,482***	***$91,759***
Total Estimated Costs	**$4,409,678**	**$2,801,426**	**$7,211,104**

Notes:
(1) Water System Direct Costs include construction items, and are itemized in Appendix G.
(2) Water System Indirect Costs include engineering, permitting, mobilization/demobilization, quality assurance/control, surveying, construction stormwater management, management/administration, traffic control and taxes and bonds and are applied as direct percentages of direct costs, as shown in Appendix G.

5.2 Wastewater System

Alternative 1: Connect to City of Anaconda Wastewater System was the alternative chosen in Section 4.0 and is discussed in detail below.

5.2.1 Site Location and Characteristics

The proposed wastewater collection system location and layout is provided on Figure 17. The proposed wastewater collection system was designed to provide a gravity flow sewer system for both ADLC and Atlantic Richfield properties within the Mill Creek TIFID. The wastewater collection system was created as two separate systems, to first collection wastewater from ADLC properties, and then Atlantic Richfield properties (note: the Atlantic Richfield wastewater system is independent on the ADLC wastewater system construction and operation). A detailed

summary of wastewater system modeling, including methods, assumptions and results are provided in Appendix I.

The following provides a summary of the proposed wastewater system characteristics:

Table 11 – Proposed Wastewater System Characteristics

System Characteristic	Information/Assumptions
ADLC Property System:	
Gravity Sewer Lines	12,100 ft. of 8-inch PVC.
Manholes	40 manholes spaced every 400 ft. along system.
Stream Crossings	3 crossings across Mill Creek and tributary channels.
Road/Rail Crossings	7 crossings across Mill Creek Road/access roads/rail.
Utility Crossings	5 crossings across utility pipelines.
Atlantic Richfield Property System:	
Gravity Sewer Lines	14,900 ft. of 8-inch PVC.
Manholes	47 manholes spaced every 400 ft. along system.
Stream Crossings	2 crossings across Mill Creek and tributary channels.
Road/Rail Crossings	14 crossings across Mill Creek Road/access roads/rail.
Utility Crossings	6 crossings across utility pipelines.
Force Main/Lift Station: (1)	
Force Main	6,025 ft. of 3-inch PVC.
Minimum Force Main Velocity	2 fps.
Peak Hourly Flow to Lift Station	36.4 gpm for 41 lots at 1,280 gpm each (after 3.2 peaking factor is applied)
Average Daily Flow to Lift Station	11.4 gpm for 41 lots at 400 gpm each.
Lift Station Pumps (2)	2 x 7.5 hp, 3,450 RPM, 3 inch NPT, 44 gpm Submersible Grinder Pumps with rail systems.
Total System Flows	92,200 gpd.

Notes:

(1) The lift station will be construction on Atlantic Richfield property to convey wastewater via force main through Atlantic Richfield and ADLC properties to the MCIC connection, See Figure 17.

(2) Only one pump is required to transfer wastewater flow to the MCIC connection; however two pumps are specified as required for system redundancy.

5.2.2 Operational Requirements

The proposed wastewater collection system and lift station would be constructed as an extension of the existing City of Anaconda Wastewater System and would therefore be operated and maintained by the Anaconda Wastewater Department. The proposed system will require additional system monitoring and inspection, consistent with the existing system. The proposed lift station will require electric service and routine inspection, cleaning and maintenance.

5.2.3 Impact on Existing Facilities

The Mill Creek TIFID proposed wastewater collection system and lift station will have minimal impact on the existing City of Anaconda wastewater collection and treatment system. The maximum daily flow from the Mill Creek TIFID is estimated to be approximately 92,200 gpd (including application of 3.2 peaking factor). As noted in Section 2.3.2.1, the estimated reserve capacity of the existing wastewater treatment system is between 1.0 and 2.0 MGD. Therefore, the proposed wastewater generation from the Mill Creek TIFID should minimally impact existing collection piping and treatment system.

5.2.4 Design Criteria

The proposed Mill Creek TIFID wastewater system evaluation was based on design criteria presented in MDEQ Circular DEQ 2 and other previous PER's developed for the Mill Creek and nearby properties. The following provides a summary of the proposed wastewater system design criteria and assumptions, including treatment, reserve capacity and pumping stations.

5.2.4.1. Treatment

Wastewater generated from the Mill Creek TIFID will be conveyed to the existing City of Anaconda wastewater collection and treatment system that consists of a gravity flow collection system, pre-treatment system for removal of grit and debris, an aerated lagoon treatment system, HIP complex (two holding ponds and five infiltration/percolation ponds), and land application/disposal areas. **Note:** this assumes all wastewater generated from Mill Creek TIFID development and industries will meet treatment system requirements and do not require specialized pre-treatment prior to discharge to the proposed collection system.

5.2.4.2. Reserve Capacity

The following provides a summary of the main wastewater generation assumptions used for the proposed wastewater system design.

- The Mill Creek TIFID includes 72 lots, of which are estimated 25 employees per lot with an average daily use of 16 gpd per employee.
- Assumes 100% of water demand will leave the property as wastewater.
- Assumes maximum daily flow peaking factor of 3.2.

Based on the assumptions above, the proposed water system demand was calculated as follows.

- Average Daily Flow: 28,800 gpd.
- Maximum Daily Flow: 92,200 gpd.

As discussed in Section 2.3.2.1, Anaconda's existing wastewater flows are metered with a recorder at the inlet to the aerated lagoon treatment facility. Annual and seasonal average and maximum flows from 2012/2013 data are as follows.

- Annual Average Daily Flow = 0.85 MGD.
- Average Winter Flow (October through April, 2012) = 0.68 MGD.
- Average Summer Flow (May through September, 2012 and 2013) = 0.98 MGD.
- Maximum Daily Flow = 1.36 MGD.

Typically, at least two years of previous flow records are recommended to determine design parameters for wastewater system expansion (MDEQ, 2012); however, complete and reliable records are limited for the Anaconda system. Previous evaluations by DOWL/HKM (DOWL/HKM, 2011 and DOLW/HKM, 2012) considered the latest complete set of annual flow records from 2002 and projected estimated design maximum daily flow for winter and summer seasons, based on 2000 Census population estimates, projections and estimates of infiltration and inflow. The evaluations provided the following estimates.

- Design Maximum Daily Flow (Winter) = 1.69 MGD.
- Design Maximum Daily Flow (Summer) = 1.94 MGD.

While DOWL/HKM estimates are significantly greater than rates observed in the 2012/2013 data (which is expected, given the extensive collection system upgrades completed since 2002), the estimates provide a conservative high range including estimates of infiltration and inflow. Therefore, based on the evaluations/data above, the estimated wastewater system reserve hydraulic capacity assuming 2033 population projections include the following.

- **Reserve Hydraulic Capacity** = 3.0 MGD (see Table 3) – 0.98 to 1.94 MGD (Design Maximum Daily Flow) = **2.05 to 1.06 MGD.**

Therefore, based on the calculated reserve capacity calculations above, it appears that the existing City of Anaconda reserve capacity (most conservative: 1.06 MGD) can meet the Mill Creek TIFID maximum daily flow of 92,200 gpd.

5.2.4.3. Pumping Stations

The proposed wastewater collection system is a gravity sewer system network on both ADLC and Atlantic Richfield properties within the Mill Creek TIFID. However, 41 parcels located within the northeastern section of the Mill Creek TIFID will require a lift station and force main to return collected wastewater to the MCIC connection shown on Figure 17. The proposed system will require two, 7.5 hp, 3,450 RPM, three-inch, 44 gpm submersible grinder pumps (the system requires one pump; however a second pump is added for redundancy) installed on a rail

system for easy removal/maintenance access. The pumps will be installed in a lift station facility that will meet MDEQ Circular DEQ 2 requirements.

5.2.5 Environmental Impacts and Mitigation

There should be no significant long-term environmental impacts as a result of this alternative. Contaminated soils will be encountered during construction. The amount and location of the contaminated soils will be determined more accurately during detailed design. During alternative construction, an action plan will be developed in conjunction with ADLC and Atlantic Richfield to determine proper mitigation methods.

5.2.6 Public Health and Safety

There should be no significant impacts to public health and safety as a result of this alternative.

5.2.7 Cost Summary

Estimated wastewater system construction, operation and maintenance and present worth analysis costs are summarized on Table 12. A detailed summary of cost estimate methods, assumptions and itemized results are provided in Appendix G.

Table 12 – Wastewater System Preferred Alternative Cost Summary

Item	ADLC Property	Atlantic Richfield Property	Subtotals
Wastewater System Direct Costs (1)	$1,784,640	$2,722,305	$4,556,945
Indirect Costs (2)	$624,624	$970,307	$1,594,931
Direct and Indirect Subtotal	***$2,409,264***	***$3,742,612***	***$6,151,876***
Contingency (15% Direct and Indirect)	$361,390	$561,392	$922,781
Construction Cost Subtotal	***$2,770,654***	***$4,304,004***	***$7,074,657***
Present Value O&M (i=6%, n=20 years)	***$51,615***	***$143,374***	***$194,989***
Total Estimated Costs	**$2,822,268**	**$4,447,378**	**$7,269,646**

Notes:

(1) Wastewater System Direct Costs include construction items, and are itemized in Appendix G.

(2) Wastewater System Indirect Costs include engineering, permitting, mobilization/demobilization, quality assurance/control, surveying, construction stormwater management, management/administration, traffic control and taxes and bonds and are applied as direct percentages of direct costs, as shown in Appendix G.

5.3 Stormwater System

Alternative 2: Construct an Onsite Stormwater Collection System was the alternative chosen in Section 4.0 and is discussed in detail below.

5.3.1 Site Location and Characteristics

The estimated existing stormwater drainage for the Mill Creek TIFID is provided on Figure 18. The proposed stormwater system for post-development conditions within the Mill Creek TIFID is provided on Figure 19. The proposed stormwater system was designed to convey and attenuate stormwater flows so that discharge is no greater than pre-development conditions. Runoff conditions for 2, 10 and 100 year, 24 hr. storm events were evaluated in accordance with MDEQ Circular DEQ 8. The proposed stormwater system will include armored road ditches, culverts, site grading and lined detention ponds in order to convey and attenuate post-development run-off into various discharge points along Mill Creek and associated tributary drainages. A detailed summary of water system modeling, including methods, assumptions and results are provided in Appendix J.

The following provides a summary of the proposed stormwater system characteristics:

Table 13 – Proposed Stormwater System Characteristics

System Characteristic	Information/Assumptions
Assumed Discharge Outfalls (1)	10 outfalls: 3 to Mill Creek; 7 to tributary drainages
New Graded Road Ditch Channels	Trapezoidal channels, 3:1 and 2:1 sideslopes, 2 ft. bottom width.
	33,000 ft. of channels; armored with 3 to 6 inch D_{50} riprap or equivalent protection.
Crossing Structures (Culverts)	17 road/stream/drainage crossing CMP culverts.
Water Retention/Attenuation (2)	40 acre-feet (100 year, 24 hr. storm volume)

Notes:

(1) The proposed stormwater drainage system is preliminary and highly dependent upon the actual and final layout of the Mill Creek TIFID development and size/type of industries.

(2) Water retention includes retention of the entire volume of the 100 year, 24 hr. storm event for all drainage basins combined; however, each basin may have single or multiple retention basins based on final design. Retention basins will be designed to discharge at the pre-development, 2 year, 24 hr. discharge rate per basin outfall. Detailed estimated retention requirements per basin are summarized in Appendix J.

5.3.2 Operational Requirements

The ADLC Road Department would be responsible for operation and maintenance of the Mill Creek TIFID stormwater drainage system. Operational requirements for the proposed system would consist of routine inspections, grading of channels to remove sediment and repair erosion, dewater/remove sediment from detention basins and inspect and repair detention basin liner systems.

5.3.3 Impact on Existing Facilities

The Mill Creek TIFID proposed stormwater system will have no impact on the existing City of Anaconda stormwater collection system. The nearest connection point from the Mill Creek

TIFID to the existing city stormwater collection system is approximately three miles northwest of the Mill Creek TIFID. Therefore, the proposed Mill Creek stormwater system will maintain existing drainage outfalls and pre-development discharge flows.

5.3.4 Design Criteria

The proposed Mill Creek TIFID stormwater system evaluation was based on design criteria presented in MDEQ Circular DEQ 8, previous PER's developed for the Mill Creek property and engineering standards for preliminary hydrologic/hydraulic analysis. The following provides a summary of the proposed stormwater system design criteria and assumptions, including hydrologic/hydraulic analysis and treatment.

5.3.4.1. Hydrologic/Hydraulic Analysis

Stormwater management within the Mill Creek TIFID was evaluated to compare existing and post-development conditions, in accordance with MDEQ Circular DEQ 8. The following provides a list of the general assumptions and methods used in this analysis.

- The actual development plan for Mill Creek TIFID is unknown; this stormwater analysis is based on estimated development of five acre parcels with assumed values for ground cover, access roadways, and water routing. Actual development conditions may significantly vary from this evaluation.

- Due to the unknown nature of Mill Creek TIFID development, only a cursory and relative evaluation was performed of existing and estimated post-development stormwater management. Assumptions were made regarding existing routing and hydraulic features based on general site topography and notes gathered during one site visit. Actual topographic surveys of existing drainages and structures are outside the scope of this PER and were not performed.

- This evaluation of stormwater management calculates only the relative difference between existing and post-development stormwater flows, and therefore may not exactly represent actual discharge flows.

- Detention basin design is based on attenuating the entire 100-year, 24 hr. storm event based on post-development conditions. This is considered conservative, as actual detention volumes may decrease based on more detailed flood routing and attenuation evaluations performed in detailed design. Detention basins would be designed to attenuate the 100-year, 24 hr. storm and eventually discharge at flows no greater than existing discharge for the 2-year, 24 hr. storm flowrate.

- Based on visual inspection during a site visit, it is assumed that all off-site stormwater run-on is diverted from the Mill Creek TIFID by existing berms, channels and ditches maintained on surrounding properties. This evaluation estimates on-site stormwater runoff only. Off-site stormwater run-on should be evaluated and verified during detailed engineering prior to property development.

- Precipitation for the 2yr, 10yr and 100yr-24 hr. storm were determined from National Oceanic and Atmospheric Association precipitation atlas data:

    - 2yr – 24 hr. Storm: 1.2 inches
    - 10yr – 24 hr. Storm: 1.8 inches
    - 100yr – 24 hr. Storm: 2.8 inches

- Drainage basins within the Mill Creek TIFID were divided based on available topography and visually inspected site features. **NOTE**: more recent topography may change drainage basin delineation and outfall locations.

- Basin information, including boundary delineations, assumed drainage routing and topographic information were entered and modeled within Aquaveo's Watershed Modeling System (WMS), version 9.1.

- Time of concentration and peak runoff (2yr, 10yr and 100yr-24 hr. storm events) for each basin was determined using National Resources Conservation Service TR-55 tabular methods.

5.3.4.2. Treatment

It is assumed that existing Mill Creek TIFID on-site stormwater flows are discharged as estimated on Figures 18 and 19 and do not require treatment prior to discharge. As discussed in Section 2.2.2.6, the 2012 Section 303(d) list of impaired waters for Montana lists Lower Mill Creek (Waterbody ID MT76G002_052) as Water Quality Category 5 (i.e., One or more uses are impaired and a TMDL is required). Impairment information for Lower Mill Creek includes metals contamination via contaminated sediments/mill tailings, noting aluminum, arsenic, cadmium, copper, iron, lead and zinc as probable causes, and impairment to agricultural, aquatic and drinking water use. The Mill Creek TIFID development may significantly help Mill Creek Water quality as parcels are reclaimed during development and the proposed stormwater system attenuates large storm events (e.g., the 100 year, 24 hr. storm).

5.3.5 Environmental Impacts and Mitigation

There should be no significant long-term environmental impacts as a result of this alternative. Contaminated soils will be encountered during construction. The amount and location of the

contaminated soils will be determined more accurately during detailed design. During alternative construction, an action plan will be developed in conjunction with ADLC and Atlantic Richfield to determine proper mitigation methods.

5.3.6 Public Health and Safety

There should be no significant impacts to public health and safety as a result of this alternative.

5.3.7 Cost Summary

Estimated stormwater system construction, operation and maintenance and present worth analysis costs are summarized on Table 14. A detailed summary of cost estimate methods, assumptions and itemized results are provided in Appendix G.

Table 14 – Stormwater System Preferred Alternative Cost Summary

Item	ADLC Property	Atlantic Richfield Property	Subtotals
Stormwater System Direct Costs (1)	$466,537	$452,359	$918,896
Indirect Costs (2)	$163,288	$158,326	$321,614
Direct and Indirect Subtotal	***$629,825***	***$610,684***	***$1,240,510***
Contingency (15% Direct and Indirect)	$94,474	$91,603	$186,076
Construction Cost Subtotal	***$724,299***	***$702,287***	***$1,426,586***
Present Value O&M (i=6%, n=20 years)	***$41,292***	***$61,938***	***$103,229***
Total Estimated Costs	**$765,591**	**$764,225**	**$1,529,815**

Notes:
(1) Stormwater System Direct Costs include construction items, and are itemized in Appendix G.
(2) Stormwater System Indirect Costs include engineering, permitting, mobilization/demobilization, quality assurance/control, surveying, construction stormwater management, management/administration, traffic control and taxes and bonds and are applied as direct percentages of direct costs, as shown in Appendix G.

5.4 General Access Improvements

This section discusses general access improvements and site preparation required for development of the Mill Creek TIFID parcels. Discussion includes site preparation work and access and railroad spur construction.

5.4.1 Site Location and Characteristics

The proposed access road and railroad spur locations Mill Creek TIFID are provided on Figure 15. A detailed summary of land development assumptions, including road and railroad right of ways are provided in Appendix F.

The following provides a summary of the proposed road/railroad spur characteristics:

Table 15 – Proposed General Access Improvements

System Characteristic	Information/Assumptions
Access Roads (Gravel Roads)	Approximately 1.94 miles (ADLC properties) and 2.96 miles (Atlantic Richfield properties).
Railroad Spurs (1)	Approximately 7,440 ft. (ADLC properties) and 5,240 ft. (Atlantic Richfield Properties).

Notes:

(1) Includes development of rail spurs into various property locations as shown. Spurs delineation and extent are conceptual, and do not include complete analysis of the rail system traffic, required number of switches, and complete evaluation of grade control.

5.4.2 Operational Requirements

The ADLC Road Department would be responsibility for operation and maintenance of the Mill Creek TIFID access roads. Railroad spur operation and maintenance would be supplied by the industry developer. Operational requirements for the proposed system would consist of routine inspections, grading of roads and erosion repair.

5.4.3 Impact on Existing Facilities

The Mill Creek TIFID proposed access roads and railroad spurs will have no impact on the existing City of Anaconda road system. The access roads will connect to Mill Creek Road in accordance with Montana Department of Transportation Standards.

5.4.4 Design Criteria

Access road right-of-ways were assumed to be 30 ft. from the road centerline based on industry standards. Railroad spur right of way, minimum curvature, turnouts, side track right of way widths and minimum grades were set based on various railroad industry guidelines and specifications. Design criteria and assumptions for all road and railroad spur construction are provided in Appendix F.

5.4.5 Environmental Impacts and Mitigation

There should be no significant long-term environmental impacts as a result of this work. Contaminated soils will be encountered during construction. The amount and location of the contaminated soils will be determined more accurately during detailed design. During alternative construction, an action plan will be developed in conjunction with ADLC and Atlantic Richfield to determine proper mitigation methods.

5.4.6 Public Health and Safety

There should be no significant impacts to public health and safety as a result of this work.

5.4.7 Cost Summary

Estimated site preparation and road/railroad spur construction, operation and maintenance and present worth analysis costs are summarized on Table 16. A detailed summary of cost estimate methods, assumptions and itemized results are provided in Appendix G.

Table 16 – Site Preparation/Access Roads/Railroad Spur System Preferred Alternative Cost Summary

Item	ADLC Property	Atlantic Richfield Property	Subtotals
Site Preparation/Roads/Rail Spur Direct Costs (1)	$2,238,562	$2,184,825	$4,423,387
Indirect Costs (2)	$783,497	$764,689	$1,548,186
Direct and Indirect Subtotal	***$3,022,059***	***$2,949,514***	***$5,971,573***
Contingency (15% Direct and Indirect)	$453,309	$442,427	$895,736
Construction Cost Subtotal	***$3,475,367***	***$3,391,941***	***$6,867,309***
Present Value O&M (i=6%, n=20 years)	***$83,157***	***$123,302***	***$206,459***
Total Estimated Costs	**$3,558,524**	**$3,515,243**	**$7,073,767**

Notes:

(1) Direct Costs include construction items, and are itemized in Appendix G.

(2) Indirect Costs include engineering, permitting, mobilization/demobilization, quality assurance/control, surveying, construction stormwater management, management/administration, traffic control and taxes and bonds and are applied as direct percentages of direct costs, as shown in Appendix G.

6.0 RECOMMENDATIONS AND IMPLEMENTATION

This section provides discussion and recommendation of financing options available through W_2ASACT, project implementation and public participation.

6.1 Financing Options

Primary funding for infrastructure improvements in the Mill Creek TIFID will be obtained through an established Tax Increment Financing Industrial District (TIFID). Additional funding can be obtained through various loans and grants. Table 17 shows a current list of applicable funding programs for loans and grants, with brief discussion of participation recommendations.

Table 17 – Available Grant and Loan Programs for Municipal Infrastructure Projects

Program	Description/Discussion	Recommendation and Basis
Renewable Resource Grant and Loan Program	This program provides low-interest loans and grants of up to $100,000 with no specific match requirement.	Yes
Community Development Block Grant (CDBG) Program	CDBG funds are available principally to benefit low- to moderate-income projects. In public facilities projects, this is accomplished by improving public facilities that serve communities or neighborhoods consisting of 51% or more low or moderate-income families or by providing services to low or moderate-income people.	Yes, Assuming TIFID development will meet the Grant Requirements.
Treasure State Endowment Program (TSEP)	TSEP funds are available for various public facilities projects. This program is similar to the CDBG program; except it has no low-income requirement. Maximum funding is $750,000 every other year. Funds are generally allocated to communities whose combined water and sewer rates exceed the State average. However, in the past TSEP applications have been approved and funded regardless of the combined water and sewer rates with respect to target rates.	Yes, Assuming TIFID development meets the requirements.
State Revolving Fund Program	This DEQ-administered program provides low-interest loans for utility system planning, design, and construction. Some grant funds are available. Interest rates are 3.75% with terms of 20 years.	No, Unless no other funding can be obtained.
Rural Development Loan and Grant Program	The maximum loan term is 40 years and the lowest interest rate is generally around 4.0%. The maximum grant amount is 75% of the project costs. Funds are generally allocated to incorporated towns and cities and water and/or sewer districts. Applicants with population of 10,000 or less are eligible, with a priority given to those with a population of less than 5,500. The census data obtained from the most recent decennial census is used to determine population and income.	No, Unless no other funding can be obtained.
Intermediate Term Capital Program (INTERCAP)	This program provides interim loans up to 10 years for water and wastewater system improvements with no limit. Interest rates are on a variable rate program.	No, Unless no other funding can be obtained.
State and Tribal Assistance Grants Federal Fiscal Appropriations (Administered by the US Environmental Protection Agency)	STAG funds are available to municipalities, tribal governments and county water and sewer districts. The funds typically require a 45% match of local funds which can be provided from other federal or state grant or loan programs.	Yes, Assuming TIFID development meets the requirements.
Section 595 of the Water Resources Act (US Corps of Engineers)	Section 595 is part of the Water Resources Development Act of 1999. The purpose of the program is to provide design and construction assistance to non-federal interests for water-related environmental infrastructure and resource protection and development projects in rural Montana. Local (non-federal) cost share	Yes, Assuming TIFID development meets the requirements.

Program	Description/Discussion	Recommendation and Basis
	requirements are 25% local to 75% federal.	
Economic Development Association	Authorized by the Public Works and Economic Development Act of 1965. Provides grants on a cost share basis to projects that create sustainable economic opportunity in the community.	Yes, Assuming TIFID development meets the requirements.

6.2 Implementation

CEC understands that construction of all proposed water, wastewater, stormwater and site access infrastructure improvements for the entire Mill Creek TIFID exceeds the current TIFID budget. However, ADLC can develop the Mill Creek TIFID in phases as funding and potential developers become available. ADLC could elect to focus first on development within ADLC properties, and then Atlantic Richfield properties.

A phased development example within the ADLC property is shown on Figure 20. This development example represents a total developed area of 73 acres which is approximately half of the total proposed ADLC developed area (i.e., 155 acres). In order to further decrease costs, water system pump station (to boost fire and irrigation flows) and railroad spur construction could be removed and assigned as a responsibility of the developer, as desired. Therefore, focusing development only on this example area, costs become more reasonable for development within existing TIFID budgets. Table 18 summarizes the total costs to provide all services (except railroad spurs) to this portion of the TIFID.

Table 18 – Mill Creek TIFID Selective Development Example

Item	Parcels 1-9 and 12-16 (1)
Site Preparation/Access Roads Direct Costs (2)	$292,187
Water System Direct Costs (2)	$766,177
Wastewater System Direct Costs (2)	$430,470
Stormwater System Direct Costs (2)	$184,531
Indirect Costs (3)	$585,678
Direct and Indirect Subtotal	***$2,259,043***
Contingency (15% Direct and Indirect)	$338,856
Construction Cost Subtotal	***$2,597,899***
Present Value O&M (i=6%, n=20 years)	***$106,670***
Total Estimated Costs	**$2,704,569**

Notes:

(1) Mill Creek TIFID Selective development parcels are shown on Figure 20.

(2) Direct Costs include construction items, and are itemized in Appendix G.

(3) Indirect Costs include engineering, permitting, mobilization/demobilization, quality assurance/control, surveying, construction stormwater management, management/administration, traffic control and taxes and bonds and are applied as direct percentages of direct costs, as shown in Appendix G.

CEC understands that currently, ADLC has not secured developers or tenants for development of properties within the Mill Creek TIFID. Therefore, given that the type and extent of future industrial development within the Mill Creek TIFID is currently unknown, ADLC may select to perform phased development within the Mill Creek TIFID, or reserve TIFID funds to target development/support of committed developers only. This latter option may provide the most efficient and accurate application of TIFID funds, once detailed industrial developer requirements and plans are known.

6.3 Public Participation

Meetings were held on August 7, 2013, September 12, 2013, August 14, 2013 October 17, 2013, and March 30, 2014 with the Mill Creek TIFID Board and ADLC representatives to discuss the Mill Creek TIFID PER development. No public comments were received at these meetings. The Final PER will be made available to the public for additional comment and discussion at a future ADLC Commission Meeting, currently pending.

7.0 REFERENCES

DOWL/HKM, 2009, *CCCS Facility Building Off-Site Improvements Lift Station & Force Main Design Report*.

DOWL/HKM, 2011, *Preliminary Engineering Report - Anaconda East Yards Development: Water, Wastewater, and Stormwater Systems*.

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MDEQ, 2010, *Upper Clark Fork River Tributaries Sediment, Metals, and Temperature TMDLs and Framework for Water Quality Restoration*, March 4, 2010

MDEQ, 2011, *Water Quality Assessment Method, WQPBWQM-001*, November 8, 2011.

MDEQ, 2012, *Circular DEQ 2 – Design Standards for Public Sewage Systems, Rev. 2.*

RPA, 2008, *Mill Creek Industrial Complex Water and Wastewater System – Preliminary Engineering Report*.

Thomas, Dean & Hoskins, Inc. (TD&H), 1983, *Construction Drawings for Anaconda-Deer Lodge Wastewater Treatment Facility*.

Thomas, Dean & Hoskins, Inc. (TD&H), 1985, *Operation and Maintenance Manual for Anaconda-Deer Lodge County Wastewater Treatment Plant and Outfall Sewer*.

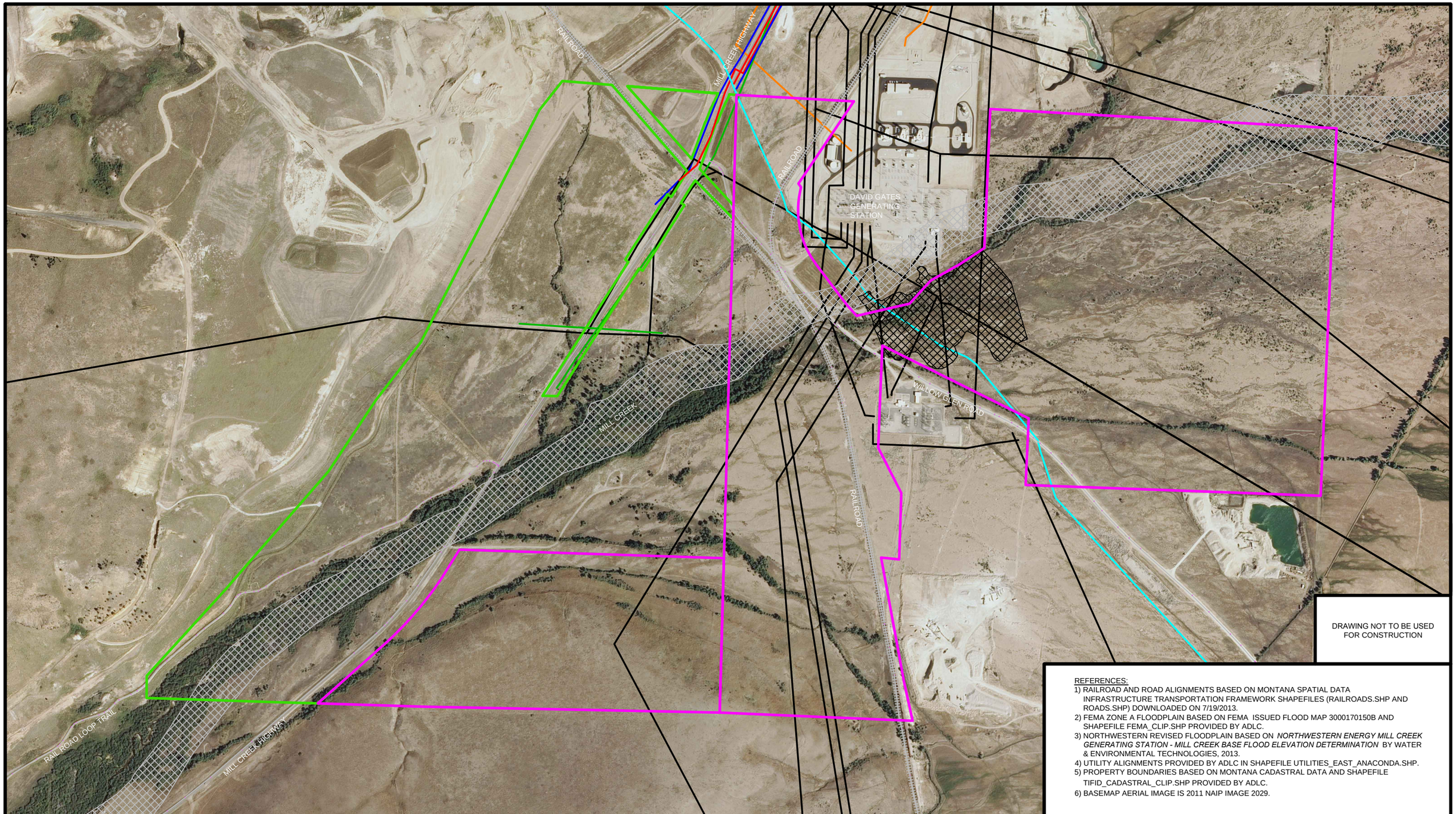
U.S. EPA Region VIII, 1999, Section V(A)(3), *Five-Year Review Report, Second Five-Year Review for Anaconda Company Smelter Site, Anaconda, Deer Lodge County, Montana*.

Water & Environmental Technologies, PC (WET), 2013, *Northwestern Energy Mill Creek Substation, Mill Creek Base Flood Evaluation Determination*.

Wickstrom Economic & Planning Consultants, Inc., 2008, ”*East Deer Lodge Reuse Plan*”.

Figures

Preliminary Engineering Report
Mill Creek TIFID



DRAWING NOT TO BE USED FOR CONSTRUCTION

REFERENCES:

1) RAILROAD AND ROAD ALIGNMENTS BASED ON MONTANA SPATIAL DATA INFRASTRUCTURE TRANSPORTATION FRAMEWORK SHAPEFILES (RAILROADS.SHP AND ROADS.SHP) DOWNLOADED ON 7/19/2013.
2) FEMA ZONE A FLOODPLAIN BASED ON FEMA ISSUED FLOOD MAP 3000170150B AND SHAPEFILE FEMA_CLIP.SHP PROVIDED BY ADLC.
3) NORTHWESTERN REVISED FLOODPLAIN BASED ON *NORTHWESTERN ENERGY MILL CREEK GENERATING STATION - MILL CREEK BASE FLOOD ELEVATION DETERMINATION* BY WATER & ENVIRONMENTAL TECHNOLOGIES, 2013.
4) UTILITY ALIGNMENTS PROVIDED BY ADLC IN SHAPEFILE UTILITIES_EAST_ANACONDA.SHP.
5) PROPERTY BOUNDARIES BASED ON MONTANA CADASTRAL DATA AND SHAPEFILE TIFID_CADASTRAL_CLIP.SHP PROVIDED BY ADLC.
6) BASEMAP AERIAL IMAGE IS 2011 NAIP IMAGE 2029.

LEGEND:

- EXISTING ROAD
- EXISTING RAILROAD
- FEMA ZONE A FLOODPLAIN
- NORTHWESTERN ENERGY REVISED FLOODPLAIN
- ARCO ENVIRONMENTAL REMEDIATION PROPERTY BOUNDARY
- DEER LODGE COUNTY PROPERTY BOUNDARY
- EXISTING OVERHEAD POWER LINE
- EXISTING SEWER LINE
- EXISTING WATER LINE
- SILVER LAKE PIPELINE
- EXISTING GAS LINE
- EXISTING PHONE LINE

SCALE IN FEET
0 200 400 800

N

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406 East Park Avenue Suite 2
Anaconda, MT 59711
(406) 563-2700

SITE MAP
MILL CREEK TIFID PER
PREPARED FOR:
ANACONDA-DEER LODGE COUNTY

FIGURE
1

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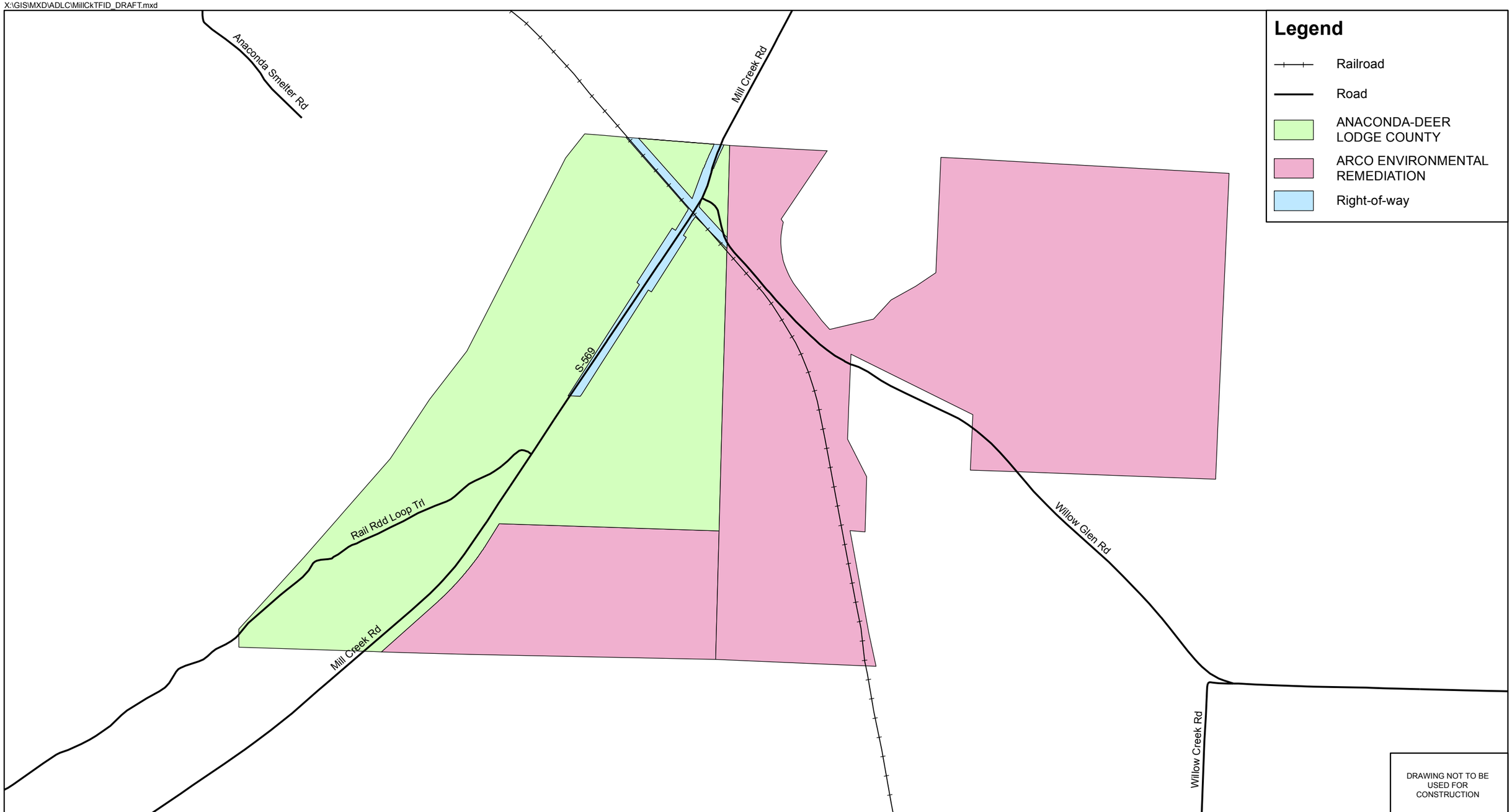

Reference Notes:
1. Railroad and road information based on Montana Spatial Data Infrastructure Transportation Framework.
2. Property boundaries based on shapefile Tifid_Cadastral_clip.shp provided by ADLC. Verfied by reveiw of data from Montana Cadastral (svc.mt.gov/msl/mtcadastral/) on 10/08/13.

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Figure 2

Property Map
Mill Creek TIFID PER
Prepared for:
Anaconda-Deer Lodge County

Date: 05/01/2014	BY: KWP	FOR: MCM

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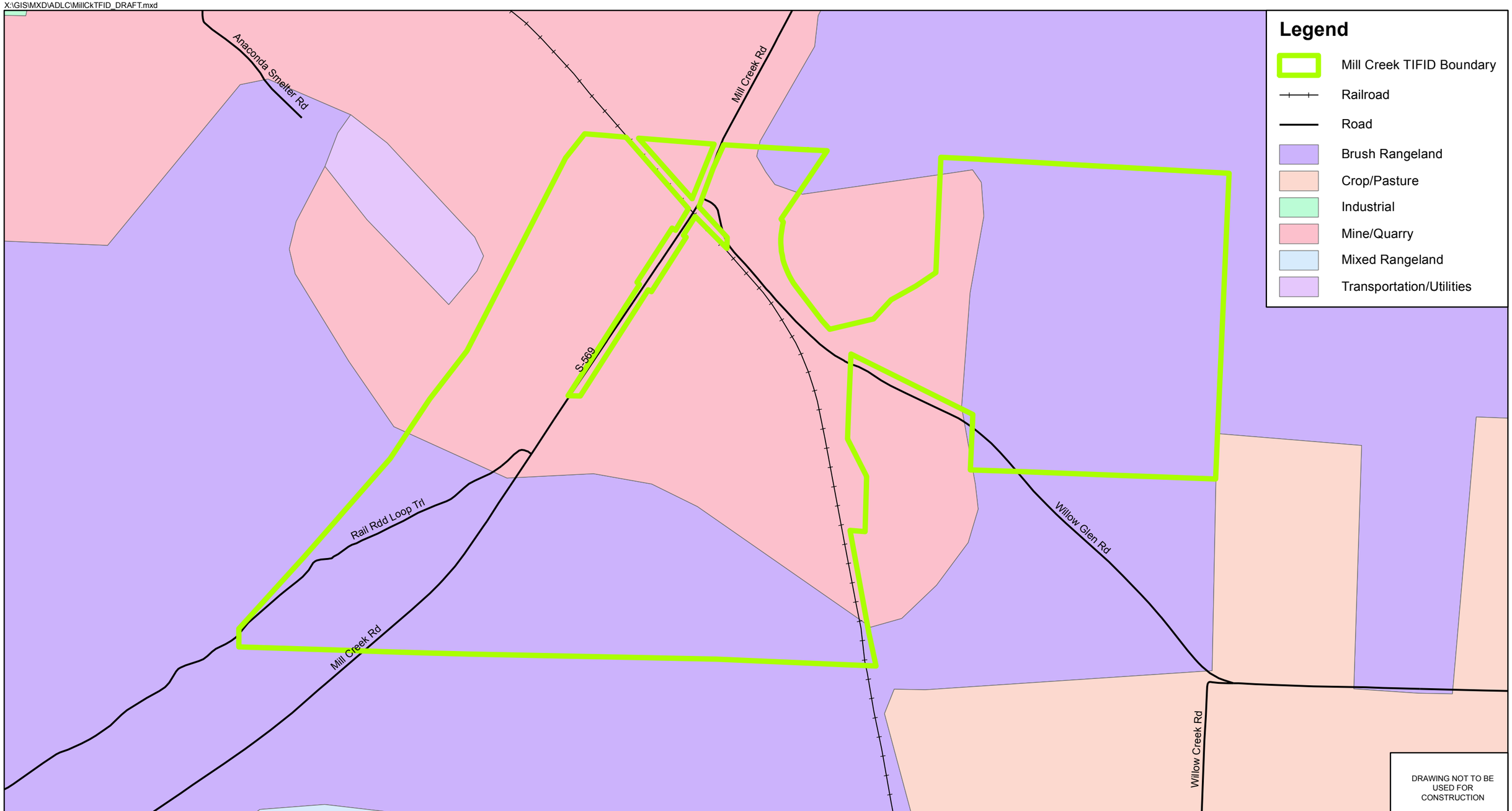

Reference Notes:

1. Land use information based on shapefiles from USGS Montana 1:250,000 Scale Land Use. Downlaoded from Montana State Library on 7/18/2013.
2. Railroad and road information based on Montana Spatial Data Infrastructure Transportation Framework. Downloaded on 7/19/2013.

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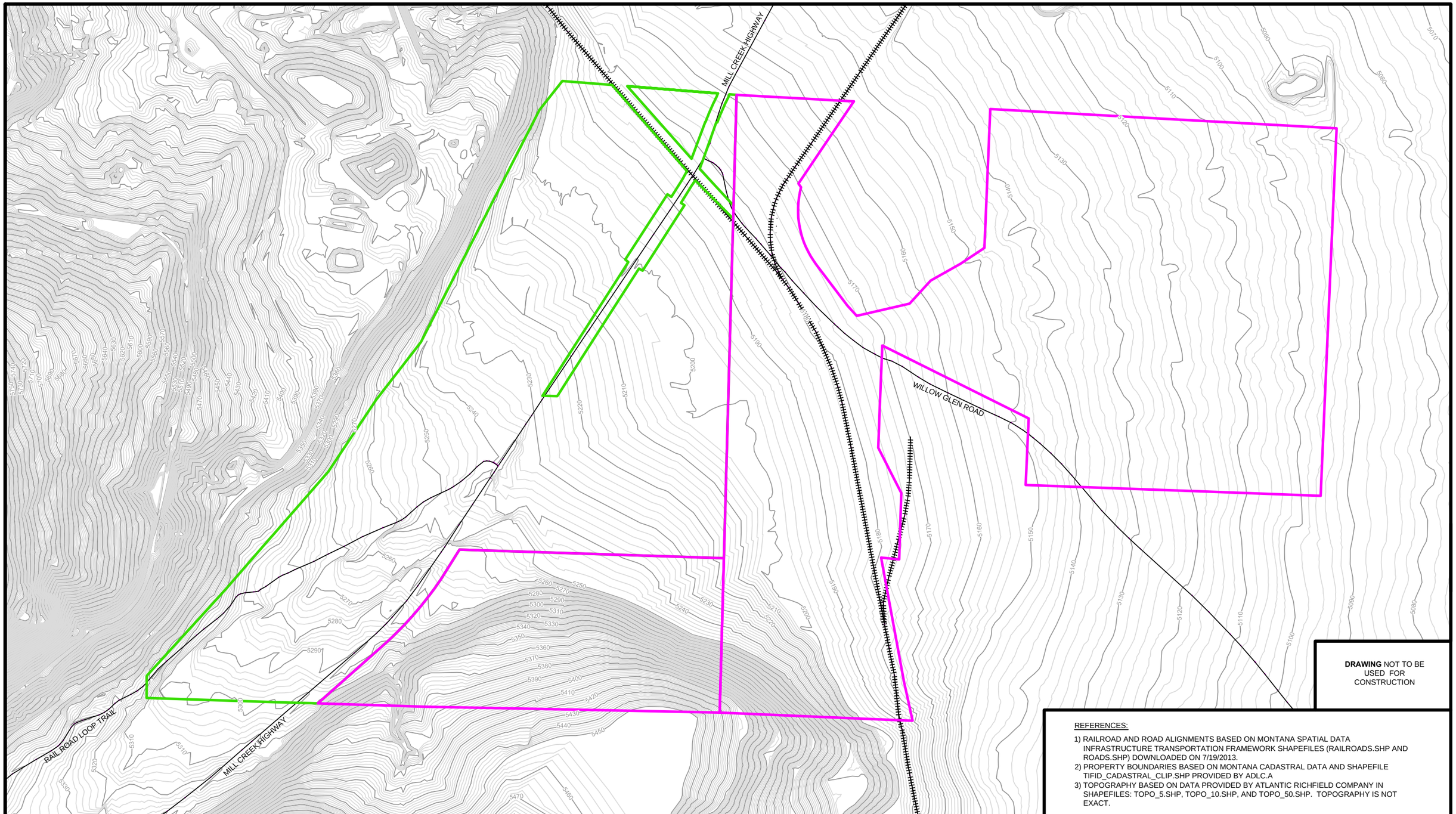
Figure 3

Land Use Map
Mill Creek TIFID PER
Prepared for:
Anaconda-Deer Lodge County

Date: 05/01/2014	BY: KWP	FOR: MCM



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REFERENCES:

1) RAILROAD AND ROAD ALIGNMENTS BASED ON MONTANA SPATIAL DATA INFRASTRUCTURE TRANSPORTATION FRAMEWORK SHAPEFILES (RAILROADS.SHP AND ROADS.SHP) DOWNLOADED ON 7/19/2013.
2) PROPERTY BOUNDARIES BASED ON MONTANA CADASTRAL DATA AND SHAPEFILE TIFID_CADASTRAL_CLIP.SHP PROVIDED BY ADLC.A
3) TOPOGRAPHY BASED ON DATA PROVIDED BY ATLANTIC RICHFIELD COMPANY IN SHAPEFILES: TOPO_5.SHP, TOPO_10.SHP, AND TOPO_50.SHP. TOPOGRAPHY IS NOT EXACT.

LEGEND:

- EXISTING ROAD
- EXISTING RAILROAD
- ARCO ENVIRONMENTAL REMEDIATION PROPERTY BOUNDARY
- DEER LODGE COUNTY PROPERTY BOUNDARY
- 5200 EXISTING TOPOGRAPHY (2-FT INTERVALS)

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SCALE IN FEET
0 200 400 800

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406 East Park Avenue Suite 2
Anaconda, MT 59711
(406) 563-2700

SITE TOPOGRAPHY
MILL CREEK TIFID PER
PREPARED FOR:
ANACONDA-DEER LODGE COUNTY

FIGURE
4

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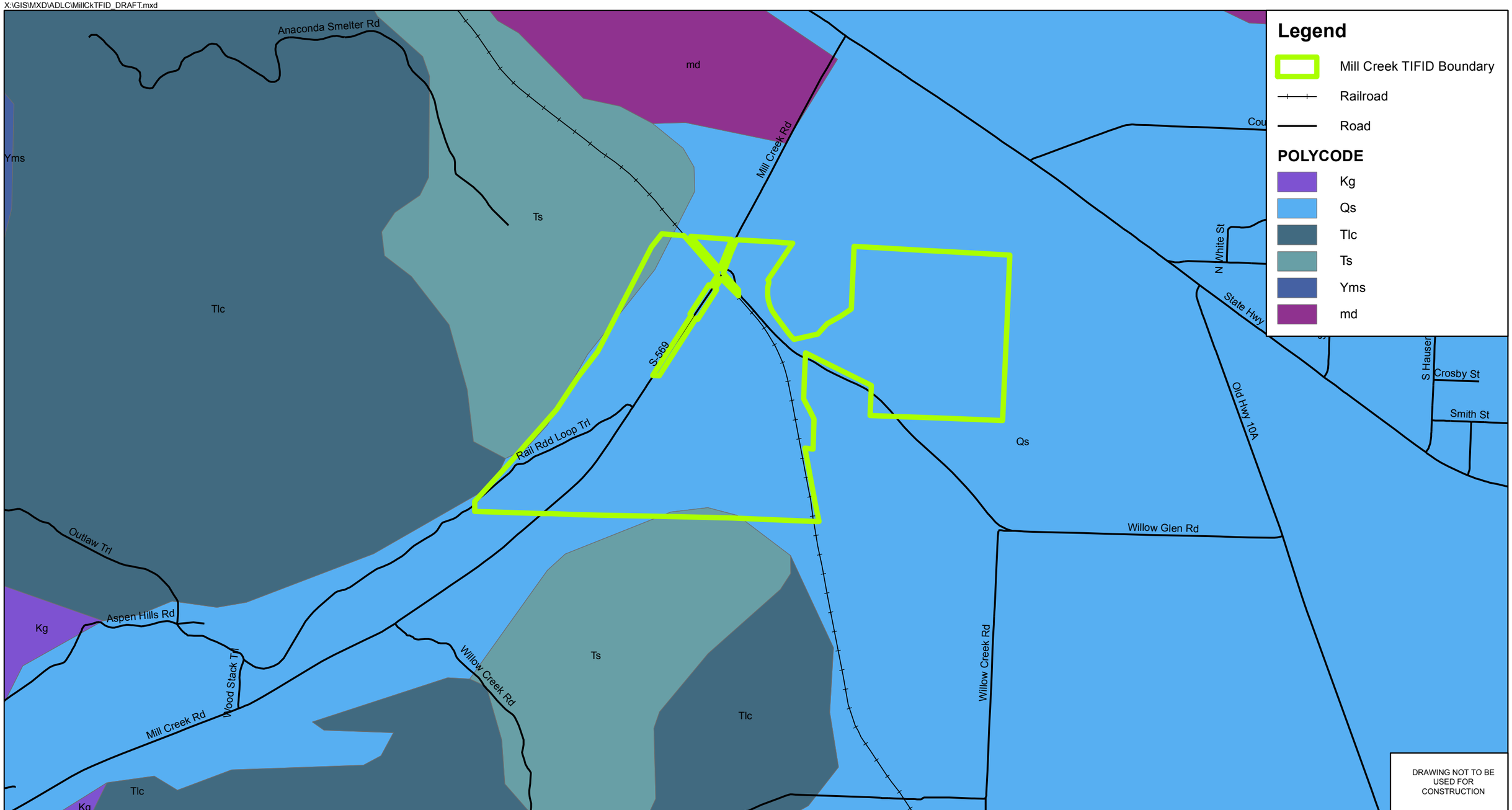

Reference Notes:

1. Geological information based on Geologic Map of the Butte 1-degree x 2-degree Quadrangle, MBMG Open File Report MBMG 363, by Reed S. Lewis (1998).
2. Railroad and road information based on Montana Spatial Data Infrastructure Transportation Framework. Downloaded on 7/19/2013.

0 0.25 0.5 1 Miles

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Figure 5

Site Geology
Mill Creek TIFID PER
Prepared for:
Anaconda-Deer Lodge County

Date: 05/01/2014	BY: KWP	FOR: MCM

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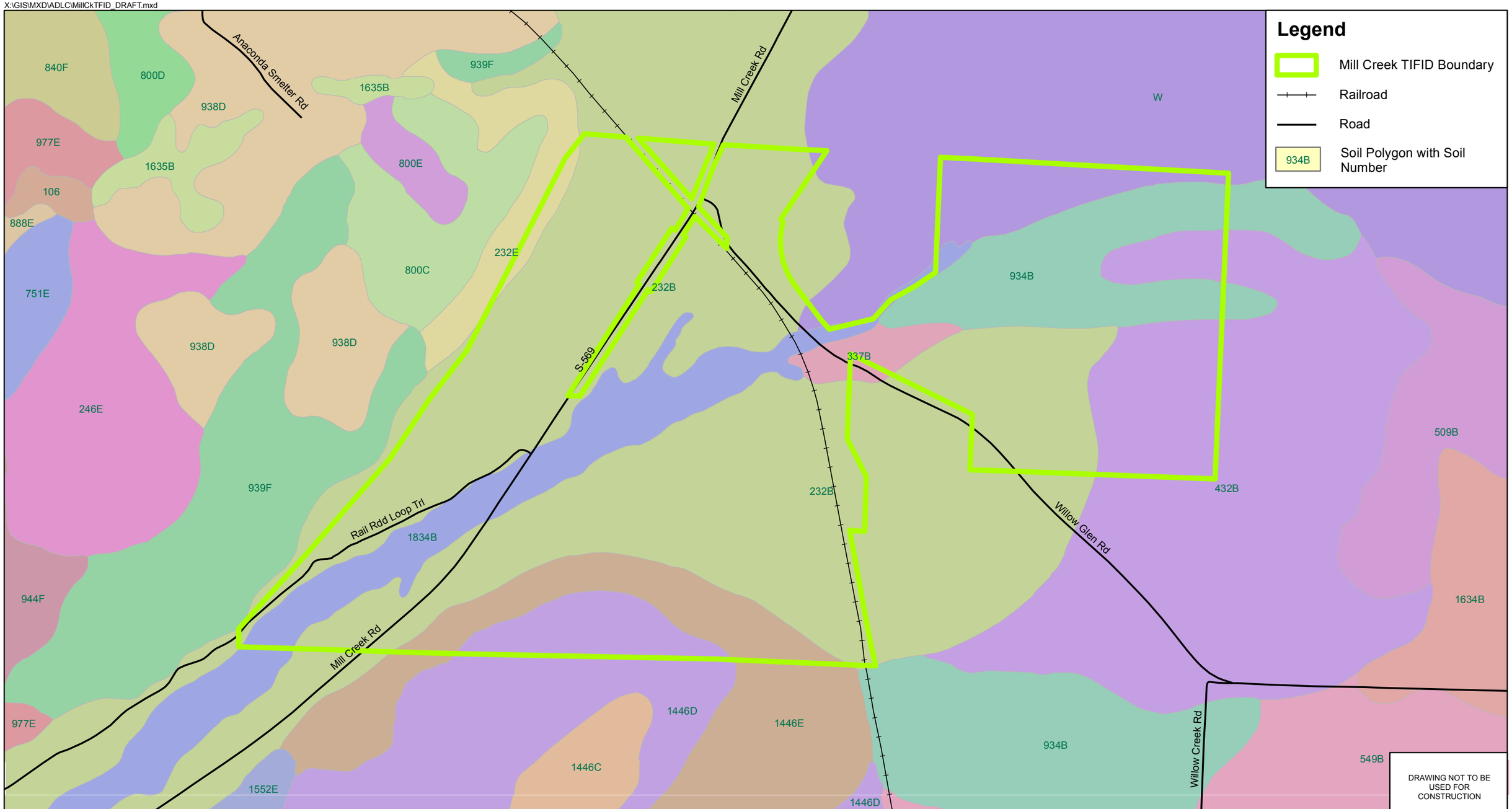

Reference Notes:
1. Soils information based on NRCS data obtained through Montana State Library Natural Resource Information System Digital Atlas of Montana. Downloaded on 7/18/2013.
2. Railroad and road information based on Montana Spatial Data Infrastructure Transportation Framework. Downloaded on 7/19/2013.

0 0.25 0.5 1 Miles

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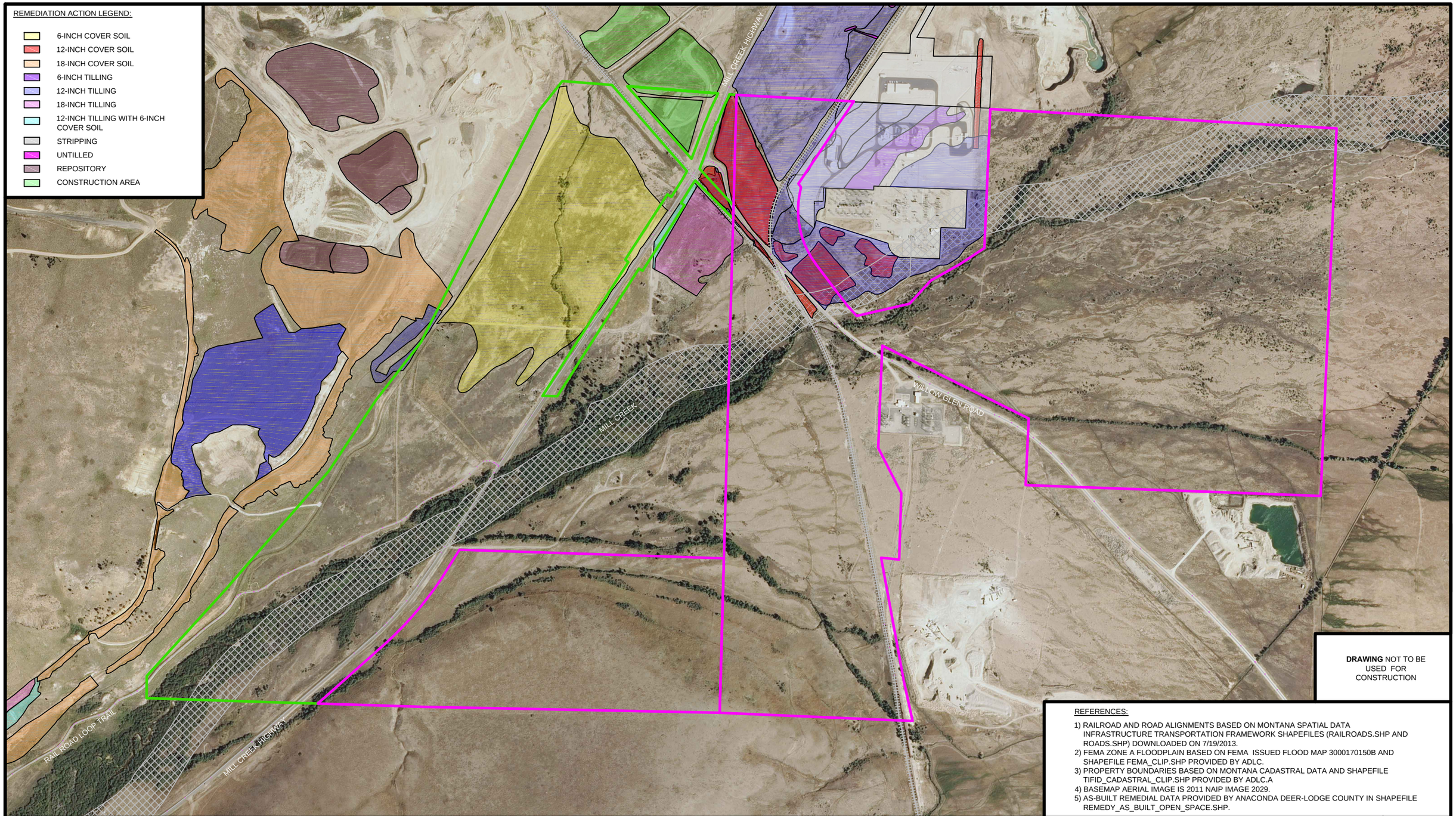
Figure 6

Soil Map
Mill Creek TIFID PER
Prepared for:
Anaconda-Deer Lodge County

Date: 05/01/2014	BY: KWP	FOR: MCM



DRAWING NOT TO BE USED FOR CONSTRUCTION

REFERENCES:

1) RAILROAD AND ROAD ALIGNMENTS BASED ON MONTANA SPATIAL DATA INFRASTRUCTURE TRANSPORTATION FRAMEWORK SHAPEFILES (RAILROADS.SHP AND ROADS.SHP) DOWNLOADED ON 7/19/2013.
2) FEMA ZONE A FLOODPLAIN BASED ON FEMA ISSUED FLOOD MAP 3000170150B AND SHAPEFILE FEMA_CLIP.SHP PROVIDED BY ADLC.
3) PROPERTY BOUNDARIES BASED ON MONTANA CADASTRAL DATA AND SHAPEFILE TIFID_CADASTRAL_CLIP.SHP PROVIDED BY ADLC.A
4) BASEMAP AERIAL IMAGE IS 2011 NAIP IMAGE 2029.
5) AS-BUILT REMEDIAL DATA PROVIDED BY ANACONDA DEER-LODGE COUNTY IN SHAPEFILE REMEDY_AS_BUILT_OPEN_SPACE.SHP.

LEGEND:

- EXISTING ROAD
- EXISTING RAILROAD
- ARCO ENVIRONMENTAL REMEDIATION PROPERTY BOUNDARY
- DEER LODGE COUNTY PROPERTY BOUNDARY
- FEMA ZONE A FLOODPLAIN

SCALE IN FEET
0 200 400 800

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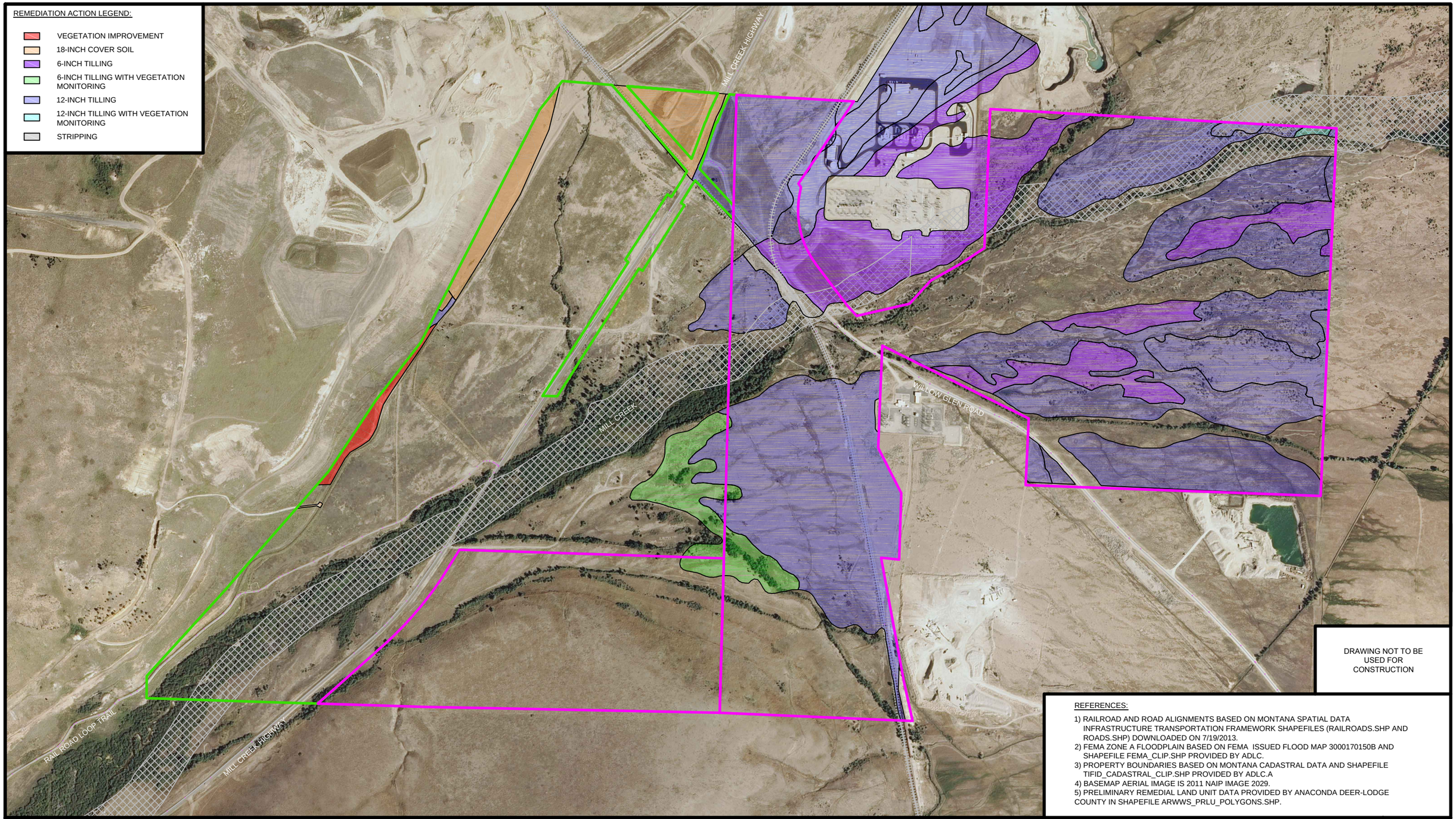
406 East Park Avenue Suite 2
Anaconda, MT 59711
(406) 563-2700

COMPLETED REMEDIATION
MILL CREEK TIFID PER
PREPARED FOR:
ANACONDA-DEER LODGE COUNTY

FIGURE
7



DRAWING NOT TO BE USED FOR CONSTRUCTION

REFERENCES:

1) RAILROAD AND ROAD ALIGNMENTS BASED ON MONTANA SPATIAL DATA INFRASTRUCTURE TRANSPORTATION FRAMEWORK SHAPEFILES (RAILROADS.SHP AND ROADS.SHP) DOWNLOADED ON 7/19/2013.
2) FEMA ZONE A FLOODPLAIN BASED ON FEMA ISSUED FLOOD MAP 3000170150B AND SHAPEFILE FEMA_CLIP.SHP PROVIDED BY ADLC.
3) PROPERTY BOUNDARIES BASED ON MONTANA CADASTRAL DATA AND SHAPEFILE TIFID_CADASTRAL_CLIP.SHP PROVIDED BY ADLC.A
4) BASEMAP AERIAL IMAGE IS 2011 NAIP IMAGE 2029.
5) PRELIMINARY REMEDIAL LAND UNIT DATA PROVIDED BY ANACONDA DEER-LODGE COUNTY IN SHAPEFILE ARWWS_PRLU_POLYGONS.SHP.

LEGEND:

- EXISTING ROAD
- EXISTING RAILROAD
- ARCO ENVIRONMENTAL REMEDIATION PROPERTY BOUNDARY
- DEER LODGE COUNTY PROPERTY BOUNDARY
- FEMA ZONE A FLOODPLAIN

SCALE IN FEET
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N

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406 East Park Avenue Suite 2
Anaconda, MT 59711
(406) 563-2700

PLANNED REMEDIATION
MILL CREEK TIFID PER
PREPARED FOR:
ANACONDA-DEER LODGE COUNTY

FIGURE
8

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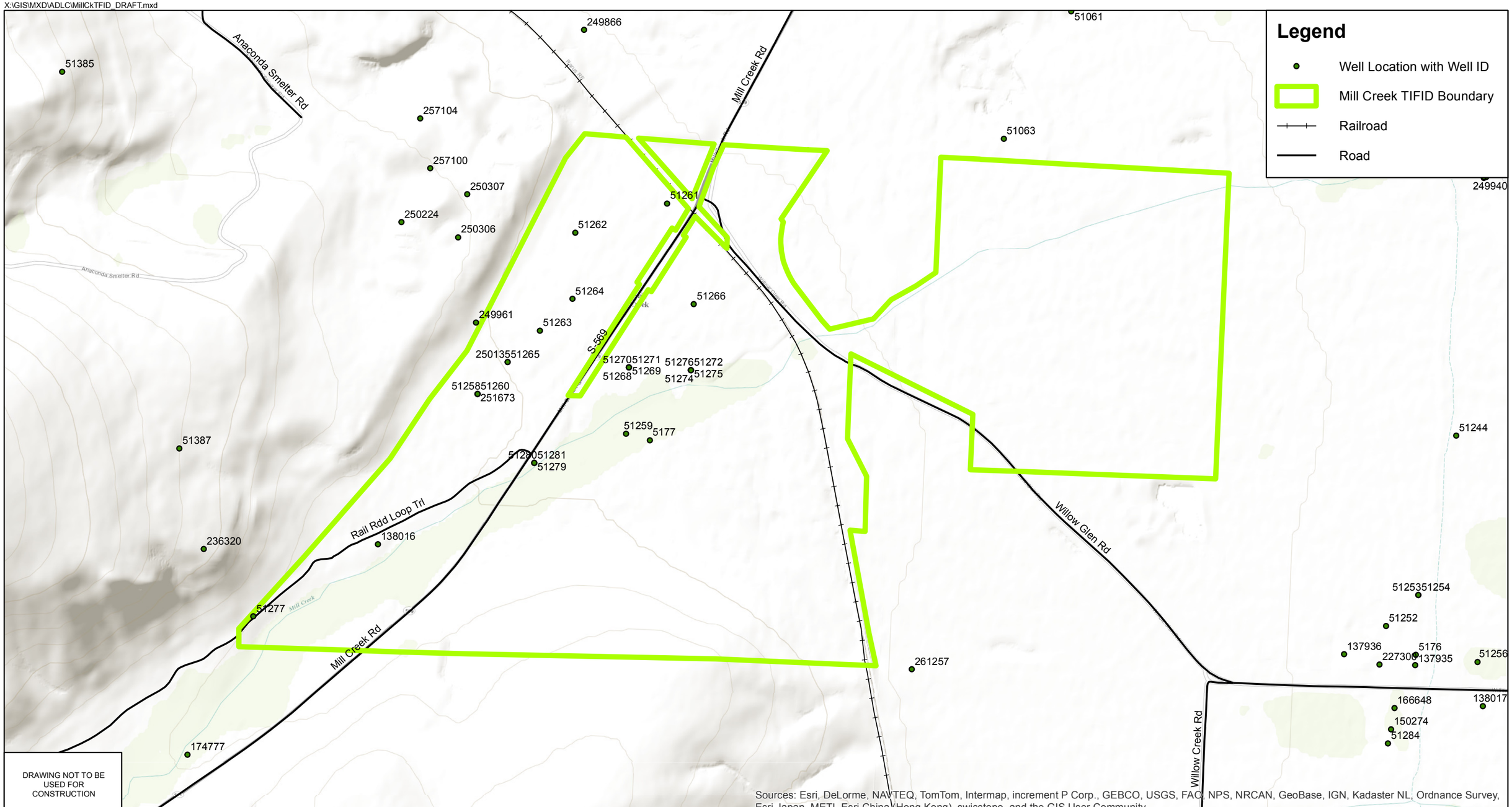

DRAWING NOT TO BE USED FOR CONSTRUCTION

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

Reference Notes:

1. Railroad and road information based on Montana Spatial Data Infrastructure Transportation Framework.
2. Basemap information based on ArcMap 10.1 Topo Basemap. Sources listed in bottom right of map.
3. Well location information provided by the Water Information System from Montana State Library in the shapfile gwicwells.shp downloaded on 10/08/13.

0 0.25 0.5 1 Miles

N

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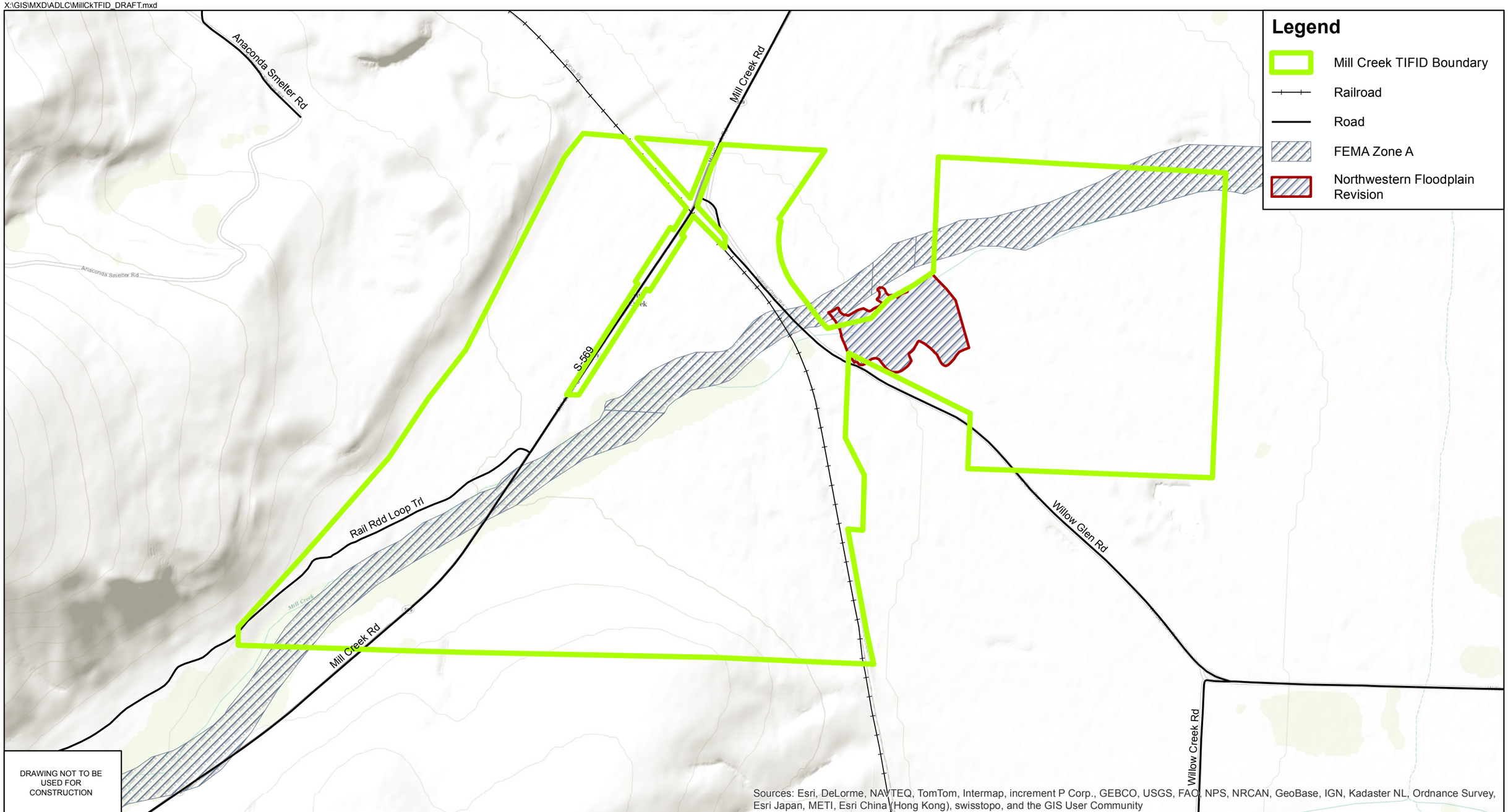
Figure 9

Ground Water Wells
Mill Creek TIFID PER
Prepared for:
Anaconda-Deer Lodge County

Date: 05/01/2014	BY: KWP	FOR: MCM

X:\GIS\MXD\ADLC\MillCkTFID_DRAFT.mxd



Reference Notes:

1. Railroad aand road information based on Montana Spatial Data Infrastructure Transportation Framework.
2. Basemap information based on ArcMap 10.1 Topo Basemap. Sources listed in bottom right of map.
3. FEMA floodplain information provided by FEMA and ADLC,
4. Northwestern revised floodplain based on information from 'Northwestern Energy Mill Creek Generating Substation - Mill Creek Base Flood Elevation Determination' by Water and Environmental Technologies, 2013.

0 0.25 0.5 1 Miles

N

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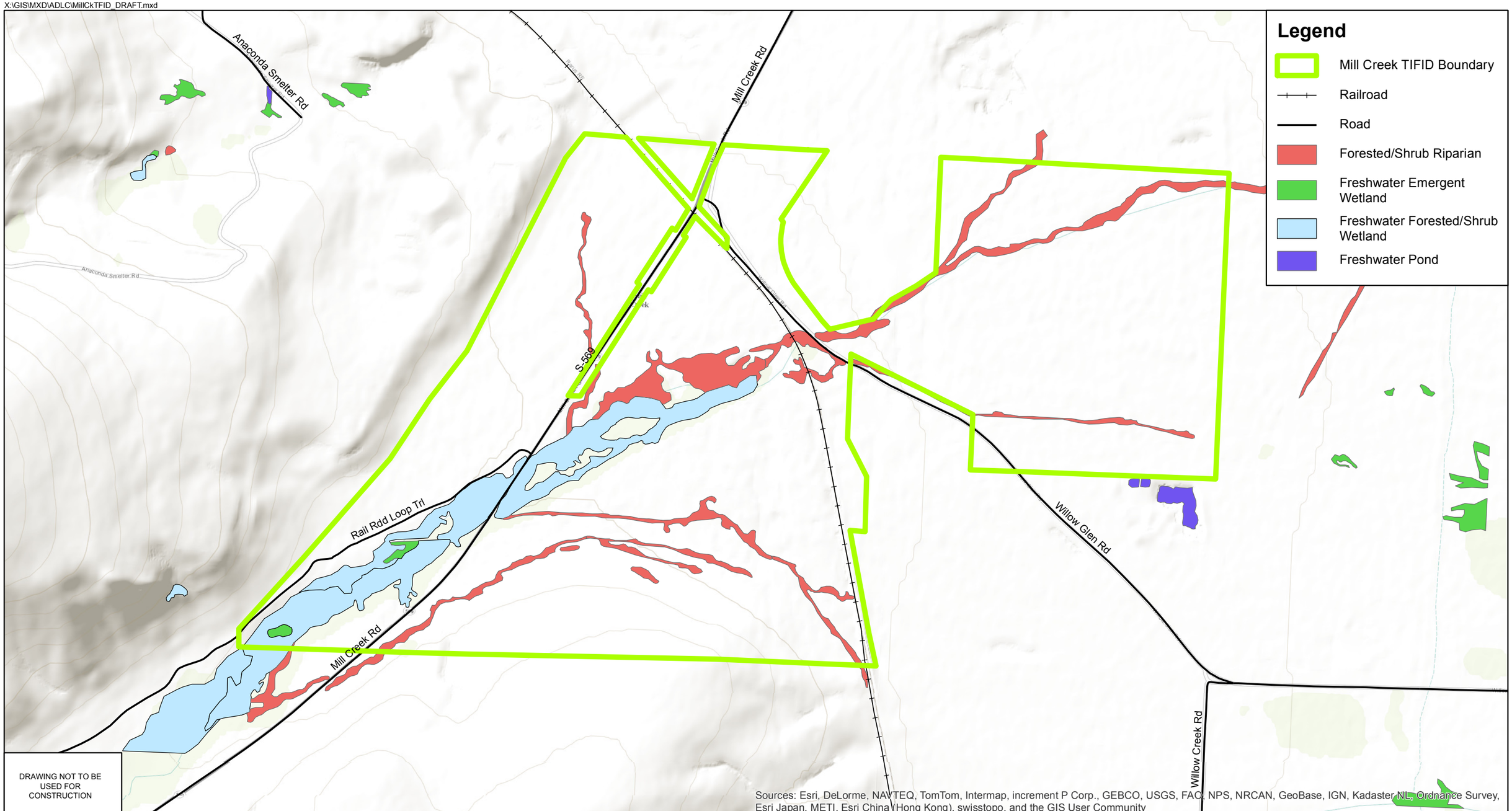
Figure 10

Floodplain Map
Mill Creek TIFID PER
Prepared for:
Anaconda-Deer Lodge County

Date: 05/01/2014	BY: KWP	FOR: MCM

X:\GIS\MXD\ADLC\MillCkTFID_DRAFT.mxd



Reference Notes:
1. Railroad aand road information based on Montana Spatial Data Infrastructure Transportation Framework.
2. Basemap information based on ArcMap 10.1 Topo Basemap. Sources listed in bottom right of map.
3. Wetlands and riparian data provided by U.S. Fish and Wildlife Service.

0 0.25 0.5 1 Miles

N

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Figure 11

Wetlands Map
Mill Creek TIFID PER
Prepared for:
Anaconda-Deer Lodge County

Date: 05/01/2014	BY: KWP	FOR: MCM

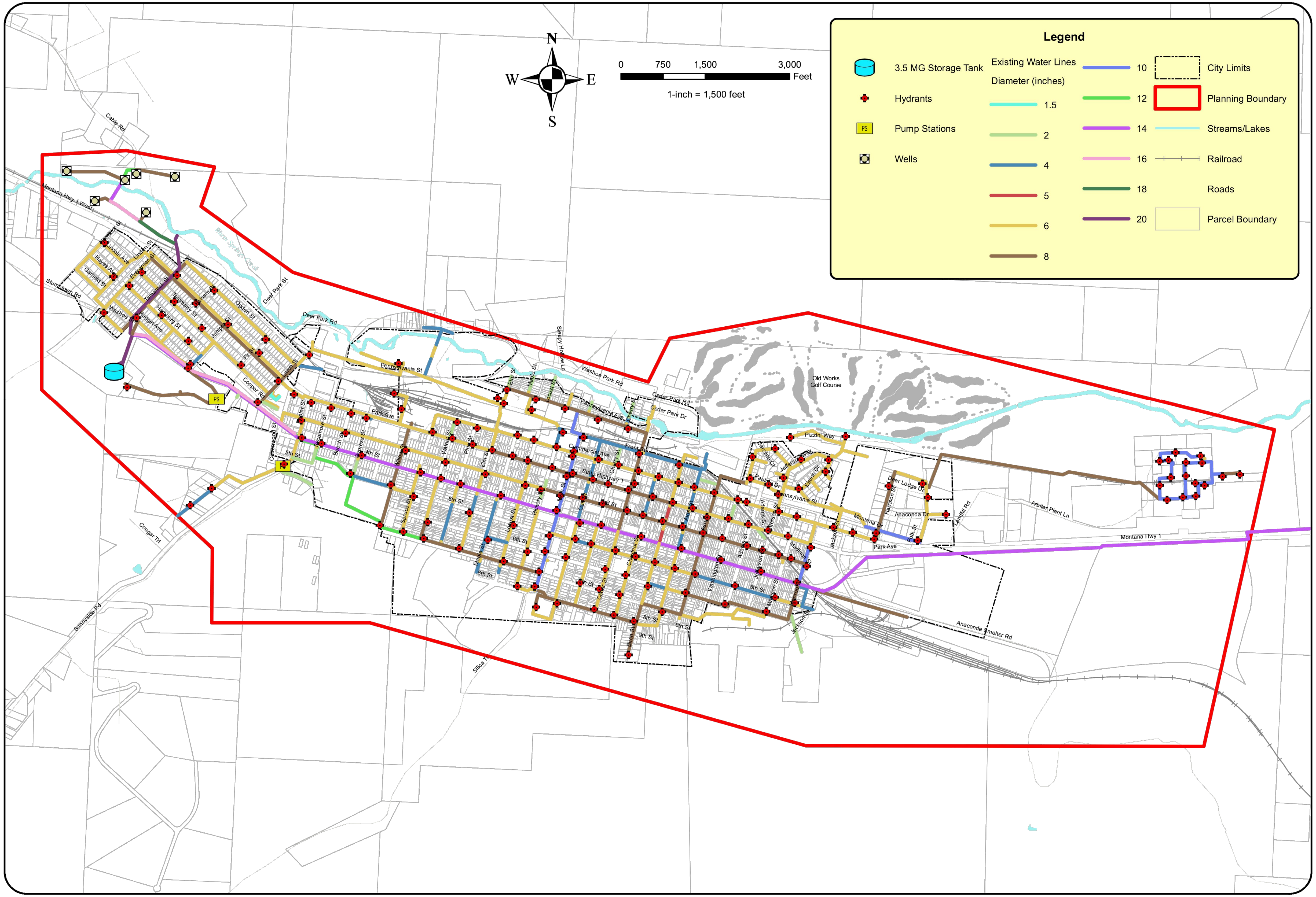

Figure 5

Anaconda-Deer Lodge County Water Modeling Study
Existing Water Distribution System - Pipe Diameter

DOWL HKM

DRAWING NOT TO BE USED FOR CONSTRUCTION

REFERENCES:

DRAWING FROM DOWL HKM'S "PRELIMINARY ENGINEERING REPORT - ANACONDA EAST YARDS DEVELOPMENT: WATER, WASTEWATER, AND STORMWATER SYSTEMS" DATED NOVEMBER 2011 FIGURE 2-9.

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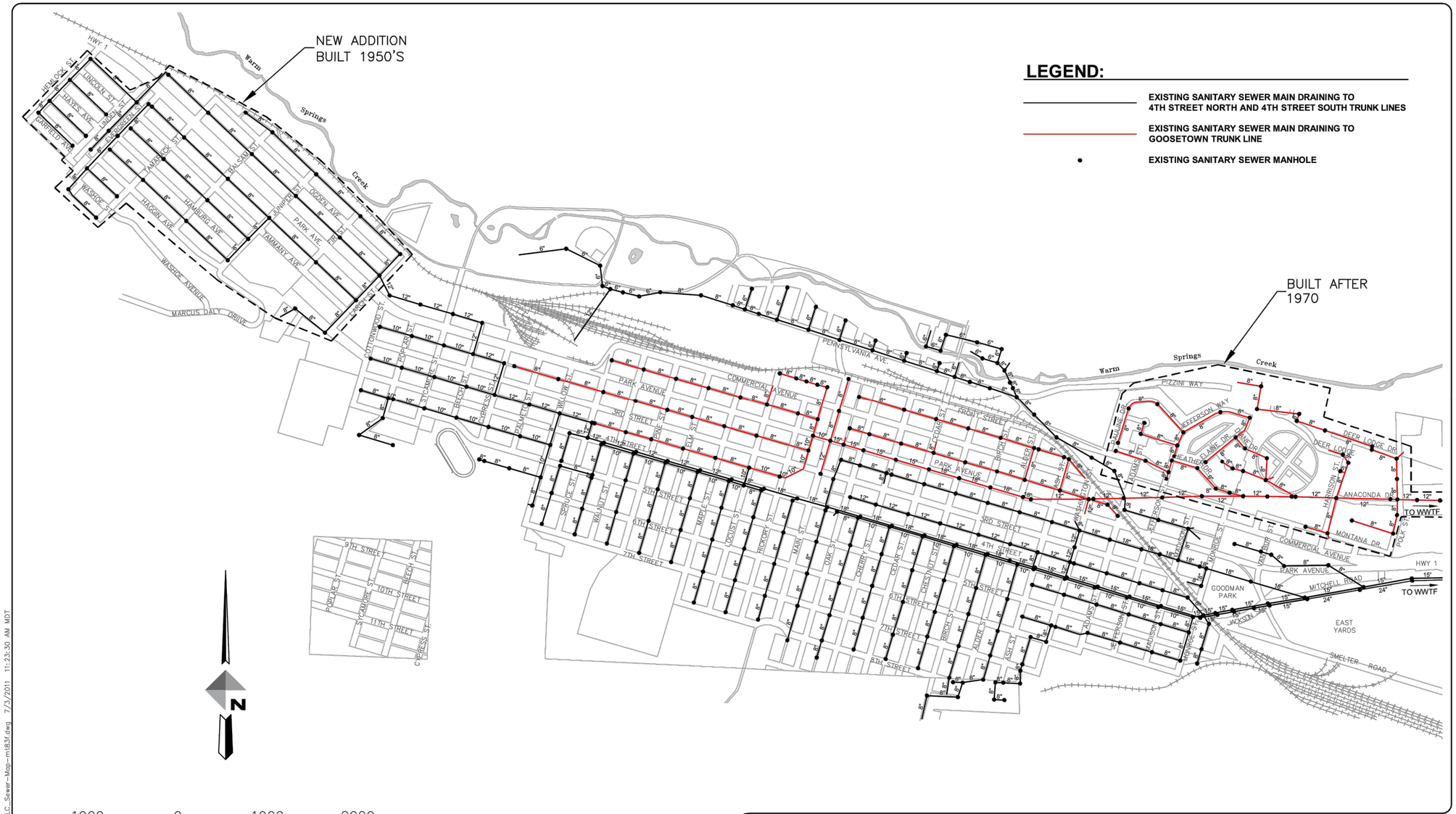
ANACONDA EXISTING WATER SYSTEM
MILL CREEK TIFID PER
PREPARED FOR:
ANACONDA-DEER LODGE COUNTY

FIGURE

12



REFERENCE NOTE:

1. Sewer mains and manhole locations are approximate based on Anaconda-Deer Lodge Sanitary Sewer Map.

EAST YARDS PER
EXISTING ANACONDA
WASTEWATER COLLECTION SYSTEM MAP

FIGURE 2-10

DOWL HKM

4428.10353.02	NOVEMBER 2011

DRAWING NOT TO BE USED FOR CONSTRUCTION

Q:\28\10353\dwg\ADLC_Sewer-Map-mt183f.dwg 7/3/2011 11:23:30 AM MDT

REFERENCES:

DRAWING FROM DOWL HKM'S "PRELIMINARY ENGINEERING REPORT - ANACONDA EAST YARDS DEVELOPMENT: WATER, WASTEWATER, AND STORMWATER SYSTEMS" DATED NOVEMBER 2011 FIGURE 2-10.

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ANACONDA EXISTING WASTEWATER SYSTEM
MILL CREEK TIFID PER
PREPARED FOR:
ANACONDA-DEER LODGE COUNTY

FIGURE
13

PLATE 1

FIGURE 1
ANACONDA STORM DRAIN
SITE MAP

DRAWING NOT TO BE USED FOR CONSTRUCTION

REFERENCES:

DRAWING FROM DOWL HKM'S "PRELIMINARY ENGINEERING REPORT - ANACONDA EAST YARDS DEVELOPMENT: WATER, WASTEWATER, AND STORMWATER SYSTEMS" DATED NOVEMBER 2011, PLATE 1: PIONEER TECHNICAL SERVICES ANACONDA EXISTING STORMWATER SYSTEM.

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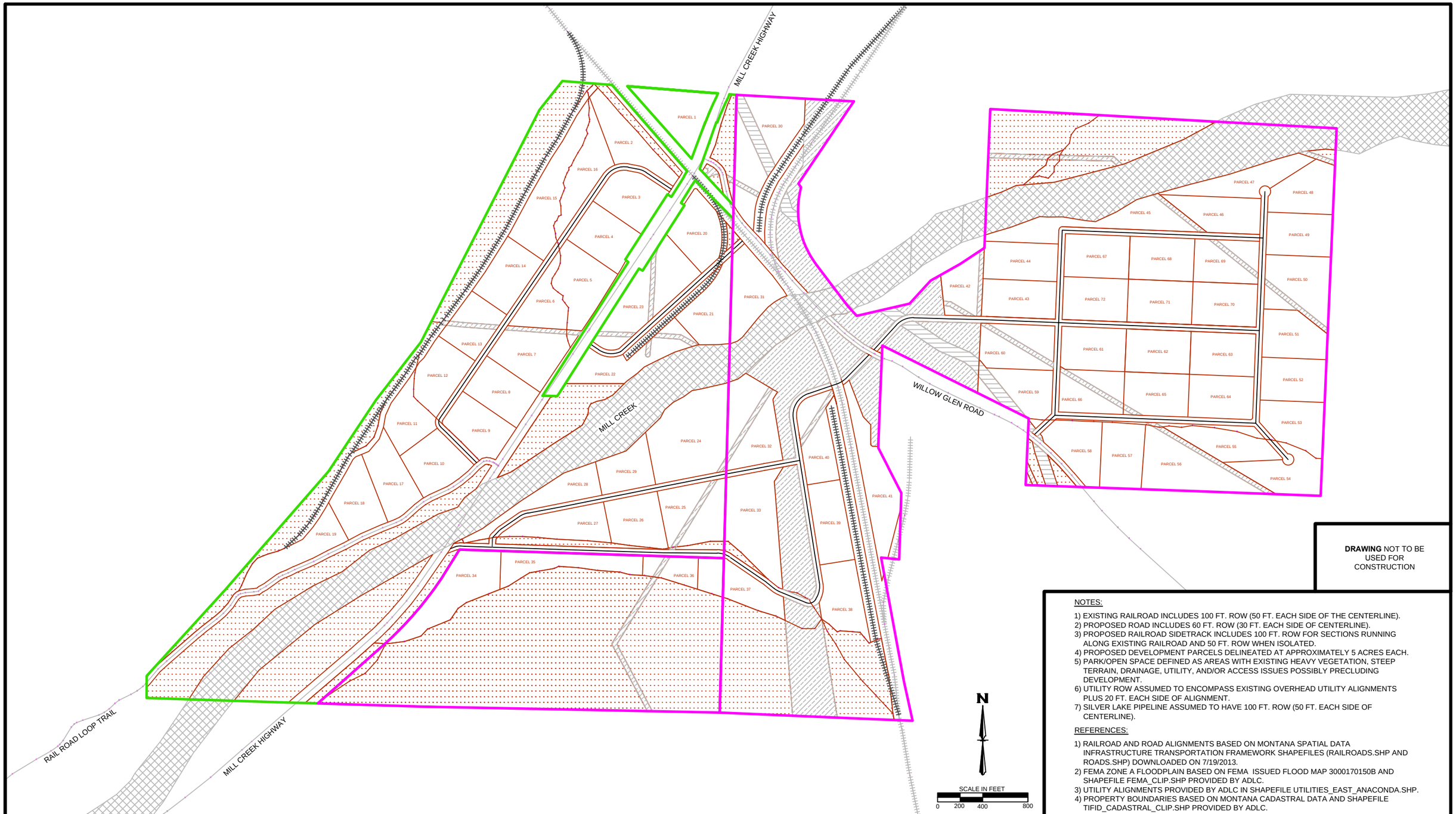
ANACONDA EXISTING STORMWATER SYSTEM
MILL CREEK TIFID PER
PREPARED FOR:
ANACONDA-DEER LODGE COUNTY

FIGURE
14



DRAWING NOT TO BE USED FOR CONSTRUCTION

NOTES:

1) EXISTING RAILROAD INCLUDES 100 FT. ROW (50 FT. EACH SIDE OF THE CENTERLINE).
2) PROPOSED ROAD INCLUDES 60 FT. ROW (30 FT. EACH SIDE OF CENTERLINE).
3) PROPOSED RAILROAD SIDETRACK INCLUDES 100 FT. ROW FOR SECTIONS RUNNING ALONG EXISTING RAILROAD AND 50 FT. ROW WHEN ISOLATED.
4) PROPOSED DEVELOPMENT PARCELS DELINEATED AT APPROXIMATELY 5 ACRES EACH.
5) PARK/OPEN SPACE DEFINED AS AREAS WITH EXISTING HEAVY VEGETATION, STEEP TERRAIN, DRAINAGE, UTILITY, AND/OR ACCESS ISSUES POSSIBLY PRECLUDING DEVELOPMENT.
6) UTILITY ROW ASSUMED TO ENCOMPASS EXISTING OVERHEAD UTILITY ALIGNMENTS PLUS 20 FT. EACH SIDE OF ALIGNMENT.
7) SILVER LAKE PIPELINE ASSUMED TO HAVE 100 FT. ROW (50 FT. EACH SIDE OF CENTERLINE).

REFERENCES:

1) RAILROAD AND ROAD ALIGNMENTS BASED ON MONTANA SPATIAL DATA INFRASTRUCTURE TRANSPORTATION FRAMEWORK SHAPEFILES (RAILROADS.SHP AND ROADS.SHP) DOWNLOADED ON 7/19/2013.
2) FEMA ZONE A FLOODPLAIN BASED ON FEMA ISSUED FLOOD MAP 3000170150B AND SHAPEFILE FEMA_CLIP.SHP PROVIDED BY ADLC.
3) UTILITY ALIGNMENTS PROVIDED BY ADLC IN SHAPEFILE UTILITIES_EAST_ANACONDA.SHP.
4) PROPERTY BOUNDARIES BASED ON MONTANA CADASTRAL DATA AND SHAPEFILE TIFID_CADASTRAL_CLIP.SHP PROVIDED BY ADLC.

LEGEND:

- EXISTING ROAD
- EXISTING RAILROAD (SEE NOTE 1)
- PROPOSED ROAD CENTERLINE (SEE NOTE 2)
- PROPOSED RAILROAD SIDETRACK CENTERLINE (SEE NOTE 3)
- PARCEL ## — PROPOSED DEVELOPMENT PARCELS (SEE NOTE 4)
- PARK/OPEN SPACE (SEE NOTE 5)
- OVERHEAD UTILITY RIGHT-OF-WAY (ROW) (SEE NOTE 6)
- SILVER LAKE PIPELINE RIGHT-OF-WAY (SEE NOTE 7)
- FEMA ZONE A FLOODPLAIN
- ARCO PROPERTY BOUNDARY
- ADLC PROPERTY BOUNDARY

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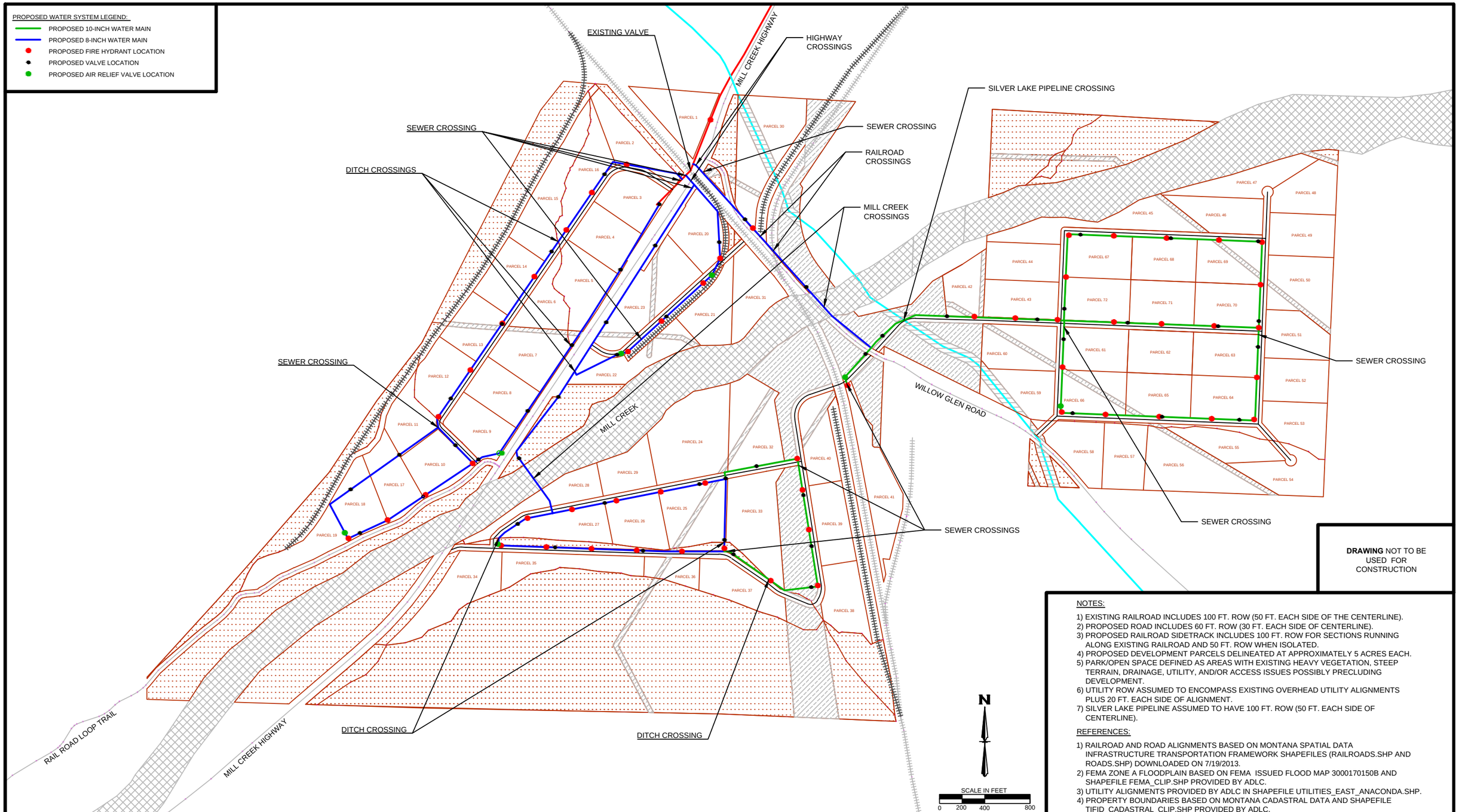
MILL CREEK TIFID PROPOSED DEVELOPMENT PLAN
MILL CREEK TIFID PER
PREPARED FOR:
ANACONDA-DEER LODGE COUNTY

FIGURE
15

PROPOSED WATER SYSTEM LEGEND:

- PROPOSED 10-INCH WATER MAIN
- PROPOSED 8-INCH WATER MAIN
- PROPOSED FIRE HYDRANT LOCATION
- PROPOSED VALVE LOCATION
- PROPOSED AIR RELIEF VALVE LOCATION



DRAWING NOT TO BE USED FOR CONSTRUCTION

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4) PROPERTY BOUNDARIES BASED ON MONTANA CADASTRAL DATA AND SHAPEFILE TIFID_CADASTRAL_CLIP.SHP PROVIDED BY ADLC.

LEGEND:

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- EXISTING RAILROAD (SEE NOTE 1)
- PROPOSED ROAD CENTERLINE (SEE NOTE 2)
- PROPOSED RAILROAD SIDETRACK CENTERLINE (SEE NOTE 3)
- PARCEL ## PROPOSED DEVELOPMENT PARCELS (SEE NOTE 4)
- PARK/OPEN SPACE (SEE NOTE 5)
- FEMA ZONE A FLOODPLAIN
- OVERHEAD UTILITY RIGHT-OF-WAY (ROW) (SEE NOTE 6)
- SILVER LAKE PIPELINE RIGHT-OF-WAY (SEE NOTE 7)
- EXISTING WATER MAIN
- SILVER LAKE PIPELINE

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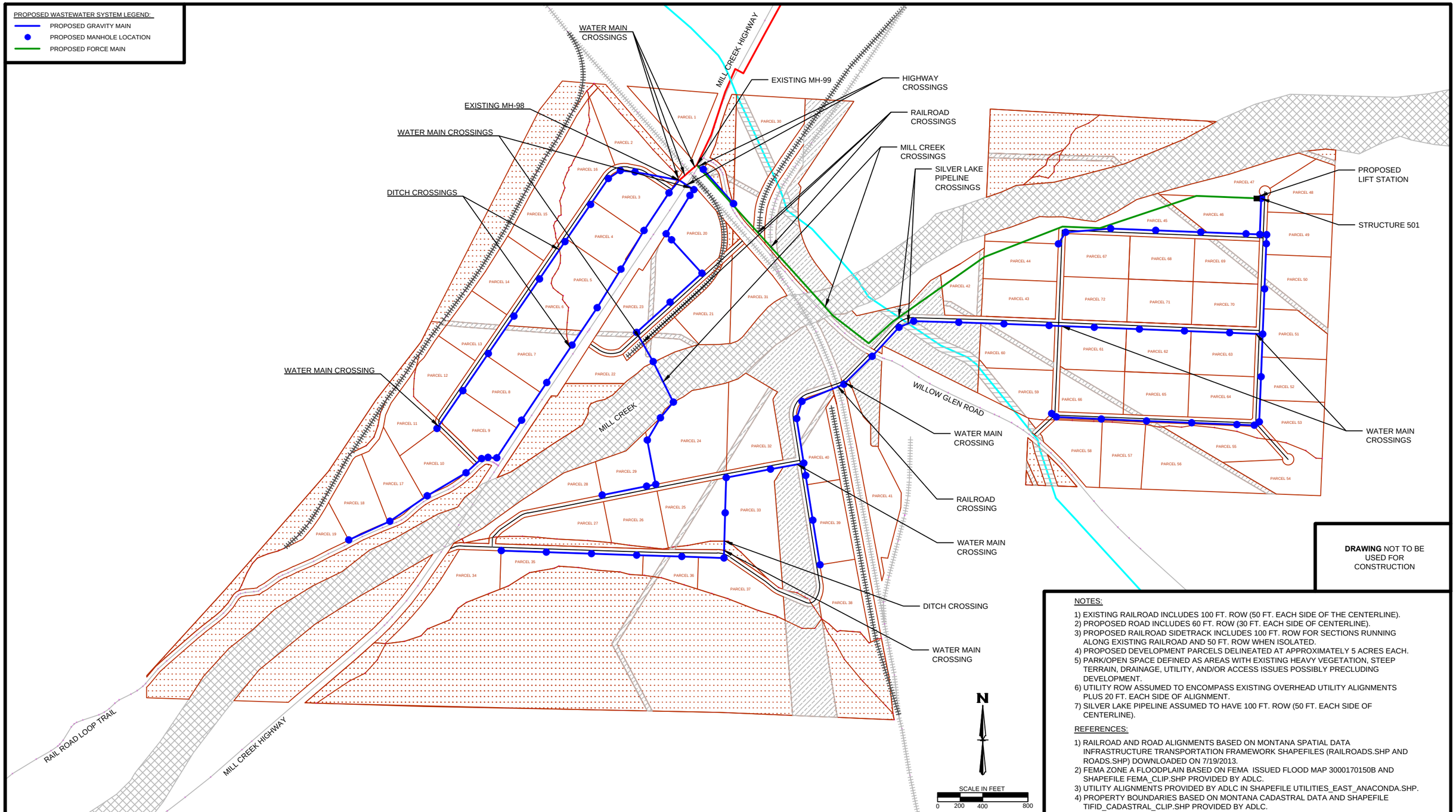
WATER SYSTEM ALTERNATIVE 1: CONNECT TO CITY OF ANACONDA WATER SYSTEM MILL CREEK TIFID PER

PREPARED FOR:

ANACONDA-DEER LODGE COUNTY

FIGURE

16



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- EXISTING RAILROAD (SEE NOTE 1)
- PROPOSED ROAD CENTERLINE (SEE NOTE 2)
- PROPOSED RAILROAD SIDETRACK CENTERLINE (SEE NOTE 3)
- PARCEL ## PROPOSED DEVELOPMENT PARCELS (SEE NOTE 4)
- PARK/OPEN SPACE (SEE NOTE 5)
- FEMA ZONE A FLOODPLAIN
- OVERHEAD UTILITY RIGHT-OF-WAY (ROW) (SEE NOTE 6)
- SILVER LAKE PIPELINE RIGHT-OF-WAY (ROW) (SEE NOTE 7)
- EXISTING GRAVITY SEWER LINE
- SILVER LAKE PIPELINE

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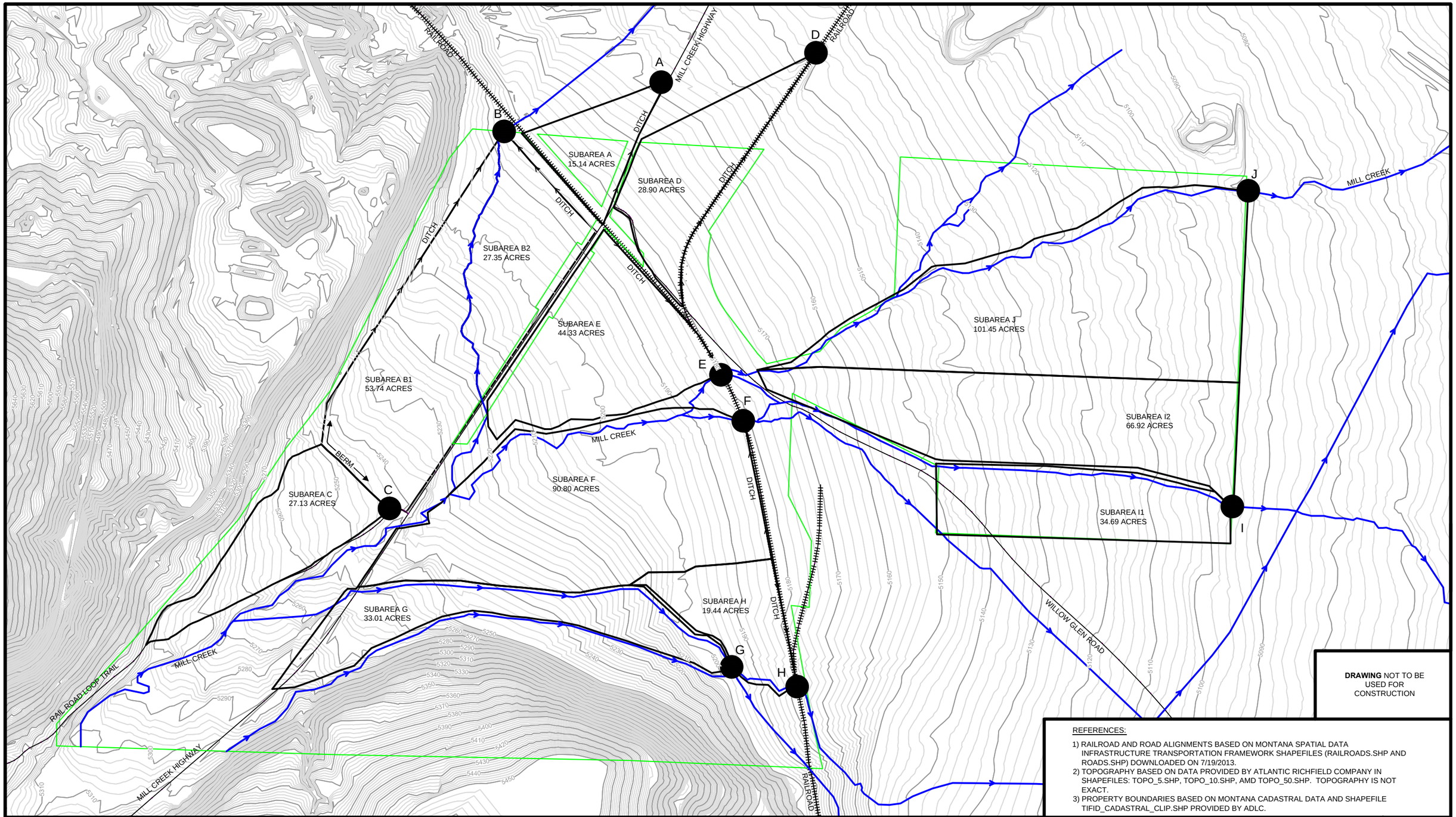
WASTEWATER SYSTEM ALTERNATIVE 1: CONNECT TO CITY OF ANACONDA WASTEWATER SYSTEM MILL CREEK TIFID PER

PREPARED FOR:

ANACONDA-DEER LODGE COUNTY

FIGURE

17



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2) TOPOGRAPHY BASED ON DATA PROVIDED BY ATLANTIC RICHFIELD COMPANY IN SHAPEFILES: TOPO_5.SHP, TOPO_10.SHP, AMD TOPO_50.SHP. TOPOGRAPHY IS NOT EXACT.
3) PROPERTY BOUNDARIES BASED ON MONTANA CADASTRAL DATA AND SHAPEFILE TIFID_CADASTRAL_CLIP.SHP PROVIDED BY ADLC.

LEGEND:

- EXISTING ROAD
- 5200 EXISTING TOPOGRAPHY (2 FT-INTERVALS)
- EXISTING RAILROAD
- DRAINAGE BOUNDARY
- OUTFALL
- EXISTING STREAM/DRAINAGE DITCH
- TIFID BOUNDARY

SCALE IN FEET
0 200 400 800

N

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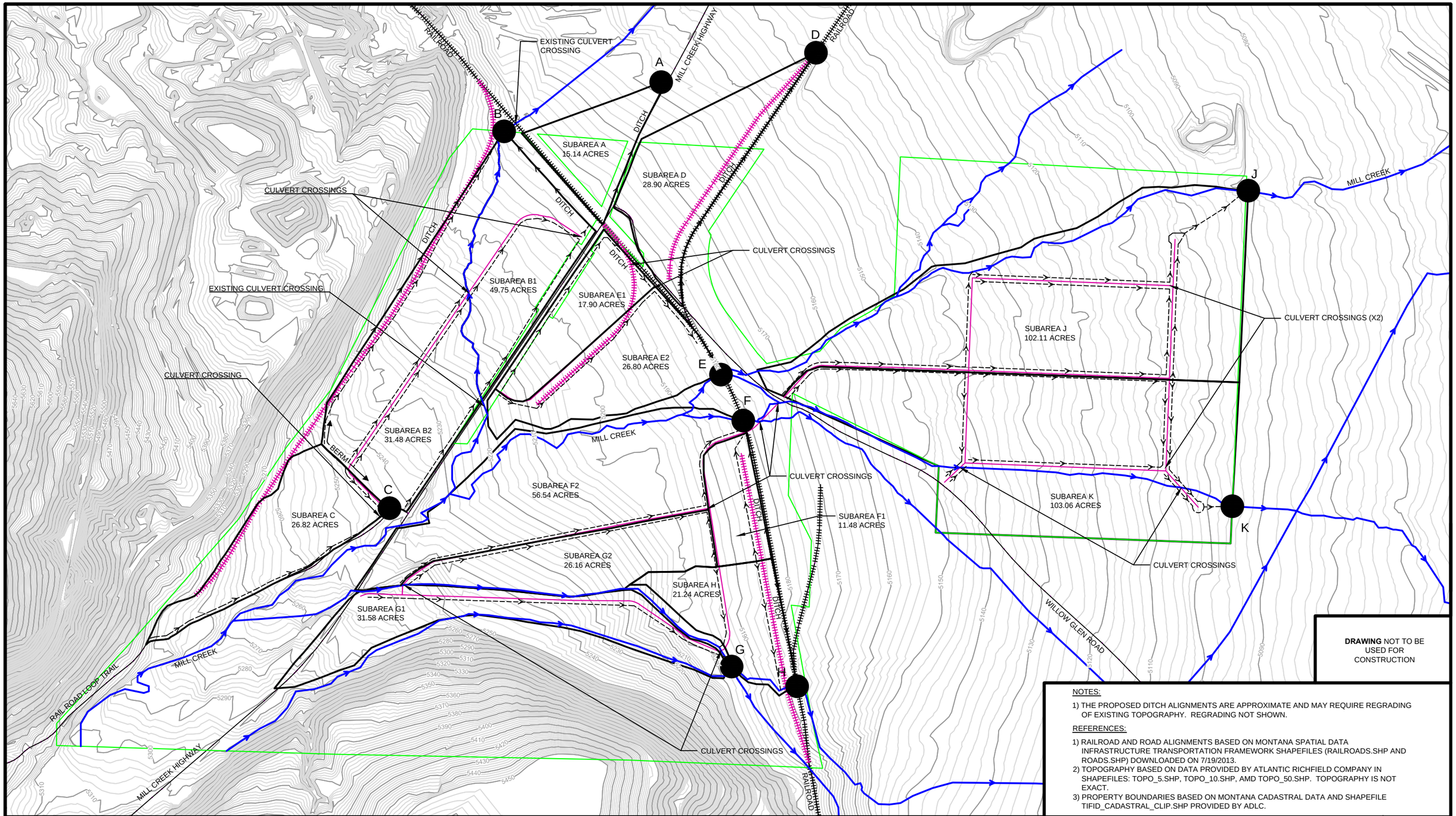
EXISTING STORMWATER DRAINAGES
MILL CREEK TIFID PER
PREPARED FOR:
ANACONDA-DEER LODGE COUNTY

FIGURE
18



DRAWING NOT TO BE USED FOR CONSTRUCTION

NOTES:

1) THE PROPOSED DITCH ALIGNMENTS ARE APPROXIMATE AND MAY REQUIRE REGRADING OF EXISTING TOPOGRAPHY. REGRADING NOT SHOWN.

REFERENCES:

1) RAILROAD AND ROAD ALIGNMENTS BASED ON MONTANA SPATIAL DATA INFRASTRUCTURE TRANSPORTATION FRAMEWORK SHAPEFILES (RAILROADS.SHP AND ROADS.SHP) DOWNLOADED ON 7/19/2013.
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LEGEND:

- EXISTING ROAD
- 5200 EXISTING TOPOGRAPHY (2 FT-INTERVALS)
- EXISTING RAILROAD
- DRAINAGE BOUNDARY
- OUTFALL
- TIFID BOUNDARY
- EXISTING STREAM/DRAINAGE DITCH
- PROPOSED RAILROAD
- PROPOSED ROAD
- PROPOSED DITCH (SEE NOTE 1)

SCALE IN FEET
0 200 400 800

N

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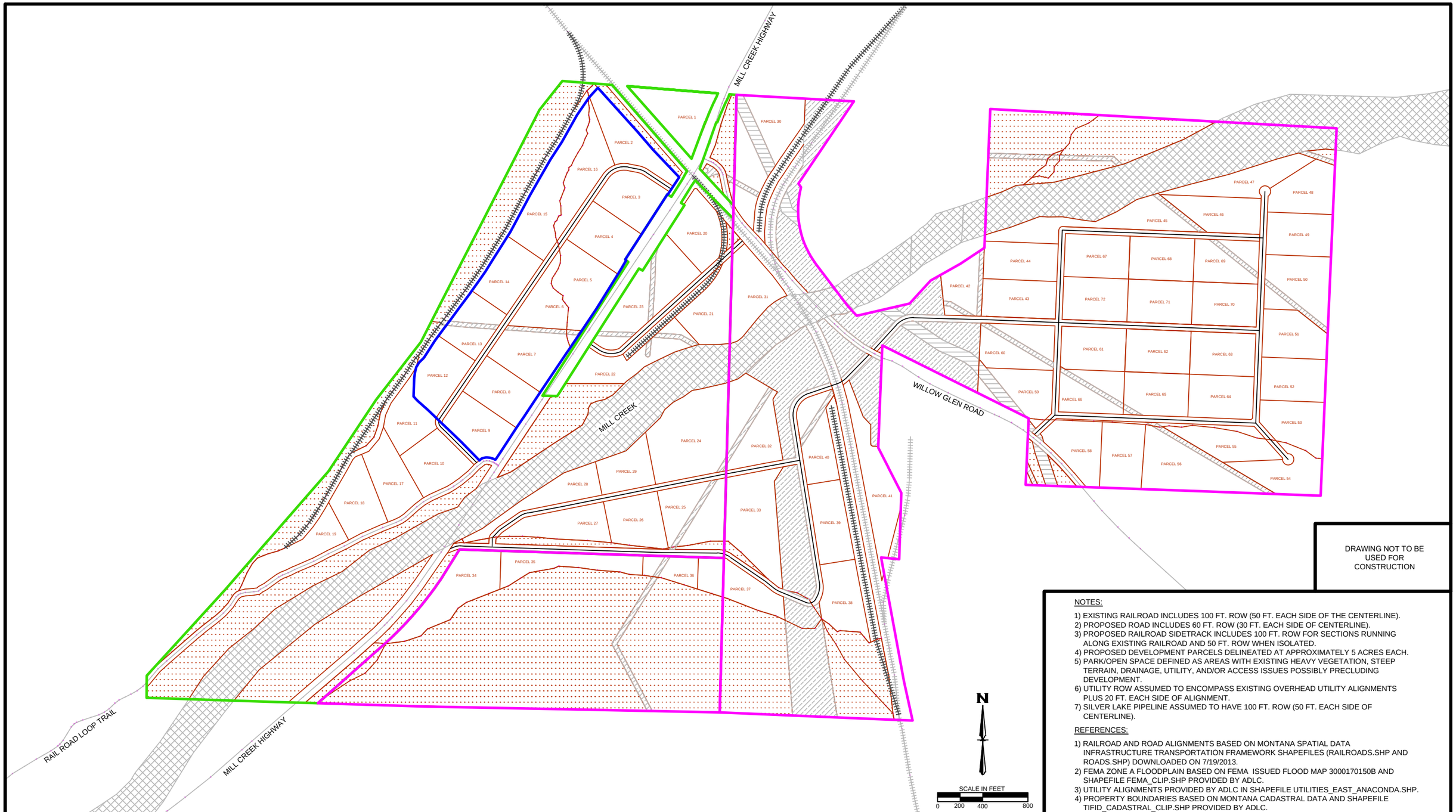
STORMWATER SYSTEM ALTERNATIVE 2: CONSTRUCT AN ONSITE STORMWATER COLLECTION SYSTEM MILL CREEK TIFID PER

PREPARED FOR:

ANACONDA-DEER LODGE COUNTY

SHEET

19



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NOTES:

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- PARK/OPEN SPACE (SEE NOTE 5)
- OVERHEAD UTILITY RIGHT-OF-WAY (ROW) (SEE NOTE 6)
- SILVER LAKE PIPELINE RIGHT-OF-WAY (SEE NOTE 7)
- FEMA ZONE A FLOODPLAIN
- ARCO PROPERTY BOUNDARY
- ADLC PROPERTY BOUNDARY
- SELECTIVE DEVELOPMENT EXAMPLE BOUNDARY

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MILL CREEK TIFID SELECTIVE DEVELOPMENT EXAMPLE
MILL CREEK TIFID PER
PREPARED FOR:
ANACONDA-DEER LODGE COUNTY

FIGURE
20

Appendix A

MDEQ's 2012 Water Quality Information Report for Lower Mill Creek

Preliminary Engineering Report
Mill Creek TIFID

Montana Department of Environmental Quality

Clean Water Act Information Center

Close Window Print Window Export Data

2012 Water Quality Information

Water Information

Waterbody Id	MT76G002_052	Water Type	RIVER
Name	Mill Creek	Hydro Unit	17010201 - Upper Clark Fork
Size (Miles/Acres)	9.5	Basin	Columbia
Ecoregion	Middle Rockies	Watershed	Upper Clark Fork
County	DEER LODGE	Use Class	B-1
TMDL Planning Area	Upper Clark Fork	Trophic Status and Trend	NA
Location	MILL CREEK, line between sections 27-28 T4N R11W to Mill-Willow Bypass diversion		
Water Quality Category	5 - One or more uses are impaired and a TMDL is required.		

Beneficial Use Support Information

Use Name	Fully Supporting	Partially Supporting	Not Supporting	Threatened	Insufficient Information	Not Assessed
Agricultural		✓				
Aquatic Life			✓			
Drinking Water			✓			
Primary Contact Recreation		✓				

Impairment Information

Probable Causes	Probable Sources	Associated Uses	TMDL Completed
Alteration in stream-side or littoral vegetative covers	Irrigated Crop Production	Aquatic Life	NO
Aluminum	Contaminated Sediments Mill Tailings	Agricultural Aquatic Life Drinking Water	NO
Arsenic	Contaminated Sediments Mill Tailings	Agricultural Aquatic Life Drinking Water	YES
Cadmium	Contaminated Sediments Mill Tailings	Agricultural Aquatic Life Drinking Water	YES
Copper	Contaminated Sediments Mill Tailings	Agricultural Aquatic Life Drinking Water	YES
Iron	Contaminated Sediments Mill Tailings	Agricultural Aquatic Life Drinking Water	YES
Lead	Contaminated Sediments Mill Tailings	Agricultural Aquatic Life Drinking Water	YES
Low flow alterations	Irrigated Crop Production	Aquatic Life Primary Contact Recreation	NO
Zinc	Contaminated Sediments Mill Tailings	Agricultural Aquatic Life Drinking Water	YES

Assessment Information

Assessment Type	Associated Uses	Confidence
BIOLOGICAL	Aquatic Life	GOOD
HABITAT	Aquatic Life	GOOD
PHYSICAL/CHEMICAL	Agricultural Aquatic Life Drinking Water Primary Contact Recreation	GOOD

Assessment Method	Associated Uses
NA	NA

Comments

Overall Assessment	
WATERBODY: Clark Fork tributaries upstream of Little Blackfoot River	
Use	Comment
NA	NA
Cause	Comment
NA	NA
Source	Comment
NA	NA

Appendix B

Uniform Environmental Checklist

Preliminary Engineering Report
Mill Creek TIFID

UNIFORM ENVIRONMENTAL CHECKLIST

As the engineer that prepared the preliminary engineering report, I MICHAEL MAHON, **(print name of engineer)**

have reviewed the information presented in this checklist and believe that it accurately identifies the environmental resources in the area and the potential impacts that the project could have on those resources. In addition, the required state and federal agencies were provided with the required information about the project and requested to provide comments on the proposed public facility project. Their comments have been incorporated into and attached to the Preliminary Engineering Report.

Engineer's Signature: _____

Date: 4/200/14

Key Letter: N – No Impact/Not Applicable **B** – Potentially Beneficial **A** – Potentially Adverse
P – Approval/Permits Required **M** – Mitigation Required

PHYSICAL ENVIRONMENT	
Key **A, P, M**	**1. Soil Suitability, Topographic and/or Geologic Constraints (e.g., soil slump, steep slopes, subsidence, seismic activity)** *Comments and Source of Information*: **Comment.** The site is located within the Anaconda Regional Waste, Water and Soils (ARWWS) operable unit of the Smelter Hill National Priorities List (NPL) Site. Road construction and installation of buried utilities will likely expose contaminated soils (also see Physical Environment Item No. 2 below). There are areas of steep topography noted along the western and southern project area boundaries that may limit access and development. Geologic conditions are not anticipated to affect the proposed project. **Approval/Permits Required.** The project is located in the ARWWS Operable Unit which subjects proposed construction to review and approval under the Anaconda-Deer Lodge County (ADLC) Development Permit System. **Mitigation.** Specific construction requirements will be set by the ALDC Development Permit System, but it is anticipated that general remediation measures may be needed, such as off-site disposal of waste materials excavated during construction and importing clean fill material. Final decision is subject to determination within the ALDC Development Permit System.
Key **A, P, M**	**2. Hazardous Facilities (e.g., power lines, EPA hazardous waste sites, acceptable distance from explosive and flammable hazards including chemical/petrochemical storage tanks, underground fuel storage tanks, and related facilities such as natural gas storage facilities & propane storage tanks)** *Comments and Source of Information*: **Comments.** The proposed project is located within the ARWWS operable unit of the Smelter Hill NPL Site. There are five contaminants of concern within the unit: arsenic, copper, cadmium, lead, and zinc. Arsenic is the most concerning due to its heavy carcinogenic nature. The Montana Department of Environmental Quality (MDEQ) has established a generic action limit of 40 milligrams/kilogram (mg/kg) surface concentration for arsenic since arsenic naturally occurs in Montana soil. The United States Environmental Protection Agency (US EPA) was contacted via correspondence dated 7/22/13. US EPA provided response via correspondence dated 7/24/13 (See Appendix B). The US EPA confirmed that the project was indeed part of the Smelter Hill NPL site and as such, proposed construction activities are required to be

	reviewed and approved following the ADLC Development Permit System. While the specific construction requirements will be specified through the system, it is anticipated that the following general practices will be required: • Stripping and sampling of the uppermost soil layer; • On-site disposal of contaminated soils that exceed the established action limit concentrations; and • Off-site disposal of waste materials that are classified as excess excavation. Additional measures, such as off-site disposal of all waste materials encountered during excavation and importing clean fill materials are possible, but subject to the results of the ADLC Development Permit System. Several overhead power lines cross the project area, are service lines to the nearby Northwestern Energy Mill Creek Generating Station and substation, and may limit development based on power line pole locations, line clearance and service right-of-ways. **Approval/Permits Required.** The project is located in the ARWWS Operable Unit which subjects proposed construction to review and approval under the ADLC Development Permit System. **Mitigation.** Specific construction requirements will be set by the ADLC Development Permit System, but it is anticipated that general remediation measures may be needed, such as off-site disposal of waste materials excavated during construction and importing clean fill material. Final decision is subject to determination within the ADLC Development Permit System.
Key **A, P, M**	**3. Effects of Project on Surrounding Air Quality or Any Kind of Effects of Existing Air Quality on Project (e.g., dust, odors, emissions)** *Comments and Source of Information*: **Comment.** The air quality is described as good. No known state or federal air quality standards will be violated. The project area is located in an unclassified/attainment area of air quality under 40 CFR 81.1327, as amended. **Impacts.** The air quality may be decreased temporarily within the project area due to construction. The impact will be short-term and mostly confined to the construction zones. **Approval/Permits Required.** Suppliers of crushed rock for construction may be required to have an MDEQ air permit. **Mitigation.** Water can be used to control dust along areas subject to heavy traffic, if deemed necessary, during construction.
Key **N**	**4. Groundwater Resources & Aquifers (e.g., quantity, quality, distribution, depth to groundwater, sole source aquifers)** *Comments and Source of Information*: **Comment.** The Mill Creek TIFID will not access groundwater resources, as it is prohibited to develop wells within the Superfund Site.
Key **A, P, M**	**5. Surface Water/Water Quality, Quantity & Distribution (e.g., streams, lakes, storm runoff, irrigation systems, canals)** *Comments and Source of Information*: **Comment.** Mill Creek runs directly through the proposed project area and is a tributary to Silver Bow Creek. The United States Army Corps of Engineers (US ACOE) was contacted via correspondence dated 7/22/13. US ACOE provided response via correspondence dated 8/29/13. US ACOE

noted that any construction work that includes placement of fill material within jurisdictional waters (i.e., areas below the ordinary high water mark of stream channels, lakes or ponds and wetlands adjacent to these waters) would require a 404 Permit from US ACOE.

Impacts. The proposed project will not affect the quantity or quality of surface water in the project area. New storm water collection mains will be installed for collection and discharge into site storm water diversions/impoundments for eventual discharge into Mill Creek.

Approval/Permits Required. The following permits may be required:

- **124SPA Permit.** Any work that may affect the bed or banks of Mill Creek will require a 124SPA Stream Protection Permit from Montana Fish, Wildlife, and Parks.
- **404 Permit.** Any work that will result in discharge of fill material into Mill Creek will require a 404 Permit from the US ACOE.
- **Floodplain Development Permit.** Discussed under Physical Environment Item No. 6. Floodplains & Floodplain Management.
- **318 Authorization.** Any work that will cause short term or temporary violations of state surface water quality standards for turbidity can be granted temporary exemptions from these standards by MDEQ.
- **Stormwater Discharge General Permits.** Any work that would cause a discharge of storm water into Mill Creek will require a Stormwater Discharge General Permit from MDEQ.

Mitigation. Short term construction impacts will be mitigated through the use of appropriate stormwater best management practices.

Key
A, P

6. Floodplains & Floodplain Management (Identify any floodplains within one mile of the boundary of the project.)

Comments and Source of Information:

Comment. The Montana Department of Natural Resources and Conservation (DNRC) State Floodplain Coordinator was contacted via correspondence dated 7/22/13. DNRC provided response via correspondence dated 7/30/13. The DNRC confirmed that portions of the project are located in an Approximate Zone A special flood hazard area associated with Mill Creek. The DNRC recommended contact of ADLC for permit requirements.

Water & Environmental Technologies (WET) was contracted by Northwestern Energy (NWE) to determine the boundary and base flood elevation of Mill Creek immediately south of NWE's generating station in preparation for planned expansion work (WET, 2013). WET performed detailed survey, hydrology and hydraulic analysis to extend the Zone A floodplain in this area.

Impacts. The proposed work will include underground installation of water and sewer mains in previously disturbed areas and will include stream crossings at several locations along Mill Creek. The proposed construction will not change the elevation of the 100 or 500-year floodplain or adversely affect the natural values and functions of the floodplain in this area.

Approval/Permits Required. A Floodplain Development Permit would be required for any construction within the 100-year floodplain of Mill Creek. The permit must be obtained from the ADLC Floodplain Administrator prior to any construction activities.

Key
A, P, M

7. Wetlands Protection (Identify any wetlands within one mile of the boundary of the project.)

Comments and Source of Information:

Comment. A search in the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory revealed several areas of known wetlands within the Mill Creek TIFID area, primarily along Mill Creek within the Zone A floodplain boundary and along tributary drainages to Mill Creek. The Montana Natural Heritage Program (MNHP) was contacted via online data request dated 8/20/13. MNHP provided response via email dated 8/21/13. The

MNHP confirmed USFWS notification of several areas of known wetlands along Mill Creek, including:

- Freshwater Emergent Wetland;
- Freshwater Scrub-Shrub Wetland;
- Riparian Scrub-Shrub; and
- Riparian Forested.

Impacts. The proposed work will include access road construction and underground installation of water and sewer mains in previously disturbed areas and will include stream crossings at several locations along Mill Creek and tributary drainages.

Approval/Permits Required. The following permits may be required:

- **404 Permit.** Any work that will result in discharge of fill material into a wetland will require a 404 Permit from the US ACOE.
- **Floodplain Development Permit.** Discussed under Physical Environment Item No. 6. Floodplains & Floodplain Management.
- **318 Authorization.** Any work that will cause short term or temporary violations of state surface water quality standards for turbidity can be granted temporary exemptions from these standards by MDEQ.
- **Stormwater Discharge General Permits.** Any work that would cause a discharge of storm water into wetlands will require a Stormwater Discharge General Permit from MDEQ.

Mitigation. Short term construction impacts will be mitigated through the use of appropriate best management practices.

Key
N

8. Agricultural Lands, Production, & Farmland Protection (e.g., grazing, forestry, cropland, prime or unique agricultural lands) (Identify any prime or important farm ground or forest lands within one mile of the boundary of the project.)

Comments and Source of Information:

The proposed project does not encroach on agricultural land or important farm ground or forest lands. There will be no impact to agricultural lands.

Key
N

9. Vegetation & Wildlife Species & Habitats, Including Fish (e.g., terrestrial, avian and aquatic life and habitats)

Comments and Source of Information:

Comment. The USFWS was contacted via correspondence dated 7/22/13. USFWS provided response via correspondence dated 7/31/13. The USFWS confirmed the proposed project would not cause adverse effects to vegetation, wildlife or habitat resources.

Key
N

10. Unique, Endangered, Fragile, or Limited Environmental Resources, Including Endangered Species (e.g., plants, fish or wildlife)

Comments and Source of Information:

Comment. The USFWS was contacted via correspondence dated 7/22/13. USFWS provided response via correspondence dated 7/31/13. The USFWS confirmed the proposed project would not cause adverse effects to threatened, endangered or candidate species or critical habitat.

Key Letter: N – No Impact/Not Applicable **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

Key **N**	**11. Unique Natural Features (e.g., geologic features)** *Comments and Source of Information*: **Comments.** There are no unique natural features in the project area.
Key **N**	**12. Access to, and Quality of, Recreational & Wilderness Activities, Public Lands and Waterways (including Federally Designated Wild & Scenic Rivers), and Public Open Space** *Comments and Source of Information*: **Comment.** The project will have no effect on the access to or the quality of recreational and wilderness activities, public lands and waterways, and public open space.
HUMAN POPULATION	
Key **N**	**1. Visual Quality – Coherence, Diversity, Compatibility of Use and Scale, Aesthetics** *Comments and Source of Information*: **Comment.** The proposed project includes development of light and/or heavy industrial businesses and open space. The Mill Creek TIFID area is currently surrounded by industrial business including an electric generation station, substation and two gravel pit operations; therefore, the proposed project is similar in visual quality. **Impacts.** The proposed project would have no long-term adverse effects on the visual quality of the project or surrounding areas.
Key **N**	**2. Nuisances (e.g., glare, fumes)** *Comments and Source of Information*: **Comment.** The proposed project is distant from existing human population: approximately one mile to the nearest residence, and one mile from Highway 1. However, temporary nuisances may be associated with construction activities. Efforts will be made to minimize nuisances as they arise.
Key **N**	**3. Noise -- suitable separation between noise sensitive activities (such as residential areas) and major noise sources (aircraft, highways & railroads)** *Comments and Source of Information*: **Comment.** The proposed project is distant from existing human population: approximately one mile to the nearest residence, and one mile from Highway 1. However, construction of new development will temporarily increase noise levels within the project area. Efforts will be made to minimize noise levels during construction.
Key **A, P, M**	**4. Historic Properties, Cultural, and Archaeological Resources** *Comments and Source of Information*: **Comment.** The Montana State Historic Preservation Office (SHPO) was contacted on 7/22/13 for information regarding previous cultural resource surveys completed around the project area and for a listing of previously recorded historical and archeological sites in the project area. **Impacts.** SHPO responded via correspondence dated 7/22/13 and noted there have been several previously recorded cultural resource sites within the project area. There have also

	been previously conducted cultural resources inventories in the area. Based on the potential ground disturbance, there may be a potential for an impact to cultural properties. It is recommended that a cultural resource inventory be performed for this project prior to construction activities. **Mitigation.** If cultural resources are encountered during construction of the proposed project, work will be suspended in the area so the significance of the material can be investigated.
Key **B**	**5. Changes in Demographic (population) Characteristics (e.g., quantity, distribution, density)** *Comments and Source of Information*: **Impacts.** The proposed project will not have a major impact of the location, distribution, density or growth rate of the area's population. The proposed project will not affect any social or ethnic groups that will be isolated or divided any existing residential areas. The proposed project may increase jobs and promote population growth.
Key **N**	**6. Environmental Justice – (Does the project avoid placing lower income households in areas where environmental degradation has occurred, such as adjacent to brownfield sites?)** *Comments and Source of Information*: **Comment.** This project will not place lower income households in areas where environmental degradation has occurred.
Key **N**	**7. General Housing Conditions - Quality, Quantity, Affordability** *Comments and Source of Information*: **Comment.** This project would have little effect on the quality, quantity, or affordability of housing in Anaconda or surrounding portions of Deer Lodge County.
Key **B**	**8. Displacement or Relocation of Businesses or Residents** *Comments and Source of Information*: **Comment.** There are no businesses or residents in the project area to be relocated or displaced. There are currently no plans to relocate any businesses to the Mill Creek TIFID. ADLC hopes the Mill Creek TIFID development will attract additional business and be an asset to the community.
Key **B**	**9. Public Health and Safety** *Comments and Source of Information*: **Comment.** Development will continue the mitigation of mining contaminated soils including the remediation, removal and/or capping of contaminated soils as encountered.
Key **N**	**10. Lead Based Paint and/or Asbestos** *Comments and Source of Information*: **Comment.** No lead based paint or asbestos is expected to be encountered during this project.

Key Letter: N – No Impact/Not Applicable **B –** Potentially Beneficial **A –** Potentially Adverse
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Key **B**	**11. Local Employment & Income Patterns - Quantity and Distribution of Employment, Economic Impact** *Comments and Source of Information*: **Comment.** Construction of the proposed project would temporarily create jobs and the need for local goods and services, which would provide a short-term economic benefit for Anaconda. The finished development would hopefully attract new business and jobs, providing an economic benefit for the community.
Key **B**	**12. Local & State Tax Base & Revenues** *Comments and Source of Information*: **Comment.** The proposed project would benefit Anaconda over time by increasing local revenues collected through payment for additional service areas and by increasing the tax base through new development.
Key **N**	**13. Educational Facilities - Schools, Colleges, Universities** *Comments and Source of Information*: **Comment.** The proposed project would not affect existing educational facilities in Anaconda.
Key **B**	**14. Commercial and Industrial Facilities - Production & Activity, Growth or Decline** *Comments and Source of Information*: **Comment.** The proposed project utility improvements enable commercial and industrial growth to occur within the site.
Key **N**	**15. Health Care – Medical Services** *Comments and Source of Information*: **Comment.** The proposed project will not affect existing health care or medical services nor create the demand for additional medical services.
Key **N**	**16. Social Services – Governmental Services (e.g., demand on)** *Comments and Source of Information*: **Comment.** The proposed project will not affect the demand for social or governmental services.
Key **N**	**17. Social Structures & Mores (Standards of Social Conduct/Social Conventions)** *Comments and Source of Information*: **Comment.** The proposed project will not affect social structures or community mores.

Key Letter: N – No Impact/Not Applicable **B –** Potentially Beneficial **A –** Potentially Adverse
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Key **B**	**18. Land Use Compatibility (e.g., growth, land use change, development activity, adjacent land uses and potential conflicts)** *Comments and Source of Information*: **Comment.** The proposed project will encourage development and growth in an area previously impacted by mining operations.
Key **N**	**19. Energy Resources - Consumption and Conservation** *Comments and Source of Information*: **Comment.** Energy use would increase for a short time during construction of the proposed project due to need for construction equipment. The project would not use energy resources or natural materials that are in short supply.
Key **N**	**20. Solid Waste Management** *Comments and Source of Information*: **Comment.** The proposed project would have negligible effects on the generation and management of solid waste within the community. At completion of full development of the Mill Creek TIFID, there will be additional solid waste generated, but should not have a major impact on existing solid waste management systems.
Key **B, P**	**21. Wastewater Treatment - Sewage System** *Comments and Source of Information*: **Comment.** The proposed project is increasing the coverage of the existing Anaconda sanitary sewer collection system and extending sewer mains into areas that are presently not being serviced by the existing ADLC wastewater treatment facility. The project will add approximately 92,200 to the ADLC wastewater treatment plan, but the system can accommodate the anticipated increase in flows. Approval from MDEQ will be required.
Key **A, B, P**	**22. Storm Water – Surface Drainage** *Comments and Source of Information*: **Comment.** Storm water flows will be collected in surface water channels and detained in lined ponds with controlled releases to minimize downstream impacts. The increased storm water runoff and collection system will minimize the possibility of percolation into the groundwater.
Key **A, B, P**	**23. Community Water Supply** *Comments and Source of Information*: **Comment.** Extending the existing water mains within the project site to service the entire proposed development will increase demands on the existing Anaconda water system. The proposed development will increase demand by approximately 86,400 to 631,000 gpd (depending on season) and the existing system has capacity for this increased demand. Approval from MDEQ will be required.

Key Letter: N – No Impact/Not Applicable **B –** Potentially Beneficial **A –** Potentially Adverse
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Key **N**	**24. Public Safety – Police** *Comments and Source of Information*: **Comment.** The proposed project would not affect public safety nor increase the need for law enforcement.
Key **N**	**25. Fire Protection – Hazards** *Comments and Source of Information*: **Comment.** The proposed project would not affect the area's fire protection system or limit the community's fire-fighting capabilities.
Key **N**	**26. Emergency Medical Services** *Comments and Source of Information*: **Comment.** The proposed project would not increase the need for emergency medical services.
Key **B**	**27. Parks, Playgrounds, & Open Space** *Comments and Source of Information*: **Comment.** Approximately 180 acres of open space are proposed to be maintained, including space for separate and future consideration as an open trail system for pedestrians and bicyclists.
Key **N**	**28. Cultural Facilities, Cultural Uniqueness & Diversity** *Comments and Source of Information*: **Comment.** The proposed project would not affect cultural facilities or cultural uniqueness and diversity of Anaconda or the surrounding area.
Key **A, P**	**29. Transportation Networks and Traffic Flow Conflicts (e.g., rail; auto including local traffic; airport runway clear zones - avoidance of incompatible land use in airport runway clear zones)** *Comments and Source of Information*: **Comment.** Construction of the proposed utilities may disrupt vehicle traffic on local roads within the project area. Traffic control will be implemented to ensure alternative routes within the area are available and work areas are clearly marked to ensure safety. Any construction crossing railroads will follow all standards that apply. Airport facilities will not be affected by the project.
Key **N**	**30. Consistency with Local Ordinances, Resolutions, or Plans (e.g., conformance with local comprehensive plans, zoning, or capital improvement plans)** *Comments and Source of Information*: **Comment.** The proposed project does not conflict with any local ordinances, resolutions or plans.

Key Letter: N – No Impact/Not Applicable **B –** Potentially Beneficial **A –** Potentially Adverse
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Key	
N	**31. Is There a Regulatory Action on Private Property Rights as a Result of this Project? (consider options that reduce, minimize, or eliminate the regulation of private property rights.)** *Comments and Source of Information*: **Comment.** The proposed project will not involve any regulatory action that would affect private property rights.

Copper Environmental
Consulting, LLC

406 East Park Avenue, Suite 2
Anaconda, Montana 59711
(406) 563-2700
Fax: (406) 563-2701

July 22, 2013

Mr. Todd Tillinger
Montana Program Manager
U.S. Army Corps of Engineers
10 West 15th Street, Suite 2200
Helena, MT 59626
todd.n.tillinger@usace.army.mil

RE: Mill Creek Tax Increment Financing Industrial District
Anaconda-Deer Lodge County, Montana

Dear Mr. Tillinger,

Copper Environmental Consulting, LLC has been retained by Anaconda-Deer Lodge County (ADLC) to develop a Preliminary Engineering Report which is a planning document for the Mill Creek Tax Increment Financing Industrial District (TIFID). Guidelines require us to advise appropriate agencies of the scope of the project and request comments.

The Mill Creek TIFID is located east of the former Anaconda Company smelter site along Mill Creek Road, Route 569, as shown on Figure 1, enclosed. The site is approximately 749 acres in total area. ADLC is proposing to subdivide the site into parcels for commercial and/or industrial uses. The project area is located within a Superfund site (Anaconda Regional Water and Waste Operable Unit). Well bans within the Superfund site eliminate the possibility of onsite access to groundwater.

Development alternatives for water, wastewater, and stormwater systems include:

- Extending existing sewer mains and connecting to the existing Anaconda sewer system;
- Construction of a new sewer collection system and connecting to nearby Anaconda sewer mains with a new lift station on the south side of Highway 1;
- Extending existing on-site water mains to serve the development; and
- Constructing a stormwater collection system for the proposed development.

The preferred alternatives for water, wastewater and stormwater systems have not been selected.

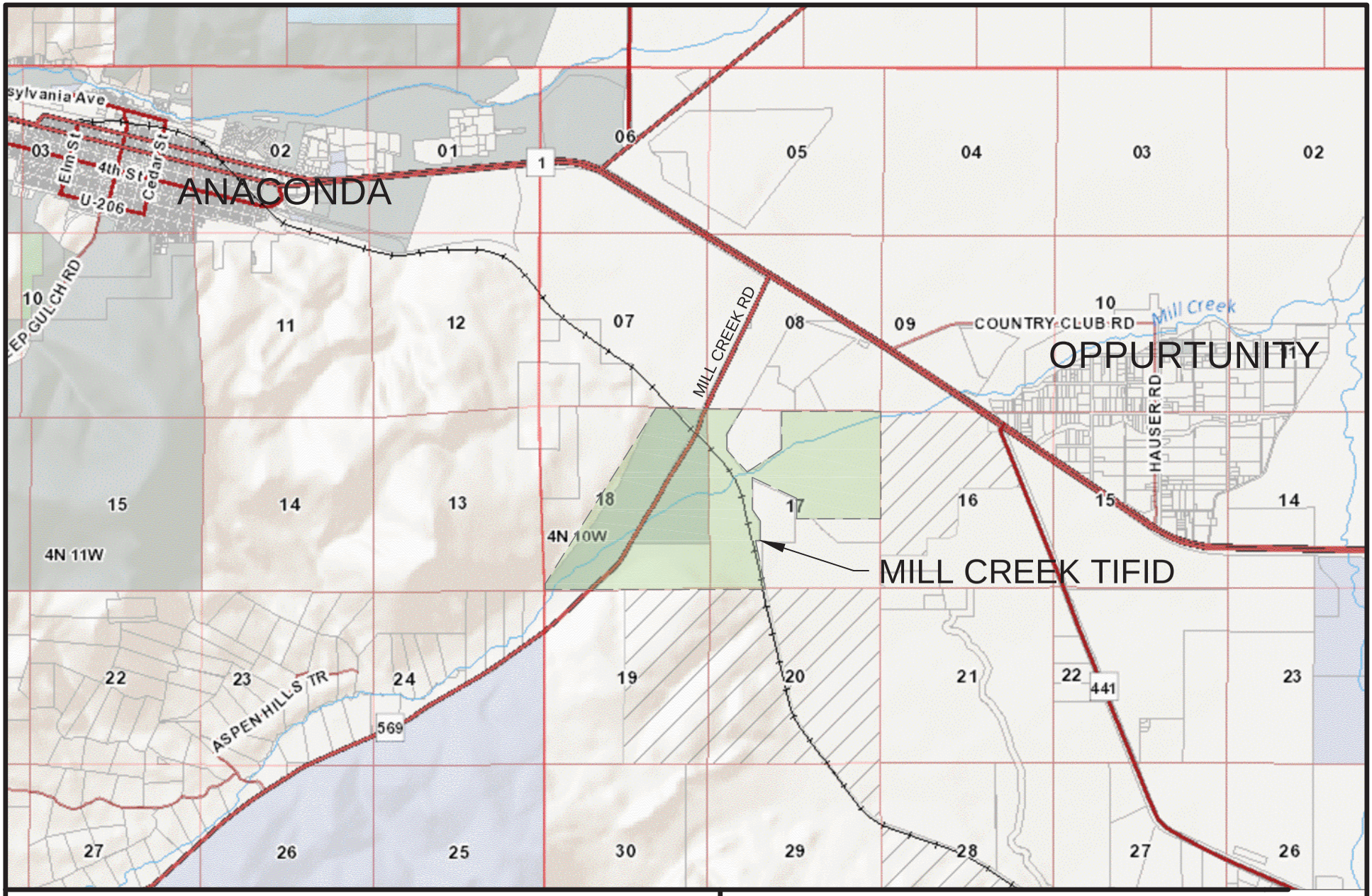
We would like you to identify any environmental permitting requirements or other issues of interest to your agency that we should consider in the development of this project. Any other statements you may have on this project will help us determine the need for further coordination and for more detailed evaluation of potential project impacts. If we do not receive a reply, we will assume that your agency has no comments to offer about this project.

If you have any questions, please contact me at (406) 599-6612 for assistance.

Sincerely,

Michael C. Mahon, P.E.
Principal Engineer

Enclosures: Figure 1 – Site Vicinity Map



Copper Environmental Consulting, LLC

COPPER ENVIRONMENTAL
CONSULTING, LLC.
406 East Park Avenue Suite 2
Anaconda, MT 59711
(406) 563-2700

FIGURE 1

SITE VICINITY MAP
MILL CREEK TIFID

DATE: 7/17/2013	BY: KWP	FOR: MCM

Copper Environmental
Consulting, LLC

406 East Park Avenue, Suite 2
Anaconda, Montana 59711
(406) 563-2700
Fax: (406) 563-2701

July 22, 2013

Mr. Daryl Reed
Department of Environmental Quality
Federal Superfund Section
P.O. Box 200901
Helena, MT 59620-0901
dreed@mt.gov

RE: Mill Creek Tax Increment Financing Industrial District
Anaconda-Deer Lodge County, Montana

Mr. Reed,

Copper Environmental Consulting, LLC has been retained by Anaconda-Deer Lodge County (ADLC) to develop a Preliminary Engineering Report which is a planning document for the Mill Creek Tax Increment Financing Industrial District (TIFID). Guidelines require us to advise appropriate agencies of the scope of the project and request comments.

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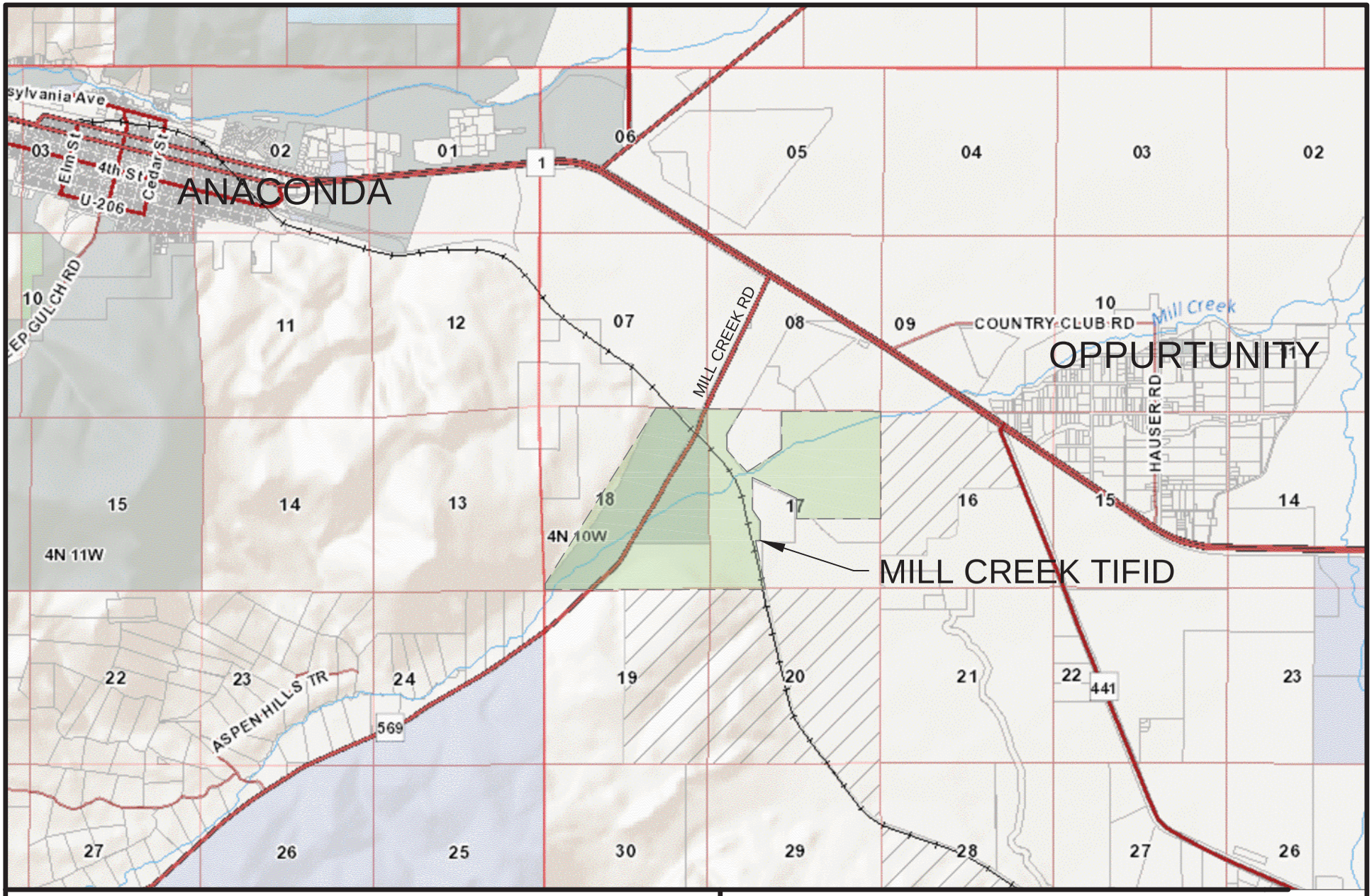

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FIGURE 1

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MILL CREEK TIFID

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Copper Environmental
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406 East Park Avenue, Suite 2
Anaconda, Montana 59711
(406) 563-2700
Fax: (406) 563-2701

July 22, 2013

Mr. Stephen Story
State Floodplain Engineer
Department of Natural Resources and Conservation
Water Resources Bureau
1429 9th Avenue
Helena, MT 59621-1601
sestory@mt.gov

RE: Mill Creek Tax Increment Financing Industrial District
Anaconda-Deer Lodge County, Montana

Dear Mr. Story,

Copper Environmental Consulting, LLC has been retained by Anaconda-Deer Lodge County (ADLC) to develop a Preliminary Engineering Report which is a planning document for the Mill Creek Tax Increment Financing Industrial District (TIFID). Guidelines require us to advise appropriate agencies of the scope of the project and request comments.

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Development alternatives for water, wastewater, and stormwater systems include:

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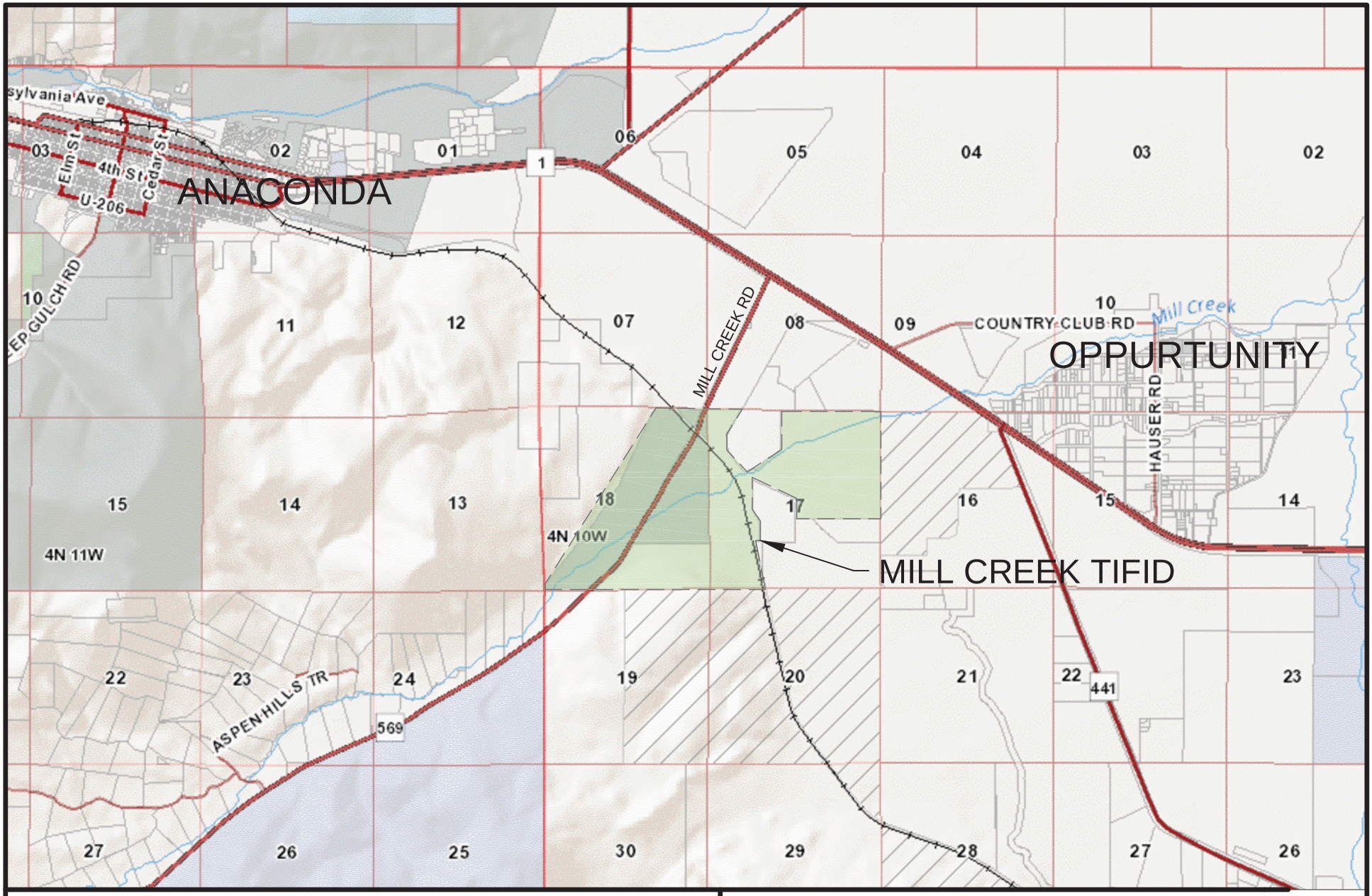

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Anaconda, Montana 59711
(406) 563-2700
Fax: (406) 563-2701

July 22, 2013

Mr. Charles Coleman
Environmental Protection Agency, Remedial Project manager
Region 8, Montana Office, Federal Building
10 West 15th Street, Suite 3200
Helena, MT 59626
coleman.charles@epa.gov

RE: Mill Creek Tax Increment Financing Industrial District
Anaconda-Deer Lodge County, Montana

Mr. Coleman,

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Development alternatives for water, wastewater, and stormwater systems include:

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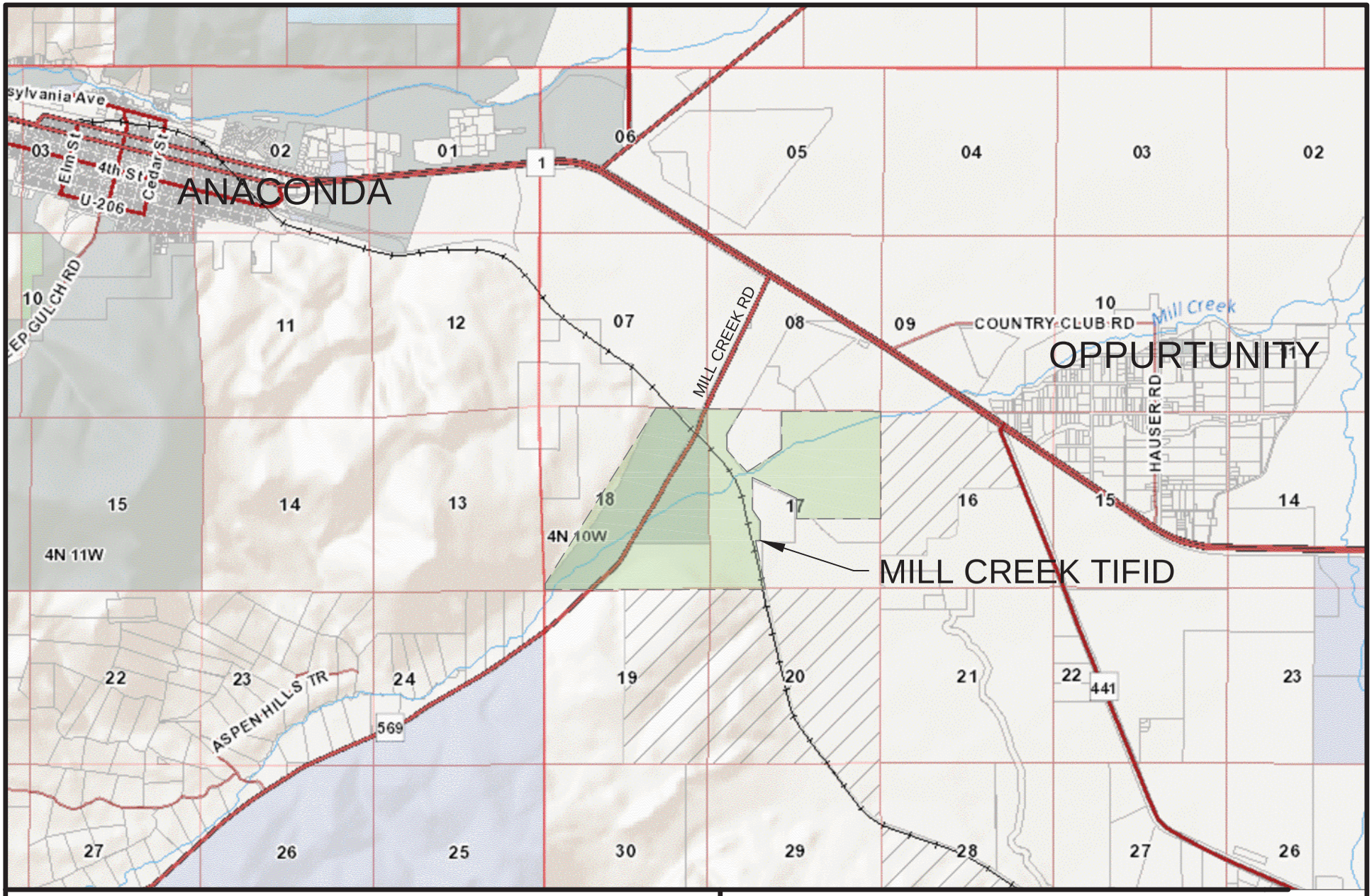
If you have any questions, please contact me at (406) 599-6612 for assistance.

Sincerely,

Michael C. Mahon, P.E.
Principal Engineer

Enclosures: Figure 1 – Site Vicinity Map



Copper Environmental Consulting, LLC

COPPER ENVIRONMENTAL
CONSULTING, LLC.
406 East Park Avenue Suite 2
Anaconda, MT 59711
(406) 563-2700

FIGURE 1

SITE VICINITY MAP
MILL CREEK TIFID

DATE: 7/17/2013	BY: KWP	FOR: MCM

Copper Environmental
Consulting, LLC

406 East Park Avenue, Suite 2
Anaconda, Montana 59711
(406) 563-2700
Fax: (406) 563-2701

July 22, 2013

Acting Supervisor
Montana Department of Fish, Wildlife & Parks
Region 2
3201 Spurgin Road
Missoula, MT 59804

RE: Mill Creek Tax Increment Financing Industrial District
Anaconda-Deer Lodge County, Montana

To Whom It May Concern,

Copper Environmental Consulting, LLC has been retained by Anaconda-Deer Lodge County (ADLC) to develop a Preliminary Engineering Report which is a planning document for the Mill Creek Tax Increment Financing Industrial District (TIFID). Guidelines require us to advise appropriate agencies of the scope of the project and request comments.

The Mill Creek TIFID is located east of the former Anaconda Company smelter site along Mill Creek Road, Route 569, as shown on Figure 1, enclosed. The site is approximately 749 acres in total area. ADLC is proposing to subdivide the site into parcels for commercial and/or industrial uses. The project area is located within a Superfund site (Anaconda Regional Water and Waste Operable Unit). Well bans within the Superfund site eliminate the possibility of onsite access to groundwater.

Development alternatives for water, wastewater, and stormwater systems include:

- Extending existing sewer mains and connecting to the existing Anaconda sewer system;
- Construction of a new sewer collection system and connecting to nearby Anaconda sewer mains with a new lift station on the south side of Highway 1;
- Extending existing on-site water mains to serve the development; and
- Constructing a stormwater collection system for the proposed development.

The preferred alternatives for water, wastewater and stormwater systems have not been selected.

We would like you to identify any wildlife or fisheries concerns or other issues of interest to your agency that we should consider in the development of this project. Any other statements you may have on this project will help us determine the need for further coordination and for more detailed evaluation of potential project impacts. If we do not receive a reply, we will assume that your agency has no comments to offer about this project.

If you have any questions, please contact me at (406) 599-6612 for assistance.

Sincerely,

Michael C. Mahon, P.E.
Principal Engineer

Enclosures: Figure 1 – Site Vicinity Map

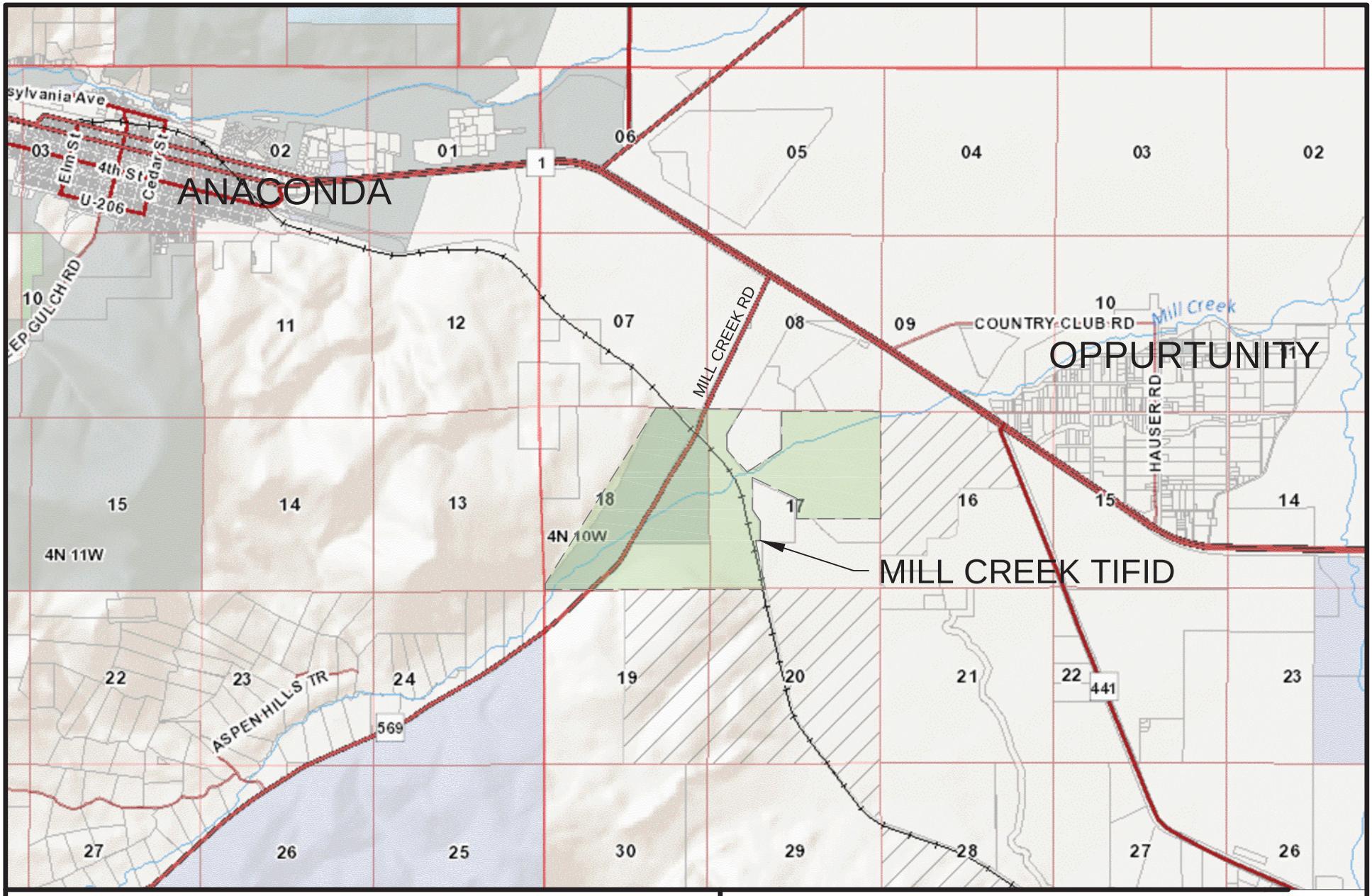


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FIGURE 1

SITE VICINITY MAP
MILL CREEK TIFID

DATE: 7/17/2013	BY: KWP	FOR: MCM

Copper Environmental
Consulting, LLC

406 East Park Avenue, Suite 2
Anaconda, Montana 59711
(406) 563-2700
Fax: (406) 563-2701

July 22, 2013

Mr. Damon Murdo
State Historic Preservation Office
Montana Historical Society
P.O. Box 201202
Helena, MT 59620-1202
dmurdo@mt.gov

RE: Mill Creek Tax Increment Financing Industrial District
Anaconda-Deer Lodge County, Montana

Mr. Murdo,

Copper Environmental Consulting, LLC has been retained by Anaconda-Deer Lodge County (ADLC) to develop a Preliminary Engineering Report which is a planning document for the Mill Creek Tax Increment Financing Industrial District (TIFID). Guidelines require us to advise appropriate agencies of the scope of the project and request comments.

The Mill Creek TIFID is located east of the former Anaconda Company smelter site along Mill Creek Road, Route 569, as shown on Figure 1, enclosed. The site is approximately 749 acres in total area. ADLC is proposing to subdivide the site into parcels for commercial and/or industrial uses. The project area is located within a Superfund site (Anaconda Regional Water and Waste Operable Unit). Well bans within the Superfund site eliminate the possibility of onsite access to groundwater.

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- Construction of a new sewer collection system and connecting to nearby Anaconda sewer mains with a new lift station on the south side of Highway 1;
- Extending existing on-site water mains to serve the development; and
- Constructing a stormwater collection system for the proposed development.

The preferred alternatives for water, wastewater and stormwater systems have not been selected.

In an effort to help us identify any historical or archeological resources that may be affected by the proposed project, we would like to request Cultural Resource Information System and Cultural Resource Annotated Bibliography System searches for the following areas:

- T-4-N, R-10-W, Sections 7, 8, 9, 16, 17, 18, 19, 20, 21; and
- T-4-N, R-11-W, Sections 12, 13 and 24.

Any other statements you may have on this project will help us determine the need for further coordination and for more detailed evaluation of potential project impacts. If we do not receive a reply, we will assume that your agency has no comments to offer about this project.

If you have any questions, please contact me at (406) 599-6612 for assistance.

Sincerely,

Michael C. Mahon, P.E.
Principal Engineer

Enclosures: Figure 1 – Site Vicinity Map

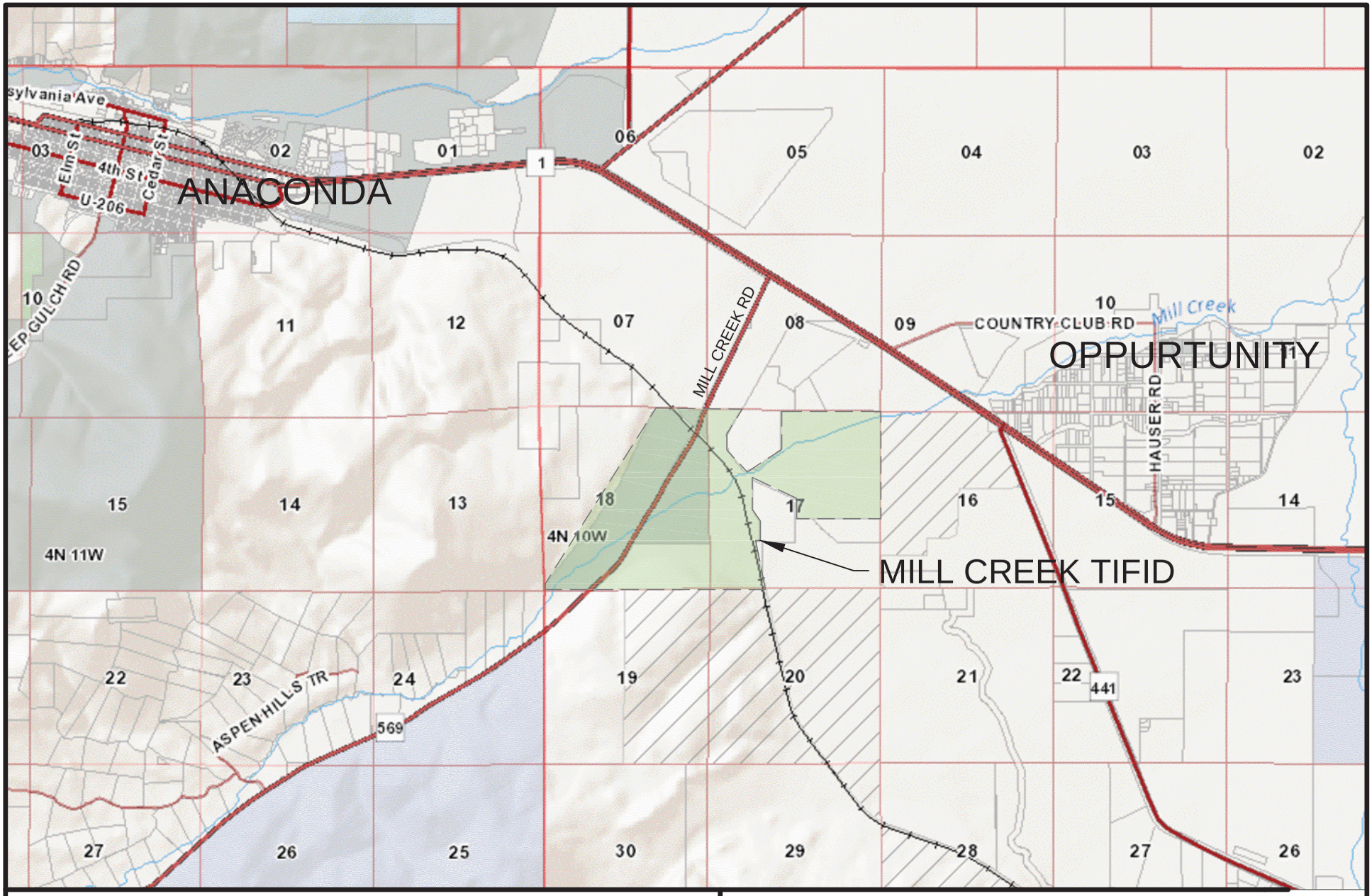

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FIGURE 1

SITE VICINITY MAP
MILL CREEK TIFID

DATE: 7/17/2013	BY: KWP	FOR: MCM

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Consulting, LLC

406 East Park Avenue, Suite 2
Anaconda, Montana 59711
(406) 563-2700
Fax: (406) 563-2701

July 22, 2013

Mr. R. Mark Wilson
US Fish and Wildlife Services
Ecological Services
585 Shepard Way
Helena, MT 59601
Mark_Wilson@fws.gov

RE: Mill Creek Tax Increment Financing Industrial District
Anaconda-Deer Lodge County, Montana

Dear Mr. Wilson,

Copper Environmental Consulting, LLC has been retained by Anaconda-Deer Lodge County (ADLC) to develop a Preliminary Engineering Report which is a planning document for the Mill Creek Tax Increment Financing Industrial District (TIFID). Guidelines require us to advise appropriate agencies of the scope of the project and request comments.

The Mill Creek TIFID is located east of the former Anaconda Company smelter site along Mill Creek Road, Route 569, as shown on Figure 1, enclosed. The site is approximately 749 acres in total area. ADLC is proposing to subdivide the site into parcels for commercial and/or industrial uses. The project area is located within a Superfund site (Anaconda Regional Water and Waste Operable Unit). Well bans within the Superfund site eliminate the possibility of onsite access to groundwater.

Development alternatives for water, wastewater, and stormwater systems include:

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- Extending existing on-site water mains to serve the development; and
- Constructing a stormwater collection system for the proposed development.

The preferred alternatives for water, wastewater and stormwater systems have not been selected.

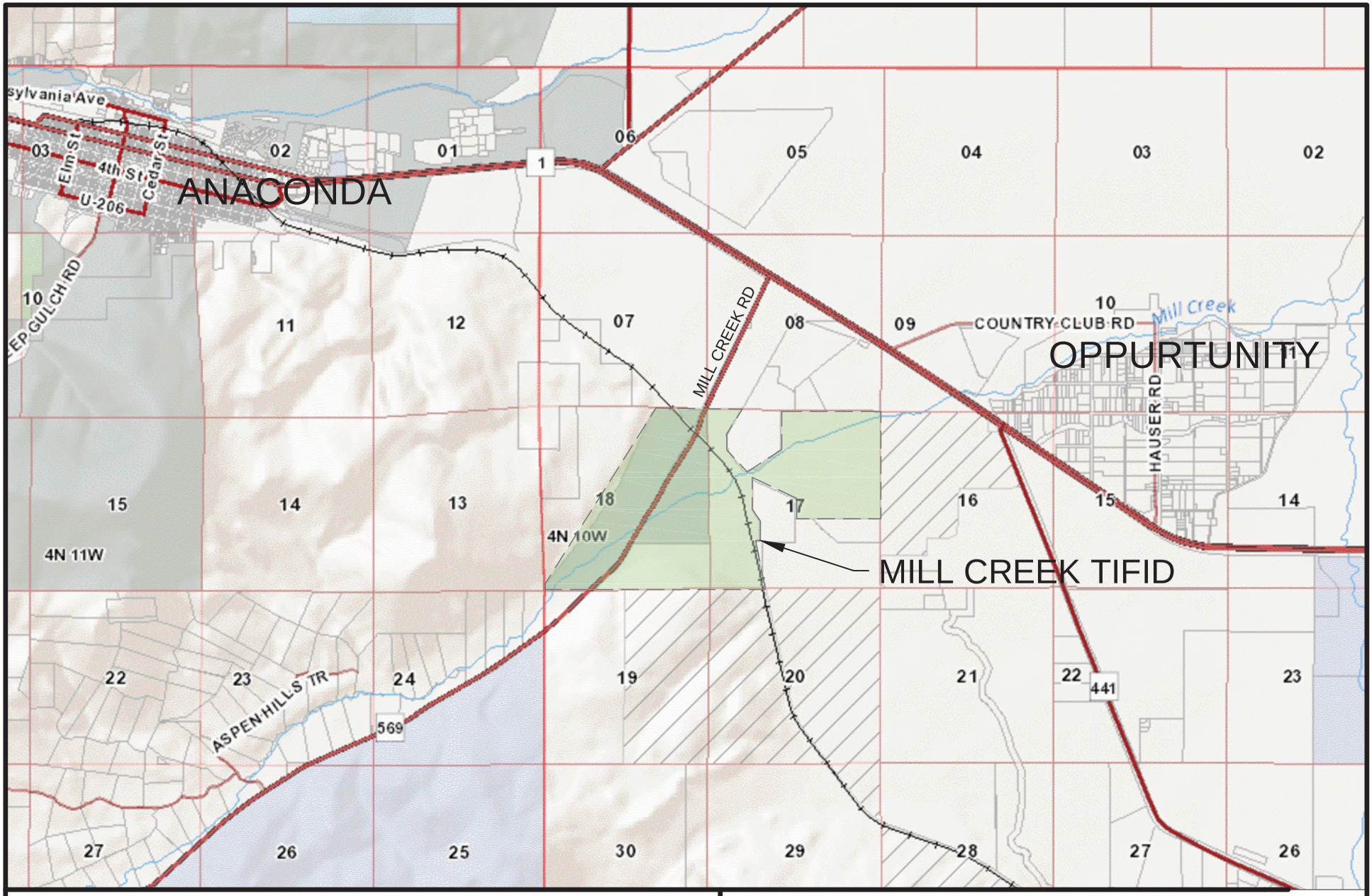
We would like you to identify any federally-listed threatened or endangered species or critical habitat for such species that occur or may occur in the project area. Any other statements you may have on this project will help us determine the need for further coordination and for more detailed evaluation of potential project impacts. If we do not receive a reply, we will assume that your agency has no comments to offer about this project.

If you have any questions, please contact me at (406) 599-6612 for assistance.

Sincerely,

Michael C. Mahon, P.E.
Principal Engineer

Enclosures: Figure 1 – Site Vicinity Map



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406 East Park Avenue Suite 2
Anaconda, MT 59711
(406) 563-2700

FIGURE 1

SITE VICINITY MAP
MILL CREEK TIFID

DATE: 7/17/2013	BY: KWP	FOR: MCM

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
BILLINGS REGULATORY OFFICE
POST OFFICE BOX 2256
BILLINGS, MONTANA 59103-2256

REPLY TO
ATTENTION OF

August 29, 2013

Regulatory Branch
Montana State Program
Corps No. **NWO-2013-01334-MTB**

Subject: Mill Creek Tax Increment Financing Industrial District

Mr. Michael Mahon
Copper Environmental Consulting, LLC
406 East Park Avenue, Suite 2
Anaconda, Montana 59711

Dear Mr. Mahon:

Reference is made to your letter requesting comments on behalf of Anaconda-Deer Lodge County regarding the Mill Creek Tax Increment Financing Industrial District located in Section 17, Township 4 North, Range 10 West, in Deer Lodge County, Montana.

Under the authority of Section 404 of the Clean Water Act, Department of the Army (DA) permits are required for the discharge of fill material into waters of the United States. Waters of the United States include the area below the ordinary high water (OHW) mark of stream channels and lakes or ponds connected to the tributary system, and wetlands adjacent to these waters. Isolated waters and wetlands, as well as man-made channels and ditches, may be waters of the United States, which must be determined on a case-by-case basis.

It is unclear from the information provided what jurisdictional waters, if any, will be impacted. If your final design prescribes the placement of fill material in any of the jurisdictional areas described above, please submit an application form prior to doing any work. The application can be found at http://www.nwo.usace.army.mil/Missions/RegulatoryProgram/Montana.aspx. We will determine the type, if any, of permit required.

Work in an aquatic site should be shown on a map identifying the Quarter Section, Township, Range and County, Latitude and Longitude, Decimal Degrees (datum NAD 83), and the dimensions of work in each aquatic site. Include a delineation of special aquatic sites such as wetlands or pool and riffle complexes that will be impacted. Any loss of an aquatic site may require mitigation. Mitigation requirements will be determined during the Department of the Army permitting review.

Printed on Recycled Paper

Please contact me at (406) 657-5910 if you have any questions and reference Corps File Number NWO-2013-01334-MTB.

Sincerely,

Cathy Juhas
Regulatory Project Manager

Copy Furnished:
Anaconda-Deer Lodge County
800 South Main Street
Anaconda, Montana 59711-2950

Printed on Recycled Paper

DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

HELENA WATER RESOURCES REGIONAL OFFICE

STATE OF MONTANA

PHONE: (406) 444-6999
TELEFAX NUMBER: (406) 444-9317

1424 9TH AVENUE
PO BOX 201601
HELENA, MT 59620-1601

July 30, 2013

Mr. Michael C. Mahon, P.E.
Copper Environmental Consulting
406 E. Park Ave, Suite 2
Anaconda, MT 59711

RE: Project Review & Comment – Mill Creek Tax Increment Financing Industrial District, Anaconda-Deer Lodge County, MT

Dear Mr. Mahon:

Per your request, the DNRC Helena Regional Office has completed a cursory review of the proposed Mill Creek Tax Increment Financing Industrial District project in Anaconda-Deer Lodge County, Montana. Our review focused solely on the project's potential impacts to flood risk and the regulatory floodplain requirements. Additional impacts relating to water rights, wetlands, etc. are beyond the scope and purview of this review, and should be sought from the appropriate agency programs.

Review of the Effective FEMA Flood Insurance Rate Maps (FIRMs), Effective Map Panels 3000170131B and 3000170150B, indicate portions of the proposed Mill Creek Tax Increment Financing Industrial District project are located in an Approximate Zone A special flood hazard area associated with Mill Creek. We recommend you contact the Anaconda-Deer Lodge County floodplain administrator to discuss the project and confirm the permitting requirements. In some cases, communities regulate to floodplain boundaries beyond those shown on the FEMA FIRMs. In addition, there may be other permitting requirements associated with subdivisions. Therefore it is always sound practice to discuss projects with the local officials, if you haven't already.

Prior to beginning work on the proposed project, all applicable county, state, and federal permits should be obtained. It is the responsibility of the applicant to determine which permits are required for the proposed project.

Please contact me at 406.444.9724 directly if you would like to discuss these comments or have additional questions.

Sincerely,

John Connors, P.E., CFM
Helena Regional Office Engineer, DNRC WRD

STATE WATER PROJECTS BUREAU (406) 444-6646
WATER MANAGEMENT BUREAU (406) 444-6637
WATER OPERATIONS BUREAU (406) 444-0860
WATER RIGHTS BUREAU (406) 444-6610

From: Coleman, Charles
To: Mike Mahon
Cc: Chavez, Joel; Carl Nyman
Subject: RE: Mill Creek TIFID Information Request
Date: Wednesday, July 24, 2013 10:28:00 AM

Mike,

As you identified, this TFIID is within the Anaconda Smelter Superfund site. All development within the Superfund site must go though the Anaconda-Deer Lodge County Development Permit System. This will ensure that any superfund issues related to the site will be addressed appropriately. Other environmental permits are administered through the State of Montana (potentially other federal agencies may be involved if this project were to impact wetland or stream areas). Additionally, land use covenants or restrictions may have been placed by previous landowners.

If you have any questions regarding past and future superfund activities, please call me at 406-457-5038.

Charlie

From: Mike Mahon [mailto:mike.Mahon@copperenv.com]
Sent: Monday, July 22, 2013 11:29 AM
To: Coleman, Charles
Subject: Mill Creek TIFID Information Request

Mr. Coleman,

Copper Environmental Consulting, LLC has been retained by Anaconda-Deer Lodge County to develop a Preliminary Engineering Report which is a planning document for the Mill Creek Tax Increment Financing Industrial District (TIFID). Please see the attached request for information regarding this TIFID. A copy of this request was also mailed to your office.

Thank you for your help.

Mike Mahon, P.E.
Copper Environmental Consulting
406 East Park Avenue, Suite 2
Anaconda, MT 59711
Phone (406) 563-2700
Fax (406) 563-2701
Mobile (406) 599-6612
email: mike.mahon@copperenv.com
www.copperenv.com

Montana Fish, Wildlife & Parks

Region 2 Office
3201 Spurgin Road
Missoula, MT 59804-3101
406-542-5500
Fax 406-542-5529

August 19, 2013

Michael C. Mahon, Principal Engineer
mike.mahon@copperenv.com
Copper Environmental Consulting, LLC
406 E. Park Ave. Ste. 2
Anaconda, MT 59711

Reference: Mill Creek Tax Increment Financing Industrial District, Anaconda-Deer Lodge County--Resource information for Preliminary Engineering Report

Dear Mr. Mahon:

Montana Fish, Wildlife & Parks (FWP) has reviewed the information you provided regarding the potential "development alternatives for water, wastewater, and stormwater systems" for the Mill Creek Industrial District southeast of Anaconda. While FWP does not have preferences at this time for which alternatives might be selected for the water systems, we offer the following information relating to fish and wildlife resources at this early stage.

1. Mill Creek supports populations of brown trout, as well as westslope cutthroat trout, a Montana Species of Concern[1] (SOC). In order to protect Mill Creek and its associated fisheries, we recommend that a 150-foot naturally vegetated buffer plus 50 additional feet of building setback be applied to any development along the stream.

2. Potential occurrences in or near the project area of Threatened or Endangered Species (under the Federal Endangered Species Act) and/or any additional Montana SOC can be obtained from the Montana Natural Heritage Program. Requests can be made under the data tab at http://mtnhp.org.

3. We note that a Montana Stream Protection Act (SPA) 124 permit administered by FWP would be required for any construction work on or adjacent to Mill Creek. For further information, please contact our area fisheries biologist Jason Lindstrom (phone 406-563-7435 in Anaconda, jlindstrom@mt.gov).

[1] A native animal breeding in Montana that is considered to be "at risk" due to declining population trends, threats to its habitats, and/or restricted distribution. The purpose of Montana's SOC listing is to highlight species in decline and encourage conservation efforts to reverse population declines and prevent the need for future listing as Threatened or Endangered Species under the Federal Endangered Species Act.

4. Outdoor sewage treatment system. It appears that this type of system is not being considered, but if it were, FWP notes that bears, elk, moose and deer are attracted to outdoor sewage treatment systems. The wastewater and associated vegetation can be a major attractant to bears. For instance, our regional bear specialist Jamie Jonkel has had experience in the Yellowstone Ecosystem managing multiple grizzly and black bears feeding on sewage sludge and the associated vegetation at lagoons in the Canyon Village and Pahaska Teepee areas. If a brown-water site were to become attractive to wildlife, it may need to be enclosed by an electrified fence in order to help avoid problems with bears or other wildlife. If you needed information on electric fence designs or wildlife-resistant fencing designs, please contact Jamie Jonkel at 406-542-5508 in Missoula or jajonkel@mt.gov.

Thank you for providing the opportunity for FWP to comment on this project.

Sincerely,

Michael Thompson
Acting Regional Supervisor

ML/sr

Michael Mahon
Copper Environmental
406 East Park Ave, Suite 2
Anaconda MT 59711

RE: MILL CREEK TIFID, ALTERNATIVES FOR WATER, WASTEWATER, AND STORMWATER. SHPO Project #: 2013072212

Dear Mr. Mahon:

I have conducted a cultural resource file search for the above-cited project. According to our records there have been several previously recorded sites within the designated search locales. In addition to the sites there have been a few previously conducted cultural resource inventories done in the areas. I've attached a list of these sites and reports. If you would like any further information regarding these sites or reports you may contact me at the number listed below.

Based on the number of sites within the proposed project area, some of which are listed on the National Register of Historic Places, and the ground disturbance required by this undertaking we feel that this project has the potential to impact cultural properties. We, therefore, recommend that when a preferred alternative is selected a cultural resource inventory be conducted in order to determine whether or not sites exist and if they will be impacted by the proposed project.

If this project involves a federal agency, it may constitute a federal undertaking subject to compliance with Section 106 of the National Historic Preservation Act. As such it will be important for you to coordinate efforts in the further consideration of impacts to cultural resources through the federal agency for consultation with our office.

If you have any further questions or comments you may contact me at (406) 444-7767 or by e-mail at dmurdo@mt.gov. I have attached an invoice for the file search. Thank you for consulting with us.

Sincerely,

Damon Murdo
Cultural Records Manager
State Historic Preservation Office

Big Sky. Big Land. Big History.
Montana
Historical Society

STATE HISTORIC PRESERVATION OFFICE

Cultural Resource Information Systems

CRIS Township, Range, Section Report

Report Date: 07/22/2013

Site #	Twp	Rng	Sec	Qs	Site Type1	Site Type 2	Time Period	Owner	NR Status
24DL0300	4 N	10W	7	Comb	Historic Smelter	Historic Stamp Mill	Historic More Than One Decade	Private	undetermined
24DL0211	4 N	10W	7	Comb	Historic District	Multi County	Historic More Than One Decade	Combination	NR Listed
24DL0756	4 N	10W	8	Comb	Historic Energy Development	Multi County	1950-1959	Other	CD
24DL0788	4 N	10W	8	NE	Historic Irrigation System	Null	1930-1939	Combination	undetermined
24DL0236	4 N	10W	9	NE	Historic Homestead/Farmstead	Null	1870-1879	Private	undetermined
24DL0788	4 N	10W	9	comb	Historic Irrigation System	Null	1930-1939	Combination	undetermined
24DL0788	4 N	10W	16	comb	Historic Irrigation System	Null	1930-1939	Combination	undetermined
24DL0211	4 N	10W	17	Comb	Historic District	Multi County	Historic More Than One Decade	Combination	NR Listed
24DL0756	4 N	10W	17	NW	Historic Energy Development	Multi County	1950-1959	Other	CD
24DL0238	4 N	10W	17	comb	Lithic Material Concentration	Firehearths or Roasting Pits, FCR	No Indication of Time	Private	undetermined
24DL0211	4 N	10W	18	Comb	Historic District	Multi County	Historic More Than One Decade	Combination	NR Listed
24DL0300	4 N	10W	18	Comb	Historic Smelter	Historic Stamp Mill	Historic More Than One Decade	Private	undetermined
24DL0297	4 N	10W	18	NE	Historic Architecture	Historic Residence	1940-1949	Private	undetermined
24DL0298	4 N	10W	18	NE	Historic Architecture	Historic Residence	1930-1939	Private	undetermined
24DL0295	4 N	10W	18	NE	Historic Architecture	Historic Residence	1900-1909	Private	undetermined
24DL0294	4 N	10W	18	NE	Historic Homestead/Farmstead	Historic Outbuildings	1900-1909	Private	undetermined
24DL0293	4 N	10W	18	NE	Historic Architecture	Historic Residence	1920-1930	Private	undetermined
24DL0266	4 N	10W	18	NW	Historic Vehicular/Foot Bridge	Null	1950-1959	No Data	undetermined
24DL0238	4 N	10W	18	comb	Lithic Material Concentration	Firehearths or Roasting Pits, FCR	No Indication of Time	Private	undetermined
24DL0238	4 N	10W	19	NW	Lithic Material Concentration	Firehearths or Roasting Pits, FCR	No Indication of Time	Private	undetermined
24DL0211	4 N	10W	20	Comb	Historic District	Multi County	Historic More Than One Decade	Combination	NR Listed
24DL0788	4 N	10W	21	comb	Historic Irrigation System	Null	1930-1939	Combination	undetermined
24DL0211	4 N	11W	12	Comb	Historic District	Multi County	Historic More Than One Decade	Combination	NR Listed
24DL0300	4 N	11W	12	Comb	Historic Smelter	Historic Stamp Mill	Historic More Than One Decade	Private	undetermined
24DL0290	4 N	11W	12	SW	Historic Mining	Historic Smelter	1910-1919	Private	NR Listed
24DL0435	4 N	11W	12		Historic Mining	Historic Irrigation System	1940-1949	Private	undetermined
24DL0300	4 N	11W	13	NE	Historic Smelter	Historic Stamp Mill	Historic More Than One Decade	Private	undetermined
24DL0238	4 N	11W	13	SE	Lithic Material Concentration	Firehearths or Roasting Pits, FCR	No Indication of Time	Private	undetermined
24DL0465	4 N	11W	24	Comb	Lithic Material Concentration	Null	No Data	Private	undetermined
24DL0466	4 N	11W	24	Comb	Lithic Material Concentration	Null	No Data	Private	undetermined
24DL0300	4 N	11W	24	NW	Historic Smelter	Historic Stamp Mill	Historic More Than One Decade	Private	undetermined
24DL0467	4 N	11W	24	SE	Historic Irrigation System	Historic Building Foundation	Historic Period	Private	undetermined
24DL0238	4 N	11W	24	comb	Lithic Material Concentration	Firehearths or Roasting Pits, FCR	No Indication of Time	Private	undetermined

Township: 4 N Range: 10W Section: 17

JEPSON DANIEL A., ET AL.

12 / /1989 *CLASS I AND CLASS III CULTURAL RESOURCE INVENTORIES OF AT & T SPOKANE-BILLINGS FIBER OPTIC FACILITIES IN MONTANA*

CRABS Document Number: ZZ 6 10823 Agency Document Number: 00

Township: 4 N Range: 10W Section: 17

SHIVE JAMES J. ET AL.

1 / /2001 *SILVER BOW GENERATION PROJECT APPLICATION TO THE DEPARTMENT OF ENVIROMENTAL QUALITY CULTUAL AND PALEONTOLOGICAL RESOURCE MANAGEMENT TECHNICAL DATA*

CRABS Document Number: ZZ 6 32883 Agency Document Number:

Township: 4 N Range: 10W Section: 18

SHOVERS BRIAN

10 / /1988 *CULTURAL RESOURCE INVENTORY AND ASSESSMENT OF MILL CREEK MONTANA (SAME REPORT BY BRIAN SHOVERS DATED MAY 1988 IS ATTACHED)*

CRABS Document Number: DL 6 2467 Agency Document Number:

Township: 4 N Range: 11W Section: 12

WOODS CLYDE M., ET AL.

11 /1 /1988 *SAMPLING PLAN FOR FLUE DUST MATERIALS AT THE ANACONDA SMELTER SITE, DETERMINATION OF ELIGIBILITY AND EFFECT FOR CULTURAL RESOURCES*

CRABS Document Number: DL 6 2468 Agency Document Number:

United States Department of the Interior

Fish and Wildlife Service

Ecological Services
Montana Field Office
585 Shepard Way, Suite 1
Helena, Montana 59601-6287
Phone: (406) 449-5225 Fax: (406) 449-5339

File: M29 Public (I) July 31, 2013

Michael C. Mahon
Copper Environmental Consulting, LLC
406 East Park Avenue, Suite 2
Anaconda, Montana 59711

Dear Mr. Mahon:

This is in response to your July 22, 2013, letter regarding proposed water development alternatives of the Mill Creek Tax Increment Financing Industrial District, Preliminary Engineering Report, for Anaconda-Deer Lodge County. The development of water, wastewater, and storm water systems would consist of 749 acres in total area, east of the former Anaconda Company smelter site, along Mill Creek Road, Route 569.Your letter and map of the proposed site vicinity were received at our office on July 24, 2013.

We offer the following comments under the authority of and in accordance with the Migratory Bird Treaty Act (MBTA; 16 U.S.C 703 et seq.), as amended, Bald and Golden Eagle Protection Act (BGEPA; 16 U.S.C. 668-668d, 54 Stat. 250), as amended, Executive Order 13186 *Responsibilities of Federal Agencies to Protect Migratory Birds*, Endangered Species Act (ESA; 16 U.S.C. 1531 et seq.) as amended, and the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq*.).

Threatened and Endangered Species
Outlined below is the current list of threatened, endangered and candidate species occurring within the boundaries of Deer Lodge County:

Scientific name	Common name	Status*
Thymallus arcticus	Arctic Grayling (Upper Missouri River DPS)	C
Salvelinus confluentus	Bull Trout	LT, CH
Lynx canadensis	Canada Lynx	LT
Ursus arctos horribilis	Grizzly Bear	LT
Gulo gulo luscus	Wolverine	P
Pinus albicaulis	Whitebark Pine	C

*LE=Listed as Endangered, LT=Listed Threatened, C=Candidate species for listing, P=Proposed, CH=Designated Critical Habitat

Given the proposed project alternatives as described in your letter and accompanying materials, we do not anticipate adverse effects to threatened, endangered, or candidate species or critical habitat to result from proposed project implementation within the designated Project Area, as defined by the Mill Creek TIFID Site Vicinity Map. Any viable wastewater treatment options that improve the quality of effluent that reaches waters in the State of Montana are likely to prove beneficial to fish, wildlife, and their habitat.

In regards to the candidate species, Whitebark Pine and Arctic Grayling, we appreciate your analysis in association with this project. Candidate species are those placed on the candidate list for future action, meaning those species do not receive statutory protection under the ESA. Candidates are reviewed annually by the Service to determine if they continue to warrant listing or to reassess their listing priority. Ideally, sufficient threats can be removed to eliminate the need for listing. If threats are not addressed or the status of the species declines, a candidate species can move up in priority for a listing proposal. Based on the project information provided, we do not anticipate adverse effects that would be likely to jeopardize Whitebark Pine and Arctic Grayling in association with the project.

Additionally, we are not aware of active bald eagle or golden eagle nest occurrences within one mile of the proposed project site. Should occupied eagle nests occur within 0.5 mile of the proposed site, we recommend that you comply with the recommended temporary seasonal and distance constructions buffers stipulated in the *2010 Montana Bald Eagle Management Guidelines: An Addendum to Montana Bald Eagle Management Plan (1994).*

Other recommendations include the following:

- We strongly recommend coordination with Montana Fish, Wildlife and Parks at 1420 East Sixth Ave., P.O. Box 200701, Helena, Montana 59620, (406) 444-2535 and the Montana Natural Heritage Program, 1515 East 6th Avenue, Box 201800, Helena, Montana 59620, (406) 444-5354. Both of these agencies may be able to provide updated, site-specific information regarding eagle and other raptor nests, as well as all other fish, wildlife, and sensitive plant resources occurring in the proposed project areas that will assist you.

- If work is proposed to take place during the breeding season and may result in take of migratory birds, their eggs, or active nests, the Service recommends that the project proponent take all practicable measures to avoid and minimize take, such as maintaining adequate buffers, to protect the birds until the young have fledged. Active nests may not be removed.

The Service appreciates your efforts to incorporate fish and wildlife resource concerns, including threatened and endangered species, into your project planning. Should you have any questions, please contact Kelly Douglas within this office at (406) 449-5225, extension 219.

Sincerely,

for Jodi L. Bush
Field Supervisor

From: Miller, Martin
To: mike.mahon@copperenv.com
Subject: Mill Creek TIFID
Date: Wednesday, August 21, 2013 10:21:09 AM
Attachments: 14mtco0009.zip

Michael,

The information you requested is attached. Please let me know if you would like printed version of these documents.

The map(s) are produced in Adobe GeoPDF format. With the appropriate Adobe Reader, it provides a convenient way to query and understand the information presented on the map. Documentation is included.

We also provide information on wetlands in the project vicinity. Explanatory material is included.

In order to help us improve our services to you, we invite you to take a simple survey. The survey is intended to gather some basic information on the value and quality of the information and services you recently received from the Montana Natural Heritage Program. The survey is short and should not take more than a few minutes to complete. All information will be kept confidential and will be used internally to improve the delivery of services and to help document the value of our services. Use this link to go to the survey: http://www.surveymonkey.com/s/RYN8Y8L.

Let me know if you have any questions.

Thanks,

Martin Miller | Data Assistant | Montana Natural Heritage Program (http://mtnhp.org) ¦ P.O. Box 201800, 1515 East Sixth Ave., Helena, MT 59620-1800 | (406) 444-3290 | (406) 444-0266 (fax) | martinm@mt.gov

MONTANA
Natural Heritage
Program

P.O. Box 201800 • 1515 East Sixth Avenue • Helena, MT 59620-1800 • fax 406.444.0266 • tel 406.444.5354 • http://mtnhp.org

August 21, 2013

Michael Mahon
Copper Environmental Consulting LLC
406 East Park Avenue, Suite 2
Anaconda, Montana 59711

Dear Michael,

I am writing in response to your recent request regarding Montana Species of Concern in the vicinity of the Mill Creek TIFID project, in Sections 17 and 18, T04N, R10W, in Deer Lodge County. I checked our databases for information in this general area and have enclosed 7 species occurrence reports for 4 animal species of concern, a map depicting species of concern and wetland locations, and explanatory material. Note that the maps are in Adobe GeoPDF format. With the appropriate Adobe Reader, it provides a convenient way to query and understand the information presented on the map. Documentation is included.

Please keep in mind the following when using and interpreting the enclosed information and maps:

(1) These materials are the result of a search of our database for species of concern that occur in an area defined by the requested township, range and section with an additional one-mile buffer surrounding the requested area. This is done to provide a more inclusive set of records and to capture records that may be immediately adjacent to the requested area. Please let us know if a buffer greater than 1 mile would be of use to your efforts. Reports are provided for the species of concern that are located in your requested area with a one-mile buffer. Species of concern outside of this buffered area may be depicted on the map due to the map extent, but are not selected for the SOC report.

(2) On the map, polygons represent one or more source features as well as the locational uncertainty associated with the source features. A source feature is a point, line, or polygon that is the basic mapping unit of a Species Occurrence (SO) representation. The recorded location of the occurrence may vary from its true location due to many factors, including the level of expertise of the data collector, differences in survey techniques and equipment used, and the amount and type of information obtained. Therefore, this inaccuracy is characterized as locational uncertainty, and is now incorporated in the representation of an SO. If you have a question concerning a specific SO, please do not hesitate to contact us.

(3) This report may include sensitive data, and is not intended for general distribution, publication, or for use outside of your organization. In particular, public release of specific location information may jeopardize the welfare of threatened, endangered, or sensitive species or biological communities.

(4) The accompanying map(s) display land management status, which may differ from ownership. Features shown on this map do not imply public access to any lands.

(5) Additional biological data for the search area(s) may be available from other sources. We suggest you contact the U.S. Fish and Wildlife Service for any additional information on threatened and endangered species (406-449-5225). For additional fisheries information in your area of interest, you may wish to contact Montana Fish, Wildlife, and Park's Montana Fisheries Information System (phone: 406-444-3373, or web site: **http://fwp.mt.gov/fishing/mFish/**).

(6) Additional information on species habitat, ecology and management is available on our web site in the Plant, Animal, and ecological Systems Field Guides, which we encourage you to consult for valuable information. You can access these guides at http://mtnhp.org. General information on any species can be found by accessing the link to NatureServe Explorer.

The results of a data search by the Montana Natural Heritage Program reflect the current status of our data collection efforts. These results are not intended as a final statement on sensitive species within a given area, or as a substitute for on-site surveys, which may be required for environmental assessments. The information is intended for project screening only with respect to species of concern, and not as a determination of environmental impacts, which should be gained in consultation with appropriate agencies and authorities.

In order to help us improve our services to you, we invite you to take a simple survey. The survey is intended to gather some basic information on the value and quality of the information and services you recently received from the Montana Natural Heritage Program. The survey is short and should not take more than a few minutes to complete. All information will be kept confidential and will be used internally to improve the delivery of services and to help document the value of our services. Use this link to go to the survey: **http://www.surveymonkey.com/s/RYN8Y8L**.

I hope the enclosed information is helpful to you. Please feel free to contact me at (406) 444-3290 or via my e-mail address, below, should you have any questions or require additional information.

Sincerely,

Martin P. Miller
Montana Natural Heritage Program
martinm@mt.gov

Montana Species of Concern
Mill Creek TIFID

SPECIES OF CONCERN: A polygon feature representing only what is known from direct observation with a defined level of certainty regarding the spatial location of the feature.

NonVascular Plants
- NonVascular Plants

Vascular Plants
- Vascular Plants

Invertebrates
- Invertebrates

Amphibians
- Amphibians

Fish
- Fish

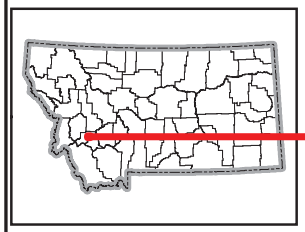
Reptiles
- Reptiles

Birds
- Birds

Mammals
- Mammals

Sites
- Sites

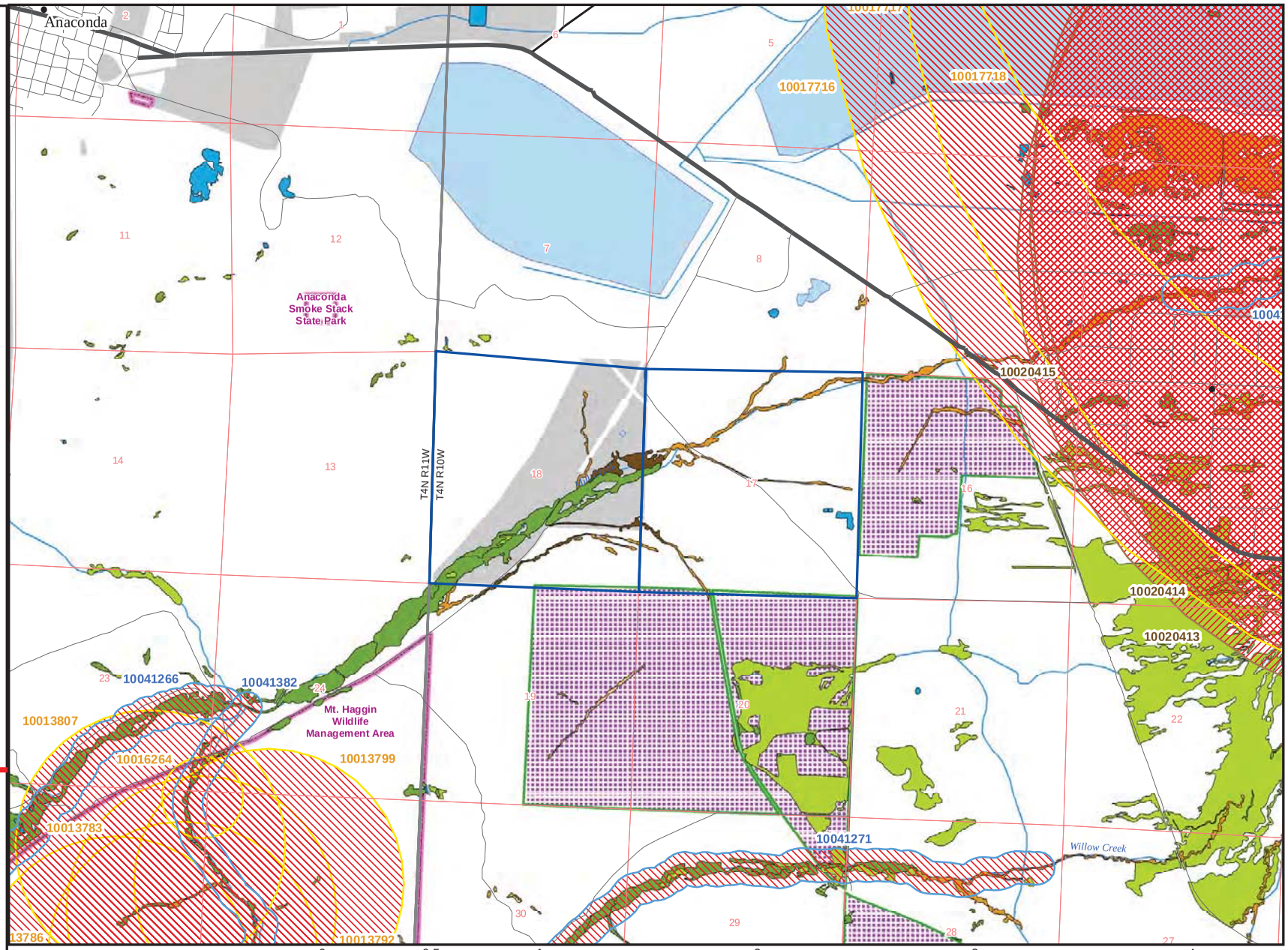
Wetland Types
- Lake
- River
- Freshwater Pond
- Freshwater Emergent Wetland
- Freshwater Scrub-Shrub Wetland
- Freshwater Forested Wetland
- Riparian Emergent
- Riparian Scrub-Shrub
- Riparian Forested



Not all legend items may occur on the map.

Features shown on this map do not imply public access to any lands.

This map displays management status, which may vary from ownership.



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1515 East Sixth Ave., Helena, MT 59620-1800

406 444-5354 http://mtnhp.org mtnhp@mt.gov

0 0.5 1 2 3 4 Miles

Map Document: K:\REQUESTS\Requests\14\MTCO\14mtco0009\14mtco0009.mxd (8/21/2013)

A GUIDE TO WETLAND AND DEEPWATER HABITATS CLASSIFICATION USED IN THE NATIONAL WETLAND INVENTORY (NWI) MAPPING IN MONTANA

Purpose:

The Montana Wetland and Riparian Mapping Center uses the Cowardin classification system (Cowardin et al. 1979) adopted by the National Wetland Inventory (NWI) for wetlands (FGDC Wetlands Subcommittee, 2009). The riparian system follows the U.S. Fish and Wildlife Service (USFWS) standard (U.S. Fish and Wildlife Services, 2009). NWI is the standard classification system for wetland mapping across the United States. For ease of display and interpretation the NWI attributes have been grouped into major wetland and riparian types.

Wetlands

In Montana, there are three NWI wetland systems: Palustrine, Lacustrine, and Riverine.

PALUSTRINE:

- In Montana, this system includes all wetlands dominated by trees, shrubs, and emergent, herbaceous vegetation.
- Wetlands lacking vegetation are included if they are less than 8 hectares (20 acres) in size and are less than 2 meters (6.6 feet) deep in the deepest portion of the wetland.

Freshwater pond:

- Wetlands with vegetation growing on or below the water surface for most of the growing season.

Freshwater Emergent Wetland:

- Wetlands with erect, rooted herbaceous vegetation present during most of the growing season.

Freshwater Shrub Wetland:

- Wetlands dominated by woody vegetation less than 6 meters (20 feet) tall. Woody vegetation includes tree saplings and trees that are stunted due to environmental conditions.

Freshwater Forested Wetland:

- Wetlands dominated by woody vegetation greater than 6 meters (20 feet) tall.

LACUSTRINE (Lakes):

- This system includes any large body of water that is greater than 8 hectares (20 acres) in size OR is more than 2 meters (6.6 feet) deep.
- This system is usually found in a topographic depression. It may also be formed by damming of a river channel.

RIVERINE (Rivers and streams and shore):

- This system includes all wetlands and deepwater habitats that are within natural and artificial channels.
- These systems contain either continuous (perennial) or intermittently flowing water.

RIPARIAN:

The Wetland and Riparian Mapping Center uses the riparian classification system developed by the U.S. Fish and Wildlife Service to map riparian areas in Montana. The riparian classification types listed below are followed by the coding convention used for mapping purposes.

- Plant communities (trees, shrubs and/or herbaceous plants)contiguous to rivers, streams, lakes, or drainage ways.
- Riparian areas are influenced by both surface and below surface hydrology.
- The plant species present in riparian areas are distinctly different from plant species found in adjacent areas.
- Plants in riparian areas demonstrate more vigorous or robust growth forms than in adjacent areas.

Riparian Classes:

Scrub-Shrub (SS):

- This type of riparian area is dominated by woody vegetation that is less than 6 meters (20 feet) tall.
- Woody vegetation includes tree saplings and trees that are stunted due to environmental conditions.

Forested (FO):

- This riparian class has woody vegetation that is greater than 6 meters (20 feet) tall.

Emergent (EM):

- Riparian areas that have erect, rooted herbaceous vegetation during most of the growing season.

References

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service, Washington, D.C. FWS/OBS-79/31.

FGDC Wetlands Subcommittee. 2009. Wetlands Mapping Standard. U.S. Geological Survey, Reston, Virginia.

U.S. Fish and Wildlife Services. 2009. A system for mapping riparian areas in the western United States. Division of Habitat and Resource Conservation, Branch of Resource and Mapping Support, Arlington, Virginia.

Directions for Using Adobe GeoPDFs

June 2010

A GeoPDF differs from a PDF in that it contains spatial information. When a GeoPDF is created it retains the latitude and longitude information. Using the GeoSpatial Location Tool in Adobe Reader, the latitude and longitude of your cursor location is displayed.

In order to access the GeoSpatial Location Tool make sure you have the latest version of Adobe Reader. The most current version is Adobe Reader 9 Version 9.3.2. To check your version of Adobe Reader open Adobe Reader and click on “Help” at the top and then click on “About Adobe Reader”.

Click on the following link to download the latest version: http://get.adobe.com/reader/

Using the GeoSpatial Location Tool

1. Open a GeoPDF in Adobe Reader
2. Click on “Tools” in the top menu
3. Click on Analysis
4. Click on GeoSpatial Location Tool
5. A gray band with the Latitude and Longitude will not be displayed in the lower right-hand corner of the GeoPDF.
6. Place your cursor within the map to update the Latitude and Longitude

Displaying Map Features

Map features including the spatial data layers, labels, and attributes may be displayed. To turn on or off map layers, click on the “Layers” button on the left side of the GeoPDF.

The “Layers” button looks like two overlapping diamonds.

If the “Layers” button is not visible then right click within the gray bar on the left side of the GeoPDF and then left click on “Layers”. To turn the layers or labels off, click on the “eye” in the box. To turn the layers back on click back in the box until you see the “eye”.

Natural Resource Information System
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PO Box 201800
Helena, MT 59620-1800
(406)444-3009 mtnhp@mt.gov

Species of Concern Data Report

Visit http://mtnhp.org for additional information.

Report Date:
Wednesday, August 21, 2013

Ardea herodias

View Species in MT Field Guide

Common Name: Great Blue Heron

General Habitat: Riparian forest

Description: Birds

Mapping Delineation:

Confirmed nesting area buffered by a minimum distance of 6,500 meters in order to be conservative about encompassing the areas commonly used for foraging near the breeding colony and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

Click Status for Explanations

Natural Heritage Ranks:

State: S3
Global: G5

FWP CFWCS Tier: 3

MT PIF Code:

Federal Agency Status:

U.S. Fish & Wildlife Service:
U.S. Forest Service:
U.S. Bureau of Land Management:

Species Occurrences

Species Occurence Map Label: 10017717

First Observation Date:	1978-02-16	**SO Number:**	598
Last Observation Date:	1979-12-14	**Acreage:**	32,633

Species Occurence Map Label: 10017716

First Observation Date:	2009-06-12	**SO Number:**	761
Last Observation Date:	2009-06-12	**Acreage:**	32,633

Nucifraga columbiana

View Species in MT Field Guide

Common Name: Clark's Nutcracker

General Habitat: Conifer forest

Description: Birds

Mapping Delineation:

Observations with evidence of breeding activity buffered by a minimum distance of 1,000 meters in order to be conservative about encompassing the spring/summer breeding territories of family groups and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

Click Status for Explanations

Natural Heritage Ranks:

State: S3
Global: G5

FWP CFWCS Tier: 3

MT PIF Code: 3

Federal Agency Status:

U.S. Fish & Wildlife Service:
U.S. Forest Service:
U.S. Bureau of Land Management:

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Species of Concern Data Report

Visit http://mtnhp.org for additional information.

Report Date:
Wednesday, August 21, 2013

Species Occurrences

Species Occurence Map Label: 10013799

First Observation Date: 2009-07-01
Last Observation Date: 2009-07-01
SO Number: 2,614
Acreage: 772

Oncorhvnchus clarkii lewisi

View Species in MT Field Guide

Common Name: Westslope Cutthroat Trout
General Habitat: Mountain streams, rivers, lakes
Description: Fish
Mapping Delineation:

Stream reaches and standing water bodies where the species presence has been confirmed through direct capture or where they are believed to be present based on the professional judgement of a fisheries biologist due to confirmed presence in adjacent areas. In order to reflect the importance of adjacent terrestrial habitats to survival, stream reaches are buffered 100 meters, standing water bodies greater than 1 acre are buffered 50 meters, and standing water bodies less than 1 acre are buffered 30 meters into the terrestrial habitat based on PACFISH/INFISH Riparian Conservation Area standards.

Species Status

Click Status for Explanations

Natural Heritage Ranks:

State: S2
Global: G4T3

FWP CFWCS Tier: 1

MT PIF Code:

Federal Agency Status:

U.S. Fish & Wildlife Service:
U.S. Forest Service: SENSITIVE
U.S. Bureau of Land Management: SENSITIVE

Species Occurrences

Species Occurence Map Label: 10041382

First Observation Date:
Last Observation Date:
SO Number:
Acreage: 227

Lasiurus cinereus

View Species in MT Field Guide

Common Name: Hoary Bat
General Habitat: Riparian and forest
Description: Mammals
Mapping Delineation:

Mistnet captures, definitively identified acoustic recordings, and definitively identified roosting individuals buffered by a minimum distance of 3,500 meters in order to be conservative about encompassing the maximum reported foraging distance for the congeneric Lasiurus borealis and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

Click Status for Explanations

Natural Heritage Ranks:

State: S3
Global: G5

FWP CFWCS Tier: 2

MT PIF Code:

Federal Agency Status:

U.S. Fish & Wildlife Service:
U.S. Forest Service:
U.S. Bureau of Land Management:

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Species of Concern Data Report

Visit http://mtnhp.org for additional information.

Report Date:
Wednesday, August 21, 2013

Species Occurrences

Species Occurence Map Label: 10020415

First Observation Date:	2009-07-23	**SO Number:**	611,648
Last Observation Date:	2009-07-23	**Acreage:**	9,462

Species Occurence Map Label: 10020414

First Observation Date:	2009-07-23	**SO Number:**	611,652
Last Observation Date:	2009-07-23	**Acreage:**	9,462

Species Occurence Map Label: 10020413

First Observation Date:	2009-07-23	**SO Number:**	611,655
Last Observation Date:	2009-07-23	**Acreage:**	9,462

MONTANA Natural Heritage Program

Montana Natural Heritage Program

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(406) 444-5354 http://mtnhp.org

Explanation of Species of Concern Reports

Since 1985, the Montana Natural Heritage Program (MTNHP) has been compiling and maintaining an inventory of elements of biological diversity in Montana. This inventory includes plant species, animal species, plant communities, and other biological features that are rare, endemic, disjunct, threatened, or endangered throughout their range in Montana, vulnerable to extirpation from Montana, or in need of further research.

Species Occurrences: (formerly called 'Element Occurrences') A "**Species Occurrence**" (**SO**) is an area depicting only what is known from direct observation with a defined level of certainty regarding the spatial location of the feature. If an observation can be associated with a map feature that can be tracked (e.g., a wetland) then this polygon feature is used to represent the SO. Areas that can be inferred as probable occupied habitat based on direct observation of a species location and what is known about the foraging area or home range size of the species may be incorporated into the Species Occurrence. A "Species Occurrence" generally falls into one of the following three categories:

Plants: A documented location of a specimen collection or observed plant population. In some instances, adjacent, spatially separated clusters are considered subpopulations and are grouped as one occurrence (e.g., the subpopulations occur in ecologically similar habitats, and are within approximately one air mile of one another).

Animals: The location of a specimen collection or of a verified sighting; known or assumed to represent a breeding population. Additional collections or sightings are often appended to the original record.

Other: Significant biological features not included in the above categories, such as bird rookeries, peatlands, or state champion trees.

Ecological Information: Areas for which we have ecological information are represented on the map as either shaded polygons (where small and/or well defined) or simply as map labels (where they are large generally-defined landscapes). Descriptive information about these areas is contained in the associated report. Such information can be useful in assessing biological values and interpreting Species of Concern data.

The quantity and quality of data contained in MTNHP reports is dependent on the research and observations of the many individuals and organizations that contribute information to the program. Please keep in mind that the absence of information for an area does not mean the absence of significant biological features, since no surveys may have been conducted there. Reports produced by the Montana Natural Heritage Program summarize information documented in our databases at the time of a request. These reports are not intended as a final statement on the species or areas being considered, nor are they a substitute for on-site surveys, which may be required for environmental assessments.

As a user of MTNHP, your contributions of data are essential to maintaining the accuracy of our databases. New or updated location information for all species of concern is always welcome.

We encourage you to visit our website at http://**mtnhp.org.** On-line tools include a species observation viewer: the Natural Heritage TRACKER and *The Montana Field Guide* which contains photos, illustrations, and supporting information on Montana's animals and plant species of concern. Additional data are available on most species and ecological areas identified in our reports.

If you have questions or need further assistance, please contact us either by phone at (406/444-5354), e-mail (mtnhp@mt.gov) or

Revision Date: 10/28/2008

Data Descriptions

The section below lists the names and definitions for descriptions of the data fields used in the reports. Certain codes and abbreviations are used in Species Occurrence reports. Although many of these are very straightforward, the following explanations should answer most questions.

Map Label: The label for the species occurrence as it appears on the map.

Element Subnational ID: The unique code used by the state or province to identify a specific element (species).

SO Number: Number that identifies the particular occurrence of the element (species).

Scientific Name: Latin (scientific) name.

Common Name: Commonly recognized name.

Species of Concern/Potential Concern: This value indicates whether the species is a "Species of Concern" (Y) or of "Potential Concern" (W).

Last Observation Date: The date the Species Occurrence was last observed extant at the site (not necessarily the date the site was last visited).

First Observation Date: The date the Species Occurrence was first reported at the site.

EO Rank: indicates the relative value of the Species Occurrence (SO) with respect to other occurrences of the Species, based on an assessment of estimated viability (species).

Values:

A - Excellent estimated viability/ecological integrity
A? - Possibly excellent estimated viability/ecological integrity
AB - Excellent or good estimated viability/ecological integrity
AC - Excellent, good, or fair estimated viability/ecological integrity
B - Good estimated viability/ecological integrity
B? - Possibly good estimated viability/ecological integrity
BC - Good or fair estimated viability/ecological integrity
BD - Good, fair, or poor estimated viability/ecological integrity
C - Fair estimated viability/ecological integrity
C? - Possibly fair estimated viability/ecological integrity
CD - Fair or poor estimated viability/ecological integrity
D - Poor estimated viability/ecological integrity
D? - Possibly poor estimated viability/ecological integrity
E - Verified extant (viability/ecological integrity not assessed)
F - Failed to find
F? - Possibly failed to find
H - Historical
H? - Possibly historical
X - Extirpated
X? - Possibly extirpated
U - Unrankable
NR - Not ranked

SO Data: Data collected on the biology of this Species Occurrence. Specific information may include number of individuals, vigor, habitat, soils, associated species, and other characteristics.

Species Status Codes

Provided below are definitions for species conservation status ranks, categories and other codes designated by MTNHP, Federal and State Agencies and non-governmental organizations.

- Montana Species of Concern
- Montana Potential Species of Concern
- Status Under Review
- Exotic Species
- Montana Species Ranking Codes
- U.S. Fish and Wildlife Service
- Forest Service
- Bureau of Land Management
- MFWP Conservation Need
- Partners In Flight (PIF)
- MNPS Threat Category

Species of Concern

Species of Concern are native taxa that are at-risk due to declining population trends, threats to their habitats, restricted distribution, and/or other factors. Designation as a Montana Species of Concern or Potential Species of Concern is based on the Montana Status Rank, and is not a statutory or regulatory classification. Rather, these designations provide information that helps resource managers make proactive decisions regarding species conservation and data collection priorities. See the latest Species of Concern Reports for more detailed explanations and assessment criteria.

Potential Species of Concern

Potential Species of Concern are native taxa for which current, often limited, information suggests potential vulnerability. Also included are animal species which additional data are needed before an accurate status assessment can be made.

Status Under Review

Species designated "Status Under Review" are plant species that require additional information and currently do not have a status rank but may warrant future consideration as Species of Concern. This category also includes plant species whose status rank is questionable due to the availability of new information or the availability of conflicting or ambiguous information or data. Species listed in this category will be reviewed periodically or as new information becomes available.

Exotic Species

Exotic species are not native to Montana, but have either been reported in Montana or have established populations in Montana outside of their native range.

Montana Species Ranking Codes

Montana employs a standardized ranking system to denote global (G) and state (S) status (NatureServe 2003). Species are assigned numeric ranks ranging from 1 (critically imperiled) to 5 (demonstrably secure), reflecting the relative degree to which they are "at-risk". Rank definitions are given below. A number of factors are considered in assigning ranks - the number, size and distribution of known "occurrences" or populations, population trends (if known), habitat sensitivity, life history traits and threats.

For example, Clustered lady's slipper (*Cypripedium fasciculatum*) is ranked G4 S2. Globally the species is uncommon but not vulnerable, while in Montana it is at risk because of limited and potentially declining numbers, extent and/or habitat.

G1 S1
At high risk because of extremely limited and potentially declining numbers, extent and/or habitat, making it highly vulnerable to global extinction or extirpation in the state.

G2 S2
At risk because of very limited and potentially declining numbers, extent and/or habitat, making it vulnerable to global extinction or extirpation in the state.

G3 S3
Potentially at risk because of limited and potentially declining numbers, extent and/or habitat, even though it may be abundant in some areas.

G4 S4
Uncommon but not rare (although it may be rare in parts of its range), and usually widespread. Apparently not vulnerable in most of its range, but possibly cause for long-term concern.

G5 S5
Common, widespread, and abundant (although it may be rare in parts of its range). Not vulnerable in most of its range.

GX SX
Presumed Extinct or Extirpated - Species is believed to be extinct throughout its range or extirpated in Montana. Not located despite intensive searches of historical sites and other appropriate habitat, and small likelihood that it will ever be rediscovered.

GH SH

Possibly Extinct or Extirpated - Species is known only from historical records, but may nevertheless still be extant; additional surveys are needed.

GNR SNR

Not yet ranked.

GU SU

Unrankable - Species currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

GNA SNA

A conservation status rank is not applicable for one of the following reasons:
The taxa is of Hybrid Origin; is Exotic or Introduced; is Accidental or is Not Confidently Present in the state. (see other codes below)

Other Codes and Modifiers

HYB

Hybrid-Entity not ranked because it represents an interspecific hybrid and not a species.

T

Infraspecific Taxon (trinomial) - The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank.

?

Inexact Numeric Rank - Denotes inexact numeric rank.

Q

Questionable taxonomy that may reduce conservation priority-Distinctiveness of this entity as a taxon at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority (numerically higher) conservation status rank.

C

Captive or Cultivated Only - Species at present is extant only in captivity or cultivation, or as a reintroduced population not yet established.

A

Accidental - Species is accidental or casual in Montana, in other words, infrequent and outside usual range. Includes species (usually birds or butterflies) recorded once or only a few times at a location. A few of these species may have bred on the one or two occasions they were recorded.

SYN

Synonym - Species reported as occurring in Montana, but the Montana Natural Heritage Program does not recognize the taxon; therefore the species is not assigned a rank.

B

Breeding - Rank refers to the breeding population of the species in Montana.

N

Nonbreeding - Rank refers to the non-breeding population of the species in Montana.

M

Migratory - Species occurs in Montana on during migration.

U.S. Fish and Wildlife Service

LE

Listed endangered - Any species in danger of extinction throughout all or a significant portion of its range (16 U.S.C. 1532(6)).

PE

Proposed endangered - Any species for which a proposed rule has been published in the Federal Register to list the species as endangered.

LT

Listed threatened - Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (16 U.S.C. 1532(20)).

PT

Proposed threatened - Any species for which a proposed rule has been published in the Federal Register to list the species as threatened.

E(S/A) or T(S/A)

Any species listed endangered or threatened because of similarity of appearance.

C

Candidate - Those taxa for which sufficient information on biological status and threats exists to propose to list them as threatened or endangered. We encourage their consideration in environmental planning and partnerships; however, none of the substantive or procedural provisions of the Act apply to candidate species.

PDL

Proposed for delisting - Any species for which a final rule has been published in the Federal Register to delist the species.

DM

Recovered, delisted, and being monitored - Any previously listed species that is now recovered, has been delisted, and is being monitored.

NL

Not listed - No designation.

XE

Essential experimental population - An experimental population whose loss would be likely to appreciably reduce the likelihood of the survival of the species in the wild.

XN

Nonessential experimental population - An experimental population of a listed species reintroduced into a specific area that receives more flexible management under the Act.

CH

Critical Habitat - The specific areas (i) within the geographic area occupied by a species, at the time it is listed, on which are found those physical or biological features (I) essential to conserve the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by the species at the time it is listed upon determination that such areas are essential to conserve the species.

PS

Partial status - status in only a portion of the species' range. Typically indicated in a "full" species record where an infraspecific taxon or population, that has a record in the database has USESA status, but the entire species does not.

PS:value

Partial status - status in only a portion of the species' range. The value of that status appears in parentheses because the entity with status is not recognized as a valid taxon by Central Sciences (usually a population defined by geopolitical boundaries or defined administratively, such as experimental populations.

Forest Service

The status of species on Forest Service lands as defined by the U.S. Forest Service manual (2670.22). These taxa are listed as such by the Regional Forester (Northern Region). The Forest Service lists animal species as:

Endangered

Listed as Endangered (LE) by the USFWS.

Threatened

Listed as Threatened (LT) by the USFWS.

Sensitive

Any species for which the Regional Forester has determined there is a concern for population viability within the state, as evidenced by a significant current or predicted downward trend in populations or habitat.

Species of Concern

USFS Species-of-Concern (FSH 1909.12, 43.22b) are species for which the Responsible Official determines management actions may be necessary to prevent listing under the Endangered Species Act (ESA). The Responsible Official, as appropriate, may identify the following plant and animal species, including macro-lichens, as species-of-concern:

1. Species identified as proposed and candidate species under the ESA.
2. Species with ranks of G-1 through G-3 on the NatureServe ranking system.
3. Infraspecific (subspecific) taxa with ranks of T-1 through T-3 on the NatureServe ranking system.
4. Species that have been petitioned for federal listing and for which a positive "90-day finding" has been made (a 90-day finding is a preliminary finding that substantive information was provided indicating that the petition listing may be warranted and a full status review will be conducted).
5. Species that have been recently delisted (these include species delisted within the past five years and other delisted species for which regulatory agency monitoring is still considered necessary).

Species of Interest

USFS Species-of-Interest (FSH 1909.12, 43.22c) are species for which the Responsible Official determines that management actions may be necessary or desirable to achieve ecological or other multiple-use objectives. The Responsible Official may review the following sources for potential species-of-interest:

1. Species with ranks of S-1, S-2, N1, or N2 on the NatureServe ranking system.
2. State listed threatened and endangered species that do not meet the criteria as species-of-concern.
3. Species identified as species of conservation concern in State Comprehensive Wildlife Strategies.
4. Bird species on the U.S. Fish and Wildlife Service Birds of Conservation Concern National Priority list (for the U.S. portion of the northern Rockies that occur on National Forest system lands).
5. Additional species that valid existing information indicates are of regional or local conservation concern (this includes all Forest Service Northern Region sensitive species) due to factors that may include:
    a. Significant threats to populations or habitat.
    b. Declining trends in populations or habitat.
    c. Rarity.
    d. Restricted ranges (for example, narrow endemics, disjunct populations, or species at the edge of their range).
6. Species that are hunted or fished and other species of public interest. Invasive species may also be considered.

Bureau of Land Management

BLM Sensitive Species are defined by the BLM 6840 Manual as those that normally occur on Bureau administered lands for which BLM has the capability to significantly affect the conservation status of the species through management. The State Director may designate additional categories of special status species as appropriate and applicable to his or her state's needs. The sensitive species designation, for species other than federally listed, proposed, or candidate species, may include such native species as those that:

1. could become endangered in or extirpated from a state, or within a significant portion of its distribution in the foreseeable future,
2. are under status review by FWS and/or NMFS,
3. are undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution,

4. are undergoing significant current or predicted downward trends in population or density such that federally listed, proposed, candidate, or State listed status may become necessary,
5. have typically small and widely dispersed populations,
6. are inhabiting ecological refugia, specialized or unique habitats, or
7. are State listed but which may be better conserved through application of BLM sensitive species status. Such species should be managed to the level of protection required by State laws or under the BLM policy for candidate species, whichever would provide better opportunity for its conservation.

MFWP Conservation Need

In recent years states have received federal funding to develop Comprehensive Fish and Wildlife Conservation Strategies. Montana Fish, Wildlife, and Parks completed Montana's Comprehensive Fish and Wildlife Conservation Strategy in 2005. Under this conservation strategy individual animal species were assigned levels of conservation need as follows:

Tier I:
Tier I: Greatest conservation need. Montana Fish, Wildlife & Parks has a clear obligation to use its resources to implement conservation actions that provide direct benefit to these species, communities, and focus areas.

Tier II:
Tier II: Moderate conservation need. Montana Fish, Wildlife & Parks could use its resources to implement conservation actions that provide direct benefit to these species, communities, and focus areas.

Tier III:
Tier III: Lower conservation need. Although important to Montana's wildlife diversity, these species, communities, and focus areas are either abundant and widespread or are believed to have adequate conservation already in place.

Tier IV:
Tier IV: Species that are non-native, incidental, or on the periphery of their range and are either expanding or very common in adjacent states.

Partners In Flight (PIF)

Partners In Flight (PIF) is a partnership of federal and state agencies, industry, non-governmental organizations, and many others, with the goal of conserving North American birds. In 1991, PIF began developing a formal species assessment process that could provide consistent, scientific evaluations of conservation status across all bird species in North America, and identify areas most important to the conservation of each species. This process applies quantitative rule sets to complex biological data on the population size, distribution, population trend, threats, and regional abundance of individual bird species to generate simple numerical scores that rank each species in terms of its biological vulnerability and regional status. The process results in global and regional conservation assessments of each bird species that, among other uses, can be used to objectively assign regional and continental conservation priorities among birds.
The species assessment scores and process has recently been updated! Check out the new scores and make sure to download and read the updated Handbook on Species Assessment, which contains important information on the how scores are derived and used in the assessment process. Note that currently only breeding-season regional scores are available for BCRs. We hope to have non-breeding scores available soon. For those needing access to the previous versions of the PIF Species Assessment Database, including past regional scores for physiographic areas, click here.

Montana Native Plant Society (MNPS) Threat Category

The MNPS Threat Category process was initiated in 2006 at the Montana Plant Conservation Conference with the formation of a committee represented by federal, state and private botanists, ecologists and biologists. The objectives were to: 1) Evaluate threats impacting Montana's Plant Species of Concern and to classify species according to their level of imperilment/risk as a result of these threats. 2) Develop a ranking system based on the impacts of the identified threats to the species' viability in the state. The result of this process is a 4-tier threat ranking system for Plant Species of Concern in Montana. The threat categories are:

Category 1:
The viability of the species in the state is Highly Threatened by one or more activities. Associated threats have caused or are likely to cause a major reduction of the state population or its habitat that will require 50 years or more for recovery, 20% or more of the state population has been or will be affected, and the negative impact is occurring or is likely to occur within the next 5 years.

Category 2:
The viability of the species or a portion of the species habitat in the state is Threatened by one or more activities, though impacts to the species are expected to be less severe than those in Category 1. Associated threats exist but are not as severe, wide-ranging or immediate as for Category 1, though negative impacts are occurring or are likely to occur.

Category 3:
The viability of the species in the state is Not Threatened or the Threats are Insignificant. Associated threats are either not known to exist, are not likely to occur in the near future or are not known to be having adverse impacts that will severely affect the species' viability in the state.

Category 4:
Assessment not possible due to insufficient and/or conflicting information on potential threats to the species.

Please visit the MNPS website at http://www.mtnativeplants.org for additional information on MNPS Threat Categories or for MNPS contact information.

Appendix C

City of Anaconda Water System Records

Preliminary Engineering Report
Mill Creek TIFID

City of Anaconda Water System
Daily Logs

Preliminary Engineering Report
Mill Creek TIFID

Anaconda Water System Flow Records Summary

Record Period: Novembmer 1, 2009 to April 9, 2013

(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)

Date	Tank Level (ft)	Tank Volume (MG)	Gallons Pumped (MGD)	Gallons Used (MGD)
11/1/09	20.82	3.04	2.23	2.16
11/2/09	23.17	3.38	2.6	2.11
11/3/09	20.23	2.95	1.9	2.1
11/4/09	21.64	3.16	2.43	2.1
11/5/09	24	3.50	2.51	2.1
11/6/09	22.94	3.35	2.18	2.08
11/7/09	20.82	3.04	2.07	2.1
11/8/09	21.52	3.14	2.29	2.11
11/9/09	23.76	3.46	2.6	2.18
11/10/09	21.87	3.19	2.15	2.13
11/11/09	22.59	3.29	2.4	2.12
11/12/09	20	2.92	1.94	2.16
11/13/09	23.41	3.41	2.68	2.13
11/14/09	21.17	3.09	2.09	2.12
11/15/09	22.58	3.29	2.44	2.14
11/16/09	22.82	3.33	2.34	2.2
11/17/09	22.46	3.28	2.39	2.16
11/18/09	20	2.92	2.01	2.15
11/19/09	20.11	2.93	2.24	2.18
11/20/09	22.94	3.35	2.73	2.18
11/21/09	20.11	2.93	2.04	2.14
11/22/09	20.46	2.98	2.27	2.17
11/23/09	23.05	3.36	2.7	2.22
11/24/09	20.11	2.93	2.12	2.2
11/25/09	20.23	2.95	2.27	2.21
11/26/09	23.17	3.38	2.76	2.2
11/27/09	20	2.92	2.13	2.23
11/28/09	20.11	2.93	2.22	2.19
11/29/09	22.94	3.35	2.67	2.11
11/30/09	20.94	3.05	2.28	2.27
12/1/09	20.82	3.04	2.23	2.23
12/2/09	22.59	3.29	2.68	2.26
12/3/09	20.23	2.95	2.19	2.26
12/4/09	20.22	2.95	2.25	2.22
12/5/09	23.4	3.41	2.74	2.21
12/6/09	20.46	2.98	2.09	2.19
12/7/09	20.58	3.00	2.33	2.31
12/8/09	22.46	3.28	2.77	2.36
12/9/09	21.4	3.12	2.35	2.3
12/10/09	21.5	3.14	2.31	2.29
12/11/09	22.46	3.28	2.62	2.3
12/12/09	22.82	3.33	2.48	2.26
12/13/09	23.53	3.43	2.46	2.34
12/14/09	20.11	2.93	2.25	2.39
12/15/09	23.64	3.45	2.76	2.34
12/16/09	20.7	3.02	2.31	2.34
12/17/09	20.58	3.00	2.37	2.35
12/18/09	22.11	3.22	2.74	2.24
12/19/09	22.34	3.26	2.49	2.3
12/20/09	23.41	3.41	2.54	2.29
12/21/09	21.52	3.14	2.37	2.35
12/22/09	23.53	3.43	2.59	2.32

Average Daily Tank Vol. (MG)	3.01	Based on 0.145 MG/ft, per...; excludes records noted as 0.5 MGD as outliers.
Maximum Daily Tank Vol. (MG)	3.55	
Average Daily Capacity (MGD)	2.43	Average of Gallons Pumped; Excludes records noted as 0.5 MGD as outliers.
Peak Daily Capacity (MGD)	4.91	Maximum of Gallons Pumped.
Average Daily Flow (MGD)	2.06	Average of Gallons Used; Excludes records noted as 0 MGD as outliers.
Peak Daily Flow (MGD)	4.46	Maximum of Gallons Used.
Average Winter Demand (October through April)	1.64	Average of Gallons Used for October through April
Average Summer Demand (May through Semptember)	2.67	Average of Gallons Used for May through September

Anaconda Water System Flow Records Summary

Record Period: Novembmer 1, 2009 to April 9, 2013

(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)

12/23/09	20.23	2.95	2.19	2.31
12/24/09	23.76	3.46	2.77	2.36
12/25/09	20.23	2.95	2.19	2.35
12/26/09	23.53	3.43	2.73	2.35
12/27/09	21.52	3.14	2.47	2.41
12/28/09	20	2.92	2.57	2.37
12/29/09	22.11	3.22	2.57	2.37
12/30/09	21.29	3.10	2.35	2.34
12/31/09	22.71	3.31	2.68	2.32
1/1/10	23.29	3.40	2.56	2.31
1/2/10	23.76	3.46	2.44	2.3
1/3/10	22.96	3.35	2.5	2.3
1/4/10	20.23	2.95	4.42	2.35
1/5/10	22.46	3.28	2.82	2.32
1/6/10	23.05	3.36	2.6	2.36
1/7/10	22.11	3.22	2.45	2.44
1/8/10	20.58	3.00	2.32	2.4
1/9/10	22.46	3.28	2.76	2.33
1/10/10	21.52	3.14	2.39	2.38
1/11/10	22.23	3.24	2.72	2.41
1/12/10	20.82	3.04	2.34	2.33
1/13/10	22.35	3.26	2.75	2.36
1/14/10	22.35	3.26	2.48	2.28
1/15/10	22.94	3.35	2.42	2.33
1/16/10	21.52	3.14	2.33	2.27
1/17/10	23.64	3.45	2.59	2.31
1/18/10	20	2.92	2.22	2.37
1/19/10	23.41	3.41	2.72	2.31
1/20/10	19.99	2.92	2.2	2.31
1/21/10	23.64	3.45	2.76	2.32
1/22/10	20.58	3.00	2.32	2.39
1/23/10	20.93	3.05	2.35	2.28
1/24/10	22.35	3.26	2.75	2.33
1/25/10	20.71	3.02	2.32	2.37
1/26/10	22.11	3.22	2.76	2.36
1/27/10	23	3.35	2.38	2.21
1/28/10	20.82	3.04	2.09	2.16
1/29/10	22.71	3.31	2.66	2.19
1/30/10	20.23	2.95	2.12	2.17
1/31/10	21.17	3.09	2.35	2.18
2/1/10	22.59	3.29	2.65	2.25
2/2/10	20.82	3.04	2.24	2.21
2/3/10	20.23	2.95	2.09	2.12
2/4/10	22.82	3.33	2.72	2.19
2/5/10	20.11	2.93	2.13	2.19
2/6/10	20.46	2.98	2.38	2.17
2/7/10	22.94	3.35	2.71	2.17
2/8/10	21.52	3.14	2.3	2.24
2/9/10	20.11	2.93	2.06	2.15
2/10/10	23.4	3.41	2.71	2.11
2/11/10	21.17	3.09	2.09	2.09
2/12/10	23.52	3.43	2.49	2.15
2/13/10	20.23	2.95	1.74	2
2/14/10	23.88	3.48	2.7	2.06

Anaconda Water System Flow Records Summary

Record Period: Novembmer 1, 2009 to April 9, 2013

(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)

2/15/10	22.7	3.31	2.15	2.05
2/16/10	19.99	2.92	2	2.07
2/17/10	21.17	3.09	2.27	2.04
2/18/10	23.17	3.38	2.44	2.05
2/19/10	22.94	3.35	2.34	2.11
2/20/10	20.82	3.04	2.02	2.03
2/21/10	22.34	3.26	2.36	2.07
2/22/10	21.17	3.09	2.13	2.12
2/23/10	23.29	3.40	2.52	2.05
2/24/10	21.05	3.07	2.05	2.04
2/25/10	23.64	3.45	2.47	2.04
2/26/10	20.11	2.93	1.8	2.08
2/27/10	23.88	3.48	2.65	2
2/28/10	22.94	3.35	2.16	2.06
3/1/10	20	2.92	2.02	2.11
3/2/10	20.94	3.05	2.22	2
3/3/10	22.23	3.24	2.35	2.02
3/4/10	21.41	3.12	2.21	1.99
3/5/10	21.05	3.07	2.05	1.98
3/6/10	21.76	3.17	2.25	1.97
3/7/10	23.65	3.45	2.45	1.98
3/8/10	22.46	3.28	2.09	2
3/9/10	20.11	2.93	1.99	2.13
3/10/10	21.65	3.16	2.24	2.16
3/11/10	21.41	3.12	2.12	1.99
3/12/10	23.76	3.46	2.46	1.96
3/13/10	23.06	3.36	2.12	1.97
3/14/10	20.7	3.02	1.87	1.8
3/15/10	21.17	3.09	2.21	2.05
3/16/10	21.88	3.19	2.3	2.04
3/17/10	23.29	3.40	2.43	2.02
3/18/10	21.17	3.09	2.02	2.03
3/19/10	23.05	3.36	2.48	2.01
3/20/10	20.23	2.95	1.73	2.01
3/21/10	23.88	3.48	2.65	2
3/22/10	23.29	3.40	2.19	2.03
3/23/10	20.94	3.05	1.98	2.01
3/24/10	23.17	3.38	2.42	2
3/25/10	19.99	2.92	1.8	1.98
3/26/10	22.46	3.28	2.43	1.88
3/27/10	23.41	3.41	2.31	1.97
3/28/10	21.29	3.10	2.08	2.06
3/29/10	22.71	3.31	2.4	2.07
3/30/10	20.7	3.02	1.96	2.06
3/31/10	23.06	3.36	2.44	1.98
4/1/10	23.41	3.41	2.22	1.94
4/2/10	21.88	3.19	1.98	1.93
4/3/10	21.17	3.09	2.07	1.95
4/4/10	20.58	3.00	2.01	1.98
4/5/10	22.23	3.24	2.35	1.96
4/6/10	23.65	3.45	2.37	2
4/7/10	21.99	3.21	2.07	2.01
4/8/10	20.23	2.95	2	1.97
4/9/10	20.11	2.93	2.29	1.98

Anaconda Water System Flow Records Summary

Record Period: Novembmer 1, 2009 to April 9, 2013

(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)

4/10/10	20.23	2.95	1.92	1.96
4/11/10	22	3.21	2.39	1.93
4/12/10	20.58	3.00	2.04	2.02
4/13/10	23.06	3.36	2.48	1.98
4/14/10	23.3	3.40	2.2	1.96
4/15/10	21.29	3.10	1.97	1.97
4/16/10	23.64	3.45	2.45	1.97
4/17/10	20.82	3.04	1.79	1.96
4/18/10	21.88	3.19	1.34	2
4/19/10	23.29	3.40	2.49	2.07
4/20/10	20.23	2.95	2.02	2.1
4/21/10	20.23	2.95	2.2	2.11
4/22/10	20.35	2.97	2.23	2.15
4/23/10	21.88	3.19	2.46	2.06
4/24/10	22.59	3.29	2.3	2.01
4/25/10	23.88	3.48	2.48	2.09
4/26/10	23.18	3.38	2.23	2.06
4/27/10	20.7	3.02	2.06	2.07
4/28/10	22.82	3.33	2.39	2.03
4/29/10	20.11	2.93	1.84	1.99
4/30/10	22.82	3.33	2.65	2.14
5/1/10	23.76	3.46	2.25	1.94
5/2/10	23.88	3.48	2.19	1.97
5/3/10	23.18	3.38	2.23	2.04
5/4/10	22.11	3.22	2.01	1.96
5/5/10	20.35	2.97	2	1.99
5/6/10	23.88	3.48	2.5	1.99
5/7/10	20.58	3.00	1.74	1.96
5/8/10	21.06	3.07	2.2	1.94
5/9/10	22.59	3.29	2.33	1.95
5/10/10	23.64	3.45	2.4	2.04
5/11/10	22.11	3.22	2.12	2.07
5/12/10	20	2.92	2.05	2.05
5/13/10	22.59	3.29	2.45	2.04
5/14/10	20	2.92	2.03	2.12
5/15/10	23.88	3.48	2.81	2.19
5/16/10	20.58	3.00	2.2	2.27
5/17/10	21.4	3.12	3.11	2.72
5/18/10	19.67	2.87	3.04	2.82
5/19/10	19.52	2.85	2.9	2.59
5/20/10	19.52	2.85	2.77	2.71
5/21/10	22.94	3.35	2.76	2.34
5/22/10	20.23	2.95	2.38	2.42
5/23/10	20.35	2.97	2.25	2.19
5/24/10	20.58	3.00	2.69	2.41
5/25/10	20.35	2.97	2.39	2.32
5/26/10	21.99	3.21	2.67	2.3
5/27/10	23.29	3.40	2.79	2.42
5/28/10	23.17	3.38	2.38	2.27
5/29/10	21.29	3.10	2.2	2.18
5/30/10	21.88	3.19	2.38	2.31
5/31/10	23.41	3.41	2.58	2.36
6/1/10	20.23	2.95	2.19	2.3
6/2/10	20.11	2.93	2.36	2.29

Anaconda Water System Flow Records Summary

Record Period: Novembmer 1, 2009 to April 9, 2013

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6/3/10	21.41	3.12	2.69	2.35
6/4/10	22.71	3.31	2.78	2.33
6/5/10	23.29	3.40	2.52	2.29
6/6/10	20.46	2.98	2.22	2.25
6/7/10	22.59	3.29	2.75	2.48
6/8/10	19.88	2.90	2.45	2.45
6/9/10	22.11	3.22	2.77	2.49
6/10/10	22	3.21	2.66	2.48
6/11/10	22.7	3.31	2.53	2.3
6/12/10	19.88	2.90	2.25	2.29
6/13/10	20	2.92	2.38	2.29
6/14/10	19.05	2.78	2.97	2.88
6/15/10	19.76	2.88	3.31	2.75
6/16/10	23.17	3.38	2.75	2.36
6/17/10	20.23	2.95	2.27	2.32
6/18/10	20.23	2.95	2.38	2.29
6/19/10	22.35	3.26	2.73	2.3
6/20/10	19.88	2.90	2.24	2.26
6/21/10	22.46	3.28	2.75	2.44
6/22/10	19.76	2.88	2.48	2.48
6/23/10	21.17	3.09	2.76	2.58
6/24/10	20.23	2.95	2.76	2.79
6/25/10	20	2.92	2.76	2.72
6/26/10	20.82	3.04	2.77	2.62
6/27/10	20.7	3.02	2.76	2.61
6/28/10	20.11	2.93	3.53	3.23
6/29/10	21.64	3.16	3.15	3.37
6/30/10	20.11	2.93	3.52	3.16
7/1/10	19.28	2.81	3.52	3.06
7/2/10	21.52	3.14	4.18	3.35
7/3/10	19.64	2.86	3.04	2.95
7/4/10	19.06	2.78	3.22	2.78
7/5/10	19.17	2.80	3.42	2.91
7/6/10	20.58	3.00	3.94	3.22
7/7/10	19.29	2.81	3.51	3.11
7/8/10	19.06	2.78	4.05	3.48
7/9/10	19.09	2.78	4.08	3.5
7/10/10	19.05	2.78	4.91	3.73
7/11/10	19.29	2.81	3.26	4.03
7/12/10	18.82	2.74	4.13	3.55
7/13/10	19.06	2.78	4.52	3.84
7/14/10	18.94	2.76	4.03	3.45
7/15/10	18.7	2.73	4.56	3.87
7/16/10	18.58	2.71	4.6	3.9
7/17/10	18.94	2.76	4.53	3.84
7/18/10	18.82	2.74	4.3	3.67
7/19/10	18.7	2.73	4.8	4.11
7/20/10	18.58	2.71	4.84	4.12
7/21/10	18.58	2.71	4.77	4.07
7/22/10	19.52	2.85	4.24	3.51
7/23/10	18.94	2.76	4.01	3.5
7/24/10	19.05	2.78	4.24	3.62
7/25/10	19.05	2.78	4.21	3.61
7/26/10	18.46	2.69	4.79	4.15

Anaconda Water System Flow Records Summary

Record Period: Novembmer 1, 2009 to April 9, 2013

(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)

7/27/10	18.82	2.74	4.57	3.9
7/28/10	20	2.92	3.89	3.21
7/29/10	19.06	2.78	3.96	3.49
7/30/10	18.82	2.74	4.35	3.75
7/31/10	21.06	3.07	4.25	3.42
8/1/10	19.05	2.78	2.9	2.85
8/2/10	18.7	2.73	4.33	3.71
8/3/10	18.7	2.73	4.49	3.84
8/4/10	18.94	2.76	4.36	3.73
8/5/10	18.7	2.73	4.91	3.66
8/6/10	19.76	2.88	4.14	3.23
8/7/10	22.59	3.29	4.07	2.98
8/8/10	20.23	2.95	3.45	3.16
8/9/10	19.05	2.78	3.62	3.18
8/10/10	21.17	3.09	4.06	3.2
8/11/10	19.17	2.80	3.01	2.95
8/12/10	22.11	3.22	4	3.08
8/13/10	20.82	3.04	3.47	3.05
8/14/10	19.64	2.86	2.92	2.79
8/15/10	19.06	2.78	3.26	2.79
8/16/10	20	2.92	4.03	3.31
8/17/10	19.05	2.78	4.05	3.53
8/18/10	19.05	2.78	4.27	3.59
8/19/10	19.29	2.81	4.1	3.46
8/20/10	18.94	2.76	4.09	3.51
8/21/10	19.29	2.81	4.24	3.57
8/22/10	19.52	2.85	4.14	3.47
8/23/10	20.23	2.95	4	3.38
8/24/10	19.17	2.80	3.52	3.08
8/25/10	19.29	2.81	3.86	3.26
8/26/10	19.06	2.78	3.25	3.82
8/27/10	19.06	2.78	4.08	3.48
8/28/10	20.58	3.00	4.17	3.37
8/29/10	19.17	2.80	3.11	2.94
8/30/10	22.71	3.31	3.95	2.99
8/31/10	20	2.92	2.51	2.64
9/1/10	21.88	3.19	2.76	2.49
9/2/10	21.64	3.16	2.77	2.73
9/3/10	20.23	2.95	2.76	2.8
9/4/10	20.23	2.95	3.29	2.95
9/5/10	20.7	3.02	3.06	2.74
9/6/10	19.05	2.78	2.75	2.79
9/7/10	23.17	3.38	4	2.97
9/8/10	19.41	2.83	2.55	2.76
9/9/10	19.52	2.85	3.12	2.62
9/10/10	22.82	3.33	2.78	2.4
9/11/10	19.64	2.86	2.34	2.41
9/12/10	22.94	3.35	2.75	2.35
9/13/10	23.17	3.38	2.75	2.64
9/14/10	19.41	2.83	2.29	2.43
9/15/10	19.99	2.92	2.68	2.25
9/16/10	20	2.92	2.34	2.2
9/17/10	22.94	3.35	2.77	2.24
9/18/10	19.88	2.90	2.12	2.18

Anaconda Water System Flow Records Summary

Record Period: Novembmer 1, 2009 to April 9, 2013

(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)

9/19/10	20.58	3.00	2.25	2.07
9/20/10	20.23	2.95	2.38	2.17
9/21/10	23.29	3.40	2.89	2.27
9/22/10	20.35	2.97	1.96	2.03
9/23/10	21.05	3.07	2.27	2.06
9/24/10	20.23	2.95	2.11	2
9/25/10	20.82	3.04	2.31	1.99
9/26/10	21.05	3.07	2.32	2.06
9/27/10	21.05	3.07	2.49	2.21
9/28/10	21.17	3.09	2.5	2.22
9/29/10	23.41	3.41	2.68	2.12
9/30/10	19.4	2.83	2.02	2.16
10/1/10	20.34	2.97	2.63	2.17
10/2/10	20.11	2.93	2.75	2.25
10/3/10	21.17	3.09	2.46	2.09
10/4/10	20.11	2.93	2.29	2.12
10/5/10	21.06	3.07	2.21	1.89
10/6/10	20.23	2.95	1.84	1.8
10/7/10	20.35	2.97	2.01	1.78
10/8/10	20.11	2.93	1.92	1.74
10/9/10	20.23	2.95	1.94	1.7
10/10/10	20.35	2.97	1.91	1.66
10/11/10	20.46	2.98	1.97	1.75
10/12/10	20.35	2.97	1.84	1.75
10/13/10	20.46	2.98	1.88	1.68
10/14/10	20.58	3.00	1.87	1.65
10/15/10	21.05	3.07	1.94	1.66
10/16/10	20.7	3.02	1.79	1.63
10/17/10	21.29	3.10	1.89	1.63
10/18/10	21.29	3.10	1.87	1.67
10/19/10	20.82	3.04	1.77	1.61
10/20/10	20.23	2.95	1.76	1.61
10/21/10	20.94	3.05	1.86	1.59
10/22/10	21.05	3.07	1.8	1.61
10/23/10	21.17	3.09	1.81	1.56
10/24/10	20.7	3.02	1.67	1.54
10/25/10	20.35	2.97	1.76	1.63
10/26/10	20.34	2.97	1.76	1.58
10/27/10	20.23	2.95	1.74	1.58
10/28/10	20.11	2.93	1.86	1.6
10/29/10	20.11	2.93	1.66	1.57
10/30/10	20.58	3.00	1.78	1.55
10/31/10	20.94	3.05	1.73	1.59
11/1/10	20.94	3.05	1.85	1.65
11/2/10	20.82	3.04	1.77	1.58
11/3/10	20.46	2.98	1.76	1.61
11/4/10	20.58	3.00	1.84	1.6
11/5/10	20.94	3.05	1.84	1.61
11/6/10	20.7	3.02	1.79	1.61
11/7/10	20.35	2.97	1.83	1.64
11/8/10	20.58	3.00	1.84	1.63
11/9/10	20.7	3.02	1.78	1.59
11/10/10	20.46	2.98	1.74	1.58
11/11/10	20.11	2.93	1.87	1.59

Anaconda Water System Flow Records Summary								
Record Period: Novembmer 1, 2009 to April 9, 2013								
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)								
11/12/10	20.11	2.93	1.91	1.58				
11/13/10	20.11	2.93	1.9	1.57				
11/14/10	20.11	2.93	1.89	1.57				
11/15/10	20.23	2.95	1.95	1.63				
11/16/10	20.11	2.93	1.92	1.57				
11/17/10	20.46	2.98	1.97	1.6				
11/18/10	20.58	3.00	1.91	1.56				
11/19/10	20.46	2.98	1.84	1.57				
11/20/10	20.34	2.97	1.86	1.55				
11/21/10	20.35	2.97	1.92	1.62				
11/22/10	20.45	2.98	1.98	1.67				
11/23/10	20.25	2.95	1.97	1.68				
11/24/10	20.46	2.98	1.95	1.64				
11/25/10	21.05	3.07	2.14	1.75				
11/26/10	22	3.21	2.1	1.67				
11/27/10	21.29	3.10	1.93	1.82				
11/28/10	20.23	2.95	1.86	1.83				
11/29/10	21.29	3.10	2.2	1.83				
11/30/10	21.29	3.10	2.04	1.81				
12/1/10	21.29	3.10	1.94	1.78				
12/2/10	21.03	3.07	1.94	1.77				
12/3/10	20.7	3.02	1.91	1.79				
12/4/10	20.94	3.05	1.91	1.67				
12/5/10	21.29	3.10	1.91	1.7				
12/6/10	20.94	3.05	1.87	1.71				
12/7/10	20.58	3.00	1.82	1.67				
12/8/10	21.17	3.09	1.96	1.68				
12/9/10	20.7	3.02	1.79	1.65				
12/10/10	20.82	3.04	1.84	1.64				
12/11/10	20.82	3.04	1.77	1.61				
12/12/10	18.5	2.70	1.68	1.66				
12/13/10	23.53	3.43	2.7	1.65				
12/14/10	24	3.50	2.24	1.64				
12/15/10	21.5	3.14	2.22	1.67				
12/16/10	0.01	0.00	1.67	1.71				
12/17/10	0.01	0.00	2.24	1.69				
12/18/10	0.01	0.00	1.64	1.65				
12/19/10	23	3.35	1.1	1.77				
12/20/10	0.01	0.00	1.86	1.71				
12/21/10	20	2.92	1.86	1.71				
12/22/10	0.01	0.00	2.4	1.67				
12/23/10	0.01	0.00	2.31	1.66				
12/24/10	0.01	0.00	2.01	1.68				
12/25/10	0.01	0.00	2.4	1.69				
12/26/10	0.01	0.00	2.02	1.68				
12/27/10	0.01	0.00	2.24	1.75				
12/28/10	0.01	0.00	2.03	1.7				
12/29/10	0.01	0.00	3.21	1.63				
12/30/10	0.01	0.00	1.93	1.63				
12/31/10	0.01	0.00	2.1	1.55				
1/1/11	0	0.00	0	0				
1/2/11	0.01	0.00	4.38	3.31				
1/3/11	0.01	0.00	2.21	1.73				
1/4/11	0.01	0.00	2.34	1.66				

Anaconda Water System Flow Records Summary

Record Period: Novembmer 1, 2009 to April 9, 2013

(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)

1/5/11	0.01	0.00	1.96	1.63
1/6/11	0.01	0.00	1.99	1.59
1/7/11	0.01	0.00	1.85	1.6
1/8/11	0.01	0.00	2.09	1.59
1/9/11	0.01	0.00	1.65	1.66
1/10/11	0.01	0.00	1.65	1.66
1/11/11	0.01	0.00	2.32	1.69
1/12/11	0.01	0.00	2.91	1.64
1/13/11	0.01	0.00	2.02	1.63
1/14/11	0.01	0.00	1.97	1.6
1/15/11	22.35	3.26	1.14	1.58
1/16/11	21.45	3.13	1.82	1.67
1/17/11	20.82	3.04	1.82	1.67
1/18/11	21.52	3.14	1.91	1.68
1/19/11	0	0.00	0	0
1/20/11	20.46	2.98	3.48	3.34
1/21/11	20	2.92	1.65	1.64
1/22/11	20.11	2.93	1.36	1.59
1/23/11	20.94	3.05	1.83	1.6
1/24/11	24	3.50	1.56	1.69
1/25/11	22.35	3.26	1.59	1.63
1/26/11	20.7	3.02	1.63	1.61
1/27/11	19.99	2.92	1.72	1.61
1/28/11	22.23	3.24	1.46	1.63
1/29/11	22.23	3.24	1.38	1.57
1/30/11	20.82	3.04	1.62	1.6
1/31/11	20.82	3.04	1.86	1.71
2/1/11	21.64	3.16	2.26	2.06
2/2/11	20.46	2.98	1.88	1.81
2/3/11	20.11	2.93	1.79	1.66
2/4/11	20.35	2.97	1.86	1.66
2/5/11	20.48	2.99	1.8	1.6
2/6/11	20.46	2.98	1.9	1.75
2/7/11	20.46	2.98	1.9	1.72
2/8/11	20.58	3.00	1.86	1.69
2/9/11	20.11	2.93	1.77	1.66
2/10/11	20.23	2.95	1.81	1.68
2/11/11	20.35	2.97	1.84	1.65
2/12/11	20.58	3.00	1.84	1.59
2/13/11	20.46	2.98	1.83	1.65
2/14/11	20.46	2.98	1.88	1.7
2/15/11	20.47	2.99	1.84	1.64
2/16/11	20.46	2.98	1.84	1.65
2/17/11	20.46	2.98	1.81	1.64
2/18/11	20.46	2.98	1.85	1.67
2/19/11	20.58	3.00	1.85	1.65
2/20/11	20.46	2.98	1.85	1.69
2/21/11	20.35	2.97	1.88	1.72
2/22/11	20.35	2.97	1.9	1.72
2/23/11	20.46	2.98	1.88	1.68
2/24/11	20.46	2.98	1.84	1.67
2/25/11	20.7	3.02	1.89	1.71
2/26/11	20.7	3.02	1.87	1.7
2/27/11	19.52	2.85	1.73	1.67

Anaconda Water System Flow Records Summary								
Record Period: Novembmer 1, 2009 to April 9, 2013								
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)								
2/28/11	20.46	2.98	2.04	1.74				
3/1/11	20.11	2.93	1.86	1.71				
3/2/11	20.35	2.97	1.91	1.79				
3/3/11	20.46	2.98	1.86	1.67				
3/4/11	20.46	2.98	1.91	1.72				
3/5/11	20.46	2.98	1.88	1.68				
3/6/11	20.35	2.97	1.87	1.69				
3/7/11	20.23	2.95	1.92	1.74				
3/8/11	21.41	3.12	2.16	1.72				
3/9/11	20.7	3.02	1.81	1.7				
3/10/11	20.35	2.97	1.82	1.68				
3/11/11	20.23	2.95	1.84	1.69				
3/12/11	20.11	2.93	1.86	1.7				
3/13/11	0	0.00	2.02	1.65				
3/14/11	20.94	3.05	2.03	1.7				
3/15/11	21.64	3.16	2.11	1.7				
3/16/11	23.88	3.48	2.41	1.67				
3/17/11	19.05	2.78	1.8	1.7				
3/18/11	19.52	2.85	2.05	1.67				
3/19/11	21.05	3.07	2.27	1.64				
3/20/11	23.29	3.40	2.36	1.68				
3/21/11	20.46	2.98	2.01	1.71				
3/22/11	21.64	3.16	2.3	1.67				
3/23/11	21.99	3.21	2.34	1.69				
3/24/11	19.17	2.80	1.81	1.66				
3/25/11	19.52	2.85	2.07	1.68				
3/26/11	19.64	2.86	2.03	1.69				
3/27/11	19.76	2.88	2.02	1.67				
3/28/11	19.88	2.90	2.11	1.74				
3/29/11	20	2.92	2.03	1.68				
3/30/11	20.23	2.95	2.02	1.67				
3/31/11	19.76	2.88	1.95	1.66				
4/1/11	20.11	2.93	2.07	1.69				
4/2/11	20.46	2.98	2.04	1.65				
4/3/11	20.82	3.04	2.04	1.67				
4/4/11	20.94	3.05	2.17	1.72				
4/5/11	20.93	3.05	2.03	1.68				
4/6/11	21.17	3.09	2.05	1.69				
4/7/11	21.4	3.12	2.08	1.7				
4/8/11	22.11	3.22	2.14	1.73				
4/9/11	23.41	3.41	2.15	1.68				
4/10/11	22.23	3.24	1.9	1.68				
4/11/11	20.23	2.95	1.87	1.73				
4/12/11	20.7	3.02	2.14	1.74				
4/13/11	21.29	3.10	2.12	1.71				
4/14/11	21.64	3.16	2.09	1.7				
4/15/11	21.88	3.19	2.04	1.67				
4/16/11	22.82	3.33	2.16	1.7				
4/17/11	23.53	3.43	2.1	1.7				
4/18/11	21.17	3.09	1.86	2.04				
4/19/11	19.41	2.83	1.84	2.37				
4/20/11	19.52	2.85	2.06	2.02				
4/21/11	19.76	2.88	2.05	1.68				
4/22/11	20.11	2.93	2.06	1.7				

Anaconda Water System Flow Records Summary								
Record Period: Novembmer 1, 2009 to April 9, 2013								
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)								
4/23/11	20.46	2.98	2.07	1.76				
4/24/11	20.35	2.97	2.04	2.57				
4/25/11	20.58	3.00	2.09	2.17				
4/26/11	20.46	2.98	2.08	2.5				
4/27/11	20.46	2.98	2.03	2.7				
4/28/11	20.58	3.00	2.09	2.67				
4/29/11	20.7	3.02	1.93	3.2				
4/30/11	21.29	3.10	2.05	3.52				
5/1/11	21.76	3.17	2.06	4.23				
5/2/11	22.46	3.28	2.14	2.12				
5/3/11	23.29	3.40	2.18	2.01				
5/4/11	22.11	3.22	1.92	1.48				
5/5/11	20	2.92	1.86	2.02				
5/6/11	20.7	3.02	2.22	2.12				
5/7/11	21.4	3.12	2.14	1.88				
5/8/11	22	3.21	2.15	1.74				
5/9/11	22.46	3.28	2.19	1.41				
5/10/11	23.17	3.38	2.16	1.85				
5/11/11	22.35	3.26	1.97	1.41				
5/12/11	21.05	3.07	1.86	1.55				
5/13/11	20.23	2.95	1.93	1.8				
5/14/11	21.64	3.16	2.17	1.83				
5/15/11	23.18	3.38	2.09	1.44				
5/16/11	20.94	3.05	1.81	1.42				
5/17/11	20.11	2.93	2.07	1.45				
5/18/11	20.46	2.98	2.21	1.36				
5/19/11	20.35	2.97	2.16	1.36				
5/20/11	20.35	2.97	2.24	1.82				
5/21/11	20	2.92	1.95	1.28				
5/22/11	20.71	3.02	2.17	1.52				
5/23/11	20.58	3.00	2.16	1.56				
5/24/11	20.7	3.02	2.14	1.49				
5/25/11	20	2.92	1.94	1.4				
5/26/11	20.11	2.93	1.96	1.31				
5/27/11	20.11	2.93	1.99	1.09				
5/28/11	20.23	2.95	1.97	1.04				
5/29/11	20.13	2.94	1.96	1.07				
5/30/11	20.23	2.95	0	1.37				
5/31/11	20.11	2.93	1.96	1.58				
6/1/11	20.33	2.96	1.97	1.67				
6/2/11	20.11	2.93	1.98	1.77				
6/3/11	20.23	2.95	1.96	1.88				
6/4/11	20.23	2.95	1.97	2.1				
6/5/11	20.82	3.04	2.17	2.49				
6/6/11	23.29	3.40	2.69	3.02				
6/7/11	20.11	2.93	2.09	2.62				
6/8/11	21.17	3.09	2.16	2.14				
6/9/11	20.58	3.00	1.92	2.02				
6/10/11	20.11	2.93	1.96	2.08				
6/11/11	20.11	2.93	2.01	1.86				
6/12/11	20.7	3.02	2.02	1.72				
6/13/11	21.76	3.17	2.12	1.52				
6/14/11	23.76	3.46	2.23	1.5				
6/15/11	20.58	3.00	1.85	1.69				

Anaconda Water System Flow Records Summary								
Record Period: Novembmer 1, 2009 to April 9, 2013								
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)								
6/16/11	22.94	3.35	2.54	1.8				
6/17/11	21.4	3.12	2.09	1.69				
6/18/11	20.11	2.93	2.07	1.64				
6/19/11	21.99	3.21	2.38	1.7				
6/20/11	22.59	3.29	2.47	1.93				
6/21/11	19.64	2.86	2.47	2.08				
6/22/11	19.88	2.90	2.76	2.35				
6/23/11	19.29	2.81	2.8	2.47				
6/24/11	19.06	2.78	3.14	2.38				
6/25/11	19.17	2.80	3	2.22				
6/26/11	19.29	2.81	3.16	2.47				
6/27/11	22.11	3.22	4.04	2.98				
6/28/11	19.64	2.86	3.59	3.08				
6/29/11	21.05	3.07	3.62	2.77				
6/30/11	20.11	2.93	3.31	2.7				
7/1/11	20.7	3.02	3.42	2.65				
7/2/11	19.76	2.88	3.6	2.95				
7/3/11	19.6	2.86	4.03	3.28				
7/4/11	19.05	2.78	4.03	3.29				
7/5/11	19.29	2.81	4.2	3.4				
7/6/11	18.94	2.76	4.33	3.56				
7/7/11	18.82	2.74	4.68	3.83				
7/8/11	19.05	2.78	4.14	3.32				
7/9/11	19.29	2.81	3.81	3.08				
7/10/11	19.17	2.80	4	3.24				
7/11/11	19.05	2.78	4.22	3.42				
7/12/11	19.05	2.78	4.07	3.29				
7/13/11	19.41	2.83	3.95	3.16				
7/14/11	20	2.92	3.43	2.71				
7/15/11	20.46	2.98	3.2	2.48				
7/16/11	20.23	2.95	3.44	2.64				
7/17/11	20.23	2.95	3.19	2.5				
7/18/11	17.99	2.62	4.1	3.37				
7/19/11	18.94	2.76	4.77	3.62				
7/20/11	20	2.92	4.52	3.34				
7/21/11	18.94	2.76	3.44	3.28				
7/22/11	19.06	2.78	4.01	3.25				
7/23/11	20	2.92	3.73	2.93				
7/24/11	19.29	2.81	3.75	3.07				
7/25/11	19.06	2.78	4.54	3.69				
7/26/11	18.7	2.73	4.46	3.65				
7/27/11	19.05	2.78	4.34	3.47				
7/28/11	18.94	2.76	4.19	3.4				
7/29/11	19.05	2.78	4.46	3.58				
7/30/11	18.94	2.76	4.32	3.49				
7/31/11	19.52	2.85	3.91	3.09				
8/1/11	19.29	2.81	3.22	2.59				
8/2/11	21.88	3.19	3.86	2.82				
8/3/11	19.41	2.83	3.63	3.13				
8/4/11	19.41	2.83	3.89	3.12				
8/5/11	20.58	3.00	3.7	2.87				
8/6/11	20.11	2.93	3.29	2.63				
8/7/11	19.76	2.88	3.21	2.58				
8/8/11	21.56	3.14	4.12	3.15				

Anaconda Water System Flow Records Summary

Record Period: Novembmer 1, 2009 to April 9, 2013

(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)

8/9/11	19.17	2.80	3.8	3.25
8/10/11	18.94	2.76	4.12	3.37
8/11/11	19.41	2.83	3.93	3.13
8/12/11	13.05	1.90	3.62	3.49
8/13/11	19.41	2.83	4.42	2.99
8/14/11	14.05	2.05	4.15	3.33
8/15/11	19.06	2.78	4.15	3.33
8/16/11	19.06	2.78	4	3.23
8/17/11	19.05	2.78	4.14	3.33
8/18/11	18.94	2.76	4.2	3.38
8/19/11	14.23	2.08	3.71	3.37
8/20/11	16.94	2.47	3.97	3.13
8/21/11	20.46	2.98	4.33	3.16
8/22/11	18.82	2.74	4.22	3.57
8/23/11	18.96	2.76	4.44	3.6
8/24/11	18.82	2.74	4.31	3.49
8/25/11	18.94	2.76	4.57	3.64
8/26/11	20.58	3.00	4.1	3.12
8/27/11	21.52	3.14	4.12	3.2
8/28/11	19.05	2.78	3.78	3.29
8/29/11	19.17	2.80	4.05	3.38
8/30/11	19.64	2.86	3.57	2.86
8/31/11	21.76	3.17	3.54	2.63
9/1/11	19.29	2.81	2.53	2.38
9/2/11	19.17	2.80	3.23	2.56
9/3/11	19.88	2.90	3.4	2.61
9/4/11	19.06	2.78	2.77	2.56
9/5/11	20.82	3.04	3.92	2.95
9/6/11	19.17	2.80	3.71	3.11
9/7/11	19.88	2.90	3.97	3.12
9/8/11	19.05	2.78	3.71	3.01
9/9/11	19.17	2.80	3.48	2.77
9/10/11	19.17	2.80	3.42	2.68
9/11/11	19.29	2.81	3.52	2.8
9/12/11	22.23	3.24	3.98	3.88
9/13/11	19.76	2.88	3.37	2.87
9/14/11	19.64	2.86	3.49	2.77
9/15/11	20.11	2.93	3.43	2.65
9/16/11	20.23	2.95	2.87	2.38
9/17/11	19.88	2.90	2.36	2.07
9/18/11	21.64	3.16	2.74	2.11
9/19/11	19.76	2.88	2.38	2.24
9/20/11	21.29	3.10	2.74	2.15
9/21/11	19.64	2.86	2.32	2.13
9/22/11	21.05	3.07	2.82	2.22
9/23/11	22.59	3.29	2.77	2.31
9/24/11	19.17	2.80	2.33	2.19
9/25/11	19.41	2.83	2.9	2.23
9/26/11	19.17	2.80	2.99	2.37
9/27/11	19.05	2.78	2.82	2.18
9/28/11	19.17	2.80	2.84	2.19
9/29/11	19.52	2.85	2.53	2.01
9/30/11	20	2.92	2.32	1.95
10/1/11	21.17	3.09	2.44	1.85

Anaconda Water System Flow Records Summary								
Record Period: Novembmer 1, 2009 to April 9, 2013								
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)								
10/2/11	20.35	2.97	2.22	1.84				
10/3/11	20.7	3.02	2.39	1.89				
10/4/11	20.46	2.98	2.22	1.79				
10/5/11	20.11	2.93	2.01	1.61				
10/6/11	20.11	2.93	1.9	1.47				
10/7/11	20.23	2.95	1.87	1.43				
10/8/11	20.11	2.93	1.79	1.33				
10/9/11	20.11	2.93	1.78	1.35				
10/10/11	20.11	2.93	1.84	1.41				
10/11/11	20.23	2.95	1.8	1.35				
10/12/11	20.23	2.95	1.78	1.34				
10/13/11	20.23	2.95	1.73	1.21				
10/14/11	20.23	2.95	1.73	1.31				
10/15/11	20.35	2.97	1.71	1.26				
10/16/11	19.99	2.92	1.64	1.26				
10/17/11	20.11	2.93	1.77	1.34				
10/18/11	20.23	2.95	1.74	1.3				
10/19/11	20.35	2.97	1.73	1.29				
10/20/11	20.46	2.98	1.72	1.28				
10/21/11	20.35	2.97	1.68	1.26				
10/22/11	20.11	2.93	1.66	1.25				
10/23/11	19.99	2.92	1.72	1.26				
10/24/11	20.11	2.93	1.74	1.3				
10/25/11	20.11	2.93	1.7	1.28				
10/26/11	20.11	2.93	1.69	1.26				
10/27/11	19.99	2.92	1.71	1.28				
10/28/11	20.11	2.93	1.72	1.28				
10/29/11	20.11	2.93	1.65	1.21				
10/30/11	20.46	2.98	1.7	1.25				
10/31/11	20.35	2.97	1.74	1.31				
11/1/11	20.11	2.93	1.66	1.25				
11/2/11	20.23	2.95	1.69	1.27				
11/3/11	20	2.92	1.67	1.25				
11/4/11	20	2.92	1.67	1.25				
11/5/11	20.23	2.95	1.71	1.25				
11/6/11	20.23	2.95	1.72	1.28				
11/7/11	20.11	2.93	1.73	1.32				
11/8/11	20.11	2.93	1.65	1.22				
11/9/11	20.11	2.93	1.63	1.21				
11/10/11	20.23	2.95	1.63	1.2				
11/11/11	20.06	2.93	1.6	1.18				
11/12/11	20.23	2.95	1.61	1.17				
11/13/11	20.35	2.97	1.63	1.18				
11/14/11	20.24	2.95	1.65	1.22				
11/15/11	20.11	2.93	1.62	1.22				
11/16/11	20	2.92	1.64	1.23				
11/17/11	19.99	2.92	1.63	1.21				
11/18/11	20.11	2.93	1.69	1.26				
11/19/11	20.11	2.93	1.62	1.2				
11/20/11	20.35	2.97	1.67	1.22				
11/21/11	20.11	2.93	1.71	1.28				
11/22/11	20.11	2.93	1.65	1.22				
11/23/11	20.11	2.93	1.68	1.23				
11/24/11	20.23	2.95	1.67	1.22				

Anaconda Water System Flow Records Summary								
Record Period: Novembmer 1, 2009 to April 9, 2013								
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)								
11/25/11	20.35	2.97	1.72	1.27				
11/26/11	20.34	2.97	1.67	1.24				
11/27/11	20.46	2.98	1.7	1.26				
11/28/11	20.7	3.02	1.79	1.28				
11/29/11	20.23	2.95	1.64	1.27				
11/30/11	20	2.92	1.65	1.25				
12/1/11	20.11	2.93	1.67	1.25				
12/2/11	20.11	2.93	1.66	1.25				
12/3/11	20.46	2.98	1.67	1.23				
12/4/11	21.17	3.09	1.7	1.24				
12/5/11	21.4	3.12	1.7	1.29				
12/6/11	21.29	3.10	1.68	1.29				
12/7/11	21.17	3.09	1.67	1.29				
12/8/11	20.7	3.02	1.62	1.28				
12/9/11	20.46	2.98	1.66	1.27				
12/10/11	20.7	3.02	1.65	1.23				
12/11/11	21.41	3.12	1.72	1.24				
12/12/11	21.64	3.16	1.75	1.32				
12/13/11	21.17	3.09	1.62	1.27				
12/14/11	20.82	3.04	1.62	1.26				
12/15/11	20.58	3.00	1.63	1.24				
12/16/11	20.35	2.97	1.64	1.25				
12/17/11	20.7	3.02	1.66	1.21				
12/18/11	21.3	3.11	1.68	1.22				
12/19/11	21.64	3.16	1.73	1.3				
12/20/11	21.29	3.10	1.59	1.22				
12/21/11	20.94	3.05	1.61	1.24				
12/22/11	20.94	3.05	1.62	1.22				
12/23/11	21.05	3.07	1.66	1.25				
12/24/11	21.29	3.10	1.67	1.23				
12/25/11	22	3.21	1.72	1.24				
12/26/11	21.76	3.17	1.56	1.22				
12/27/11	20.94	3.05	1.61	1.28				
12/28/11	20.46	2.98	1.62	1.24				
12/29/11	20.23	2.95	1.65	1.24				
12/30/11	20.23	2.95	1.65	1.23				
12/31/11	20.35	2.97	1.67	1.23				
1/1/12	21.29	3.10	1.74	1.24				
1/2/12	20.82	3.04	1.53	1.23				
1/3/12	23.46	3.42	1.98	1.29				
1/4/12	23.17	3.38	1.61	1.24				
1/5/12	22.46	3.28	1.59	1.24				
1/6/12	21.64	3.16	1.68	1.28				
1/7/12	21.29	3.10	1.59	1.24				
1/8/12	21.64	3.16	1.69	1.27				
1/9/12	21.76	3.17	1.72	1.32				
1/10/12	21.29	3.10	1.62	1.27				
1/11/12	20.7	3.02	1.6	1.29				
1/12/12	20.11	2.93	1.62	1.31				
1/13/12	20	2.92	1.67	1.32				
1/14/12	20.23	2.95	1.64	1.22				
1/15/12	20.94	3.05	1.69	1.23				
1/16/12	21.06	3.07	1.7	1.3				
1/17/12	21.06	3.07	1.7	1.32				

Anaconda Water System Flow Records Summary

Record Period: Novembmer 1, 2009 to April 9, 2013

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1/18/12	20.46	2.98	1.63	1.3
1/19/12	20.23	2.95	1.65	1.26
1/20/12	20	2.92	1.67	1.27
1/21/12	20.11	2.93	1.68	1.27
1/22/12	20.82	3.04	1.74	1.27
1/23/12	20.46	2.98	1.71	1.35
1/24/12	20.35	2.97	1.69	1.3
1/25/12	20.23	2.95	1.68	1.28
1/26/12	20.23	2.95	1.7	1.28
1/27/12	20.23	2.95	1.68	1.29
1/28/12	20	2.92	1.63	1.24
1/29/12	20.7	3.02	1.71	1.24
1/30/12	20.82	3.04	1.79	1.32
1/31/12	20.23	2.95	1.65	1.29
2/1/12	20.11	2.93	1.7	1.28
2/2/12	20.35	2.97	1.76	1.29
2/3/12	20.46	2.98	1.72	1.28
2/4/12	20.46	2.98	1.67	1.25
2/5/12	20.11	2.93	1.66	1.26
2/6/12	20.11	2.93	1.74	1.3
2/7/12	20.35	2.97	1.72	1.28
2/8/12	20.35	2.97	1.71	1.29
2/9/12	20.46	2.98	1.73	1.29
2/10/12	20.46	2.98	1.73	1.28
2/11/12	20.46	2.98	1.66	1.25
2/12/12	20.23	2.95	1.66	1.26
2/13/12	20.35	2.97	1.75	1.31
2/14/12	20.46	2.98	1.72	1.27
2/15/12	20.58	3.00	1.72	1.28
2/16/12	20.58	3.00	1.71	1.23
2/17/12	20.58	3.00	1.71	1.33
2/18/12	20.58	3.00	1.67	1.25
2/19/12	20.35	2.97	1.67	1.27
2/20/12	20.46	2.98	1.76	1.33
2/21/12	20.23	2.95	1.7	1.29
2/22/12	20.46	2.98	1.75	1.29
2/23/12	20.58	3.00	1.73	1.29
2/24/12	20.58	3.00	1.7	1.28
2/25/12	20.35	2.97	1.65	1.23
2/26/12	20.34	2.97	1.71	1.28
2/27/12	20.46	2.98	1.76	1.32
2/28/12	20.46	2.98	1.71	1.27
2/29/12	20.46	2.98	1.68	1.26
3/1/12	20.58	3.00	1.71	1.27
3/2/12	20.82	3.04	1.74	1.28
3/3/12	20.58	3.00	1.63	1.23
3/4/12	20.46	2.98	1.77	1.26
3/5/12	20.11	2.93	1.77	1.32
3/6/12	20.23	2.95	1.75	1.29
3/7/12	20.23	2.95	1.73	1.3
3/8/12	20.11	2.93	1.71	1.3
3/9/12	20.23	2.95	1.72	1.27
3/10/12	20.11	2.93	1.67	1.25
3/11/12	20.82	3.04	1.72	1.22

Anaconda Water System Flow Records Summary

Record Period: Novembmer 1, 2009 to April 9, 2013

(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)

3/12/12	20.11	2.93	1.65	1.31
3/13/12	20.35	2.97	1.73	1.29
3/14/12	20.35	2.97	1.69	1.28
3/15/12	20.35	2.97	1.68	1.27
3/16/12	20.58	3.00	1.7	1.27
3/17/12	20.7	3.02	1.71	1.27
3/18/12	21.52	3.14	1.75	1.26
3/19/12	21.76	3.17	1.68	1.29
3/20/12	21.52	3.14	1.67	1.29
3/21/12	21.29	3.10	1.67	1.29
3/22/12	21.05	3.07	1.68	1.29
3/23/12	20.7	3.02	1.66	1.28
3/24/12	20.93	3.05	1.7	1.26
3/25/12	21.64	3.16	1.77	1.29
3/26/12	22.23	3.24	1.8	1.33
3/27/12	21.88	3.19	1.58	1.3
3/28/12	21.64	3.16	1.69	1.3
3/29/12	21.29	3.10	1.68	1.3
3/30/12	21.17	3.09	1.65	1.31
3/31/12	15.05	2.19	1.07	1.3
4/1/12	20.23	2.95	1.09	1.24
4/2/12	20	2.92	1.75	1.34
4/3/12	20.11	2.93	1.76	1.33
4/4/12	20.11	2.93	1.73	1.3
4/5/12	20.23	2.95	1.74	1.3
4/6/12	20.23	2.95	1.73	1.29
4/7/12	20.55	3.00	1.72	1.28
4/8/12	20.11	2.93	1.69	1.28
4/9/12	20	2.92	1.71	1.29
4/10/12	20.11	2.93	1.76	1.31
4/11/12	20.23	2.95	1.74	1.29
4/12/12	20.35	2.97	1.74	1.29
4/13/12	20.46	2.98	1.74	1.3
4/14/12	20.35	2.97	1.71	1.28
4/15/12	20.11	2.93	1.71	1.3
4/16/12	20.23	2.95	1.79	1.34
4/17/12	20.23	2.95	1.76	1.31
4/18/12	20.23	2.95	1.74	1.31
4/19/12	20.35	2.97	1.76	1.32
4/20/12	20.35	2.97	1.78	1.34
4/21/12	20.35	2.97	1.79	1.37
4/22/12	20.7	3.02	2.07	1.56
4/23/12	20.7	3.02	2.18	1.71
4/24/12	20.7	3.02	2.09	1.84
4/25/12	20.23	2.95	2.04	1.63
4/26/12	23.88	3.48	2.59	1.8
4/27/12	21.41	3.12	1.74	1.55
4/28/12	20.7	3.02	1.81	1.45
4/29/12	20.11	2.93	1.82	1.44
4/30/12	20.46	2.98	2.03	1.56
5/1/12	20.58	3.00	1.98	1.54
5/2/12	20.46	2.98	1.97	1.56
5/3/12	20.34	2.97	1.96	1.53
5/4/12	20.11	2.93	1.92	1.52

Anaconda Water System Flow Records Summary								
Record Period: Novembmer 1, 2009 to April 9, 2013								
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)								
5/5/12	20	2.92	1.86	1.42				
5/6/12	20.23	2.95	1.91	1.46				
5/7/12	20.46	2.98	2.03	1.57				
5/8/12	20.82	3.04	2.15	1.68				
5/9/12	22	3.21	2.62	2.05				
5/10/12	19.76	2.88	2.39	2.15				
5/11/12	22.59	3.29	2.52	1.84				
5/12/12	23.29	3.40	2.39	1.95				
5/13/12	19.88	2.90	2.45	2.24				
5/14/12	21.29	3.10	3.28	2.76				
5/15/12	20.11	2.93	3.29	2.85				
5/16/12	19.06	2.78	3.56	2.9				
5/17/12	19.29	2.81	3.31	2.92				
5/18/12	19.05	2.78	3.01	2.52				
5/19/12	19.41	2.83	3.09	2.5				
5/20/12	19.29	2.81	3.01	2.47				
5/21/12	19.29	2.81	3.37	2.98				
5/22/12	19.99	2.92	3.37	2.73				
5/23/12	21.64	3.16	2.76	2.3				
5/24/12	19.88	2.90	2.48	2.29				
5/25/12	21.64	3.16	2.78	2.21				
5/26/12	19.64	2.86	2.15	1.91				
5/27/12	21.05	3.07	2.31	1.82				
5/28/12	23.06	3.36	2.52	1.9				
5/29/12	20	2.92	2.19	2.01				
5/30/12	22.23	3.24	2.74	2.23				
5/31/12	20.23	2.95	2.61	2.28				
6/1/12	19.76	2.88	2.41	2.12				
6/2/12	20.11	2.93	2.86	2.29				
6/3/12	21.29	3.10	2.74	2.17				
6/4/12	22	3.21	2.76	2.37				
6/5/12	20.58	3.00	2.75	2.57				
6/6/12	22.94	3.35	2.76	2.25				
6/7/12	19.88	2.90	2.5	2.26				
6/8/12	20.7	3.02	2.79	2.4				
6/9/12	23.05	3.36	2.76	2.23				
6/10/12	19.29	2.81	2.17	2.05				
6/11/12	19.29	2.81	2.75	2.23				
6/12/12	19.05	2.78	2.9	2.36				
6/13/12	19.52	2.85	3.07	2.47				
6/14/12	21.17	3.09	2.77	2.3				
6/15/12	20.46	2.98	3.09	2.76				
6/16/12	20.35	2.97	3.12	2.56				
6/17/12	20.23	2.95	3.29	2.71				
6/18/12	19.17	2.80	3.23	2.79				
6/19/12	19.17	2.80	3.08	2.53				
6/20/12	19.17	2.80	3.16	2.6				
6/21/12	19.29	2.81	3.39	3.02				
6/22/12	19.17	2.80	3.64	3.25				
6/23/12	19.29	2.81	3.5	3.12				
6/24/12	19.05	2.78	3.63	3.28				
6/25/12	18.94	2.76	4.34	3.94				
6/26/12	18.82	2.74	4.38	3.39				
6/27/12	19.06	2.78	3.78	3.39				

Anaconda Water System Flow Records Summary								
Record Period: Novembmer 1, 2009 to April 9, 2013								
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)								
6/28/12	18.7	2.73	4.3	3.75				
6/29/12	18.82	2.74	4.18	3.68				
6/30/12	18.94	2.76	3.95	3.5				
7/1/12	18.96	2.76	4.08	3.7				
7/2/12	20	2.92	3.63	3.22				
7/3/12	18.94	2.76	4.04	3.55				
7/4/12	18.82	2.74	4.76	3.42				
7/5/12	19.17	2.80	3.91	3.54				
7/6/12	18.7	2.73	3.84	3.55				
7/7/12	19.06	2.78	3.78	3.47				
7/8/12	18.94	2.76	3.67	3.38				
7/9/12	18.94	2.76	4.46	4.21				
7/10/12	18.58	2.71	4.03	3.83				
7/11/12	18.94	2.76	3.99	3.69				
7/12/12	18.94	2.76	3.53	3.25				
7/13/12	18.94	2.76	4	3.64				
7/14/12	19.17	2.80	3.34	3.01				
7/15/12	19.29	2.81	3.13	2.59				
7/16/12	19.17	2.80	3.01	2.47				
7/17/12	20	2.92	3.47	2.77				
7/18/12	20	2.92	2.76	2.45				
7/19/12	19.17	2.80	3.39	2.98				
7/20/12	19.17	2.80	3.76	3.2				
7/21/12	19.29	2.81	3.65	3.08				
7/22/12	19.05	2.78	3.57	3.06				
7/23/12	19.05	2.78	4.01	3.42				
7/24/12	18.94	2.76	3.02	3.43				
7/25/12	19.05	2.78	3.72	3.4				
7/26/12	18.82	2.74	3.69	3.39				
7/27/12	19.05	2.78	3.72	3.41				
7/28/12	19.17	2.80	3.21	2.69				
7/29/12	19.17	2.80	3.21	2.45				
7/30/12	18.94	2.76	3.53	3.22				
7/31/12	19.52	2.85	3.56	3.21				
8/1/12	19.05	2.78	3.3	2.79				
8/2/12	18.82	2.74	3.75	3.45				
8/3/12	19.05	2.78	3.6	3.28				
8/4/12	19.05	2.78	3.47	3.16				
8/5/12	19.29	2.81	3.48	3.17				
8/6/12	18.82	2.74	3.91	3.64				
8/7/12	19.17	2.80	3.71	3.41				
8/8/12	18.82	2.74	3.82	3.62				
8/9/12	18.94	2.76	3.76	3.54				
8/10/12	18.82	2.74	3.74	3.56				
8/11/12	19.29	2.81	3.45	3.13				
8/12/12	19.05	2.78	3.42	3.17				
8/13/12	19.17	2.80	3.94	3.67				
8/14/12	18.82	2.74	3.81	3.59				
8/15/12	19.17	2.80	3.74	3.47				
8/16/12	19.05	2.78	3.42	3.15				
8/17/12	18.94	2.76	3.74	3.5				
8/18/12	18.94	2.76	3.5	3.25				
8/19/12	19.05	2.78	3.51	3.28				
8/20/12	18.82	2.74	3.6	3.37				

Anaconda Water System Flow Records Summary								
Record Period: Novembmer 1, 2009 to April 9, 2013								
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)								
8/21/12	18.94	2.76	3.66	3.4				
8/22/12	21.52	3.14	3.76	2.95				
8/23/12	19.05	2.78	3.32	3.03				
8/24/12	19.05	2.78	3.54	3.25				
8/25/12	20	2.92	3.3	2.91				
8/26/12	20	2.92	3.36	2.81				
8/27/12	21.17	3.09	4.13	3.18				
8/28/12	19.05	2.78	3.59	3.24				
8/29/12	19.05	2.78	3.5	3.26				
8/30/12	19.05	2.78	3.37	3.12				
8/31/12	21.17	3.09	3.4	3.02				
9/1/12	19.29	2.81	2.8	2.53				
9/2/12	19.64	2.86	3.27	2.72				
9/3/12	19.41	2.83	3.35	3.01				
9/4/12	19.17	2.80	3.34	3.1				
9/5/12	19.17	2.80	3.17	2.9				
9/6/12	19.17	2.80	3.19	2.9				
9/7/12	21.52	3.14	3.64	2.85				
9/8/12	20.46	2.98	3.11	2.69				
9/9/12	20.35	2.97	3.21	2.68				
9/10/12	20	2.92	3.43	2.91				
9/11/12	20.46	2.98	3.13	2.73				
9/12/12	20.7	3.02	3.02	2.54				
9/13/12	19.05	2.78	3.18	2.78				
9/14/12	20.35	2.97	2.84	2.43				
9/15/12	21.41	3.12	3.23	2.45				
9/16/12	20.82	3.04	2.88	2.43				
9/17/12	21.52	3.14	3.2	2.44				
9/18/12	21.76	3.17	2.99	2.34				
9/19/12	19.29	2.81	3.07	2.39				
9/20/12	18.46	2.69	3.21	2.4				
9/21/12	20.11	2.93	2.62	2.46				
9/22/12	20.58	3.00	2.35	2.35				
9/23/12	19.88	2.90	3.14	2.32				
9/24/12	19.76	2.88	3.24	2.36				
9/25/12	19.64	2.86	3.21	2.33				
9/26/12	19.54	2.85	3.06	2.15				
9/27/12	19.76	2.88	3.1	2.2				
9/28/12	19.76	2.88	2.97	2.16				
9/29/12	20	2.92	2.71	2.03				
9/30/12	20.11	2.93	2.61	1.95				
10/1/12	19.88	2.90	2.74	2.09				
10/2/12	20	2.92	2.6	1.94				
10/3/12	21.05	3.07	2.39	1.83				
10/4/12	20.11	2.93	1.82	1.48				
10/5/12	20.08	2.93	1.89	1.44				
10/6/12	20.11	2.93	1.78	1.38				
10/7/12	20.11	2.93	1.82	1.39				
10/8/12	20.11	2.93	1.86	1.42				
10/9/12	20.11	2.93	1.84	1.38				
10/10/12	20.23	2.95	1.83	1.38				
10/11/12	20.35	2.97	1.81	1.36				
10/12/12	20.46	2.98	1.88	1.42				
10/13/12	20.35	2.97	1.68	1.26				

Anaconda Water System Flow Records Summary								
Record Period: Novembmer 1, 2009 to April 9, 2013								
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)								
10/14/12	19.64	2.86	1.61	1.25				
10/15/12	23.17	3.38	1.07	1.32				
10/16/12	23.06	3.36	1.67	1.24				
10/17/12	22.46	3.28	1.62	1.27				
10/18/12	21.52	3.14	1.57	1.26				
10/19/12	21.41	3.12	1.73	1.32				
10/20/12	20.82	3.04	1.64	1.27				
10/21/12	20.94	3.05	1.66	1.25				
10/22/12	20.94	3.05	1.73	1.31				
10/23/12	20.34	2.97	1.66	1.3				
10/24/12	20.11	2.93	1.68	1.31				
10/25/12	20.11	2.93	1.76	1.34				
10/26/12	20.23	2.95	1.78	1.36				
10/27/12	20.11	2.93	1.73	1.33				
10/28/12	20.35	2.97	1.77	1.34				
10/29/12	20.58	3.00	1.8	1.36				
10/30/12	20.46	2.98	1.72	1.31				
10/31/12	21.05	3.07	1.69	1.3				
11/1/12	20.46	2.98	1.51	1.23				
11/2/12	22.34	3.26	1.77	1.26				
11/3/12	20.93	3.05	1.5	1.22				
11/4/12	20.11	2.93	1.84	1.31				
11/5/12	20.58	3.00	1.68	1.33				
11/6/12	20.7	3.02	1.73	1.27				
11/7/12	20.7	3.02	1.71	1.28				
11/8/12	20.7	3.02	1.7	1.27				
11/9/12	21.05	3.07	1.75	1.29				
11/10/12	21.17	3.09	1.71	1.29				
11/11/12	21.05	3.07	1.72	1.32				
11/12/12	21.05	3.07	1.77	1.38				
11/13/12	20.82	3.04	1.71	1.29				
11/14/12	20.82	3.04	1.75	1.33				
11/15/12	20.82	3.04	1.73	1.3				
11/16/12	20.82	3.04	1.76	1.3				
11/17/12	20.94	3.05	1.68	1.28				
11/18/12	20.7	3.02	1.66	1.21				
11/19/12	20.82	3.04	1.79	1.36				
11/20/12	20.78	3.03	1.76	1.22				
11/21/12	20.7	3.02	1.76	1.33				
11/22/12	20.58	3.00	1.76	1.34				
11/23/12	20.7	3.02	1.81	1.36				
11/24/12	20.8	3.03	1.79	1.33				
11/25/12	20.82	3.04	1.77	1.35				
11/26/12	0	0.00	0	0				
11/27/12	20.7	3.02	3.58	2.74				
11/28/12	20.7	3.02	1.79	1.36				
11/29/12	20.7	3.02	1.76	1.33				
11/30/12	20.82	3.04	1.82	1.36				
12/1/12	20.93	3.05	1.76	1.33				
12/2/12	20.7	3.02	1.75	1.34				
12/3/12	20.58	3.00	1.82	1.39				
12/4/12	20.58	3.00	1.78	1.35				
12/5/12	20.7	3.02	1.79	1.34				
12/6/12	20.58	3.00	1.77	1.36				

Anaconda Water System Flow Records Summary								
Record Period: Novembmer 1, 2009 to April 9, 2013								
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)								
12/7/12	20.7	3.02	1.81	1.38				
12/8/12	21.06	3.07	1.85	1.37				
12/9/12	20.46	2.98	1.72	1.37				
12/10/12	20.7	3.02	1.79	1.44				
12/11/12	20.82	3.04	1.8	1.37				
12/12/12	20.58	3.00	1.77	1.36				
12/13/12	20.58	3.00	1.8	1.38				
12/14/12	20.58	3.00	1.86	1.41				
12/15/12	20.58	3.00	1.76	1.34				
12/16/12	20.46	2.98	1.79	1.38				
12/17/12	21.29	3.10	1.86	1.44				
12/18/12	20.94	3.05	1.8	1.41				
12/19/12	20.7	3.02	1.79	1.4				
12/20/12	20.46	2.98	1.8	1.41				
12/21/12	20.58	3.00	1.89	1.44				
12/22/12	20.46	2.98	1.85	1.44				
12/23/12	20.11	2.93	1.93	1.53				
12/24/12	20.7	3.02	2.06	1.45				
12/25/12	20.58	3.00	1.9	1.47				
12/26/12	20.46	2.98	1.87	1.46				
12/27/12	20.23	2.95	1.92	1.51				
12/28/12	20.11	2.93	1.89	1.45				
12/29/12	20.11	2.93	1.85	1.43				
12/30/12	20	2.92	1.91	1.46				
12/31/12	20.11	2.93	1.91	1.47				
1/1/13	20.11	2.93	1.89	1.46				
1/2/13	21.29	3.10	1.94	1.5				
1/3/13	20.7	3.02	1.84	1.48				
1/4/13	20.58	3.00	1.8	1.47				
1/5/13	20.35	2.97	1.84	1.43				
1/6/13	20.11	2.93	1.85	1.44				
1/7/13	20.11	2.93	1.94	1.5				
1/8/13	20.11	2.93	1.93	1.48				
1/9/13	20.23	2.95	1.92	1.47				
1/10/13	20.39	2.97	2.04	1.48				
1/11/13	20.35	2.97	1.91	1.48				
1/12/13	20.58	3.00	1.87	1.44				
1/13/13	20.23	2.95	1.82	1.44				
1/14/13	20.35	2.97	1.93	1.49				
1/15/13	20.48	2.99	1.83	1.46				
1/16/13	20.46	2.98	1.91	1.42				
1/17/13	20.46	2.98	1.85	1.43				
1/18/13	20.46	2.98	1.9	1.45				
1/19/13	20.46	2.98	1.85	1.43				
1/20/13	20.46	2.98	1.92	1.47				
1/21/13	20.23	2.95	1.95	1.53				
1/22/13	20.11	2.93	1.92	1.5				
1/23/13	20.11	2.93	1.96	1.51				
1/24/13	20.11	2.93	1.95	1.51				
1/25/13	20.23	2.95	1.97	1.53				
1/26/13	20	2.92	1.85	1.52				
1/27/13	20.34	2.97	2.02	1.54				
1/28/13	20.23	2.95	2	1.57				
1/29/13	20.1	2.93	1.94	1.5				

Anaconda Water System Flow Records Summary								
Record Period: Novembmer 1, 2009 to April 9, 2013								
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)								
1/30/13	20.11	2.93	2.07	1.52				
1/31/13	20.23	2.95	1.96	1.52				
2/1/13	20.23	2.95	1.94	1.51				
2/2/13	20.11	2.93	1.89	1.47				
2/3/13	20.11	2.93	1.94	1.5				
2/4/13	20.11	2.93	2	1.55				
2/5/13	20.11	2.93	1.94	1.51				
2/6/13	20	2.92	1.92	1.49				
2/7/13	20.23	2.95	1.94	1.49				
2/8/13	20.35	2.97	1.97	1.52				
2/9/13	20	2.92	1.89	1.49				
2/10/13	23.41	3.41	2.51	1.53				
2/11/13	21.17	3.09	1.76	1.6				
2/12/13	20.34	2.97	1.9	1.56				
2/13/13	21.05	3.07	2.08	1.56				
2/14/13	21.29	3.10	2.03	1.55				
2/15/13	21.29	3.10	2.03	1.57				
2/16/13	21.64	3.16	2.02	1.54				
2/17/13	22	3.21	2.07	1.57				
2/18/13	22.11	3.22	2.11	1.64				
2/19/13	22.23	3.24	2.07	1.61				
2/20/13	22	3.21	2.01	1.57				
2/21/13	21.64	3.16	1.99	1.58				
2/22/13	21.64	3.16	1.97	1.53				
2/23/13	21.76	3.17	2.02	1.56				
2/24/13	21.76	3.17	2	1.56				
2/25/13	21.76	3.17	2.09	1.64				
2/26/13	21.64	3.16	2.02	1.59				
2/27/13	21.64	3.16	2.02	1.58				
2/28/13	21.64	3.16	2.01	1.56				
3/1/13	21.52	3.14	2.02	1.58				
3/2/13	21.76	3.17	2.03	1.54				
3/3/13	22.11	3.22	2.08	1.58				
3/4/13	22.11	3.22	2.1	1.64				
3/5/13	21.88	3.19	2.03	1.61				
3/6/13	22	3.21	2.07	1.6				
3/7/13	22.11	3.22	2.09	1.61				
3/8/13	21.88	3.19	2.05	1.62				
3/9/13	22.34	3.26	2.12	1.61				
3/10/13	23.52	3.43	2.1	1.55				
3/11/13	23.88	3.48	1.16	1.65				
3/12/13	23.76	3.46	2.06	1.62				
3/13/13	23.41	3.41	2.05	1.63				
3/14/13	22.35	3.26	2.01	1.64				
3/15/13	20.58	3.00	1.99	1.71				
3/16/13	21.99	3.21	2.15	1.57				
3/17/13	22.82	3.33	2.05	1.56				
3/18/13	20.46	2.98	1.77	1.62				
3/19/13	20.7	3.02	2.1	1.63				
3/20/13	21.52	3.14	2.11	1.57				
3/21/13	21.76	3.17	2.09	1.6				
3/22/13	21.76	3.17	2.06	1.61				
3/23/13	21.88	3.19	1.97	1.52				
3/24/13	21.99	3.21	2.01	1.53				

Anaconda Water System Flow Records Summary

Record Period: Novembmer 1, 2009 to April 9, 2013

(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)

3/25/13	21.64	3.16	2.02	1.6
3/26/13	21.76	3.17	2.01	1.55
3/27/13	20.46	2.98	2.1	1.72
3/28/13	21.54	3.14	1.79	1.38
3/29/13	21.88	3.19	2.06	1.56
3/30/13	22.11	3.22	2.04	1.55
3/31/13	22.23	3.24	2.05	1.57
4/1/13	23.11	3.37	1.94	1.58
4/2/13	22.11	3.22	1.02	1.55
4/3/13	21.76	3.17	1.99	1.56
4/4/13	21.52	3.14	1.92	1.48
4/5/13	21.41	3.12	1.99	1.53
4/6/13	22.54	3.29	2.07	1.52
4/7/13	22.23	3.24	2.07	1.52
4/8/13	22.82	3.33	2.19	1.65
4/9/13	23.06	3.36	2.1	1.64
4/10/13	22.94	3.35	2.01	1.57
4/11/13	23.88	3.48	2.22	1.66
4/12/13	23.64	3.45	1.85	1.4
4/13/13	23.65	3.45	1.76	1.3
4/14/13	22.59	3.29	1.63	1.29
4/15/13	21.64	3.16	1.69	1.34
4/16/13	21.05	3.07	1.7	1.32
4/17/13	20.82	3.04	1.74	1.31
4/18/13	20.7	3.02	1.77	1.32
4/19/13	20.7	3.02	1.77	1.32
4/20/13	20.58	3.00	1.76	1.29
4/21/13	21.05	3.07	1.78	1.28
4/22/13	20.82	3.04	1.79	1.36
4/23/13	20.7	3.02	1.73	1.3
4/24/13	20.58	3.00	1.77	1.32
4/25/13	20.58	3.00	1.78	1.33
4/26/13	20.46	2.98	1.81	1.36
4/27/13	20.46	2.98	1.86	1.39
4/28/13	21.05	3.07	1.94	1.41
4/29/13	20.93	3.05	1.97	1.52
4/30/13	20.7	3.02	1.78	1.36
5/1/13	20.58	3.00	1.81	1.37
5/2/13	20.7	3.02	1.79	1.33
5/3/13	20.7	3.02	1.83	1.37
5/4/13	20.82	3.04	1.8	1.32
5/5/13	20.94	3.05	1.8	1.35
5/6/13	20.94	3.05	2.11	1.62
5/7/13	21.64	3.16	2.4	1.84
5/8/13	21.52	3.14	2.34	1.87
5/9/13	22.11	3.22	2.73	2.16
5/10/13	22.11	3.22	2.4	2.21
5/11/13	20	2.92	3.15	2.52
5/12/13	20.58	3.00	2.89	2.48
5/13/13	19.29	2.81	3.43	2.82
5/14/13	22.59	3.29	3.67	2.76
5/15/13	20.11	2.93	3.07	2.86
5/16/13	19.17	2.80	3.33	2.76
5/17/13	19.17	2.80	2.84	2.37

Anaconda Water System Flow Records Summary								
Record Period: Novembmer 1, 2009 to April 9, 2013								
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)								
5/18/13	19.52	2.85	2.61	2.15				
5/19/13	23.41	3.41	2.76	2.05				
5/20/13	19.05	2.78	2.22	2.15				
5/21/13	19.67	2.87	3.07	2.49				
5/22/13	19.64	2.86	2.71	2.36				
5/23/13	19.57	2.85	2.45	1.85				
5/24/13	19.99	2.92	2.55	1.85				
5/25/13	23.53	3.43	2.62	1.8				
5/26/13	20.23	2.95	1.85	1.83				
5/27/13	22.68	3.31	2.62	1.9				
5/28/13	19.88	2.90	2.21	1.99				
5/29/13	21.17	3.09	2.45	1.93				
5/30/13	23.06	3.36	2.46	1.83				
5/31/13	20.94	3.05	1.97	1.71				
6/1/13	20	2.92	2.12	1.75				
6/2/13	20	2.92	2.37	2.03				
6/3/13	21.88	3.19	2.66	1.99				
6/4/13	20.23	2.95	2.39	2.19				
6/5/13	20.93	3.05	2.57	2.04				
6/6/13	21.76	3.17	2.77	2.34				
6/7/13	20.82	3.04	2.76	2.52				
6/8/13	20.11	2.93	2.77	2.5				
6/9/13	19.76	2.88	3.09	2.61				
6/10/13	19.05	2.78	3	2.91				
6/11/13	19.29	2.81	3.25	3.01				
6/12/13	19.29	2.81	2.8	2.37				
6/13/13	19.64	2.86	2.89	2.34				
6/14/13	19.88	2.90	2.33	1.95				
6/15/13	21.52	3.14	2.65	2.02				
6/16/13	20	2.92	2.47	2.29				
6/17/13	19.76	2.88	3.16	2.65				
6/18/13	19.05	2.78	3.57	2.9				
6/19/13	22.22	3.24	3.69	2.83				
6/20/13	19.64	2.86	2.55	2.38				
6/21/13	21.52	3.14	2.77	2.25				
6/22/13	19.88	2.90	2.39	2.19				
6/23/13	21.52	3.14	2.62	1.99				
6/24/13	20.7	3.02	2.76	1.49				
6/25/13	21.29	3.10	2.76	2.37				
6/26/13	19.41	2.83	2.36	2.17				
6/27/13	19.17	2.80	2.66	2.39				
6/28/13	19.17	2.80	3.02	2.75				
6/29/13	19.29	2.81	3.2	2.97				
6/30/13	19.64	2.86	3.22	2.68				
7/1/13	19.17	2.80	3.24	3.08				
7/2/13	18.7	2.73	3.49	3.37				
7/3/13	18.94	2.76	3.6	4.46				
7/4/13	18.94	2.76	3.63	3.5				
7/5/13	19.17	2.80	3.36	3.15				
7/6/13	21.05	3.07	3.71	2.97				
7/7/13	19.17	2.80	3.63	3.06				
7/8/13	18.82	2.74	3.5	3.37				
7/9/13	21.52	3.14	3.66	2.87				
7/10/13	18.94	2.76	3.15	2.99				

Anaconda Water System Flow Records Summary								
Record Period: Novembmer 1, 2009 to April 9, 2013								
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/13)								
7/11/13	19.05	2.78	3.34	3.19				
7/12/13	19.64	2.86	2.84	2.54				
7/13/13	19.29	2.81	3.01	2.8				
7/14/13	19.05	2.78	2.83	2.65				
7/15/13	19.06	2.78	3.23	3.05				
7/16/13	18.94	2.76	3.43	3.31				
7/17/13	20.23	2.95	3.12	2.74				
7/18/13	19.17	2.80	2.83	2.44				
7/19/13	24.35	3.55	3.52	2.7				
7/20/13	19.52	2.85	2.73	2.85				
7/21/13	19.29	2.81	3.08	2.87				
7/22/13	19.06	2.78	3.32	3.13				
7/23/13	19.17	2.80	3.43	3.25				
7/24/13	19.05	2.78	3.41	3.24				
7/25/13	18.82	2.74	3.54	3.41				
7/26/13	18.82	2.74	3.66	3.49				
7/27/13	19.17	2.80	3.22	3.02				
7/28/13	19.06	2.78	3.2	2.97				
7/29/13	19.17	2.80	3.42	3.21				
7/30/13	19.06	2.78	3.21	3.02				
7/31/13	20.23	2.95	2.89	2.51				
8/1/13	19.88	2.90	2.76	2.45				
8/2/13	19.29	2.81	2.64	2.65				
8/3/13	19.52	2.85	2.76	1.89				
8/4/13	19.29	2.81	2.75	2.29				
8/5/13	19.17	2.80	3.06	2.76				
8/6/13	19.17	2.80	3.15	2.88				
8/7/13	19.29	2.81	3.14	2.91				
8/8/13	19.17	2.80	3.2	2.98				
8/9/13	19.29	2.81	3.13	2.89				

NOV. 2009	TIME	CONTROL BLD.	METER DISCHG.	TANK LEVEL	GAL. PUMPED	GAL. USED
1	8:00	452554	930950	20.82	2.23	2.16
2	8:00	455160	933061	23.17	2.60	2.11
3	8:00	457065	935169	20.23	1.90	2.10
4	8:00	459498	937278	21.64	2.43	2.10
5	8:00	462016	939384	24.00	2.51	2.10
6	8:00	464198	941463	22.94	2.18	2.08
7	8:00	466267	943560	20.82	2.07	2.10
8	8:00	468565	945678	21.52	2.29	2.11
9	8:00	471173	947864	23.76	2.60	2.18
10	8:00	473332	949997	21.87	2.15	2.13
11	8:00	475734	952117	22.59	2.40	2.12
12	8:00	477673	954273	20.00	1.94	2.16
13	8:00	480359	956401	23.41	2.68	2.13
14	8:00	482445	958527	21.17	2.09	2.12
15	8:00	484888	960676	22.58	2.44	2.14
16	8:00	487237	962878	22.82	2.34	2.20
17	8:00	499628	965038	22.46	2.39	2.16
18	8:00	491712	967187	20.00	2.01	2.15
19	8:00	493958	969363	20.11	2.24	2.18
20	8:00	496686	971547	22.94	2.73	2.18
21	8:00	498722	973688	20.11	2.04	2.14
22	8:00	500998	975865	20.46	2.27	2.17
23	8:00	503700	978088	23.05	2.70	2.22
24	8:00	505828	980286	20.11	2.12	2.20
25	8:00	508099	982490	20.23	2.27	2.21
26	8:00	510868	984695	23.17	2.76	2.20
27	8:00	512995	986929	20.00	2.13	2.23
28	8:00	515216	989110	20.11	2.22	2.19
29	8:00	517995	991320	22.94	2.67	2.11
30	8:00	520281	993595	20.94	2.28	2.27

Dec. 2009	Time	Cont. Bldg	Meter Bldg.	Tank Level	Gal. pumped	Gal. used
1	8:00	522514	995825	20.82	2.23	2.23
2	8:00	525199	998094	22.59	2.68	2.26
3	8:00	527394	000355	20.23	2.19	2.26
4	8:00	529644	002579	20.22	2.25	2.22
5	8:00	532383	004784	23.40	2.74	2.21
6	8:00	534475	006978	20.46	2.09	2.19
7	8:00	536810	009288	20.58	2.33	2.31
8	8:00	539585	011656	22.46	2.77	2.36
9	8:00	541941	013957	21.40	2.35	2.30
10	8:00	544253	016249	21.50	2.31	2.29
11	8:00	546873	018542	22.46	2.62	2.30
12	8:00	549355	020805	22.82	2.48	2.26
13	8:00	551824	023145	23.53	2.46	2.34
14	8:00	554080	025543	20.11	2.25	2.39
15	8:00	556844	027887	23.64	2.76	2.34
16	8:00	559160	030230	20.70	2.31	2.34
17	8:00	561538	032581	20.58	2.37	2.35
18	8:00	564279	034902	22.11	2.74	2.24
19	8:00	566769	037200	22.34	2.49	2.30
20	8:00	569316	039496	23.41	2.54	2.29
21	8:00	571691	041851	21.52	2.37	2.35
22	8:00	574290	044174	23.53	2.59	2.32
23	8:00	576485	046483	20.23	2.19	2.31
24	8:00	579261	048849	23.76	2.77	2.36
25	8:00	581453	051205	20.23	2.19	2.35
26	8:00	584189	053554	23.53	2.73	2.35
27	8:00	586650	055963	21.52	2.47	2.41
28	8:00	589222	058333	20.00	2.57	2.37
29	8:00	591792	060710	22.11	2.57	2.37
30	8:00	594145	063052	21.29	2.35	2.34
31	8:00	596833	065380	22.71	2.68	2.32

JAN. 2010	Time	Cont. Bldg.	Meter Bldg.	Tank Level	Gal. pumped	Gal. used
1	8:00	599397	067696	23.29	2.56	2.31
2	8:00	601835	069996	23.76	2.44	2.30
3	8:00	602060	072326	22.96	2.50	2.30
4	8:00	606486	074683	20.23	? 4.42	2.35
5	8:00	609301	077004	22.46	2.82	2.32
6	8:00	611902	079373	23.08	2.60	2.36
7	8:00	614359	081819	22.11	2.45	2.44
8	8:00	616685	084223	20.58	2.32	2.40
9	8:00	619448	0865568	22.46	2.76	2.33
10	8:00	621845	088957	21.52	2.39	2.38
11	8:00	624565	091372	22.23	2.72	2.41
12	8:00	626909	093711	20.82	2.34	2.33
13	8:00	629661	096075	22.35	2.75	2.36
14	8:00	632148	098350	22.35	2.48	2.28
15	8:00	634674	100680	22.94	2.42	2.33
16	8:00	637012	102955	21.52	2.33	2.27
17	8:00	639610	105266	23.64	2.59	2.31
18	8:00	641830	107631	20.00	2.22	2.37
19	8:00	644556	109941	23.41	2.72	2.31
20	8:00	646763	112251	19.99	2.20	2.31
21	8:00	649528	114576	23.64	2.76	2.32
22	8:00	651856	116962	20.58	2.32	2.39
23	8:00	654200	119241	20.93	2.35	2.28
24	8:00	656952	121575	22.35	2.75	2.33
25	8:00	659278	123946	20.71	2.32	2.37
26	8:00	662044	126312	22.11	2.76	2.36
27	8:00	664428	128526	23.00	2.38	2.21
28	8:00	666519	130682	20.82	2.09	2.16
29	8:00	669176	132876	22.71	2.66	2.19
30	8:00	671291	135040	20.23	2.12	2.17
31	8:00	673643	137223	21.17	2.35	2.18

FEB 2010	TIME	CONTROL BLDG.	METER DISCHG.	TANK LEVEL	GAL. PUMPED	GAL. USED
1	8:00	676299	139478	22.59	2.65	2.25
2	8:00	678531	141680	20.82	2.24	2.21
3	8:00	680724	143884	20.23	2.09	2.12
4	8:00	683452	146082	22.82	2.72	2.19
5	8:00	685584	148276	20.11	2.13	2.19
6	8:00	687869	150469	20.46	2.38	2.17
7	8:00	690580	152645	22.94	2.71	2.17
8	8:00	692884	154894	21.52	2.30	2.24
9	8:00	694949	157043	20.11	2.06	2.15
10	8:00	697664	159160	23.40	2.71	2.11
11	8:00	699752	161250	21.17	2.09	2.09
12	8:00	702246	163303	23.52	2.49	2.15
13	8:00	703983	165303	20.23	1.74	2.00
14	8:00	706683	167372	23.88	2.70	2.06
15	8:00	708842	169430	22.70	2.15	2.05
16	8:00	710851	171502	19.99	2.00	2.07
17	8:00	713124	173543	21.17	2.27	2.04
18	8:00	715565	175596	23.17	2.44	2.05
19	8:00	717908	177705	22.94	2.34	2.11
20	8:00	719925	179730	20.82	2.02	2.03
21	8:00	722290	181807	22.34	2.36	2.07
22	8:00	724427	183936	21.17	2.13	2.12
23	8:00	726949	185993	23.29	2.52	2.05
24	8:00	729000	188040	21.05	2.05	2.04
25	8:00	731478	190085	23.64	2.47	2.04
26	8:00	733277	192163	20.11	1.80	2.08
27	8:00	735924	194166	23.88	2.65	2.00
28	8:00	738086	196220	22.94	2.16	2.06

MAR 2010	TIME	CONTROL BLD.	METER DISCHG.	TANK LEVEL	GAL PUMPED	GAL USED
1.	8:00	740108	198331	20.00	2.02	2.11
2.	8:00	742335	200335	20.94	2.22	2.00
3.	8:00	744687	202356	22.23	2.35	2.02
4.	8:00	746902	204346	21.41	2.21	1.99
5.	8:00	748957	206334	21.05	2.05	1.98
6.	8:00	751201	208306	21.76	2.25	1.97
7.	8:00	753652	210289	23.65	2.45	1.98
8.	8:00	755745	212298	22.46	2.09	2.00
9.	8:00	757736	214330	20.11	1.99	2.13
10.	8:00	759978	216292	21.65	2.24	2.16
11.	8:00	762099	218284	21.41	2.12	1.99
12.	8:00	764558	220249	23.76	2.46	1.96
13.	8:00	766671	222217	23.06	2.12	1.97
14.	8:00 DSL	768544	224125	20.70	1.87	1.80
15.	8:00	770761	226178	21.17	2.21	2.05
16.	8:00	773067	228215	21.88	2.30	2.04
17.	8:00	775494	230237	23.29	2.43	2.02
18.	8:00	777515	232261	21.17	2.02	2.03
19.	8:00	779996	234280	23.05	2.48	2.01
20.	8:00	781729	236299	20.23	1.73	2.01
21.	8:00	784385	238308	23.88	2.65	2.00
22.	8:00	786576	240347	23.29	2.19	2.03
23.	8:00	788562	242358	20.94	1.98	2.01
24.	8:00	790982	244359	23.17	2.42	2.00
25.	8:00	792782	246343	19.99	1.80	1.98
26.	8:00	795217	248330	22.46	2.43	1.88
27.	8:00	797526	250307	23.41	2.31	1.97
28.	8:00	799612	252373	21.29	2.08	2.06
29.	8:00	802014	254452	22.71	2.40	2.07
30.	8:00	803974	256510	20.70	1.96	2.06
31.	8:00	806420	258490	23.06	2.44	1.98

APR. 2010	TIME	CONTROL USED	METER DISCHG.	TANK LVL	GAL. PUMPED	GAL USED
1	8:00	808645	260437	23.41	2.22	1.94
2	8:00	810629	262374	21.88	1.98	1.93
3	8:00	812696	264327	21.17	2.07	1.95
4	8:00	814710	266314	20.58	2.01	1.98
5	8:00	817064	268275	22.23	2.35	1.96
6	8:00	819437	270284	23.65	2.37	2.00
7	8:00	821509	272297	21.99	2.07	2.01
8	8:00	823518	274267	20.23	2.00	1.97
9	8:00	825814	276250	20.11	2.29	1.98
10	8:00	827736	278214	20.23	1.92	1.96
11	8:00	830134	280148	22.00	2.39	1.93
12	8:00	832178	282171	20.58	2.04	2.02
13	8:00	834659	284153	23.06	2.48	1.98
14	8:00	836866	286117	23.30	2.20	1.96
15	8:00	838844	288093	21.29	1.97	1.97
16	8:00	841270	290067	23.64	2.45	1.97
17	8:00	843066	292027	20.82	1.79	1.96
18	8:00	845406	294030	21.88	1.34	2.00
19	8:00	847902	296107	23.29	2.49	2.07
20	8:00	849923	298215	20.23	2.02	2.10
21	8:00	852125	300322	20.23	2.20	2.11
22	8:00	854357	302477	20.35	2.23	2.15
23	8:00	856814	304534	21.88	2.46	2.06
24	8:00	859119	306541	22.59	2.30	2.01
25	8:00	861601	308637	23.88	2.48	2.09
26	8:00	863835	310701	23.18	2.23	2.06
27	8:00	865898	312780	20.70	2.06	2.07
28	8:00	868287	314813	22.82	2.39	2.03
29	8:00	870134	316804	20.11	1.84	1.99
30	8:00	872783	318948	22.82	2.65	2.14

MAY 2010	TIME	CONTROL BLD	METER DISCHG.	TANK LVL	GAL. Pumped	GAL USED
1.	8:00	875036	320882	23.76	2.25	1.94
2.	8:00	877233	322861	23.88	2.19	1.97
3.	8:00	879464	324905	23.18	2.23	2.04
4.	8:00	881482	326869	22.11	2.01	1.96
5.	8:00	883489	328850	20.35	2.00	1.99
6.	8:00	885993	330840	23.88	2.50	1.99
7.	8:00	887734	332803	20.58	1.74	1.96
8.	8:00	889938	334744	21.06	2.20	1.94
9.	8:00	892276	336703	22.59	2.33	1.95
10.	8:00	894677	338751	23.64	2.40	2.04
11.	8:00	896806	340829	22.11	2.12	2.07
12.	8:00	898862	342887	20.00	2.05	2.05
13.	8:00	901316	344929	22.59	2.45	2.04
14.	8:00	903349	347054	20.00	2.03	2.12
15.	8:00	906156	349240	23.88	2.81	2.19
16.	8:00	908360	351513	20.58	2.20	2.27
17.	8:00	911475	354242	21.40	3.11	2.72
18.	8:00	914419	357070	19.67	3.04	2.82
19.	8:00	917425	359664	19.52	2.90	2.59
20.	8:00	920201	362381	19.52	2.77	2.71
21.	8:00	922964	364726	22.94	2.76	2.34
22.	8:00	925349	367140	20.23	2.38	2.42
23.	8:00	927604	369334	20.35	2.25	2.19
24.	8:00	930299	371751	20.58	2.69	2.41
25.	8:00	932696	374079	20.35	2.39	2.32
26.	8:00	935373	376379	21.99	2.67	2.30
27.	8:00	938163	378790	23.29	2.79	2.42
28.	8:00	940549	381064	23.17	2.38	2.27
29.	8:00	942752	383244	21.29	2.20	2.18
30.	8:00	945136	385358	21.88	2.38	2.31
31.	8:00	947721	387720	23.41	2.58	2.36

June 2010	Time	Cont. Bldg	Meter Dschg.	Tank Level	Gal. pumped	Gal. used
1	8:00	949911	390028	20.23	2.19	2.30
2	8:00	952273	392325	20.11	2.36	2.29
3	8:00	954972	394681	21.41	2.69	2.35
4	8:00	957661	397018	22.71	2.78	2.33
5	8:00	960184	399316	23.29	2.52	2.29
6	8:00	962404	401566	20.46	2.22	2.25
7	8:00	965157	404050	22.59	2.75	2.48
8	8:00	967616	406500	19.89	2.45	2.45
9	8:00	970392	408997	22.11	2.77	2.49
10	8:00	973052	411480	22.00	2.66	2.48
11	8:00	975588	413787	22.70	2.53	2.30
12	8:00	977839	416074	19.88	2.25	2.29
13	8:00	980215	418360	20.00	2.38	2.29
14	8:00	983186	421148	19.05	2.97	2.88
15	8:00	986497	423898	19.76	3.31	2.75
16	8:00	989249	426250	23.17	2.75	2.36
17	8:00	991510	428572	20.23	2.27	2.32
18	8:00	993891	430862	20.23	2.38	2.29
19	8:00	996628	433167	22.35	2.73	2.30
20	8:00	998860	435424	19.88	2.24	2.26
21	8:00	001614	437865	22.46	2.75	2.44
22	8:00	004097	440351	19.76	2.48	2.48
23	8:00	006861	442931	21.17	2.76	2.58
24	8:00	009626	445726	20.23	2.76	2.79
25	8:00	012382	448444	20.00	2.76	2.72
26	8:00	015153	451062	20.82	2.77	2.62
27	8:00	017914	453781	20.70	2.76	2.61
28	8:00	021453	457012	20.11	3.53	3.23
29	8:00	025603	460382	21.64	3.15	3.37
30	8:00	029128	463548	20.11	3.52	3.16

JULY 2010	TIME	CONT. BULDG	METER. DISCHG.	TANK LEVEL	GAL. PUMPED	GAL. USED
1	8:00	032641	466607	19.28	3.52	3.06
2	8:00	036820	469954	21.52	4.18	3.35
3	8:00	039867	472901	19.64	3.04	2.95
4	8:00	043092	475681	19.06	3.22	2.78
5	8:00	046510	478592	19.17	3.42	2.91
6	8:00	050450	481819	20.58	3.94	3.22
7	8:00	053962	484933	19.29	3.51	3.11
8	8:00	058018	488418	19.06	4.05	3.48
9	8:00	062098	492910	19.09	4.08	3.50
10	8:00	066900	494645	19.05	4.91	3.73
11	8:00	070161	498683	19.29	3.26	4.03
12	8:00	074291	502237	18.82	4.13	3.55
13	8:00	078818	506083	19.06	4.52	3.84
14	8:00	082848	509534	18.94	4.03	3.45
15	8:00	087415	513406	18.70	4.56	3.87
16	8:00	092012	517305	18.58	4.60	3.90
17	8:00	096545	521144	18.94	4.53	3.84
18	8:00	100845	524822	18.82	4.30	3.67
19	8:00	105649	528936	18.70	4.80	4.11
20	8:00	110490	533056	18.58	4.84	4.12
21	8:00	115269	537121	18.58	4.77	4.07
22	8:00	119514	540632	19.52	4.24	3.51
23	8:00	123524	544133	18.94	4.01	3.50
24	8:00	127765	547755	19.05	4.24	3.62
25	8:00	131980	551367	19.05	4.21	3.61
26	8:00	136775	555518	18.46	4.79	4.15
27	8:00	141354	559424	18.82	4.57	3.90
28	8:00	145251	562638	20.00	3.89	3.21
29	8:00	149210	566123	19.06	3.96	3.49
30	8:00	153565	569877	18.82	4.35	3.75
31	8:00	157811	573291	21.06	4.25	3.42

AUG 2010	TIME	CONT. BLDG	METER DISCH	TANK LEVEL	GALS PUMPED	GAL. USED
1	~~8:00~~	~~160716~~	~~576150~~	~~19.05~~	~~2.90~~	~~2.85~~
2.	8:00	165046	579868	18.70	4.33	3.71
3.	8:00	169541	583710	18.70	4.49	3.84
4.	8:00	173910	587447	18.94	4.36	3.73
5.	8:00	178824	591104	18.70	4.91	3.66
6	8:00	182966	594331	19.76	4.14	3.23
7.	8:00	187039	597319	22.59	4.07	2.98
8.	8:00	190492	600481	20.23	3.45	3.16
9.	8:00	194121	603663	19.05	3.62	3.18
10.	8:00	198186	606866	21.17	4.06	3.20
11.	8:00	201202	609821	19.17	3.01	2.95
12.	8:00	205208	612904	22.11	4.00	3.08
13.	8:00	208681	615962	20.82	3.47	3.05
14.	8:00	211604	618751	19.64	2.92	2.79
15.	8:00	214870	621545	19.06	3.26	2.79
16.	8:00	218908	624857	20.00	4.03	3.31
17.	8:00	222956	628388	19.05	4.05	3.53
18.	8:00	227226	631985	19.05	4.27	3.59
19.	8:00	231321	635440	19.29	4.10	3.46
20.	8:00	235414	638954	18.94	4.09	3.51
21.	8:00	239659	642520	19.29	4.24	3.57
22.	8:00	243800	645992	19.52	4.14	3.47
23.	8:00	247801	649380	20.23	4.00	3.38
24.	8:00	251326	652464	19.17	3.52	3.08
25.	8:00	255189	655732	19.29	3.86	3.26
26.	8:00	259443	659356	19.06	3.25	3.82
27.	8:00	263525	662839	19.06	4.08	3.48
28.	8:00	267696	666201	20.58	4.17	3.37
29.	8:00	270813	669150	19.17	3.11	2.94
30	8:00	274765	672144	22.71	3.95	2.99
31.	8:00	277279	674784	20.00	2.51	2.64

SEP 2010	TIME	CONT. BUILDG.	METER DISCHG	TANK LEVEL	GALS PUMPED	GALS USED
1.	8:00	280036	677275	21.88	2.76	2.49
2.	8:00	282802	680000	21.64	2.77	2.73
3.	8:00	285561	682805	20.23	2.76	2.80
4.	8:00	288850	685759	20.23	3.29	2.95
5.	8:00	291910	688508	20.70	3.06	2.74
6.	8:00	294661	691307	19.05	2.75	2.79
7.	8:00	298669	694278	23.17	4.00	2.97
8.	8:00	301224	697246	19.41	2.55	2.76
9.	8:00	304353	699675	19.52	3.12	2.62
10.	8:00	307134	702077	22.82	2.78	2.40
11.	8:00	309475	704482	19.64	2.34	2.41
12.	8:00	312231	706841	22.94	2.75	2.35
13.	8:00	314985	709483	23.17	2.75	2.64
14.	8:00	317275	711915	19.41	2.29	2.43
15.	8:00	319964	714171	19.99	2.68	2.25
16.	8:00	322302	716379	20.00	2.34	2.20
17.	8:00	325079	718614	22.94	2.77	2.24
18.	8:00	327193	720795	19.88	2.12	2.18
19.	8:00	329447	722865	20.58	2.25	2.07
20.	8:00	331828	725038	20.23	2.38	2.17
21.	8:00	334724	727315	23.29	2.89	2.27
22.	8:00	336688	729348	20.35	1.96	2.03
23.	8:00	338954	731403	21.05	2.27	2.06
24.	8:00	341067	733402	20.23	2.11	2.00
25.	8:00	343376	735391	20.82	2.31	1.99
26.	8:00	345704	737457	21.05	2.32	2.06
27.	8:00	348197	739676	21.05	2.49	2.21
28.	8:00	350699	741898	21.17	2.50	2.22
29.	8:00	353379	744101	23.41	2.68	2.12
30.	8:00	355391	746272	19.40	2.02	2.16

OCT 2010	TIME	CONT. BUILD	METER READ	FLASH LEVEL	GALS PUMPED	GALS USED
1.	8:00	358025	748443	20.34	2.63	2.17
2.	8:00	360372	750690	20.11	2.75	2.25
3.	8:00	362837	752781	21.17	2.46	2.09
4.	8:00	365133	754908	20.11	2.29	2.12
5.	8:00	367345	756805	21.06	2.21	1.89
6.	8:00	369287	758605	20.23	1.84	1.80
7.	8:00	371297	760387	20.35	2.01	1.78
8.	8:00	373215	762123	20.11	1.92	1.74
9.	8:00	375139	763829	20.23	1.94	1.70
10.	8:00	377048	765492	20.35	1.91	1.66
11.	8:00	379027	767249	20.46	1.97	1.75
12.	8:00	380870	768905	20.35	1.84	1.75
13.	8:00	382756	770592	20.46	1.88	1.68
14.	8:00	384627	772244	20.58	1.87	1.65
15.	8:00	386561	773906	21.05	1.94	1.66
16.	8:00	388358	775535	20.70	1.79	1.63
17.	8:00	390249	777166	21.29	1.89	1.63
18.	8:00	392120	778845	21.29	1.87	1.67
19.	8:00	393893	780456	20.82	1.77	1.61
20.	8:00	395656	782074	20.23	1.76	1.61
21.	8:00	397510	783662	20.94	1.86	1.59
22.	8:00	399317	785273	21.05	1.80	1.61
23.	8:00	401127	786838	21.17	1.81	1.56
24.	8:00	402803	788384	20.70	1.67	1.54
25.	8:00	404566	790015	20.35	1.76	1.63
26.	8:00	406324	791591	20.34	1.76	1.58
27.	8:00	408064	793175	20.23	1.74	1.58
28.	8:00	409931	794777	20.11	1.86	1.60
29.	8:00	411596	796343	20.11	1.66	1.57
30.	8:00	413377	797892	20.58	1.78	1.55
31.	8:00	415209	799485	20.94	1.73	1.59

		CONTROL BLD	METER DISCH	TANK LEVEL	GAL PUMPED	GAL USED
1	8:00	417063	801137	20.94	1.85	1.65
2	8:00	418841	802723	20.82	1.77	1.58
3	8:00	420601	804341	20.46	1.76	1.61
4	8:00	422444	805944	20.58	1.84	1.60
5	8:00	424284	807556	20.94	1.84	1.61
6	8:00	426074	809161	20.70	1.79	1.61
7	8:00 STANDARD TIME	427909	810804	20.35	1.83	1.64
8	8:00	429752	812436	20.58	1.84	1.63
9	8:00	431538	814032	20.70	1.78	1.59
10	8:00	433277	815612	20.46	1.74	1.58
11	8:00	435148	817204	20.11	1.87	1.59
12	8:00	437055	818787	20.11	1.91	1.58
13	8:00	438952	820357	20.11	1.90	1.57
14	8:00	440842	821935	20.11	1.89	1.57
15	8:00	442797	823567	20.23	1.95	1.63
16	8:00	444719	825145	20.11	1.92	1.57
17	8:00	446689	826749	20.46	1.97	1.60
18	8:00	448605	828316	20.58	1.91	1.56
19	8:00	450442	829882	20.46	1.84	1.57
20	8:00	452300	831434	20.34	1.86	1.55
21	8:00	454222	833059	20.35	1.92	1.62
22	8:00	456203	834734	20.45	1.98	1.67
23	8:00	458173	836414	20.25	1.97	1.68
24	8:00	460127	838059	20.46	1.95	1.64
25	8:00	462261	839804	21.05	2.14	1.75
26	8:00	464368	841477	22.00	2.10	1.67
27	8:00	466293	843291	21.29	1.93	1.82
28	8:00	468155	845126	20.23	1.86	1.83
29	8:00	470363	847065	21.29	2.20	1.83
30	8:00	472411	848881	21.29	2.04	1.81

Dec. 2010	Time	Control Bldg	Meter Dischg.	Tank Level	Gal. pumped	Gal. Used
1	8:00	474359	850664	21.29	1.94	1.78
2	8:00	476308	852437	21.03	1.94	1.77
3	8:00	478221	854228	20.70	1.91	1.79
4	8:00	480139	855894	20.94	1.91	1.67
5	8:00	482055	857595	21.29	1.91	1.70
6	8:00	483929	859312	20.94	1.87	1.71
7	8:00	485755	860983	20.58	1.82	1.67
8	8:00	487716	862663	21.17	1.96	1.68
9	8:00	489502	864312	20.70	1.79	1.65
10	8:00	491348	865950	20.82	1.84	1.64
11	8:00	493119	867569	20.82	1.77	1.61
12	8:00	494804	869235	(18.5) 0.00	1.68	1.66
13	8:00	497511	870890	23.53	2.70	1.65
14	8:00	499754	872536	(24.00) 0.01	2.24	1.64
15	8:00	501978	874200	(21.5) 0.01	2.22	1.67
16	8:00	503652	875912	0.01	1.67	1.71
17	8:00	505891	877600	0.01	2.24	1.69
18	8:00	507537	879251	.01	1.64	1.65
19	8:00	509640	880928	(23.00) .01	1.10	1.77
20	8:00	511402	882638	.001	1.86	1.71
21	8:00	513563	884341	(20.00) 0.01	1.86	1.71
22	8:00	515963	886017	0.01	2.40	1.67
23	8:00	518277	887677	0.01	2.31	1.66
24	8:00	520296	889363	0.01	2.01	1.68
25	8:00	522696	891052	0.01	2.40	1.69
26	8:00	524724	892741	0.01	2.02	1.68
27	8:00	526964	894493	0.01	2.24	1.75
28	8:00	528997	896194	0.01	2.03	1.70
29	8:00	532287	897820	0.01	3.21	1.63
30	8:00	534217	899452	0.01	1.93	1.63
31	8:00	536317	901107	0.01	2.10	1.55

DAY 2011	TIME	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1						
2	8:00	540710	904422	0.01	4.38	3.31
3	8:00	542920	906160	0.01	2.21	1.73
4	8:00	545268	907822	0.01	2.34	1.66
5	8:00	547220	909453	0.01	1.96	1.63
6	8:00	549212	911051	0.01	1.99	1.59
7	8:00	551065	912651	0.01	1.85	1.60
8	8:00	553155	914244	0.01	2.09	1.59
9	8:00	554805	916903	0.01	1.65	1.66
10	8:00	556455	917563	0.01	1.65	1.66
11	8:00	558783	919253	0.01	2.32	1.69
12	8:00	560696	920900	0.01	2.91	1.64
13	8:00	562721	922538	0.01	2.02	1.63
14	8:00	564693	924145	0.01	1.97	1.60
15	8:00	565807	925720	22.35	1.14	1.58
16	8:00	567627	927390	21.45	1.82	1.67
17	8:00	569441	929064	20.82	1.82	1.67
18	8:00	571353	930746	21.52	1.91	1.68
19	[illegible]	[illegible]	[illegible]		[illegible]	
20	8:00 AM	574838	934083	20.46	3.48	3.34
21	8:00	576996	935730	20.00	1.65	1.64
22	8:00	578357	937320	20.11	1.36	1.59
23	8:00	580191	938929	20.94	1.83	1.60
24	8:00	581745	940626	24.00	1.56	1.69
25	8:00	583341	942262	22.35	1.59	1.63
26	8:00	584972	943872	20.70	1.63	1.61
27	8:00	586695	945485	19.99	1.72	1.61
28	8:00	588153	947118	22.23	1.46	1.63
29	8:00	589538	948680	22.23	1.38	1.57
30	8:00	591160	950284	20.82	1.62	1.60
31	8:00	593028	951999	20.82	1.86	1.71

Feb. 2011	Time	Cont. Bldg.	Meter Discharge	Tank Level	Gal. pumped	Gal. used
1	8:00	595293	954068	21.64	2.26	2.06
2	8:00	597179	955882	20.46	1.88	1.81
3	8:00	598975	957548	20.11	1.79	1.66
4	8:00	600830	959204	20.35	1.86	1.66
5	8:00	602630	960804	20.48	1.80	1.60
6	8:00	604536	962555	20.46	1.90	1.75
7	8:00	606439	964275	20.46	1.90	1.72
8	8:00	608306	965974	20.58	1.86	1.69
9	8:00	610078	967640	20.11	1.77	1.66
10	8:00	611961	969325	20.23	1.81	1.68
11	8:00	613805	970976	20.35	1.84	1.65
12	8:00	615649	972566	20.58	1.84	1.59
13	8:00	617479	974216	20.46	1.83	1.65
14	8:00	619367	975917	20.46	1.88	1.70
15	8:00	621207	977563	20.47	1.84	1.64
16	8:00	623052	979216	20.46	1.84	1.65
17	8:00	624865	980859	20.46	1.81	1.64
18	8:00	626713	982523	20.46	1.85	1.67
19	8:00	628561	984176	20.58	1.85	1.65
20	8:00	630414	985867	20.46	1.85	1.69
21	8:00	632298	987595	20.35	1.88	1.72
22	8:00	634201	989321	20.35	1.90	1.72
23	8:00	636082	991010	20.46	1.88	1.68
24	8:00	637922	992686	20.46	1.84	1.67
25	8:00	639811	994396	20.70	1.89	1.71
26	8:00	641680	996095	20.70	1.87	1.70
27	8:00	643418	997774	19.52	1.73	1.67
28	8:00	645466	999516	20.46	2.04	1.74

MARCH 2011	TIME	CONTROL BUILD	METER DISCHG	TANK LEVEL	GAL PUMPED	GAL USED
1	8:00	647333	001229	20.11	1.86	1.71
2	8:00	649247	002924	20.35	1.91	1.79
3	8:00	651120	004596	20.46	1.86	1.67
4	8:00	653032	006315	20.46	1.91	1.72
5	8:00	654910	008006	20.46	1.88	1.68
6	8:00	656785	009703	20.35	1.87	1.69
7	8:00	658709	011450	20.23	1.92	1.74
8	8:00	660847	013178	21.41	2.16	1.72
9	8:00	662664	014878	20.70	1.81	1.70
10	8:00	664485	016558	20.35	1.82	1.68
11	8:00	666328	018249	20.23	1.84	1.69
12	8:00	668180	019941	20.11	1.86	1.70
13	8:00				2.02	1.65
14	8:00	672231	023299	20.94	2.03	1.70
15	8:00	674341	025000	21.64	2.11	1.70
16	8:00	676752	026679	23.88	2.41	1.67
17	8:00	678557	028388	19.05	1.80	1.70
18	8:00	680608	030054	19.52	2.05	1.67
19	8:00	682872	031699	21.05	2.27	1.64
20	8:00	685241	033382	23.29	2.36	1.68
21	8:00	687254	035095	20.46	2.01	1.71
22	8:00	689555	036769	21.64	2.30	1.67
23	8:00	691896	038461	21.99	2.34	1.69
24	8:00	693715	040123	19.17	1.81	1.66
25	8:00	695787	041808	19.52	2.07	1.68
26	8:00	697817	043496	19.64	2.03	1.69
27	8:00	699843	045170	19.76	2.02	1.67
28	8:00	701954	046911	19.88	2.11	1.74
29	8:00	703993	048595	20.00	2.03	1.68
30	8:00	706019	050264	20.23	2.02	1.67
31	8:00	707973	051925	19.76	1.95	1.66

APR 2011

	TIME	CONTROL TIMED.	METER DISCHG.	TANK LEVEL	GAL. PUMPED	GAL USED
1	8:00	710045	053614	20.11	2.07	1.69
2	8:00	712083	055264	20.46	2.04	1.65
3	8:00	714130	056934	20.82	2.04	1.67
4	8:00	716207	058658	20.94	2.17	1.72
5	8:00	718241	060345	20.93	2.03	1.68
6	8:00	720292	062035	21.17	2.05	1.69
7	8:00	722372	063743	21.40	2.08	1.70
8	8:00	724520	065474	22.11	2.14	1.73
9	8:00	726672	067151	23.41	2.15	1.68
10	8:00	728572	068837	22.23	1.90	1.68
11	8:00	730448	070572	20.23	1.87	1.73
12	8:00	732594	072315	20.70	2.14	1.74
13	8:00	734716	074025	21.29	2.12	1.71
14	8:00	736808	075730	21.64	2.09	1.70
15	8:00	738849	077401	21.88	2.04	1.67
16	8:00	741005	079101	22.82	2.16	1.70
17	8:00	743113	080806	23.53	2.10	1.70
18	8:00	744974	082853	21.17	1.86	2.04
19	8:00	746818	085228	19.41	1.84	2.37
20	8:00	748887	087253	19.52	2.06	2.02
21	8:00	750940	088939	19.76	2.05	1.68
22	8:00	753000	090635	20.11	2.06	1.70
23	8:00	755075	092397	20.46	2.07	1.76
24	8:00	757120	094973	20.35	2.04	2.57
25	8:00	759214	097149	20.58	2.09	2.17
26	8:00	761294	099655	20.46	2.08	2.50
27	8:00	763333	102356	20.46	2.03	2.70
28	8:00	765424	105030	20.58	2.09	2.67
29	8:00	767451	108235	20.70	1.93	3.20
30	8:00	769509	111759	21.29	2.05	3.52

Chart failed

Diagram	Time	Cont. Bldg.	Meter Dischg.	Tank Level	Gal. Pumped	Gal. used
1	8:00	771578	115992	21.76	2.06	4.23
2	8:00	773726	118113	22.46	2.14	2.12
3	8:00	775911	120123	23.29	2.18	2.01
4	8:00	777832	121610	22.11	1.92	1.48
5	8:00	779698	123637	20.00	1.86	2.02
6	8:00	781915	125758	20.70	2.22	2.12
7	8:00	784059	127635	21.40	2.14	1.88
8	8:00	786210	129375	22.00	2.15	1.74
9	8:00	788404	130785	22.46	2.19	1.41
10	8:00	790573	131641	23.17	2.16	1.85
11	8:00	792552	133059	22.35	1.97	1.41
12	8:00	794414	134613	21.05	1.86	1.55
13	8:00	796340	136412	20.23	1.93	1.80
14	8:00	798479	138247	21.64	2.17	1.83
15	8:00	800570	139695	23.18	2.09	1.44
16	8:00	802386	141124	20.94	1.81	1.42
17	8:00	804459	142578	20.11	2.07	1.45
18	8:00	806670	143942	20.46	2.21	1.36
19	8:00	808837	145206	20.35	2.16	1.36
20	8:00	811071	147021	20.35	2.24	1.82
21	8:00	813023	148303	20.00	1.95	1.28
22	8:00	815196	149826	20.71	2.17	1.52
23	8:00	817353	151392	20.58	2.16	1.56
24	8:00	819493	152891	20.70	2.14	1.49
25	8:00	821437	154300	20.00	1.94	1.40
26	8:00	823400	155611	20.11	1.96	1.31
27	8:00	825390	156703	20.11	1.99	1.09
28	8:00	827369	157745	20.23	1.97	1.04
29	8:00	829329	158817	20.13	1.96	1.07
30	8:00	831282	160191	20.23		1.37
31	8:00	833251	161771	20.11	1.96	1.58
30		[illegible]	[illegible]	16.77	2.15	3.

CHARTS

JUNE 2011	TIME	CONT BLD.	MIXTER DISCHG.	TANK LEVEL	GAL. PUMPED	GAL USED
JUNE 2011 1	8:00	835230	163446	20.33	1.97	1.67
2	8:00	837210	165216	20.11	1.98	1.77
3	8:00	839171	167102	20.23	1.96	1.88
4	8:00	841144	169205	20.23	1.97	2.10
5	8:00	843321	171704	22.82	2.17	2.49
6	8:00	846012	174724	23.29	2.69	3.02
7	8:00	848104	177351	20.11	2.09	2.62
8	8:00	850268	179491	21.17	2.16	2.14
9	8:00	852188	181512	20.58	1.92	2.02
10	8:00	854141	183599	20.11	1.96	2.08
11	8:00	856157	185458	20.11	2.01	1.86
12	8:00	858180	187181	20.70	2.02	1.72
13	8:00	860307	188705	21.76	2.12	1.52
14	8:00	862540	190212	23.76	2.23	1.50
15	8:00	864392	191905	20.58	1.85	1.69
16	8:00	866933	193700	22.94	2.54	1.80
17	8:00	869024	195392	21.40	2.09	1.69
18	8:00	871090	197032	20.11	2.07	1.64
19	8:00	873473	198737	21.99	2.38	1.70
20	8:00	875946	200676	22.59	2.47	1.93
21	8:00	878378	202752	19.64	2.47	2.08
22	8:00	881138	205105	19.88	2.76	2.35
23	8:00	883935	207581	19.29	2.80	2.47
24	8:00	887084	209964	19.06	3.14	2.39
25	8:00	890091	212186	19.17	3.00	2.22
26	8:00	893255	214658	19.29	3.16	2.47
27	8:00	897299	217640	22.11	4.04	2.98
28	8:00	900896	220722	19.64	3.59	3.08
29	8:00	904522	223498	21.05	3.62	2.77
30	8:00	907834	226207	20.11	3.31	2.70
30	8:00	910001	97.5[illegible]	18.94	3.95	3.[illegible]

July 2011						
1	8:00	911255	228856	20.70	3.42	2.65
2	8:00	914850	231805	19.76	3.60	2.95
3	8:00	918880	236574	19.60	4.05	3.28
4	8:00	922910	238379	19.05	4.03	3.29
5	8:00	927113	241776	19.29	4.20	3.40
6	8:00	931451	245343	18.94	4.33	3.56
7	8:00	936138	249182	18.82	4.68	3.83
8	8:00	940284	252510	19.05	4.14	3.32
9	8:00	944101	255591	19.29	3.81	3.08
10	8:00	948107	258837	19.17	4.00	3.24
11	8:00	952332	262254	19.05	4.22	3.42
12	8:00	956404	265548	19.05	4.07	3.29
13	8:00	960354	268708	19.41	3.95	3.16
14	8:00	963789	271426	20.00	3.43	2.71
15	8:00	966989	273911	20.46	3.20	2.48
16	8:00	970423	276657	20.23	3.44	2.64
17	8:00	973620	279164	20.23	3.19	2.50
18	8:00	977725	282542	17.99	4.10	3.37
19	8:00	982501	286169	18.94	4.77	3.62
20	8:00	987023	289514	20.00	4.52	3.34
21	8:00	990468	292802	18.94	3.44	3.28
22	8:00	994477	296055	19.06	4.01	3.25
23	8:00	998217	298981	20.00	3.73	2.93
24	8:00	001968	302052	19.29	3.75	3.07
25	8:00	006513	305742	19.06	4.54	3.69
26	8:00	010976	309393	18.70	4.46	3.65
27	8:00	015312	312869	19.05	4.34	3.47
28	8:00	019508	316268	18.94	4.19	3.40
29	8:00	023971	319853	19.05	4.46	3.58
30	8:00	028292	323346	18.94	4.32	3.49
31	8:00	032203	326442	19.52	3.91	3.09
30	8:00	790001	[illegible]	19.77	5.15	3.[illegible]

Aug. 2011	Time	Cont. Rdg.	Meter Dischg	Tank Level	Gal. pumped	Gal. used
1	8:00	035429	329041	19.29	3.22	2.59
2	8:00	039296	331869	21.88	3.86	2.82
3	8:00	042929	334999	19.41	3.63	3.13
4	8:00	046820	338126	19.41	3.89	3.12
5	8:00	050524	341000	20.58	3.70	2.87
6	8:00	053816	343638	20.11	3.29	2.63
7	8:00	057034	346225	19.76	3.21	2.58
8	8:00	061161	349382	21.56	4.12	3.15
9	8:00	064963	352637	19.17	3.80	3.25
10	8:00	069091	355995	18.94	4.12	3.37
11	8:00	073028	359125	19.41	3.93	3.13
12	8:00	076648	362619	13.05	3.62	3.49
13	8:00	081060	365600	19.41	4.42	2.99
14				14.05	4.15	3.33
15	8:00	089362	372260	19.06	4.15	3.33
16	8:00	093368	375494	19.06	4.00	3.23
17	8:00	097514	378828	19.05	4.14	3.33
18	8:00	101721	382217	18.94	4.20	3.38
19	8:00	105431	385591	14.23	3.71	3.37
20	8:00	109403	388729	16.94	3.97	3.13
21	8:00	113742	391893	20.46	4.33	3.16
22	8:00	117969	395464	18.82	4.22	3.57
23	8:00	122414	399072	18.96	4.44	3.60
24	8:00	126728	402563	18.82	4.31	3.49
25	8:00	131290	406211	18.94	4.57	3.64
26	8:00	135396	409333	20.58	4.10	3.12
27	8:00	139519	412538	21.52	4.12	3.20
28	8:00	143307	415831	19.05	3.78	3.29
29	8:00	147357	419213	19.17	4.05	3.38
30	8:00	150927	422075	19.64	3.57	2.86
31	8:00	154472	424707	21.76	3.54	2.63

SEPT. 2011	TIME	CONT. BLD.	METER DISCHG	TANK LEVEL	GAL. PUMPED	GAL USED
SEPT 2011 1	8:00	157008	427083	19.29	2.53	2.38
2	8:00	160233	429642	19.17	3.23	2.56
3	8:00	163638	432259	19.88	3.40	2.61
4	8:00	166410	434927	19.06	2.77	2.56
5	8:00	170339	437780	20.82	3.92	2.95
6	8:00	174055	440891	19.17	3.71	3.11
7	8:00	178029	444014	19.88	3.97	3.12
8	8:00	181740	447031	19.05	3.71	3.01
9	8:00	185229	449800	19.17	3.48	2.77
10	8:00	188648	452488	19.17	3.42	2.68
11	8:00	192172	455291	19.29	3.52	2.80
12	8:00	196154	458178	22.23	3.98	3.88
13	8:00	199526	461053	19.76	3.37	2.87
14	8:00	203018	463823	19.64	3.49	2.77
15	8:00	206451	466477	20.11	3.43	2.65
16	8:00	209323	468859	20.23	2.87	2.38
17	8:00	211688	470936	19.88	2.36	2.07
18	8:00	214428	473046	21.64	2.74	2.11
19	8:00	216812	475289	19.76	2.38	2.24
20	8:00	219558	477432	21.29	2.74	2.15
21	8:00	221879	479567	19.64	2.32	2.13
22	8:00	224705	481788	21.05	2.82	2.22
23	8:00	227474	484098	22.59	2.77	2.31
24	8:00	229802	486281	19.17	2.33	2.19
25	8:00	232710	488515	19.41	2.90	2.23
26	8:00	235702	490885	19.17	2.99	2.37
27	8:00	238523	493070	19.05	2.82	2.18
28	8:00	241370	495261	19.17	2.84	2.19
29	8:00	244008	497272	19.52	2.53	2.01
30	8:00	246327	499222	20.00	2.32	1.95
30	8:00	140001	[illegible]	[illegible]	3.15	[illegible]

OCT 2011	TIME	CONT. BLD.	METER DISCH.	TANK LEVEL	GAL. PUMPED	GAL. USED
OCT 2011 1.	8:00	248763	501076	21.17	2.44	1.85
2.	8:00	250989	502924	20.35	2.22	1.84
3.	8:00	253380	504821	20.70	2.39	1.89
4.	8:00	255600	506616	20.46	2.22	1.79
5.	8:00	257619	508229	20.11	2.01	1.61
6.	8:00	259511	509690	20.11	1.90	1.47
7.	8:00	261383	511120	20.23	1.87	1.43
8.	8:00	263179	512499	20.11	1.79	1.33
9.	8:00	264965	513857	20.11	1.78	1.35
10.	8:00	266812	515273	20.11	1.84	1.41
11.	8:00	268617	516632	20.23	1.80	1.35
12.	8:00	270401	517981	20.23	1.78	1.34
13.	8:00	272131	519291	20.23	1.73	1.21
14.	8:00	273868	520609	20.23	1.73	1.31
15.	8:00	275570	521866	20.35	1.71	1.26
16.	8:00	277219	523128	19.99	1.64	1.26
17.	8:00	278996	524469	20.11	1.77	1.34
18.	8:00	280740	525771	20.23	1.74	1.30
19.	8:00	282471	527068	20.35	1.73	1.29
20.	8:00	284191	528342	20.46	1.72	1.28
21.	8:00	285873	529603	20.35	1.68	1.26
22.	8:00	287540	530858	20.11	1.66	1.25
23.	8:00	289266	532119	19.99	1.72	1.26
24.	8:00	291014	533419	20.11	1.74	1.30
25.	8:00	292721	534706	20.11	1.70	1.28
26.	8:00	294411	535971	20.11	1.69	1.26
27.	8:00	296122	537254	19.99	1.71	1.28
28.	8:00	297844	538534	20.11	1.72	1.28
29.	8:00	299493	539749	20.11	1.65	1.21
30.	8:00	301201	541002	20.46	1.70	1.25
31.	8:00	302949	542321	20.35	1.74	1.31

NOV 2011

	TIME	CONTROL BUILDING	METER DISCHARGE	TANK LEVEL	GAL. PUMPED	GAL. USED
1	8:00	304612	543580	20.11	1.66	1.25
2	8:00	306305	544851	20.23	1.69	1.27
3	8:00	307975	546108	20.00	1.67	1.25
4	8:00	309647	547351	20.00	1.67	1.25
5	8:00	311355	548604	20.23	1.71	1.25
6	8:00 STANDARD TIME	313078	549891	20.23	1.72	1.28
7	8:00	314816	551212	20.11	1.73	1.32
8	8:00	316467	552442	20.11	1.65	1.22
9	8:00	318101	553651	20.11	1.63	1.21
10	8:00	319734	554854	20.23	1.63	1.20
11	8:00	321336	556039	20.06	1.60	1.18
12	8:00	322946	557206	20.23	1.61	1.17
13	8:00	324573	558385	20.35	1.63	1.18
14	8:00	326225	559617	20.24	1.65	1.22
15	8:00	327849	560838	20.11	1.62	1.22
16	8:00	329495	562075	20.00	1.64	1.23
17	8:00	331131	563291	19.99	1.63	1.21
18	8:00	332828	564552	20.11	1.69	1.26
19	8:00	334442	565759	20.11	1.62	1.20
20	8:00	336115	566986	20.35	1.67	1.22
21	8:00	337829	568274	20.11	1.71	1.28
22	8:00	339481	569500	20.11	1.65	1.22
23	8:00	341161	570739	20.11	1.68	1.23
24	8:00	342835	571960	20.23	1.67	1.22
25	8:00	344564	573231	20.35	1.72	1.27
26	8:00	346236	574473	20.34	1.67	1.24
27	8:00	347941	575738	20.46	1.70	1.26
28	8:00	349736	577025	20.70	1.79	1.28
29	8:00	351380	578297	20.23	1.64	1.27
30	8:00	353034	579547	20.00	1.65	1.25

DEC, 2011

DEC 2011

	TIME	CONTROL BLD	METER DIS.	TANK LEVEL	GAL. PUMPED	GAL USED
1	8:00	354695	580799	20.11	1.67	1.25
2	8:00	356350	582045	20.11	1.66	1.25
3	8:00	358023	583274	20.46	1.67	1.23
4	8:00	359730	584516	21.17	1.70	1.24
5	8:00	361438	585815	21.40	1.70	1.29
6	8:00	363120	587113	21.29	1.68	1.29
7	8:00	364798	588408	21.17	1.67	1.29
8	8:00	366419	589680	20.70	1.62	1.28
9	8:00	368070	590951	20.46	1.66	1.27
10	8:00	369727	592185	20.70	1.65	1.23
11	8:00	371448	593427	21.41	1.72	1.24
12	8:00	373201	594756	21.64	1.75	1.32
13	8:00	374828	596030	21.17	1.62	1.27
14	8:00	376455	597294	20.82	1.62	1.26
15	8:00	378085	598542	20.58	1.63	1.24
16	8:00	379726	599795	20.35	1.64	1.25
17	8:00	381380	601003	20.70	1.66	1.21
18	8:00	383068	602225	21.30	1.68	1.22
19	8:00	384800	603526	21.64	1.73	1.30
20	8:00	386397	604748	21.29	1.59	1.22
21	8:00	388010	605995	20.94	1.61	1.24
22	8:00	389633	607221	20.94	1.62	1.22
23	8:00	391302	608478	21.05	1.66	1.25
24	8:00	392972	609708	21.29	1.67	1.23
25	8:00	394695	610954	22.00	1.72	1.24
26	8:00	396250	612173	21.76	1.56	1.22
27	8:00	397865	613456	20.94	1.61	1.28
28	8:00	399487	614704	20.46	1.62	1.24
29	8:00	401136	615949	20.23	1.65	1.24
30	8:00	402787	617175	20.23	1.65	1.23
31	8:00	404451	618403	20.35	1.67	1.23

JAN 2012

		[illegible]	METER DIS.	TANK LEVEL	GAL PUMPED	GAL USED
1.	8:00	406191	619650	21.29	1.74	1.24
2.	8:00	407722	620888	20.82	1.53	1.23
3.	8:00	409706	622180	23.46	1.98	1.29
4.	8:00	411322	623424	23.17	1.61	1.24
5.	8:00	412913	624669	22.46	1.59	1.24
6.	8:00	414500	625949	21.64	1.68	1.28
7.	8:00	416090	627188	21.29	1.59	1.24
8.	8:00	417786	628467	21.64	1.69	1.27
9.	8:00	419506	629789	21.76	1.72	1.32
10.	8:00	421133	631068	21.29	1.62	1.27
11.	8:00	422737	632353	20.70	1.60	1.29
12.	8:00	424353	633669	20.11	1.62	1.31
13.	8:00	426024	634986	20.00	1.67	1.32
14.	8:00	427664	636209	20.23	1.64	1.22
15.	8:00	429362	637446	20.94	1.69	1.23
16.	8:00	431067	638754	21.06	1.70	1.30
17.	8:00	432772	640076	21.06	1.70	1.32
18.	8:00	434406	641374	20.46	1.63	1.30
19.	8:00	436056	642640	20.23	1.65	1.26
20.	8:00	437728	643917	20.00	1.67	1.27
21.	8:00	439400	645168	20.11	1.68	1.27
22.	8:00	441142	646442	20.82	1.74	1.27
23.	8:00	442861	647796	20.46	1.71	1.35
24.	8:00	444551	649098	20.35	1.69	1.30
25.	8:00	446235	650378	20.23	1.68	1.28
26.	8:00	447931	651657	20.23	1.70	1.28
27.	8:00	449616	652941	20.23	1.68	1.29
28.	8:00	451247	654185	20.00	1.63	1.24
29.	8:00	452958	655431	20.70	1.71	1.24
30.	8:00	454757	656760	20.82	1.79	1.32
31.	8:00	456409	658051	20.23	1.65	1.29

FEB 2012

	TIME	CONTROL BLD	METER DISCHARGE	TANK LEVEL	GAL PUMPED	GAL USED
1	8:00	458113	659340	20.11	1.70	1.28
2	8:00	459874	660638	20.35	1.76	1.29
3	8:00	461594	661925	20.46	1.72	1.28
4	8:00	463262	663177	20.46	1.67	1.25
5	8:00	464926	664445	20.11	1.66	1.26
6	8:00	466674	665745	20.11	1.74	1.30
7	8:00	468402	667033	20.35	1.72	1.28
8	8:00	470120	668327	20.35	1.71	1.29
9	8:00	471850	669623	20.46	1.73	1.29
10	8:00	473583	670907	20.46	1.73	1.28
11	8:00	475245	672152	20.46	1.66	1.25
12	8:00	476913	673415	20.23	1.66	1.26
13	8:00	478672	674733	20.35	1.75	1.31
14	8:00	480390	676006	20.46	1.72	1.27
15	8:00	482117	677290	20.58	1.72	1.28
16	8:00	483827	678524	20.58	1.71	1.23
17	8:00	485541	679854	20.58	1.71	1.33
18	8:00	487217	681103	20.58	1.67	1.25
19	8:00	488896	682373	20.35	1.67	1.27
20	8:00	490659	683703	20.46	1.76	1.33
21	8:00	492368	685000	20.23	1.70	1.29
22	8:00	494118	686290	20.46	1.75	1.29
23	8:00	495840	687585	20.58	1.73	1.29
24	8:00	497547	688861	20.58	1.70	1.28
25	8:00	499190	690099	20.35	1.65	1.23
26	8:00	500902	691386	20.34	1.71	1.28
27	8:00	502665	692710	20.46	1.76	1.32
28	8:00	504374	693989	20.46	1.71	1.27
29	8:00	506061	695244	20.46	1.68	1.26

MARCH 2012

MAR 2012

	TIME	CONTROL BLD	METER DISCHG	TANK LEVEL	GAL PUMPED	GAL USED
1	8:00	507774	6946516	20.58	1.71	1.27
2	8:00	509514	697804	20.82	1.74	1.28
3	8:00	511144	699037	20.58	1.63	1.23
4	8:00	512923	700304	20.46	1.77	1.26
5	8:00	514700	701628	20.11	1.77	1.32
6	8:00	516455	702926	20.23	1.75	1.29
7	8:00	518181	704229	20.23	1.73	1.30
8	8:00	519894	705530	20.11	1.71	1.30
9	8:00	521617	706807	20.23	1.72	1.27
10	8:00	523289	708054	20.11	1.67	1.25
11	8:00 DST	525017	709278	20.82	1.72	1.22
12	8:00	526675	710597	20.11	1.65	1.31
13	8:00	528409	711889	20.35	1.73	1.29
14	8:00	530104	713176	20.35	1.69	1.28
15	8:00	531791	714450	20.35	1.68	1.27
16	8:00	533492	715722	20.58	1.70	1.27
17	8:00	535203	716997	20.70	1.71	1.27
18	8:00	536957	718266	21.52	1.75	1.26
19	8:00	538639	719556	21.76	1.68	1.29
20	8:00	540303	720846	21.52	1.67	1.29
21	8:00	541977	722138	21.29	1.67	1.29
22	8:00	543660	723435	21.05	1.68	1.29
23	8:00	545323	724723	20.70	1.66	1.28
24	8:00	547026	725983	20.93	1.70	1.26
25	8:00	548797	727278	21.64	1.77	1.29
26	8:00	550602	728610	22.23	1.80	1.33
27	8:00	552290	729915	21.88	1.58	1.30
28	8:00	553984	731218	21.64	1.69	1.30
29	8:00	555661	732516	21.29	1.68	1.30
30	8:00	557319	733820	21.17	1.65	1.31
31	8:00	558380	735124	15.05	1.07	1.30

ARP
2012

Apr
2012

	TIME	CONTROL BLD.	METER DIS	TANK LEVEL	GAL PUMPED	GAL USED
1.	8:00	560476	736372	20.23	1.09	1.24
2.	8:00	562233	737718	20.00	1.75	1.34
3.	8:00	564001	739048	20.11	1.76	1.33
4.	8:00	565736	740349	20.11	1.73	1.30
5.	8:00	567476	741650	20.23	1.74	1.30
6.	8:00	569207	742940	20.23	1.73	1.29
7.	8:00	570924	744224	20.55	1.72	1.28
8.	8:00	572622	745512	20.11	1.69	1.28
9.	8:00	574341	746802	20.00	1.71	1.29
10.	8:00	576106	748113	20.11	1.76	1.31
11.	8:00	577851	749412	20.23	1.74	1.29
12.	8:00	579600	750711	20.35	1.74	1.29
13.	8:00	581346	752010	20.46	1.74	1.30
14.	8:00	583055	753295	20.35	1.71	1.28
15.	8:00	584770	754598	20.11	1.71	1.30
16.	8:00	586562	755944	20.23	1.79	1.34
17.	8:00	588330	757260	20.23	1.76	1.31
18.	8:00	590077	758573	20.23	1.74	1.31
19.	8:00	591842	759893	20.35	1.76	1.32
20.	8:00	593622	761233	20.35	1.78	1.34
21.	8:00	595418	762604	20.55	1.79	1.37
22.	8:00	597494	764165	20.70	2.07	1.56
23.	8:00	599683	765882	20.70	2.18	1.71
24.	8:00	601772	767526	20.70	2.09	1.84
25.	8:00	603814	769156	20.23	2.04	1.63
26.	8:00	606410	770957	23.88	2.59	1.80
27.	8:00	608150	772516	21.41	1.74	1.55
28.	8:00	609966	773969	20.70	1.81	1.45
29.	8:00	611787	775417	20.11	1.82	1.44
30.	8:00	613824	776985	20.46	2.03	1.56

MAY 2012

MAY 2012

	TIME	CONTROL BLD.	MATRIX DIS	TANK LEVEL	GAL PUMPED	GAL USED
1	8:00	615807	778533	20.58	1.98	1.54
2	8:00	617779	780097	20.46	1.97	1.56
3	8:00	619741	781631	20.34	1.96	1.53
4	8:00	621668	783152	20.11	1.92	1.52
5	8:00	623524	784573	20.00	1.86	1.42
6	8:00	625440	786034	20.23	1.91	1.46
7	8:00	627471	787606	20.46	2.03	1.57
8	8:00	629625	789292	20.82	2.15	1.68
9	8:00	632250	791343	22.00	2.62	2.05
10	8:00	634648	793494	19.76	2.39	2.15
11	8:00	637169	795340	22.59	2.52	1.84
12	8:00	639550	797297	23.29	2.39	1.95
13	8:00	642003	799544	19.88	2.45	2.24
14	8:00	645289	802310	21.29	3.28	2.76
15	8:00	648579	805168	20.11	3.29	2.85
16	8:00	652143	808072	19.06	3.56	2.90
17	8:00	655454	810996	19.29	3.31	2.92
18	8:00	658468	813517	19.05	3.01	2.52
19	8:00	661556	816011	19.41	3.09	2.50
20	8:00	664568	818483	19.29	3.01	2.47
21	8:00	667941	821469	19.29	3.37	2.98
22	8:00	671315	824199	19.99	3.37	2.73
23	8:00	674079	826508	21.64	2.76	2.30
24	8:00	676563	828807	19.88	2.48	2.29
25	8:00	679348	831122	21.64	2.78	2.21
26	8:00	681493	833032	19.64	2.15	1.91
27	8:00	683801	834859	21.05	2.31	1.82
28	8:00	686324	836766	23.06	2.52	1.90
29	8:00	688520	838778	20.00	2.19	2.01
30	8:00	691267	841015	22.23	2.74	2.23
31	8:00	693883	843298	20.23	2.61	2.28

JUNE 2012

	TIME	CONTROL READ.	MASTER DBS	TANK LEVEL	GAL. PUMPED	GAL. USED
1	8:00	696297	845416	19.76	2.41	2.12
2	8:00	699151	847703	20.11	2.86	2.29
3	8:00	701896	849876	21.29	2.74	2.17
4	8:00	704656	852249	22.00	2.76	2.37
5	8:00	707414	854826	20.58	2.75	2.57
6	8:00	710181	857076	22.94	2.76	2.25
7	8:00	712686	859356	19.88	2.50	2.26
8	8:00	715470	861732	20.70	2.79	2.40
9	8:00	718232	863965	23.05	2.76	2.23
10	8:00	720404	866016	19.29	2.17	2.05
11	8:00	723161	868248	19.29	2.75	2.23
12	8:00	726064	870617	19.05	2.90	2.36
13	8:00	729143	873092	19.62	3.07	2.47
14	8:00	731913	875400	21.17	2.77	2.30
15	8:00	735007	878164	20.46	3.09	2.76
16	8:00	738121	880720	20.35	3.12	2.56
17	8:00	741415	883434	20.23	3.29	2.71
18	8:00	744646	886229	19.17	3.23	2.79
19	8:00	747729	888759	19.17	3.08	2.53
20	8:00	750894	891363	19.17	3.16	2.60
21	8:00	754289	894381	19.29	3.39	3.02
22	8:00	757911	897636	19.17	3.62	3.25
23	8:00	761411	900752	19.29	3.50	3.12
24	8:00	765048	904039	19.05	3.63	3.28
25	8:00	769393	907987	18.94	4.34	3.94
26	8:00	773774	911375	18.82	4.38	3.39
27	8:00	777556	914769	19.06	3.78	3.39
28	8:00	781857	918528	18.70	4.30	3.75
29	8:00	786043	922208	18.82	4.18	3.68
30	8:00	790001	925828	18.94	3.95	3.[illegible]

JULY 2012	TIME	CONTROL BLDG.	METER DRS.	TANK LEVEL	GAL. PUMPED	GAL. USED
1	8:00	794089	929532	18.96	4.08	3.70
2	8:00	797729	932761	20.00	3.63	3.22
3	8:00	801768	936320	18.94	4.04	3.55
4	8:00	805529	939742	18.82	4.76	3.42
5	8:00	809448	943285	19.17	3.91	3.54
6	8:00	813284	946839	18.70	3.84	3.55
7	8:00	817165	950309	19.06	3.78	3.47
8	8:00	820835	953692	18.94	3.67	3.38
9	8:00	825304	957808	18.94	4.46	4.21
10	8:00	829343	961641	18.58	4.03	3.83
11	8:00	833333	965333	18.94	3.99	3.69
12	8:00	836872	968590	18.94	3.53	3.25
13	8:00	840871	972233	18.94	4.00	3.64
14	8:00	844216	975248	19.17	3.34	3.01
15	8:00	847352	977838	19.29	3.13	2.59
16	8:00	850364	980313	19.17	3.01	2.47
17	8:00	853838	983088	20.00	3.47	2.77
18	8:00	856604	985546	20.00	2.76	2.45
19	8:00	860000	988527	19.17	3.39	2.98
20	8:00	863766	991723	19.17	3.76	3.20
21	8:00	867417	994807	19.29	3.65	3.08
22	8:00	870987	997869	19.05	3.57	3.06
23	8:00	874997	001294	19.05	4.01	3.42
24	8:00	878812	004728	18.94	3.82	3.43
25	8:00	882538	008120	19.05	3.72	3.40
26	8:00	886225	011519	18.82	3.69	3.39
27	8:00	889940	014922	19.05	3.72	3.41
28	8:00	893158	017616	19.17	3.21	2.69
29	8:00	896366	020262	19.17	3.21	2.45
30	8:00	899901	023488	18.94	3.53	3.22
31	8:00	903467	026699	19.52	3.56	3.21

AUG. 2012	TIME	CONTROL BLD.	METER DIS	TANK LEVEL	GAL. PUMPED	GAL. USED
1	8:00	906773	029497	19.05	3.30	2.79
2	8:00	910530	032953	18.82	3.75	3.45
3	8:00	914139	036237	19.05	3.60	3.28
4	8:00	917601	039395	19.05	3.47	3.16
5	8:00	921088	042569	19.29	3.48	3.17
6	8:00	925001	046217	18.82	3.91	3.64
7	8:00	928714	049627	19.17	3.71	3.41
8	8:00	932538	053231	18.82	3.82	3.62
9	8:00	936306	056793	18.94	3.76	3.54
10	8:00	940051	060355	18.82	3.74	3.56
11	8:00	943500	063484	19.29	3.45	3.13
12	8:00	946924	066659	19.05	3.42	3.17
13	8:00	950865	070327	19.17	3.94	3.67
14	8:00	954676	073919	18.82	3.81	3.59
15	8:00	958425	077394	19.17	3.74	3.47
16	8:00	961851	080551	19.05	3.42	3.15
17	8:00	965599	084055	18.94	3.74	3.50
18	8:00	969094	087308	18.94	3.50	3.25
19	8:00	972612	090592	19.05	3.51	3.28
20	8:00	976213	093963	18.82	3.60	3.37
21	8:00	979880	097364	18.94	3.66	3.40
22	8:00	983646	100321	21.52	3.76	2.95
23	8:00	986971	103356	19.05	3.32	3.03
24	8:00	990514	106607	19.05	3.54	3.25
25	8:00	993811	109512	20.00	3.30	2.91
26	8:00	997172	112327	20.00	3.36	2.81
27	8:00	001311	115514	21.17	4.13	3.18
28	8:00	004902	118761	19.05	3.59	3.24
29	8:00	008406	122021	19.05	3.50	3.26
30	8:00	011782	125148	19.05	3.37	3.12
31	8:00	015275	128165	21.17	3.40	3.02

SEP 2012	TIME	CONTROL BLD.	METER DIS	TANK LEVEL	GAL PUMPED	GAL USED
1.	8:00	018075	130690	19.29	2.80	2.53
2.	8:00	021354	133411	19.64	3.27	2.72
3.	8:00	024707	136424	19.41	3.35	3.01
4.	8:00	028048	139524	19.17	3.34	3.10
5.	8:00	031221	142426	19.17	3.17	2.90
6.	8:00	034420	145330	19.17	3.19	2.90
7.	8:00	038065	148181	21.52	3.64	2.85
8.	8:00	041177	150870	20.46	3.11	2.69
9.	8:00	044395	153557	20.35	3.21	2.68
10.	8:00	047828	156473	20.00	3.43	2.91
11.	8:00	050967	159212	20.46	3.13	2.73
12.	8:00	053993	161758	20.70	3.02	2.54
13.	8:00	057180	164540	19.05	3.18	2.78
14.	8:00	060023	166970	20.35	2.84	2.43
15.	8:00	063253	169429	21.41	3.23	2.45
16.	8:00	066140	171862	20.82	2.88	2.43
17.	8:00	069349	174309	21.52	3.20	2.44
18.	8:00	072341	176654	21.76	2.99	2.34
19.	8:00	075416	179051	19.29	3.07	2.39
20.	8:00	078634	181459	18.46	3.21	2.40
21.	8:00	081259	183910	20.11	2.62	2.46
22.	8:00	083602	186266	20.58	2.35	2.35
23.	8:00	086745	188590	19.88	3.14	2.32
24.	8:00	089987	190959	19.76	3.24	2.36
25.	8:00	093200	193291	19.64	3.21	2.33
26.	8:00	096261	195450	19.54	3.06	2.15
27.	8:00	099362	197653	19.76	3.10	2.20
28.	8:00	102330	199816	19.76	2.97	2.16
29.	8:00	105045	201844	20.00	2.71	2.03
30.	8:00	107655	203803	20.11	2.61	1.95

OCT	1	8:00	110396	205893	19.88	2.74	2.09
2012	2	8:00	113003	207841	20.00	2.60	1.94
	3	8:00	115399	209677	21.05	2.39	1.83
	4	8:00	117227	211163	20.11	1.82	1.48
	5	8:00	119120	212611	20.08	1.89	1.44
	6	8:00	120909	213990	20.11	1.78	1.38
	7	8:00	122735	215380	20.11	1.82	1.39
	8	8:00	124600	216804	20.11	1.86	1.42
	9	8:00	126443	218193	20.11	1.84	1.38
	10	8:00	128276	219578	20.23	1.83	1.38
	11	8:00	130093	220945	20.35	1.81	1.36
	12	8:00	131970	222366	20.46	1.88	1.42
	13	8:00	133654	223622	20.35	1.68	1.26
	14	8:00	135266	224975	19.64	1.61	1.25
	15	8:00	137344	226204	23.17	1.07	1.32
	16	8:00	139018	227446	23.06	1.67	1.24
	17	8:00	140644	228721	22.46	1.62	1.27
	18	8:00	142217	229987	21.52	1.57	1.26
	19	8:00	143944	231300	21.41	1.73	1.32
	20	8:00	145586	232576	20.82	1.64	1.27
	21	8:00	147249	233822	20.94	1.66	1.25
	22	8:00	148979	235140	20.94	1.73	1.31
	23	8:00	150642	236449	20.34	1.66	1.30
	24	8:00	152329	237759	20.11	1.68	1.31
	25	8:00	154095	239103	20.11	1.76	1.34
	26	8:00	155876	240467	20.23	1.78	1.36
	27	8:00	157608	241794	20.11	1.73	1.33
	28	8:00	159383	243135	20.35	1.77	1.34
	29	8:00	161185	244500	20.58	1.80	1.36
	30	8:00	162910	245819	20.46	1.72	1.31
	31	8:00	164604	247120	21.05	1.69	1.30

		TIME	CONTROL BLD.	MILLER DRS.	TANK LEVEL	GAL PUMPED	GAL. USED
NOV.	1	8:00	166118	248357	20.46	1.51	1.23
2012	2	8:00	167996	249618	22.34	1.77	1.26
	3	8:00	169499	250839	20.93	1.50	1.22
DAYLIGHT	4	8:00	171343	252166	20.11	1.84	1.31
TIME	5	8:00	173023	253496	20.58	1.68	1.33
END.	6	8:00	174760	254775	20.70	1.73	1.27
	7	8:00	176471	256057	20.70	1.71	1.28
	8	8:00	178171	257330	20.70	1.70	1.27
	9	8:00	179925	258622	21.05	1.75	1.29
	10	8:00	181633	259918	21.17	1.71	1.29
	11	8:00	183353	261245	21.05	1.72	1.32
	12	8:00	185127	262628	21.05	1.77	1.38
	13	8:00	186841	263924	20.82	1.71	1.29
	14	8:00	188595	265258	20.82	1.75	1.33
	15	8:00	190330	266565	20.82	1.73	1.30
	16	8:00	192099	267868	20.82	1.76	1.30
	17	8:00	193776	269144	20.94	1.68	1.28
	18	8:00	195444	270363	20.70	1.66	1.21
	19	8:00	197242	271724	20.82	1.79	1.36
	20	8:00	199003	273053	20.78	1.76	1.22
	21	8:00	200763	274387	20.70	1.76	1.33
	22	8:00	202527	275730	20.58	1.76	1.34
	23	8:00	204332	277090	20.70	1.81	1.36
	24	8:00	206120	278427	20.80	1.79	1.33
	25	8:00	207897	279781	20.82	1.77	1.35
	26	8:00					
	27		211481	282530	20.70	3.58	2.74
	28	8:00	213274	283895	20.70	1.79	1.36
	29	8:00	215037	285233	20.70	1.76	1.33
	30	8:00	216859	286599	20.82	1.82	1.36

1	8:00	218618	287920	20.93	1.76	1.33
Dec 2012 2	8:00	220369	289262	20.70	1.75	1.34
3	8:00	222189	290657	20.58	1.82	1.39
4	8:00	223976	292015	20.58	1.78	1.35
5	8:00	225770	293363	20.70	1.79	1.34
6	8:00	227544	294727	20.58	1.77	1.36
7	8:00	229359	296104	20.70	1.81	1.38
8	8:00	231204	297475	21.06	1.85	1.37
9	8:00	232933	298851	20.46	1.72	1.37
10	8:00	234729	300293	20.70	1.79	1.44
11	8:00	236530	301671	20.82	1.80	1.37
12	8:00	238301	303039	20.58	1.77	1.36
13	8:00	240109	304422	20.58	1.80	1.38
14	8:00	241960	305835	20.58	1.86	1.41
15	8:00	243728	307178	20.58	1.76	1.34
16	8:00	245527	308563	20.46	1.79	1.38
17	8:00	247395	310003	21.29	1.86	1.44
18	8:00	249195	311414	20.94	1.80	1.41
19	8:00	250993	312817	20.70	1.79	1.40
20	8:00	252796	314224	20.46	1.80	1.41
21	8:00	254691	315664	20.58	1.89	1.44
22	8:00	256547	317104	20.46	1.85	1.44
23	8:00	258483	318635	20.11	1.93	1.53
24	8:00	260551	320193	20.70	2.06	1.45
25	8:00	262452	321667	20.58	1.90	1.47
26	8:00	264329	323126	20.46	1.87	1.46
27	8:00	266252	324636	20.23	1.92	1.51
28	8:00	268142	326092	20.11	1.89	1.45
29	8:00	269999	327521	20.11	1.85	1.43
30	8:00	271900	328988	20.00	1.91	1.46
31	8:00	273812	330467	20.11	1.91	1.47

	TIME	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	8:00	275707	331930	20.11	1.89	1.46
2	8:00	277653	333432	21.29	1.94	1.50
3	8:00	279498	334915	20.70	1.84	1.48
4	8:00	281384	336385	20.58	1.80	1.47
5	8:00	283225	337811	20.35	1.84	1.43
6	8:00	285084	339254	20.11	1.85	1.44
7	8:00	287027	340760	20.11	1.94	1.50
8	8:00	288958	342244	20.11	1.93	1.48
9	8:00	290884	343719	20.23	1.92	1.47
10	8:00	292825	345204	20.39	2.04	1.48
11	8:00	294741	346684	20.35	1.91	1.48
12	8:00	296617	348124	20.58	1.87	1.44
13	8:00	298441	349565	20.23	1.82	1.44
14	8:00	300372	351064	20.35	1.93	1.49
15	8:00	302211	352520	20.48	1.83	1.46
16	8:00	304124	353940	20.46	1.91	1.42
17	8:00	305980	355373	20.46	1.85	1.43
18	8:00	307881	356825	20.46	1.90	1.45
19	8:00	309738	358251	20.46	1.85	1.43
20	8:00	311665	359726	20.46	1.92	1.47
21	8:00	313623	361258	20.23	1.95	1.53
22	8:00	315550	362759	20.11	1.92	1.50
23	8:00	317511	364276	20.11	1.96	1.51
24	8:00	319470	365788	20.11	1.95	1.51
25	8:00	321447	367314	20.23	1.97	1.53
26	8:00	323392	368833	20.00	1.85	1.52
27	8:00	325412	370373	20.34	2.02	1.54
28	8:00	327414	371950	20.23	2.00	1.57
29	8:00	329357	373451	20.10	1.94	1.50
30	8:00	331329	374976	20.11	2.07	1.52
31	8:00	333285	376490	20.23	1.96	1.52

FEB 2013	TIME	CONTROL BLD	METER DEC	TANK LEVEL	GAL PUMPED	GAL USED
1.	8:00	335234	378000	20.23	1.94	1.51
2.	8:00	337125	379476	20.11	1.89	1.47
3.	8:00	339070	380977	20.11	1.94	1.50
4.	8:00	341073	382532	20.11	2.00	1.55
5.	8:00	343016	384050	20.11	1.94	1.51
6.	8:00	344940	385594	20.00	1.92	1.49
7.	8:00	346888	387041	20.23	1.94	1.49
8.	8:00	348859	388565	20.35	1.97	1.52
9.	8:00	350754	390058	20.00	1.89	1.49
10.	8:00	353271	391595	23.41	2.51	1.53
11.	8:00	355033	393203	21.17	1.76	1.60
12.	8:00	356934	394767	20.34	1.90	1.56
13.	8:00	359020	396331	21.05	2.08	1.56
14.	8:00	361051	397889	21.29	2.03	1.55
15.	8:00	363080	399459	21.29	2.03	1.57
16.	8:00	365105	400999	21.64	2.02	1.54
17.	8:00	367179	402575	22.00	2.07	1.57
18.	8:00	369289	404215	22.11	2.11	1.64
19.	8:00	371371	405829	22.23	2.07	1.61
20.	8:00	373384	407406	22.00	2.01	1.57
21.	8:00	375382	408990	21.64	1.99	1.58
22.	8:00	377353	410528	21.64	1.97	1.53
23.	8:00	379370	412089	21.76	2.02	1.56
24.	8:00	381370	413649	21.76	2.00	1.56
25.	8:00	383473	415291	21.76	2.09	1.64
26.	8:00	385497	416880	21.64	2.02	1.59
27.	8:00	387520	418462	21.64	2.02	1.58
28.	8:00	389530	420023	21.64	2.01	1.56

MARCH 2013	TIME	CONTROL BLD	METER DIS.	TANK LEVEL	GAL. PUMPED	GAL. USED
1	8:00	391557	421603	21.52	2.02	1.58
2	8:00	393587	423147	21.76	2.03	1.54
3	8:00	395668	424729	22.11	2.08	1.58
4	8:00	397776	426378	22.11	2.10	1.64
5	8:00	399804	427983	21.88	2.03	1.61
6	8:00	401877	429586	22.00	2.07	1.60
7	8:00	403960	431194	22.11	2.09	1.61
8	8:00	406018	432812	21.88	2.05	1.62
9	8:00	408136	434428	22.34	2.12	1.61
10	8:00 DL SAVING	410242	435979	23.52	2.10	1.55
11	8:00	412406	437630	23.88	1.16	1.65
12	8:00	414474	439257	23.76	2.06	1.62
13	8:00	416529	440880	23.41	2.05	1.63
14	8:00	418544	442523	22.35	2.01	1.64
15	8:00	420536	444230	20.58	1.99	1.71
16	8:00	422688	445801	21.99	2.15	1.57
17	8:00	424738	447364	22.82	2.05	1.56
18	8:00	426508	448992	20.46	1.77	1.62
19	8:00	428609	450628	20.70	2.10	1.63
20	8:00	430726	452204	21.52	2.11	1.57
21	8:00	432811	453802	21.76	2.09	1.60
22	8:00	434878	455413	21.76	2.06	1.61
23	8:00	436848	456938	21.88	1.97	1.52
24	8:00	438861	458477	21.99	2.01	1.53
25	8:00	440885	460079	21.64	2.02	1.60
26	8:00	442899	461626	21.76	2.01	1.55
27	8:00	444997	463349	20.46	2.10	1.72
28	8:00	446889	464722	21.54	1.79	1.38
29	8:00	448941	466287	21.88	2.06	1.56
30	8:00	450986	467834	22.11	2.04	1.55
31	8:00	453039	469413	22.23	2.05	1.57

APRIL 2013	TIME	CONTROL BLD.	MASTER DES.	TANK LEVEL	GAL. PUMPED	GAL. USED
1	8:00	455082	470996	23.11	1.94	1.58
2	8:00	457104	472555	22.11	1.02	1.55
3	8:00	459103	474115	21.76	1.99	1.56
4	8:00	461023	475600	21.52	1.92	1.48
5	8:00	463015	477133	21.41	1.99	1.53
6	8:00	465085	478663	22.54	2.07	1.52
7	8:00	467165	480273	22.23	2.07	1.52
8	8:00	469357	481931	22.82	2.19	1.65
9	8:00	471466	483572	23.06	2.10	1.64
10	8:00	473478	485148	22.94	2.01	1.57
11	8:00	475706	486810	23.88	2.22	1.66
12	8:00	477555	488217	23.64	1.85	1.40
13	8:00	479313	489512	23.65	1.76	1.30
14	8:00	480947	490810	22.59	1.63	1.29
15	8:00	482640	492158	21.64	1.69	1.34
16	8:00	484344	493482	21.05	1.70	1.32
17	8:00	486085	494800	20.82	1.74	1.31
18	8:00	487856	496126	20.70	1.77	1.32
19	8:00	489622	497441	20.70	1.77	1.32
20	8:00	491364	498732	20.58	1.76	1.29
21	8:00	493147	500015	21.05	1.78	1.28
22	8:00	494937	501382	20.82	1.79	1.36
23	8:00	496673	502683	20.70	1.73	1.30
24	8:00	498436	504001	20.58	1.77	1.32
25	8:00	500222	505334	20.58	1.78	1.33
26	8:00	502038	506694	20.46	1.81	1.36
27	8:00	503892	508086	20.46	1.86	1.39
28	8:00	505830	509497	21.05	1.94	1.41
29	8:00	507801	511011	20.93	1.97	1.52
30	8:00	509585	512378	20.70	1.78	1.36

MAY 2013

	TIME 8:00	CONTROL BLD. 511393	METER DIS 513743	TANK LEVEL 20.58	GAL Pumped 1.81	GAL used 1.37
1.						
2.	8:00	513186	515076	20.70	1.79	1.33
3.	8:00	515016	516451	20.70	1.83	1.37
4.	8:00	516818	517772	20.82	1.80	1.32
5.	8:00	518626	519124	20.94	1.80	1.35
6.	8:00	520743	520749	20.94	2.11	1.62
7.	8:00	523145	522592	21.64	2.40	1.84
8.	8:00	525490	524470	21.52	2.34	1.87
9.	8:00	528227	526633	22.11	2.73	2.16
10.	8:00	530633	528844	22.11	2.40	2.21
11.	8:00	533788	531368	20.00	3.15	2.52
12.	8:00	536679	533852	20.58	2.89	2.48
13.	8:00	540114	536677	19.29	3.43	2.82
14.	8:00	543789	539437	22.59	3.67	2.76
15.	8:00	546851	542291	20.11	3.07	2.86
16.	8:00	550187	545058	19.17	3.33	2.76
17.	8:00	553033	547435	19.17	2.84	2.37
18.	8:00	555640	549585	19.52	2.61	2.15
19.	8:00	558408	551640	23.41	2.76	2.05
20.	8:00	560637	553790	19.05	2.22	2.15
21.	8:00	563708	556283	19.67	3.07	2.49
22.	8:00	566421	558647	19.64	2.71	2.36
23.	8:00	566666	560597	19.57	2.45	1.85
24.	8:00	571311	562544	19.99	2.55	1.85
25.	8:00	573932	564343	33.53	2.62	1.80
26.	8:00	575791	566175	20.23	1.85	1.83
27.	8:00	578414	568084	22.68	2.62	1.90
28.	8:00	580626	570076	19.88	2.21	1.99
29.	8:00	583082	572006	21.17	2.45	1.93
30.	8:00	585542	573843	23.06	2.46	1.83
31	8:00	587520	575562	20.94	1.97	1.71

	TIME	CONTROL BULB	METHANE BULB	[illegible]	[illegible]	[illegible]
1.	8:00	589638	577315	20.00	2.12	1.75
2.	8:00	592015	579348	20.00	2.37	2.03
3.	8:00	594679	581347	21.88	2.66	1.99
4.	8:00	597077	583541	20.23	2.39	2.19
5.	8:00	599647	585581	20.93	2.57	2.04
6.	8:00	602417	587920	21.76	2.77	2.34
7.	8:00	605177	590441	20.82	2.76	2.52
8.	8:00	607947	592940	20.11	2.77	2.50
9.	8:00	611046	595558	19.76	3.09	2.61
10.	8:00	614155	598470	19.05	3.00	2.91
11.	8:00	617410	601487	19.29	3.25	3.01
12.	8:00	620219	603863	19.29	2.80	2.37
13.	8:00	623102	606200	19.64	2.89	2.34
14.	8:00	625433	608150	19.88	2.33	1.95
15.	8:00	628082	610176	21.52	2.65	2.02
16.	8:00	630555	612466	20.00	2.47	2.29
17.	8:00	633723	615123	19.76	3.16	2.65
18.	8:00	637300	618029	19.35	3.57	2.90
19.	8:00	640995	620861	22.22	3.69	2.83
20.	8:00	643553	623241	19.64	2.55	2.38
21.	8:00	646326	625499	21.52	2.77	2.25
22.	8:00	648718	627686	19.88	2.39	2.19
23.	8:00	651342	629676	21.52	2.62	1.99
24.	8:00	654105	632184	20.70	2.76	1.49
25.	8:00	656867	634547	21.29	2.76	2.37
26.	8:00	659230	636724	19.41	2.36	2.17
27.	8:00	661898	639117	19.17	2.56	[illegible]
28	8:00	664926	641876	19.12	3.02	2.75
29	8:00	668129	644846	19.29	3.20	2.97
30	8:00	671358	647533	19.64	3.22	2.68

2013	1	8:00	674600	650616	19.17	3.24	3.08
	2	8:00	678093	652989	18.70	3.49	3.37
July 2013	3	8:00	681700	657451	18.94	3.60	4.46
	4	8:00	685335	660958	18.94	3.63	3.56
	5	8:00	688695	664109	19.17	3.36	3.15
	6	8:00	692403	667074	21.05	3.71	2.97
	7	8:00	696042	670136	19.17	3.63	3.06
	8	8:00	699548	673516	18.82	3.50	3.37
	9	8:00	703210	676386	21.52	3.66	2.87
	10	8:00	706366	679385	18.94	3.15	2.99
	11	8:00	709707	682580	19.05	3.34	3.19
	12	8:00	712540	685120	19.64	2.84	2.54
	13	8:00	715551	687923	19.29	3.01	2.80
	14	8:00	718389	690574	19.05	2.83	2.65
	15	8:00	721621	693633	19.06	3.23	3.05
	16	8:00	725059	696943	18.94	3.43	3.31
	17	8:00	728171	699689	20.23	3.12	2.74
	18	8:00	731003	702127	19.17	2.83	2.44
	19	8:00	734522	704826	24.35	3.52	2.70
	20	8:00	737257	707673	19.52	2.73	2.85
	21	8:00	740344	710549	19.29	3.08	2.87
	22	8:00	743672	713686	19.06	3.32	3.13
	23	8:00	747110	716944	19.17	3.43	3.25
	24	8:00	750521	720185	19.05	3.41	3.24
	25	8:00	754067	723597	18.82	3.54	3.41
	26	8:00	757723	727084	18.82	3.66	3.49
	27	8:00	760945	730100	19.17	3.22	3.02
	28	8:00	764140	733071	19.06	3.20	2.97
	29	8:00	767560	736286	19.17	3.42	3.21
	30	8:00	770779	739306	19.06	3.21	3.02
	31	8:00	773678	741821	20.23	2.89	2.51

AUG 2013

	TIME	CONTROL BLD	MIXER DIS	TANK LEVEL	GAL. PUMPED	GAL USED
1	8:00	776439	744279	19.88	2.76	2.45
2	8:00	779082	746938	19.29	2.64	2.65
3	8:00	781848	748822	19.52	2.76	1.89
4	8:00	784601	751117	19.29	2.75	2.29
5	8:00	787663	753879	19.17	3.06	2.76
6	8:00	790812	756757	19.17	3.15	2.88
7	8:00	793959	759667	19.29	3.14	2.91
8	8:00	797154	762642	19.17	3.20	2.98
9	8:00	800283	765530	19.29	3.13	2.89
10						
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City of Anaconda Water System
Inspection Report

Preliminary Engineering Report
Mill Creek TIFID

SANITARY SURVEY FORM - INVENTORY

2/2/2005

DATE OF SURVEY 9-12-2012 | COUNTY Deer Lodge | SURVEYOR NAME – Luella B. Schultz

(SYSTEM REPRESENTATIVE) Paul D. Puccinelli | (OTHER REPRESENTATIVE)

SYSTEM ADDRESS – ADMINISTRATIVE CONTACT

Addressee Paul D. Puccinelli , Water Supervisor
Primary Address

Street PO Box 1459 50 North Main Street

City Anaconda State MT Zip 59711
System Phone (406) 563-7111 Fax (406) 563-3703

SYSTEM OWNER

Addressee City of Anaconda Connie Ternis Gray, Interim CEO
Owners Address

Street same

City _____ State _____ Zip _____

Owner Phone (_____)_____ Fax (_____)_____

LOCATION OF SYSTEM

Nearest City __Butte_____ Description or Physical Address __Anaconda is 26 miles west of Butte; take exit 208 off I-90_____

☐ seasonal operation
dates:_____to_____
x year round operation

OPERATOR OF SYSTEM

Name Paul Puccinelli
Certified Operator Yes
Certification # 5569
Phone # (406) 563-7111 Cell Phone # (_____)_____
Fax # same

ALTERNATE OPERATOR OF SYSTEM

Name Carl Eccleston (5543) and Jeff Smith (7124)
Certified Operator Yes
Certification # 5543 and 7124
Phone # 406-563-7111

SYSTEM STATUS

X A = Active

SYSTEM CLASS

X C = Community

Total Service Connections: Residential / Non-Transient: 2794
Transient:_____

Total Active Connections: Residential / Non-Transient:
Transient: _____

Service Connections Metered? X Yes 300 are metered
Percent Metered 10%

Resident Population 6500 - 7000
(Number of permanent residents utilizing PWS daily)

Non-Transient Population _____
(Maximum number of non-transient persons utilizing PWS daily)

Transient Population _____
(Maximum number of transient persons served by PWS daily)

OWNER TYPE

☐ 1 Federal Government
☐ 2 Private Subdivision, Investor, Trust, Cooperative, Water Association, etc.
☐ 3 State Government
x 4 Local Government Authority, Commission, District, Municipality, City, etc.
☐ 5 Mixed Public/Private
☐ 6 Native American

SERVICE AREA CHARACTERISTICS LIST

☐ BR Bar
☐ DC Day Care Center
☐ DI Dispenser
☐ HS Head Start
☐ HA Homeowners Assoc.
☐ HM Hotel/Motel
☐ HR Highway Rest Area
☐ IA Industrial/Agricultural
☐ IC Interstate Carrier
☐ IN Institution
☐ MF Medical Facility
☐ MH Mobile Home Park
x MU Municipality
☐ OA Other Area
☐ ON Other Non-Transient Area (_____Average Daily Visitors TNC)
☐ OR Other Residential Area
☐ OT Other Transient Area
☐ PA Recreation Areas
☐ RA Residential Area
☐ RE Retail Employees
☐ RS Restaurant
☐ RV RV Park
☐ SC School
☐ SI Sanitary Improvement District
☐ SK Summer Camp
☐ SR Secondary Residences
☐ SS Service Station
☐ SU Subdivision
☐ WBWater Bottler
☐ WH Wholesaler (Sells Water)

Service Category Description _____

Comments:

This system 3.5 mgd in the summer. It also serves Warm Springs which is a metered service connection. There is no back flow prevention device between the two systems as Warm Springs is at a lower elevation and it is a gravity flow system. There are three pressure reducing stations on the line between Anaconda and Warm Springs. They reduce the pressure from 180 psi to 75 psi.

The system loses 100K per day, but last year it was 400K. With the mainline replacements they are getting it under control.

SANITARY SURVEY FORM – WATER SYSTEM FACILITIES

Error! Reference source not found.

Water System Facilities (WSF) numbers are WSF Type Codes plus an assigned number. (i.e. source facility numbering starts with 002 and all non-source facilities start with 001). See instruction sheet for a list of WSF Type Codes. When a source is operational it is considered *A*ctive, this includes systems that are seasonal. *I*nactive sources are those which are shut down but can return to active status, such as a system out of business. *P*roposed sources are those that have been identified through the Plan Review process, but are not connected to the water system.

*A **water source facility** is a well, spring, intake, infiltration gallery or consecutive connections from which a system draws or purchases water:*

Total Number of Source Facilities 6

WATER SYSTEM FACILITIES SUMMARY (WSF)

WSF ID	Facility Name	Water Type Code	Purchased	Seller PWSID	Activity Status*
DS 001	Distribution System				
ST002	3.5 MG storage		☐ Yes x No		A
TP002	Treatment Plant for wells 1a, 2b, 3c, 4d, 5e, and 6D		☐ Yes x No		A
WL005	well 1A	GW	☐ Yes x No		A
WL006	well 2b	GW	☐ Yes x No		A
WL007	well 3C	GW	☐ Yes x No		A
WL008	well 4D	GW	☐ Yes x No		A
WL009	well 5E	GW	☐ Yes x No		A
WL0010	well 6F	GW	☐ Yes x No		A
PF003	Smelter City Booster pump station		☐ Yes ☐ No		A
PF004	Sunny Side Booster Pump Station		☐ Yes ☐ No		A
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		

Description of Water System Facility flow: All wells flow to treatment building (TP002); then to storage (ST002); then to distribution system DS001 and PF003 and PF004.

Example: Well 1 (WL002) to common header (CH001), Well 2 (WL003) to common header (CH001) to treatment plant (TP001) to pressure control assembly (PC001) to distribution system (DS001) to storage tank (ST001) to distribution system (DS001).

*(A)Active, (I)Inactive, (P)Proposed

EMERGENCY POWER

Does the system have emergency power? Yes – for scrubber unit only

If yes, what type: Generac Generator

Frequency of testing: monthly

Record of primary power failures: _____ in last year

Switchover: x Automatic ☐ Manual

Comments: the generator runs the chlorine scrubber (nothing else) if the power goes out. When the alarm system kicks on, the generator would go on.

Alarm system goes to office and notifies them 24/7 if problems occur. There are alarms on the chlorine pumps, the chlorine leak detection system, the wells, communication system, storage tank levels and also the overflow on the tank. Would like to put in a natural gas generator, but don't have the funding.

SANITARY SURVEY FORM – WELLS & WELL PUMPS

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE **STATUS OF SOURCE** X (A)ctive

WSF ID WL 005 *Entry Point ID* EP502
These are State assigned identification numbers

Source Name well 1A
Name of Source – Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **well is located in field west of town off North Cable Road**

Entry Point Name Entry point for all wells
Name of EP – Example: Entry point for North Well 1 & South Well 2

Location of Entry Point at treatment plant

Available X Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _____ to _____

GWUDISW PA Completed ☒ Yes ☐ No

Log Available? X Yes ☐ No

Average Production 425 indicate units

Maximum Production unk. indicate units

Date Drilled 4-19-94 if well. . date drilled

Casing Size _____ size of casing installed in well

Case Depth 56' depth of casing installed in well

Well Depth 56' depth of well expressed in feet

Grout Depth 20' bentonite depth of grout used to seal well walls

Log SWL 10' (static) expressed in feet below ground elevation

Log PWL 44' (pumping) expressed in feet below ground elevation

Test Pump Rate unk. expressed in gallons per min

Intake Type unk. type of intake mechanism

Screened Interval 34-51' slots expressed in feet below ground elevation

Well Yield 880 gpm pump tested in gallons per minute

Latitude 46.14306 °

Longitude 112.98940°

WELLS

	Yes	No	Unk	N/A
Is well metered? Hourly meter	X	☐	☐	☐
Is well site protected from flooding?	X	☐	☐	☐
Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)?	X	☐	☐	☐
If no . . explain _____				
Does casing extend at least				
☐18 inches above outside ground level;	☐	☐	☐	☐
☐12 inches above finished floor inside well house; and	x	☐	☐	☐
☐3 feet above 100 year flood elevation?	☐	☐	☐	☐
(Check for appropriate distance)				
Is top of the well casing properly sealed? (sanitary seal)	X	☐	☐	☐
Is well vented?	X	☐	☐	☐
Is well vent properly screened and terminated in a downward position?	X	☐	☐	☐
Does well have suitable sampling tap? Raw Water	X	☐	☐	☐
Treated	X	☐	☐	☐
Are check valves, blow-off valves and water meters maintained and operating properly?	X	☐	☐	☐
Is upper termination of well protected (housed or fenced)?	X	☐	☐	☐
Is intake located below the maximum drawdown?	☐	☐	X	☐

PUMPS

Type 50 HP vertical Turbine
(example: 30 hp line shaft turbine)
Rated Capacity unk.

	Yes	No	Unk	N/A
Are pumps operable?	X	☐	☐	☐
How frequently are pump(s) replaced? NEW 1994			☐	☐
Are backup pumps/motors provided?	☐	X	☐	☐
Are controls functioning properly and adequately protected?	X	☐	☐	☐
Do underground compartments have a drain?	☐	☐	☐	X
Is facility properly protected against trespassing and vandalism?	X	☐	☐	☐
Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?	X	☐	☐	☐
Is the plumbing adequately painted to prevent excessive corrosion?	X	☐	☐	☐
Are adequate heating, lighting, and ventilation provided?	X	☐	☐	☐
Is a preventive maintenance program in operation?	X	☐	☐	☐
Are recommended spare parts on hand?	☐	X	☐	☐
Cross connection protection provided?	☐	☐	X	☐

Comment: Latitude reading of creek 46.14288; long 112.98930. Using ArcGIS the distance to the creek is estimated at 76 ft.

Explain Controls:
The pumps are controlled by telemetry at the storage tank which kicks them on when tank levels drop. The pumps operate in groups of 3 depending upon the demand. (2B, 5E and 4D were not on during visit). Wells 1,3 and 6 (2100 gpm) operate during low demand and all kick on in periods of high Demand (an additional 2700 gpm).

Comment:

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site on a topographic map
View field visits for this site
View water quality for this site
View scanned well log (6/11/2009 8:03:32 AM)

Site Name: ANACONDA-DEERLODGE COUNTY *WELL A(1)
GWIC Id: 153862
DNRC Water Right: P072455-00

Section 1: Well Owner

Owner Name
ANACONDA-DEER LODGE COUNTY
Mailing Address
800 S MAIN

City	State	Zip Code
ANACONDA	MT	59711

Section 2: Location

Township	Range	Section	Quarter Sections
05N	11W	33	NW¼ NW¼ NW¼ SW¼

County	Geocode
DEER LODGE	30137733412020000

Latitude	Longitude	Geomethod	Datum
46.143043	112.989276	NAV-GPS	WGS84

Ground Surface Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: ROTARY

Section 5: Well Completion Date

Date well completed: Tuesday, April 19, 1994

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	34	12

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	34	12				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
34	39	12			.170 SLOT
39	47	12			.120 SLOT
47	51	12			.170 SLOT

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	

Section 7: Well Test Data

Total Depth: 56
Static Water Level: 10
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
880 gpm pump rate with _ feet of drawdown after 24 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 44 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
110ALVM - ALLUVIUM (QUATERNARY)

From	To	Description
0	3	TOPSOIL
3	5	VERY FINE GRAVEL & SAND
5	10	VERY FINE SAND & SILT MED GRAVEL-SUBROUNDED TO SUBANGULAR
10	13	MED TO FINE GRAVEL SUBROUNDED TO SUBANGULAR-VERY FINE SAND & SILT
13	15	VERY FINE SAND & SILT
15	18	VERY FINE SAND & SILT-GRAVEL MED TO FINE SUBROUNDED TO SUBANGULAR
18	20	GRAVEL-MED TO FINE-ROUNDED TO SUBROUNDED-LIGHT BROWN SILT & SAND
20	23	FINE TO MED SAND & GRAVEL-SUBROUNDED TO SUBANGULAR MORE SILT TO 15%-VERY LITTLE WATER
23	24	FINE TO MED SAND & GRAVEL-SUBROUNDED TO SUBANGULAR-NO SILT-NO WATER-SOME GRAVEL VERY COARSE 5-50%
24	26	FINE TO MED SAND & GRAVEL-ANGULAR TO SUBANGULAR 5% SILT-BLOWING NO WATER
26	27	FINE TO COARSE GRAVEL & SAND-SUBROUNDED TO SUBANGULAR-10-15% SILT-BLOWING NO WATER
27	28	FINE TO MED SAND & GRAVEL-SUBROUNDED TO SUBANGULAR 20% SILT NO WATER
28	29	COARSE TO FINE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR-15-20% SILT NO WATER
29	30	MED TO FINE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR 10-15% SILT NO WATER
30	31	COARSE TO FINE GRAVEL-SUBROUNDED TO SUBANGULAR-NO WATER 5-10% SILT

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: OKEEFE DRILLING CO
License No: WWC-48
Date Completed: 4/19/1994

Site Name: ANACONDA-DEERLODGE COUNTY *WELL A(1)
GWIC Id: 153862
Additional Lithology Records

From	To	Description
31	32	COARSE TO FINE GRAVEL-ANGULAR TO SUBANGULAR-NO WATER 5-10% SILT BLOWING 5% CLAY
32	33	COARSE TO FINE GRAVEL-ANGULAR TO SUBANGULAR 5-10% SILT 5% CLAY
33	34	COARSE TO FINE SAND & GRAVEL-ANGULAR TO SUBANGULAR-5% SILT-PICKED UP LITTLE WATER
34	35	COARSE TO FINE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR-5% SILT
35	36	FINE TO MED SAND & GRAVEL-SUBROUNDED TO SUBANGULAR 5% SILT-MORE WATER 5 GPM
36	37	FINE TO MED SAND & FINE GRAVEL-SUBROUNDED TO SUBANGULAR-10% SILT-MORE WATER 10 GPM-MED GRAVEL ANGULAR TO SUBANGULAR
37	38	FINE TO MED SAND & GRAVEL-SUBROUNDED TO SUBANGULAR 15% WATER DIRTY
38	39	FINE TO MED SAND & GRAVEL-SUBROUNDED TO SUBANGULAR VERY WATER DIRTY-SILT 15%
39	40	COARSE TO FINE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR-SILT 15-20%
40	41	MED TO FINE SAND & SILT-VERY DIRTY
41	42	FINE TO MED SAND & GRAVEL-SUBROUNDED TO SUBANGULAR SILT 10-15%
42	43	MED TO FINE SAND & SILT-VERY DIRTY-5% CLAY
43	44	MED TO FINE SAND & GRAVEL-VERY SILTY-5% CLAY
44	45	MED TO FINE SANSDSILT & GRAVEL-SILT 10-15% 5% CLAY
45	46	MED TO FINE SAND & GRAVEL-SILT 20%-5% CLAY
46	47	MED TO FINE SAND & GRAVEL-SILT 30%-5% CLAY
47	48	MED TO FINE SAND & GRAVEL-SILT 5-10%-SUBROUNDED TO SUBANGULAR-MORE WATER 30 GPM
48	49	FINE TO MED SAND & GRAVEL-SUBROUNDED TO SUBANGULAR SILT 5-10% LESS WATER 15 GPM
49	50	FINE TO COARSE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR-SILT 10-15% WATER DIRTY 10 GPM
50	51	COARSE TO FINE SAND & GRAVEL-ANGULAR TO SUBANGULAR-SILT 10-15% WATER DIRTY
51	52	FINE TO MED SAND & GRAVEL-ROUNDED TO SUBROUNDED SILT 20% WATER DIRTY NO WATER
52	53	MED TO FINE SAN D& GRAVEL-SUBROUNDED TO SUBANGULAR-SILT 10-15%-SMALL CLAY WADS
53	56	MED TO FINE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR SILT 10-15%-FEW SMALL CLAY WADS
56	58	MED TO FINE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR MANY BLACK PARTICLES-CLAY 5% MED TO FINE SAND & GRAVEL-ANGULAR TO SUBANGULAR-BLACK COLORED PIECES-CLAY 5-10%-SMALL CLAY WADS

SANITARY SURVEY FORM – WELLS & WELL PUMPS

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE **STATUS OF SOURCE** x (A)ctive

WSF ID WL006 *Entry Point ID* EP502
These are State assigned identification numbers

Source Name well 2-B
Name of Source – Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **located in well field location west of town**

Entry Point Name entry point for all wells
Name of EP – Example: Entry point for North Well 1 & South Well 2

Location of Entry Point at treatment plant

Available X Perm
If seasonal: _____ to _____

GWUDISW PA Completed ☒ Yes ☐ No

Log Available? X Yes

Average Production 1360 gpm
indicate units

Maximum Production unk.
indicate units

Date Drilled 4-12-94
if well. . date drilled

Casing Size 12"
size of casing installed in well

Case Depth -1.5 – 23'
depth of casing installed in well

Well Depth 43'
depth of well expressed in feet

Grout Depth 21' bentonite
depth of grout used to seal well walls

Log SWL 11.7'
(static) expressed in feet below ground elevation

Log PWL 31.5'
(pumping) expressed in feet below ground elevation

Test Pump Rate unk.
expressed in gallons per min

Intake Type unk.
type of intake mechanism

Screened Interval 21-43 slots
expressed in feet below ground elevation

Well Yield 1330 gpm
pump tested in gallons per minute

Latitude 46.14301°

Longitude 112.98431°

WELLS

	Yes	No	Unk	N/A
Is well metered? hourly	X	☐	☐	☐
Is well site protected from flooding?	X	☐	☐	☐
Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)?	X	☐	☐	☐
If no . . explain _____				
Does casing extend at least				
☐18 inches above outside ground level;	☐	☐	☐	☐
☐12 inches above finished floor inside well house; and	X	☐	☐	☐
☐3 feet above 100 year flood elevation? (Check for appropriate distance)	☐	☐	☐	☐
Is top of the well casing properly sealed? (sanitary seal)	X	☐	☐	☐
Is well vented?	X	☐	☐	☐
Is well vent properly screened and terminated in a downward position?	X	☐	☐	☐
Does well have suitable sampling tap? Raw Water	X	☐	☐	☐
Treated	X	☐	☐	☐
Are check valves, blow-off valves and water meters maintained and operating properly?	X	☐	☐	☐
Is upper termination of well protected (housed or fenced)?	X	☐	☐	☐
Is intake located below the maximum drawdown?	☐	☐	x	☐

PUMPS

Type 125 HP vertical Turbine this pump was not running during the inspection (low demand)
(example: 30 hp line shaft turbine)
Rated Capacity unk.

	Yes	No	Unk	N/A
Are pumps operable?	X	☐	☐	☐
How frequently are pump(s) replaced? New 1994			☐	☐
Are backup pumps/motors provided?	☐	X	☐	☐
Are controls functioning properly and adequately protected?	X	☐	☐	☐
Do underground compartments have a drain?	☐	☐	☐	X
Is facility properly protected against trespassing and vandalism?	X	☐	☐	☐
Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?	X	☐	☐	☐
Is the plumbing adequately painted to prevent excessive corrosion?	X	☐	☐	☐
Are adequate heating, lighting, and ventilation provided?	X	☐	☐	☐
Is a preventive maintenance program in operation?	X	☐	☐	☐
Are recommended spare parts on hand?	X	☐	☐	☐
Cross connection protection provided?	☐	☐	X	☐

Comment: All wells are configured the same.

The lat long of the irrig. Ditch is 46.14280; 112.98478 (approx). This puts the well an estimated 150 feet from the irrigation ditch.

Explain Controls:
The pumps are controlled by telemetry at the storage tank which kicks them on when tank levels drop. The pumps operate in groups of 3 depending upon the demand. (2B, 5E and 4D were not on during visit).
Wells 1,3 and 6 (2100 gpm) operate during low demand and all kick on in periods of high demand (an additional 2700 gpm).

Comment: _____

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site on a topographic map
View field visits for this site
View water quality for this site
View scanned well log (8/24/2006 9:30:49 AM)
View scanned well log (6/11/2009 8:16:06 AM)

Site Name: ANACONDA-DEERLODGE COUNTY *WELL B(2)
GWIC Id: 154079
DNRC Water Right: G017056-00

Section 1: Well Owner

Owner Name
ANACONDA DEER LODGE COUNTY
Mailing Address
800 SOUTH MAIN

City	State	Zip Code
ANACONDA	MT	59711

Section 2: Location

Township	Range	Section	Quarter Sections
05N	11W	33	NW¼ NW¼ NW¼ SE¼

County	Geocode
DEER LODGE	30137733412020000

Latitude	Longitude	Geomethod	Datum
46.142983333333	112.984266666667	NAV-GPS	WGS84

Ground Surface Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: ROTARY

Section 5: Well Completion Date

Date well completed: Tuesday, April 12, 1994

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	23	12

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	23	12				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
21	23	12			.00 SLOT SCREEN
23	33.5	12			.13 SLOT SCREEN
33.5	38	12			.25 SLOT SCREEN
38	43	12			.00 SLOT SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	21	BENTONITE	

Section 7: Well Test Data

Total Depth: 43
Static Water Level: 11.7
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
1330 gpm pump rate with _ feet of drawdown after 24 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 31.5 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
112SNGR - SAND AND GRAVEL (PLEISTOCENE)

From	To	Description
0	5	50% CLAY 50% GRAVEL
5	10	SAND & GRAVEL DAMP 50% GRAVEL 50% SAND
10	15	95% COARSE GRAVEL 5% SMALL GROUND UP GRAVEL DAMP
15	20	80% COARSE GRAVEL 20% FINE & SILT LITTLE MORE WATER
20	25	20 FT 20 GPM-25 POSSIBLE MORE 85% COARSE GRAVEL 15% COARSE SAND
25	28	50% COARSE SAND 50% COARSE GRAVEL MORE WATER
28	28	70% COARSE SAND 20% COARSE GRAVEL
29	30	80% COARSE SAND 20% COARSE GRAVEL
30	31	80% COARSE SAND 20% COARSE GRAVEL
31	32	80% COARSE SAND 20% COARSE GRAVEL
32	33	75% COARSE SAND 25% COARSE GRAVEL WATER GOT CLEANER
33	34	70% COARSE GRAVEL 30% COARSE SANDS
34	35	70% COARSE GRAVEL 30% COARSE SAND
35	36	70% COARSE GRAVEL 30% COARSE SAND
36	37	85% COARSE GRAVEL 15% COARSE SAND

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company:OKEEFE DRILLING CO
License No:WWC-48
Date Completed:4/12/1994

Site Name: ANACONDA-DEERLODGE COUNTY *WELL B(2)
GWIC Id: 154079
Additional Lithology Records

From	To	Description
37	38	38 FT WATER STOPPING POSSIBLE BEDROCK COARSE GRAVEL 50% FINE SAND 50% WATER CHANGE COLOR SAND
38	39	GROUND UP BEDROCK 95% 5% COARSE GRAVEL
39	40	GROUND UP BEDROCK
40	43	GROUND UP BEDROCK

SANITARY SURVEY FORM – WELLS & WELL PUMPS

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE **STATUS OF SOURCE** X (A)ctive

WSF ID WL007 *Entry Point ID* EP 502
These are State assigned identification numbers

Source Name well 3C
Name of Source – Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **in well field west of town but on the opposite side of the North Cable Road as the treatment facility.**

Entry Point Name entry point for wells 1-6
Name of EP – Example: Entry point for North Well 1 & South Well 2

Location of Entry Point at treatment building

Available ☐ Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _____ to _____

GWUDISW PA Completed ☒ Yes passed

Log Available? X Yes

Average Production 1200 gpm (indicate units)

Maximum Production unk. (indicate units)

Date Drilled 1994 (if well. . date drilled)

Casing Size 12" (size of casing installed in well)

Case Depth -1.5-27' (depth of casing installed in well)

Well Depth 48' (depth of well expressed in feet)

Grout Depth 20' bentonite (depth of grout used to seal well walls)

Log SWL 6.2 (static) expressed in feet below ground elevation

Log PWL 21.7 (pumping) expressed in feet below ground elevation

Test Pump Rate unk. (expressed in gallons per min)

Intake Type _____ (type of intake mechanism)

Screened Interval 25-48' screen (expressed in feet below ground elevation)

Well Yield 1000 gpm (pump tested in gallons per minute)

Latitude 46.14305°

Longitude 112.98172°

WELLS

	Yes	No	Unk	N/A
Is well metered? hourly meter	X	☐	☐	☐
Is well site protected from flooding?	X	☐	☐	☐
Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)?	X	☐	☐	☐
If no . . explain _____				
Does casing extend at least				
☐18 inches above outside ground level;	☐	☐	☐	☐
☐12 inches above finished floor inside well house; and	X	☐	☐	☐
☐3 feet above 100 year flood elevation?	☐	☐	☐	☐
(Check for appropriate distance)				
Is top of the well casing properly sealed? (sanitary seal)	X	☐	☐	☐
Is well vented?	X	☐	☐	☐
Is well vent properly screened and terminated in a downward position?	X	☐	☐	☐
Does well have suitable sampling tap? Raw Water	X	☐	☐	☐
Treated	X	☐	☐	☐
Are check valves, blow-off valves and water meters maintained and operating properly?	X	☐	☐	☐
Is upper termination of well protected (housed or fenced)?	X	☐	☐	☐
Is intake located below the maximum drawdown?	☐	☐	X	☐

PUMPS

Type 75HP vertical Turbine
(example: 30 hp line shaft turbine)
Rated Capacity unk.

	Yes	No	Unk	N/A
Are pumps operable? 70 psi	X	☐	☐	☐
How frequently are pump(s) replaced? new 1994			☐	☐
Are backup pumps/motors provided?	☐	X	☐	☐
Are controls functioning properly and adequately protected?	X	☐	☐	☐
Do underground compartments have a drain?	☐	☐	☐	X
Is facility properly protected against trespassing and vandalism?	X	☐	☐	☐
Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?	X	☐	☐	☐
Is the plumbing adequately painted to prevent excessive corrosion?	X	☐	☐	☐
Are adequate heating, lighting, and ventilation provided?	X	☐	☐	☐
Is a preventive maintenance program in operation?	X	☐	☐	☐
Are recommended spare parts on hand?	☐	X	☐	☐
Cross connection protection provided?	☐	☐	X	☐

Comment: To take a treated water sample, they would need to shut off all wells but one.

Warm Springs Creek is greater than 250 feet from the well.

Explain Controls:
The pumps are controlled by telemetry at the storage tank which kicks them on when tank levels drop. The pumps operate in groups of 3 depending upon the demand. (2B, 5E and 4D were not on during visit).
Wells 1,3 and 6 (2100 gpm) operate during low demand and all kick on in periods of high demand (an additional 2700 gpm).

Comment: SERVICE UNITS ONCE A YEAR

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
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View water quality for this site
View scanned well log (8/24/2006 9:31:02 AM)
View scanned well log (6/11/2009 8:13:18 AM)

Site Name: ANACONDA-DEERLODGE COUNTY *WELL C(3)
GWIC Id: 153814
DNRC Water Right: C072455-00

Section 1: Well Owner

Owner Name
ANADONDA-DEERLODGE COUNTY
Mailing Address
800 SOUTH MAIN

City	State	Zip Code
ANACONDA	MT	59711

Section 2: Location

Township	Range	Section	Quarter Sections
05N	11W	33	NW¼ NE¼ NW¼ SE¼

County	Geocode
DEER LODGE	30137733412020000

Latitude	Longitude	Geomethod	Datum
46.143121666667	112.981575	NAV-GPS	WGS84

Ground Surface Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: AIR ROTARY

Section 5: Well Completion Date

Date well completed: Saturday, July 09, 1994

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	27	12

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	27	12				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
25	27	12			0 SCREEN
27	35	12			.130 SCREEN
35	41	12			.100 SCREEN
41	43	12			.150 SCREEN
43	48	12			000 SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE CEMENT	

Section 7: Well Test Data

Total Depth: 48
Static Water Level: 6.2
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
1000 gpm pump rate with _ feet of drawdown after 24 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 21.7 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
112SNGR - SAND AND GRAVEL (PLEISTOCENE)

From	To	Description
0	2	TOPSOIL
2	15	VERY DARK CLAY & SILT-INADEQUATE RETURN-BOULDER AT 13'
15	18	DARK BROWN SAND & SILT-SOME MEDIUM TO FINE GRAVEL SUBROUNDED TO SUBANGULAR-LITTLE WATER 5 GPM
18	23	FINE SAND & SILT-MEDIUM TO FINE GRAVEL SUBROUNDED TO SUBANGULAR-LITTLE WATER 5 GPM
23	24	FINE SAND & FINE GRAVEL SUBROUNDED TO SUBANGULAR SOME SILT 5-10
24	25	COARSE TO FINE SAND & GRAVEL SUBROUNDED TO SUBANGULAR STILL SILTY 10%
25	26	FINE SAND & GRAVEL SUBROUNDED TO SUBANGULAR VERY SITLTY
26	27	FINE TO MED SAND & GRAVEL SUBROUNDED TO SUBANGULAR SILT 5-10%
27	28	MED TO FINE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR-LESS SILT-MORE WATER-15GPM+
28	29	MED TO FINE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR LESS SILT-LESS WATER
29	30	MED TO FINE SAND-SOME MED GRAVE-10-15%SILT
30	31	MED TO FINE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR LESS SILT-LITTLE MORE WATER-10GPM
31	32	COARSE SAND TO MED GRAVEL-SUBROUNDED TO SUBANGULAR VERY LITTLE SILT-10GPM
32	33	FINE TO MED GRAVEL COARSE SAND SUBROUNDED TO SUBANGULAR-10-15%SILT-LESS WATER
33	34	FINE TO MED GRAVEL & SAND-SUBROUNDED TO

		SUBANGULAR 10-15% SILT 5-10 GPM

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company:OKEEFE DRILLING CO
License No:WWC-48
Date Completed:7/9/1994

Site Name: ANACONDA-DEERLODGE COUNTY *WELL C(3)
GWIC Id: 153814
Additional Lithology Records

From	To	Description
34	35	FINE TO MED GRAVEL & SAND-SOME COARSE GRAVEL-VERY SILTY 15-20%-5-10 GPM
35	36	FINE TO MED SAND & GRAVEL-SUBROUNDED TO SUBANGULAR VERY SILTY 10-15%-10 GPM
36	37	MED TO COARSE SAND-MED GRAVEL-SUBROUNDED TO SUBANGULAR-LESS SILT 5%-MOR WATER 20 GPM
37	38	FINE TO MED SAND & SILT-LOTS OF WATER 30-40 GPM
38	39	FINE TO MED SAND-FINE GRAVEL SUBROUNDED TO TO SUBANGULAR 5-10% SILT-30-40 GPM
39	40	FINE TO MED SAND & GRAVEL-ANGULAR TO SUBANGULAR SILT-10%-20-30 GPM H2O DIRTY
40	41	COARSE TO FINE GRAVEL & SAND-ANGULAR TO SUBANGULAR LESS H2O VERY DIRTY 10-15% SILT VERY DEFINITE COLOR CHANGE
41	42	VERY COARSE TO FINE GRAVEL & SAND-ANGULAR TO SUBANGULAR-5% SILT-5% CLAY-NO H20
42	43	VERY COARSE TO MED GRAVEL & SAND-ANGULAR TO SUBANGULAR-5% CLAY-NO H2O
43	44	VERY COARSE TO MED GRAVEL & SAND - ANGULAR TO SUBANGULAR-NO H2O-5% CLAY-CLOSE TO BEDROCK
44	45	MED TO FINE GRAVEL & SAND-ANGULAR TO SUBANGULAR MORE CLAY VERY STIFF-BEDROCK-PURPLE COLOR DIFFERENT FROM PREVIOUS SAMPLES-PURPLE
45	48	PURPLE COLORED SANDY CLAY-GRAVEL MED TO FINE ANGULAR TO SUBANGULAR-NO WATER-BEDROCK
48	49	MED TO FINE GRAVEL-FEW CLAY WADS-GRAVEL PREDOMINATELY BLACK

SANITARY SURVEY FORM – WELLS & WELL PUMPS

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE **STATUS OF SOURCE** X (A)ctive

WSF ID WL008 *Entry Point ID* EP502
These are State assigned identification numbers

Source Name well 4D
Name of Source – Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **on the west end of town across from the Haufbrau in a field south of the creek**

Entry Point Name _____
Name of EP – Example: Entry point for North Well 1 & South Well 2

Location of Entry Point _____

Available XPerm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _____ to _____

GWUDISW PA Completed ☒ Yes passed

Log Available? X Yes ☐ No

Average Production 800 gpm
Indicate units

Maximum Production _____
Indicate units

Date Drilled 1994
If well. . date drilled

Casing Size 12'
size of casing installed in well

Case Depth 27'
depth of casing installed in well

Well Depth 51.5'
depth of well expressed in feet

Grout Depth 20'
BENTONITE/CEMENT
depth of grout used to seal well walls

Log SWL 9.6
(static) expressed in feet below ground elevation

Log PWL 19.8
(pumping) expressed in feet below ground elevation

Test Pump Rate unk.
expressed in gallons per min

Intake Type unk.
type of intake mechanism

Screened Interval 29 -45.5' SLOTS
expressed in feet below ground elevation

Well Yield 820 GPM
pump tested in gallons per minute

Latitude 46.14156°

Longitude 112.98720°

WELLS

	Yes	No	Unk	N/A
Is well metered? HOURLY	X	☐	☐	☐
Is well site protected from flooding?	X	☐	☐	☐
Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)?	X	☐	☐	☐
If no . . explain _____				
Does casing extend at least				
☐18 inches above outside ground level;	☐	☐	☐	☐
☐12 inches above finished floor inside well house; and	X	☐	☐	☐
☐3 feet above 100 year flood elevation? (Check for appropriate distance)	☐	☐	☐	☐
Is top of the well casing properly sealed? (sanitary seal)	X	☐	☐	☐
Is well vented?	X	☐	☐	☐
Is well vent properly screened and terminated in a downward position?	X	☐	☐	☐
Does well have suitable sampling tap? Raw Water	X	☐	☐	☐
Treated	X	☐	☐	☐
Are check valves, blow-off valves and water meters maintained and operating properly?	X	☐	☐	☐
Is upper termination of well protected (housed or fenced)?	X	☐	☐	☐
Is intake located below the maximum drawdown?	☐	☐	x	☐

PUMPS

Type 75 hp vertical turbine (not pumping the day of visit)
(example: 30 hp line shaft turbine)
Rated Capacity unk.

	Yes	No	Unk	N/A
Are pumps operable?	x	☐	☐	☐
How frequently are pump(s) replaced? 1994			☐	☐
Are backup pumps/motors provided?	☐	X	☐	☐
Are controls functioning properly and adequately protected? (not pumping the day of visit)	☐	☐	X	☐
Do underground compartments have a drain?	☐	☐	☐	X
Is facility properly protected against trespassing and vandalism?	X	☐	☐	☐
Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?	X	☐	☐	☐
Is the plumbing adequately painted to prevent excessive corrosion?	X	☐	☐	☐
Are adequate heating, lighting, and ventilation provided?	X	☐	☐	☐
Is a preventive maintenance program in operation?	X	☐	☐	☐
Are recommended spare parts on hand?	X	☐	☐	
Cross connection protection provided?	☐	☐	☐	X

Comment: This well is greater than 250 feet from Warm Springs Creek

The highway 1 is just south of this well.

Explain Controls:
The pumps are controlled by telemetry at the storage tank which kicks them on when tank levels drop. The pumps operate in groups of 3 depending upon the demand. (2B, 5E and 4D were not on during visit). Wells 1,3 and 6 (2100 gpm) operate during low demand and all kick on in periods of high demand (an additional 2700 gpm).

Comment:

MONTANA WELL LOG REPORT

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View scanned well log (8/24/2006 9:30:22 AM)
View scanned well log (6/11/2009 7:55:41 AM)

Site Name: ANACONDA-DEERLODGE COUNTY *WELL D-2 (4)
GWIC Id: 153966
DNRC Water Right: C017054-00

Section 1: Well Owner

Owner Name
ANACONDA-DEER LODGE COUNTY
Mailing Address
800 S MAIN

City	State	Zip Code
ANACONDA	MT	59711

Section 2: Location

Township	Range	Section	Quarter Sections
05N	11W	33	NE¼ NW¼ NE¼ SW¼

County	Geocode
DEER LODGE	30137733412020000

Latitude	Longitude	Geomethod	Datum
46.141573333333	112.987176666667	NAV-GPS	WGS84

Ground Surface Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: ROTARY

Section 5: Well Completion Date

Date well completed: Monday, February 28, 1994

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	27	12

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	27	12				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
29	45.5	12			.130 SLOT SCRN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE/CEMENT	

Section 7: Well Test Data

Total Depth: 51.5
Static Water Level: 9.6
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
820 gpm pump rate with _ feet of drawdown after 24 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 19.8 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
112SNGR - SAND AND GRAVEL (PLEISTOCENE)

From	To	Description
0	2	TOPSOIL
2	4	FINE SAND SILT-GREY COLOR TURNING TO RUSTY BROWN
4	5	FINE SAND & SILT-BACK TO GREY COLOR
5	8	SAME FINE GREY SAND & SILT-MOIST AT 8'
8	10	ROUNDED TO SUBROUNDED GRAVEL & SAND MED TO COARSE
10	15	SUBROUNDED TO SUBANGULAR GRAVEL & SAND-MED TO COARSE-SOME SILT APPROX 5%
15	20	MED TO FINE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR SOME COARSE-MOIST BLEW WATER AFTER 10 MIN
20	21	FINE SILT & CLAY VERY STICKY
21	25	MED TO FINE SAND & GRAVEL-ANGULAR TO SUBANGULAR APPROX 20 GPM
25	28	MED TO FINE GRAVEL & SAND ANGULAR TO SUBANGULAR
28	29	VERY COARSE GRAVEL-ANGULAR TO SUBANGULAR
29	30	VERY COARSE GRAVEL & SAND SOME FINE SAND & SILT - 20% 30-50 GPM
30	31	VERY COARSE GRAVEL & SAND-ANGULAR TO SUBANGULAR 30-50 GPM
31	32	VERY COARSE GRAVEL & SAND-SUBROUNDED TO SUBANGULAR 30-50 GPM
32	33	MED TO FINE SAND-SOME VERY COARSE GRAVEL 30-50 GPM

Driller Certification
All work performed and reported in this well log is in compliance with

the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company:OKEEFE DRILLING CO
License No:WWC-48
Date Completed:2/28/1994

Site Name: ANACONDA-DEERLODGE COUNTY *WELL D-2 (4)
GWIC Id: 153966
Additional Lithology Records

From	To	Description
33	34	MED TO FINE SAND-SOME VERY COARSE GRAVEL 20%
34	35	COARSE TO FINE SAND-MED GRAVEL-SUBROUNDED TO SUBANGULAR 30-50 GPM
35	36	FINE GRAVEL & COARSE SAND SUBROUNDED TO SUBANGULAR 5% SILT 30-50 GPM
36	37	FINE TO MED GRAVEL & COARSE SAND-5% SILT 30-50 GPM
37	38	FINE SAND & SILT-MED GRAVEL-SOME COARSE GRAVEL UNSORTED 20-25 GPM
38	39	INCREASE IN FINE SAND & SILT-MED GRAVEL-SOME COARSE-WATER DIRTY 20-25 GPM
39	40	MED TO FINE GRAVEL-SILTY SUBROUNDED TO SUBANGULAR- SILT 25% 20-25 GPM
40	41	GRAVELLY SAND-20% SILT-;WATER DIRTY-COARSE TO MED GRAVEL-SAND COARSE TO FINE 20-25 GPM
41	42	COARSE TO FINE GRAVEL-WATER-SILT-15% 10 GPM
42	43	SANDY GRAVEL-20% SILT-INCREASE IN SAND & SILT 10 GPM
43	44	MED TO FINE GRAVEL SILT 20%-LESS WATER 10 GPM
44	45	MED TO COARSE SAND-MED GRAVEL-15% SILT-55% CLAY MED TO FINE GRAVEL 10 GPM
45	46	MED GRAVEL TO FINE SAND 5 GPM
46	47	FINE TO MED SAND-ANGULAR CHIPS OF GREY SLTAE- BEDROCK AT 46.5'-VERY LITTLE WATER
47	48	MOSTLY GREY TO BLACK SHALE-RED & GREEN COLORS ALSO PRESENT-NO WATER(0-5 GPM) WATER

SANITARY SURVEY FORM – WELLS & WELL PUMPS

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE **STATUS OF SOURCE** X (A)ctive

WSF ID WL009 *Entry Point ID* EP502
These are State assigned identification numbers

Source Name WELL 5e
Name of Source – Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **LOCATED IN FIELD SOUTH OF CREEK AND ACROSS FROM THE HAUFBRAU RESTAURANT**

Entry Point Name ENTRY POINT FOR ALL WELLS
Name of EP – Example: Entry point for North Well 1 & South Well 2

Location of Entry Point in treatment building

Available x Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _____ to _____

GWUDISW PA Completed ☒ Yes passed

Log Available? x Yes

Average Production 425 gpm (indicate units)

Maximum Production 800 gpm (indicate units)

Date Drilled 1994 (if well, . date drilled)

Casing Size 12" (size of casing installed in well)

Case Depth 28' (depth of casing installed in well)

Well Depth 48' (depth of well expressed in feet)

Grout Depth 20' bentonite (depth of grout used to seal well walls)

Log SWL 8.2 (static) expressed in feet below ground elevation

Log PWL 42.1 (pumping) expressed in feet below ground elevation

Test Pump Rate unk. (expressed in gallons per min)

Intake Type unk. (type of intake mechanism)

Screened Interval 28-48' slots (expressed in feet below ground elevation)

Well Yield 800 gpm (pump tested in gallons per minute)

Latitude 46.14124°

Longitude 112.98360°

WELLS

	Yes	No	Unk	N/A
Is well metered?	X	☐	☐	☐
Is well site protected from flooding?	X	☐	☐	☐
Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)?	X	☐	☐	☐
If no . . explain _____				
Does casing extend at least				
☐18 inches above outside ground level;	☐	☐	☐	☐
☐12 inches above finished floor inside well house; and	X	☐	☐	☐
☐3 feet above 100 year flood elevation?	☐	☐	☐	☐
(Check for appropriate distance)				
Is top of the well casing properly sealed? (sanitary seal)	X	☐	☐	☐
Is well vented?	X	☐	☐	☐
Is well vent properly screened and terminated in a downward position?	X	☐	☐	☐
Does well have suitable sampling tap? Raw Water	X	☐	☐	☐
Treated	X	☐	☐	☐
Are check valves, blow-off valves and water meters maintained and operating properly?	X	☐	☐	☐
Is upper termination of well protected (housed or fenced)?	X	☐	☐	☐
Is intake located below the maximum drawdown?	☐	☐	X	☐

PUMPS

Type 40 hp vertical Turbine (not running the day of inspection)
(example: 30 hp line shaft turbine)
Rated Capacity unk.

	Yes	No	Unk	N/A
Are pumps operable?	X	☐	☐	☐
How frequently are pump(s) replaced? 1994 rewound in 2000				
Are backup pumps/motors provided?	☐	X	☐	☐
Are controls functioning properly and adequately protected?	X	☐	☐	☐
Do underground compartments have a drain?	☐	☐	☐	X
Is facility properly protected against trespassing and vandalism?	X	☐	☐	☐
Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?	X	☐	☐	☐
Is the plumbing adequately painted to prevent excessive corrosion?	X	☐	☐	☐
Are adequate heating, lighting, and ventilation provided?	X	☐	☐	☐
Is a preventive maintenance program in operation?	X	☐	☐	☐
Are recommended spare parts on hand?	X	☐	☐	
Cross connection protection provided?	☐	☐	X	☐

Comment: This pump vibrates during pumping so there is a floor jack under the main to prevent the vibration.

Explain Controls:
The pumps are controlled by telemetry at the storage tank which kicks them on when tank levels drop. The pumps operate in groups of 3 depending upon the demand. (2B, 5E and 4D were not on during visit). Wells 1,3 and 6 (2100 gpm) operate during low demand and all kick on in periods of high demand (an additional 2700 gpm).

Comment:

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site on a topographic map
View field visits for this site
View water quality for this site
View scanned well log (8/24/2006 9:30:37 AM)
View scanned well log (6/11/2009 8:22:02 AM)

Site Name: ANACONDA-DEER LODGE COUNTY * WELL E (5)
GWIC Id: 154387
DNRC Water Right: C017054-00

Section 1: Well Owner

Owner Name
ANACONDA-DEERLODGE COURTHOUSE
Mailing Address
800 SOUTH MAIN

City	State	Zip Code
ANACONDA	MT	59711

Section 2: Location

Township	Range	Section	Quarter Sections
05N	11W	33	SW¼ NW¼ NW¼ SE¼

County	Geocode
DEER LODGE	30137733412020000

Latitude	Longitude	Geomethod	Datum
46.141908	112.983913	NAV-GPS	WGS84

Ground Surface Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: ROTARY

Section 5: Well Completion Date

Date well completed: Saturday, April 02, 1994

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	28	12

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	28	12				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
28	30	12			.0 SLOT SCREEN
30	43	12			.12 SLOT SCREEN
43	48	12			.0 SLOT SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE GROUT	

Section 7: Well Test Data

Total Depth: 48
Static Water Level: 8.2
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
800 gpm pump rate with _ feet of drawdown after 24 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 42.1 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
112SNGR - SAND AND GRAVEL (PLEISTOCENE)

From	To	Description
0	5	TOPSOIL - BIG ROCK AT 4.5'
5	10	CEMENTED GRAVEL & VERY FINE SAND (SEEPAGE AT 8')
10	12	CEMENTED GRAVEL - BIG BOULDER AT 12'
12	15	COARSE GRAVEL & SAND - STICKY AT 15'
15	19	CEMENTED GRAVEL & SAND
19	20	VERY COARSE GRAVEL - GOOD WATER
20	25	VERY COARSE GRAVEL - WATER HALF CLEAN
25	28	VERY COARSE GRAVEL
28	29	COARSE GRAVEL & VERY FINE SILT (WATER DIRTY)
29	30	COARSE GRAVEL WITH MEDIUM & FINE SAND
30	33	COARSE GRAVEL WITH FINE SAND & SILT - WATER DIRTY
33	35	MEDIUM GRAVEL - (WATER CLEANER)
35	37	MEDIUM GRAVEL & SILT - SOME COARSE GRAVEL - WATER VERY DIRTY
37	38	FINE SAND & SILT
38	39	VERY COARSE GRAVEL - WATER MUCH CLEANER

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company:BECK DRILLING & PUMP
License No:WWC-48
Date Completed:4/2/1994

Site Name: ANACONDA-DEER LODGE COUNTY * WELL E (5)
GWIC Id: 154387
Additional Lithology Records

From	To	Description
39	41	VERY CAORSE GRAVEL & SAND - SILTY - WATER DIRTY
41	43	VERY COARSE GRAVEL - VERY SILTY WATER VERY DIRTY SMALL BALLS OF SILTY DARK BROWN CLAY
43	45	SILTY DARK BROWN CLAY - SLATE - BEDROCK

SANITARY SURVEY FORM – WELLS & WELL PUMPS

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE **STATUS OF SOURCE** X (A)ctive

WSF ID WL0010 *Entry Point ID* EP502
These are State assigned identification numbers

Source Name well 6F
Name of Source – Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) located in well field area north of creek.

Entry Point Name entry point for wells 1a-6f
Name of EP – Example: Entry point for North Well 1 & South Well 2

Location of Entry Point at treatment building

Available X Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _____ to _____

GWUDISW PA Completed ☒ Yes failed

Log Available? X Yes ☐ No

Average Production 350 gpm (indicate units)

Maximum Production unk. (indicate units)

Date Drilled 1994 (if well. . date drilled)

Casing Size 12" (size of casing installed in well)

Case Depth 31' (depth of casing installed in well)

Well Depth 50' (depth of well expressed in feet)

Grout Depth 29' bentonite (depth of grout used to seal well walls)

Log SWL 10' (static) expressed in feet below ground elevation

Log PWL 43' (pumping) expressed in feet below ground elevation

Test Pump Rate unk. (expressed in gallons per min)

Intake Type unk. (type of intake mechanism)

Screened Interval 31-45 (expressed in feet below ground elevation)

Well Yield 550 gpm (pump tested in gallons per minute)

Latitude 46.14266°

Longitude 112/98507°

WELLS

	Yes	No	Unk	N/A
Is well metered? hourly	x	☐	☐	☐
Is well site protected from flooding?	☐	☐	x	☐
Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)?	☐	☐	x	☐
If no . . explain _____				
Does casing extend at least				
☐18 inches above outside ground level;	☐	☐	☐	☐
☐12 inches above finished floor inside well house; and	X	☐	☐	☐
☐3 feet above 100 year flood elevation? (Check for appropriate distance)	☐	☐	☐	☐
Is top of the well casing properly sealed? (sanitary seal)	X	☐	☐	☐
Is well vented?	X	☐	☐	☐
Is well vent properly screened and terminated in a downward position?	☐	☐	☐	☐
Does well have suitable sampling tap? Raw Water	X	☐	☐	☐
Treated	X	☐	☐	☐
Are check valves, blow-off valves and water meters maintained and operating properly?	X	☐	☐	☐
Is upper termination of well protected (housed or fenced)?	X	☐	☐	☐
Is intake located below the maximum drawdown?	☐	☐	X	☐

PUMPS

Type 30 hp vertical turbine
(example: 30 hp line shaft turbine)
Rated Capacity _____

	Yes	No	Unk	N/A
Are pumps operable? 70 PSI	X	☐	☐	☐
How frequently are pump(s) replaced? NEW 1994			☐	☐
Are backup pumps/motors provided?	☐	X	☐	☐
Are controls functioning properly and adequately protected?	X	☐	☐	☐
Do underground compartments have a drain?	☐	☐	☐	X
Is facility properly protected against trespassing and vandalism?	X	☐	☐	☐
Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?	X	☐	☐	☐
Is the plumbing adequately painted to prevent excessive corrosion?	X	☐	☐	☐
Are adequate heating, lighting, and ventilation provided?	X	☐	☐	☐
Is a preventive maintenance program in operation?	X	☐	☐	☐
Are recommended spare parts on hand?	☐	X	☐	☐
Cross connection protection provided?	☐	☐	X	☐

Comment: The well is located an estimate 135 feet from the creek using the lat/longs.

Explain Controls:
The pumps are controlled by telemetry at the storage tank which kicks them on when tank levels drop. The pumps operate in groups of 3 depending upon the demand. (2B, 5E and 4D were not on during visit). Wells 1,3 and 6 (2100 gpm) operate during low demand and all kick on in periods of high demand (an additional 2700 gpm).

Comment:

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options
Return to menu
Plot this site on a topographic map
View field visits for this site
View water quality for this site
View scanned well log (8/24/2006 9:26:00 AM)
View scanned well log (6/11/2009 7:55:23 AM)

Site Name: ANACONDA-DEERLODGE COUNTY *WELL G (6)
GWIC Id: 153868
DNRC Water Right: C017056-00

Section 1: Well Owner

Owner Name
ANACONDA-DEER LODGE COUNTY
Mailing Address
800 S MAIN

City	State	Zip Code
ANACONDA	MT	59711

Section 2: Location

Township	Range	Section	Quarter Sections
05N	11W	33	NE¼ NE¼ NE¼ SW¼

County	Geocode
DEER LODGE	30137733412020000

Latitude	Longitude	Geomethod	Datum
46.142678333333	112.985008333333	NAV-GPS	WGS84

Ground Surface Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: ROTARY

Section 5: Well Completion Date

Date well completed: Friday, August 05, 1994

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	31	12

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	31	12				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
31	40	12			.250 SCREEN
40	45	12			.220 SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	29	BENTONITE/CEMENT	

Section 7: Well Test Data

Total Depth: 50
Static Water Level: 10.1
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
550 gpm pump rate with _ feet of drawdown after 24 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 43 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
112SNGR - SAND AND GRAVEL (PLEISTOCENE)

From	To	Description
0	5	TOPSOIL - MED GRAVEL
5	10	MED TO COARSE GRAVEL-SUBROUNDED TO SUBANGULAR-WET AT 10'
10	15	MED TO COARSE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR BLOWING WATER AT 15'
15	20	COARSE SAND & GRAVEL-ROUNDED TO SUBROUNDED-APPROX 20 GPM
20	21	MED TO COARSE SAND & GRAVEL-SOME FINE-5% WATER DIRTY
21	22	MED TO COARSE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR 5-10% SILT 15-20 GPM
22	23	MED TO COARSE GRAVEL & SAND ANGULAR TO SUBANGULAR 5-10% SILT 15-20 GPM
23	24	COARSE TO VERY COARSE GRAVEL SUBROUNDED TO SUBANGULAR-WATER CLEAN 20-30 GPM
24	25	COARSE TO MED SAND-SUBROUNDED TO SUBANGULAR-VERY LITTLE SILT 20-30 GPM
25	26	FINE TO COARSE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR 20-30 GPM 5% SILT
26	27	MED TO COARSE SAND & GRAVEL-SUBR9OUNDED TO SUBANGULAR 30-40 GPM-5% SILT
27	28	MED TO COARSE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR-LESS WATER 10 GPM 5% SILT
28	29	FINE TO COARSE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR 10-15 GPM
29	30	FINE TO VERY COARSE SAND & GRAVEL-SUBROUNDED TO SUBANGULAR 30-40 GPM NO SILT
30	32	FINE TO COARSE SAND & GRAVEL-SUBROUNDED TO

		SUBANGULAR SILT 40-50 GPM

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company:OKEEFE DRILLING CO
License No:WWC-48
Date Completed:8/5/1994

Site Name: ANACONDA-DEERLODGE COUNTY *WELL G (6)
GWIC Id: 153868
Additional Lithology Records

From	To	Description
32	33	FINE TO COARSE SAND & GRAVEL-ANGULAR TO SUBANGULAR 5-10% SILT 40-50 GPM
33	35	FINE TO COARSE GRAVEL & SAND SUBROUNDED TO SUBANGULAR SILT 30-50 GPM
35	36	MED TO COARSE GRAVEL & SAND ANGULAR TO SUBANGULAR LESS WATER 20-30 GPM
36	37	FINE TO COARSE SAND & GRAVEL-ROUND TO SUBROUNDED 5-10% SILT 20-30 GPM
37	39	MED TO COARSE GRAVEL & SAND ANGULAR TO SUBANGULAR 20-40 GPM
39	40	MED TO COARSE GRAVEL & SAND ANGULAR TO SUBVANGULAR 5-10% SILT 40-50 GPM
40	42	MED TO COARSE GRAVEL & SAND 40-50 GPM
42	44	FINE TO COARSE GRAVEL & SAND SUBROUNDED TO SUBANGULAR 30-40 GPM
44	45	BLACK CHUNK OF BEDROCK-SOME CLAY-NO WAT3ER
45	50	BLACK GREY CHUNKS STICK AT FIRST-THEN FINE GREY POWDER

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Metcalf Building 1520 East Sixth Avenue P.O. Box 200901 Helena, MT 59620-0901

PRELIMINARY ASSESSMENT WORKSHEET

Preliminary Assessment of Ground Water Sources that may be Under the Direct Influence of Surface Water

PWS System and Source Facility Information			
PWS Name: ANACONDA		PWS ID#: (MT000nnnn)	00016
Type (C, NTNC, NC): C	County: DEER LODGE	Population Served:	6500
Source Facility Name: WELL 6F	SDWIS Facility ID: (WL00n,SP00n,IG00n) WL0010	Date: (m/d/yy)	9/12/12

COMPUTE PA SCORE Mark (X) ONE option that applies and enter option index pts at right					Points
A. TYPE OF STRUCTURE					
Spring (40) ___	Horizontal Well (40) ___	Well (0) X			0
B. HISTORICAL PATHOGENIC ORGANISM CONTAMINATION: History or suspected outbreak of Giardia, or other pathogenic organisms associated with surface water, with current system configuration.					
Yes (40) ___	No (0) X				0
C. HISTORICAL MICROBIOLOGICAL CONTAMINATION:					
I) Record of **acute** (boil order or fecal positive sample) MCL violations of the Total Coliform Rule during the last 3 years. **Number of violations:**					
None (0) X	One (5) ___	Two (10) ___	Three (15) ___		0
II) Record of **non-acute** (two coliform positive samples in one month) MCL violations of the Total Coliform Rule during the last 3 years. **Number of violations:**					
None or One (0) X	Two (5) ___	Three (10) ___	Turbidity Complaints (DEQ verified) (5) ___		0
D. HYDROLOGICAL FEATURES: Horizontal distance between surface water & source.					
> 250 ft (0) ___	175 - 250 ft (10) ___	100 - 174 ft (20) X	< 100 ft (40) ___		20
E. WELL SEAL: Poorly constructed well (uncased, or annular space not sealed to depth of at least 18 feet below land surface), or casing construction is unknown.					
Yes (15) ___	No (0) X				0
F. WELL INTAKE CONSTRUCTION: In wells tapping unconfined or semi-confined aquifers, the depth below land surface to top of perforated interval or screen is:					
>100 ft (0) ___	50-100 ft (5) ___	25-49 ft (10) X	0-24 ft (15) ___	Unkn (15) ___	10
G. STATIC WATER LEVEL: In wells tapping unconfined or semi-confined aquifers, the depth to static water level below land surface is:					
>100 ft (0) ___	50-100 ft (5) ___	25-49 ft (10) ___	0-24 ft (15) X	Unkn (15) ___	15
H. WELL CAP CONSTRUCTION: Poor sanitary seal, or seal without acceptable material.					
Yes (15) X	No (0) ___				0
TOTAL PA SCORE (Right click in cell to right and select Update Field.)					45

Continued other side ...

I. PRELIMINARY ASSESSMENT DETERMINATION	Mark (X) ONE
1. **PASS:** Source is not under the direct influence of surface water.	___
2. **FAIL:** Well must undergo further GWUDISW analysis.	X
3. **FAIL:** Spring, must undergo further GWUDISW analysis.	___
4. **FAIL:** Well or horizontal well less than 100 feet from surface water, **must undergo further GWUDISW analysis.**	___
5. **FAIL:** Well **will** PASS if well construction deficiencies (section E or F) are repaired.	___
6. **FAIL:** Well **may** PASS if well construction details (section E, F, or G) become available.	___

ANALYST INFORMATION AND COMMENTS
NAME: LUELLA SCHULTZ
AFFILIATION: DEQ
COMMENTS
using latitude/longitude readings the well is approx. 135 feet from Warm Springs Creek.

Electronic Entry Instructions: Open the WORD document template (DOT) as a WORD document (DOC) with an appropriate name and location. The document is protected from all edits other than form entry. Enter the requested information in the form fields and tab forward between fields. All character entries will be converted to upper case. In the Compute PA Score table for questions A through H, mark with an X the one option which applies to each, then enter the score corresponding to that option in the field to the right under the Points column. When scores A-H have been entered right click on the Total PA Score field and select Update Field. The total score will be computed. Select the PA Determination option by marking with an X. Fill out the Analyst Information and Comments table. Save the document with your entries.

SANITARY SURVEY FORM - TREATMENT

Treatment Objective

- B = Disinfection Byproduct Control
- C = Corrosion Control
- D = Disinfection
- E = Dechlorination
- F = Iron Removal
- I = Inorganics Removal
- M = Manganese Removal
- N = *No Treatment at Source*
- O = Organics Removal
- P = Particulate Removal
- R = Radionuclides Removal
- S = Softening (Hardness Removal)
- T = Taste / Odor Control
- Z = Other _____

WATER TREATMENT FACILITIES

WSF ID	Treatment Plant Name	Treatment Objectives and Code
TP002	treatment point for wells 1a, 2b, 3c, 4d, 5e and 6d	D401

WSF ID	Location	
TP002	Latitude 46.13979°	Longitude 112.98161°
	Latitude ___° ___' ___"	Longitude ___° ___' ___"
	Latitude ___° ___' ___"	Longitude ___° ___' ___"
	Latitude ___° ___' ___"	Longitude ___° ___' ___"
	Latitude ___° ___' ___"	Longitude ___° ___' ___"

Treatment plant description: All wells pump to the chlorine treatment building. Water is chlorinated with gaseous chlorine and then pumped to the storage facility; then to the distribution system. Chlorine residual at the treatment building was 0.7 ppm.

FOR SYSTEMS EMPLOYING FULL-TIME DISINFECTION

	Yes	No	Unk	N/A
What disinfectant is used? Gas chlorine				
Is the disinfectant used NSF approved?	x	☐	☐	☐
Is the amount of disinfectant used recorded? If Yes, amount used: 11 lbs/day .5 ppm _____ other (give units)	x	☐	☐	☐
Is the amount of disinfectant used compared to water pumped to verify concentration?	☐	☐	☐	☐
Is chemical storage adequate and safe? If No, explain _____	x	☐	☐	☐
Is disinfectant residual being monitored daily?	X	☐	☐	☐
Are residual reports submitted monthly?	☐	☐	☐	☐
Is the disinfection equipment being operated and maintained properly?	X	☐	☐	☐
Is operational standby equipment provided?	X	☐	☐	☐
If not, are critical spare parts on hand?	X	☐	☐	☐
Has disinfection system been free from failure during the past year – no interruption?	X	☐	☐	☐

If No, give dates of interruptions _____

Describe provisions for providing contact time between disinfection point and the first point of use: ALL WATER IS TREATED AND PUMPED TO THE STORAGE TANK FOR CONTACT TIME BEFORE ENTERING THE DISTRIBUTION SYSTEM.

IF USING GAS CHLORINATION

	Yes	No	Unk	N/A
Is a manifold provided to allow feeding gas from more than one cylinder?	X	☐	☐	☐
Is there automatic switchover from cylinder to cylinder?	X	☐	☐	☐
Are scales provided for weighing of containers?	X	☐	☐	☐
Are chlorine storage and use areas isolated from other work areas?	☐	X	☐	☐
Are stored cylinders capped and labeled?	X	☐	☐	☐
Is room vented to the outdoors with suction located no more than 6 inches above the floor level? USE SCRUBBER	X	☐	☐	☐
Is vent inlet near the ceiling?	X	☐	☐	☐
Is room containing chlorination treatment labeled sufficiently (DANGER signs, etc.)? SEE NOTE BELOW	☐	x	☐	☐
Is a view port provided into the room storing chlorine?	X	☐	☐	☐
Is a means of leak detection provided? Type? _____	X	☐	☐	☐
Is a self-contained breathing apparatus available for use during repair of leaks? Where?_____	X	☐	☐	☐
Are personnel trained to use apparatus?	☐	X	☐	☐
Are all doors hinged outward and equipped with panic bars?	X	☐	☐	☐
Are all gas cylinders restrained near the top and about half way down by chaining to wall or by other means?	X	☐	☐	☐

Comment: system is radio controlled. The point of application is in the pumping room and this makes the operator vulnerable should a gas leak occur.

Building is not labeled that chlorine gas is used and stored inside. The operator stated that homeland Security had suggested the placards be removed. This system must follow OSHA requirements for the safety of employees and passers-by. MSDS sheets should be posted in the building

SANITARY SURVEY FORM - PUMPING FACILITIES

WSF ID PF003

Location, Description Smelter City Booster Station – this booster station is located right above the intersection of Juniper and Higgins (above the baseball field). The booster staion was designed and built as part of the minor subdivision and then given to the city to operate

Latitude 46.13224°

Longitude 112.97805

Type series of 3 pumps (7.5 HP, 10 HP and 40HP) with an expansion tank in the configuration (no size marking)

(example: 30 hp line shaft turbine)

Rated Capacity Unk.

How frequently are pump(s) replaced? New

	Yes	No	Unk	N/A
Is redundancy provided?	☒		☐	☐
Are backup pumps/motors provided?	X	☐	☐	☐
Is there a pressure relief valve?	☒	☐		☐
Does each pump have compound gauge on suction side?	☒		☐	☐
Is there automatic cutoff for low suction pressure?	X	☐	☐	☐
Does each pump have standard pressure gauge on discharge side?	X	☐	☐	☐
Does low pressure level provide adequate pressure?	X	☐	☐	☐
Are controls functioning properly and adequately protected?	X	☐	☐	☐
Do underground compartments have a drain?	☐	X	☐	☐
Is facility properly protected against trespassing and vandalism?	X	☐	☐	☐
Are pump records maintained (amp, discharge, pressure, maintenance schedule, manuals, etc.)?	x	☐	☐	☐
Is the plumbing adequately painted to prevent excessive corrosion?	☒		☐	☐
Are adequate heating, lighting, and ventilation provided?	☒		☐	☐
Is a preventive maintenance program in operation?	X	☐	☐	☐
Are recommended spare parts on hand?	X		☐	☐

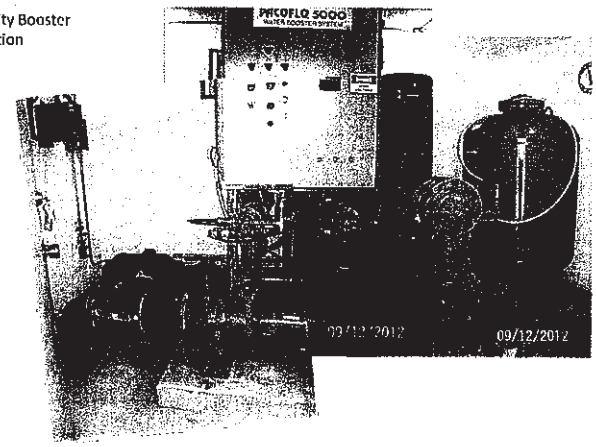
Controlled by pressures in the upper distribution system.

Comments: The operating pressure after the booster station is 81.66 psi.

This a PACOFLOW 5000 water booster station packaged plant.

Has extra 7.5 HP pump

Smelter City Booster Pump Station



SANITARY SURVEY FORM - PUMPING FACILITIES

WSF ID PF004 Location, Description Sunny Side Booster Pump Station – this booster station is located at the corner of Poplar and West 5th Street in a vault..

Latitude 46.12931°
Longitude 112.97288
Type series of 3 pumps (100 HP and 7.5HP) with an expansion tank in the configuration (no size marking)
(example: 30 hp line shaft turbine)

Rated Capacity _____

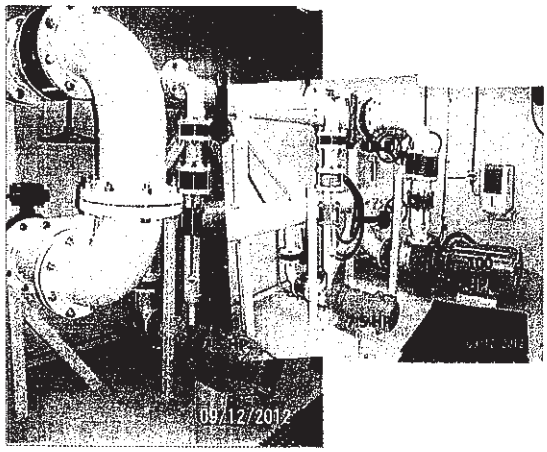
How frequently are pump(s) replaced? New 2010

	Yes	No	Unk	N/A
Is redundancy provided?	X	☐	☐	☐
Are backup pumps/motors provided?		X	☐	☐
Is there a pressure relief valve?	☐	x	☐	☐
Does each pump have compound gauge on suction side?	X	☐	☐	☐
Is there automatic cutoff for low suction pressure?	X	☐	☐	☐
Does each pump have standard pressure gauge on discharge side?	X	☐	☐	☐
Does low pressure level provide adequate pressure?	X	☐	☐	☐
Are controls functioning properly and adequately protected?	☐	☐	☐	X
Do underground compartments have a drain?	X	☐	☐	☐
Is facility properly protected against trespassing and vandalism?	X	☐	☐	☐
Are pump records maintained (amp, discharge, pressure, maintenance schedule, manuals, etc.)?	☐	☐	☐	X
Is the plumbing adequately painted to prevent excessive corrosion?	X	☐	☐	☐
Are adequate heating, lighting, and ventilation provided?	X	☐	☐	☐
Is a preventive maintenance program in operation?	☐	☐	☐	X
Are recommended spare parts on hand?	☐	X	☐	☐

Comments: Pumping station is on-line

In the vault there is no air monitoring, but there is a vent fan in the vault..

See next slide for the rest



Sunnyside booster station

SANITARY SURVEY FORM - STORAGE

COMPLETE ONE SECTION FOR EACH STORAGE FACILITY

Total storage provided? 3.5 million gal	Total treated storage provided 3.5 mg gallons	Storage provides 1+ days of water reserve (water usage is 3 – 3.5 mgd in summer)

STORAGE FACILITY

WSF ID ST002

Location: Description 3.5 mg buried storage facility located beyond the subdivision served by the Smelter City Booster Station.

Latitude: 46.13353°

Longitude: 112.98548°

Storage Volume? 3.5 million gallons

Year constructed: 1993/94

Condition: XGood

	Yes	No	Unk	N/A
Does surface runoff and underground drainage drain away?	X	☐	☐	☐
Is the site protected against flooding?	X	☐	☐	☐
Is the site protected against trespass/vandalism?	X	☐	☐	☐
Ladders caged and locked? SECURITY FENCED	☐	☐	☐	X
Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface?	X	☐	☐	☐
Overflow pad?	X	☐	☐	☐
Is access hatch sealed properly and locked?	X	☐	☐	☐
Are surface coatings in contact with water ANSI / NSF approved?	X	☐		☐
Is tank protected against icing and corrosion?	X	☐	☐	☐
Can tank be isolated from system?	X	☐	☐	☐
Is all treated water storage covered?	X	☐	☐	☐
Are tanks disinfected after repairs are made?	X	☐		☐
What is cleaning frequency for tanks? 5+				
Is tank inspected every 5 years by a structural engineer for structural integrity?	X	☐	☐	

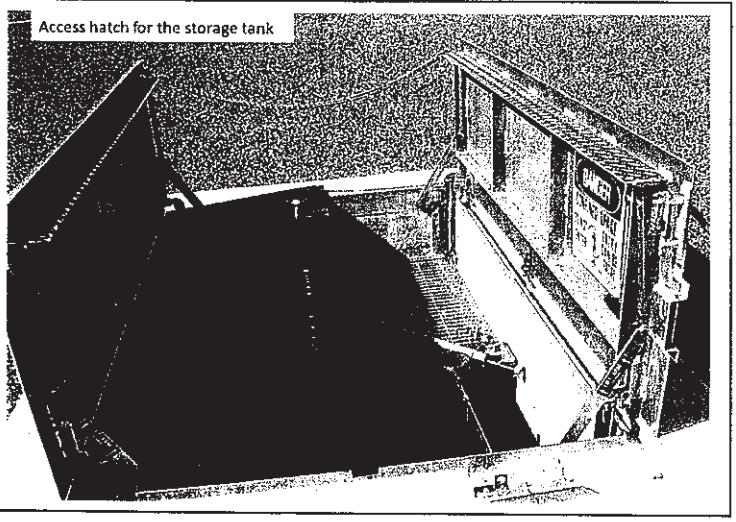
Summer 2009 — Date of last inspection

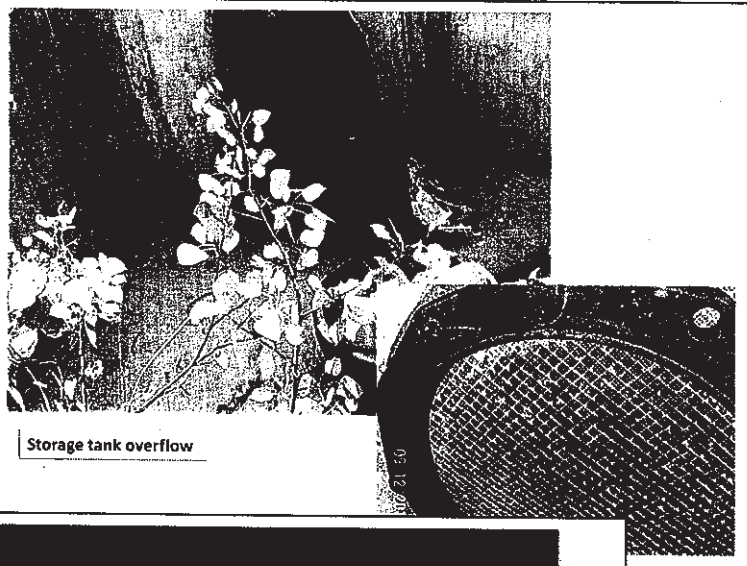
Liquid Engineering — By whom

Comments: Drain by opening hydrant.

Tank is full at 24 feet; at 20 ft wells 1,3,6 come on; at 19 ft all wells c
on.

Very little sediment is visible in the bottom of the tank.


Access hatch for the storage tank


Storage tank overflow

2 vents storage

SANITARY SURVEY FORM - MISCELLANEOUS

DISTRIBUTION SYSTEM EVALUATION

Distribution description mostly 6"-20" ductile iron

	Yes	No	Unk	N/A
System drawings available?	X	☐	☐	☐
Accurate As-Built drawing(s) on-site?	X	☐	☐	☐
Lines adequately sized?	X	☐	☐	☐
Adequate pressure maintained?	X		☐	☐
Mains protected from freezing?	X	☐	☐	☐
Distribution system free of leaks?	X		☐	☐
Asbestos concrete pipe used? ABOUT 500 FEET	X	☐	☐	☐
Fire hydrants?	X	☐	☐	☐
Dead end lines minimized by looping mains? (10 DEADENDS)	X	☐	☐	☐
Flushing program? 2 x /YR	X	☐	☐	☐
Pressure reducing stations? Number 2	☐	☐	☐	☐
Booster stations? Number 2 (1 active, 1 pending)	☐	☐	☐	☐
Are individual booster pumps on any service lines? (see DEQ-1 8.9.2)	X	☐	☐	☐
Were cross connections observed?	☐	X		

Comments: Two booster stations exist (Sunny Side and Smelter City) and three pressure reducing stations exist (one between Anaconda and Warm Springs and one in Warm Springs).

This system also serves Warm Springs which is 7 miles away. Warm Springs is a metered service connection, down gradient from Anaconda so they have 3 pressure reducing stations. The pressure is reduced from 180 psi to 75 psi. They check chlorine residual weekly and rotate a bacti sample into their collection. *** MT State Hospital will become a new PWS 04805 as a consecutive connection.

SAFETY

	Yes	No	Unk	N/A
Were confined spaces observed?	X	☐	☐	☐

Describe any confined spaces observed: The Sunny Side Booster Station is located in a vault. The storage tank and chlorination facilities represent confined spaces.

Confined space safety adequate?	☐	X	☐	☐
Fall risks adequately mitigated?	X	☐	☐	☐

Note all safety deficiencies (consider items such as ladders, tank supports, guards on rotating electrical equipment, lightning protection for pumps, etc.) _____

MONITORING AND RECORDKEEPING EVALUATION

	Yes	No	Unk	N/A
Does the system have a current Monitoring Schedule?	☒	☐	☐	☐
Bacti monitoring records maintained? (5 years)	☒	☐	☐	☐
Bacti Sample Site Plan submitted?	☒	☐	☐	☐
Familiar with repeat sampling?	☒	☐	☐	☐
Chemical monitoring records maintained? (10 years)	☒	☐	☐	☐
System specific records / plans maintained? (DBP, PB/CU, treatments, waivers, violations, etc.)	☒	☐	☐	☐
Familiar with Public Notice requirements?	☒	☐	☐	☐

Did Surveyor take a bacteriological sample?	☐	☒

If Yes, date of Sample: _____ Time of Sample: _____

Comments: Not all service connections are metered. They will install if requested. The charge is $25.86 mo flat rate or if they are metered they pay $14. Per 1000 gallons.

MANAGEMENT

	Yes	No	Unk	N/A
Are there sufficient personnel?	☒	☐	☐	☐
Are operators properly certified?	☒	☐	☐	☐
Are personnel adequately trained?	☒	☐	☐	☐
Is there a current O&M manual on-site?	☒	☐	☐	☐
Is an emergency plan on-site and workable?	☒	☐	☐	☐
Has system addressed concerns from previous sanitary survey(s) or technical visit(s)?	☒	☐	☐	☐
Budget exists?	☒	☐	☐	☐
Does system maintain an emergency fund?	☒	☐	☐	☐
Does system contribute to facility replacement fund?	☒	☐	☐	☐
Are abandoned wells present?	☐	☒	☐	☐
Do abandoned wells appear to be properly abandoned? (see ARM 36.21.670)	☐	☐	☒	

Comments: Should schedule a meeting with RATES technical staff to talk about capacity development, facility replacement and rate setting.

REPORT SUMMARY

The State, or an authorized agent, must conduct sanitary surveys for all public water supply systems in Montana. DEQ believes that periodic sanitary surveys, along with appropriate corrective actions, are indispensable for assuring the long-term quality and safety of drinking water. When properly conducted, sanitary surveys can provide important information on a water system's design and operations and can identify minor and significant deficiencies for correction before they become major problems.

Minor deficiencies do not pose serious health threats. However, corrective action of minor deficiencies can be critical in the long-term operation and safety of a public water system. Minor deficiencies are generally described as suggested or recommended corrections in the letter to system owner(s).

Significant deficiencies can be defined as a defective water supply component(s) having or likely to have an adverse influence on public health. Significant deficiencies require immediate corrective action in efforts to protect consumers.

EPA and ASDWA guidance identifies eight broad components that should be covered in a sanitary survey. Using these eight broad components as a guide, minor and significant deficiencies should be described in the letter to system owner(s).

1) Source
2) Treatment
3) Distribution system
4) Finished water storage
5) Pumps, pump facilities, and controls
6) Monitoring and reporting, and data verification
7) System management and operation
8) Operator compliance with State requirements

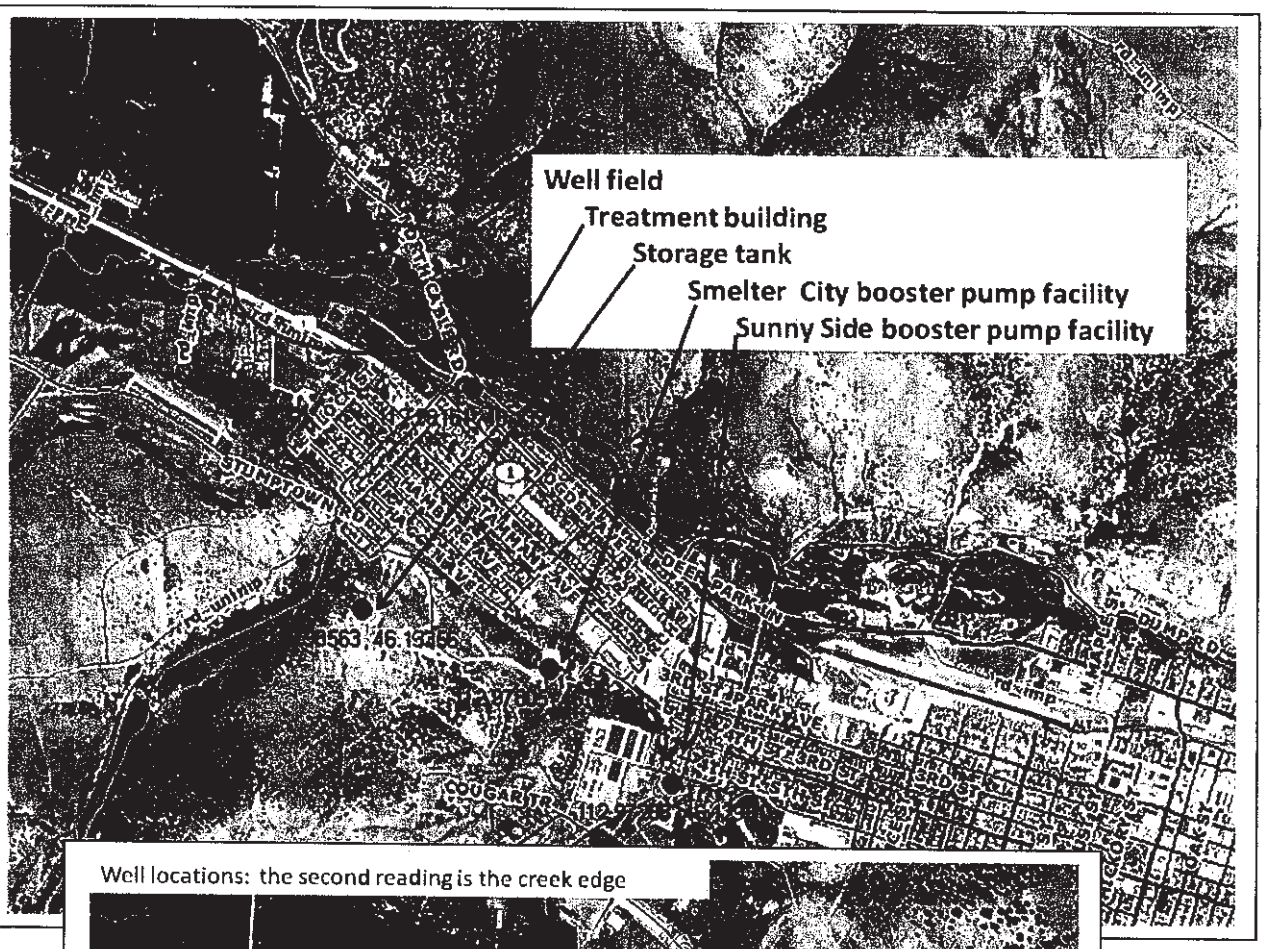
With consideration that significant deficiencies may influence regulatory decisions and monitoring requirements, please list all significant deficiencies observed and corrective action(s) taken below.

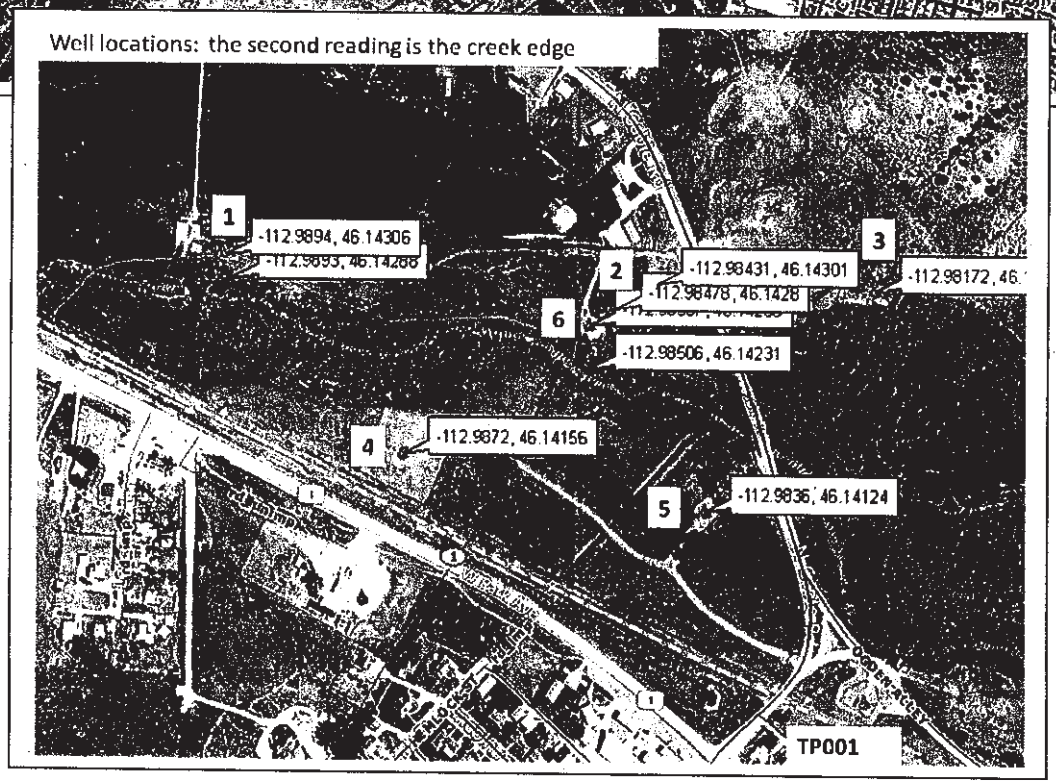
Comments: **No significant deficiencies were identified.**

System is well maintained. All six wells are basically configured the same and housekeeping/maintenance reflect the care given to the system.

SANITARY SURVEY FORM - DIAGRAMS

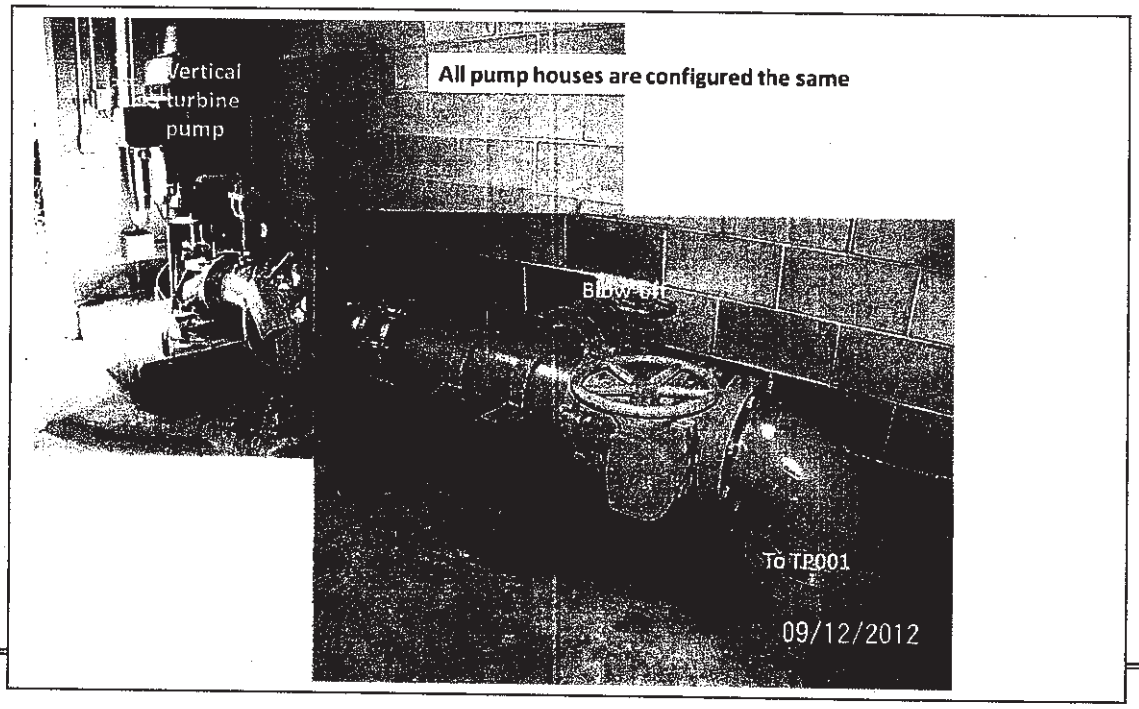
Draw brief site plan showing location of well(s), springs(s), water storage, distribution system, pumphouse(s), entry point(s), treatment, etc. and label with appropriate facility designation. Include interconnections with other PWS's. Add additional pages as needed.

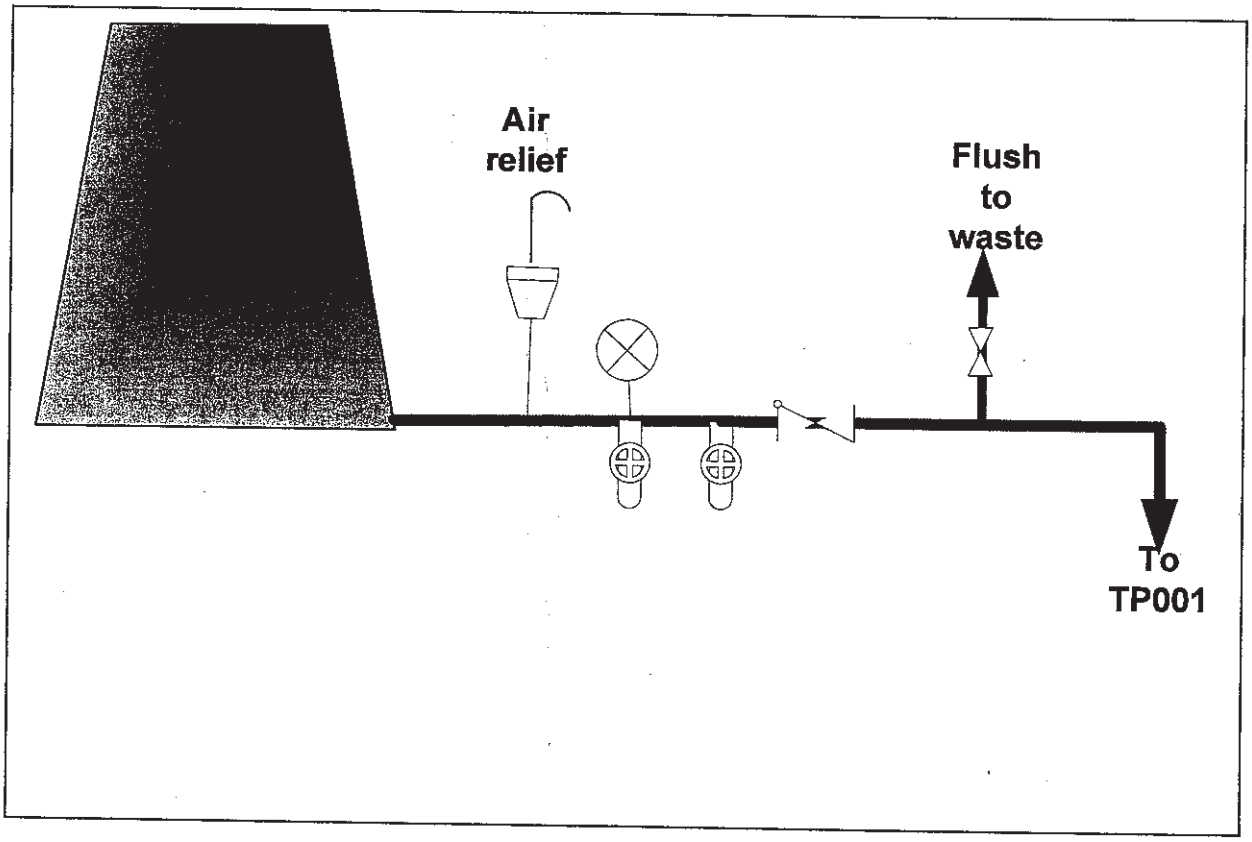




Draw brief schematic of pumphouse facilities (pressure control assemblies, treatment(s) valves, filters, meters, electrical controls, etc.)

All 6 pumping stations are similar: Vertical turbine pump to air relief valve, sample tap, pressure gauge, check valve, blow-off to waste and to piped to chlorine treatment building.

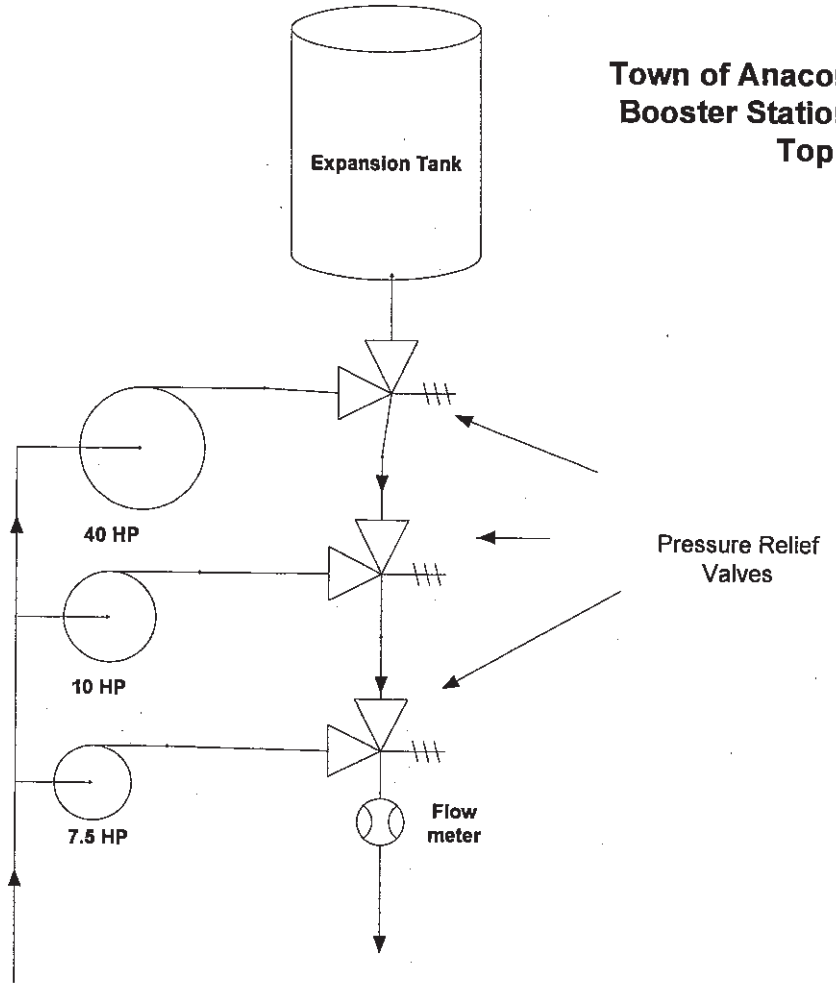


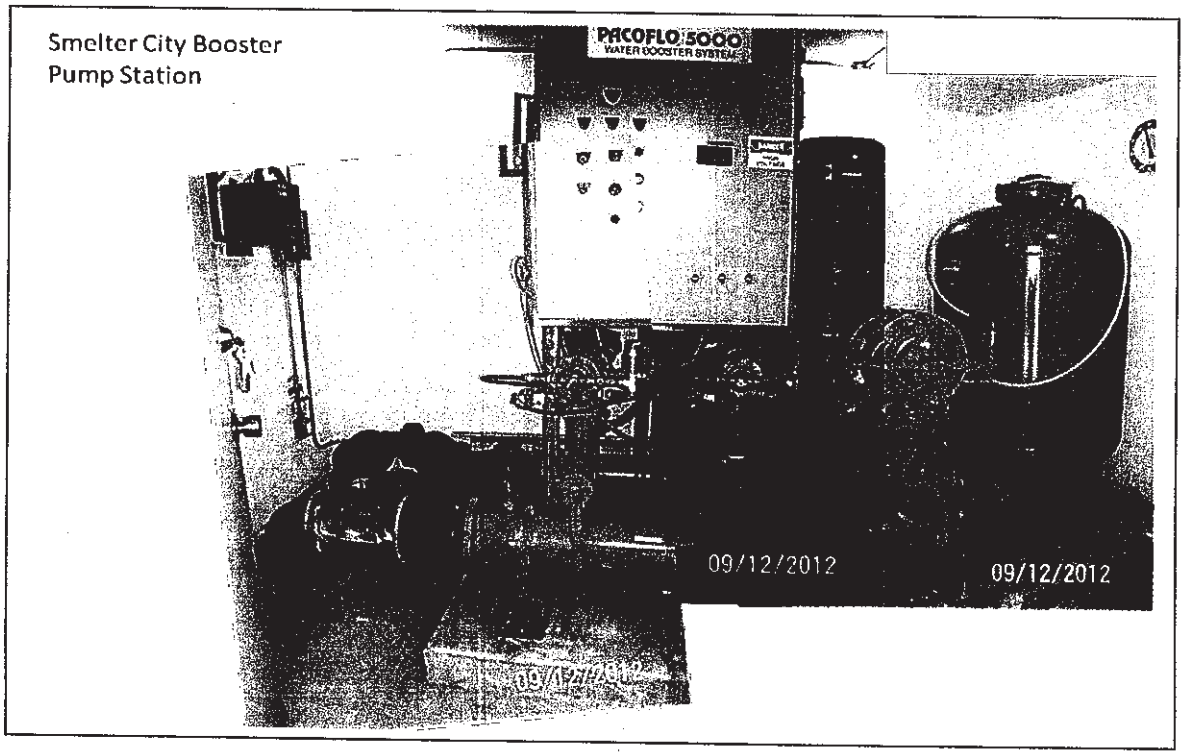


P. Wisniewski
10-30-2009

NOT TO SCALE

Town of Anaconda Smelter City Booster Station (PWSID00016) Top View

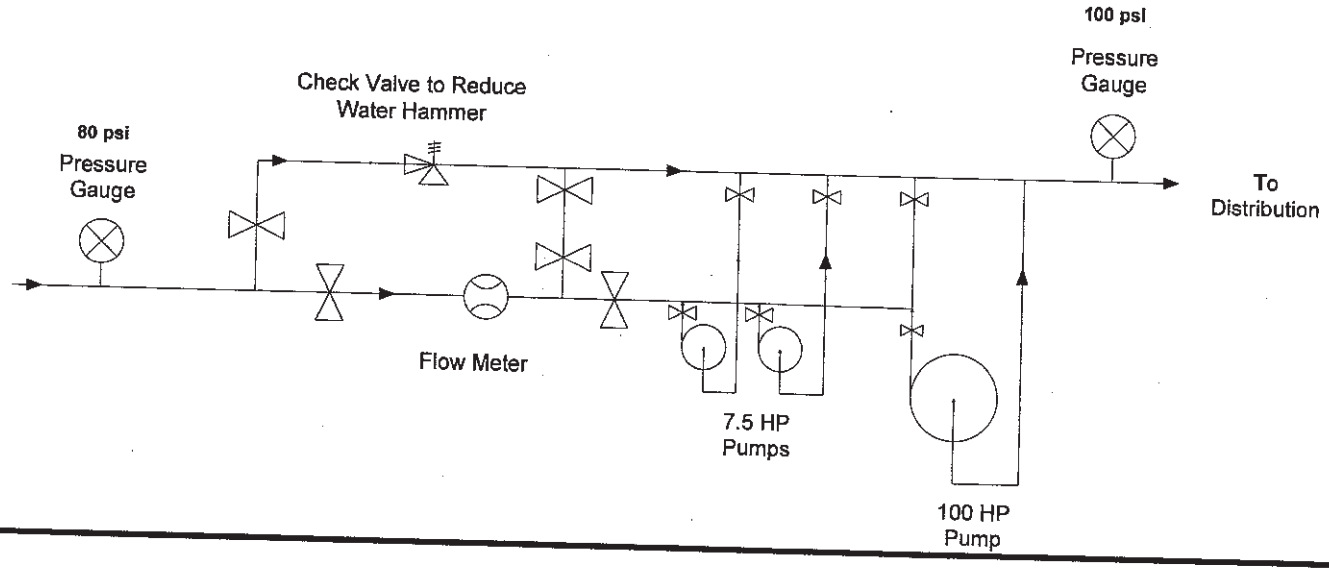




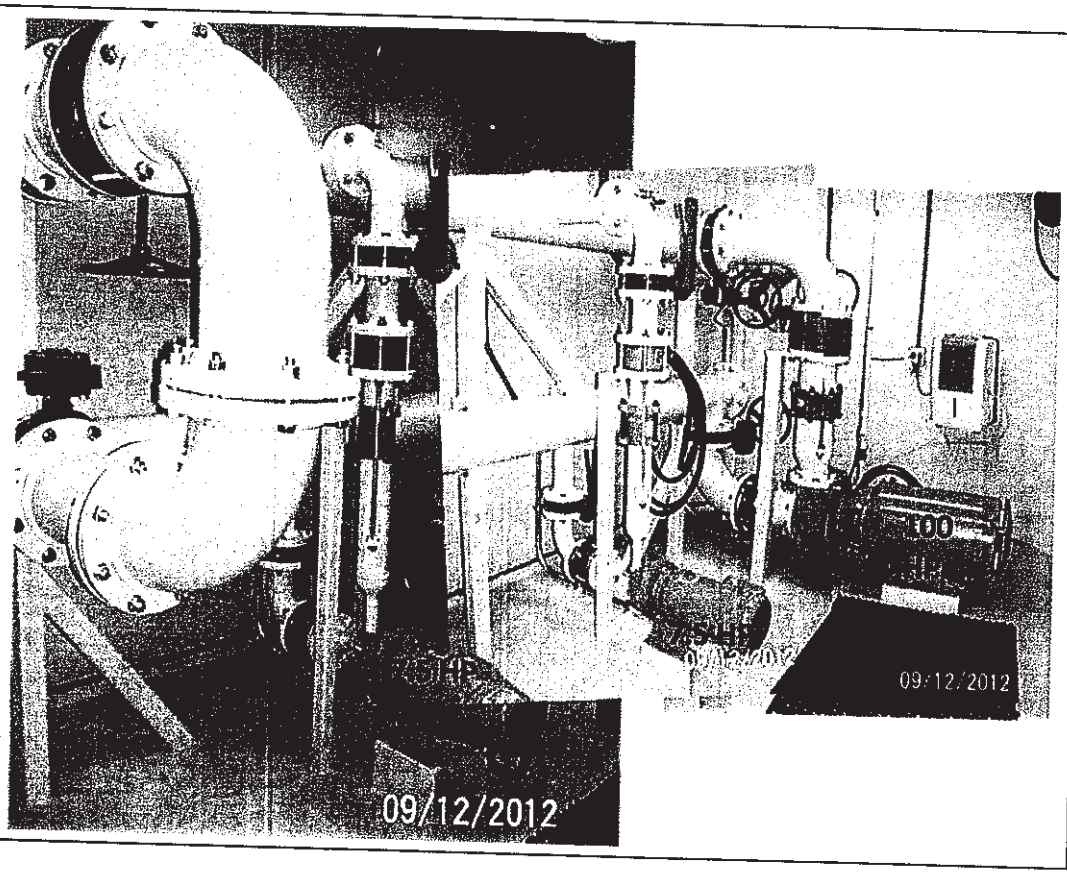
P. Wisniewski
10-30-2009

NOT TO SCALE

Town of Anaconda Sunny Side Booster Pump Station (PWSID00016)



See next slide for the rest



ANACONDA WATER DEPT
8 N MAIN ST
ANACONDA, MT

3,000 WATER USERS
APPROX. 700 METERED ACCOUNTS

NO BAD DEBT – WATER STAYS WITH PROPERTY AND WILL BE COLLECTED WHEN PROPERTY SELLS OR WATER SERVICE IS RESUMED.

City of Anaconda Water System
Lab Data

Preliminary Engineering Report
Mill Creek TIFID

MSE Lab Services

Date: *21-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307144
Project: SOC VOC ARSENIC
Lab ID: 1307144-001

Client Sample ID: ARSENIC
Collection Date: 7/23/2013 2:45:00 PM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**	**E200.2**			Analyst: **kgw**
Arsenic	0.869	1.50	J	µg/L	10	1	8/14/2013 9:06:1

KW **Review**

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE-TA Analytical Laboratory
P.O. Box 4078
200 Technology Way
Butte, MT 59701
Lab: 406-494-7334
Fax: 406-494-7230
labinfo@mse-ta.com

MSE Analytical Laboratory
P.O. Box 4078
200 Technology Way
Butte, MT 59701
Lab: 406-494-7334
Fax: 406-494-7230
labinfo@mse-ta.com

Date: 21-Aug-13
Report Date: 21-Aug-13

QA/QC SUMMARY REPORT

Client: Anaconda Water Co
Project: SOC VOC ARSENIC

Work Order: 1307144
BatchID: 7012

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
*Sample ID: **7012-LRB***			*Method: **E200.8***		*Batch ID: **7012***		*Analysis Date: 8/14/2013 9:06:19 AM*			
Arsenic	ND	1.50	µg/L							
*Sample ID: **7012-LFB***			*Method: **E200.8***		*Batch ID: **7012***		*Analysis Date: 8/14/2013 9:06:19 AM*			
Arsenic	35.8	1.50	µg/L	40.00	89.6	85	115			
*Sample ID: **1307144-001A-D***			*Method: **E200.8***		*Batch ID: **7012***		*Analysis Date: 8/14/2013 9:06:19 AM*			
Arsenic	0.844	1.50	µg/L					0	20	J
*Sample ID: **1307144-001A-LFM***			*Method: **E200.8***		*Batch ID: **7012***		*Analysis Date: 8/14/2013 9:06:19 AM*			
Arsenic	38.0	1.50	µg/L	40.00	92.9	70	130			

Qualifiers: NA Sample conc. is > 4*spike level R* RPD NA based on sample concentration

LAB FEDERAL ID#: ID00013	LAB SAMPLE NUMBER: 130726021-001
DATE RECEIVED: 7/26/2013	DATE REPORTED BY LAB: 8/8/2013
COMPLIANCE SAMPLE: YES	REPLACEMENT SAMPLE: NO
COLLECTION DATE: 7/23/2013	COLLECTION TIME: 2:45 PM
SAMPLE TYPE:	
PWS #: MT0000016	PWS NAME: ANACONDA WATER CO
SAMPLING POINT/LOCATION: 1307144	TAG #/FACILITY ID:
CONTACT NAME: MSE-TA LABORATORY	CONTACT PHONE: 406-494-7334

Anatek Labs, Inc.

1282 Alturas Drive
Moscow, ID 83843
(208) 883-2839
FAX 882-9246
moscow@anateklabs.com

504 E. Sprague Ste. D
Spokane, WA 99202
(509) 838-3999
FAX 838-4433
spokane@anateklabs.com

www.anateklabs.com

Public Drinking Water System Synthetic Organic Chemical (SOC) Analysis Report

FRDS	Compound	Result	Units	MCL	MDL	Method	Analysis Date	Analyst	Qualifier
	Regulated SOC Contaminants								
2005	Endrin	ND	ug/L	2	0.02	EPA 505	8/6/2013	MAH	
2010	Lindane	ND	ug/L	0.2	0.02	EPA 505	8/6/2013	MAH	
2015	Methoxychlor	ND	ug/L	40	0.1	EPA 505	8/6/2013	MAH	
2020	Toxaphene	ND	ug/L	3	1	EPA 505	8/6/2013	MAH	
2031	Dalapon	ND	ug/L	200	1	EPA 515.3	8/1/2013	MAH	
2035	Di(2-ethylhexyl)adipate	ND	ug/L	400	0.2	EPA 525.2	8/1/2013	EMP	
2036	Oxamyl	ND	ug/L	200	4	EPA 531.2	7/30/2013	JWC	
2037	Simazine	ND	ug/L	4	0.15	EPA 525.2	8/1/2013	EMP	
2040	Picloram	ND	ug/L	500	0.1	EPA 515.3	8/1/2013	MAH	
2041	Dinoseb	ND	ug/L	7	0.2	EPA 515.3	8/1/2013	MAH	
2042	Hexachlorocyclopentadiene	ND	ug/L	50	0.2	EPA 525.2	8/1/2013	EMP	
2046	Carbofuran	ND	ug/L	40	2	EPA 531.2	7/30/2013	JWC	
2050	Atrazine	ND	ug/L	3	0.1	EPA 525.2	8/1/2013	EMP	
2051	Alachlor	ND	ug/L	2	0.4	EPA 525.2	8/1/2013	EMP	
2065	Heptachlor	ND	ug/L	0.4	0.04	EPA 505	8/6/2013	MAH	
2067	Heptachlor Epoxide	ND	ug/L	0.2	0.02	EPA 505	8/6/2013	MAH	
2105	2,4-D	ND	ug/L	70	0.1	EPA 515.3	8/1/2013	MAH	
2110	2,4,5-TP	ND	ug/L	50	0.2	EPA 515.3	8/1/2013	MAH	
2274	Hexachlorobenzene	ND	ug/L	1	0.2	EPA 525.2	8/1/2013	EMP	
2039	Di(2-Ethylhexyl)phthalate	ND	ug/L	6	0.6	EPA 525.2	8/1/2013	EMP	
2306	Benzo(a)pyrene	ND	ug/L	0.2	0.02	EPA 525.2	8/1/2013	EMP	
2326	Pentachlorophenol	ND	ug/L	1	0.04	EPA 515.3	8/1/2013	MAH	
2383	PCB's	ND	ug/L	0.5	0.01	EPA 505	8/6/2013	MAH	
2959	Chlordane	ND	ug/L	2	0.1	EPA 505	8/6/2013	MAH	
	Unregulated SOC Contaminants								
2076	Butachlor	ND	ug/L		0.4	EPA 525.2	8/1/2013	EMP	
2045	Metolachlor	ND	ug/L		1	EPA 525.2	8/1/2013	EMP	
2595	Metribuzin	ND	ug/L		0.2	EPA 525.2	8/1/2013	EMP	
2356	Aldrin	ND	ug/L		0.2	EPA 505	8/6/2013	MAH	
2070	Dieldrin	ND	ug/L		0.2	EPA 505	8/6/2013	MAH	
2077	Propachlor	ND	ug/L		0.2	EPA 525.2	8/1/2013	EMP	
2440	Dicamba	ND	ug/L		0.2	EPA 515.3	8/1/2013	MAH	
2047	Aldicarb	ND	ug/L	3	2	EPA 531.2	7/30/2013	JWC	

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

LAB FEDERAL ID#: ID00013	LAB SAMPLE NUMBER: 130726021-001
DATE RECEIVED: 7/26/2013	DATE REPORTED BY LAB: 8/8/2013
COMPLIANCE SAMPLE: YES	REPLACEMENT SAMPLE: NO
COLLECTION DATE: 7/23/2013	COLLECTION TIME: 2:45 PM
SAMPLE TYPE:	
PWS #: MT0000016	PWS NAME: ANACONDA WATER CO
SAMPLING POINT/LOCATION: 1307144	TAG #/FACILITY ID:
CONTACT NAME: MSE-TA LABORATORY	CONTACT PHONE: 406-494-7334

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504 E. Sprague Ste. D
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FAX 838-4433
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Public Drinking Water System Synthetic Organic Chemical (SOC) Analysis Report

FRDS	Compound	Result	Units	MCL	MDL	Method	Analysis Date	Analyst	Qualifier
2044	Aldicarb Sulfone	ND	ug/L		1	EPA 531.2	7/30/2013	JWC	
2043	Aldicarb Sulfoxide	ND	ug/L		1.8	EPA 531.2	7/30/2013	JWC	
2021	Carbaryl	ND	ug/L		2	EPA 531.2	7/30/2013	JWC	
2066	3-Hydroxycarbofuran	ND	ug/L		2	EPA 531.2	7/30/2013	JWC	
2022	Methomyl	ND	ug/L		1	EPA 531.2	7/30/2013	JWC	
	2,4-DB	ND	ug/L		1	EPA 515.3	8/1/2013	MAH	

ND = Analyte Not Detected
----- = No Analysis Performed
MCL = Maximum Contaminant Level
MDL = Method Detection Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Lab Supervisor John W. Cobb

MSE-TA LABORATORY
ANACONDA WATER CO
200 TECHNOLOGY WAY
BUTTE, MT 59701

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

LAB FEDERAL ID#: ID00013	LAB SAMPLE NUMBER: 130726021-001
DATE RECEIVED: 7/26/2013	DATE REPORTED BY LAB: 8/8/2013
COMPLIANCE SAMPLE: YES	REPLACEMENT SAMPLE: NO
COLLECTION DATE: 7/23/2013	COLLECTION TIME: 2:45 PM
SAMPLE TYPE:	
PWS #: MT0000016	PWS NAME: ANACONDA WATER CO
SAMPLING POINT/LOCATION: 1307144	TAG #/FACILITY ID:
CONTACT NAME: MSE-TA LABORATORY	CONTACT PHONE: 406-494-7334

Anatek Labs, Inc.

1282 Alturas Drive
Moscow, ID 83843
(208) 883-2839
FAX 882-9246
moscow@anateklabs.com

504 E. Sprague Ste. D
Spokane, WA 99202
(509) 838-3999
FAX 838-4433
spokane@anateklabs.com

www.anateklabs.com

Public Drinking Water System Volatile Organic Chemical (VOC) Analysis Report

FRDS	Contaminant	Result	Units	MCL	MDL	Method	Analysis Date	Analyst	Qualifier
	Regulated VOC Contaminants								
2378	1,2,4-Trichlorobenzene	ND	ug/L	70	0.5	EPA 524.2	7/26/2013	SAT	
2380	c-1,2-dichloroethene	ND	ug/L	70	0.5	EPA 524.2	7/26/2013	SAT	
2950	Total Trihalomethanes	ND	ug/L	80	0.25	EPA 524.2	7/26/2013	SAT	
2941	Chloroform	ND	ug/L		0.25	EPA 524.2	7/26/2013	SAT	
2942	Bromoform	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2943	Bromodichloromethane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2944	Dibromochloromethane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2955	Xylene (total)	ND	ug/L	10000	0.5	EPA 524.2	7/26/2013	SAT	
2964	Dichloromethane	ND	ug/L	5	0.5	EPA 524.2	7/26/2013	SAT	
2968	o-Dichlorobenzene	ND	ug/L	600	0.5	EPA 524.2	7/26/2013	SAT	
2969	p-Dichlorobenzene	ND	ug/L	75	0.5	EPA 524.2	7/26/2013	SAT	
2976	Vinyl Chloride	ND	ug/L	2	0.5	EPA 524.2	7/26/2013	SAT	
2977	1,1-Dichloroethylene	ND	ug/L	7	0.5	EPA 524.2	7/26/2013	SAT	
2979	t-1,2-Dichloroethylene	ND	ug/L	100	0.5	EPA 524.2	7/26/2013	SAT	
2980	1,2-Dichloroethane	ND	ug/L	5	0.5	EPA 524.2	7/26/2013	SAT	
2981	1,1,1-Trichloroethane	ND	ug/L	200	0.5	EPA 524.2	7/26/2013	SAT	
2982	Carbon Tetrachloride	ND	ug/L	5	0.5	EPA 524.2	7/26/2013	SAT	
2983	1,2-Dichloropropane	ND	ug/L	5	0.5	EPA 524.2	7/26/2013	SAT	
2984	Trichloroethylene	ND	ug/L	5	0.5	EPA 524.2	7/26/2013	SAT	
2985	1,1,2-Trichloroethane	ND	ug/L	5	0.5	EPA 524.2	7/26/2013	SAT	
2987	Tetrachloroethylene	ND	ug/L	5	0.5	EPA 524.2	7/26/2013	SAT	
2989	Monochlorobenzene	ND	ug/L	100	0.5	EPA 524.2	7/26/2013	SAT	
2990	Benzene	ND	ug/L	5	0.5	EPA 524.2	7/26/2013	SAT	
2991	Toluene	ND	ug/L	1000	0.5	EPA 524.2	7/26/2013	SAT	
2992	Ethylbenzene	ND	ug/L	700	0.5	EPA 524.2	7/26/2013	SAT	
2996	Styrene	ND	ug/L	100	0.5	EPA 524.2	7/26/2013	SAT	
	Unregulated VOC Contaminants								
2993	Bromobenzene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2430	Bromochloromethane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2214	Bromomethane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2422	n-Butylbenzene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2428	s-Butylbenzene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2426	t-Butylbenzene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2216	Chloroethane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

LAB FEDERAL ID#: ID00013	LAB SAMPLE NUMBER: 130726021-001
DATE RECEIVED: 7/26/2013	DATE REPORTED BY LAB: 8/8/2013
COMPLIANCE SAMPLE: YES	REPLACEMENT SAMPLE: NO
COLLECTION DATE: 7/23/2013	COLLECTION TIME: 2:45 PM
SAMPLE TYPE:	
PWS #: MT0000016	PWS NAME: ANACONDA WATER CO
SAMPLING POINT/LOCATION: 1307144	TAG #/FACILITY ID:
CONTACT NAME: MSE-TA LABORATORY	CONTACT PHONE: 406-494-7334

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Public Drinking Water System Volatile Organic Chemical (VOC) Analysis Report

FRDS	Contaminant	Result	Units	MCL	MDL	Method	Analysis Date	Analyst	Qualifier
2210	Chloromethane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2965	o-Chlorotoluene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2966	p-Chlorotoluene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2408	Dibromomethane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2967	m-Dichlorobenzene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2212	Dichlorodifluoromethane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2978	1,1-Dichloroethane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2413	1,3-Dichloropropene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2416	2,2-Dichloropropane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2410	1,1-Dichloropropene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2412	1,3-Dichloropropane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2246	Hexachlorobutadiene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2994	Isopropylbenzene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2030	p-Isopropyltoluene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2248	Naphthalene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2998	n-Propylbenzene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2986	1,1,1,2-Tetrachloroethane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2988	1,1,2,2-Tetrachloroethane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2420	1,2,3-Trichlorobenzene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2218	Trichloroflouromethane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2414	1,2,3-Trichloropropane	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2424	1,3,5-Trimethylbenzene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	
2418	1,2,4-Trimethylbenzene	ND	ug/L		0.5	EPA 524.2	7/26/2013	SAT	

ND = Analyte Not Detected
---- = No Analysis Performed
MCL = Maximum Contaminant Level
MDL = Method Detection Limit

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Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Lab Supervisor John W. Cook

MSE-TA LABORATORY
ANACONDA WATER CO
200 TECHNOLOGY WAY
BUTTE, MT 59701

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87863; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

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1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: ANACONDA WATER CO
200 TECHNOLOGY WAY
BUTTE MT 59701

Order ID: 130726021
Order Date: 7/26/2013

Contact Name: MSE-TA LABORATORY
Project Name: VOC/SOC

Comment:

Sample #: 130726021-001 **Customer Sample #:** 1307144

Recv'd: ☑ **Collector:** CARL **Date Collected:** 7/23/2013
Quantity: 2 **Matrix:** Drinking Water **Date Received:** 7/26/2013 10:34:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
CARBAMATE 531.2 ID	M	EPA 531.2	8/6/2013	Normal (~10 Days)
HERBICIDES 515.3 ID	M	EPA 515.3	8/6/2013	Normal (~10 Days)
PESTICIDES 505 ID	M	EPA 505	8/6/2013	Normal (~10 Days)
SEMIVOLATILES 525.2 ID	M	EPA 525.2	8/6/2013	Normal (~10 Days)
VOLATILES 524.2 ID	M	EPA 524.2	8/6/2013	Normal (~10 Days)

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	16.5
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspece?	Yes
Is there a trip blank to accompany VOC samples?	No
Lebels and chain agree?	Yes

LAB FEDERAL ID#: ID00013	LAB SAMPLE NUMBER: 130712040-001
DATE RECEIVED: 7/12/2013	DATE REPORTED BY LAB: 7/25/2013
COMPLIANCE SAMPLE: YES	REPLACEMENT SAMPLE: NO
COLLECTION DATE: 7/9/2013	COLLECTION TIME: 2:20 PM
SAMPLE TYPE: DISTRIBUTION	
PWS #: MT0000016	PWS NAME: ANACONDA WATER CO
SAMPLING POINT/LOCATION: 120 W FRONT	TAG #/FACILITY ID:
CONTACT NAME: MSE-TA LABORATORY	CONTACT PHONE: 406-494-7334

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1282 Alturas Drive
Moscow, ID 83843
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FAX 882-9246
moscow@anateklabs.com

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Spokane, WA 99202
(509) 838-3999
FAX 838-4433
spokane@anateklabs.com

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Public Drinking Water System Disinfection Byproduct (DBP) Analysis Report

FRDS	Contaminant	Result	Units	MCL	MDL	Method	Analysis Date	Analyst	Qualifier
		Disinfection Byproducts							
2941	Chloroform	0.89	µg/L		0.25	EPA 524.2	7/18/2013	SAT	
2942	Bromoform	ND	µg/L		0.5	EPA 524.2	7/18/2013	SAT	
2943	Bromodichloromethane	0.85	µg/L		0.5	EPA 524.2	7/18/2013	SAT	
2944	Dibromochloromethane	0.66	µg/L		0.5	EPA 524.2	7/18/2013	SAT	
2950	Total Trihalomethanes	2.40	µg/L	80	0.25	EPA 524.2	7/18/2013	SAT	
		Haloacetic Acids (HAA5)							
2450	Monochloroacetic acid	ND	ug/L		2	SM6251B	7/18/2013	MAH	
2451	Dichloroacetic acid	ND	ug/L		1	SM6251B	7/18/2013	MAH	
2452	Trichloroacetic acid	ND	ug/L		1	SM6251B	7/18/2013	MAH	
2453	Monobromoacetic acid	ND	ug/L		1	SM6251B	7/18/2013	MAH	
2454	Dibromoacetic acid	ND	ug/L		1	SM6251B	7/18/2013	MAH	
2456	Total Haloacetic Acids	ND	ug/L	60	1	SM6251B	7/18/2013	MAH	

Lab Supervisor

ND = Analyte Not Detected
----- = No Analysis Performed
MCL = Maximum Contaminant Level
MDL = Method Detection Limit

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MSE-TA LABORATORY
ANACONDA WATER CO
200 TECHNOLOGY WAY
BUTTE, MT 59701

Comments:

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Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

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Login Report

Customer Name: ANACONDA WATER CO
200 TECHNOLOGY WAY
BUTTE MT 59701

Order ID: 130712040
Order Date: 7/12/2013

Contact Name: MSE-TA LABORATORY

Project Name: DISINFECTION BY PRODUCTS

Comment:

Sample #: 130712040-001 **Customer Sample #:** 120 W FRONT

Recv'd: ☑ **Collector:** CARL **Date Collected:** 7/9/2013
Quantity: 4 **Matrix:** Drinking Water **Date Received:** 7/12/2013 11:15:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
HAA5 SM6251B	M	SM6251B	7/24/2013	***Normal (6-10 Days)***
THM - TOTAL 524.2	M	EPA 524.2	7/24/2013	***Normal (6-10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
Whet is the temperature inside the cooler?	20.8
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

MSE Lab Services

Date: *23-Sep-13*

CLIENT: Anaconda Water Co
Lab Order: 1309102
Project: 261 CABLE CUTOFF ROAD
Lab ID: 1309102-001

Client Sample ID: TP002 EP 502 (CL2 BUILDIN
Collection Date: 9/16/2013 3:32:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
NITRATE+NITRITE BY ION CHROMATOGRAPHY			**E300.0**				Analyst: **jc**
NO2/NO3	0.355	0.030		mg/L	10	1	9/17/2013 4:41:0

HW **Review**

Definitions:	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
	MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE-TA Analytical Laboratory
P.O. Box 4078
200 Technology Way
Butte, MT 59701
Lab: 406-494-7334
Fax: 406-494-7230
labinfo@mse-ta.com

MSE Analytical Laboratory
P.O. Box 4078
200 Technology Way
Butte, MT 59701
Lab: 406-494-7334
Fax: 406-494-7230
labinfo@mse-ta.com

Date: 23-Sep-13
Report Date: 23-Sep-13

QA/QC SUMMARY REPORT

Client: Anaconda Water Co
Project: 261 CABLE CUTOFF ROAD

Work Order: 1309102
BatchID: R24554

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
*Sample ID: **1309102-001A-D***			*Method: **E300.0***		*Batch ID: **R24554***			*Analysis Date: 9/17/2013 4:41:00 PM*		
NO2/NO3	0.357	0.030	mg/L					0.478	20	
*Sample ID: **1309102-001A-LFM***			*Method: **E300.0***		*Batch ID: **R24554***			*Analysis Date: 9/17/2013 4:41:00 PM*		
NO2/NO3	4.36	0.030	mg/L	4.000	100	80	120			
*Sample ID: **LRB***			*Method: **E300.0***		*Batch ID: **R24554***			*Analysis Date: 9/17/2013 4:41:00 PM*		
NO2/NO3	ND	0.030	mg/L							
*Sample ID: **LFB #3467 9/18/13***			*Method: **E300.0***		*Batch ID: **R24554***			*Analysis Date: 9/17/2013 4:41:00 PM*		
NO2/NO3	4.15	0.030	mg/L	4.000	104	90	110			

Qualifiers: NA Sample conc. is > 4*spike level S Spike Recovery outside accepted recovery limits

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-001

Client Sample ID: 617 W PARK
Collection Date: 7/16/2013 7:00:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	67.2	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	0.285	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-002

Client Sample ID: 1013 MARCUS DALY
Collection Date: 7/17/2013 5:00:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	225	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	1.13	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-003

Client Sample ID: 105 N MAIN
Collection Date: 7/16/2013 5:30:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT		**E200.8**					Analyst: **kgw**
Copper	122	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	2.07	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-004

Client Sample ID: 1108 W 4TH
Collection Date: 7/15/2013 6:15:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	128	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	4.34	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-005

Client Sample ID: 513 CHESTNUT
Collection Date: 7/16/2013 9:15:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	1230	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	0.588	0.250		µg/L	15	1	8/13/2013 1:15:1

JC **Review**

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT:	Anaconda Water Co	**Client Sample ID:**	214 ELM
Lab Order:	1307110	**Collection Date:**	7/16/2013 6:05:00 AM
Project:	LEAD & COPPER		
Lab ID:	1307110-006	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	989	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	1.07	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-007

Client Sample ID: 116 W PENN
Collection Date: 7/16/2013 8:00:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	614	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	1.47	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-008

Client Sample ID: 420 SYCAMORE
Collection Date: 7/16/2013 8:10:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	69.9	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	9.09	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-009

Client Sample ID: 1812 W. PARK
Collection Date: 7/16/2013 5:20:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	604	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	1.51	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-010

Client Sample ID: 412 E PARK
Collection Date: 7/16/2013 9:30:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	1090	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	0.992	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110-
Project: LEAD & COPPER
Lab ID: 1307110-011

Client Sample ID: 1811 W PARK
Collection Date: 7/16/2013 6:30:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	46.2	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	1.48	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-012

Client Sample ID: 911 E 5TH
Collection Date: 7/16/2013 5:00:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	30.5	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	1.76	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-013

Client Sample ID: WARM SPRINGS
Collection Date: 7/16/2013 8:20:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT		**E200.8**					Analyst: **kgw**
Copper	268	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	16.1	0.250	X	µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-014

Client Sample ID: 1017 W 4TH
Collection Date: 7/16/2013 5:30:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	398	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	0.943	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-015

Client Sample ID: 821 E 6TH
Collection Date: 7/16/2013 7:00:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT		**E200.8**					Analyst: **kgw**
Copper	127	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	0.158	0.250	J	µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-016

Client Sample ID: 411 CHERRY
Collection Date: 7/16/2013 11:30:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	32.9	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	3.60	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-017

Client Sample ID: 304 EVER GREEN
Collection Date: 7/16/2013 11:15:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	65.2	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	1.21	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminent Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-018

Client Sample ID: 508 HICKORY
Collection Date: 7/16/2013 5:30:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	1050	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	0.858	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-019

Client Sample ID: 814 W 3RD
Collection Date: 7/16/2013 7:16:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	84.1	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	2.67	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
	MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Lab Services

Date: *14-Aug-13*

CLIENT: Anaconda Water Co
Lab Order: 1307110
Project: LEAD & COPPER
Lab ID: 1307110-020

Client Sample ID: 511 WASHINGTON
Collection Date: 7/17/2013 7:00:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	MCL	DF	Date Analyzed
ICP-MS METALS, TOTAL/DIRECT			**E200.8**				Analyst: **kgw**
Copper	47.9	1.25		µg/L	1300	1	8/13/2013 1:15:1
Lead	0.838	0.250		µg/L	15	1	8/13/2013 1:15:1

Review

Definitions:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MCL	EPA Maximum Contaminant Level	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit (MDL)	X	Value exceeds Maximum Contaminant Level

MSE Analytical Laboratory
P.O. Box 4078
200 Technology Way
Butte, MT 59701
Lab: 406-494-7334
Fax: 406-494-7230
labinfo@mse-ta.com

Date: 14-Aug-13
Report Date: 14-Aug-13

QA/QC SUMMARY REPORT

Client: Anaconda Water Co
Project: LEAD & COPPER

Work Order: 1307110
BatchID: 6996

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: 6996-LRB			*Method: E200.8*		*Batch ID: 6996*			*Analysis Date: 8/13/2013 1:15:11 AM*		
Copper	ND	1.25	µg/L							
Lead	0.248	0.250	µg/L							J
Sample ID: 6996-LFB@INS			*Method: E200.8*		*Batch ID: 6996*			*Analysis Date: 8/13/2013 1:15:11 AM*		
Copper	124	1.25	µg/L	125.0	98.9	85	115			
Lead	10.2	0.250	µg/L	10.00	102	85	115			
Sample ID: 1307110-001A-D@INS			*Method: E200.8*		*Batch ID: 6996*			*Analysis Date: 8/13/2013 1:15:11 AM*		
Copper	66.2	1.25	µg/L					1.47	20	
Lead	0.287	0.250	µg/L					0.995	20	
Sample ID: 1307110-001A-LFM@INS			*Method: E200.8*		*Batch ID: 6996*			*Analysis Date: 8/13/2013 1:15:11 AM*		
Copper	186	1.25	µg/L	125.0	94.7	70	130			
Lead	10.3	0.250	µg/L	10.00	100	70	130			
Sample ID: 1307110-011A-D@INS			*Method: E200.8*		*Batch ID: 6996*			*Analysis Date: 8/13/2013 1:15:11 AM*		
Copper	46.4	1.25	µg/L					0.641	20	
Lead	1.48	0.250	µg/L					0.0330	20	
Sample ID: 1307110-011A-LFM@INS			*Method: E200.8*		*Batch ID: 6996*			*Analysis Date: 8/13/2013 1:15:11 AM*		
Copper	156	1.25	µg/L	125.0	89.1	70	130			
Lead	11.2	0.250	µg/L	10.00	97.3	70	130			

Qualifiers: NA Sample conc. is > 4*spike level
S Spike Recovery outside accepted recovery limits

Appendix D

City of Anaconda Wastewater System Records

Preliminary Engineering Report
Mill Creek TIFID

Anaconda Wastewater System Flow Records Summary

Record Period: April 1, 2012 to August, 7 2013

(Transcribed from hard copy records provided by Anaconda Water Department 8/15/2013)

Date	Flow rates (thousand gpd)	Flow Rates (MGD)				
4/1/2012	924.71	0.92		**Annual Average Daily Flow (MGD)**	**0.85**	Average of Flow Rates (MGD); Excludes records noted as 0 MGD as outliers.
4/2/2012	877.21	0.88		**Peak Daily Flow (MGD)**	**1.36**	Maximum of Gallons Treated: 06/16/2012
4/3/2012	874.04	0.87				
4/4/2012	819.77	0.82		**Winter Average 2012 (October - April) (MGD)**	**0.68**	
4/5/2012	845.62	0.85		**Summer Average 2012 (May - Sept) (MGD)**	1.02	
4/6/2012	851.45	0.85		**Summer Average 2013 (May - Aug 7) (MGD)**	0.94	
4/7/2012	839.34	0.84		**Summer Average To-Date (MGD)**	**0.98**	
4/8/2012	843.25	0.84				
4/9/2012	769.5	0.77				
4/10/2012	808.42	0.81				
4/11/2012	854.84	0.85				
4/12/2012	790.47	0.79				
4/13/2012	873.25	0.87				
4/14/2012	966.34	0.97				
4/15/2012	910.74	0.91				
4/16/2012	982.83	0.98				
4/17/2012	981.43	0.98				
4/18/2012	873	0.87				
4/19/2012	850.72	0.85				
4/20/2012	912.91	0.91				
4/21/2012	938.62	0.94				
4/22/2012	934.06	0.93				
4/23/2012	930.52	0.93				
4/24/2012	936.49	0.94				
4/25/2012	799.87	0.80				
4/26/2012	888.27	0.89				
4/27/2012	762.18	0.76				
4/28/2012	659.18	0.66				
4/29/2012	641.14	0.64				
4/30/2012	671.45	0.67				
5/1/2012	625.46	0.63				
5/2/2012	577.28	0.58				
5/3/2012	941.68	0.94				
5/4/2012	927.43	0.93				
5/5/2012	935.92	0.94				
5/6/2012	896.16	0.90				
5/7/2012	891.25	0.89				
5/8/2012	972.99	0.97				
5/9/2012	928.79	0.93				
5/10/2012	874.57	0.87				
5/11/2012	863.01	0.86				
5/12/2012	787.35	0.79				
5/13/2012	807.44	0.81				
5/14/2012	840.98	0.84				
5/15/2012	794.61	0.79				
5/16/2012	816.63	0.82				
5/17/2012	787.91	0.79				
5/18/2012	808.53	0.81				
5/19/2012	841.45	0.84				
5/20/2012	856.39	0.86				
5/21/2012	839.1	0.84				

Anaconda Wastewater System Flow Records Summary						
Record Period: April 1, 2012 to August, 7 2013						
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/2013)						
5/22/2012	891.63	0.89				
5/23/2012	951.4	0.95				
5/24/2012	1019.08	1.02				
5/25/2012	1133.7	1.13				
5/26/2012	1258.26	1.26				
5/27/2012	1110.04	1.11				
5/28/2012	1092.23	1.09				
5/29/2012	1093.2	1.09				
5/30/2012	993.36	0.99				
5/31/2012	973.48	0.97				
6/1/2012	1064.48	1.06				
6/2/2012	1110.57	1.11				
6/3/2012	1225.42	1.23				
6/4/2012	1225.99	1.23				
6/5/2012	1235.21	1.24				
6/6/2012	1175.46	1.18				
6/7/2012	1204.75	1.20				
6/8/2012	1211.38	1.21				
6/9/2012	1175.07	1.18				
6/10/2012	1196.59	1.20				
6/11/2012	1162.06	1.16				
6/12/2012	1137.54	1.14				
6/13/2012	1181.71	1.18				
6/14/2012	1177.57	1.18				
6/15/2012	1357.07	1.36				
6/16/2012	1148.41	1.15				
6/17/2012	1154.01	1.15				
6/18/2012	1210.84	1.21				
6/19/2012	1139.44	1.14				
6/20/2012	1155.79	1.16				
6/21/2012	1158.91	1.16				
6/22/2012	1164.91	1.16				
6/23/2012	1106.24	1.11				
6/24/2012	1135.01	1.14				
6/25/2012	1140.87	1.14				
6/26/2012	1156.19	1.16				
6/27/2012	1157.87	1.16				
6/28/2012	1168.39	1.17				
6/29/2012	1151.29	1.15				
6/30/2012	1115.82	1.12				
7/1/2012	1117.27	1.12				
7/2/2012	1075.89	1.08				
7/3/2012	1049.12	1.05				
7/4/2012	1032.35	1.03				
7/5/2012	1049.97	1.05				
7/6/2012	1087.62	1.09				
7/7/2012	1101.91	1.10				
7/8/2012	1091.88	1.09				
7/9/2012	1061.38	1.06				
7/10/2012	1058.01	1.06				
7/11/2012	1057.61	1.06				
7/12/2012	1030.96	1.03				
7/13/2012	1023.64	1.02				
7/14/2012	1066.44	1.07				
7/15/2012	1292.43	1.29				

Anaconda Wastewater System Flow Records Summary						
Record Period: April 1, 2012 to August, 7 2013						
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/2013)						
7/16/2012	1115.42	1.12				
7/17/2012	1164.85	1.16				
7/18/2012	1116.86	1.12				
7/19/2012	1118.33	1.12				
7/20/2012	1104.1	1.10				
7/21/2012	1131.7	1.13				
7/22/2012	1082.67	1.08				
7/23/2012	1172.97	1.17				
7/24/2012	1117.68	1.12				
7/25/2012	1092.44	1.09				
7/26/2012	1117.6	1.12				
7/27/2012	1109.18	1.11				
7/28/2012	1068.29	1.07				
7/29/2012	1085.79	1.09				
7/30/2012	1116.51	1.12				
7/31/2012	1072.36	1.07				
8/1/2012	1035.04	1.04				
8/2/2012	1048.91	1.05				
8/3/2012	1040.54	1.04				
8/4/2012	1007.31	1.01				
8/5/2012	1041.74	1.04				
8/6/2012	1062.33	1.06				
8/7/2012	1018.36	1.02				
8/8/2012	1009.63	1.01				
8/9/2012	1025.88	1.03				
8/10/2012	984.68	0.98				
8/11/2012	990.92	0.99				
8/12/2012	978.08	0.98				
8/13/2012	990.72	0.99				
8/14/2012	988.27	0.99				
8/15/2012	971.67	0.97				
8/16/2012	988.18	0.99				
8/17/2012	973.05	0.97				
8/18/2012	958.67	0.96				
8/19/2012	953.59	0.95				
8/20/2012	970.33	0.97				
8/21/2012	968.57	0.97				
8/22/2012	973.6	0.97				
8/23/2012	925.62	0.93				
8/24/2012	931.22	0.93				
8/25/2012	891.62	0.89				
8/26/2012	936.17	0.94				
8/27/2012	921.91	0.92				
8/28/2012	961.98	0.96				
8/29/2012	992.68	0.99				
8/30/2012	921.79	0.92				
8/31/2012	939.53	0.94				
9/1/2012	893.02	0.89				
9/2/2012	922.05	0.92				
9/3/2012	913.27	0.91				
9/4/2012	922.01	0.92				
9/5/2012	899.54	0.90				
9/6/2012	923.9	0.92				
9/7/2012	900.86	0.90				
9/8/2012	905.57	0.91				

Anaconda Wastewater System Flow Records Summary						
Record Period: April 1, 2012 to August, 7 2013						
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/2013)						
9/9/2012	915.29	0.92				
9/10/2012	914.53	0.91				
9/11/2012	886.67	0.89				
9/12/2012	886.06	0.89				
9/13/2012	909.28	0.91				
9/14/2012	915.81	0.92				
9/15/2012	904.55	0.90				
9/16/2012	950.26	0.95				
9/17/2012	934.18	0.93				
9/18/2012	896.19	0.90				
9/19/2012	896.88	0.90				
9/20/2012	877.99	0.88				
9/21/2012	913.48	0.91				
9/22/2012	865.82	0.87				
9/23/2012	910.13	0.91				
9/24/2012	893.36	0.89				
9/25/2012	0	0.00				
9/26/2012	0	0.00				
9/27/2012	0	0.00				
9/28/2012	1173.91	1.17				
9/29/2012	926.35	0.93				
9/30/2012	912.35	0.91				
10/1/2012	897.24	0.90				
10/2/2012	908.55	0.91				
10/3/2012	877.07	0.88				
10/4/2012	951.74	0.95				
10/5/2012	825.74	0.83				
10/6/2012	857.75	0.86				
10/7/2012	863.1	0.86				
10/8/2012	861.68	0.86				
10/9/2012	829.48	0.83				
10/10/2012	877.76	0.88				
10/11/2012	839.51	0.84				
10/12/2012	849.09	0.85				
10/13/2012	866.92	0.87				
10/14/2012	865.95	0.87				
10/15/2012	847.25	0.85				
10/16/2012	907.56	0.91				
10/17/2012	840.88	0.84				
10/18/2012	836.73	0.84				
10/19/2012	863.49	0.86				
10/20/2012	846.69	0.85				
10/21/2012	848.69	0.85				
10/22/2012	799.36	0.80				
10/23/2012	811.44	0.81				
10/24/2012	806.41	0.81				
10/25/2012	767.17	0.77				
10/26/2012	817.77	0.82				
10/27/2012	827.34	0.83				
10/28/2012	890.58	0.89				
10/29/2012	854.15	0.85				
10/30/2012	823.1	0.82				
10/31/2012	805.85	0.81				
11/1/2012	781.65	0.78				
11/2/2012	762.01	0.76				

Anaconda Wastewater System Flow Records Summary						
Record Period: April 1, 2012 to August, 7 2013						
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/2013)						
11/3/2012	794.52	0.79				
11/4/2012	869.42	0.87				
11/5/2012	710.56	0.71				
11/6/2012	658.35	0.66				
11/7/2012	685.91	0.69				
11/8/2012	656.56	0.66				
11/9/2012	716.68	0.72				
11/10/2012	737.97	0.74				
11/11/2012	745.41	0.75				
11/12/2012	783.93	0.78				
11/13/2012	748.43	0.75				
11/14/2012	753.85	0.75				
11/15/2012	728.15	0.73				
11/16/2012	764.89	0.76				
11/17/2012	850.04	0.85				
11/18/2012	810.71	0.81				
11/19/2012	868.17	0.87				
11/20/2012	910.81	0.91	?			
11/21/2012	681.65	0.68	?			
11/22/2012	503.32	0.50	?			
11/23/2012	510.61	0.51	?			
11/24/2012	524.82	0.52	?			
11/25/2012	492.26	0.49	?			
11/26/2012	492.09	0.49	?			
11/27/2012	470.48	0.47	?			
11/28/2012	506.29	0.51	?			
11/29/2012	536.66	0.54	?			
11/30/2012	531.17	0.53				
12/1/2012	518.68	0.52				
12/2/2012	606.77	0.61	Turned on last cell at Ueland ponds			
12/3/2012	541.22	0.54				
12/4/2012	553.14	0.55				
12/5/2012	499.36	0.50				
12/6/2012	455.42	0.46				
12/7/2012	575.47	0.58				
12/8/2012	580.22	0.58				
12/9/2012	572.07	0.57				
12/10/2012	558.33	0.56				
12/11/2012	566.98	0.57				
12/12/2012	439.2	0.44				
12/13/2012	421.71	0.42				
12/14/2012	401.85	0.40				
12/15/2012	406.42	0.41				
12/16/2012	466.23	0.47				
12/17/2012	453.45	0.45				
12/18/2012	447.9	0.45				
12/19/2012	530.99	0.53				
12/20/2012	535.36	0.54				
12/21/2012	466.57	0.47				
12/22/2012	474.62	0.47				
12/23/2012	452.75	0.45				
12/24/2012	373.58	0.37				
12/25/2012	269.6	0.27	Found plug in sewer line			
12/26/2012	184.7	0.18				
12/27/2012	491.64	0.49				

Anaconda Wastewater System Flow Records Summary						
Record Period: April 1, 2012 to August, 7 2013						
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/2013)						
12/28/2012	727.56	0.73				
12/29/2012	708.44	0.71				
12/30/2012	694.53	0.69				
12/31/2012	662.29	0.66				
1/1/2013	641.3	0.64				
1/2/2013	657.86	0.66				
1/3/2013	630.53	0.63				
1/4/2013	648.27	0.65				
1/5/2013	664.65	0.66				
1/6/2013	682.28	0.68				
1/7/2013	719.5	0.72	Turned off last cell at Ueland ponds			
1/8/2013	722.34	0.72				
1/9/2013	730.68	0.73				
1/10/2013	667.91	0.67				
1/11/2013	615.58	0.62				
1/12/2013	622.45	0.62				
1/13/2013	622.32	0.62				
1/14/2013	647.73	0.65				
1/15/2013	644.37	0.64				
1/16/2013	658.61	0.66				
1/17/2013	677.07	0.68				
1/18/2013	703.81	0.70				
1/19/2013	688.77	0.69				
1/20/2013	669.85	0.67				
1/21/2013	711.65	0.71				
1/22/2013	655.64	0.66				
1/23/2013	705.45	0.71				
1/24/2013	694.8	0.69				
1/25/2013	729.52	0.73				
1/26/2013	712.69	0.71				
1/27/2013	663.25	0.66				
1/28/2013	697.87	0.70				
1/29/2013	639.46	0.64				
1/30/2013	681.12	0.68				
1/31/2013	689.68	0.69				
2/1/2013	594.33	0.59				
2/2/2013	605.11	0.61				
2/3/2013	710.54	0.71				
2/4/2013	700.13	0.70				
2/5/2013	713.1	0.71				
2/6/2013	681.8	0.68				
2/7/2013	672.16	0.67				
2/8/2013	643.78	0.64				
2/9/2013	655.66	0.66				
2/10/2013	658.82	0.66				
2/11/2013	645.51	0.65				
2/12/2013	705.19	0.71				
2/13/2013	702.49	0.70				
2/14/2013	681.91	0.68				
2/15/2013	675.94	0.68				
2/16/2013	739.73	0.74				
2/17/2013	719.06	0.72				
2/18/2013	745.76	0.75				
2/19/2013	708.48	0.71				
2/20/2013	645.99	0.65				

Anaconda Wastewater System Flow Records Summary						
Record Period: April 1, 2012 to August, 7 2013						
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/2013)						
2/21/2013	662.72	0.66				
2/22/2013	695.86	0.70				
2/23/2013	963.74	0.96				
2/24/2013	688.98	0.69				
2/25/2013	688.19	0.69				
2/26/2013	670.49	0.67				
2/27/2013	687.35	0.69				
2/28/2013	696.88	0.70				
3/1/2013	714.66	0.71				
3/2/2013	741.39	0.74				
3/3/2013	728.34	0.73	Let water to I.P. Ponds			
3/4/2013	659.96	0.66				
3/5/2013	710.17	0.71	Maine sewer line pugged in front of East Town Pump			
3/6/2013	553.2	0.55	Maine sewer line pugged in front of East Town Pump			
3/7/2013	233.3	0.23	Maine sewer line pugged in front of East Town Pump			
3/8/2013	225.02	0.23	Maine sewer line pugged in front of East Town Pump			
3/9/2013	250.95	0.25	Maine sewer line pugged in front of East Town Pump			
3/10/2013	328.9	0.33				
3/11/2013	672.99	0.67				
3/12/2013	721.71	0.72				
3/13/2013	724.81	0.72				
3/14/2013	732.73	0.73				
3/15/2013	715.46	0.72				
3/16/2013	705.6	0.71				
3/17/2013	741.3	0.74				
3/18/2013	734.07	0.73				
3/19/2013	728.16	0.73				
3/20/2013	752.7	0.75				
3/21/2013	719.46	0.72				
3/22/2013	680.08	0.68				
3/23/2013	682.75	0.68				
3/24/2013	712.95	0.71				
3/25/2013	727.56	0.73				
3/26/2013	721.91	0.72				
3/27/2013	718.17	0.72				
3/28/2013	730.84	0.73				
3/29/2013	728.05	0.73				
3/30/2013	741.15	0.74				
3/31/2013	712.86	0.71				
4/1/2013	736.42	0.74				
4/2/2013	738.82	0.74				
4/3/2013	742.29	0.74				
4/4/2013	759.66	0.76				
4/5/2013	742.64	0.74				
4/6/2013	737.19	0.74				
4/7/2013	743.04	0.74				
4/8/2013	729.7	0.73				
4/9/2013	710.77	0.71				
4/10/2013	740.48	0.74				
4/11/2013	737.56	0.74				
4/12/2013	710.25	0.71				
4/13/2013	717.21	0.72				
4/14/2013	712.95	0.71				
4/15/2013	707.22	0.71				
4/16/2013	691.64	0.69				

Anaconda Wastewater System Flow Records Summary						
Record Period: April 1, 2012 to August, 7 2013						
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/2013)						
4/17/2013	681.9	0.68				
4/18/2013	708.31	0.71				
4/19/2013	690.34	0.69				
4/20/2013	697.17	0.70				
4/21/2013	704.03	0.70				
4/22/2013	723.86	0.72				
4/23/2013	714.97	0.71				
4/24/2013	740.26	0.74				
4/25/2013	740.94	0.74				
4/26/2013	728.62	0.73				
4/27/2013	744.03	0.74				
4/28/2013	781.2	0.78				
4/29/2013	777.71	0.78				
4/30/2013	736.9	0.74				
5/1/2013	730.26	0.73				
5/2/2013	762.2	0.76				
5/3/2013	776.86	0.78				
5/4/2013	786.56	0.79				
5/5/2013	815.06	0.82				
5/6/2013	789.13	0.79				
5/7/2013	793.01	0.79				
5/8/2013	779.05	0.78				
5/9/2013	795.74	0.80				
5/10/2013	789.69	0.79				
5/11/2013	760.2	0.76				
5/12/2013	785.93	0.79				
5/13/2013	826.1	0.83				
5/14/2013	843.84	0.84				
5/15/2013	841.19	0.84				
5/16/2013	832.55	0.83				
5/17/2013	811.52	0.81				
5/18/2013	824.4	0.82				
5/19/2013	892.46	0.89				
5/20/2013	843.98	0.84				
5/21/2013	844.44	0.84				
5/22/2013	972.46	0.97				
5/23/2013	904.52	0.90				
5/24/2013	1072.41	1.07				
5/25/2013	921.71	0.92				
5/26/2013	983.48	0.98				
5/27/2013	967.44	0.97				
5/28/2013	1157.15	1.16				
5/29/2013	1040.07	1.04				
5/30/2013	1052.84	1.05				
5/31/2013	1043.53	1.04				
6/1/2013	1031.23	1.03				
6/2/2013	1076.52	1.08				
6/3/2013	1057.62	1.06				
6/4/2013	1021.14	1.02				
6/5/2013	1038.21	1.04				
6/6/2013	1015.81	1.02	Start Ueland Pump			
6/7/2013	1019.05	1.02				
6/8/2013	1010.22	1.01				
6/9/2013	1022.84	1.02				
6/10/2013	1062.96	1.06	Pump off too much rain			

Anaconda Wastewater System Flow Records Summary						
Record Period: April 1, 2012 to August, 7 2013						
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/2013)						
6/11/2013	1096.49	1.10				
6/12/2013	1089.07	1.09				
6/13/2013	1094.27	1.09				
6/14/2013	1099.03	1.10				
6/15/2013	1095.36	1.10				
6/16/2013	1110.42	1.11				
6/17/2013	1080.92	1.08				
6/18/2013	1066.13	1.07				
6/19/2013	1114.85	1.11				
6/20/2013	1109.33	1.11				
6/21/2013	1085.37	1.09				
6/22/2013	1073.88	1.07				
6/23/2013	1085.05	1.09				
6/24/2013	1112.48	1.11				
6/25/2013	1094.46	1.09				
6/26/2013	1105.17	1.11				
6/27/2013	1094.64	1.09				
6/28/2013	1082.48	1.08				
6/29/2013	1058.2	1.06				
6/30/2013	1088.9	1.09				
7/1/2013	1099.69	1.10				
7/2/2013	1097.31	1.10				
7/3/2013	1078.13	1.08				
7/4/2013	1036.67	1.04				
7/5/2013	1057.66	1.06				
7/6/2013	1041.83	1.04				
7/7/2013	1051.81	1.05				
7/8/2013	1090.56	1.09				
7/9/2013	1008.49	1.01				
7/10/2013	978	0.98				
7/11/2013	983.22	0.98				
7/12/2013	979.04	0.98				
7/13/2013	938.35	0.94				
7/14/2013	951.98	0.95				
7/15/2013	943.24	0.94				
7/16/2013	958.62	0.96				
7/17/2013	1020.59	1.02				
7/18/2013	980.19	0.98				
7/19/2013	962.15	0.96				
7/20/2013	905.87	0.91				
7/21/2013	933.81	0.93				
7/22/2013	951.12	0.95				
7/23/2013	922.57	0.92				
7/24/2013	927.01	0.93				
7/25/2013	916.23	0.92				
7/26/2013	854.09	0.85				
7/27/2013	704.8	0.70				
7/28/2013	694.4	0.69				
7/29/2013	754.87	0.75				
7/30/2013	747.95	0.75				
7/31/2013	737.23	0.74				
8/1/2013	813.14	0.81				
8/2/2013	714.53	0.71				
8/3/2013	661.4	0.66				
8/4/2013	663.23	0.66				

Anaconda Wastewater System Flow Records Summary						
Record Period: April 1, 2012 to August, 7 2013						
(Transcribed from hard copy records provided by Anaconda Water Department 8/15/2013)						
8/5/2013	631.5	0.63				
8/6/2013	637.72	0.64				
8/7/2013	600.09	0.60				

Treatment Plant Flow Rates

April 12'

4-1-12 - 924.71
4-2-12 - 877.21
4-3-12 - 874.04
4-4-12 - 819.77
4-5-12 - 845.62
X 4-6-12 [redacted] 851.45 (4-7-12 - 839.34
4-8-12 - 843.25
4-9-12 - 769.50
4-10-12 - 808.42
4-11-12 - 854.84
4-12-12 - 740.47
4-13-12 - 873.25
4-14-12 - 966.34
4-15-12 - 910.74
4-16-12 - 982.83
4-17-12 - 981.43
4-18-12 - 873.00
4-19-12 - 850.72
4-20-12 - 912.91
4-21-12 - 938.62
4-22-12 - 934.06
4-23-12 - 930.52
4-24-12 - 936.49
4-25-12 - 799.87
4-26-12 - 888.27
4-27-12 - 762.18
4-28-12 - 659.18
4-29-12 - 641.14
4-30-12 - 671.45

May 12'

5-1-12 - 625.46
5-2-12 - 877.28
5-3-12 - 941.68
5-4-12 - 927.43
5-5-12 - 935.92
5-6-12 - 896.16
5-7-12 - 891.25
5-8-12 - 972.99
5-9-12 - 928.79
5-10-12 - 874.57
5-11-12 - 863.01
5-12-12 - 787.35
5-13-12 - 807.44
5-14-12 - 840.98
5-15-12 - 794.61
5-16-12 - 816.63
5-17-12 - 787.91
5-18-12 - 808.53
5-19-12 - 841.45
5-20-12 - 856.39
5-21-12 - 839.10
5-22-12 - 891.63
5-23-12 - 951.40
5-24-12 - 1019.08
5-25-12 - 1133.70
5-26-12 - 1258.26
5-27-12 - 1110.04
5-28-12 - 1092.23
5-29-12 - 1093.20
5-30-12 - 993.36
5-31-12 973.48

June 12'

6-1-12 - 1064.48
6-2-12 - 1110.57
6-3-12 - 1225.42
6-4-12 - 1225.99
6-5-12 - 1235.21
6-6-12 - 1175.46
6-7-12 - 1204.75
6-8-12 - 1211.38
6-9-12 - 1175.07
6-10-12 - 1196.54
6-11-12 - 1162.06
6-12-12 - 1137.54
6-13-12 - 1181.71
6-14-12 - 1177.57
6-15-12 - 1357.07
6-16-12 - 1148.41
6-17-12 - 1154.01
6-18-12 - 1210.84
6-19-12 - 1139.414
6-20-12 - 1155.79
6-21-12 - 1158.91
6-22-12 - 1164.91
6-23-12 - 1106.24
6-24-12 - 1135.01
6-25-12 - 1140.87
6-26-12 - 1156.19
6-27-12 - 1157.87
6-28-12 - 1168.39
6-29-12 - 1151.29
6-30-12 - 1115.82

July 12'

7-1-12 - 1117.27
7-2-12 - 1075.89
7-3-12 - 1049.12
7-4-12 - 1032.35
7-5-12 - 1049.97
7-6-12 - 1087.62
7-7-12 - 1101.91
7-8-12 - 1091.88
7-9-12 - 1061.38
7-10-12 - 1058.01
7-11-12 - 1057.61
7-12-12 - 1030.96
7-13-12 - 1023.64
7-14-12 - 1066.44
7-15-12 - 1292.43
7-16-12 - 1115.42
7-17-12 - 1164.85
7-18-12 - 1116.86
7-19-12 - 1118.33
7-20-12 - 1104.10
7-21-12 - 1131.70
7-22-12 - 1082.67
7-23-12 - 1172.97
7-24-12 - 1117.68
7-25-12 - 1092.44
7-26-12 - 1117.60
7-27-12 - 1109.18
7-28-12 - 1068.29
7-29-12 - 1085.79
7-30-12 - 1116.51
7-31-12 - 1072.36

August 12

8-1-12 - 1035.04
8-2-12 - 1048.91
8-3-12 - 1040.54
8-4-12 - 1007.31
8-5-12 - 1041.74
8-6-12 - 1064.33
8-7-12 - 1018.36
8-8-12 - 1009.63
8-9-12 - 1025.88
8-10-12 - 984.68
8-11-12 - 990.92
8-12-12 - 978.08
8-13-12 - 990.72
8-14-12 - 988.27
8-15-12 - 971.67
8-16-12 - 988.18
8-17-12 - 973.05
8-18-12 - 958.67
8-19-12 - 953.59
8-20-12 - 970.33
8-21-12 - 968.57
8-22-12 - 973.60
8-23-12 - 925.62
8-24-12 - 931.22
8-25-12 - 891.62
8-26-12 - 936.17
8-27-12 - 921.91
8-28-12 - 961.98
8-29-12 - 992.68
8-30-12 - 921.79
8-31-12 - 939.53

September 12'

9-1-12 - 893.02
9-2-12 - 922.05
9-3-12 - 913.27
9-4-12 - 922.01
9-5-12 - 899.54
9-6-12 - 923.90
9-7-12 900.86
9-8-12 905.57
9-9-12 915.29
9-10-12 914.53
9-11-12 886.67
9-12-12 886.06
9-13-12 909.28
9-14-12 915.81
9-15-12 904.55
9-16-12 950.26
9-17-12 934.18
9-18-12 896.19
9-19-12 896.88
9-20-12 877.99
9-21-12 913.48
9-22-12 865.82
9-23-12 910.13
9-24-12 893.36
9-25-12
9-26-12
9-27-12
9-28-12 1173.91
9-29-12 926.35
9-30-12 - 912.35

October 12'

10-1-12 - 897.24
10-2-12 - 908.55
10-3-12 - 877.07
10-4-12 - 951.74
10-5-12 - 825.74
10-6-12 - 857.75
10-7-12 - 863.10
10-8-12 - 861.68
10-9-12 - 829.48
10-10-12 - 877.76
10-11-12 - 839.51
10-12-12 - 849.09
10-13-12 - 866.92
10-14-12 - 865.95
10-15-12 - 847.25
10-16-12 - 907.56
10-17-12 - 840.88
10-18-12 - 836.73
10-19-12 - 863.49
10-20-12 - 846.69
10-21-12 - 848.69
10-22-12 - 799.36
10-23-12 - 811.44
10-24-12 - 806.41
10-25-12 - 767.17
10-26-12 - 817.77
10-27-12 827.34
10-28-12 - 890.58
10-29-12 - 854.15
10-30-12 - 823.10
10-31-12 - 805.85

November 12

11-1-12 - 787.65
11-2-12 - 762.01
11-3-12 - 794.52
11-4-12 - 869.42
11-5-12 - 710.56
11-6-12 - 658.35
11-7-12 - 685.91
11-8-12 - 656.56
11-9-12 - 716.68
11-10-12 - 737.9[illegible]
11-11-12 - 745.41
11-12-12 - 783.93
11-13-12 - 748.43
11-14-12 - 753.85
11-15-12 - 728.15
11-16-12 - 764.89
11-17-12 - 850.04
11-18-12 - 910.71
11-19-12 - 868.17
11-20-12 - 910.81
11-21-12 - 681.65
11-22-12 - 503.32
11-23-12 - 510.61
11-24-12 - 524.82
11-25-12 - 492.26
11-26-12 - 492.09
11-27-12 - 470.48

?

11-28-12 - 506.29
11-29-12 - 536.66
11-30-12 - 531.17

?

December 12'

12-3 - Turned on last cell
At wetland ponds
1-7-13 - Turned off last cell
At wetland ponds

	12-1-12	518.68
	12-2-12	606.77
	12-3-12	541.22
X	12-4-12	553.14
	12-6-12	455.42
	12-7-12	575.47
	12-8-12	580.22
	12-9-12	572.07
	12-10-12	558.33
	12-11-12	566.98
	12-12-12	439.26
	12-13-12	421.71
	12-14-12	401.85
	12-15-12	406.42
	12-16-12	466.23
	12-17-12	453.45
	12-18-12	447.90
	12-19-12	530.99
	12-20-12	535.36
	12-21-12	466.57
	12-22-12	474.62
	12-23-12	452.75
	12-24-12	373.58
	12-25-12	269.60
	12-26-12	184.70 — Found plug in sewer line
	12-27-12	491.64
	12-28-12	727.56
	12-29-12	708.44
	12-30-12	694.53
	12-31-12	662.29

12-5-12 - 499.36

January 13'

1-1-13 641.30
1-2-13 657.86
1-3-13 630.53
1-4-13 648.27
1-5-13 664.65
1-6-13 682.28
1-7-13 719.50
1-8-13 722.34
1-9-13 730.68
1-10-13 667.91
1-11-13 615.58
1-12-13 622.45
1-13-12 622.32
1-14-12 674.73
1-15-12 644.37
1-16-12 658.61
1-17-12 677.07
1-18-12 703.81
1-19-12 688.77
1-20-12 669.85
1-21-12 711.65
1-22-12 655.64
1-23-12 705.45
1-24-12 694.80
1-25-12 729.57
1-26-12 712.69
1-27-12 663.25
1-28-13 - 697.87
1-29-13 - 639.46
1-30-13 - 681.12
1-31-13 689.68

Febuary 13'

2-1-13 - 594.33
2-2-13 - 605.11
2-3-13 - 710.54
2-4-13 - 700.13
2-5-13 - 713.10
2-6-13 - 681.80
2-7-13 - 672.16
2-8-13 - 643.78
2-9-13 - 655.66
2-10-13 - 658.82
2-11-13 - 645.51
2-12-13 - 705.19
2-13-13 - 702.49
2-14-13 - 681.91
2-15-13 - 675.94
2-16-13 - 739.73
2-17-13 - 719.06
2-18-13 - 745.76
2-19-13 - 708.48
2-20-13 - 645.99
2-21-13 - 662.72
2-22-13 - 695.86
2-23-13 - 693.74
2-24-13 - 688.98
2-25-13 - 688.19
2-26-13 - 670.49
2-27-13 - 687.35
2-28-13 - 696.88

March 13'

3-1-13 - 714.66
3-2-13 - 741.39
3-3-13 - 728.34
3-4-13 - 659.96 LET WATER TO I.P. POWAS
3-5-13 - 710.17
3-6-13 - 553.20
3-7-13 - 233.30
3-8-13 - 225.02
3-9-13 - 250.95
3-10-13 - 328.90

Maine sewer line plugged in front of East Town Pump

3-11-13 - 672.99
3-12-13 - 721.71
3-13-13 - 724.81
3-14-13 - 732.73
3-15-13 - 715.46
3-16-13 - 705.60
3-17-13 - 741.30
3-18-13 - 734.07
3-19-13 - 728.16
3-20-13 - 752.70
3-21-13 - 719.46
3-22-13 - 680.08
3-23-13 - 682.75
3-24-13 - 712.95
3-25-13 - 727.56
3-26-13 - 721.91
3-27-13 - 718.17
3-28-13 - 730.84
3-29-13 - 728.05
3-30-13 - 741.15
3-31-13 - 712.86

April 13'

4-1-13 - 736.42
4-2-13 738.82
4-3-13 - 742.29
4-4-13 759.66
4-5-13 742.64
4-6-13 737.14
4-7-13 743.04
4-8-13 729.70
4-9-13 710.77
4-10-13 740.48
4-11-13 737.56
4-12-13 710.25
4-13-13 717.21
4-14-13 712.95
4-15-13 707.22
4-16-13 691.64
4-17-13 681.90
4-18-13 708.31
4-19-13 690.34
4-20-13 697.17
4-21-13 704.03
4-22-13 723.86
4-23-13 714.97
4-24-13 740.26
4-25-13 740.94
4-26-13 728.62
4-27-13 744.03
4-28-13 781.20
4-29-13 777.71
4-30-13 736.90

May 13'

5-1-13 730.26
5-2-13 762.20
5-3-13 776.86
5-4-13 786.56
5-5-13 815.06
5-6-13 789.13
5-7-13 793.01
5-8-13 779.05
5-9-13 795.74
5-10-13 789.69
5-11-13 760.20
5-12-13 785.93
5-13-13 826.10
5-14-13 843.84
5-15-13 841.19
5-16-13 832.55
5-17-13 811.52
5-18-13 824.40
5-19-13 892.46
5-20-13 843.98
5-21-13 844.44
5-22-13 972.46
5-23-13 904.52
5-24-13 1072.41
5-25-13 921.71
5-26-13 983.48
5-27-13 967.44
5-28-13 1157.15
5-29-13 1040.07
5-30-13 1052.84
5-31-13 1043.53

June 13'

6-1-13 1031.23
6-2-13 1076.52
6-3-13 1057.62
6-4-13 1021.14
6-5-13 1038.21
6-6-13 1015.81
6-7-13 1019.05 ← START VELAND PUMP
6-8-13 1010.22
6-9-13 1022.84
6-10-13 1062.96
6-11-13 1096.49 ← PUMP OFF TO MUCH RAIN.
6-12-13 1089.07
6-13-13 1094.27
6-14-13 1099.03
6-15-13 1095.36
6-16-13 1110.42
6-17-13 1080.92
6-18-13 1066.13
6-19-13 1114.85
6-20-13 1109.33
6-21-13 1085.37
6-22-13 1073.88
6-23-13 1085.05
6-24-13 1112.48
6-25-13 1094.46
6-26-13 1105.17
6-27-13 1094.64
6-28-13 1082.48
6-29-13 1058.20
6-30-13 1088.90

July 13'

7-1-13	1099.69
7-2-13	1097.31
7-3-13	1078.13
7-4-13	1036.67
7-5-13	1057.66
7-6-13	1041.83
7-7-13	1051.81
7-8-13	1090.56
7-9-13	1008.49
7-10-13	978.00
7-11-13	983.22
7-12-13	979.04
7-13-13	938.35
7-14-13	951.98
7-15-13	943.24
7-16-13	958.62
7-17-13	1020.59
7-18-13	980.19
7-19-13	962.15
7-20-13	905.87
7-21-13	933.81
7-22-13	951.12
7-23-13	922.57
7-24-13	927.01
7-25-13	916.23
7-26-13	854.09
7-27-13	704.80
7-28-13	694.40
7-29-13	754.87
7-30-13	747.95
7-31-13	737.23

August '13

8-1-13	813.14	8-28-13
8-2-13	714.53	8-29-13
8-3-13	661.40	8-30-13
8-4-13	663.23	8-31-13
8-5-13	631.50	
8-6-13	637.72	
8-7-13	600.09	
8-8-13		
8-9-13		
8-10-13		
8-11-13		
8-12-13		
8-13-13		
8-14-13		
8-15-13		
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8-25-13		
8-26-13		
8-27-13		

Appendix E

City of Anaconda Water and Wastewater Budget Records

Preliminary Engineering Report
Mill Creek TIFID

ANACONDA-DEER LODGE COUNTY
Expenditure Budget Report -- MultiYear Actuals
For the Year: 2013 - 2014

5210 WATER UTILITIES FUND
939 ANACONDA MUNICIPAL WATER

Account Object	Actuals 09-10	10-11	11-12	12-13	Current Budget 12-13	% Exp. 12-13	Prelim. Budget 13-14	Budget Changes 13-14	Final Budget 13-14	% Old Budget 13-14
430501 WATER UTILITIES										
110 FULL-TIME WAGES - PERMANE	170,355	201,876	215,151	187,685	186,539	101%	195,624		195,624	104%
115 PART-TIME WAGES - PERMANE	12,061	3,169	2,945	15,369	28,998	53%	17,503		17,503	60%
120 OVER-TIME WAGES - PERMANE	12,248	9,880	9,614	13,194	15,000	88%	15,000		15,000	100%
134 CLOTHING/EQUIPMENT ALLOWA					0	0%	2,100		2,100	*****%
136 MEAL VOUCHERS					0	0%	216		216	*****%
140 EMPLOYER CONTRIBUTIONS	88,932	93,424	99,495	96,187	108,702	88%	108,129		108,129	99%
210 OFFICE SUPPLIES	2,577	2,893	4,122	1,972	3,500	56%	3,500		3,500	100%
220 OPERATING SUPPLIES	11,903	12,986	11,524	16,362	21,000	78%	21,000		21,000	100%
230 REPAIR/MAINT SUPPLIES	20,748	13,409	18,138	61,550	26,077	236%	50,000		50,000	191%
231 GAS/OIL	3,005	4,195	4,350	5,514	4,700	117%	4,700		4,700	100%
310 COMMUNICATIONS				125	0	***%			0	0%
311 POSTAGE	7,939	7,775	8,405	8,783	9,500	92%	9,500		9,500	100%
316 RADIO MAINTENANCE	53	85		182	500	36%	500		500	100%
330 SUBSCRIPTION,DUES,ADVERT	865	40	619	641	1,000	64%	1,000	-1,000	0	0%
333 REGISTRATION FEES					0	0%		500	500	*****%
337 ADVERTISING					0	0%		910	910	*****%
338 MEMBERSHIP DUES					0	0%		90	90	*****%
340 UTILITIES	95,721	92,018	94,953	102,170	115,000	89%	115,000	-115,000	0	0%
341 GAS & ELECTRIC					0	0%		114,800	114,800	*****%
342 GARBAGE					0	0%		200	200	*****%
345 TELEPHONE	4,002	3,332	3,607	4,490	4,500	100%	4,500		4,500	100%
346 PUBLIC WATER SUPPLY FEE	5,588	5,588	5,588	5,588	6,000	93%	6,000		6,000	100%
350 PROFESSIONAL SERVICES	4,656	23,494	2,298	26,519	27,500	96%	27,500		27,500	100%
355 DATA PROCESSING SERVICES	2,692	2,773	2,856	2,999	4,000	75%	4,000		4,000	100%
360 REPAIRS/MAINTENANCE SERVI	771	1,049	1,919	1,596	12,500	13%	38,000		38,000	304%
367 WEED CONTROL	1,540				0	0%			0	0%
370 TRAVEL, MEETS	955	238	374	451	1,500	30%	1,500	-1,500	0	0%
371 EMPLOYEE AUTOMOBILE ALLOW					0	0%		500	500	*****%
372 EMPLOYEE TRAVEL/MEETING E					0	0%		1,000	1,000	*****%
380 WORKSHOP & EDUCATION		150	200	175	500	35%	500	-500	0	0%
390 PURCHASED SERVICES	6,660	6,749	4,506	2,669	8,800	30%	8,800	-8,800	0	0%
398 CONTRACTED SERVICES	815		730	2,995	2,000	150%	2,000	8,800	10,800	540%
540 TAXES		2,743	3,339	3,396	4,000	85%	4,000	-4,000	0	0%
590 OTHER FIXED CHARGES-TAXES					0	0%		4,000	4,000	*****%
810 BAD DEBT EXPENSE					0	0%		1,000	1,000	*****%
815 CUSTOMER ADJUSTMENTS	231	104	335		1,000	0%	1,000	-1,000	0	0%
940 MACHINERY & EQUIPMENT		21,323			20,000	0%	20,000		20,000	100%
950 CONSTRUCTION				4,988	20,000	25%	20,000	80,000	100,000	500%
952 CONSTRUCTION/WATER IMPROV	1,351,569	1,414,430		2,355,952	2,534,521	93%			0	0%
Account:	1,805,886	1,923,723	495,068	2,921,552	3,167,337	92%	681,572	80,000	761,572	24%
430502 NRD GROUNDWATER IMPROVEMENTS										
354 ENGINER & ARCHITECT SERV					0	0%		335,829	335,829	*****%
398 CONTRACTED SERVICES					0	0%		2,141,253	2,141,253	*****%
Account:					0	***%	0	2,477,082	2,477,082	*****%

ANACONDA-DEER LODGE COUNTY
Expenditure Budget Report -- MultiYear Actuals
For the Year: 2013 - 2014

5310 WASTEWATER/SEWER FUND
128 FACILITIES MAINTENANCE

Account Object	Actuals 09-10	10-11	11-12	12-13	Current Budget 12-13	% Exp. 12-13	Prelim. Budget 13-14	Budget Changes 13-14	Final Budget 13-14	% Old Budget 13-14
430601 SEWER UTILITIES										
110 FULL-TIME WAGES - PERMANE					0	0%		41,040	41,040	*****%
120 OVER-TIME WAGES - PERMANE					0	0%		5,000	5,000	*****%
134 CLOTHING/EQUIPMENT ALLOWA					0	0%		200	200	*****%
140 EMPLOYER CONTRIBUTIONS					0	0%		20,684	20,684	*****%
220 OPERATING SUPPLIES					0	0%		2,000	2,000	*****%
230 REPAIR/MAINT SUPPLIES					0	0%		11,000	11,000	*****%
231 GAS/OIL					0	0%		4,000	4,000	*****%
233 MACHINERY/EQUIP PARTS					0	0%		6,000	6,000	*****%
234 MOTOR VEHICLE PARTS					0	0%		2,000	2,000	*****%
333 REGISTRATION FEES					0	0%		1,000	1,000	*****%
341 GAS & ELECTRIC					0	0%		55,000	55,000	*****%
345 TELEPHONE					0	0%		1,000	1,000	*****%
350 PROFESSIONAL SERVICES					0	0%		16,000	16,000	*****%
356 CONSULTANTS SERVICES					0	0%		3,000	3,000	*****%
360 REPAIRS/MAINTENANCE SERVI					0	0%		5,500	5,500	*****%
372 EMPLOYEE TRAVEL/MEETING E					0	0%		1,000	1,000	*****%
940 MACHINERY & EQUIPMENT					0	0%		5,000	5,000	*****%
Account:					0	***%	0	179,424	179,424	*****%
Orgn:					0	0%	0	179,424	179,424	*****%
										%

5310 WASTEWATER/SEWER FUND
944 WASTEWATER TREATMNT PLANT

Account Object	Actuals 09-10	10-11	11-12	12-13	Current Budget 12-13	% Exp. 12-13	Prelim. Budget 13-14	Budget Changes 13-14	Final Budget 13-14	% Old Budget 13-14
430601 SEWER UTILITIES										
110 FULL-TIME WAGES - PERMANE	85,256	114,734	116,672	34,745	34,668	100%			0	0%
115 PART-TIME WAGES - PERMANE	25,771	6,434			0	0%			0	0%
120 OVER-TIME WAGES - PERMANE	5,120	7,178	4,607	1,326	7,000	19%			0	0%
140 EMPLOYER CONTRIBUTIONS	57,335	58,790	57,761	18,197	19,546	93%			0	0%
220 OPERATING SUPPLIES	1,068	554	1,730	2,387	1,250	191%	2,000	-2,000	0	0%
230 REPAIR/MAINT SUPPLIES	15,209	12,225	4,785	15,830	15,000	106%	10,000	-10,000	0	0%
231 GAS/OIL	3,510	4,978	4,628	5,339	4,000	133%	4,000	-4,000	0	0%
233 MACHINERY/EQUIP PARTS	5,614	5,455	3,866	598	6,000	10%	6,000	-6,000	0	0%
234 MOTOR VEHICLE PARTS		5	1,085	16	2,000	1%	2,000	-2,000	0	0%
236 PLUMBING SUPPLIES		109			500	0%	1,000	-1,000	0	0%
237 ELECTRICAL SUPPLIES					500	0%			0	0%
310 COMMUNICATIONS				40	0	***%			0	0%
320 PRINTING				1,988	0	***%			0	0%
330 SUBSCRIPTION,DUES,ADVERT				298	0	***%			0	0%
340 UTILITIES	36,941	51,528	54,844	62,622	52,000	120%	55,000	-55,000	0	0%
345 TELEPHONE	790	808	335		1,000	0%	1,000	-1,000	0	0%
350 PROFESSIONAL SERVICES				218	0	***%			0	0%
356 CONSULTANTS SERVICES	4,800	2,585			3,000	0%	3,000	-3,000	0	0%
360 REPAIRS/MAINTENANCE SERVI	3,497	3,422	8,424	10,930	5,500	199%	5,500	-5,500	0	0%
362 EQUIPMENT/MAINT			50		500	0%			0	0%
367 WEED CONTROL	219	183			0	0%			0	0%
370 TRAVEL, MEETS		408		31	1,000	3%	1,000	-1,000	0	0%
380 WORKSHOP & EDUCATION	420				500	0%	1,000	-1,000	0	0%
390 PURCHASED SERVICES	385	958	13,982	447	15,000	3%			0	0%
398 CONTRACTED SERVICES		1,530	35,762	87,827	16,000	549%	16,000	-16,000	0	0%
940 MACHINERY & EQUIPMENT				27,291	27,200	100%	5,000	-5,000	0	0%
950 CONSTRUCTION	165,006				0	0%			0	0%
Account:	410,941	271,884	308,531	270,130	212,164	127%	112,500	-112,500	0	0%
510400 DEPRECIATION										
830 DEPRECIATION			206,480		0	0%			0	0%
Account:			206,480		0	***%	0	0	0	0%
Orgn:	410,941	271,884	515,011	270,130	212,164	127%	112,500	-112,500	0	0%
										%

ANACONDA-DEER LODGE COUNTY
Revenue Budget Report -- MultiYear Actuals
For the Year: 2013 - 2014

5310 WASTEWATER/SEWER FUND

Account	Actuals 09-10	Actuals 10-11	Actuals 11-12	Actuals 12-13	Current Budget 12-13	% Rec. 12-13	Prelim. Budget 13-14	Budget Change 13-14	Final Budget 13-14	% Old Budget 13-14
310000 TAXES										
312001 PENALTY & INTEREST TAXES	3,010	3,715	4,739	3,201	0	***%			0	0%
313000 TAX TITLE & PROP. SALES				725	0	***%			0	0%
Group:	3,010	3,715	4,739	3,926	0	***%	0	0	0	0%
340000 FEES & CHARGES										
343031 SEWER SERVICE CHARGES	245,931	244,905	245,701	246,886	246,456	100%	680,526		680,526	276%
Group:	245,931	244,905	245,701	246,886	246,456	100%	680,526	0	680,526	276%
360000 MISCELLANEOUS REVENUES										
360101 MISC REVENUES	4,800				0	0%			0	0%
Group:	4,800				0	0%	0	0	0	0%
370000 INVESTMENT EARNINGS										
371010 INVESTMENT EARNINGS	351	195	101	191	100	191%	100		100	100%
Group:	351	195	101	191	100	191%	100	0	100	100%
380000 OTHER FINANCING SOURCES										
382017 SALE OF EQUIP -				600	0	***%			0	0%
383038 Transfer in from 2312			279,618		0	0%			0	0%
Group:			279,618	600	0	***%	0	0	0	0%
Fund:	254,092	248,815	530,159	251,603	246,556	102%	680,626	0	680,626	276%
Grand Total:	254,092	248,815	530,159	251,603	246,556		680,626	0	680,626	

5310 WASTEWATER/SEWER FUND
128 FACILITIES MAINTENANCE

Account	Object	Actuals 09-10	Actuals 10-11	Actuals 11-12	Actuals 12-13	Current Budget 12-13	% Exp. 12-13	Prelim. Budget 13-14	Budget Changes 13-14	Final Budget 13-14	% Old Budget 13-14
430601	SEWER UTILITIES										
110	FULL-TIME WAGES - PERMANE					0	0%	_____	41,040	41,040	*****%
120	OVER-TIME WAGES - PERMANE					0	0%	_____	5,000	5,000	*****%
134	CLOTHING/EQUIPMENT ALLOWA					0	0%	_____	200	200	*****%
140	EMPLOYER CONTRIBUTIONS					0	0%	_____	20,684	20,684	*****%
220	OPERATING SUPPLIES					0	0%	_____	2,000	2,000	*****%
230	REPAIR/MAINT SUPPLIES					0	0%	_____	11,000	11,000	*****%
231	GAS/OIL					0	0%	_____	4,000	4,000	*****%
233	MACHINERY/EQUIP PARTS					0	0%	_____	6,000	6,000	*****%
234	MOTOR VEHICLE PARTS					0	0%	_____	2,000	2,000	*****%
333	REGISTRATION FEES					0	0%	_____	1,000	1,000	*****%
341	GAS & ELECTRIC					0	0%	_____	55,000	55,000	*****%
345	TELEPHONE					0	0%	_____	1,000	1,000	*****%
350	PROFESSIONAL SERVICES					0	0%	_____	16,000	16,000	*****%
356	CONSULTANTS SERVICES					0	0%	_____	3,000	3,000	*****%
360	REPAIRS/MAINTENANCE SERVI					0	0%	_____	5,500	5,500	*****%
372	EMPLOYEE TRAVEL/MEETING E					0	0%	_____	1,000	1,000	*****%
940	MACHINERY & EQUIPMENT					0	0%	_____	5,000	5,000	*****%
	Account:					0	***%	0	179,424	179,424	*****%
	Orgn:					0	0%	0	179,424	179,424	*****%
											%

ANACONDA-DEER LODGE COUNTY
Revenue Budget Report -- MultiYear Actuals
For the Year: 2013 - 2014

5210 WATER UTILITIES FUND

Account	Actuals 09-10	10-11	11-12	12-13	Current Budget 12-13	% Rec. 12-13	Prelim. Budget 13-14	Budget Change 13-14	Final Budget 13-14	% Old Budget 13-14
330000 INTERGOVERNMENTAL REVENUE										
334013 NRD WEST FOURTH STREET			96		0	0%			0	0%
334014 NRD EAST THIRD ST	37,089				0	0%			0	0%
334015 NRD WEST THIRD		1,337,292	69,220		0	0%			0	0%
334017 NRD FRONT & ALDER	1,107,699				0	0%			0	0%
334018 NRD WATER				181,658	27,969	649%	2,477,082		2,477,082	8856%
334019 NRD CROSS STREETS	14,231		606,413	1,611,099	1,622,989	99%			0	0%
334020 ST EMERGENCY AND DISASTER					708,000	0%			0	0%
Group:	1,159,019	1,337,292	675,729	1,792,757	2,358,958	76%	2,477,082	0	2,477,082	105%
340000 FEES & CHARGES										
343021 WATER METERS	160,287	209,117	221,898	213,936	180,000	119%	200,000		200,000	111%
343022 WATER FLAT RATE	833,514	826,260	822,301	801,438	800,000	100%	750,000		750,000	93%
343028 WATER SPRINKLING FEES	151,816	151,101	150,530	147,098	150,000	98%	145,000		145,000	96%
Group:	1,145,617	1,186,478	1,194,729	1,162,472	1,130,000	103%	1,095,000	0	1,095,000	96%
360000 MISCELLANEOUS REVENUES										
360101 MISC REVENUES	16,612	15,603	11,842	9,535	12,000	79%	10,000		10,000	83%
Group:	16,612	15,603	11,842	9,535	12,000	79%	10,000	0	10,000	83%
370000 INVESTMENT EARNINGS										
371010 INVESTMENT EARNINGS	15,511	10,388	16,165	10,341	15,000	69%	10,000		10,000	66%
Group:	15,511	10,388	16,165	10,341	15,000	69%	10,000	0	10,000	66%
Fund:	2,336,759	2,549,761	1,898,465	2,975,105	3,515,958	85%	3,592,082	0	3,592,082	102%
Grand Total:	2,336,759	2,549,761	1,898,465	2,975,105	3,515,958		3,592,082	0	3,592,082	

5210 WATER UTILITIES FUND
939 ANACONDA MUNICIPAL WATER

Account Object	Actuals 09-10	10-11	11-12	12-13	Current Budget 12-13	% Exp. 12-13	Prelim. Budget 13-14	Budget Changes 13-14	Final Budget 13-14	% Old Budget 13-14
430501 WATER UTILITIES										
110 FULL-TIME WAGES - PERMANE	170,355	201,876	215,151	187,685	186,539	101%	195,624		195,624	104%
115 PART-TIME WAGES - PERMANE	12,061	3,169	2,945	15,369	28,998	53%	17,503		17,503	60%
120 OVER-TIME WAGES - PERMANE	12,248	9,880	9,614	13,194	15,000	88%	15,000		15,000	100%
134 CLOTHING/EQUIPMENT ALLOWA					0	0%	2,100		2,100	*****%
136 MEAL VOUCHERS					0	0%	216		216	*****%
140 EMPLOYER CONTRIBUTIONS	88,932	93,424	99,495	96,187	108,702	88%	108,129		108,129	99%
210 OFFICE SUPPLIES	2,577	2,893	4,122	1,972	3,500	56%	3,500		3,500	100%
220 OPERATING SUPPLIES	11,903	12,986	11,524	16,362	21,000	78%	21,000		21,000	100%
230 REPAIR/MAINT SUPPLIES	20,748	13,409	18,138	61,550	26,077	236%	50,000		50,000	191%
231 GAS/OIL	3,005	4,195	4,350	5,514	4,700	117%	4,700		4,700	100%
310 COMMUNICATIONS				125	0	***%			0	0%
311 POSTAGE	7,939	7,775	8,405	8,783	9,500	92%	9,500		9,500	100%
316 RADIO MAINTENANCE	53	85		182	500	36%	500		500	100%
330 SUBSCRIPTION,DUES,ADVERT	865	40	619	641	1,000	64%	1,000	-1,000	0	0%
333 REGISTRATION FEES					0	0%		500	500	*****%
337 ADVERTISING					0	0%		910	910	*****%
338 MEMBERSHIP DUES					0	0%		90	90	*****%
340 UTILITIES	95,721	92,018	94,953	102,170	115,000	89%	115,000	-115,000	0	0%
341 GAS & ELECTRIC					0	0%		114,800	114,800	*****%
342 GARBAGE					0	0%		200	200	*****%
345 TELEPHONE	4,002	3,332	3,607	4,490	4,500	100%	4,500		4,500	100%
346 PUBLIC WATER SUPPLY FEE	5,588	5,588	5,588	5,588	6,000	93%	6,000		6,000	100%
350 PROFESSIONAL SERVICES	4,656	23,494	2,298	26,519	27,500	96%	27,500		27,500	100%
355 DATA PROCESSING SERVICES	2,692	2,773	2,856	2,999	4,000	75%	4,000		4,000	100%
360 REPAIRS/MAINTENANCE SERVI	771	1,049	1,919	1,596	12,500	13%	38,000		38,000	304%
367 WEED CONTROL	1,540				0	0%			0	0%
370 TRAVEL, MEETS	955	238	374	451	1,500	30%	1,500	-1,500	0	0%
371 EMPLOYEE AUTOMOBILE ALLOW					0	0%		500	500	*****%
372 EMPLOYEE TRAVEL/MEETING E					0	0%		1,000	1,000	*****%
380 WORKSHOP & EDUCATION		150	200	175	500	35%	500	-500	0	0%
390 PURCHASED SERVICES	6,660	6,749	4,506	2,669	8,800	30%	8,800	-8,800	0	0%
398 CONTRACTED SERVICES	815		730	2,995	2,000	150%	2,000	8,800	10,800	540%
540 TAXES		2,743	3,339	3,396	4,000	85%	4,000	-4,000	0	0%
590 OTHER FIXED CHARGES-TAXES					0	0%		4,000	4,000	*****%
810 BAD DEBT EXPENSE					0	0%		1,000	1,000	*****%
815 CUSTOMER ADJUSTMENTS	231	104	335		1,000	0%	1,000	-1,000	0	0%
940 MACHINERY & EQUIPMENT		21,323			20,000	0%	20,000		20,000	100%
950 CONSTRUCTION				4,988	20,000	25%	20,000	80,000	100,000	500%
952 CONSTRUCTION/WATER IMPROV	1,351,569	1,414,430		2,355,952	2,534,521	93%			0	0%
Account:	1,805,886	1,923,723	495,068	2,921,552	3,167,337	92%	681,572	80,000	761,572	24%
430502 NRD GROUNDWATER IMPROVEMENTS										
354 ENGINER & ARCHITECT SERV					0	0%		335,829	335,829	*****%
398 CONTRACTED SERVICES					0	0%		2,141,253	2,141,253	*****%
Account:					0	***%	0	2,477,082	2,477,082	*****%

5210 WATER UTILITIES FUND
939 ANACONDA MUNICIPAL WATER

Account Object	Actuals 09-10	10-11	11-12	12-13	Current Budget 12-13	% Exp. 12-13	Prelim. Budget 13-14	Budget Changes 13-14	Final Budget 13-14	% Old Budget 13-14
490201 REVENUE BONDS DNRC										
610 PRINCIPAL	310,000	330,000	350,000	370,000	370,000	100%			0	0%
620 INTEREST	81,290	63,000	43,200	22,200	22,200	100%			0	0%
630 PAYING AGENT FEES	300	300	300	300	300	100%			0	0%
Account:	391,590	393,300	393,500	392,500	392,500	100%	0	0	0	0%
510400 DEPRECIATION										
830 DEPRECIATION			317,420		0	0%			0	0%
Account:			317,420		0	***%	0	0	0	0%
521001 OPERATING TRANSFERS OUT										
820 OPER TRANS OUT	15,000				0	0%			0	0%
Account:	15,000				0	***%	0	0	0	0%
Orgn:	2,212,476	2,317,023	1,205,988	3,314,052	3,559,837	93%	681,572	2,557,082	3,238,654	90%
										%

ANACONDA-DEER LODGE COUNTY
Expenditure Budget Report -- MultiYear Actuals
For the Year: 2013 - 2014

5210 WATER UTILITIES FUND
957 COMP. LIABILITY INSURANCE

Account	Object	Actuals 09-10	Actuals 10-11	Actuals 11-12	Actuals 12-13	Current Budget 12-13	% Exp. 12-13	Prelim. Budget 13-14	Budget Changes 13-14	Final Budget 13-14	% Old Budget 13-14
510330 COMP. LIABILITY INSURANCE			43,182	42,497		0	0%			0	0%
510 INSURANCE			43,182	42,497		0	***%	0	0	0	0%
	Account:		43,182	42,497		0	0%	0	0	0	0%
	Orgn:										%
	Fund:	2,212,476	2,360,205	1,248,485	3,314,052	3,559,837	93%	681,572	2,557,082	3,238,654	90%
											%
	Grand Total:	2,212,476	2,360,205	1,248,485	3,314,052	3,559,837		681,572	2,557,082	3,238,654	

Appendix F

Land Development Information/Assumptions

Preliminary Engineering Report
Mill Creek TIFID

Purpose:

Summary of information used for land development of the Mill Creek TIFID.

Methods:

A. Right of Way Information

For major highways, the right-of-way was estimated at 50 ft. from the centerline of roadway. For existing non-highway roads and proposed roads, the right-of-way was estimated at 30 ft. from the centerline of the roadway. These estimates were based off of information provided by City of Los Angeles Bureau of Engineering in the pdf 'Standard Street Dimensions' (City of Los Angeles, 1970). Cul-de-sacs were created with a 50 ft. radius. This was chosen as it was the maximum literature value for radius found online (specific references are for smaller cul-de sacs (35 ft. radius and 46 ft. radius) (City of Los Angeles, 1970) (Southwest Region Planning Commission, 2001).

A 50 ft. right-of-way from centerline of rail was assumed for all existing rail lines (Foster and Griffiths, 2008) Proposed rail lines have a 25 ft. right-of-way from the centerline of rail when isolated and a 50 ft. right-of-way from centerline when along existing rail lines. The proposed rail right-of-ways will be discussed in detail in Section B.

For overhead utility corridors, a right-of-way was assumed to encompass existing overhead alignments plus 20 ft. each side of alignment.

The Silver Lake Pipeline was given a right-of way of 50 ft. on each side of the center alignment.

B. Railroad Design

The following design parameters were used for the proposed railroad sidetracks:

1) Minimum curvature used was 603.80 ft. radius (BNSF Railway Company, 2011).
2) All turnouts were placed 200 ft. from any road crossings, bridges, other turnouts, and curves (CSX Transportation, 2007).
3) Side track right of way width was set at a minimum of 50 ft. This allows for two parallel tracks with 16 ft. between centers and 17 ft. of right of way on either side of the track from track center. Minimum distance required from center of track for right of way is 12 ft. for industrial tracks and the minimum distance between tracks is 16 ft. (CSX Transportation, 2007). Where the side track parallels the Butte, Anaconda, and Pacific Railways lines, an additional 50 ft. of right of way was added.
4) Grades are not to exceed 1.5% (BNSF Railway Company, 2011).

C. Road Design

The following design parameters were used for the proposed roads:

1) Proposed roads were given a 30 ft. right-of-way (City of Los Angeles, 1970).
2) Cul-de-sacs were given a 50 ft. radial right-of way as discussed previously.
3) Intersections were offset 200 ft. from highway railroad crossings (Wooldridge et al., 2000).

D. General Site Specific Design Considerations

Several site specific features had to be considered when subdividing the TIFID land.

1) Floodplain – Subdivision of land falling within FEMA Zone A floodplain (National Flood Insurance, 1985) did not occur. Regulations governing the construction of buildings and use of land within the floodplain are given in the Code of Federal Regulations for the National Flood Insurance Program: 44 CFR Parts 59, 60, 65, and 70 (FEMA, 2013). The NWE revised floodplain (Water & Environmental Technologies, 2013) was not considered for the design as construction will be allowed within the floodplain with the appropriate permitting.
2) Steep Slopes – The hill located in the southern portion of the TIFID will not be developed. After a site visit, the hill was determined to be too steep to be useful industrial use (there does exist a possibility though that a specific business could use this land, i.e. gravel pit, grazing land, etc.).
3) Heavily Vegetated Areas – Several areas within the TIFID are heavily vegetated and located in close proximity to Mill Creek. These areas will not be developed and have been set aside as park or open space depending on their location.
4) Drainage Controls – Drainage ditches run across the TIFID and will not be disturbed by the development of this land. All ditches exist on subdivided property boundaries and will not be altered as they are important for storm water control and drainage. The westernmost portion of the TIFID is blocked by a drainage ditch that captures runoff from ARCO property and prevents this runoff from entering Mill Creek. This ditch is the westernmost boundary of the subdivision and all property west of the ditch will remain open space.
5) Overhead Utility Lines – Due to the large amount of overhead utility lines, a large utility corridor was created running from the southern boundary of the TIFID to the Gates Generating Station. All land within this corridor will not be developed.
6) Fish and Wildlife Stream Corridor – FWP recommends a 150 ft. buffer from creek with an additional 50 ft. of building setback.

7) Access Issues – Parcel to southeast of Mill Creek and west of Mill Creek Highway was not developed due to difficult and costly water and sewer designs. The property north of Mill Creek and bounded by the TIFID property border was not developed due to access issues and the need to cross the creek or other property to gain access.

Results:

Table 1 summarizes the subdivision of the TIFID. Lot specific design considerations are given in the notes section of the table. Table 2 summarizes the acreage of the development, park/open space, and right-of-way within the TIFID at full build out. Figure 19 in the Figure Section of this calculation brief displays the proposed subdivision of the TIFID.

Table 1: TIFID Parcel Summary

Lot Name	Size [Acres]	Notes
Parcel 1	5.50	
Parcel 2	5.00	Ditch abuts railway so ditch excluded from lot. Ditch to S&N runs on west end of lot. Road to south is set back 200 ft. from the railway crossing per recommendation of Federal Highway Administration (Wooldridge et al., 2000).
Parcel 3	5.00	
Parcel 4	5.00	
Parcel 5	5.90	Lot bordered by S&N ditch on west side and highway to the west.
Parcel 6	3.93	Lot is bordered by S&N ditch to the east and overhead utility lines to the south.
Parcel 7	5.83	Lot is bordered by the utility corridor to the north and is the remainder of the land from the proposed southern road north.
Parcel 8	5.00	
Parcel 9	5.00	
Parcel 10	5.00	
Parcel 11	4.06	Northern border is raised ditch.
Parcel 12	5.00	Southern border is raised ditch.
Parcel 13	3.94	Lot is split by utility corridor and is remainder of land abutting the corridor.
Parcel 14	5.00	
Parcel 15	7.50	7.5 acre lot bordered by S&N ditch to the east.
Parcel 16	5.24	
Parcel 17	5.00	
Parcel 18	5.00	
Parcel 19	5.00	
Parcel 20	5.00	
Parcel 21	5.00	Eastern boundary is ADLC/ARCO property boundary.

Table 1: TIFID Parcel Summary		
Lot Name	**Size [Acres]**	**Notes**
Parcel 22	4.63	Composed of two parcels split by overhead utility corridor.
Parcel 23	7.85	Composed of three parcels split by two overhead utility corridors.
Parcel 24	11.03	Parcel borders Mill Creek and may have to be adjusted due to revised floodplain and wetlands areas. Eastern border is property boundary between ADLC/ARCO.
Parcel 25	6.16	Composed of two parcels split by overhead utility corridor. Lot is bordered by drainage ditch to the south and ADLC/ARCO property boundary to the east. Lot is remainder of land between drainage ditch and proposed road.
Parcel 26	5.00	Bordered by drainage ditch to the south.
Parcel 27	5.00	Bordered by drainage ditch to the south.
Parcel 28	4.61	Parcel borders Mill Creek and may have to be adjusted due to revised floodplain and wetlands areas.
Parcel 29	3.98	Parcel borders Mill Creek and may have to be adjusted due to revised floodplain and wetlands areas.
Parcel 30	8.25	Composed of three parcels split by overhead utility corridor to the south and Silver Lake Pipeline to the north. Western boundary is ADLC/ARCO property boundary.
Parcel 31	5.51	Western boundary is ADLC/ARCO property boundary with floodplain acting as boundary to the south.
Parcel 32	6.94	Lot is composed of two parcels split by overhead utility corridor. Lot is adjacent to floodplain. Overhead utilities bordered the lot to the east and northeast.
Parcel 33	8.69	Lot is bordered by proposed road to north, overhead utilities to the east, a drainage ditch to the south, and the ADLC/ARCO property boundary to the west.
Parcel 34	7.50	Western border is ADLC/ARCO property boundary. Southern border is drainage ditch.
Parcel 35	5.00	Southern border is drainage ditch.
Parcel 36	2.27	Composed of remainder of land to the east and west of the utility corridor that splits property south of proposed road and north of drainage ditch.
Parcel 37	5.00	Lot is bordered by drainage ditch to the south and overhead utility corridor to the east.
Parcel 38	5.00	Lot is bordered by drainage ditch to south, proposed road to the west, and proposed railway to the east.
Parcel 39	5.00	
Parcel 40	4.54	Composed of two parcels split by overhead utility corridor and bounded by proposed road and proposed/existing railroad.
Parcel 41	6.82	Composed of available area to the east of train tracks and south of Willow Glen Road.

Table 1: TIFID Parcel Summary		
Lot Name	**Size [Acres]**	**Notes**
Parcel 42	3.27	Composed of two sections split by overhead utility corridor. A majority of this lot also falls into the NWE revised floodplain (Water & Environmental technologies, 2013).
Parcel 43	5.00	Partially included in NWE revised floodplain (Water & Environmental technologies, 2013).
Parcel 44	5.00	Partially included in NWE revised floodplain (Water & Environmental technologies, 2013).
Parcel 45	6.75	Parcel borders Mill Creek and may have to be adjusted due to revised floodplain and wetlands areas.
Parcel 46	5.00	Bordered by utility corridor to the west.
Parcel 47	5.00	Parcel borders Mill Creek and may have to be adjusted due to revised floodplain and wetlands areas.
Parcel 48	5.00	Bordered to the northeast by overhead utility corridor.
Parcel 49	5.00	
Parcel 50	6.35	Composed of two parcels split by overhead utility corridor and partially bordered to south by overhead utility corridor.
Parcel 51	5.00	Partially bordered to the northeast by overhead utility corridor.
Parcel 52	5.00	
Parcel 53	5.00	Bordered on south by drainage ditch.
Parcel 54	5.00	Bordered by drainage ditch to north and overhead utility corridor to the west.
Parcel 55	4.39	Remainder of land bordered by drainage ditch to the north and overhead utility corridor to the east.
Parcel 56	7.57	Remainder of land west of overhead utility corridor and south of drainage ditch.
Parcel 57	5.00	Northern border of drainage ditch.
Parcel 58	5.00	Bordered by drainage ditch to north and proposed road to the west.
Parcel 59	4.51	Composed of two parcels split by the Silver Lake Pipeline.
Parcel 60	5.25	Composed of two parcels split by overhead utility corridor.
Parcel 61	4.99	
Parcel 62	5.00	
Parcel 63	5.00	
Parcel 64	5.00	
Parcel 65	4.86	Composed of two parcels split by overhead utility corridor.
Parcel 66	4.41	Composed of two parcels split by overhead utility corridor.
Parcel 67	5.00	
Parcel 68	5.00	
Parcel 69	4.53	Composed of two parcels split by overhead utility corridor.
Parcel 70	5.00	
Parcel 71	5.00	
Parcel 72	5.00	

Table 2: TIFID Acreage Summary		
Development Type	**Acreage**	**Notes**
Developed	382.6	
Park	34.6	Includes undeveloped area bordering Mill Creek in the southern portion of the TIFID.
Open Space	147.6	Includes undeveloped area along hill to south of TIFID and other undeveloped areas not part of a utility corridor.
Right-of-Way/ Floodplain	222.2	Includes existing road, railroad, and utility ROWs as well as proposed road and railroad ROWs and FEMZ Zone A Floodplain.
Total Acreage	**786.8**	

References

City of Los Angeles Bureau of Engineering, 1970, *Standard Street Dimensions*, <http://eng.lacity.org/techdocs/streetd/figures/e100/e113.pdf>

Southwest Region Planning Commission, 2001, *Subdivision and Site Plan Review Handbook,* <http://www.swrpc.org/files/data/library/local_planning/Subdivision%20and%20Site%20Plan%20Review%20Handbook.pdf>

Foster, Erik and Griffiths, Peter, 2008, A Railroad Right-of-Way May be Wider than You (or Your Surveyor) Think, martindale.com, <http://www.martindale.com/insurance-law/article_Moye-White-LLP_379198.htm>

BNSF Railway Company, 2011, *Design Guidelines for Industrial Track Projects*, Revised Dec 2011.

CSX Transportation, 2007, *Standard Specifications for the Design and Construction of Private Sidetracks*, <http://www.csx.com/share/wwwcsx_mura/assets/File/Customers/Services_and_Partners/CSX_Industrial_Sidetrack_Manual_063003.pdf>

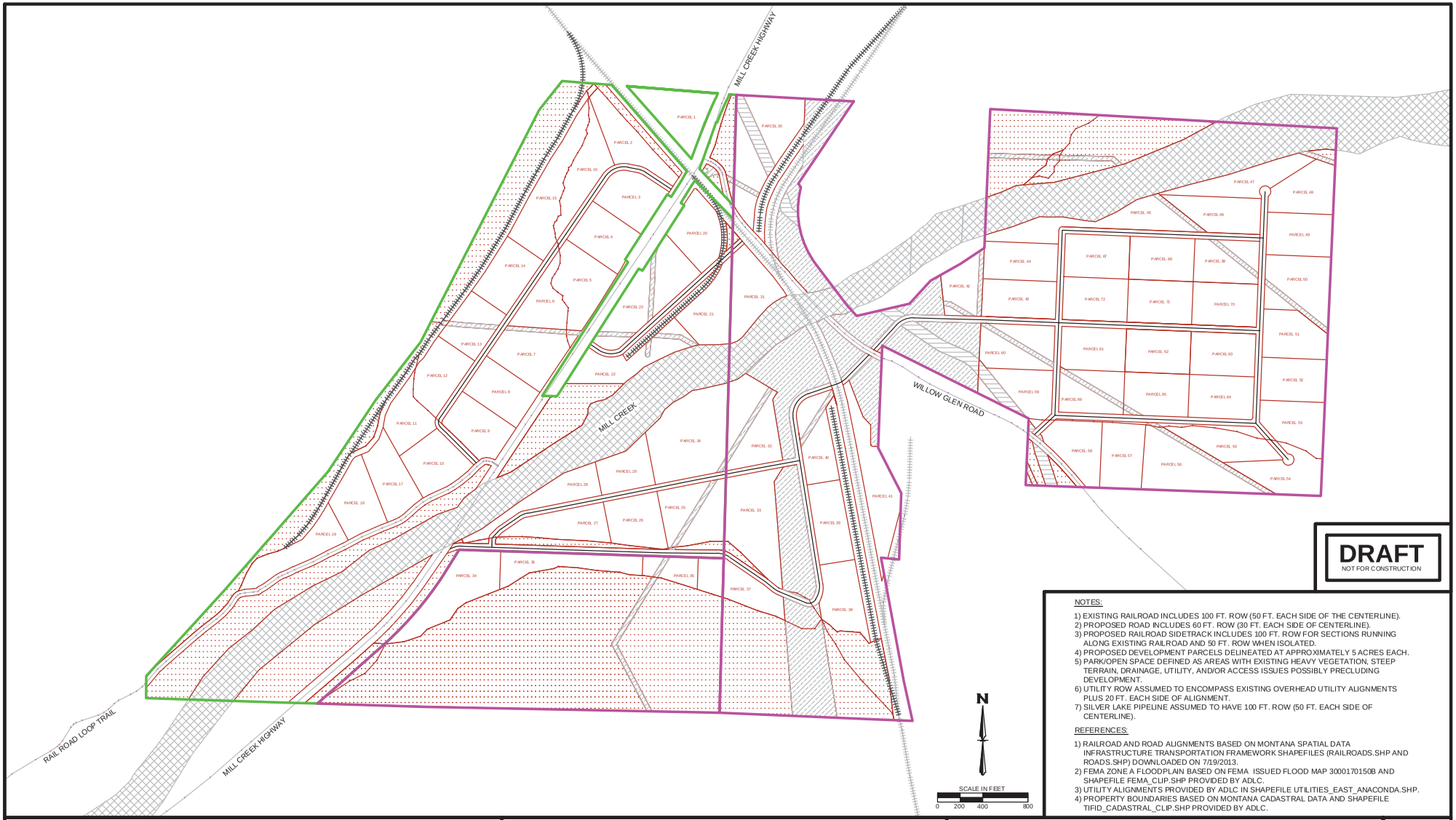
Wooldridge et al., 2000, *Design Guidelines for At-Grade Intersections near Highway-Railroad Grade Crossings,* Federal Highway Administration.

National Flood Insurance Program, 1985, *Flood Insurance Rate Map – Anaconda Deer Lodge County, Montana (Unincorporated Areas), Community Panel Number 300017 0150 B*, FEMA.

FEMA, 2013, *National Flood Insurance Program (NFIP) Floodplain Management Requirements: A Study Guide and Desk Reference for Local Officials*, <http://www.fema.gov/floodplain-management/floodplain-management-requirements>

Water & Environmental Technologies, 2013, *Northwestern Energy Mill Creek Substation – Mill Creek Base Flood Elevation Determination*.

Figure



DRAFT
NOT FOR CONSTRUCTION

NOTES:

1) EXISTING RAILROAD INCLUDES 100 FT. ROW (50 FT. EACH SIDE OF THE CENTERLINE).
2) PROPOSED ROAD INCLUDES 60 FT. ROW (30 FT. EACH SIDE OF CENTERLINE).
3) PROPOSED RAILROAD SIDETRACK INCLUDES 100 FT. ROW FOR SECTIONS RUNNING ALONG EXISTING RAILROAD AND 50 FT. ROW WHEN ISOLATED.
4) PROPOSED DEVELOPMENT PARCELS DELINEATED AT APPROXIMATELY 5 ACRES EACH.
5) PARK/OPEN SPACE DEFINED AS AREAS WITH EXISTING HEAVY VEGETATION, STEEP TERRAIN, DRAINAGE, UTILITY, AND/OR ACCESS ISSUES POSSIBLY PRECLUDING DEVELOPMENT.
6) UTILITY ROW ASSSUMED TO ENCOMPASS EXISTING OVERHEAD UTILITY ALIGNMENTS PLUS 20 FT. EACH SIDE OF ALIGNMENT.
7) SILVER LAKE PIPELINE ASSUMED TO HAVE 100 FT. ROW (50 FT. EACH SIDE OF CENTERLINE).

REFERENCES:

1) RAILROAD AND ROAD ALIGNMENTS BASED ON MONTANA SPATIAL DATA INFRASTRUCTURE TRANSPORTATION FRAMEWORK SHAPEFILES (RAILROADS.SHP AND ROADS.SHP) DOWNLOADED ON 7/19/2013.
2) FEMA ZONE A FLOODPLAIN BASED ON FEMA ISSUED FLOOD MAP 3000170150B AND SHAPEFILE FEMA_CLIP.SHP PROVIDED BY ADLC.
3) UTILITY ALIGNMENTS PROVIDED BY ADLC IN SHAPEFILE UTILITIES_EAST_ANACONDA.SHP.
4) PROPERTY BOUNDARIES BASED ON MONTANA CADASTRAL DATA AND SHAPEFILE TIFID_CADASTRAL_CLIP.SHP PROVIDED BY ADLC.

LEGEND:

- EXISTING ROAD
- EXISTING RAILROAD (SEE NOTE 1)
- PROPOSED ROAD CENTERLINE (SEE NOTE 2)
- PROPOSED RAILROAD SIDETRACK CENTERLINE (SEE NOTE 3)
- PROPOSED DEVELOPMENT PARCELS (SEE NOTE 4)
- PARK/OPEN SPACE (SEE NOTE 5)
- OVERHEAD UTILITY RIGHT-OF-WAY (ROW) (SEE NOTE 6)
- SILVER LAKE PIPELINE RIGHT-OF-WAY (SEE NOTE 7)
- FEMA ZONE A FLOODPLAIN
- ARCO PROPERTY BOUNDARY
- ADLC PROPERTY BOUNDARY

Copper Environmental Consulting, LLC

COPPER ENVIRONMENTAL CONSULTING, LLC.
406 East Park Avenue Suite 2
Anaconda, MT 59711
(406) 563-2700

MILL CREEK TIFID PROPOSED DEVELOPMENT PLAN
MILL CREEK TIFID PER
PREPARED FOR:
ANACONDA-DEER LODGE COUNTY

FIGURE
15

Appendix G

Cost Estimates

Preliminary Engineering Report
Mill Creek TIFID

TABLE G-1
COST ESTIMATE SUMMARY SHEETS
MILL CREEK TIFID PRELIMINARY ENGINEERING REPORT
ANACONDA - DEER LODGE COUNTY

Item No.	Work Item	Anaconda-Deer Lodge Property	Atlantic Richfield Property	Subtotals
1	**Direct Costs**			
2	Site Preparation/Access Roads/Rail Spur	$ 2,238,562	$ 2,184,825	$ 4,423,387
3	Water System	$ 2,816,361	$ 1,769,368	$ 4,585,729
4	Wastewater System	$ 1,784,640	$ 2,772,305	$ 4,556,945
5	Stormwater System	$ 466,537	$ 452,359	$ 918,896
6	***Direct Costs Subtotal***	***$ 7,306,100***	***$ 7,178,857***	***$ 14,484,957***
7	**Indirect Costs**			
8	Engineering and Permitting (10% Direct Costs)	$ 730,610	$ 717,886	$ 1,448,496
9	Mobilization/Demobilization (4% Direct Costs)	$ 292,244	$ 287,154	$ 579,398
10	Quality Control (2% Direct Costs)	$ 146,122	$ 143,577	$ 289,699
11	Quality Assurance/Construction Oversight (4% Direct Costs)	$ 292,244	$ 287,154	$ 579,398
12	Surveying (2% Direct Costs)	$ 146,122	$ 143,577	$ 289,699
13	Construction Stormwater Management (2% Direct Costs)	$ 146,122	$ 143,577	$ 289,699
14	Management/Administration (3% Direct Costs)	$ 219,183	$ 215,366	$ 434,549
15	Traffic Control (2% Direct Costs)	$ 146,122	$ 143,577	$ 289,699
14	Taxes and Bonds (6% Direct Costs)	$ 438,366	$ 430,731	$ 869,097
15	***Indirect Costs Subtotal***	***$ 2,557,135***	***$ 2,512,600***	***$ 5,069,735***
16	***Direct and Indirect Costs Subtotal***	***$ 9,863,235***	***$ 9,691,457***	***$ 19,554,692***
17	**Contingency (15% on Direct and Indirect Costs)**	$ 1,479,485	$ 1,453,719	$ 2,933,204
18	**TOTAL ESTIMATED CONSTRUCTION COSTS**	**$ 11,342,720**	**$ 11,145,176**	**$ 22,487,896**
19	**Present Value Annual O&M (i=6, n=20 years)**	$ 213,341	$ 383,095	$ 596,436
20	**TOTAL ESTIMATED COSTS**	**$ 11,556,061**	**$ 11,528,271**	**$ 23,084,332**

TABLE G-2
SITE PREPARATION/ACCESS ROADS/RAIL SPUR COST SUMMARY
DIRECT COSTS SUMMARY SHEET
MILL CREEK TIFID PRELIMINARY ENGINEERING REPORT
ANACONDA - DEER LODGE COUNTY

Item No.	Work Item	Quantity	Unit	Unit Cost	Subtotals		Total
1	**Anaconda-Deer Lodge County Property**						
2	Clearing and Grubbing (1)	47	AC	$ 322.00	$ 14,973		
3	Site Regrading (2)	75,020	CY	$ 1.62	$ 121,532		
4	Access Roads (3)	1.94	MI	$ 316,524	$ 614,057		
5	Rail Spurs (4)	7,440	FT	$ 200	$ 1,488,000		
6	**Anaconda-Deer Lodge County Property Subtotal**					**$ 2,238,562**	
7	**Atlantic Richfield Property**						
8	Clearing and Grubbing (1)	68	AC	$ 322.00	$ 21,928		
9	Site Regrading (2)	109,868	CY	$ 1.62	$ 177,986		
10	Access Roads (3)	2.96	MI	$ 316,524	$ 936,911		
11	Rail Spurs (4)	5,240	FT	$ 200	$ 1,048,000		
12	**Atlantic Richfield Property Subtotal**					**$ 2,184,825**	
13	**TOTAL ESTIMATED COSTS**						**$ 4,423,387**

TABLE G-2a
SITE PREPARATION/ACCESS ROADS/RAIL SPUR SUMMARY NOTES
MILL CREEK TIFID PRELIMINARY ENGINEERING REPORT
ANACONDA-DEER LODGE COUNTY

Note No.	Notes
1	Includes clearing of existing vegetation within each area. Assumes consolidation and stockpiling of all cleared material onsite (i.e. no offsite hauling/disposal). Quantity assumes 30% of parcel is cleared for development.
2	Includes on-site regrading to level area for development. Assumes local regrading only (i.e., no fill import). Quantity assumes 1 ft. of regrading depth over 30% of each parcel for development. Includes excavation and removal of all surficial debris.
3	Includes development of gravel roads, including associated erosion control, gravel surface, signage, rail crossings, excavation, fill placement, and basecourse purchase and placement.
4	Includes development of rail spurs into various property locations as shown. Spurs delineation and extent are conceptual, and do not include complete analysis of the rail system traffic, required number of switches, and complete evaluation of grade control.

TABLE G-3
WATER SYSTEM COST ESTIMATES
DIRECT COSTS SUMMARY SHEET
MILL CREEK TIFID PRELIMINARY ENGINEERING REPORT
ANACONDA - DEER LODGE COUNTY

Item No.	Work Item	Quantity	Unit	Unit Cost	Subtotals		Total
1	**Anaconda-Deer Lodge County Property**						
2	Distribution Pipe (10" Diameter DR25 PVC) - Main (1)	20,400	LF	$ 92.00	$ 1,876,800		
3	Distribution Piping Valves and Fittings (10") (2)	27	EA	$ 2,114.00	$ 57,078		
4	Air Relief Valves (3)	5	EA	$ 3,437.00	$ 17,185		
5	Fire System Hydrants (4)	27	EA	$ 4,700.00	$ 126,900		
6	Connections to Existing Water System (5)	3	EA	$ 1,101.00	$ 3,303		
7	Highway Crossings (6)	100	LF	$ 2,093.00	$ 209,300		
8	Mill Creek Crossings (6)	100	LF	$ 1,053.00	$ 105,300		
9	Drainage Crossings (6)	250	LF	$ 754.00	$ 188,500		
10	Utility (Sewer) Crossings (7)	5	EA	$ 399.00	$ 1,995		
11	Pump Station (8)	1	EA	$ 230,000.00	$ 230,000		
12	**Anaconda-Deer Lodge County Property Subtotal**					**$ 2,816,361**	
13	**Atlantic Richfield Property**						
14	Distribution Pipe (10" Diameter DR25 PVC) - Main (1)	2,300	LF	$ 92.00	$ 211,600		
15	Distribution Piping Valves (10") (2)	2	EA	$ 2,114.00	$ 4,228		
16	Distribution Pipe (8" Diameter DR25 PVC) - Main (1)	13,300	LF	$ 47.00	$ 625,100		
17	Distribution Piping Valves and Fittings (8") (2)	22	EA	$ 1,342.00	$ 29,524		
18	Air Relief Valves (3)	2	EA	$ 3,437.00	$ 6,874		
19	Fire System Hydrants (4)	28	EA	$ 4,700.00	$ 131,600		
20	Connections to Existing Water System - 6" Connections (5)	1	EA	$ 1,101.00	$ 1,101		
21	Connections to Existing Water System - 10" Connections (5)	2	EA	$ 1,405.00	$ 2,810		
22	Railroad Crossings (6)	200	LF	$ 2,093.00	$ 418,600		
23	Highway Crossings (6)	100	LF	$ 2,093.00	$ 209,300		
24	Mill Creek Crossings (6)	100	LF	$ 1,053.00	$ 105,300		
25	Drainage Crossings (6)	50	LF	$ 385.40	$ 19,270		
26	Utility (Sewer) Crossings (7)	6	EA	$ 399.00	$ 2,394		
27	Utility (Silver Lake Pipeline) Crossings (7)	1	LS	$ 1,667.00	$ 1,667		
28	**Atlantic Richfield Property Subtotal**					**$ 1,769,368**	
29	**TOTAL ESTIMATED COSTS**						**$ 4,585,729**

TABLE G-3a
WATER SYSTEM SUMMARY NOTES
MILL CREEK TIFID PRELIMINARY ENGINEERING REPORT
ANACONDA-DEER LODGE COUNTY

Note No.	Notes
1	Includes purchase, delivery and installation of piping materials, including excavation, bedding, pipe placement/connection and backfill. Due to the unknown nature and extent of onsite contaiminated soils, costs do not include contaminated soil removal, disposal and replacement.
2	Costs include purchase and installation. Number of valves and fittings estimated based on preliminary water system layout; however actual number of valves and fittings may change in detailed design.
3	Costs include purchase and installation. Estimated number of air relief vales based on preliminary water system layout and estimated topography; actual number of valves may change during detailed design.
4	Costs include purchase and placement of hydrants, assuming hydrant spacing every 500 ft. along the preliminary water system layout.
5	Costs include materials and labor to make connections to the existing Anaconda Water system, including time for system block/shutdown.
6	Crossings assume excavation, pipe placement and material replacement at each location.
7	Utility Sewer crossings assume separation and installation consistent with MDEQ Circular DEQ 2.
8	Pump Station costs are an estimated plug number based on lift station design for Wastewater System (See Table G-4). Assumes only one station is required; however, further analysis will be required to verify during detailed design.

TABLE G-4
WASTEWATER SYSTEM COST ESTIMATES
DIRECT COSTS SUMMARY SHEET
MILL CREEK TIFID PRELIMINARY ENGINEERING REPORT
ANACONDA - DEER LODGE COUNTY

Item No.	Work Item	Quantity	Unit	Unit Cost	Subtotals		Total
1	**Anaconda-Deer Lodge County Property**						
2	Gravity Sewer - 8" PVC (1)	12,100	LF	$ 89.00	$ 1,076,900		
3	Manholes (2)	40	EA	$ 3,196.00	$ 127,840		
4	Highway Crossings (3)	100	LF	$ 2,025.00	$ 202,500		
5	Mill Creek Crossings (3)	100	LF	$ 1,019.00	$ 101,900		
6	Drainage Crossings (3)	100	LF	$ 2,025.00	$ 202,500		
7	Railroad Crossings (3)	100	LF	$ 730.00	$ 73,000		
8	**Anaconda-Deer Lodge County Property Subtotal**					**$ 1,784,640**	
9	**Atlantic Richfield Property**						
10	**Piping Systems**						
11	Gravity Sewer - 8" PVC (1)	14,900	LF	$ 89.00	$ 1,326,100		
12	Forcemain - 3" PVC (1)	6,000	LF	$ 20.00	$ 120,000		
13	Manholes (2)	47	EA	$ 3,196.00	$ 150,212		
14	Highway Crossings (3)	100	LF	$ 2,025.00	$ 202,500		
15	Railroad Crossings (3)	300	LF	$ 2,025.00	$ 607,500		
16	Mill Creek Crossings (3)	100	LF	$ 1,019.00	$ 101,900		
17	Drainage Crossings (3)	50	LF	$ 730.00	$ 36,500		
18	Utility (Silver Lake Pipeline) Crossings (4)	2	EA	$ 1,667.00	$ 3,334		
19	***Piping Systems Subtotal***					$ 2,548,046	
20	**Lift Station (5)**						
21	Wet Well, Pumps, Control Panel, Level Control	1	LS	$ 45,959.00	$ 45,959		
22	Building and Foundation	300	SF	$ 150.00	$ 45,000		
23	Power Service Connection	1	LS	$ 8,000.00	$ 8,000		
24	Wiring/Electrical/Lighting	1	LS	$ 79,300.00	$ 79,300		
25	Gas Service Connection	1	LS	$ 8,000.00	$ 8,000		
26	Emergency Generator	1	EA	$ 30,000.00	$ 30,000		
27	HVAC System	1	LS	$ 8,000.00	$ 8,000		
28	***Lift Station Subtotal***					$ 224,259	
29	**Atlantic Richfield Property Subtotal**					**$ 2,772,305**	
30	**TOTAL ESTIMATED COSTS**						**$ 4,556,945**

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TABLE G-4a
WASTEWATER SYSTEM SUMMARY NOTES
MILL CREEK TIFID PRELIMINARY ENGINEERING REPORT
ANACONDA-DEER LODGE COUNTY

Note No.	Notes
1	Includes purchase, delivery and installation of piping materials, including excavation, bedding, pipe placement/connection and backfill. Due to the unknown nature and extent of onsite contaiminated soils, costs do not include contaminated soil removal, disposal and replacement.
2	Costs include purchase and placement of manholes assuming manhole spacing every 400 ft. along the preliminary wastewater system layout.
3	Crossings assume excavation, pipe placement and material replacement at each location.
4	Utility Sewer crossings assume separation and installation consistent with MDEQ Circular DEQ 2.
5	Cost includes items as shown; however actual size of the lift station structure, foundation and appurtenances will need to be verified during detailed design.

TABLE G-5
STORMWATER SYSTEM COST ESTIMATES
DIRECT COSTS SUMMARY SHEET
MILL CREEK TIFID PRELIMINARY ENGINEERING REPORT
ANACONDA - DEER LODGE COUNTY

Item No.	Work Item	Quantity	Unit	Unit Cost	Subtotals		Total
1	**Anaconda-Deer Lodge County Property**						
2	Highway/Rail Crossing Culverts and Inlet/Outlet Protection (1)	500	LF	$ 380.00	$ 190,000		
3	Access Road Culverts and Inlet/Outlet Protection (2)	300	LF	$ 72.00	$ 21,600		
4	Drainage Channels (3)	15,900	LF	$ 3.82	$ 60,738		
5	Detention Basins (4)	213,444	SF	$ 1.80	$ 384,199		
6	**Anaconda-Deer Lodge County Property Subtotal**					**$ 466,537**	
7	**Atlantic Richfield Property**						
8	Highway/Rail Crossing Culverts and Inlet/Outlet Protection (1)	750	LF	$ 380.00	$ 285,000		
9	Access Road Culverts and Inlet/Outlet Protection (2)	900	LF	$ 72.00	$ 64,800		
10	Drainage Channels (3)	17,300	LF	$ 3.82	$ 66,086		
11	Detention Basins (4)	178,596	SF	$ 1.80	$ 321,473		
12	**Atlantic Richfield Property Subtotal**					**$ 452,359**	
13	**TOTAL ESTIMATED COSTS**						**$ 918,896**

TABLE G-5a
STORMWATER SYSTEM SUMMARY NOTES
MILL CREEK TIFID PRELIMINARY ENGINEERING REPORT
ANACONDA-DEER LODGE COUNTY

Note No.	Notes
1	Includes installation of 24 to 36" CMP culverts at each highway and railroad crossing. Assumes excavation, CMP placement, backfill, construction of a concrete cut-off curbing, reinforced concrete headwall, placement of riprap and non-woven geotextile for erosion protection, and final surface asphalt replacement. Due to the unknown nature and extent of onsite contaiminated soils, costs do not include contaminated soil removal, disposal and replacement.
2	Includes installation of 24 to 36" CMP culverts road and/or minor drainage crossings. Assumes excavation, CMP placement and backfill and concrete headwall protection. Does not assume deep excavation in excess of 6 ft. Due to the unknown nature and extent of onsite contaiminated soils, costs do not include contaminated soil removal, disposal and replacement.
3	Includes excavation of trapezoidal drainage channels along roadways and railroads, armored with 6" 3 to 6 inch D50 riprap armoring. Channels assumed to be approximately 6 ft. wide with 3:1/2:1 sideslopes and 2 ft. channel bottom. Due to the unknown nature and extent of onsite contaiminated soils, costs do not include contaminated soil removal, disposal and replacement.
4	Includes preparation of detention basin subgrade for HDPE liner placement. Includes placement of 60 mil HDPE liner and underlying 10 oz. non-woven geotextile fabric liner system for detention basins. Assumes 3 feet of soil cover placed on basin bottom. Due to the unknown nature and extent of onsite contaiminated soils, costs do not include contaminated soil removal, disposal and replacement.

TABLE G-6
ANNUAL OPERATIONS AND MAINTENANCE COST
MILL CREEK TIFID PRELIMINARY ENGINEERING REPORT
ANACONDA - DEER LODGE COUNTY

Item No.	Work Item	Anaconda-Deer Lodge Property	Atlantic Richfield Property	Subtotals
1	Water System Annual O&M	$ 3,250	$ 4,750	$ 8,000
2	Wastwater System Annual O&M	$ 4,500	$ 12,500	$ 17,000
3	Stormwater System Annual O&M	$ 3,600	$ 5,400	$ 9,000
4	Roads/Railroad Annual O&M	$ 3,250	$ 4,750	$ 8,000
5	Open Space Annual O&M	$ 4,000	$ 6,000	$ 10,000
6	**Subtotal Annual O&M**	**$ 18,600**	**$ 33,400**	**$ 52,000**
7	**Present Value (I = 6%, N = 20 years)**	**$ 213,341**	**$ 383,095**	**$ 596,436**

Appendix H

Water System Calculations

Preliminary Engineering Report
Mill Creek TIFID

Purpose:

Summary of information used for water distribution design of the Mill Creek TIFID.

Methods:

A. MTDEQ Circular 1 Requirements for Water Distribution Lines

The MT DEQ Circular 1 (MDEQ, 2006) requirements were the main drivers of the sewer design. The design is split into two portions: a portion located solely on county property, and the rest on ARCO property that partly ties into a section of the County water distribution system. A surface was created in Civil 3D using contour data provided by ARCO at some point in the past (Dave is not sure where this came from). The contour data used was stored in D:>GIS>PROJECTS>Anaconda>Feature Data. The shapefiles used were topo_5.shp, topo_10.shp, and topo_50.shp. This is a crude surface and should not be used for any detailed design work. Once the surface was created, the pipe network was laid out according to the following Circular 1 (MDEQ, 2006) standards:

- Dead-ends must be minimized whenever possible (Section 8.4.2)
- Water mains must be laid at least 10 ft horizontally from any existing or proposed gravity sewer. In addition, no water pipe may pass through a manhole: there should be a distance of 10 ft between the two. Sewer crossings must be laid to provide a minimum vertical distance of 18-inches between the outside of the water main to the outside of the sewer. (Section 8.8) This was considered in the layout by locating the sewer lines on the other side of proposed roads than the water distribution lines.

The pipe sizes were selected to be 8-inches or 10-inches in diameter. Minimum pipe size for water mains providing fire protection is 6-inches per Section 8.2.2 of Circular 1 (MDEQ, 2006). PVC was selected as the pipe material. PVC meets the MDEQ requirements outlined in Section 8.1 of Circular 1 (MDEQ, 2006). The PVC pipe selected will meet AWWA C900 standards. The pressure class of the pipe selected will be PC 165 psi (DR-25) to meet the pressure requirements in Table 5 of the Results Section (Uni-Bell PVC Pipe Association, 2013).

Valves were placed according to the following Circular 1 (MDEQ, 2006) requirements:

- Valves should be located at 500-800 ft intervals (500 is for commercial districts with 800 being for all other districts). 800 ft intervals were used for this design (Section 8.3).

The following Circular 1 (MDEQ, 2006) requirements had to be considered for stream crossings:

- For underwater crossings, a minimum cover of two feet must be provided over the pipe. (If water course is greater than 15 ft, additional measures must be taken. (Section 8.9.2) As contour data was not very specific to stream crossings, no changes were made to depths for stream crossings. Instead stream crossings were avoided wherever possible.

Pressures in the water mains must meet the following Circular 1 (MDEQ, 2006) requirements (Section 8.2.1):

- Must be designed to maintain a minimum normal working pressure of 35 psi.
- Minimum pressure under all conditions of flow must be 20 psi.
- Water main pressures must be sufficient to provide required minimum pressures at ground level at the highest building sites served by proposed water mains excluding head loss.
- Maximum normal working pressure should be approximately 60 to 80 psi.

B. Fire Protection Requirements

Circular 1 (MDEQ, 2006) does not provide clear fire protection requirements. The exact subdivision layout and exact industries/buildings will determine the final fire protection design. Certain industries may require more fire flow than can be provided by the ADLC system so other fire protection measures may need to be implemented (this could include the construction and maintenance of ponds, tanks, etc.). Local fire departments will provide the final approval of all fire protection designs.

Deer Lodge County has adopted the International Fire Code (ICC, 2012). According to the International Fire Code Appendix B Section B105.2 (ICC, 2012), "The minimum fire flow and flow duration for buildings other than one and two family dwellings shall be specified in Table B105.1. Exception: A reduction in required fire flow of up to 75%, as approved, is allowed when the building is protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. The resulting fire flow shall not to be less than 1500 gpm for the prescribed duration as specified in Table B105.1." This minimum allows for a needed fire flow (NFF) to a property of 6000 gpm assuming the automatic sprinkler system does not require more than 1500 gpm. This should be sufficient for most development in the TIFID and will be taken as the basis for fire flow for water distribution analysis. A flow duration of 2 hours will be used for analysis of the water distribution system based on Table B105.1 from the International Fire Code 2012 (ICC, 2012).

Fire hydrant spacing will be subject to final build out of the TIFID and approval by local fire departments but was selected to be 500 ft for the PER based on a required fire flow of 1500 gpm and Table C105.1 of the International Fire Code 2012 (ICC, 2012).

Final fire protection design will occur once the size and construction type of the buildings is determined. In addition, any industry specific fire protection requirements outlined in the IFC will have to be considered. Table B105.1 and Table C105.1 are attached to this calculation brief in the Appendix Section.

Results

A. Water Distribution Design Specifics

The proposed water distribution network layout is given in Figure 1 in the Figures Section of this calculation brief. The design specifics are given in Table 1 and Table 2. The design was split into sections, one for Deer Lodge County property and the other for ARCO property.

Table 1: Deer Lodge County Water Main Design Specifics		
Parameter	**Value**	**Notes**
Water Main Material	10-Inch Diameter PVC	Pressure Class (PC) 165 psi (DR-25)
Water Main Length	20400 Feet	
Valves	27	
Air Relief Valves	5	
Fire Hydrants	27	
Highway Crossings	1	
Stream Crossings (Mill Creek)	1	
Proposed Road Crossings	4	
Ditch Crossings	5	
Sewer Crossings	5	

Table 2: ARCO Water Main Design Specifics		
Parameter	**Value**	**Notes**
Water Main Material	10-Inch Diameter PVC	PC 165 psi (DR-25)
Water Main Length	2300 Feet	
Water Main Material	8-Inch Diameter PVC	PC 165 psi (DR-25)
Water Main Length	13300 Feet	
Valves	24	
Air Relief Valve	2	
Fire Hydrants	28	
Highway Crossings	1	
Road Crossings (Willow Glen)	1	
Railway Crossing	1	
Stream Crossings (Mill Creek)	1	
Ditch Crossing	1	
Proposed Road Crossings	6	
Proposed railway Crossing	1	
Sewer Crossings	6	

B. EPANET Analysis Results

EPANET was used to model the proposed water distribution design under a variety of flow conditions. These included maximum daily flow, maximum daily flow with irrigation, maximum daily flow with fire flow, and maximum daily flow with irrigation and fire flow. Table 3 gives the average daily flow and maximum daily flow requirements for complete build out of the TIFID. Table 4 gives the irrigation requirements for the complete build out of the TIFID. For EPANET analysis, the most conservative value for irrigation requirements was selected (this value is 563 gpm for the total TIFID, so each lot requires 7.8 gpm).

Table 3: Water Flow Requirements (Potable Water ONLY)			
Average Daily Flow			
Parameter	**Value**	**Units**	**Source**
Flow Required per Employee per Day	16	gpd/employee	MDEQ Circular 4 Page 18-20 (MDEQ, 2004) (Note: This prediction is for wastewater. We are assuming all potable water leaves as sanitary waste.)
Number of Employees per Business	25	employees	Mill Creek Industrial Complex PER Page 3-6 (RPA, 2008)
Average Daily Water Flow Requirements per Business	400	gpd	Calculation
Number of Businesses in TIFID	72	businesses	Based on Subdivision
Total Average Daily Water Flow Requirements	28800	gpd	Calculation
Maximum Daily Demand			
Parameter	**Value**	**Units**	**Source**
Average Daily Water Flow Requirements per Business	400	gpd	Calculation
Maximum Daily Flow Factor	1.5-3.0	unitless	Page 4 (Hickey, 2008)
Mill Creek TIFID Daily Flow Factor	3	unitless	Most Conservative Value
Maximum Daily Flow Requirements per Business	1200	gpd	Calculation
Number of Businesses in TIFID	72	businesses	Based on Subdivision
Total Maximum Daily Flow Requirements	86400	gpd	Calculation

Table 4: Irrigation Demands			
Parameter	**Value**	**Units**	**Source**
TIFID Developed Area	382.60	acres	Based on Subdivision
Low Irrigated Area	19.00	acres	5% Developed TIFID Area
High Irrigated Area	76.52	acres	20% Developed TIFID Area
Water Required per Acre per Week	1.0-1.5	in/week	(DOWL HKM, 2011) and (Gough, 2012)
Rainfall per Month in Anaconda (for July and August)	1.40	in/month	Western Regional Climate Center ("Anaconda, Montana (240199)")
Low End Water Requirements per month	3.03	in/month	Calculation
High End Water Requirements per month	5.24	in/month	Calculation
Days in Month	31.00	days	Assumed value from East Yards PER (DOWL HKM, 2011)
Assumed Efficiency	0.65	unitless	Assumed value from East Yards PER (DOWL HKM, 2011)
Watering Time	16.00	hours	Assumed value from East Yards PER (DOWL HKM, 2011)
Volume Required Low/Low	7.38	ac-ft/month	Calculation
Volume Required Low/Low	2403900	gal/month	Conversion
Volume Required Low/Low	77545	gpd	Conversion
Daily Flow Rate	80.8	gpm	Conversion
Volume Required Low/High	12.77	ac-ft/month	Calculation
Volume Required Low/High	4161469	gal/month	Conversion
Volume Required Low/High	134241	gpd	Conversion
Daily Flow Rate	139.8	gpm	Conversion
Volume Required High/Low	29.71	ac-ft/month	Calculation
Volume Required High/Low	9681392.039	gal/month	Conversion

Table 4: Irrigation Demands			
Parameter	**Parameter**	**Parameter**	**Parameter**
Volume Required High/Low	312303	gpd	Conversion
Daily Flow Rate	325.3	gpm	Conversion
Volume Required High/High	51.43	ac-ft/month	Calculation
Volume Required High/High	16759768.29	gal/month	Conversion
Volume Required High/High	540638	gpd	Conversion
Daily Flow Rate	563.2	gpm	Conversion

Both systems were imported from Autodesk Civil 3D® to EPANET 2.0®. As the inlet pressure at the end of the existing line entering the TIFID was not known, the simulations were run to determine a minimum inlet pressure (Pressure at Junc. 4) required to meet MDEQ Circular 1 pressure standards. The simulations were performed using the Hazen-Williams formula with a C=140. This C value was taken from Table 3.8 from the Civil Engineering Reference Manual (Lindeburg, 1992). Table 5 summarizes the results of the simulations for the complete network (Deer Lodge and ARCO systems together). Complete output tables as well as the model layout are attached in the Model Section of this calculation brief.

Table 5: EPANET 2.0 Results

Analysis Description	Minimum Required Pressure at Junc 4 (Inlet Pressure) [psi]	Demand [GPM]	Minimum Pressure in Network and Node
Max Daily Demand w/ 6-Inch Pipe	73.4	60.5	35.1 psi @ Junc 17
Max Daily Flow w/ Irrigation w/ 6-Inch	74.7	627.2	35.0 psi @ Junc 17
Fire Flow w/ Max Demand 6-Inch	In Excess of 200 psi	1560.5	-
Fire Flow w/ Max Demand and Irrigation 6-Inch	In Excess of 200 psi	2127.2	-
Max Daily Demand w/ 8-Inch Pipe	73.4	60.5	35.1 psi @ Junc 17
Max Daily Flow w/ Irrigation w/ 8-Inch	74.7	627.2	35.4 psi @ Junc 17
Fire Flow w/ Max Demand 8-Inch	101.9	1560.5	20.3 psi @ Junc 29
Fire Flow w/ Max Demand and Irrigation 8-Inch	112.3	2127.2	20.1 psi @ Junc 29
Max Daily Demand w/ 10-Inch Pipe	73.4	60.5	35.1 psi @ Junc 17
Max Daily Flow w/ Irrigation w/ 10-Inch	74.3	627.2	35.0 psi @Junc 17
Fire Flow w/ Max Demand 10-Inch	79.4	1560.5	20.0 psi @ Junc 17
Fire Flow w/ Max Demand and Irrigation 10-Inch	83.7	2127.2	20.2 psi @ Junc 17
Max Daily Demand w/ 12-Inch Pipe	73.4	60.5	35.1 psi @ Junc 17
Max Daily Flow w/ Irrigation w/ 12-Inch	74.3	627.2	35.1 psi @ Junc 17

Table 5: EPANET 2.0 Results			
Analysis Description	**Minimum Required Pressure at Junc 4 (Inlet Pressure) [psi]**	**Demand [GPM]**	**Minimum Pressure in Network and Node**
Fire Flow w/ Max Demand 12-Inch	75.5	1560.5	20.4 psi @ Junc 17
Fire Flow w/ Max Demand and Irrigation 12-Inch	79.4	2127.2	20.1 psi @ Junc 17
Max Daily Demand w/ 8 and 10-Inch Pipe	73.4	60.5	35.1 psi @ Junc 17
Max Daily Flow w/ Irrigation w/ 8 and 10-Inch	74.3	627.2	35.0 psi @ Junc 17
Fire Flow w/ Max Demand 8 and 10-Inch	79.4	1560.5	20.1 psi @ Junc 17
Fire Flow w/ Max Demand and Irrigation 8 and 10-Inch	85.6	2127.2	20.2 psi @ Junc 17
Max Pressure in System 8 and 10-Inch Pipe	85.8	0	Max pressure is 117.2 psi @ Junc 56

Yellow highlighting indicates selected design.

C. Review against City of Anaconda Water Modelling

CEC obtained previous water system modelling information of the City of Anaconda water system from DOWL HKM via email on 4/23/14. DOWL/HKM provided the model files via EPAnet format, including modelling reports and memorandums. Specifically, CEC reviewed the Mill Creek TIFID water design vs. the following, with results noted below.

Available Flow/Pressure – CEC first evaluated the existing City of Anaconda model at node 4960, located approximately at CEC's model noted 27, near Parcels 8 and 9. **Based on our evaluation, the maximum draw from this node, in order to maintain a minimum pressure of 35 psi, is 355 gpm.** This was further substantiated by flow tests performed by DOWL/HKM and ALDC in October, 2013 (DOWL/HKM 2014) and previous DOWL/HKM Mill Creek modelling efforts (DOWL/HKM November 2011). **Booster pump station(s) would be required to provide fire and irrigation flow.**

Impact to City of Anaconda System – Excluding fire flow/irrigation, potable water demand (i.e., Maximum Daily Demand) for the complete Mill Creek TIFID water system is 60.5 gpm at 35 psi. CEC's review of the City of Anaconda model indicate that the existing city system will meet this requirement without significant pressure impact (i.e., nodes within the existing city system will not drop below 35 psi).

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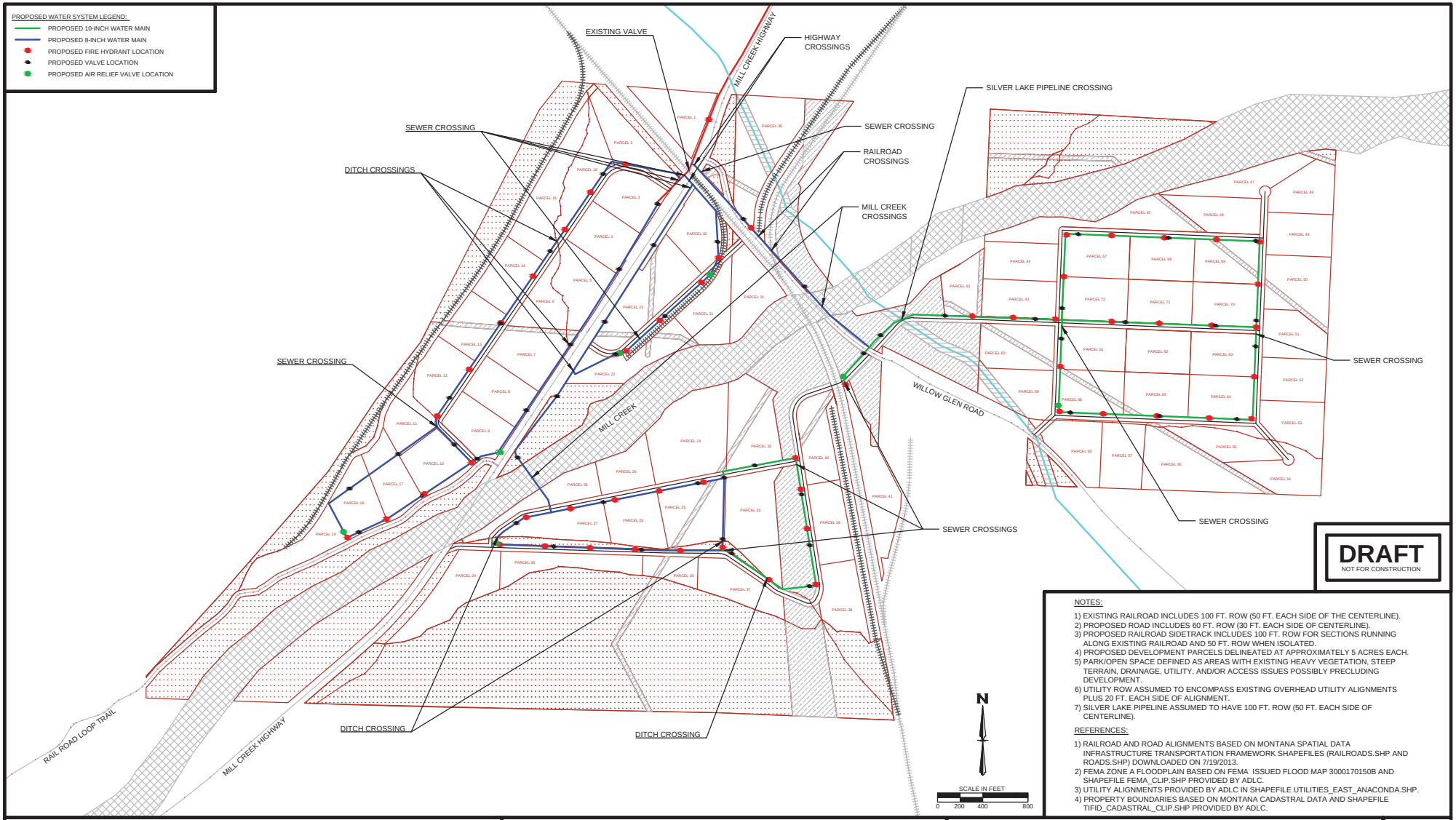
Figures



DRAFT
NOT FOR CONSTRUCTION

NOTES:

1) EXISTING RAILROAD INCLUDES 100 FT. ROW (50 FT. EACH SIDE OF THE CENTERLINE).
2) PROPOSED ROAD INCLUDES 60 FT. ROW (30 FT. EACH SIDE OF CENTERLINE).
3) PROPOSED RAILROAD SIDETRACK INCLUDES 100 FT. ROW FOR SECTIONS RUNNING ALONG EXISTING RAILROAD AND 50 FT. ROW WHEN ISOLATED.
4) PROPOSED DEVELOPMENT PARCELS DELINEATED AT APPROXIMATELY 5 ACRES EACH.
5) PARK/OPEN SPACE DEFINED AS AREAS WITH EXISTING HEAVY VEGETATION, STEEP TERRAIN, DRAINAGE, UTILITY, AND/OR ACCESS ISSUES POSSIBLY PRECLUDING DEVELOPMENT.
6) UTILITY ROW ASSUMED TO ENCOMPASS EXISTING OVERHEAD UTILITY ALIGNMENTS PLUS 20 FT. EACH SIDE OF ALIGNMENT.
7) SILVER LAKE PIPELINE ASSUMED TO HAVE 100 FT. ROW (50 FT. EACH SIDE OF CENTERLINE).

REFERENCES:

1) RAILROAD AND ROAD ALIGNMENTS BASED ON MONTANA SPATIAL DATA INFRASTRUCTURE TRANSPORTATION FRAMEWORK SHAPEFILES (RAILROADS.SHP AND ROADS.SHP) DOWNLOADED ON 7/19/2013.
2) FEMA ZONE A FLOODPLAIN BASED ON FEMA ISSUED FLOOD MAP 3000170150B AND SHAPEFILE FEMA_CLIP.SHP PROVIDED BY ADLC.
3) UTILITY ALIGNMENTS PROVIDED BY ADLC IN SHAPEFILE UTILITIES_EAST_ANACONDA.SHP.
4) PROPERTY BOUNDARIES BASED ON MONTANA CADASTRAL DATA AND SHAPEFILE TIFID_CADASTRAL_CLIP.SHP PROVIDED BY ADLC.

LEGEND:

- EXISTING ROAD
- EXISTING RAILROAD (SEE NOTE 1)
- PROPOSED ROAD CENTERLINE (SEE NOTE 2)
- PROPOSED RAILROAD SIDETRACK CENTERLINE (SEE NOTE 3)
- PROPOSED DEVELOPMENT PARCELS (SEE NOTE 4)
- PARK/OPEN SPACE (SEE NOTE 5)
- FEMA ZONE A FLOODPLAIN
- OVERHEAD UTILITY RIGHT-OF-WAY (ROW) (SEE NOTE 6)
- SILVER LAKE PIPELINE RIGHT-OF-WAY (SEE NOTE 7)
- EXISTING WATER MAIN
- SILVER LAKE PIPELINE

Copper Environmental Consulting, LLC

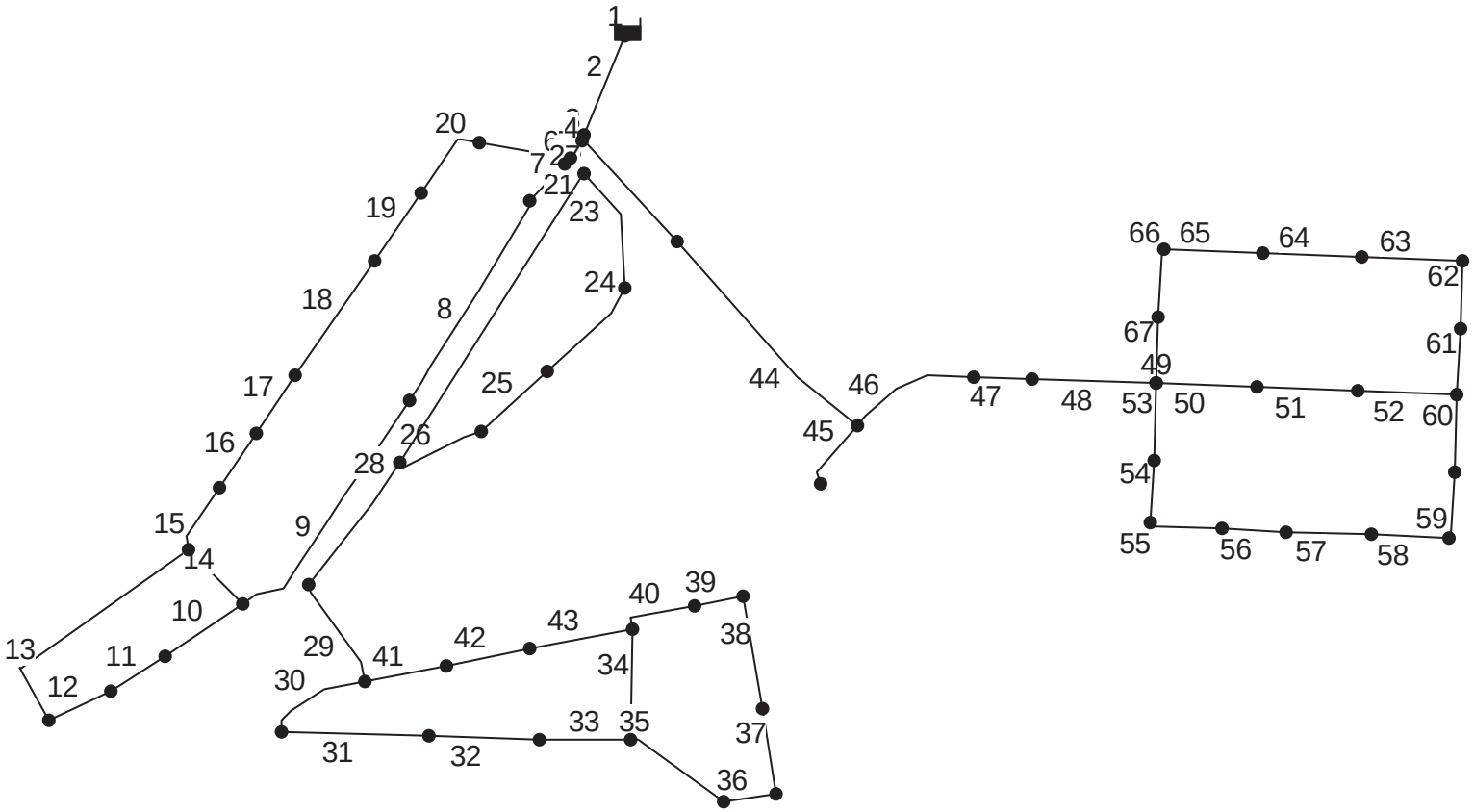
COPPER ENVIRONMENTAL CONSULTING, LLC.
406 East Park Avenue Suite 2
Anaconda, MT 59711
(406) 563-2700

WATER SYSTEM ALTERNATIVE 1: CONNECT TO CITY OF ANACONDA WATER SYSTEM
MILL CREEK TIFID PER
PREPARED FOR:
ANACONDA-DEER LODGE COUNTY

FIGURE
16

Model

Link ID



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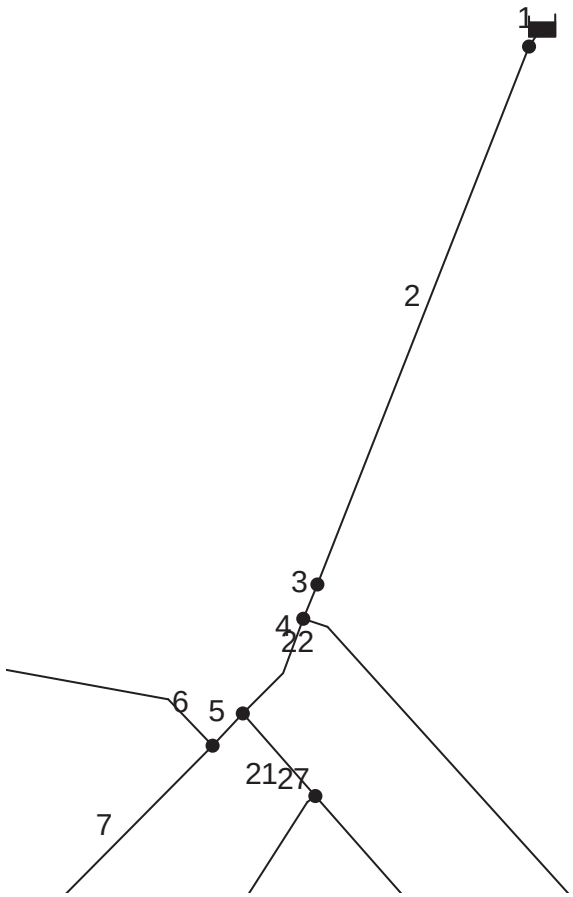

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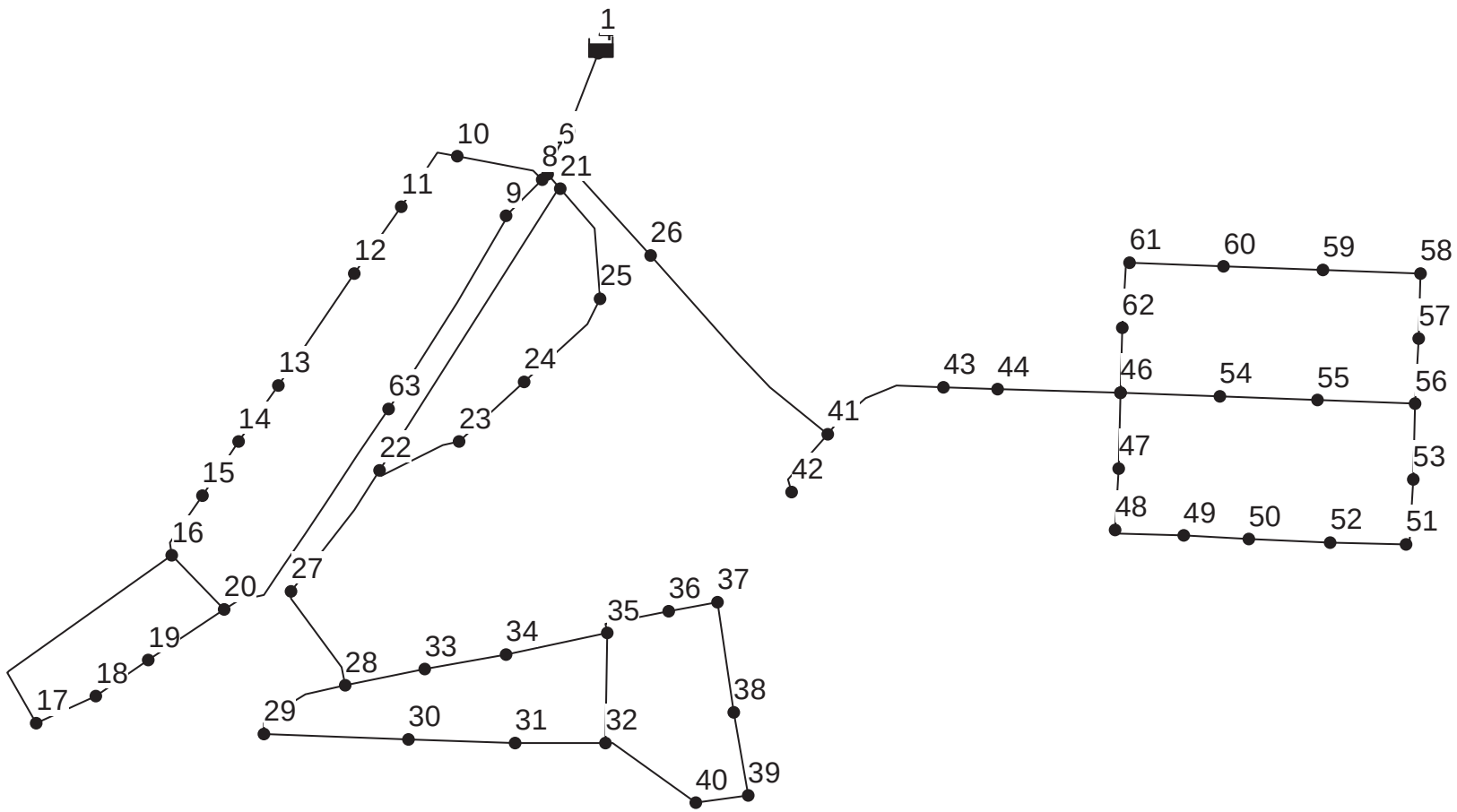

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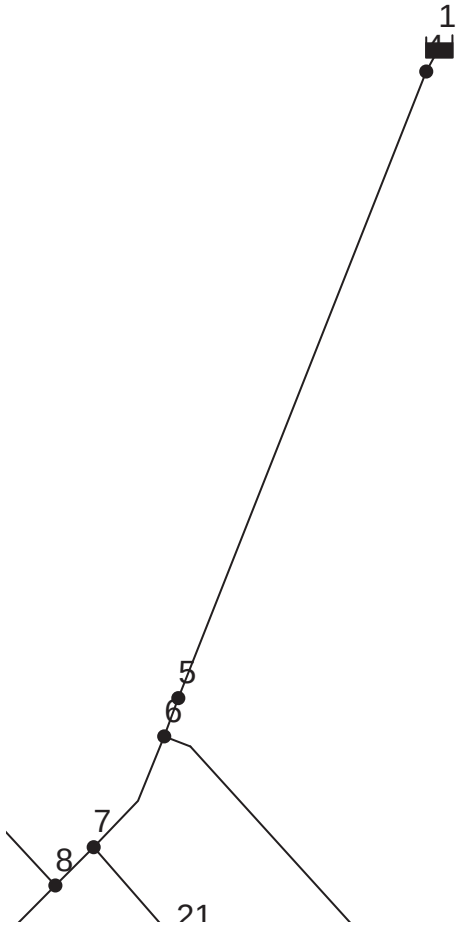

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Max Demand Results

6-Inch

Network Table - Nodes

Node ID	Elevation ft	Base Demand GPM	Demand GPM	Head ft	Pressure psi
Junc 4	5172.6	0	0	5342	73.4
Junc 5	5172.6	0.84	0.84	5342	73.4
Junc 6	5172.6	0	0	5341.99	73.4
Junc 7	5180	0	0	5341.97	70.18
Junc 8	5182.4	0	0	5341.97	69.14
Junc 9	5184.5	0	0	5341.97	68.23
Junc 10	5188.9	0.84	0.84	5341.97	66.32
Junc 11	5197.2	2.52	2.52	5341.96	62.72
Junc 12	5197.2	1.68	1.68	5341.96	62.72
Junc 13	5242.8	1.68	1.68	5341.96	42.96
Junc 14	5242.8	2.52	2.52	5341.96	42.96
Junc 15	5242.8	1.68	1.68	5341.96	42.96
Junc 16	5244	0.84	0.84	5341.96	42.44
Junc 17	5260.9	0.84	0.84	5341.96	35.12
Junc 18	5251.4	0.84	0.84	5341.96	39.24
Junc 19	5244.7	0.84	0.84	5341.96	42.14
Junc 20	5237.9	0.84	0.84	5341.96	45.09
Junc 21	5180	0	0	5341.97	70.18
Junc 22	5210	0	0	5341.95	57.18
Junc 23	5203.1	1.68	1.68	5341.95	60.17
Junc 24	5187.6	0.84	0.84	5341.96	66.88
Junc 25	5182.7	1.68	1.68	5341.96	69.01
Junc 26	5171	0.84	0.84	5341.92	74.06
Junc 27	5217.4	0	0	5341.94	53.96
Junc 28	5233.2	0	0	5341.92	47.11
Junc 29	5250	0.84	0.84	5341.92	39.83
Junc 30	5238.1	0.84	0.84	5341.92	44.98
Junc 31	5226.2	0.84	0.84	5341.92	50.14
Junc 32	5210.7	0.84	0.84	5341.92	56.86
Junc 33	5222	1.68	1.68	5341.92	51.96
Junc 34	5211	1.68	1.68	5341.92	56.73
Junc 35	5200	1.68	1.68	5341.92	61.49
Junc 36	5195.7	1.68	1.68	5341.92	63.36
Junc 37	5190	0.84	0.84	5341.92	65.82
Junc 38	5190	0.84	0.84	5341.92	65.82
Junc 39	5190	0.84	0.84	5341.92	65.82
Junc 40	5190	0	0	5341.92	65.83
Junc 41	5170	0	0	5341.8	74.44
Junc 42	5168.2	0.84	0.84	5341.8	75.22
Junc 43	5151.2	0.84	0.84	5341.74	82.56
Junc 44	5144.2	1.68	1.68	5341.72	85.59
Junc 45	5130	0	0	5341.68	91.72
Junc 46	5130	0	0	5341.68	91.72
Junc 47	5130	1.68	1.68	5341.67	91.72
Junc 48	5130	0.84	0.84	5341.67	91.72
Junc 49	5123.5	0.84	0.84	5341.67	94.53
Junc 50	5117	1.68	1.68	5341.67	97.35
Junc 51	5104.1	1.68	1.68	5341.67	102.94
Junc 52	5110.1	1.68	1.68	5341.67	100.34
Junc 53	5102	0.84	0.84	5341.67	103.85
Junc 54	5120	1.68	1.68	5341.67	96.05
Junc 55	5110	1.68	1.68	5341.67	100.38
Junc 56	5100	2.52	2.52	5341.67	104.71
Junc 57	5101	0.84	0.84	5341.67	104.28
Junc 58	5102.2	2.52	2.52	5341.67	103.76
Junc 59	5111	1.68	1.68	5341.67	99.95
Junc 60	5120.5	1.68	1.68	5341.67	95.83
Junc 61	5130	0.84	0.84	5341.67	91.72
Junc 62	5130	0.84	0.84	5341.67	91.72
Junc 63	5204	0	0	5341.96	59.78
Resvr 1	5342	#N/A	-60.48	5342	0

8-Inch

Network Table - Nodes

Node ID	Elevation ft	Base Demand GPM	Demand GPM	Head ft	Pressure psi
Junc 4	5172.6	0	0	5342	73.4
Junc 5	5172.6	0.84	0.84	5342	73.4
Junc 6	5172.6	0	0	5341.99	73.4
Junc 7	5180	0	0	5341.97	70.18
Junc 8	5182.4	0	0	5341.97	69.14
Junc 9	5184.5	0	0	5341.97	68.23
Junc 10	5188.9	0.84	0.84	5341.97	66.33
Junc 11	5197.2	2.52	2.52	5341.97	62.73
Junc 12	5197.2	1.68	1.68	5341.97	62.73
Junc 13	5242.8	1.68	1.68	5341.97	42.97
Junc 14	5242.8	2.52	2.52	5341.97	42.97
Junc 15	5242.8	1.68	1.68	5341.97	42.97
Junc 16	5244	0.84	0.84	5341.97	42.45
Junc 17	5260.9	0.84	0.84	5341.97	35.13
Junc 18	5251.4	0.84	0.84	5341.97	39.24
Junc 19	5244.7	0.84	0.84	5341.97	42.15
Junc 20	5237.9	0.84	0.84	5341.97	45.09
Junc 21	5180	0	0	5341.97	70.18
Junc 22	5210	0	0	5341.97	57.18
Junc 23	5203.1	1.68	1.68	5341.97	60.17
Junc 24	5187.6	0.84	0.84	5341.97	66.89
Junc 25	5182.7	1.68	1.68	5341.97	69.01
Junc 26	5171	0.84	0.84	5341.97	74.08
Junc 27	5217.4	0	0	5341.96	53.97
Junc 28	5233.2	0	0	5341.96	47.13
Junc 29	5250	0.84	0.84	5341.96	39.85
Junc 30	5238.1	0.84	0.84	5341.96	45
Junc 31	5226.2	0.84	0.84	5341.96	50.16
Junc 32	5210.7	0.84	0.84	5341.96	56.87
Junc 33	5222	1.68	1.68	5341.96	51.98
Junc 34	5211	1.68	1.68	5341.96	56.74
Junc 35	5200	1.68	1.68	5341.96	61.51
Junc 36	5195.7	1.68	1.68	5341.96	63.37
Junc 37	5190	0.84	0.84	5341.96	65.84
Junc 38	5190	0.84	0.84	5341.96	65.84
Junc 39	5190	0.84	0.84	5341.96	65.84
Junc 40	5190	0	0	5341.96	65.84
Junc 41	5170	0	0	5341.94	74.5
Junc 42	5168.2	0.84	0.84	5341.94	75.28
Junc 43	5151.2	0.84	0.84	5341.93	82.64
Junc 44	5144.2	1.68	1.68	5341.92	85.67
Junc 45	5130	0	0	5341.91	91.82
Junc 46	5130	0	0	5341.91	91.82
Junc 47	5130	1.68	1.68	5341.91	91.82
Junc 48	5130	0.84	0.84	5341.91	91.82
Junc 49	5123.5	0.84	0.84	5341.91	94.64
Junc 50	5117	1.68	1.68	5341.91	97.45
Junc 51	5104.1	1.68	1.68	5341.91	103.04
Junc 52	5110.1	1.68	1.68	5341.91	100.44
Junc 53	5102	0.84	0.84	5341.91	103.95
Junc 54	5120	1.68	1.68	5341.91	96.15
Junc 55	5110	1.68	1.68	5341.91	100.49
Junc 56	5100	2.52	2.52	5341.91	104.82
Junc 57	5101	0.84	0.84	5341.91	104.39
Junc 58	5102.2	2.52	2.52	5341.91	103.87
Junc 59	5111	1.68	1.68	5341.91	100.05
Junc 60	5120.5	1.68	1.68	5341.91	95.94
Junc 61	5130	0.84	0.84	5341.91	91.82
Junc 62	5130	0.84	0.84	5341.91	91.82
Junc 63	5204	0	0	5341.97	59.78
Resvr 1	5342	#N/A	-60.48	5342	0

10-Inch

Network Table - Nodes

Node ID	Elevation ft	Base Demand GPM	Demand GPM
Junc 4	5172.6	0	0
Junc 5	5172.6	0.84	0.84
Junc 6	5172.6	0	0
Junc 7	5180	0	0
Junc 8	5182.4	0	0
Junc 9	5184.5	0	0
Junc 10	5188.9	0.84	0.84
Junc 11	5197.2	2.52	2.52
Junc 12	5197.2	1.68	1.68
Junc 13	5242.8	1.68	1.68
Junc 14	5242.8	2.52	2.52
Junc 15	5242.8	1.68	1.68
Junc 16	5244	0.84	0.84
Junc 17	5260.9	0.84	0.84
Junc 18	5251.4	0.84	0.84
Junc 19	5244.7	0.84	0.84
Junc 20	5237.9	0.84	0.84
Junc 21	5180	0	0
Junc 22	5210	0	0
Junc 23	5203.1	1.68	1.68
Junc 24	5187.6	0.84	0.84
Junc 25	5182.7	1.68	1.68
Junc 26	5171	0.84	0.84
Junc 27	5217.4	0	0
Junc 28	5233.2	0	0
Junc 29	5250	0.84	0.84
Junc 30	5238.1	0.84	0.84
Junc 31	5226.2	0.84	0.84
Junc 32	5210.7	0.84	0.84
Junc 33	5222	1.68	1.68
Junc 34	5211	1.68	1.68
Junc 35	5200	1.68	1.68
Junc 36	5195.7	1.68	1.68
Junc 37	5190	0.84	0.84
Junc 38	5190	0.84	0.84
Junc 39	5190	0.84	0.84
Junc 40	5190	0	0
Junc 41	5170	0	0
Junc 42	5168.2	0.84	0.84
Junc 43	5151.2	0.84	0.84
Junc 44	5144.2	1.68	1.68
Junc 45	5130	0	0
Junc 46	5130	0	0
Junc 47	5130	1.68	1.68
Junc 48	5130	0.84	0.84
Junc 49	5123.5	0.84	0.84
Junc 50	5117	1.68	1.68
Junc 51	5104.1	1.68	1.68
Junc 52	5110.1	1.68	1.68
Junc 53	5102	0.84	0.84
Junc 54	5120	1.68	1.68
Junc 55	5110	1.68	1.68
Junc 56	5100	2.52	2.52
Junc 57	5101	0.84	0.84
Junc 58	5102.2	2.52	2.52
Junc 59	5111	1.68	1.68
Junc 60	5120.5	1.68	1.68
Junc 61	5130	0.84	0.84
Junc 62	5130	0.84	0.84
Junc 63	5204	0	0
Resvr 1	5342	#N/A	-60.48

				12-Inch								8 and 10-Inch					
				Network Table - Nodes								Network Table - Nodes					
Head	Pressure				Elevation	Base Demand	Demand	Head	Pressure				Elevation	Base Demand	Demand	Head	Pressure
ft	psi			Node ID	ft	GPM	GPM	ft	psi			Node ID	ft	GPM	GPM	ft	psi
5342	73.4			Junc 4	5172.6	0	0	5342	73.4			Junc 4	5172.6	0	0	5342	73.4
5342	73.4			Junc 5	5172.6	0.84	0.84	5342	73.4			Junc 5	5172.6	0.84	0.84	5342	73.4
5341.99	73.4			Junc 6	5172.6	0	0	5341.99	73.4			Junc 6	5172.6	0	0	5341.99	73.4
5341.97	70.18			Junc 7	5180	0	0	5341.97	70.18			Junc 7	5180	0	0	5341.97	70.18
5341.97	69.14			Junc 8	5182.4	0	0	5341.97	69.14			Junc 8	5182.4	0	0	5341.97	69.14
5341.97	68.23			Junc 9	5184.5	0	0	5341.97	68.23			Junc 9	5184.5	0	0	5341.97	68.23
5341.97	66.33			Junc 10	5188.9	0.84	0.84	5341.97	66.33			Junc 10	5188.9	0.84	0.84	5341.97	66.33
5341.97	62.73			Junc 11	5197.2	2.52	2.52	5341.97	62.73			Junc 11	5197.2	2.52	2.52	5341.97	62.73
5341.97	62.73			Junc 12	5197.2	1.68	1.68	5341.97	62.73			Junc 12	5197.2	1.68	1.68	5341.97	62.73
5341.97	42.97			Junc 13	5242.8	1.68	1.68	5341.97	42.97			Junc 13	5242.8	1.68	1.68	5341.97	42.97
5341.97	42.97			Junc 14	5242.8	2.52	2.52	5341.97	42.97			Junc 14	5242.8	2.52	2.52	5341.97	42.97
5341.97	42.97			Junc 15	5242.8	1.68	1.68	5341.97	42.97			Junc 15	5242.8	1.68	1.68	5341.97	42.97
5341.97	42.45			Junc 16	5244	0.84	0.84	5341.97	42.45			Junc 16	5244	0.84	0.84	5341.97	42.45
5341.97	35.13			Junc 17	5260.9	0.84	0.84	5341.97	35.13			Junc 17	5260.9	0.84	0.84	5341.97	35.13
5341.97	39.24			Junc 18	5251.4	0.84	0.84	5341.97	39.24			Junc 18	5251.4	0.84	0.84	5341.97	39.24
5341.97	42.15			Junc 19	5244.7	0.84	0.84	5341.97	42.15			Junc 19	5244.7	0.84	0.84	5341.97	42.15
5341.97	45.09			Junc 20	5237.9	0.84	0.84	5341.97	45.09			Junc 20	5237.9	0.84	0.84	5341.97	45.09
5341.97	70.18			Junc 21	5180	0	0	5341.97	70.18			Junc 21	5180	0	0	5341.97	70.18
5341.97	57.18			Junc 22	5210	0	0	5341.97	57.18			Junc 22	5210	0	0	5341.97	57.18
5341.97	60.17			Junc 23	5203.1	1.68	1.68	5341.97	60.17			Junc 23	5203.1	1.68	1.68	5341.97	60.17
5341.97	66.89			Junc 24	5187.6	0.84	0.84	5341.97	66.89			Junc 24	5187.6	0.84	0.84	5341.97	66.89
5341.97	69.01			Junc 25	5182.7	1.68	1.68	5341.97	69.01			Junc 25	5182.7	1.68	1.68	5341.97	69.01
5341.98	74.09			Junc 26	5171	0.84	0.84	5341.98	74.09			Junc 26	5171	0.84	0.84	5341.98	74.09
5341.97	53.98			Junc 27	5217.4	0	0	5341.97	53.98			Junc 27	5217.4	0	0	5341.97	53.98
5341.97	47.13			Junc 28	5233.2	0	0	5341.97	47.13			Junc 28	5233.2	0	0	5341.97	47.13
5341.97	39.85			Junc 29	5250	0.84	0.84	5341.97	39.85			Junc 29	5250	0.84	0.84	5341.97	39.85
5341.97	45.01			Junc 30	5238.1	0.84	0.84	5341.97	45.01			Junc 30	5238.1	0.84	0.84	5341.97	45.01
5341.97	50.16			Junc 31	5226.2	0.84	0.84	5341.97	50.16			Junc 31	5226.2	0.84	0.84	5341.97	50.16
5341.97	56.88			Junc 32	5210.7	0.84	0.84	5341.97	56.88			Junc 32	5210.7	0.84	0.84	5341.97	56.88
5341.97	51.98			Junc 33	5222	1.68	1.68	5341.97	51.98			Junc 33	5222	1.68	1.68	5341.97	51.98
5341.97	56.75			Junc 34	5211	1.68	1.68	5341.97	56.75			Junc 34	5211	1.68	1.68	5341.97	56.75
5341.97	61.51			Junc 35	5200	1.68	1.68	5341.97	61.52			Junc 35	5200	1.68	1.68	5341.97	61.51
5341.97	63.38			Junc 36	5195.7	1.68	1.68	5341.97	63.38			Junc 36	5195.7	1.68	1.68	5341.97	63.38
5341.97	65.85			Junc 37	5190	0.84	0.84	5341.97	65.85			Junc 37	5190	0.84	0.84	5341.97	65.85
5341.97	65.85			Junc 38	5190	0.84	0.84	5341.97	65.85			Junc 38	5190	0.84	0.84	5341.97	65.85
5341.97	65.85			Junc 39	5190	0.84	0.84	5341.97	65.85			Junc 39	5190	0.84	0.84	5341.97	65.85
5341.97	65.85			Junc 40	5190	0	0	5341.97	65.85			Junc 40	5190	0	0	5341.97	65.85
5341.97	74.51			Junc 41	5170	0	0	5341.98	74.52			Junc 41	5170	0	0	5341.97	74.51
5341.97	75.29			Junc 42	5168.2	0.84	0.84	5341.98	75.3			Junc 42	5168.2	0.84	0.84	5341.97	75.29
5341.97	82.66			Junc 43	5151.2	0.84	0.84	5341.98	82.66			Junc 43	5151.2	0.84	0.84	5341.96	82.65
5341.96	85.69			Junc 44	5144.2	1.68	1.68	5341.98	85.7			Junc 44	5144.2	1.68	1.68	5341.95	85.69
5341.96	91.84			Junc 45	5130	0	0	5341.98	91.85			Junc 45	5130	0	0	5341.94	91.83
5341.96	91.84			Junc 46	5130	0	0	5341.98	91.85			Junc 46	5130	0	0	5341.94	91.83
5341.96	91.84			Junc 47	5130	1.68	1.68	5341.98	91.85			Junc 47	5130	1.68	1.68	5341.94	91.83
5341.96	91.84			Junc 48	5130	0.84	0.84	5341.98	91.85			Junc 48	5130	0.84	0.84	5341.94	91.83
5341.96	94.66			Junc 49	5123.5	0.84	0.84	5341.98	94.67			Junc 49	5123.5	0.84	0.84	5341.94	94.65
5341.96	97.47			Junc 50	5117	1.68	1.68	5341.98	97.48			Junc 50	5117	1.68	1.68	5341.94	97.47
5341.96	103.06			Junc 51	5104.1	1.68	1.68	5341.98	103.07			Junc 51	5104.1	1.68	1.68	5341.94	103.05
5341.96	100.46			Junc 52	5110.1	1.68	1.68	5341.98	100.47			Junc 52	5110.1	1.68	1.68	5341.94	100.46
5341.96	103.97			Junc 53	5102	0.84	0.84	5341.98	103.98			Junc 53	5102	0.84	0.84	5341.94	103.96
5341.96	96.18			Junc 54	5120	1.68	1.68	5341.98	96.18			Junc 54	5120	1.68	1.68	5341.94	96.17
5341.96	100.51			Junc 55	5110	1.68	1.68	5341.98	100.51			Junc 55	5110	1.68	1.68	5341.94	100.5
5341.96	104.84			Junc 56	5100	2.52	2.52	5341.98	104.85			Junc 56	5100	2.52	2.52	5341.94	104.83
5341.96	104.41			Junc 57	5101	0.84	0.84	5341.98	104.41			Junc 57	5101	0.84	0.84	5341.94	104.4
5341.96	103.89			Junc 58	5102.2	2.52	2.52	5341.98	103.89			Junc 58	5102.2	2.52	2.52	5341.94	103.88
5341.96	100.07			Junc 59	5111	1.68	1.68	5341.98	100.08			Junc 59	5111	1.68	1.68	5341.94	100.07
5341.96	95.96			Junc 60	5120.5	1.68	1.68	5341.98	95.97			Junc 60	5120.5	1.68	1.68	5341.94	95.95
5341.96	91.84			Junc 61	5130	0.84	0.84	5341.98	91.85			Junc 61	5130	0.84	0.84	5341.94	91.83
5341.96	91.84			Junc 62	5130	0.84	0.84	5341.98	91.85			Junc 62	5130	0.84	0.84	5341.94	91.83
5341.97	59.78			Junc 63	5204	0	0	5341.97	59.78			Junc 63	5204	0	0	5341.97	59.78
5342	0			Resvr 1	5342	#N/A	-60.48	5342	0			Resvr 1	5342	#N/A	-60.48	5342	0

Fire Flow and Max Demand Results

8-Inch

Network Table - Nodes

Node ID	Elevation ft	Base Demand GPM	Demand GPM	Head ft	Pressure psi
Junc 4	5172.6	0	0	5407.85	101.93
Junc 5	5172.6	0.84	0.84	5407.71	101.87
Junc 6	5172.6	0	0	5402.15	99.46
Junc 7	5180	0	0	5384.88	88.77
Junc 8	5182.4	0	0	5384.87	87.73
Junc 9	5184.5	0	0	5384.87	86.82
Junc 10	5188.9	0.84	0.84	5384.87	84.91
Junc 11	5197.2	2.52	2.52	5384.87	81.32
Junc 12	5197.2	1.68	1.68	5384.87	81.32
Junc 13	5242.8	1.68	1.68	5384.87	61.56
Junc 14	5242.8	2.52	2.52	5384.87	61.56
Junc 15	5242.8	1.68	1.68	5384.87	61.56
Junc 16	5244	0.84	0.84	5384.87	61.04
Junc 17	5260.9	0.84	0.84	5384.87	53.72
Junc 18	5251.4	0.84	0.84	5384.87	57.83
Junc 19	5244.7	0.84	0.84	5384.87	60.74
Junc 20	5237.9	0.84	0.84	5384.87	63.68
Junc 21	5180	0	0	5380.93	87.06
Junc 22	5210	0	0	5360.24	65.1
Junc 23	5203.1	1.68	1.68	5364.74	70.04
Junc 24	5187.6	0.84	0.84	5369.1	78.64
Junc 25	5182.7	1.68	1.68	5374.7	83.2
Junc 26	5171	0.84	0.84	5402.13	100.15
Junc 27	5217.4	0	0	5330.29	48.92
Junc 28	5233.2	0	0	5308.2	32.5
Junc 29	5250	1500.84	1500.84	5296.73	20.25
Junc 30	5238.1	0.84	0.84	5299.17	26.46
Junc 31	5226.2	0.84	0.84	5300.99	32.41
Junc 32	5210.7	0.84	0.84	5302.53	39.79
Junc 33	5222	1.68	1.68	5306.77	36.73
Junc 34	5211	1.68	1.68	5305.3	40.86
Junc 35	5200	1.68	1.68	5303.48	44.84
Junc 36	5195.7	1.68	1.68	5303.32	46.63
Junc 37	5190	0.84	0.84	5303.23	49.06
Junc 38	5190	0.84	0.84	5303.01	48.97
Junc 39	5190	0.84	0.84	5302.84	48.89
Junc 40	5190	0	0	5302.74	48.85
Junc 41	5170	0	0	5402.1	100.57
Junc 42	5168.2	0.84	0.84	5402.1	101.35
Junc 43	5151.2	0.84	0.84	5402.09	108.71
Junc 44	5144.2	1.68	1.68	5402.08	111.74
Junc 45	5130	0	0	5402.07	117.89
Junc 46	5130	0	0	5402.07	117.89
Junc 47	5130	1.68	1.68	5402.07	117.89
Junc 48	5130	0.84	0.84	5402.07	117.89
Junc 49	5123.5	0.84	0.84	5402.07	120.7
Junc 50	5117	1.68	1.68	5402.07	123.52
Junc 51	5104.1	1.68	1.68	5402.07	129.11
Junc 52	5110.1	1.68	1.68	5402.07	126.51
Junc 53	5102	0.84	0.84	5402.07	130.02
Junc 54	5120	1.68	1.68	5402.07	122.22
Junc 55	5110	1.68	1.68	5402.07	126.55
Junc 56	5100	2.52	2.52	5402.07	130.89
Junc 57	5101	0.84	0.84	5402.07	130.45
Junc 58	5102.2	2.52	2.52	5402.07	129.93
Junc 59	5111	1.68	1.68	5402.07	126.12
Junc 60	5120.5	1.68	1.68	5402.07	122
Junc 61	5130	0.84	0.84	5402.07	117.89
Junc 62	5130	0.84	0.84	5402.07	117.89
Junc 63	5204	0	0	5384.87	78.37
Resvr 1	5408	#N/A	-1560.48	5408	0

10-Inch

Network Table - Nodes

Node ID	Elevation ft	Base Demand GPM	Demand GPM	Head ft	Pressure psi
Junc 4	5172.6	0	0	5355.85	79.4
Junc 5	5172.6	0.84	0.84	5355.71	79.34
Junc 6	5172.6	0	0	5350.15	76.93
Junc 7	5180	0	0	5332.88	66.24
Junc 8	5182.4	0	0	5326.33	62.37
Junc 9	5184.5	0	0	5318.22	57.94
Junc 10	5188.9	0.84	0.84	5324.13	58.59
Junc 11	5197.2	2.52	2.52	5322.01	54.08
Junc 12	5197.2	1.68	1.68	5319.98	53.2
Junc 13	5242.8	1.68	1.68	5316.63	31.99
Junc 14	5242.8	2.52	2.52	5314.95	31.26
Junc 15	5242.8	1.68	1.68	5313.36	30.58
Junc 16	5244	0.84	0.84	5311.66	29.32
Junc 17	5260.9	1500.84	1500.84	5307.21	20.07
Junc 18	5251.4	0.84	0.84	5308.52	24.75
Junc 19	5244.7	0.84	0.84	5309.79	28.2
Junc 20	5237.9	0.84	0.84	5311.59	31.93
Junc 21	5180	0	0	5332.87	66.24
Junc 22	5210	0	0	5332.87	53.24
Junc 23	5203.1	1.68	1.68	5332.87	56.23
Junc 24	5187.6	0.84	0.84	5332.87	62.95
Junc 25	5182.7	1.68	1.68	5332.87	65.07
Junc 26	5171	0.84	0.84	5350.14	77.62
Junc 27	5217.4	0	0	5332.87	50.03
Junc 28	5233.2	0	0	5332.87	43.19
Junc 29	5250	0.84	0.84	5332.87	35.91
Junc 30	5238.1	0.84	0.84	5332.87	41.06
Junc 31	5226.2	0.84	0.84	5332.87	46.22
Junc 32	5210.7	0.84	0.84	5332.87	52.94
Junc 33	5222	1.68	1.68	5332.87	48.04
Junc 34	5211	1.68	1.68	5332.87	52.81
Junc 35	5200	1.68	1.68	5332.87	57.57
Junc 36	5195.7	1.68	1.68	5332.87	59.44
Junc 37	5190	0.84	0.84	5332.87	61.91
Junc 38	5190	0.84	0.84	5332.87	61.91
Junc 39	5190	0.84	0.84	5332.87	61.91
Junc 40	5190	0	0	5332.87	61.91
Junc 41	5170	0	0	5350.13	78.05
Junc 42	5168.2	0.84	0.84	5350.13	78.83
Junc 43	5151.2	0.84	0.84	5350.13	86.2
Junc 44	5144.2	1.68	1.68	5350.13	89.23
Junc 45	5130	0	0	5350.12	95.38
Junc 46	5130	0	0	5350.12	95.38
Junc 47	5130	1.68	1.68	5350.12	95.38
Junc 48	5130	0.84	0.84	5350.12	95.38
Junc 49	5123.5	0.84	0.84	5350.12	98.19
Junc 50	5117	1.68	1.68	5350.12	101.01
Junc 51	5104.1	1.68	1.68	5350.12	106.6
Junc 52	5110.1	1.68	1.68	5350.12	104
Junc 53	5102	0.84	0.84	5350.12	107.51
Junc 54	5120	1.68	1.68	5350.12	99.71
Junc 55	5110	1.68	1.68	5350.12	104.04
Junc 56	5100	2.52	2.52	5350.12	108.38
Junc 57	5101	0.84	0.84	5350.12	107.94
Junc 58	5102.2	2.52	2.52	5350.12	107.42
Junc 59	5111	1.68	1.68	5350.12	103.61
Junc 60	5120.5	1.68	1.68	5350.12	99.49
Junc 61	5130	0.84	0.84	5350.12	95.38
Junc 62	5130	0.84	0.84	5350.12	95.38
Junc 63	5204	0	0	5315.15	48.16
Resvr 1	5356	#N/A	-1560.48	5356	0

12-Inch

Network Table - Nodes

Node ID	Elevation ft	Base Demand GPM	Demand GPM
Junc 4	5172.6	0	0
Junc 5	5172.6	0.84	0.84
Junc 6	5172.6	0	0
Junc 7	5180	0	0
Junc 8	5182.4	0	0
Junc 9	5184.5	0	0
Junc 10	5188.9	0.84	0.84
Junc 11	5197.2	2.52	2.52
Junc 12	5197.2	1.68	1.68
Junc 13	5242.8	1.68	1.68
Junc 14	5242.8	2.52	2.52
Junc 15	5242.8	1.68	1.68
Junc 16	5244	0.84	0.84
Junc 17	5260.9	1500.84	1500.84
Junc 18	5251.4	0.84	0.84
Junc 19	5244.7	0.84	0.84
Junc 20	5237.9	0.84	0.84
Junc 21	5180	0	0
Junc 22	5210	0	0
Junc 23	5203.1	1.68	1.68
Junc 24	5187.6	0.84	0.84
Junc 25	5182.7	1.68	1.68
Junc 26	5171	0.84	0.84
Junc 27	5217.4	0	0
Junc 28	5233.2	0	0
Junc 29	5250	0.84	0.84
Junc 30	5238.1	0.84	0.84
Junc 31	5226.2	0.84	0.84
Junc 32	5210.7	0.84	0.84
Junc 33	5222	1.68	1.68
Junc 34	5211	1.68	1.68
Junc 35	5200	1.68	1.68
Junc 36	5195.7	1.68	1.68
Junc 37	5190	0.84	0.84
Junc 38	5190	0.84	0.84
Junc 39	5190	0.84	0.84
Junc 40	5190	0	0
Junc 41	5170	0	0
Junc 42	5168.2	0.84	0.84
Junc 43	5151.2	0.84	0.84
Junc 44	5144.2	1.68	1.68
Junc 45	5130	0	0
Junc 46	5130	0	0
Junc 47	5130	1.68	1.68
Junc 48	5130	0.84	0.84
Junc 49	5123.5	0.84	0.84
Junc 50	5117	1.68	1.68
Junc 51	5104.1	1.68	1.68
Junc 52	5110.1	1.68	1.68
Junc 53	5102	0.84	0.84
Junc 54	5120	1.68	1.68
Junc 55	5110	1.68	1.68
Junc 56	5100	2.52	2.52
Junc 57	5101	0.84	0.84
Junc 58	5102.2	2.52	2.52
Junc 59	5111	1.68	1.68
Junc 60	5120.5	1.68	1.68
Junc 61	5130	0.84	0.84
Junc 62	5130	0.84	0.84
Junc 63	5204	0	0
Resvr 1	5347	#N/A	-1560.48

				8 and 10-Inch					
				Network Table - Nodes					
Head	Pressure				Elevation	Base Demand	Demand	Head	Pressure
ft	psi			Node ID	ft	GPM	GPM	ft	psi
5346.85	75.5			Junc 4	5172.6	0	0	5355.85	79.4
5346.71	75.44			Junc 5	5172.6	0.84	0.84	5355.71	79.34
5341.15	73.03			Junc 6	5172.6	0	0	5350.15	76.93
5323.88	62.34			Junc 7	5180	0	0	5332.88	66.24
5317.33	58.47			Junc 8	5182.4	0	0	5326.33	62.37
5311.65	55.09			Junc 9	5184.5	0	0	5318.22	57.94
5316.2	55.16			Junc 10	5188.9	0.84	0.84	5324.13	58.59
5315.12	51.09			Junc 11	5197.2	2.52	2.52	5322.01	54.08
5314.08	50.64			Junc 12	5197.2	1.68	1.68	5319.98	53.2
5312.37	30.14			Junc 13	5242.8	1.68	1.68	5316.63	31.99
5311.5	29.77			Junc 14	5242.8	2.52	2.52	5314.95	31.26
5310.69	29.42			Junc 15	5242.8	1.68	1.68	5313.36	30.58
5309.82	28.52			Junc 16	5244	0.84	0.84	5311.66	29.32
5307.96	20.39			Junc 17	5260.9	1500.84	1500.84	5307.21	20.07
5308.49	24.74			Junc 18	5251.4	0.84	0.84	5308.52	24.75
5309.01	27.86			Junc 19	5244.7	0.84	0.84	5309.79	28.2
5309.74	31.13			Junc 20	5237.9	0.84	0.84	5311.59	31.93
5323.88	62.34			Junc 21	5180	0	0	5332.87	66.24
5323.87	49.34			Junc 22	5210	0	0	5332.87	53.24
5323.87	52.33			Junc 23	5203.1	1.68	1.68	5332.87	56.23
5323.87	59.05			Junc 24	5187.6	0.84	0.84	5332.87	62.95
5323.87	61.17			Junc 25	5182.7	1.68	1.68	5332.87	65.07
5341.15	73.72			Junc 26	5171	0.84	0.84	5350.14	77.62
5323.87	46.13			Junc 27	5217.4	0	0	5332.87	50.03
5323.87	39.29			Junc 28	5233.2	0	0	5332.87	43.19
5323.87	32.01			Junc 29	5250	0.84	0.84	5332.87	35.91
5323.87	37.17			Junc 30	5238.1	0.84	0.84	5332.87	41.06
5323.87	42.32			Junc 31	5226.2	0.84	0.84	5332.87	46.22
5323.87	49.04			Junc 32	5210.7	0.84	0.84	5332.87	52.94
5323.87	44.14			Junc 33	5222	1.68	1.68	5332.87	48.04
5323.87	48.91			Junc 34	5211	1.68	1.68	5332.87	52.81
5323.87	53.67			Junc 35	5200	1.68	1.68	5332.87	57.57
5323.87	55.54			Junc 36	5195.7	1.68	1.68	5332.87	59.44
5323.87	58.01			Junc 37	5190	0.84	0.84	5332.87	61.91
5323.87	58.01			Junc 38	5190	0.84	0.84	5332.87	61.91
5323.87	58.01			Junc 39	5190	0.84	0.84	5332.87	61.91
5323.87	58.01			Junc 40	5190	0	0	5332.87	61.91
5341.14	74.16			Junc 41	5170	0	0	5350.13	78.05
5341.14	74.94			Junc 42	5168.2	0.84	0.84	5350.13	78.83
5341.14	82.3			Junc 43	5151.2	0.84	0.84	5350.12	86.19
5341.14	85.33			Junc 44	5144.2	1.68	1.68	5350.11	89.22
5341.14	91.49			Junc 45	5130	0	0	5350.1	95.37
5341.14	91.49			Junc 46	5130	0	0	5350.1	95.37
5341.14	91.49			Junc 47	5130	1.68	1.68	5350.1	95.37
5341.14	91.49			Junc 48	5130	0.84	0.84	5350.1	95.37
5341.14	94.3			Junc 49	5123.5	0.84	0.84	5350.1	98.19
5341.14	97.12			Junc 50	5117	1.68	1.68	5350.1	101
5341.14	102.71			Junc 51	5104.1	1.68	1.68	5350.1	106.59
5341.14	100.11			Junc 52	5110.1	1.68	1.68	5350.1	103.99
5341.14	103.62			Junc 53	5102	0.84	0.84	5350.1	107.5
5341.14	95.82			Junc 54	5120	1.68	1.68	5350.1	99.7
5341.14	100.15			Junc 55	5110	1.68	1.68	5350.1	104.03
5341.14	104.48			Junc 56	5100	2.52	2.52	5350.1	108.37
5341.14	104.05			Junc 57	5101	0.84	0.84	5350.1	107.93
5341.14	103.53			Junc 58	5102.2	2.52	2.52	5350.1	107.41
5341.14	99.72			Junc 59	5111	1.68	1.68	5350.1	103.6
5341.14	95.6			Junc 60	5120.5	1.68	1.68	5350.1	99.49
5341.14	91.49			Junc 61	5130	0.84	0.84	5350.1	95.37
5341.14	91.49			Junc 62	5130	0.84	0.84	5350.1	95.37
5310.76	46.26			Junc 63	5204	0	0	5315.15	48.16
5347	0			Resvr 1	5356	#N/A	-1560.48	5356	0

Max Demand and Irrigation Results

6-Inch

Network Table - Nodes at 0:00 Hrs

	Elevation	Base Demand	Demand	Head	Pressure
Node ID	ft	GPM	GPM	ft	psi
Junc 4	5172.6	0	0	5344.97	74.69
Junc 5	5172.6	8.71	8.71	5344.95	74.68
Junc 6	5172.6	0	0	5343.94	74.24
Junc 7	5180	0	0	5342.93	70.6
Junc 8	5182.4	0	0	5342.83	69.52
Junc 9	5184.5	0	0	5342.73	68.56
Junc 10	5188.9	8.71	8.71	5342.39	66.51
Junc 11	5197.2	26.14	26.14	5342.03	62.76
Junc 12	5197.2	17.42	17.42	5341.85	62.68
Junc 13	5242.8	17.42	17.42	5341.69	42.85
Junc 14	5242.8	26.14	26.14	5341.66	42.84
Junc 15	5242.8	17.42	17.42	5341.66	42.84
Junc 16	5244	8.71	8.71	5341.67	42.32
Junc 17	5260.9	8.71	8.71	5341.67	35
Junc 18	5251.4	8.71	8.71	5341.67	39.11
Junc 19	5244.7	8.71	8.71	5341.68	42.02
Junc 20	5237.9	8.71	8.71	5341.71	44.98
Junc 21	5180	0	0	5342.64	70.47
Junc 22	5210	0	0	5341.39	56.93
Junc 23	5203.1	17.42	17.42	5341.52	59.98
Junc 24	5187.6	8.71	8.71	5341.73	66.79
Junc 25	5182.7	17.42	17.42	5342.08	69.06
Junc 26	5171	8.71	8.71	5338.86	72.73
Junc 27	5217.4	0	0	5340.09	53.16
Junc 28	5233.2	0	0	5339.13	45.9
Junc 29	5250	8.71	8.71	5338.95	38.54
Junc 30	5238.1	8.71	8.71	5338.76	43.62
Junc 31	5226.2	8.71	8.71	5338.67	48.73
Junc 32	5210.7	8.71	8.71	5338.62	55.43
Junc 33	5222	17.42	17.42	5338.88	50.64
Junc 34	5211	17.42	17.42	5338.72	55.34
Junc 35	5200	17.42	17.42	5338.61	60.06
Junc 36	5195.7	17.42	17.42	5338.58	61.91
Junc 37	5190	8.71	8.71	5338.58	64.38
Junc 38	5190	8.71	8.71	5338.58	64.38
Junc 39	5190	8.71	8.71	5338.58	64.38
Junc 40	5190	0	0	5338.59	64.39
Junc 41	5170	0	0	5329.89	69.28
Junc 42	5168.2	8.71	8.71	5329.89	70.06
Junc 43	5151.2	8.71	8.71	5325.47	75.51
Junc 44	5144.2	17.42	17.42	5323.74	77.79
Junc 45	5130	0	0	5320.36	82.48
Junc 46	5130	0	0	5320.35	82.48
Junc 47	5130	17.42	17.42	5320.06	82.35
Junc 48	5130	8.71	8.71	5319.91	82.29
Junc 49	5123.5	8.71	8.71	5319.77	85.04
Junc 50	5117	17.42	17.42	5319.68	87.82
Junc 51	5104.1	17.42	17.42	5319.61	93.38
Junc 52	5110.1	17.42	17.42	5319.63	90.79
Junc 53	5102	8.71	8.71	5319.62	94.29
Junc 54	5120	17.42	17.42	5319.99	86.65
Junc 55	5110	17.42	17.42	5319.75	90.89
Junc 56	5100	26.14	26.14	5319.62	95.16
Junc 57	5101	8.71	8.71	5319.62	94.73
Junc 58	5102.2	26.14	26.14	5319.62	94.21
Junc 59	5111	17.42	17.42	5319.66	90.41
Junc 60	5120.5	17.42	17.42	5319.77	86.34
Junc 61	5130	8.71	8.71	5319.96	82.31
Junc 62	5130	8.71	8.71	5320.14	82.39
Junc 63	5204	0	0	5342.26	59.91
Resvr 1	5345	#N/A	-627.16	5345	0

8-Inch

Network Table - Nodes at 0:00 Hrs

	Elevation	Base Demand	Demand	Head	Pressure
Node ID	ft	GPM	GPM	ft	psi
Junc 4	5172.6	0	0	5344.97	74.69
Junc 5	5172.6	8.71	8.71	5344.95	74.68
Junc 6	5172.6	0	0	5343.94	74.24
Junc 7	5180	0	0	5342.93	70.6
Junc 8	5182.4	0	0	5342.83	69.52
Junc 9	5184.5	0	0	5342.81	68.59
Junc 10	5188.9	8.71	8.71	5342.72	66.65
Junc 11	5197.2	26.14	26.14	5342.64	63.02
Junc 12	5197.2	17.42	17.42	5342.59	63
Junc 13	5242.8	17.42	17.42	5342.55	43.22
Junc 14	5242.8	26.14	26.14	5342.54	43.22
Junc 15	5242.8	17.42	17.42	5342.54	43.22
Junc 16	5244	8.71	8.71	5342.55	42.7
Junc 17	5260.9	8.71	8.71	5342.55	35.38
Junc 18	5251.4	8.71	8.71	5342.55	39.49
Junc 19	5244.7	8.71	8.71	5342.55	42.4
Junc 20	5237.9	8.71	8.71	5342.56	45.35
Junc 21	5180	0	0	5342.86	70.57
Junc 22	5210	0	0	5342.55	57.44
Junc 23	5203.1	17.42	17.42	5342.58	60.44
Junc 24	5187.6	8.71	8.71	5342.64	67.18
Junc 25	5182.7	17.42	17.42	5342.72	69.34
Junc 26	5171	8.71	8.71	5342.69	74.39
Junc 27	5217.4	0	0	5342.23	54.09
Junc 28	5233.2	0	0	5342	47.14
Junc 29	5250	8.71	8.71	5341.95	39.84
Junc 30	5238.1	8.71	8.71	5341.9	44.98
Junc 31	5226.2	8.71	8.71	5341.88	50.12
Junc 32	5210.7	8.71	8.71	5341.87	56.84
Junc 33	5222	17.42	17.42	5341.93	51.97
Junc 34	5211	17.42	17.42	5341.89	56.72
Junc 35	5200	17.42	17.42	5341.87	61.47
Junc 36	5195.7	17.42	17.42	5341.86	63.33
Junc 37	5190	8.71	8.71	5341.86	65.8
Junc 38	5190	8.71	8.71	5341.86	65.8
Junc 39	5190	8.71	8.71	5341.86	65.8
Junc 40	5190	0	0	5341.86	65.8
Junc 41	5170	0	0	5340.48	73.87
Junc 42	5168.2	8.71	8.71	5340.48	74.65
Junc 43	5151.2	8.71	8.71	5339.4	81.54
Junc 44	5144.2	17.42	17.42	5338.97	84.39
Junc 45	5130	0	0	5338.13	90.18
Junc 46	5130	0	0	5338.13	90.18
Junc 47	5130	17.42	17.42	5338.06	90.15
Junc 48	5130	8.71	8.71	5338.02	90.14
Junc 49	5123.5	8.71	8.71	5337.99	92.94
Junc 50	5117	17.42	17.42	5337.97	95.75
Junc 51	5104.1	17.42	17.42	5337.95	101.33
Junc 52	5110.1	17.42	17.42	5337.95	98.73
Junc 53	5102	8.71	8.71	5337.95	102.24
Junc 54	5120	17.42	17.42	5338.04	94.48
Junc 55	5110	17.42	17.42	5337.99	98.79
Junc 56	5100	26.14	26.14	5337.95	103.11
Junc 57	5101	8.71	8.71	5337.95	102.67
Junc 58	5102.2	26.14	26.14	5337.95	102.15
Junc 59	5111	17.42	17.42	5337.96	98.34
Junc 60	5120.5	17.42	17.42	5337.99	94.24
Junc 61	5130	8.71	8.71	5338.04	90.14
Junc 62	5130	8.71	8.71	5338.08	90.16
Junc 63	5204	0	0	5342.69	60.1
Resvr 1	5345	#N/A	-627.16	5345	0

10-Inch

Network Table - Nodes

	Elevation	Base Demand	Demand
Node ID	ft	GPM	GPM
Junc 4	5172.6	0	0
Junc 5	5172.6	8.71	8.71
Junc 6	5172.6	0	0
Junc 7	5180	0	0
Junc 8	5182.4	0	0
Junc 9	5184.5	0	0
Junc 10	5188.9	8.71	8.71
Junc 11	5197.2	26.14	26.14
Junc 12	5197.2	17.42	17.42
Junc 13	5242.8	17.42	17.42
Junc 14	5242.8	26.14	26.14
Junc 15	5242.8	17.42	17.42
Junc 16	5244	8.71	8.71
Junc 17	5260.9	8.71	8.71
Junc 18	5251.4	8.71	8.71
Junc 19	5244.7	8.71	8.71
Junc 20	5237.9	8.71	8.71
Junc 21	5180	0	0
Junc 22	5210	0	0
Junc 23	5203.1	17.42	17.42
Junc 24	5187.6	8.71	8.71
Junc 25	5182.7	17.42	17.42
Junc 26	5171	8.71	8.71
Junc 27	5217.4	0	0
Junc 28	5233.2	0	0
Junc 29	5250	8.71	8.71
Junc 30	5238.1	8.71	8.71
Junc 31	5226.2	8.71	8.71
Junc 32	5210.7	8.71	8.71
Junc 33	5222	17.42	17.42
Junc 34	5211	17.42	17.42
Junc 35	5200	17.42	17.42
Junc 36	5195.7	17.42	17.42
Junc 37	5190	8.71	8.71
Junc 38	5190	8.71	8.71
Junc 39	5190	8.71	8.71
Junc 40	5190	0	0
Junc 41	5170	0	0
Junc 42	5168.2	8.71	8.71
Junc 43	5151.2	8.71	8.71
Junc 44	5144.2	17.42	17.42
Junc 45	5130	0	0
Junc 46	5130	0	0
Junc 47	5130	17.42	17.42
Junc 48	5130	8.71	8.71
Junc 49	5123.5	8.71	8.71
Junc 50	5117	17.42	17.42
Junc 51	5104.1	17.42	17.42
Junc 52	5110.1	17.42	17.42
Junc 53	5102	8.71	8.71
Junc 54	5120	17.42	17.42
Junc 55	5110	17.42	17.42
Junc 56	5100	26.14	26.14
Junc 57	5101	8.71	8.71
Junc 58	5102.2	26.14	26.14
Junc 59	5111	17.42	17.42
Junc 60	5120.5	17.42	17.42
Junc 61	5130	8.71	8.71
Junc 62	5130	8.71	8.71
Junc 63	5204	0	0
Resvr 1	5344	#N/A	-627.16

				12-Inch								8 and 10-Inch					
				Network Table - Nodes								Network Table - Nodes					
Head	Pressure				Elevation	Base Demand	Demand	Head	Pressure				Elevation	Base Demand	Demand	Head	Pressure
ft	psi			Node ID	ft	GPM	GPM	ft	psi			Node ID	ft	GPM	GPM	ft	psi
5343.97	74.26			Junc 4	5172.6	0	0	5343.97	74.26			Junc 4	5172.6	0	0	5343.97	74.26
5343.95	74.24			Junc 5	5172.6	8.71	8.71	5343.95	74.24			Junc 5	5172.6	8.71	8.71	5343.95	74.24
5342.94	73.81			Junc 6	5172.6	0	0	5342.94	73.81			Junc 6	5172.6	0	0	5342.94	73.81
5341.93	70.16			Junc 7	5180	0	0	5341.93	70.16			Junc 7	5180	0	0	5341.93	70.16
5341.83	69.08			Junc 8	5182.4	0	0	5341.83	69.08			Junc 8	5182.4	0	0	5341.83	69.08
5341.83	68.17			Junc 9	5184.5	0	0	5341.83	68.17			Junc 9	5184.5	0	0	5341.76	68.14
5341.8	66.25			Junc 10	5188.9	8.71	8.71	5341.82	66.26			Junc 10	5188.9	8.71	8.71	5341.79	66.25
5341.77	62.64			Junc 11	5197.2	26.14	26.14	5341.81	62.66			Junc 11	5197.2	26.14	26.14	5341.75	62.63
5341.75	62.63			Junc 12	5197.2	17.42	17.42	5341.8	62.66			Junc 12	5197.2	17.42	17.42	5341.73	62.63
5341.74	42.87			Junc 13	5242.8	17.42	17.42	5341.79	42.89			Junc 13	5242.8	17.42	17.42	5341.71	42.86
5341.74	42.87			Junc 14	5242.8	26.14	26.14	5341.79	42.89			Junc 14	5242.8	26.14	26.14	5341.71	42.86
5341.74	42.87			Junc 15	5242.8	17.42	17.42	5341.79	42.89			Junc 15	5242.8	17.42	17.42	5341.7	42.86
5341.74	42.35			Junc 16	5244	8.71	8.71	5341.79	42.37			Junc 16	5244	8.71	8.71	5341.7	42.34
5341.74	35.03			Junc 17	5260.9	8.71	8.71	5341.79	35.05			Junc 17	5260.9	8.71	8.71	5341.7	35.01
5341.74	39.14			Junc 18	5251.4	8.71	8.71	5341.79	39.17			Junc 18	5251.4	8.71	8.71	5341.7	39.13
5341.74	42.05			Junc 19	5244.7	8.71	8.71	5341.79	42.07			Junc 19	5244.7	8.71	8.71	5341.7	42.03
5341.74	44.99			Junc 20	5237.9	8.71	8.71	5341.8	45.02			Junc 20	5237.9	8.71	8.71	5341.71	44.98
5341.91	70.15			Junc 21	5180	0	0	5341.92	70.16			Junc 21	5180	0	0	5341.91	70.15
5341.8	57.11			Junc 22	5210	0	0	5341.88	57.14			Junc 22	5210	0	0	5341.8	57.11
5341.81	60.1			Junc 23	5203.1	17.42	17.42	5341.88	60.13			Junc 23	5203.1	17.42	17.42	5341.81	60.1
5341.83	66.83			Junc 24	5187.6	8.71	8.71	5341.89	66.85			Junc 24	5187.6	8.71	8.71	5341.83	66.83
5341.86	68.96			Junc 25	5182.7	17.42	17.42	5341.9	68.98			Junc 25	5182.7	17.42	17.42	5341.86	68.96
5342.52	74.32			Junc 26	5171	8.71	8.71	5342.77	74.43			Junc 26	5171	8.71	8.71	5342.52	74.32
5341.7	53.86			Junc 27	5217.4	0	0	5341.83	53.92			Junc 27	5217.4	0	0	5341.7	53.86
5341.62	46.98			Junc 28	5233.2	0	0	5341.8	47.06			Junc 28	5233.2	0	0	5341.62	46.98
5341.6	39.69			Junc 29	5250	8.71	8.71	5341.8	39.77			Junc 29	5250	8.71	8.71	5341.6	39.69
5341.59	44.84			Junc 30	5238.1	8.71	8.71	5341.79	44.93			Junc 30	5238.1	8.71	8.71	5341.59	44.84
5341.58	49.99			Junc 31	5226.2	8.71	8.71	5341.79	50.08			Junc 31	5226.2	8.71	8.71	5341.58	49.99
5341.57	56.71			Junc 32	5210.7	8.71	8.71	5341.78	56.8			Junc 32	5210.7	8.71	8.71	5341.57	56.71
5341.6	51.82			Junc 33	5222	17.42	17.42	5341.79	51.91			Junc 33	5222	17.42	17.42	5341.6	51.82
5341.58	56.58			Junc 34	5211	17.42	17.42	5341.79	56.67			Junc 34	5211	17.42	17.42	5341.58	56.58
5341.57	61.34			Junc 35	5200	17.42	17.42	5341.78	61.44			Junc 35	5200	17.42	17.42	5341.57	61.34
5341.57	63.21			Junc 36	5195.7	17.42	17.42	5341.78	63.3			Junc 36	5195.7	17.42	17.42	5341.56	63.2
5341.57	65.68			Junc 37	5190	8.71	8.71	5341.78	65.77			Junc 37	5190	8.71	8.71	5341.56	65.67
5341.57	65.68			Junc 38	5190	8.71	8.71	5341.78	65.77			Junc 38	5190	8.71	8.71	5341.56	65.67
5341.57	65.68			Junc 39	5190	8.71	8.71	5341.78	65.77			Junc 39	5190	8.71	8.71	5341.57	65.67
5341.57	65.68			Junc 40	5190	0	0	5341.78	65.77			Junc 40	5190	0	0	5341.57	65.67
5341.78	74.43			Junc 41	5170	0	0	5342.46	74.73			Junc 41	5170	0	0	5341.78	74.43
5341.78	75.21			Junc 42	5168.2	8.71	8.71	5342.46	75.51			Junc 42	5168.2	8.71	8.71	5341.78	75.21
5341.41	82.42			Junc 43	5151.2	8.71	8.71	5342.31	82.81			Junc 43	5151.2	8.71	8.71	5340.69	82.11
5341.27	85.39			Junc 44	5144.2	17.42	17.42	5342.25	85.82			Junc 44	5144.2	17.42	17.42	5340.26	84.95
5340.98	91.42			Junc 45	5130	0	0	5342.14	91.92			Junc 45	5130	0	0	5339.43	90.75
5340.98	91.42			Junc 46	5130	0	0	5342.14	91.92			Junc 46	5130	0	0	5339.43	90.74
5340.96	91.41			Junc 47	5130	17.42	17.42	5342.13	91.91			Junc 47	5130	17.42	17.42	5339.35	90.71
5340.95	91.4			Junc 48	5130	8.71	8.71	5342.12	91.91			Junc 48	5130	8.71	8.71	5339.32	90.7
5340.94	94.21			Junc 49	5123.5	8.71	8.71	5342.12	94.73			Junc 49	5123.5	8.71	8.71	5339.28	93.5
5340.93	97.03			Junc 50	5117	17.42	17.42	5342.11	97.54			Junc 50	5117	17.42	17.42	5339.26	96.31
5340.92	102.62			Junc 51	5104.1	17.42	17.42	5342.11	103.13			Junc 51	5104.1	17.42	17.42	5339.25	101.89
5340.92	100.02			Junc 52	5110.1	17.42	17.42	5342.11	100.53			Junc 52	5110.1	17.42	17.42	5339.25	99.29
5340.92	103.53			Junc 53	5102	8.71	8.71	5342.11	104.04			Junc 53	5102	8.71	8.71	5339.25	102.8
5340.95	95.74			Junc 54	5120	17.42	17.42	5342.12	96.25			Junc 54	5120	17.42	17.42	5339.34	95.04
5340.93	100.06			Junc 55	5110	17.42	17.42	5342.12	100.58			Junc 55	5110	17.42	17.42	5339.28	99.35
5340.92	104.39			Junc 56	5100	26.14	26.14	5342.11	104.91			Junc 56	5100	26.14	26.14	5339.25	103.67
5340.92	103.96			Junc 57	5101	8.71	8.71	5342.11	104.47			Junc 57	5101	8.71	8.71	5339.25	103.23
5340.92	103.44			Junc 58	5102.2	26.14	26.14	5342.11	103.95			Junc 58	5102.2	26.14	26.14	5339.25	102.71
5340.93	99.63			Junc 59	5111	17.42	17.42	5342.11	100.14			Junc 59	5111	17.42	17.42	5339.26	98.9
5340.94	95.51			Junc 60	5120.5	17.42	17.42	5342.12	96.03			Junc 60	5120.5	17.42	17.42	5339.28	94.8
5340.95	91.41			Junc 61	5130	8.71	8.71	5342.12	91.91			Junc 61	5130	8.71	8.71	5339.33	90.7
5340.97	91.41			Junc 62	5130	8.71	8.71	5342.13	91.92			Junc 62	5130	8.71	8.71	5339.38	90.72
5341.79	59.7			Junc 63	5204	0	0	5341.81	59.71			Junc 63	5204	0	0	5341.74	59.68
5344	0			Resvr 1	5344	#N/A	-627.16	5344	0			Resvr 1	5344	#N/A	-627.16	5344	0

Fire Flow with Max Demand and Irrigation Results

8-Inch

Network Table - Nodes

	Elevation	Base Demand	Demand	Head	Pressure
Node ID	ft	GPM	GPM	ft	psi
Junc 4	5172.6	0	0	5431.74	112.28
Junc 5	5172.6	8.71	8.71	5431.48	112.17
Junc 6	5172.6	0	0	5421.68	107.93
Junc 7	5180	0	0	5397.65	94.31
Junc 8	5182.4	0	0	5397.55	93.22
Junc 9	5184.5	0	0	5397.52	92.3
Junc 10	5188.9	8.71	8.71	5397.44	90.36
Junc 11	5197.2	26.14	26.14	5397.35	86.72
Junc 12	5197.2	17.42	17.42	5397.31	86.71
Junc 13	5242.8	17.42	17.42	5397.27	66.93
Junc 14	5242.8	26.14	26.14	5397.26	66.93
Junc 15	5242.8	17.42	17.42	5397.26	66.93
Junc 16	5244	8.71	8.71	5397.26	66.41
Junc 17	5260.9	8.71	8.71	5397.26	59.08
Junc 18	5251.4	8.71	8.71	5397.26	63.2
Junc 19	5244.7	8.71	8.71	5397.26	66.11
Junc 20	5237.9	8.71	8.71	5397.27	69.06
Junc 21	5180	0	0	5392.91	92.26
Junc 22	5210	0	0	5368.54	68.7
Junc 23	5203.1	17.42	17.42	5373.57	73.87
Junc 24	5187.6	8.71	8.71	5378.64	82.78
Junc 25	5182.7	17.42	17.42	5385.27	87.77
Junc 26	5171	8.71	8.71	5420.43	108.08
Junc 27	5217.4	0	0	5334.13	50.58
Junc 28	5233.2	0	0	5308.74	32.73
Junc 29	5250	1508.71	1508.71	5296.49	20.14
Junc 30	5238.1	8.71	8.71	5298.58	26.21
Junc 31	5226.2	8.71	8.71	5300.21	32.07
Junc 32	5210.7	8.71	8.71	5301.63	39.4
Junc 33	5222	17.42	17.42	5306.76	36.72
Junc 34	5211	17.42	17.42	5304.85	40.66
Junc 35	5200	17.42	17.42	5302.61	44.46
Junc 36	5195.7	17.42	17.42	5302.39	46.23
Junc 37	5190	8.71	8.71	5302.28	48.65
Junc 38	5190	8.71	8.71	5302.05	48.55
Junc 39	5190	8.71	8.71	5301.89	48.48
Junc 40	5190	0	0	5301.81	48.45
Junc 41	5170	0	0	5418.22	107.55
Junc 42	5168.2	8.71	8.71	5418.22	108.33
Junc 43	5151.2	8.71	8.71	5417.13	115.23
Junc 44	5144.2	17.42	17.42	5416.7	118.07
Junc 45	5130	0	0	5415.87	123.87
Junc 46	5130	0	0	5415.87	123.87
Junc 47	5130	17.42	17.42	5415.79	123.83
Junc 48	5130	8.71	8.71	5415.76	123.82
Junc 49	5123.5	8.71	8.71	5415.72	126.62
Junc 50	5117	17.42	17.42	5415.7	129.43
Junc 51	5104.1	17.42	17.42	5415.69	135.01
Junc 52	5110.1	17.42	17.42	5415.69	132.41
Junc 53	5102	8.71	8.71	5415.69	135.92
Junc 54	5120	17.42	17.42	5415.78	128.16
Junc 55	5110	17.42	17.42	5415.72	132.47
Junc 56	5100	26.14	26.14	5415.69	136.79
Junc 57	5101	8.71	8.71	5415.69	136.35
Junc 58	5102.2	26.14	26.14	5415.69	135.83
Junc 59	5111	17.42	17.42	5415.7	132.03
Junc 60	5120.5	17.42	17.42	5415.72	127.92
Junc 61	5130	8.71	8.71	5415.77	123.82
Junc 62	5130	8.71	8.71	5415.81	123.84
Junc 63	5204	0	0	5397.41	83.8
Resvr 1	5432	#N/A	-2127.16	5432	0

10-Inch

Network Table - Nodes

	Elevation	Base Demand	Demand	Head	Pressure
Node ID	ft	GPM	GPM	ft	psi
Junc 4	5172.6	0	0	5365.74	83.69
Junc 5	5172.6	8.71	8.71	5365.48	83.57
Junc 6	5172.6	0	0	5355.68	79.33
Junc 7	5180	0	0	5331.65	65.71
Junc 8	5182.4	0	0	5323.93	61.32
Junc 9	5184.5	0	0	5322.83	59.94
Junc 10	5188.9	8.71	8.71	5321.94	57.65
Junc 11	5197.2	26.14	26.14	5320.07	53.24
Junc 12	5197.2	17.42	17.42	5318.37	52.5
Junc 13	5242.8	17.42	17.42	5315.67	31.58
Junc 14	5242.8	26.14	26.14	5314.37	31.01
Junc 15	5242.8	17.42	17.42	5313.21	30.51
Junc 16	5244	8.71	8.71	5312.01	29.47
Junc 17	5260.9	1508.71	1508.71	5307.51	20.2
Junc 18	5251.4	8.71	8.71	5308.83	24.88
Junc 19	5244.7	8.71	8.71	5310.13	28.35
Junc 20	5237.9	8.71	8.71	5312.01	32.11
Junc 21	5180	0	0	5331.62	65.7
Junc 22	5210	0	0	5331.52	52.65
Junc 23	5203.1	17.42	17.42	5331.53	55.65
Junc 24	5187.6	8.71	8.71	5331.55	62.37
Junc 25	5182.7	17.42	17.42	5331.57	64.51
Junc 26	5171	8.71	8.71	5355.25	79.84
Junc 27	5217.4	0	0	5331.41	49.4
Junc 28	5233.2	0	0	5331.33	42.52
Junc 29	5250	8.71	8.71	5331.31	35.23
Junc 30	5238.1	8.71	8.71	5331.3	40.38
Junc 31	5226.2	8.71	8.71	5331.29	45.54
Junc 32	5210.7	8.71	8.71	5331.29	52.25
Junc 33	5222	17.42	17.42	5331.31	47.36
Junc 34	5211	17.42	17.42	5331.29	52.12
Junc 35	5200	17.42	17.42	5331.29	56.89
Junc 36	5195.7	17.42	17.42	5331.28	58.75
Junc 37	5190	8.71	8.71	5331.28	61.22
Junc 38	5190	8.71	8.71	5331.28	61.22
Junc 39	5190	8.71	8.71	5331.28	61.22
Junc 40	5190	0	0	5331.28	61.22
Junc 41	5170	0	0	5354.51	79.95
Junc 42	5168.2	8.71	8.71	5354.51	80.73
Junc 43	5151.2	8.71	8.71	5354.14	87.94
Junc 44	5144.2	17.42	17.42	5354	90.91
Junc 45	5130	0	0	5353.72	96.94
Junc 46	5130	0	0	5353.72	96.94
Junc 47	5130	17.42	17.42	5353.69	96.93
Junc 48	5130	8.71	8.71	5353.68	96.92
Junc 49	5123.5	8.71	8.71	5353.67	99.73
Junc 50	5117	17.42	17.42	5353.66	102.55
Junc 51	5104.1	17.42	17.42	5353.66	108.13
Junc 52	5110.1	17.42	17.42	5353.66	105.53
Junc 53	5102	8.71	8.71	5353.66	109.04
Junc 54	5120	17.42	17.42	5353.69	101.26
Junc 55	5110	17.42	17.42	5353.67	105.58
Junc 56	5100	26.14	26.14	5353.66	109.91
Junc 57	5101	8.71	8.71	5353.66	109.48
Junc 58	5102.2	26.14	26.14	5353.66	108.96
Junc 59	5111	17.42	17.42	5353.66	105.14
Junc 60	5120.5	17.42	17.42	5353.67	101.03
Junc 61	5130	8.71	8.71	5353.69	96.92
Junc 62	5130	8.71	8.71	5353.7	96.93
Junc 63	5204	0	0	5317.82	49.32
Resvr 1	5366	#N/A	-2127.16	5366	0

12-Inch

Network Table - Nodes

	Elevation	Base Demand	Demand
Node ID	ft	GPM	GPM
Junc 4	5172.6	0	0
Junc 5	5172.6	8.71	8.71
Junc 6	5172.6	0	0
Junc 7	5180	0	0
Junc 8	5182.4	0	0
Junc 9	5184.5	0	0
Junc 10	5188.9	8.71	8.71
Junc 11	5197.2	26.14	26.14
Junc 12	5197.2	17.42	17.42
Junc 13	5242.8	17.42	17.42
Junc 14	5242.8	26.14	26.14
Junc 15	5242.8	17.42	17.42
Junc 16	5244	8.71	8.71
Junc 17	5260.9	1508.71	1508.71
Junc 18	5251.4	8.71	8.71
Junc 19	5244.7	8.71	8.71
Junc 20	5237.9	8.71	8.71
Junc 21	5180	0	0
Junc 22	5210	0	0
Junc 23	5203.1	17.42	17.42
Junc 24	5187.6	8.71	8.71
Junc 25	5182.7	17.42	17.42
Junc 26	5171	8.71	8.71
Junc 27	5217.4	0	0
Junc 28	5233.2	0	0
Junc 29	5250	8.71	8.71
Junc 30	5238.1	8.71	8.71
Junc 31	5226.2	8.71	8.71
Junc 32	5210.7	8.71	8.71
Junc 33	5222	17.42	17.42
Junc 34	5211	17.42	17.42
Junc 35	5200	17.42	17.42
Junc 36	5195.7	17.42	17.42
Junc 37	5190	8.71	8.71
Junc 38	5190	8.71	8.71
Junc 39	5190	8.71	8.71
Junc 40	5190	0	0
Junc 41	5170	0	0
Junc 42	5168.2	8.71	8.71
Junc 43	5151.2	8.71	8.71
Junc 44	5144.2	17.42	17.42
Junc 45	5130	0	0
Junc 46	5130	0	0
Junc 47	5130	17.42	17.42
Junc 48	5130	8.71	8.71
Junc 49	5123.5	8.71	8.71
Junc 50	5117	17.42	17.42
Junc 51	5104.1	17.42	17.42
Junc 52	5110.1	17.42	17.42
Junc 53	5102	8.71	8.71
Junc 54	5120	17.42	17.42
Junc 55	5110	17.42	17.42
Junc 56	5100	26.14	26.14
Junc 57	5101	8.71	8.71
Junc 58	5102.2	26.14	26.14
Junc 59	5111	17.42	17.42
Junc 60	5120.5	17.42	17.42
Junc 61	5130	8.71	8.71
Junc 62	5130	8.71	8.71
Junc 63	5204	0	0
Resvr 1	5356	#N/A	-2127.16

				8 and 10-Inch					
				Network Table - Nodes					
Head	Pressure				Elevation	Base Demand	Demand	Head	Pressure
ft	psi			Node ID	ft	GPM	GPM	ft	psi
5355.74	79.35			Junc 4	5172.6	0	0	5370.24	85.64
5355.48	79.24			Junc 5	5172.6	8.71	8.71	5369.98	85.52
5345.68	74.99			Junc 6	5172.6	0	0	5360.18	81.28
5321.65	61.37			Junc 7	5180	0	0	5336.15	67.66
5313.93	56.99			Junc 8	5182.4	0	0	5328.43	63.27
5313.47	55.88			Junc 9	5184.5	0	0	5319.32	58.42
5313.11	53.82			Junc 10	5188.9	8.71	8.71	5325.73	59.29
5312.34	49.89			Junc 11	5197.2	26.14	26.14	5323.18	54.59
5311.64	49.59			Junc 12	5197.2	17.42	17.42	5320.84	53.57
5310.53	29.35			Junc 13	5242.8	17.42	17.42	5317.1	32.19
5309.99	29.12			Junc 14	5242.8	26.14	26.14	5315.28	31.41
5309.52	28.91			Junc 15	5242.8	17.42	17.42	5313.64	30.7
5309.02	28.18			Junc 16	5244	8.71	8.71	5311.94	29.44
5307.17	20.05			Junc 17	5260.9	1508.71	1508.71	5307.41	20.15
5307.71	24.4			Junc 18	5251.4	8.71	8.71	5308.72	24.84
5308.25	27.54			Junc 19	5244.7	8.71	8.71	5310.01	28.3
5309.02	30.82			Junc 20	5237.9	8.71	8.71	5311.89	32.06
5321.63	61.37			Junc 21	5180	0	0	5336.12	67.65
5321.59	48.35			Junc 22	5210	0	0	5336.02	54.6
5321.6	51.34			Junc 23	5203.1	17.42	17.42	5336.03	57.6
5321.6	58.06			Junc 24	5187.6	8.71	8.71	5336.05	64.32
5321.62	60.19			Junc 25	5182.7	17.42	17.42	5336.07	66.46
5345.5	75.61			Junc 26	5171	8.71	8.71	5359.75	81.79
5321.55	45.13			Junc 27	5217.4	0	0	5335.91	51.35
5321.52	38.27			Junc 28	5233.2	0	0	5335.83	44.47
5321.51	30.98			Junc 29	5250	8.71	8.71	5335.81	37.18
5321.5	36.14			Junc 30	5238.1	8.71	8.71	5335.8	42.33
5321.5	41.29			Junc 31	5226.2	8.71	8.71	5335.79	47.49
5321.5	48.01			Junc 32	5210.7	8.71	8.71	5335.79	54.2
5321.51	43.12			Junc 33	5222	17.42	17.42	5335.81	49.31
5321.5	47.88			Junc 34	5211	17.42	17.42	5335.79	54.07
5321.5	52.64			Junc 35	5200	17.42	17.42	5335.79	58.84
5321.5	54.51			Junc 36	5195.7	17.42	17.42	5335.78	60.7
5321.5	56.98			Junc 37	5190	8.71	8.71	5335.78	63.17
5321.5	56.98			Junc 38	5190	8.71	8.71	5335.78	63.17
5321.5	56.98			Junc 39	5190	8.71	8.71	5335.78	63.17
5321.5	56.98			Junc 40	5190	0	0	5335.78	63.17
5345.2	75.91			Junc 41	5170	0	0	5359.01	81.9
5345.2	76.69			Junc 42	5168.2	8.71	8.71	5359.01	82.68
5345.05	83.99			Junc 43	5151.2	8.71	8.71	5357.92	89.57
5344.99	87			Junc 44	5144.2	17.42	17.42	5357.49	92.42
5344.87	93.1			Junc 45	5130	0	0	5356.66	98.21
5344.87	93.1			Junc 46	5130	0	0	5356.66	98.21
5344.86	93.1			Junc 47	5130	17.42	17.42	5356.59	98.18
5344.86	93.1			Junc 48	5130	8.71	8.71	5356.55	98.16
5344.85	95.91			Junc 49	5123.5	8.71	8.71	5356.52	100.97
5344.85	98.73			Junc 50	5117	17.42	17.42	5356.5	103.77
5344.85	104.32			Junc 51	5104.1	17.42	17.42	5356.48	109.36
5344.85	101.72			Junc 52	5110.1	17.42	17.42	5356.48	106.76
5344.85	105.23			Junc 53	5102	8.71	8.71	5356.48	110.27
5344.86	97.43			Junc 54	5120	17.42	17.42	5356.57	102.51
5344.85	101.76			Junc 55	5110	17.42	17.42	5356.51	106.81
5344.85	106.09			Junc 56	5100	26.14	26.14	5356.48	111.13
5344.85	105.66			Junc 57	5101	8.71	8.71	5356.48	110.7
5344.85	105.14			Junc 58	5102.2	26.14	26.14	5356.48	110.18
5344.85	101.33			Junc 59	5111	17.42	17.42	5356.49	106.37
5344.85	97.21			Junc 60	5120.5	17.42	17.42	5356.52	102.27
5344.86	93.1			Junc 61	5130	8.71	8.71	5356.57	98.17
5344.86	93.1			Junc 62	5130	8.71	8.71	5356.61	98.19
5311.41	46.54			Junc 63	5204	0	0	5315.88	48.48
5356	0			Resvr 1	5370.5	#N/A	-2127.16	5370.5	0

Max Pressure (no Flow , inlet pressure of 5370.5 feet head for 8 and 10-inch network fire flow with max demand and irrigation)

Network Table - Nodes

	Elevation	Base Demand	Demand	Head	Pressure
Node ID	ft	GPM	GPM	ft	psi
Junc 4	5172.6	0	0	5370.5	85.75
Junc 5	5172.6	0	0	5370.5	85.75
Junc 6	5172.6	0	0	5370.5	85.75
Junc 7	5180	0	0	5370.5	82.54
Junc 8	5182.4	0	0	5370.5	81.5
Junc 9	5184.5	0	0	5370.5	80.59
Junc 10	5188.9	0	0	5370.5	78.69
Junc 11	5197.2	0	0	5370.5	75.09
Junc 12	5197.2	0	0	5370.5	75.09
Junc 13	5242.8	0	0	5370.5	55.33
Junc 14	5242.8	0	0	5370.5	55.33
Junc 15	5242.8	0	0	5370.5	55.33
Junc 16	5244	0	0	5370.5	54.81
Junc 17	5260.9	0	0	5370.5	47.49
Junc 18	5251.4	0	0	5370.5	51.61
Junc 19	5244.7	0	0	5370.5	54.51
Junc 20	5237.9	0	0	5370.5	57.46
Junc 21	5180	0	0	5370.5	82.54
Junc 22	5210	0	0	5370.5	69.54
Junc 23	5203.1	0	0	5370.5	72.53
Junc 24	5187.6	0	0	5370.5	79.25
Junc 25	5182.7	0	0	5370.5	81.37
Junc 26	5171	0	0	5370.5	86.44
Junc 27	5217.4	0	0	5370.5	66.34
Junc 28	5233.2	0	0	5370.5	59.49
Junc 29	5250	0	0	5370.5	52.21
Junc 30	5238.1	0	0	5370.5	57.37
Junc 31	5226.2	0	0	5370.5	62.53
Junc 32	5210.7	0	0	5370.5	69.24
Junc 33	5222	0	0	5370.5	64.35
Junc 34	5211	0	0	5370.5	69.11
Junc 35	5200	0	0	5370.5	73.88
Junc 36	5195.7	0	0	5370.5	75.74
Junc 37	5190	0	0	5370.5	78.21
Junc 38	5190	0	0	5370.5	78.21
Junc 39	5190	0	0	5370.5	78.21
Junc 40	5190	0	0	5370.5	78.21
Junc 41	5170	0	0	5370.5	86.88
Junc 42	5168.2	0	0	5370.5	87.66
Junc 43	5151.2	0	0	5370.5	95.02
Junc 44	5144.2	0	0	5370.5	98.06
Junc 45	5130	0	0	5370.5	104.21
Junc 46	5130	0	0	5370.5	104.21
Junc 47	5130	0	0	5370.5	104.21
Junc 48	5130	0	0	5370.5	104.21
Junc 49	5123.5	0	0	5370.5	107.03
Junc 50	5117	0	0	5370.5	109.84
Junc 51	5104.1	0	0	5370.5	115.43
Junc 52	5110.1	0	0	5370.5	112.83
Junc 53	5102	0	0	5370.5	116.34
Junc 54	5120	0	0	5370.5	108.54
Junc 55	5110	0	0	5370.5	112.87
Junc 56	5100	0	0	5370.5	117.21
Junc 57	5101	0	0	5370.5	116.77
Junc 58	5102.2	0	0	5370.5	116.25
Junc 59	5111	0	0	5370.5	112.44
Junc 60	5120.5	0	0	5370.5	108.32
Junc 61	5130	0	0	5370.5	104.21
Junc 62	5130	0	0	5370.5	104.21
Junc 63	5204	0	0	5370.5	72.14
Resvr 1	5370.5	#N/A	-0.01	5370.5	0

Pipe Data for 8 and 10-Inch			
Network Table - Links			
	Length	Diameter	Roughness
Link ID	ft	in	
Pipe 1	1	6	140
Pipe 2	1	6	140
Pipe 3	37.74	6	140
Pipe 4	121.25	6	140
Pipe 5	46.87	6	140
Pipe 6	516.41	10	140
Pipe 7	294.09	6	140
Pipe 8	1339.19	10	140
Pipe 9	1551.92	10	140
Pipe 10	531.38	10	140
Pipe 11	373.9	10	140
Pipe 12	386.73	10	140
Pipe 13	1514.02	10	140
Pipe 14	441.9	10	140
Pipe 15	408.14	10	140
Pipe 16	378.64	10	140
Pipe 17	399.38	10	140
Pipe 18	791.58	10	140
Pipe 19	479.57	10	140
Pipe 20	496.66	10	140
Pipe 21	114.41	10	140
Pipe 22	790.98	10	140
Pipe 23	727.6	10	140
Pipe 24	657.09	10	140
Pipe 25	512.98	10	140
Pipe 26	531.21	10	140
Pipe 27	1958.51	10	140
Pipe 28	873.82	10	140
Pipe 29	644.6	10	140
Pipe 30	601.51	10	140
Pipe 31	842.72	10	140
Pipe 32	627.3	10	140
Pipe 33	525.66	10	140
Pipe 34	640.31	10	140
Pipe 35	640.6	8	140
Pipe 36	298.82	8	140
Pipe 37	498	8	140
Pipe 38	646.02	8	140
Pipe 39	286.05	8	140
Pipe 40	431.48	8	140
Pipe 41	469.62	10	140
Pipe 42	482.99	10	140
Pipe 43	606.88	10	140
Pipe 44	1478.04	10	140
Pipe 45	428	8	140
Pipe 46	771.77	8	140
Pipe 47	322.74	8	140
Pipe 48	712.68	8	140
Pipe 49	3.76	8	140
Pipe 50	573.64	8	140
Pipe 51	573.12	8	140
Pipe 52	573.01	8	140
Pipe 53	440.33	8	140
Pipe 54	359.47	8	140
Pipe 55	410.79	8	140
Pipe 56	371.35	8	140
Pipe 57	482.94	8	140
Pipe 58	441.77	8	140
Pipe 59	388.77	8	140
Pipe 60	439.78	8	140
Pipe 61	380.65	8	140
Pipe 62	380.06	8	140
Pipe 63	573.83	8	140
Pipe 64	573.31	8	140
Pipe 65	556.78	8	140
Pipe 66	386.7	8	140
Pipe 67	383.87	8	140

DOWL HKM

Memorandum

Project No.: 4428.10900.01

TO: Sarah Jones, P.E.

CC: Ed Janney, P.E.

FROM: Jessica Salo, P.E.

DATE: November 1, 2011

SUBJECT: Anaconda Water Modeling for Mill Creek Water Line

Introduction

The purpose of this memo is to document hydraulic water model results for design of the Mill Creek water line extension in Anaconda. The Mill Creek property is located approximately 2 miles to the southeast of the Anaconda city limit boundary. Currently, an existing 14-inch water main extends to the east of Anaconda along Highway 1. This line runs all the way to the Warm Springs State Hospital. The Mill Creek water line will connect to the existing 14-inch line at Highway 1 at the approximate location shown on Figure 1. The length of this line is approximately 14,000 lineal feet from the connection at Highway 1 to the northern boundary of the Mill Creek property near the intersection of Mill Creek Road and Willow Glen Road. For modeling purposes, the Mill Creek extension is extended an additional 6,000 feet to the high point located along the southern edge of the property. The Mill Creek extension will supply domestic/potable water for industrial use to the Mill Creek Industrial Complex.

Water Model Background

A computer water system model of Anaconda was developed as part of the Preliminary Engineering Report Modeling Study Amendment, March 2009. The modeling study provided additional justification for a prioritization of water main replacement projects or phases. Since the time of the report, Anaconda has continued to implement the replacement projects intended to eliminate a significant amount of system leakage due to old distribution mains that date back to the early 1900's.

The water model consists of several demand scenarios that take into account a large amount of system leakage. Separate scenarios were developed for each improvement phase so that the hydraulic benefits are demonstrated based on new replacement pipe sizes, pipe materials, and reduced amount of leakage demand. The base scenario used for the Mill Creek modeling is the Phase II improvement project, scheduled to be constructed in the summer of 2012.

The following is a summary of several of the design criteria developed as part of the modeling study pertinent to the modeling of the Mill Creek water line extension:

Tank Elevation

The water level in the 3.5 MG tank controls the starting hydraulic grade line (HGL) of the system. The tank is buried and is approximately 24 feet high with a diameter of approximately 158 feet. The ground elevation at the tank location is approximately 5,554'. It is assumed that the roof of the tank sits at the ground surface elevation. Based on information from the water department, the well pumps turn on when the water level in the tank drops to 18 feet and turn off when the water level reaches 24 feet. This is the operational range of the tank. It is assumed that the 24 foot water level corresponds to elevation 5552 to account for space between the roof and high water operational level. Therefore, the bottom of the operational range (18') corresponds to an elevation of 5546. The bottom operational water level (5546) is used in this modeling for the starting HGL.

Demand Allocation

Model demands are based on a variety of data sources such as meter readings (although the majority of the system is not metered); water production records, Census data, and GIS base mapping layers. Table 1 summarizes the model demands assuming all water main improvements have been constructed through Phase II. Demands are included for recent developments that have been added since the modeling report such as CCCS, Triangle subdivision, and the East Yards development (currently in the design phase).

Table 1 – Demand Summary

Demand Type	Average Day Demand	
	gpm	*MGD*
Modeling Report, 2009		
Domestic (Residential & Commercial) within Anaconda	994	1.43
Line to Warm Springs	14	0.02
Leakage	681	0.98
Recent Development, Post 2009		
CCCS	77	0.11
Triangle Subdivision	41	0.06
East Yards	24	0.04
Total System Demand	1,831	2.64
Note: East Yards demands are estimated based on AWWA Journal article, "Estimating Commercial, Industrial, and Institutional Water Use on the Basis of Heated Building Area", June 2011.		

Peaking Factors

The following peaking factors were developed as part of the modeling study. These peaking factors will be perpetuated for the Mill Creek modeling.

Peak Day to Average Day = 2.68
Peak Hour to Average Day = 4.86

Mill Creek Extension Model Results

Preliminary design calculations indicate that a 6-inch water main will be sufficient to provide the projected Mill Creek water demands and needed flushing flow and pressure. Therefore, the Mill Creek water main extension is modeled as 6-inch diameter PVC. The Hazen-Williams C factor is equal to 140 and the diameter is modeled as 6.08 inches to reflect the approximate inside diameter of Class 150 DR 18 pipe.

In addition to the Mill Creek extension, a new PRV is proposed along the existing 14-inch water main upstream of the Mill Creek connection (refer to Figure 1). This PRV is intended to reduce pressures along the Mill Creek line to within tolerances acceptable for Class 150 pipe. In addition, this PRV will also reduce pressure along the 14-inch main and alleviate some of the high pressure concerns directly upstream of a second PRV station approximately 1.5 miles to the east.

The following model scenarios verify and document the hydraulics associated with the Mill Creek water line extension and proposed PRV. Detailed model results are included in Table 2 and specific node locations are depicted on Figure 1.

Scenario 1 – Average Day with Flushing Demand at Mill Creek

The Mill Creek Industrial Complex requires a flushing velocity of 2.5 feet per second (equates to 220 gpm in a 6-inch line) at a minimum pressure of 20 psi. A 220 gpm demand was placed at the end of the Mill Creek extension during an average day demand scenario in the model. The results of this modeling indicate that the proposed PRV downstream pressure cannot be set lower than 100 psi in order to achieve 20 psi minimum pressure at the high point at the end of the line.

Scenario 2 – Peak Day with Mill Creek Capacity

This scenario models a peak day demand scenario throughout the system and establishes the capacity of the 6-inch Mill Creek extension to supply water at 35 psi minimum pressure. Results of this scenario indicate that the capacity of the 6-inch line is 155 gpm under a peak day modeling scenario. A demand of 155 gpm at the end of the Mill Creek extension results in a minimum pressure of 35 psi at the high point at the end of the line.

Scenario 3A – Peak Hour with Mill Creek Capacity

This scenario models a peak hour demand scenario throughout the system and establishes the capacity of the 6-inch Mill Creek extension to supply water at 35 psi minimum pressure. Results of this scenario indicate that portions of the existing system, specifically the end of Birch Street, are experiencing pressures less than 35 psi even before demands are added to the system for Mill Creek. Due to the demand on the system and the high elevation of the node at the end of Birch Street, the pressure at the end of Birch Street is 32 psi under a peak hour scenario. As demands as added to the system (such as for the Mill Creek extension), the end of Birch Street will continue to loose pressure due to additional headloss in the system. Therefore, the capacity of the Mill Creek line is essentially zero under this modeling scenario.

Scenario 3B – Peak Hour with Mill Creek Capacity (with reduced system leakage)

All of the modeling scenarios discussed above assumes that the leakage demand has been removed from all mains that have been recently replaced through the phased water main rehabilitation projects up through Phase II. However, additional phased improvements are planned for future years. This modeling scenario runs the previous assumptions from Scenario 3A but assumes that all phased improvements are in place and system leakage is further reduced. The end of Birch Street is above 35 psi under this scenario and the capacity of the Mill Creek line is 151 gpm. A demand of 151 gpm at the end of the Mill Creek extension results in a minimum pressure of 35 psi at the high point at the end of the line.

Conclusions and Recommendations

The modeling and hydraulics presented above result in the following recommendations for the design of the Mill Creek extension:

- A 6-inch water line is adequate to provide the desired flushing velocities and demand for domestic service to the Mill Creek Industrial Complex.
- The capacity of the 6-inch Mill Creek extension under normal domestic demand (i.e. no flushing or fire flows) is approximately 150-155 gpm depending on the demand scenario.
- The pressure settings of the new PRV are as follows:
    - Maximum upstream pressure (based on static conditions and full tank) = 157 psi
    - Downstream pressure = 100 psi
- As future demands are added to the system, the end of Birch Street will continue to experience low pressures during times of peak demand. A pump station may eventually be needed to boost pressures at this location.

Table 2
Mill Creek Extension Model Results

Description	Node Elevation (ft)	Scenario			
		1	2	3A	3B
		FLOWS (GPM)			
Total System Flow	-	2,051	3,916	6,261	6,111
Line to Mill Creek	-	220	155	0	151
		PRESSURES (PSI)			
Proposed PRV Upstream Pressure (PRV-3)	5,190	149	139	118	124
Proposed PRV Downstream Pressure (PRV-3)	5,190	100	100	100	100
Upstream Pressure Existing PRV (PRV-1)	5,107	136	135	134	134
End of Birch Street (J-208)	5,395	61	51	32	38
Mill Creek Low Point (J-656)	5,082	133	139	146	139
End of Mill Creek Extension/Design (J-657)	5,182	81	91	103	91
High Point at Southern End of Mill Creek Property (J-658)	5,300	20	35	51	35

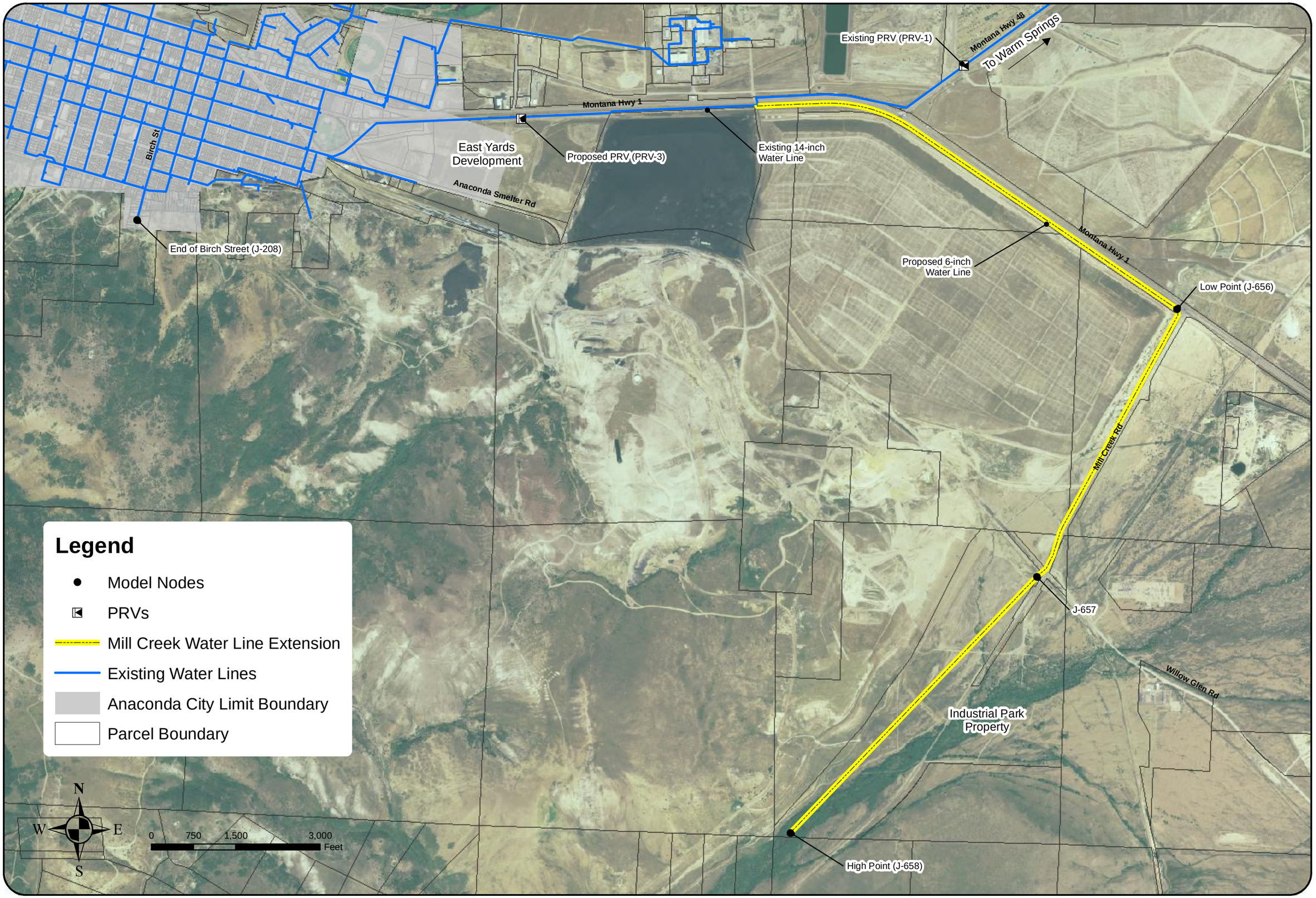

Figure 1

Anaconda Water Modeling for Mill Creek Water Line
Location Map

DOWL HKM

Mike Mahon

From: Janney, Edward <EJanney@dowlhkm.com>
Sent: Wednesday, April 23, 2014 6:12 PM
To: Mike Mahon
Subject: Mill Creek Waterline Flushing Hydrant Flow Test Results

Categories: ADLC - Mill Creek TIFID

Mike,

On October 15, 2013 at approximately 3:30 p.m. DOWL HKM and ADLC water department personnel flow tested the flushing hydrant on the Mill Creek waterline located just south of the railroad tracks on the Mill Creek Highway. The following pressures were measured during the flow test.

- Static pressure = 94 psi
- Pitot pressure = 11.0 psi
- Residual line pressure during flow test = 40 psi

Based on a pitot pressure of 11.0 psi and a 2-inch nozzle diameter, the calculated flow rate equated to 356 gpm ($29.83 \times 0.9 \times 2^2 \times 11.0^{0.5} = 356$).

During the flow test the downstream pressure setting at the PRV station across from the Town Pump was observed to be 90 psi.

Please call if you have questions.

Thanks,

Ed

From: Janney, Edward
Sent: Wednesday, April 23, 2014 4:01 PM
To: 'Mike Mahon'
Subject: RE: Mill Creek TIFID Water Modelling Help

Mike,

Here is the second modeling report file.

It will take me a few minutes to find the hydrant flow test results in our archives, but not a problem. You can expect the flow test information shortly.

Ed

From: Janney, Edward
Sent: Wednesday, April 23, 2014 3:57 PM
To: 'Mike Mahon'
Subject: RE: Mill Creek TIFID Water Modelling Help

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 2382	6.81	5512.76	107.6	0
Junc 2385	2.91	5512.32	117.65	0
Junc 2386	2.04	5512.3	117.64	0
Junc 2388	0.1	5513.42	106.14	0
Junc 2389	0.02	5513.42	106.17	0
Junc 2394	0.09	5520.75	75.37	0
Junc 2397	0.11	5513.86	96.24	0
Junc 2398	2.72	5513.86	96.17	0
Junc 2403	1.61	5512.73	83.8	0
Junc 2404	1.56	5512.74	84.37	0
Junc 2407	1.55	5512.44	123.6	0
Junc 2409	7.77	5513	93.13	0
Junc 2410	8.81	5513	93.37	0
Junc 2412	2.33	5512.47	120.81	0
Junc 2413	3.73	5512.47	120.79	0
Junc 2415	3.81	5515.3	91.9	0
Junc 2416	5.27	5515.28	91.71	0
Junc 2418	0.86	5518.15	80.09	0
Junc 2420	17.88	5513.12	88.89	0
Junc 2422	3.01	5512.84	111.21	0
Junc 2424	6.9	5512.71	105.92	0
Junc 2425	5.19	5512.71	105.64	0
Junc 2427	0.1	5513.74	104.21	0
Junc 2428	0.11	5513.73	104.07	0
Junc 2430	3.61	5517.63	91.12	0
Junc 2431	1.61	5517.65	91.03	0
Junc 2433	3	5520.67	74.69	0
Junc 2435	2.92	5522.86	79.12	0
Junc 2436	0.08	5522.86	79.2	0
Junc 2439	3.12	5518.3	91.69	0
Junc 2441	0.06	5512.33	129.01	0
Junc 2443	4.84	5512.5	117.34	0
Junc 2444	2.28	5512.5	117.4	0
Junc 2449	5.9	5512.73	83.68	0
Junc 2451	1.67	5513.35	105.28	0
Junc 2454	4.65	5512.85	112.36	0
Junc 2457	0.02	5512.33	128.15	0
Junc 2458	0.04	5512.33	128.22	0
Junc 2461	5.98	5513.2	106.81	0
Junc 2463	0.95	5512.61	115.03	0
Junc 2464	4.09	5512.61	114.96	0
Junc 2466	0.02	5514.23	96.82	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 2467	3.74	5514.22	96.91	0
Junc 2469	3.92	5512.62	115.75	0
Junc 2472	7.53	5512.82	112.33	0
Junc 2475	5.32	5514.95	92.47	0
Junc 2476	3	5514.99	92.6	0
Junc 2478	0.44	5517.63	91.03	0
Junc 2480	1.53	5512.97	110.77	0
Junc 2481	0.13	5512.97	110.85	0
Junc 2483	6.04	5512.7	113.83	0
Junc 2486	2.98	5513.41	106.16	0
Junc 2488	0.2	5514.67	92.22	0
Junc 2489	7.49	5514.67	92.19	0
Junc 2491	6.09	5512.71	114.04	0
Junc 2494	3.21	5513.11	109.02	0
Junc 2497	1.96	5517.93	90.14	0
Junc 2498	0.19	5517.93	90.16	0
Junc 2500	0.81	5529.74	56.95	0
Junc 2501	0.4	5529.73	57.94	0
Junc 2503	2.34	5512.73	51	0
Junc 2505	4.45	5519.02	87.8	0
Junc 2507	6.71	5512.66	102.25	0
Junc 2508	4.45	5512.66	102.9	0
Junc 2510	6.63	5516.35	97.72	0
Junc 2512	6.61	5512.81	112.47	0
Junc 2514	0.07	5513.47	80.52	0
Junc 2515	1.56	5513.45	80.6	0
Junc 2517	0.12	5513.88	96.21	0
Junc 2519	5.9	5512.7	105.43	0
Junc 2521	0.85	5513.52	101.5	0
Junc 2522	2.29	5513.52	101.66	0
Junc 2524	5.17	5512.71	113.79	0
Junc 2526	4.46	5517.47	93.42	0
Junc 2528	13.65	5513.49	90.63	0
Junc 2530	0.78	5512.54	114.4	0
Junc 2532	4.46	5512.62	115.08	0
Junc 2534	19.11	5511.76	118.81	0
Junc 2536	14.69	5512.51	119.55	0
Junc 2538	2.29	5512.37	124.99	0
Junc 2539	0.92	5512.37	125.04	0
Junc 2541	5.28	5512.51	115.82	0
Junc 2543	6.63	5512.44	120.05	0
Junc 2545	7.44	5512.93	110.73	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 2547	3.82	5512.43	121.9	0
Junc 2549	6.18	5513.19	106.94	0
Junc 2551	3.01	5520.13	78.71	0
Junc 2553	3.73	5517.35	81.04	0
Junc 2555	3.74	5513.32	105.32	0
Junc 2557	17.76	5512.29	121.82	0
Junc 2559	9.62	5512.88	100.6	0
Junc 2561	12.87	5523.29	74.89	0
Junc 2563	3.75	5513.09	108.66	0
Junc 2565	7.47	5512.72	111.9	0
Junc 2568	7.36	5512.75	84.61	0
Junc 2570	4.44	5512.67	112.02	0
Junc 2572	3.73	5516.91	95.53	0
Junc 2574	8.8	5512.64	115.75	0
Junc 2575	6.8	5512.63	115.86	0
Junc 2580	2.26	5512.66	102.77	0
Junc 2582	0.12	5513.13	106.59	0
Junc 2584	4.46	5512.61	114.09	0
Junc 2586	1.53	5513.85	83.52	0
Junc 2587	0.81	5513.84	83.93	0
Junc 2589	4.46	5515.25	100	0
Junc 2591	4.67	5526.3	59.03	0
Junc 2592	0.77	5526.48	59.14	0
Junc 2594	4.45	5513.11	107.79	0
Junc 2595	0.31	5513.11	107.72	0
Junc 2597	3.75	5513.84	90.35	0
Junc 2600	4.44	5513.8	79.9	0
Junc 2602	19.76	5685.98	93.34	0
Junc 2604	10.07	5685.69	82.84	0
Junc 2606	3.12	5512.61	114.05	0
Junc 2608	1.58	5512.34	128.15	0
Junc 2611	2.93	5512.62	115.23	0
Junc 2614	0.1	5513.52	105.51	0
Junc 2617	13.61	5512.43	123.23	0
Junc 2619	4.45	5513.1	108.06	0
Junc 2621	0.03	5513.13	96.66	0
Junc 2623	7.35	5514.23	97.05	0
Junc 2625	2.18	5512.33	128.15	0
Junc 2627	6.63	5517.72	81.91	0
Junc 2629	6.75	5512.53	118.04	0
Junc 2631	7.09	5513.55	96.02	0
Junc 2633	0.51	5522.56	82.77	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 2635	4.46	5516.08	93.24	0
Junc 2637	0.85	5513.13	108.95	0
Junc 2639	2.27	5518.28	91.78	0
Junc 2641	8.81	5512.88	104.35	0
Junc 2643	6.73	5513.98	79.02	0
Junc 2645	3.73	5512.44	123	0
Junc 2646	0.86	5512.44	123	0
Junc 2648	0.94	5512.33	132.47	0
Junc 2650	5.17	5512.49	120.82	0
Junc 2652	7.45	5514.19	89.9	0
Junc 2654	1.55	5513.17	101.27	0
Junc 2656	8.82	5514.93	92.91	0
Junc 2658	5.93	5512.46	122.19	0
Junc 2660	4.46	5513.02	100.07	0
Junc 2662	8.8	5512.73	113.87	0
Junc 2664	4.46	5513.57	104.1	0
Junc 2666	3	5513.83	94.55	0
Junc 2669	11.06	5514.52	94.69	0
Junc 2671	5.91	5512.95	111.08	0
Junc 2673	5.96	5512.44	118.52	0
Junc 2675	2.99	5512.47	120.42	0
Junc 2677	7.52	5522.75	81.76	0
Junc 2678	0.2	5522.73	81.87	0
Junc 2681	0.15	5512.32	132.34	0
Junc 2683	4.46	5512.86	111.44	0
Junc 2685	5.26	5513.27	107.27	0
Junc 2687	13.4	5523.46	74.94	0
Junc 2689	4.46	5513.48	103.34	0
Junc 2691	3.01	5513.45	102.94	0
Junc 2693	7.35	5514.13	99.96	0
Junc 2697	12.86	5513	89.26	0
Junc 2699	7.36	5512.45	123.04	0
Junc 2701	2.29	5512.72	113.04	0
Junc 2703	6.63	5512.62	115.76	0
Junc 2705	8.21	5512.44	119.92	0
Junc 2707	13.97	5512.6	117.6	0
Junc 2709	5.97	5524.66	60.84	0
Junc 2711	2.29	5513.62	104	0
Junc 2713	5.9	5513.39	106.41	0
Junc 2715	0.15	5513.5	105.71	0
Junc 2717	12.52	5512.52	121.24	0
Junc 2719	5.27	5513.63	100.19	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 2722	14.7	5514.78	98.61	0
Junc 2724	3.7	5522.78	80.49	0
Junc 2726	6.02	5512.44	121.44	0
Junc 2728	6.35	5513.82	102.6	0
Junc 2730	4.64	5514.77	89.1	0
Junc 2731	6.63	5514.78	89.63	0
Junc 2733	6.73	5513.32	106.39	0
Junc 2735	16.16	5512.57	117.25	0
Junc 2737	7.34	5512.98	109.27	0
Junc 2739	3.82	5513.73	98.93	0
Junc 2741	3.01	5512.97	109.25	0
Junc 2743	5.94	5524.74	64.29	0
Junc 2745	5.94	5525.24	61.81	0
Junc 2747	5.51	5513.56	74.99	0
Junc 2749	1.56	5513.78	104	0
Junc 2751	6.63	5514.09	102.5	0
Junc 2754	15.59	5522.84	80.02	0
Junc 2756	4.99	5512.35	126.42	0
Junc 2758	6.71	5512.7	99.46	0
Junc 2759	6.61	5512.69	99.38	0
Junc 2761	3.82	5512.86	87.68	0
Junc 2762	9.56	5512.86	88.84	0
Junc 2764	8.08	5515.49	91.45	0
Junc 2765	3.19	5515.54	91.49	0
Junc 2767	5.17	5524.26	69.49	0
Junc 2769	5.91	5517.73	92.14	0
Junc 2771	3.73	5512.84	112.5	0
Junc 2773	2.36	5524.66	60.77	0
Junc 2775	6.63	5514.4	101.1	0
Junc 2777	0.15	5520.76	74.84	0
Junc 2780	3.74	5512.95	106.34	0
Junc 2782	2.38	5521.97	81.12	0
Junc 2784	6.63	5512.7	114.25	0
Junc 2786	7.36	5512.51	117.29	0
Junc 2788	2.65	5520.04	64.24	0
Junc 2790	6.1	5512.72	114.03	0
Junc 2792	8.12	5512.45	118.48	0
Junc 2794	11.8	5512.86	98.62	0
Junc 2796	13.25	5516.51	94.61	0
Junc 2798	7.36	5513.29	102.12	0
Junc 2800	0.91	5512.47	118.78	0
Junc 2802	2.99	5525.38	69.8	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 2804	5.97	5524.6	63.4	0
Junc 2806	6.73	5514.21	94.32	0
Junc 2808	0.81	5513.35	102.92	0
Junc 2809	0.77	5513.35	102.77	0
Junc 2811	2.44	5521.5	73.08	0
Junc 2812	0.06	5521.44	75.92	0
Junc 2814	11.97	5522.94	78.21	0
Junc 2819	0.84	5512.5	116.94	0
Junc 2822	12.32	5523.89	71.22	0
Junc 2824	3.88	5512.44	119.74	0
Junc 2826	5.18	5514.22	98.85	0
Junc 2829	5.2	5514.61	92.45	0
Junc 2833	4.44	5514.24	96.58	0
Junc 2835	3.73	5513.46	79.7	0
Junc 2837	5.92	5517.68	93.58	0
Junc 2839	4.55	5516.02	93.28	0
Junc 2842	6.58	5512.44	123.71	0
Junc 2845	1.51	5512.4	123.85	0
Junc 2847	0.87	5512.47	117.58	0
Junc 2849	10.34	5525.1	68.55	0
Junc 2851	6.38	5512.45	123.8	0
Junc 2852	5.17	5512.45	123.87	0
Junc 2859	8.8	5515.43	97.7	0
Junc 2861	1.57	5513.82	101.68	0
Junc 2865	7.46	5517.71	93.57	0
Junc 2867	2.39	5517.74	81.11	0
Junc 2869	6.74	5519.38	85.32	0
Junc 2871	5.8	5517.92	90.73	0
Junc 2874	0.51	5524.27	69.22	0
Junc 2876	10.26	5515.94	98.57	0
Junc 2879	11.88	5524.53	71.04	0
Junc 2881	0.82	5512.4	124.8	0
Junc 2883	0.06	5522.88	75.55	0
Junc 2885	14.82	5523.07	77.57	0
Junc 2887	1.54	5512.4	121.5	0
Junc 2890	8.9	5513.01	96.43	0
Junc 2892	4.18	5513.13	96.63	0
Junc 2894	0.08	5513.18	101.35	0
Junc 2896	5.97	5525.63	53.88	0
Junc 2898	4.56	5513	88.59	0
Junc 2900	8.09	5513.18	103.85	0
Junc 2902	0.82	5512.47	120.05	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 2905	2.47	5695.7	60.45	0
Junc 2907	1.76	5512.33	129.31	0
Junc 2909	14.14	5514.74	101.67	0
Junc 2912	0.22	5513.46	103.03	0
Junc 2914	2.27	5524.61	63.4	0
Junc 2916	3.86	5512.42	122.36	0
Junc 2918	5.38	5518.06	91.69	0
Junc 2921	7.46	5515.33	100.02	0
Junc 2924	3	5520.69	80.01	0
Junc 2927	0.86	5522.85	79.25	0
Junc 2929	9.07	5523.65	76.67	0
Junc 2935	3.71	5513.88	83.66	0
Junc 2937	1.07	5513.5	100.7	0
Junc 2939	0.11	5522.88	76.79	0
Junc 2940	0.86	5522.88	77.46	0
Junc 2942	10.98	5513.9	96.24	0
Junc 2944	3.01	5512.44	117.24	0
Junc 2946	3.07	5512.45	123.13	0
Junc 2947	3.3	5512.45	123.16	0
Junc 2950	8.75	5512.62	115.49	0
Junc 2952	13.41	5515.84	98.9	0
Junc 2955	2.36	5525.23	61.47	0
Junc 2962	8.07	5517.21	91.79	0
Junc 2964	5.27	5517.47	80.71	0
Junc 2967	10.43	5524.63	67.02	0
Junc 2969	7.44	5525.36	63.61	0
Junc 2972	9.28	5512.44	121.48	0
Junc 2974	5.28	5513.83	95.25	0
Junc 2979	3.08	5524.74	64.15	0
Junc 2981	3.03	5513.52	101.23	0
Junc 2985	9.5	5512.63	114.66	0
Junc 2986	0.22	5512.63	114.97	0
Junc 2994	1.58	5519.09	87.23	0
Junc 2996	0.01	5695.7	88.83	0
Junc 2997	1.39	5695.7	84.87	0
Junc 2999	27.61	5513.55	100.83	0
Junc 3001	0.21	5512.32	131.96	0
Junc 3003	6.72	5516.43	97.26	0
Junc 3006	3.1	5513.61	103.93	0
Junc 3010	16.78	5512.66	110.14	0
Junc 3014	9	5513.04	99.44	0
Junc 3016	4.56	5512.97	105.96	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 3020	6.74	5514.12	100.26	0
Junc 3022	2.62	5513.56	96.05	0
Junc 3025	5.32	5517.55	92.8	0
Junc 3027	0.92	5513.12	108.29	0
Junc 3028	5.88	5513.12	108.59	0
Junc 3030	8	5513.55	95.11	0
Junc 3032	3.8	5513.18	101.58	0
Junc 3034	7.16	5513.2	102.56	0
Junc 3035	0.12	5513.2	102.57	0
Junc 3040	3.88	5513.14	106.11	0
Junc 3041	0.17	5513.14	106.47	0
Junc 3043	9.6	5513.11	100.07	0
Junc 3044	0.81	5513.11	99.88	0
Junc 3047	3.22	5513.12	107.89	0
Junc 3052	7.6	5514.18	84.71	0
Junc 3060	1.74	5513.11	108.29	0
Junc 3062	8.24	5516.64	86.61	0
Junc 3065	3.7	5512.97	110.72	0
Junc 3069	0.82	5513.91	101.23	0
Junc 3070	0.16	5513.84	100.75	0
Junc 3072	5.27	5519.52	85.94	0
Junc 3076	8.99	5512.61	113.57	0
Junc 3078	1.36	5520.63	85.59	0
Junc 3080	3.7	5513.43	106.19	0
Junc 3089	4.93	5513.56	101.45	0
Junc 3091	5.17	5515.23	96.35	0
Junc 3093	0.84	5516.99	95.43	0
Junc 3096	0.74	5518.85	87.69	0
Junc 3097	0.9	5518.85	87.51	0
Junc 3099	3.91	5512.9	103.82	0
Junc 3103	5.37	5512.84	111.9	0
Junc 3108	3.82	5512.43	123.41	0
Junc 3109	1.66	5512.42	123.37	0
Junc 3115	2.3	5518.98	87.36	0
Junc 3117	3.72	5513.35	105.36	0
Junc 3125	2.99	5512.97	110.45	0
Junc 3126	2.91	5512.97	110.53	0
Junc 3128	3.11	5513.19	84.74	0
Junc 3129	10.72	5513.18	85.43	0
Junc 3133	1.16	5517.63	90.81	0
Junc 3135	0.8	5512.42	120.63	0
Junc 3138	5.88	5512.97	109.69	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 3140	10.27	5518.2	84.42	0
Junc 3142	8.2	5520.28	84.17	0
Junc 3150	1.57	5520.21	77.64	0
Junc 3155	1.52	5513.77	78.96	0
Junc 3156	0.14	5513.79	78.76	0
Junc 3160	3.74	5513.84	88.05	0
Junc 3161	2.19	5513.84	87.37	0
Junc 3163	0.79	5522.85	79.96	0
Junc 3170	8.19	5513.47	81.31	0
Junc 3172	0.13	5512.44	119.91	0
Junc 3174	4.75	5524.31	68.67	0
Junc 3176	4.02	5524.41	65.81	0
Junc 3177	4.52	5524.39	66.59	0
Junc 3179	2.27	5513.69	104.33	0
Junc 3182	0.97	5512.4	124.91	0
Junc 3184	0.25	5513.35	101.86	0
Junc 3186	2.91	5519.09	87.5	0
Junc 3188	4.51	5520.71	73.48	0
Junc 3192	3.13	5526.97	59.43	0
Junc 3194	4.5	5520.21	77.41	0
Junc 3208	4.44	5516.99	95.42	0
Junc 3213	0.02	5512.47	119.37	0
Junc 3219	4.58	5521.11	82.52	0
Junc 3227	14.5	5512.62	109.91	0
Junc 3228	9.98	5512.63	111.21	0
Junc 3232	5.16	5518.1	91.72	0
Junc 3237	3	5513.51	105.22	0
Junc 3239	1.94	5522.05	91.74	0
Junc 3241	1.72	5522.89	72.98	0
Junc 3243	1.47	5523.87	66.75	0
Junc 3244	0.4	5523.88	69.84	0
Junc 3246	7.05	5512.42	122.8	0
Junc 3248	1.47	5524.39	66.04	0
Junc 3252	0.22	5513.5	100.38	0
Junc 3256	1.53	5513.48	105.97	0
Junc 3258	2.98	5512.39	122.69	0
Junc 3259	1.62	5512.39	123.11	0
Junc 3263	3	5513.76	100.96	0
Junc 3270	6.42	5512.21	128.77	0
Junc 3271	0.22	5512.33	129	0
Junc 3278	0.21	5525.48	55.25	0
Junc 3282	3.65	5512.47	121.64	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 3286	3.76	5512.44	123.33	0
Junc 3289	6.62	5514.77	79.39	0
Junc 3291	3.63	5513.11	108.88	0
Junc 3293	5.55	5522.49	82.59	0
Junc 3294	3.89	5522.49	82.72	0
Junc 3299	0.13	5513.54	72.63	0
Junc 3300	0.84	5513.56	74.75	0
Junc 3302	2.93	5517.55	93.13	0
Junc 3305	5.98	5512.95	109.4	0
Junc 3316	4.35	5513.58	79.08	0
Junc 3325	3.71	5512.71	113.33	0
Junc 3328	0.08	5522.86	80.07	0
Junc 3332	2.27	5514.05	102.62	0
Junc 3334	4.93	5511.98	119.45	0
Junc 3336	0.81	5512.44	123.1	0
Junc 3338	0.13	5512.44	119.97	0
Junc 3340	2.8	5513.09	101.65	0
Junc 3342	3.98	5512.62	114.11	0
Junc 3346	3.04	5512.4	123.85	0
Junc 3347	2.21	5512.4	123.86	0
Junc 3349	7.6	5512.82	111.18	0
Junc 3352	4.49	5521.19	80.26	0
Junc 3357	0.25	5513.23	102.25	0
Junc 3364	5.19	5515.28	69.37	0
Junc 3370	1.5	5512.42	119.74	0
Junc 3371	0.11	5512.42	120.75	0
Junc 3373	5.1	5512.7	96.93	0
Junc 3376	5.95	5513.18	101.96	0
Junc 3380	3.68	5512.4	123.19	0
Junc 3381	4.55	5512.4	122.6	0
Junc 3383	1.59	5512.4	121.54	0
Junc 3385	0.23	5512.37	125.39	0
Junc 3386	0.78	5512.37	124.51	0
Junc 3388	3.06	5512.82	112.54	0
Junc 3390	0.9	5522.05	92.65	0
Junc 3397	7.53	5525.5	58.39	0
Junc 3400	2.23	5512.47	118.75	0
Junc 3401	1.62	5512.47	117.51	0
Junc 3403	5.47	5517.91	90.52	0
Junc 3405	0.94	5512.33	128.15	0
Junc 3409	6.27	5512.39	108	0
Junc 3412	6.28	5511.78	115.4	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 3415	36.24	4996.56	71.17	0
Junc 3422	12.69	5512.84	109.51	0
Junc 3428	13.93	5512.68	95.3	0
Junc 3430	4.32	5511.58	90.51	0
Junc 3431	4.68	5511.64	90.29	0
Junc 3440	0.19	5525.46	69.31	0
Junc 3441	3.14	5524.93	71.66	0
Junc 3444	10.27	5510.94	98.02	0
Junc 3448	6.06	5524.17	71.84	0
Junc 3451	0.38	5512.4	124.96	0
Junc 3453	0.87	5512.42	120.28	0
Junc 3460	6.15	5524.84	57.88	0
Junc 3466	7.1	5511.25	83.91	0
Junc 3471	3.68	5513.5	100.45	0
Junc 3483	6.09	5512.73	112.64	0
Junc 3486	0.81	5522.88	79.89	0
Junc 3490	0.9	5513.5	55.91	0
Junc 3492	11.25	5513.12	103.13	0
Junc 3497	15.6	5512.65	115.56	0
Junc 3500	6	5515.54	97.53	0
Junc 3505	11.88	5514.73	99.57	0
Junc 3508	11.99	5516.47	97.07	0
Junc 3511	3.11	5520.69	80.41	0
Junc 3520	0.11	5512.44	123.57	0
Junc 3526	5.26	5512.7	113.35	0
Junc 3528	0.09	5522.88	79.93	0
Junc 3532	2.84	5512.57	114.65	0
Junc 3535	7.63	5524.73	66.1	0
Junc 3539	6.9	5525.36	62.66	0
Junc 3551	5.17	5514.33	102.1	0
Junc 3553	3.89	5513.32	104.55	0
Junc 3555	0.21	5513.2	106.03	0
Junc 3563	0	5512.4	126.32	0
Junc 3568	10.47	5524.65	61.68	0
Junc 3570	3.84	5513.11	109.01	0
Junc 3572	9.08	5524.58	63.11	0
Junc 3580	4.56	5526.18	54.84	0
Junc 3584	6.21	5525.67	63.18	0
Junc 3585	6.06	5525.36	65.63	0
Junc 3587	6.87	5524.52	73.1	0
Junc 3593	7.49	5524.69	61.16	0
Junc 3603	12.29	5512.34	88.32	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 3606	1.85	5512.32	132.4	0
Junc 3629	0.13	5512.5	116.95	0
Junc 3631	0.01	5512.37	125.38	0
Junc 3636	9.76	5522.11	83.86	0
Junc 3641	0.13	5512.68	111.54	0
Junc 3680	11.12	5509.81	100.01	0
Junc 3693	0.84	5522.73	83.68	0
Junc 3700	0.13	5512.4	128.83	0
Junc 3701	0.24	5512.4	126.11	0
Junc 3703	13.08	5520.23	68.14	0
Junc 3706	0.87	5512.33	132.47	0
Junc 3709	1.6	5512.53	115.46	0
Junc 3711	2.41	5512.42	121.53	0
Junc 3721	11.23	5511.16	87.98	0
Junc 3722	5.2	5511.24	87.51	0
Junc 3725	0.24	5512.37	125.38	0
Junc 3735	0.22	5512.33	129.8	0
Junc 3752	0.27	5512.32	132.35	0
Junc 3753	3.11	5512.31	134.76	0
Junc 3757	6.19	5510.47	108.02	0
Junc 3764	11.52	5520.3	86.44	0
Junc 3786	11	5527.79	78.16	0
Junc 3794	0.2	5514.27	102.02	0
Junc 3796	8.5	5513.33	102.16	0
Junc 3799	0.74	5695.7	58.6	0
Junc 3800	1.37	5529.04	70.51	0
Junc 3805	3.89	5522.78	80.85	0
Junc 3810	14.93	5512.4	131.53	0
Junc 3813	16.44	5268.38	105.23	0
Junc 3814	1.37	5268.38	111.88	0
Junc 3816	0.57	5522.78	80.46	0
Junc 3820	0.24	5522.88	79.08	0
Junc 3822	5.37	5522.04	88.75	0
Junc 3825	1.95	5512.43	124.06	0
Junc 3875	2.13	5522.05	90.83	0
Junc 3912	0.3	5512.33	128.87	0
Junc 3981	0.1	5522.78	80.42	0
Junc 3991	8.9	5520.04	81.66	0
Junc 3994	8.15	5518.86	87.56	0
Junc 3997	4.54	5518.33	89.87	0
Junc 4002	3.93	5517.82	91.8	0
Junc 4007	9.61	5517.17	93.14	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 4012	10.32	5516.03	95.84	0
Junc 4023	12.45	5514.38	101.11	0
Junc 4042	13.94	5512.48	122.39	0
Junc 4045	16.85	5512.56	119.18	0
Junc 4068	7.42	5518.56	90.25	0
Junc 4071	7.43	5519.63	82.76	0
Junc 4084	5.24	5519.3	89.93	0
Junc 4088	6	5516.99	95.56	0
Junc 4091	3.83	5515.41	99.4	0
Junc 4094	9.63	5514.22	96.6	0
Junc 4100	0.13	5513.12	96.68	0
Junc 4117	20.6	5511.94	116.92	0
Junc 4122	20.19	5511.78	120.15	0
Junc 4125	6.73	5512.49	119.95	0
Junc 4128	8.88	5512.56	116.78	0
Junc 4131	17.38	5513.11	92.23	0
Junc 4136	11.87	5514.85	94.23	0
Junc 4139	11.87	5516.08	96.9	0
Junc 4142	16.33	5516.56	94.68	0
Junc 4145	11.13	5517.58	91.45	0
Junc 4148	2.35	5518.24	90.76	0
Junc 4151	14.22	5513.47	85.01	0
Junc 4164	9.12	5513.13	97.05	0
Junc 4167	9.02	5513.12	95.93	0
Junc 4173	2.27	5518.47	91.5	0
Junc 4180	0.61	5526.63	68.27	0
Junc 4189	3.92	5513.11	109.46	0
Junc 4192	10.97	5512.77	107.81	0
Junc 4196	6.62	5512.68	111.2	0
Junc 4199	8.79	5512.69	111.67	0
Junc 4219	6.67	5685.65	72.75	0
Junc 4259	9.45	5519.67	74.04	0
Junc 4291	4	5512.61	114.44	0
Junc 4319	1.61	5512.27	154.83	0
Junc 4333	0.9	5512.27	155.81	0
Junc 4335	0.79	5512.26	155.99	0
Junc 4337	0.12	5512.26	158.28	0
Junc 4339	0.97	5512.26	156.66	0
Junc 4341	1.57	5512.26	158.23	0
Junc 4343	0.87	5512.27	154.93	0
Junc 4345	0.87	5512.26	158.26	0
Junc 4347	0.88	5512.26	156.72	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 4349	2.33	5512.26	155.3	0
Junc 4351	0.18	5512.26	156.75	0
Junc 4353	0.13	5512.26	157.52	0
Junc 4355	0.88	5512.26	157.86	0
Junc 4357	0.12	5512.26	156.11	0
Junc 4358	0.02	5512.26	156.33	0
Junc 4360	0.87	5512.26	157.72	0
Junc 4362	0.05	5512.26	158.26	0
Junc 4363	0.02	5512.26	158.92	0
Junc 4372	0.86	5512.26	156.88	0
Junc 4373	2.27	5512.27	154.93	0
Junc 4375	0.23	5512.26	158.93	0
Junc 4377	0.88	5512.26	157.2	0
Junc 4378	0.1	5512.26	158.07	0
Junc 4437	1.28	5512.26	159.03	0
Junc 4451	6	5515.23	96.59	0
Junc 4455	0	5512.17	159.21	0
Junc 4462	17.83	5686.46	134.29	0
Junc 4465	7.2	5684.06	114.82	0
Junc 4567	11.93	5522.25	86.13	0
Junc 4581	1.45	5512.15	170.07	0
Junc 4598	0.08	5268.41	79.72	0
Junc 4628	0.28	5268.41	79.58	0
Junc 4631	1.47	5268.41	81.62	0
Junc 4661	5.6	5512.31	138.49	0
Junc 4671	2.28	5512.17	159.21	0
Junc 4679	0.67	5268.42	75.75	0
Junc 4681	1.12	5268.43	70.04	0
Junc 4711	7.55	5517.19	92.56	0
Junc 4717	8.28	5515.93	98.57	0
Junc 4729	2.59	5513.3	96.56	0
Junc 4735	0.03	5513.08	96.34	0
Junc 4736	1.24	5513.08	96.33	0
Junc 4738	0.71	5513.09	95.6	0
Junc 4750	0.83	5513.09	99.14	0
Junc 4752	1.76	5513.08	98.58	0
Junc 4753	0.12	5513.08	98.49	0
Junc 4755	1.74	5513.08	95.6	0
Junc 4756	0.28	5513.08	95.21	0
Junc 4758	44.7	5512.94	96.59	0
Junc 4763	6.66	5513.07	98.55	0
Junc 4766	4.39	5513.08	96.4	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 4774	2.54	5513.36	96.59	0
Junc 4783	2.26	5513.12	99.99	0
Junc 4785	6.71	5513.09	95.61	0
Junc 4788	11.4	5512.86	92.61	0
Junc 4818	1.28	5512.37	131.63	0
Junc 4837	6	5514.23	98.69	0
Junc 4847	6.61	5516.99	95.37	0
Junc 4854	8.08	5515.38	99.19	0
Junc 4862	6.62	5513.2	106.03	0
Junc 4869	0.83	5512.94	97.16	0
Junc 4887	2.67	5512.34	86.63	0
Junc 4890	6.34	5522.05	91.23	0
Junc 4893	10.64	5522.06	90.83	0
Junc 4897	3.5	5512.94	99.09	0
Junc 4904	2.25	5512.48	120.87	0
Junc 4931	0.11	5512.54	114.4	0
Junc 4949	15.58	5504.86	135.89	0
Junc 4950	3.79	5512.17	160	0
Junc 4956	0	5504.86	135.89	0
Junc 4960	60.5	5504.86	135.89	0
Junc 4969	0.77	5512.17	160.09	0
Junc 2190	0	5512.35	126.19	0
Junc 2191	0	5525.1	68.64	0
Junc 2192	0	5524.53	70.82	0
Junc 2193	0	5525.36	63.72	0
Junc 2194	0	5524.63	67.25	0
Junc 2195	0	5512.51	119.57	0
Junc 2196	0	5512.73	113.84	0
Junc 2197	0	5512.64	115.67	0
Junc 2198	0	5519.38	85.12	0
Junc 2199	0	5512.86	111.67	0
Junc 2200	0	5513.1	108.29	0
Junc 2201	0	5513.32	106.58	0
Junc 2202	0	5512.98	109.44	0
Junc 2203	0	5515.43	97.76	0
Junc 2204	0	5514.09	102.36	0
Junc 2205	0	5512.49	120.85	0
Junc 2206	0	5514.4	101.23	0
Junc 2207	0	5512.46	122.18	0
Junc 2208	0	5512.47	120.88	0
Junc 2209	0	5513.78	103.87	0
Junc 2210	0	5512.45	124.1	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 2211	0	5513.52	105.56	0
Junc 2212	0	5520.69	79.72	0
Junc 2213	0	5516.51	94.76	0
Junc 2214	0	5512.57	117.06	0
Junc 2215	0	5517.73	92.1	0
Junc 2216	0	5512.72	113.14	0
Junc 2217	0	5513.29	102.38	0
Junc 2218	0	5512.95	106.4	0
Junc 2219	0	5519.02	87.83	0
Junc 2220	0	5512.52	121.17	0
Junc 2221	0	5513.82	101.54	0
Junc 2222	0	5515.25	100.11	0
Junc 2223	0	5512.45	123.01	0
Junc 2224	0	5513.55	100.8	0
Junc 2225	0	5516.35	97.7	0
Junc 2226	0	5520.67	75.02	0
Junc 2227	0	5517.47	93.64	0
Junc 2228	0	5520.13	78.78	0
Junc 2229	0	5516.91	95.46	0
Junc 2230	0	5512.6	117.58	0
Junc 2231	0	5511.76	118.78	0
Junc 2232	0	5512.67	112.05	0
Junc 2233	0	5512.62	115.35	0
Junc 2234	0	5512.77	107.86	0
Junc 2235	0	5513.02	100.17	0
Junc 2236	0	5513.13	96.98	0
Junc 2237	0	5512.88	104.42	0
Junc 2238	0	5520.63	85.58	0
Junc 2239	0	5515.94	98.54	0
Junc 2240	0	5514.78	98.29	0
Junc 2241	0	5512.29	121.84	0
Junc 2242	0	5513.83	94.56	0
Junc 2243	0	5512.44	123.05	0
Junc 2244	0	5513.55	96.34	0
Junc 2245	0	5520.04	64.56	0
Junc 2246	0	5517.68	93.81	0
Junc 2247	0	5518.28	91.6	0
Junc 2248	0	5512.53	118.21	0
Junc 2249	0	5512.61	113.77	0
Junc 2250	0	5512.7	105.58	0
Junc 2251	0	5513.01	96.04	0
Junc 2252	0	5512.88	100.32	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 2253	0	5514.19	89.77	0
Junc 2254	0	5512.47	121.06	0
Junc 2255	0	5513.84	90.38	0
Junc 2256	0	5515.23	96.45	0
Junc 2257	0	5513.49	90.47	0
Junc 2258	0	5517.21	91.58	0
Junc 2259	0	5512.66	103.37	0
Junc 2260	0	5513	92.76	0
Junc 2261	0	5513.12	88.63	0
Junc 2262	0	5512.86	98.09	0
Junc 2263	0	5516.08	93.18	0
Junc 2264	0	5514.78	88.4	0
Junc 2265	0	5513.84	83.99	0
Junc 2266	0	5517.72	81.17	0
Junc 2267	0	5517.35	81.17	0
Junc 2268	0	5518.15	80.17	0
Junc 2269	0	5512.75	85.56	0
Junc 2270	0	5513	89.88	0
Junc 2271	0	5512.86	88.43	0
Junc 2272	0	5513.98	78.57	0
Junc 2273	0	5513.8	79.76	0
Junc 2274	0	5513.46	79.81	0
Junc 2275	0	5513.56	75.11	0
Junc 2276	0	5512.32	132.52	0
Junc 2278	0	5512.42	120.31	0
Junc 2279	0	5512.51	115.8	0
Junc 2280	0	5512.71	113.55	0
Junc 2281	0	5512.62	115.01	0
Junc 2282	0	5512.81	112.13	0
Junc 2283	0	5513.09	108.41	0
Junc 2284	0	5513.19	106.89	0
Junc 2285	0	5512.93	110.55	0
Junc 2286	0	5512.34	128.15	0
Junc 2287	0	5513.52	101.48	0
Junc 2288	0	5512.37	124.76	0
Junc 2289	0	5512.44	120.06	0
Junc 2290	0	5513.63	99.78	0
Junc 2291	0	5512.43	121.93	0
Junc 2292	0	5513.45	102.75	0
Junc 2293	0	5513.48	103.26	0
Junc 2294	0	5513.73	98.78	0
Junc 2295	0	5513.32	105.22	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 2296	0	5514.21	94.36	0
Junc 2297	0	5512.54	114.42	0
Junc 2298	0	5514.61	92.49	0
Junc 2299	0	5522.88	75.85	0
Junc 2300	0	5512.33	129.01	0
Junc 2301	0	5512.32	131.67	0
Junc 2302	0	5512.4	123.85	0
Junc 2303	0	5512.73	50.54	0
Junc 2304	0	5512.84	111.37	0
Junc 2305	0	5513.11	107.72	0
Junc 2306	0	5513.35	102.67	0
Junc 2307	0	5525.38	69.16	0
Junc 2308	0	5526.48	59.48	0
Junc 2309	0	5525.24	61.98	0
Junc 2310	0	5512.4	121.26	0
Junc 2313	0	5517.92	90.58	0
Junc 2314	0	5517.91	89.34	0
Junc 2315	0	5513.5	100.79	0
Junc 2317	0	5512.42	122.18	0
Junc 2318	0	5512.4	126.45	0
Junc 2319	0	5512.4	121.83	0
Junc 2320	0	5512.32	133.97	0
Junc 2321	0	5695.7	57.3	0
Junc 2322	0	5512.4	124.51	0
Junc 2323	0	5512.44	119.5	0
Junc 2324	0	5524.6	63.44	0
Junc 2325	0	5524.66	61.03	0
Junc 2326	0	5512.33	128.78	0
Junc 2327	0	5512.33	132.47	0
Junc 2328	0	5522.56	82.82	0
Junc 2329	0	5523.46	74.75	0
Junc 2330	0	5522.84	79.9	0
Junc 2332	0	5512.45	118.28	0
Junc 2333	0	5512.7	114.24	0
Junc 2334	0	5512.62	115.61	0
Junc 2335	0	5523.89	71.1	0
Junc 2336	0	5519.52	85.92	0
Junc 2337	0	5512.84	112.48	0
Junc 2338	0	5513.13	108.7	0
Junc 2339	0	5513.27	107.18	0
Junc 2340	0	5512.95	111.05	0
Junc 2341	0	5521.97	81.13	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 2342	0	5518.98	87.14	0
Junc 2343	0	5514.23	97.07	0
Junc 2344	0	5522.94	78.4	0
Junc 2345	0	5513.82	102.58	0
Junc 2346	0	5512.44	119.54	0
Junc 2347	0	5523.29	74.88	0
Junc 2348	0	5522.78	80.29	0
Junc 2349	0	5514.13	99.94	0
Junc 2350	0	5512.44	121.5	0
Junc 2351	0	5513.57	103.85	0
Junc 2352	0	5513.62	103.87	0
Junc 2353	0	5514.22	98.69	0
Junc 2354	0	5512.44	123.96	0
Junc 2355	0	5513.39	106.12	0
Junc 2356	0	5514.52	94.53	0
Junc 2357	0	5521.11	82.39	0
Junc 2358	0	5515.49	91.45	0
Junc 2359	0	5520.28	83.9	0
Junc 2360	0	5524.26	69.62	0
Junc 2361	0	5514.93	92.93	0
Junc 2362	0	5512.51	117.13	0
Junc 2363	0	5512.47	118.82	0
Junc 2364	0	5512.5	117.34	0
Junc 2365	0	5512.44	119.86	0
Junc 2366	0	5512.47	117.42	0
Junc 2367	0	5513.13	106.71	0
Junc 2369	0	5513.17	101.22	0
Junc 2370	0	5513.18	103.43	0
Junc 2372	0	5685.98	92.08	0
Junc 2373	0	5685.69	81.72	0
Junc 2374	0	5524.74	64.49	0
Junc 2375	0	5523.65	76.36	0
Junc 2376	0	5525.63	54.12	0
Junc 2377	0	5522.05	92.07	0
Junc 4183	0	5526.63	68.7	0
Junc 4302	0	5512.26	159.04	0
Junc 4303	0	5512.27	154.87	0
Junc 4304	0	5512.27	155.14	0
Junc 4305	0	5512.26	156.17	0
Junc 4306	0	5512.26	158.13	0
Junc 4307	0	5512.26	156.83	0
Junc 4308	0	5512.26	157.53	0

Scenario: Potable Water Flow (no Fire Flow/Irrigation)				
Check against City nodes (maintain pressure > 35 psi)				
Network Table - Nodes at 17:00 Hrs				
	Demand	Head	Pressure	Quality
Node ID	GPM	ft	psi	
Junc 4309	0	5512.26	158.54	0
Junc 4310	0	5512.26	157.84	0
Junc 4311	0	5512.26	158.34	0
Junc 4312	0	5512.26	158.33	0
Junc 4313	0	5512.26	156.83	0
Junc 4314	0	5512.26	156.66	0
Junc 4315	0	5512.26	155.3	0
Junc 4316	0	5512.26	156.06	0
Junc 4317	0	5512.27	155.84	0
Junc 4792	0	5513.09	98.77	0
Junc 4793	0	5513.08	96.47	0
Junc 4794	0	5513.09	95.6	0
Junc 4850	0	5516.99	95.2	0
Junc 4852	0	5515.28	74.94	0
Junc 4857	0	5515.38	99.19	0
Junc 4859	0	5514.77	76.99	0
Junc 4865	0	5513.2	106.03	0
Junc 4867	0	5512.43	123.29	0
Junc 4975	0	5512.28	145.76	0
Junc 3894-A	0	5268.32	187.52	0
Junc 3894-B	0	4996.56	70	0
Junc 3895-A	0	5512.14	175.39	0
Junc 3895-B	0	5268.43	70	0
Junc 4688-A	0	5512.31	139.03	0
Junc 4688-B	0	5512.31	139.03	0
Junc 4220-A	0	5529.04	41.22	0
Junc 4220-B	0	5695.7	113.29	0
Junc 4467-A	0	5520	63.2	0
Junc 4467-B	0	5686.51	135.2	0
Tank 3838	-2994.98	5531.17	1.37	0

Appendix

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- Appendix C - Fire Hydrant Locations and Distribution
  - SECTION C101 GENERAL
  - SECTION C102 LOCATION
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  - SECTION C104 CONSIDERATION OF EXISTING FIRE HYDRANTS
  - SECTION C105 DISTRIBUTION OF FIRE HYDRANTS

C105.1 Hydrant spacing.
C105.1 Hydrant spacing.
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SECTION C105 DISTRIBUTION OF FIRE HYDRANTS

C105.1 Hydrant spacing.
The average spacing between fire hydrants shall not exceed that listed in Table C105.1.

Exception: The fire chief is authorized to accept a deficiency of up to 10 percent where existing fire hydrants provide all or a portion of the required fire hydrant service.

Regardless of the average spacing, fire hydrants shall be located such that all points on streets and access roads adjacent to a building are within the distances listed in Table C105.1.

TABLE C105.1 NUMBER AND DISTRIBUTION OF FIRE HYDRANTS

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS[a, b, c] (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT[d]
1,750 or less	1	500	250
2,000-2,250	2	450	225
2,500	3	450	225
3,000	3	400	225
3,500-4,000	4	350	210
4,500-5,000	5	300	180

5,500	6	300	180
6,000	6	250	150
6,500-7,000	7	250	150
7,500 or more	8 or more[e]	200	120

For SI: 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.

a. Reduce by 100 feet for dead-end streets or roads.

b. Where streets are provided with median dividers which cannot be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis up to a fire-flow requirement of 7,000 gallons per minute and 400 feet for higher fire-flow requirements.

c. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.

d. Reduce by 50 feet for dead-end streets or roads.

e. One hydrant for each 1,000 gallons per minute or fraction thereof.

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B105.1 One- and two-family dwellings.
B105.2 Buildings other than one- and two-family dwellings.

B105.1 One- and two-family dwellings.
B105.2 Buildings other than one- and two-family dwellings.
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SECTION B105 FIRE-FLOW REQUIREMENTS FOR BUILDINGS

B105.1 One- and two-family dwellings.
The minimum fire-flow and flow duration requirements for one- and two-family dwellings having a fire-flow calculation area that does not exceed 3,600 square feet (344.5 m^2) shall be 1,000 gallons per minute (3785.4 L/min) for 1 hour. Fire-flow and flow duration for dwellings having a fire-flow calculation area in excess of 3,600 square feet (344.5m^2) shall not be less than that specified in Table B105.1.

Exception: A reduction in required fire-flow of 50 percent, as approved, is allowed when the building is equipped with an approved automatic sprinkler system.

TABLE B105.1 MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	

48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
		156,701-	113,201-	69,601-		

—	—	167,900	121,300	74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the International Building Code.

b. Measured at 20 psi residual pressure.

B105.2 Buildings other than one- and two-family dwellings.
The minimum fire-flow and flow duration for buildings other than one- and two-family dwellings shall be as specified in Table B105.1.

Exception: A reduction in required fire-flow of up to 75 percent, as approved, is allowed when the building is provided with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. The resulting fire-flow shall not be less than 1,500 gallons per minute (5678 L/min) for the prescribed duration as specified in Table B105.1.

Top Previous Section Next Section To view the next subsection please select the Next Section option.

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NOTICE OF INCREASE TO WATER RATES – January 2008

NEW WATER RATES WILL BE EFFECTIVE JANUARY 1, 2008

Dear Anaconda Water Customer:

In accordance with Anaconda-Deer Lodge County Resolution #05-27, enacted on September 13, 2005, charges for both residential and commercial flat rate water services will increase by 11% effective January 1, 2008. Charges for metered water services for both residential and commercial customers will increase by 9% effective January 1, 2008. A schedule of the new rates is shown below and on the reverse of this letter.

***If you have any questions or comments regarding your water rates please call* (406) 563-7111**

2008 SCHEDULE OF RATES FOR RESIDENTIAL ANACONDA AND VICINITY

SECTION I – RESIDENTIAL FLAT RATES

TYPE OF RESIDENCE	RATE PER MONTH	
	Old Rate	*New Rate*
Single Family Dwelling	~~$23.30~~	$25.86
Apartment Building (per unit)	~~$11.79~~	$13.09
Guest dwelling (habitable temporarily)	~~$16.80~~	$18.65

RESIDENTIAL SPRINKLING RATES PER SEASON		
	Old Rate	*New Rate*
Minimum charge for use of hose for any purpose during season, except sprinkling lawn or garden:	~~$20.89~~	$23.19
Sprinkling lawn or garden, first 500 square ft or less:	~~$27.61~~	$30.65
Each additional 100 square feet	~~$ 1.85~~	$ 2.05

SECTION II – RESIDENTIAL METER RATES

METER SIZE	MINIMUM MONTHLY CHARGE	
	Old Rate	*New Rate*
5/8" meter	~~$ 12.92~~	$ 14.08
1.0" meter	~~$ 23.82~~	$ 25.96
1-1/4" meter	~~$ 31.94~~	$ 34.81
1-1/2" meter	~~$ 36.30~~	$ 39.57
2.0" meter	~~$ 46.60~~	$ 50.79
3.0" meter	~~$ 93.14~~	$101.52
4.0" meter	~~$140.12~~	$152.73
6.0" meter	~~$233.26~~	$254.25
8.0" meter	~~$337.74~~	$368.14
10" meter	~~$466.96~~	$508.99
Secondary Meter	~~$ 10.36~~	$ 11.29

CUBIC FEET PER MONTH CHARGE		
RATE PER 100 CU. FT (OR 748 GALLONS).		
	Old Rate	*New Rate*
Up to First 7,480 gal. (1,000 cu ft)	~~$1.96~~	$2.14
Next 29,920 gal. (4,000 cu ft)	~~$1.85~~	$2.02
Next 37,400 gal. (5,000 cu ft)	~~$1.53~~	$1.67
Next 448,800 gal. (60,000 cu ft)	~~$1.31~~	$1.43
Next 6,956,400 gal. (930,000 cu ft)	~~$1.20~~	$1.31
Over 7,480,000 gal. (1,000,000 cu ft)	~~$1.09~~	$1.19

SECTION III – ANACONDA-DEER LODGE COUNTY ENTITIES WITH MONTHLY FEE WAIVER OF WATER ASSESSMENT

- Fire Department 420 W.Commercial Ave.
- Courthouse 800 South Main St.
- Charolette Yeoman Marten Complex
- Municipal/City Fire Hydrants
- Durstan Park
- Library
- Marty May Field
- Parks and Recreation 923 West 5th Street
- Theresa Ann
- Water Plant – Waste
- Yeoman East
- Yeoman West
- Airport Maintenance Building & Fire Hydrants
- Detention Center
- Fire Hydrants
- City Commons
- Benny Goodman Park
- Washoe Park
- Landfill
- Chamber of Commerce

Anaconda Water Department
50 Main Street
Anaconda, MT 59711

This is a two-sided document. Please be sure to view both sides.

2008 SCHEDULE OF RATES FOR COMMERCIAL WATER CUSTOMERS

SECTION IV. COMMERCIAL FLAT RATES

Established Rate =One Monthly Base Rate of $18.60 PLUS the price per month listed below:

USE DESCRIPTION	RATE PER MONTH Old Rate	RATE PER MONTH New Rate
Lodging Place (per unit)	~~$ 7.67~~	$ 8.51
Theaters and similar places of assembly	~~$ 7.67~~	$ 8.51
Schools (per building including fixtures)	~~$38.30~~	$42.51
Hospitals. Rest Homes and similar uses (PRICE PER ROOM)	~~$ 9.24~~	$10.26
Hardware/Building Material.		
Farm Equipment and similar retail	~~$ 5.82~~	$ 6.46
Financial. real estate. insurance and similar	~~$ 7.67~~	$ 8.51

USE DESCRIPTION	RATE PER MONTH Old Rate	RATE PER MONTH New Rate
Groceries. bakeries and similar retail	~~$11.31~~	$ 12.55
General merchandise. and similar retail	~~$ 5.82~~	$ 6.46
Automotive/marine/ATV retail and similar	~~$37.02~~	$ 41.09
Restaurant/Eating establishments or similar	~~$13.27~~	$ 14.73
Drinking/Casino establishments or similar	~~$15.23~~	$ 16.91
Beauty. barber. spas and similar uses	~~$11.31~~	$ 12.55
Health Services excluding hospitals	~~$13.61~~	$ 15.11

COMMERCIAL USE	RATE PER MONTH Old Rate	RATE PER MONTH New Rate
Professional Services	~~$ 5.82~~	$ 6.46
Shopping centers	~~$ 7.67~~	$ 8.51
Mixed office uses	~~$ 6.16~~	$ 6.84
Car Washes (per stall)	~~$ 30.69~~	$ 34.07
Horticulture/Greenhouse or similar	~~$ 22.40~~	$ 24.86
Laundry Service (hand/self service)	~~$ 38.36~~	$ 42.58
Laundry Service (steam)	~~$138.15~~	$153.35
Private Swimming Pools Calc. Vol. per 1.000 gal	~~$ 1.34~~	$ 1.49
Tank Trucks – Calc. Vol. per 1000 gal	~~$ 1.34~~	$ 1.49
Reconnect Fee	$ 50.00	

	RATE PER MONTH Old Rate	RATE PER MONTH New Rate
CHURCH CLUBS		
Minimum (add base rate)	~~$18.20~~	$ 20.20
FIRE HYDRANTS & FIRE LANES:		
Private Hydrants (do not add montbly base rate)	~~$ 17.47~~	$ 19.39
Private Fire Lines – 4" & over (NO monthly base rate added)	~~$ 17.47~~	$ 19.39

SECTION V – COMMERCIAL METER RATES

METER SIZE	MINIMUM MONTHLY CHARGE Old Rate	MINIMUM MONTHLY CHARGE New Rate
½:. ¾".5/8" meter	$ ~~12.92~~	$ 14.08
1" meter	$ ~~23.82~~	$ 25.96
1-1/4" meter	$ ~~31.94~~	$ 34.81
1-1/2" meter	$ ~~36.30~~	$ 39.57
2" meter	$ ~~46.60~~	$ 50.79
3" meter	$ ~~93.14~~	$101.52
4" meter	~~$140.12~~	$152.73
6" meter	~~$233.26~~	$254.25
8" meter	~~$337.74~~	$368.14
10" meter	~~$466.96~~	$508.99
Secondary Meter	$ ~~10.36~~	$ 11.29

CUBIC FEET PER MONTH CHARGE

RATE PER 100 CU. FT (OR 748 GALLONS).

	Old Rate	New Rate
First 7.480 gal (1.000 cu ft)	~~$1.96~~	$ 2.14
Next 29.920 gal (4.000 cu ft)	~~$1.85~~	$ 2.02
Next 37.400gal (5.000 cu ft)	~~$1.53~~	$ 1.67
Next 448.800 gal (60.000 cu ft)	~~$1.31~~	$ 1.43
Next 6.956.400 gal (930.000 cu ft)	~~$1.20~~	$ 1.31
Over 7.480.000 gal (1.000.000 cu ft)	~~$1.09~~	$ 1.19

Anaconda Water Department
50 Main Street
Anaconda, MT 59711

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Appendix I

Wastewater System Calculations

Preliminary Engineering Report
Mill Creek TIFID

Purpose

The purpose of this calculation brief is to design a preliminary gravity sewer, force main, and lift station for the Mill Creek TIFID site. Specifically, the purposes are to summarize the information used for the design of the Mill Creek TIFID gravity sewer and force main, determine a layout for the gravity main, force main, and lift station, evaluate the preliminary gravity sewer design to ensure compliance with Montana Department of Environmental Quality (MDEQ) requirements, and size the lift station pumps to meet MDEQ requirements.

Methods

A. MDEQ Circular 2 Requirements for Gravity Sewer Lines

The MDEQ Circular 2 (MDEQ, 2012) requirements were the main drivers of the sewer design. The gravity sewer design is split into two portions: a portion located solely on county property, and a portion located solely on ARCO property. A surface was created in Autodesk Civil 3D® using contour data provided by ARCO at some point in the past (Dave is not sure where this came from – no general date or source). The contour data used was stored in D:>GIS>PROJECTS>Anaconda>Feature Data. The shapefiles used were topo_5.shp, topo_10.shp, and topo_50.shp. This is a crude surface and should not be used for any detailed design work. Once the surface was created, a minimum cover and slope were specified based on the following Circular 2 (MDEQ, 2012) requirements:

- Minimum depth of bury must not be less than 4 ft to the top of the pipe (Section 33.2)
- Minimum slope of 0.40 ft/100 ft for 8-inch pipe (Section 33.41)

The pipe size was selected to be 8-inches in diameter per Section 33.1 of Circular 2 (MDEQ, 2012). This is the minimum diameter allowed and was verified to provide adequate flow with the analysis (See Results Section). PVC was selected as the pipe material to be consistent with the Mill Creek PER (RPA, 2008) and to reduce the cost of the system . MDEQ Circular 1 (MDEQ, 2006) requires that the water mains be located a distance of 10 ft horizontally from sanitary sewer lines (This also applies to manholes and all sanitary sewer structures). This was considered in the layout by locating the sewer lines on the other side of proposed roads than the water distribution lines.

Manholes were placed according to the following Circular 2 (MDEQ, 2012) requirements:

- Slope between manholes must be uniform (Section 33.44)
- Pipe between manholes must have a straight alignment (Section 33.5)
- Manholes must be located at the end of sewer lines, any intersections, any changes in grade, size, or alignment as well as at 400 ft intervals (Section 34.1)

The following Circular 2 (MDEQ, 2012) requirements had to be considered for stream crossings:

- Cover depth for stream crossings must be one foot where sewer is located on rock, three feet in other materials. Use of casing pipe or encasement in concrete is required for PVC or HDPE pipe. (Section 63.11) As contour data was not very detailed especially in the vicinity of streams and ditches, no changes were made to burial depths for stream crossings. However, the number of stream crossings was minimized.
- Sewers located along streams must be located outside of stream bed and far enough away to provide for future widening and pollution prevention via siltation. (Section 63.12)
- Structures must be located far enough so they don't interfere with discharge of flood flows. (Section 36.13) The sewer design accounts for the current FEMA Zone A Floodplain for Mill Creek but does not include the floodplain revisions from 'Northwestern Energy Mill Creek Substation – Mill Creek Base Flood Elevation Determination' (Water & Environmental Technologies, 2013). Design revisions will be required if floodplain revisions result in proposed manhole locations being entered into the floodplain.
- Sewers crossing streams must cross as nearly perpendicular as possible and be free from grade change. (Section 36.14)

The gravity main system layout was created and a drawing of the layout is attached to this calculation brief in the Figures Section. The design specifics for each portion of the system are detailed in the Results Section.

B. MDEQ Circular 2 Requirements for Force Main Lines

A force main is required to connect the ARCO gravity sewer network into the existing ADLC system. The force main was designed with the following design assumptions/parameters:

- Minimum required velocity in force main of 2 ft/s (Section 42.38 (MDEQ, 2012))
- Minimum force main diameter of 4-inches (Section 49.1 (MDEQ, 2012))
- Maximum velocity in force main of 8 ft/s (Section 49.1 (MDEQ, 2012))
- Minimum bury depth of force main is 6 ft (Section 49.6 (MDEQ, 2012))

The force main layout is included in the drawing in the Figures Section. The lift station will be sized according to these force main requirements and other design parameters given by Table 3 in the Results Section.

Results

A. Gravity Sewer Design Specifics

The design specifics for the gravity sewer systems are given in Table 1 and Table 2.

Table 1: County Gravity Main Design Specs		
Parameter	**Value**	**Notes**
Gravity Sewer Material	8-Inch Diameter PVC	
Gravity Sewer Length	12100 Feet	
Manholes	40	42 Manholes in CAD drawing but 2 are existing
Highway Crossings	1	
Stream Crossings (Mill Creek)	1	
Proposed Road Crossings	5	
Proposed Rail Crossings	1	
Drainage Ditch Crossings	2	

Table 2: ARCO Gravity Main Design Specs		
Parameter	**Value**	**Notes**
Gravity Sewer Material	8-Inch Diameter PVC	
Gravity Sewer Length	14900 Feet	
Manholes	47	
Highway Crossings	1	Force Main to Existing Gravity Sewer
Railroad Crossings	2	One with Force Main, One with Gravity Main
Road Crossings (Willow Glen Road)	1	
Stream Crossings (Mill Creek)	1	With Force Main
Proposed Road Crossings	9	
Proposed Rail Crossings	1	With Force Main
Drainage Ditch Crossings	1	
Silver Lake Pipeline Crossings	1	
Other	1	Lift Station with Force Main to Existing Manhole 99

B. Force Main and Lift Station Design Specifics

The design specifics for the force main and lift station are given in Table 3. Eric is currently working on pump sizing.

Table 3: Lift Station and Force Main Specs		
Parameter	**Value**	**Source**
Inlet Elevation (Sump Elevation)	5091.5'	Structure 501 Sump Elevation in CAD Drawing
Outlet Elevation (Inv in)	5177.49'	MH-99 from RPA 'As Constructed Drawings - Mill Creek Industrial Complex Water and Wastewater System Extensions' Sheet CS-1 (RPA, 2011)
Minimum Velocity in Force Main	2 ft/s	MDEQ Circular 2 Page 33 Section 42.38 (MDEQ, 2012)
Minimum Force Main Diameter	4"	MDEQ Circular 2 Page 41 Section 49.1 (MDEQ, 2012)
Maximum Velocity in Force Main	8 ft/s	MDEQ Circular 2 Page 41 Section 49.1 (MDEQ, 2012)
Minimum Bury Depth	6 ft	MDEQ Circular 2 Page 41 Section 49.6 (MDEQ, 2012)
Friction Coefficient Formula	Hazen-Williams	MDEQ Circular 2 Page 41 Section 49.71 (MDEQ, 2012)
"C" Value for Hazen Williams	100 for unlined iron or steel pipe	MDEQ Circular 2 Page 41 Section 49.71 (MDEQ, 2012)
	Max. 120 for PVC, ductile iron, etc.	MDEQ Circular 2 Page 42 Section 49.71 (MDEQ, 2012)
Force Main Length	6025	[Feet] From Proposed Force Main in CAD Drawing
Peak Hourly Flow to Lift Station	36.4 gpm	41 Lots @ 1280 gpm each
Average Daily Flow to Lift Station	11.4 gpm	41 Lots @ 400 gpm each
Pump Size	7.5 hp	Based on quote from Industrial Systems, Inc.

C. Storm And Sanitary Analysis Results

Both gravity sewer systems were imported from Autodesk Civil 3D® to Autodesk Storm and Sanitary Analysis® (SSA). The hydraulic routing for the model was set to hydrodynamic and an analysis was run for the peak hour flow rates given in Table 4. There were no overflow issues with the systems. The output tables from the analysis are attached to this calculation brief in

the Model Section. Also included in the Model Section are copies of the model layout and the input parameters.

The force main flow can be added into pipe "Link-01" which is the outlet pipe from MH-99 (part of the existing system). Link-01 is an existing gravity sewer line that feeds from MH-99 to MH-100. This pipe has a design flow capacity of 422 gpm based on the analysis run in SSA. The force main flow of 36.44 gpm (based on 41 businesses feeding into the ARCO system) combined with the flow from the county gravity sewer can easily be handled by this pipe. The combined peak hour outflow from the TIFID is 92160 gpd (64 gpm) and is well below the design flow capacity of the existing gravity main.

Table 4: Wastewater Flow Requirements (Sanitary Sewer ONLY)

Average Daily Flow			
Parameter	**Value**	**Units**	**Source**
Flow Required per Employee per Day	16	gpd/employee	MDEQ Circular 4 Page 18-20 (MDEQ, 2004)
Number of Employees per Business	25	employees	Mill Creek Industrial Complex PER Page 3-6 (RPA, 2008)
Average Daily Wastewater Flow Requirements per Business	400	gpd	Calculation
Number of Businesses in TIFID	72	businesses	Based on Subdivision
Total Average Daily Wastewater Flow Requirements	28800	gpd	Calculation
Peak Flow			
Parameter	**Value**	**Units**	**Source**
Average Daily Wastewater Flow Requirements per Business	400	gpd	Calculation
Maximum Peaking Factor	3.2	unitless	(DOWL HKM, 2011)
Mill Creek TIFID Peaking Factor	3.2	unitless	Conservative Value
Maximum Peaking Flow Requirements per Business	1280	gpd	Calculation
Number of Businesses in TIFID	72	businesses	Based on Subdivision
Total Maximum Peaking Flow Requirements	92160	gpd	Calculation

References

DOWL HKM, 2011*, Preliminary Engineering Report - Anaconda East Yards Development: Water, Wastewater, and Stormwater Systems*.

MDEQ, 2004, *Circular DEQ 4 – Montana Standards for Subsurface Wastewater Treatment Systems*, 2004 Edition, Montana Department of Environmental Quality.

MDEQ, 2006, *Circular DEQ 1 – Standards for Water Works*, Montana Department of Environmental Quality.

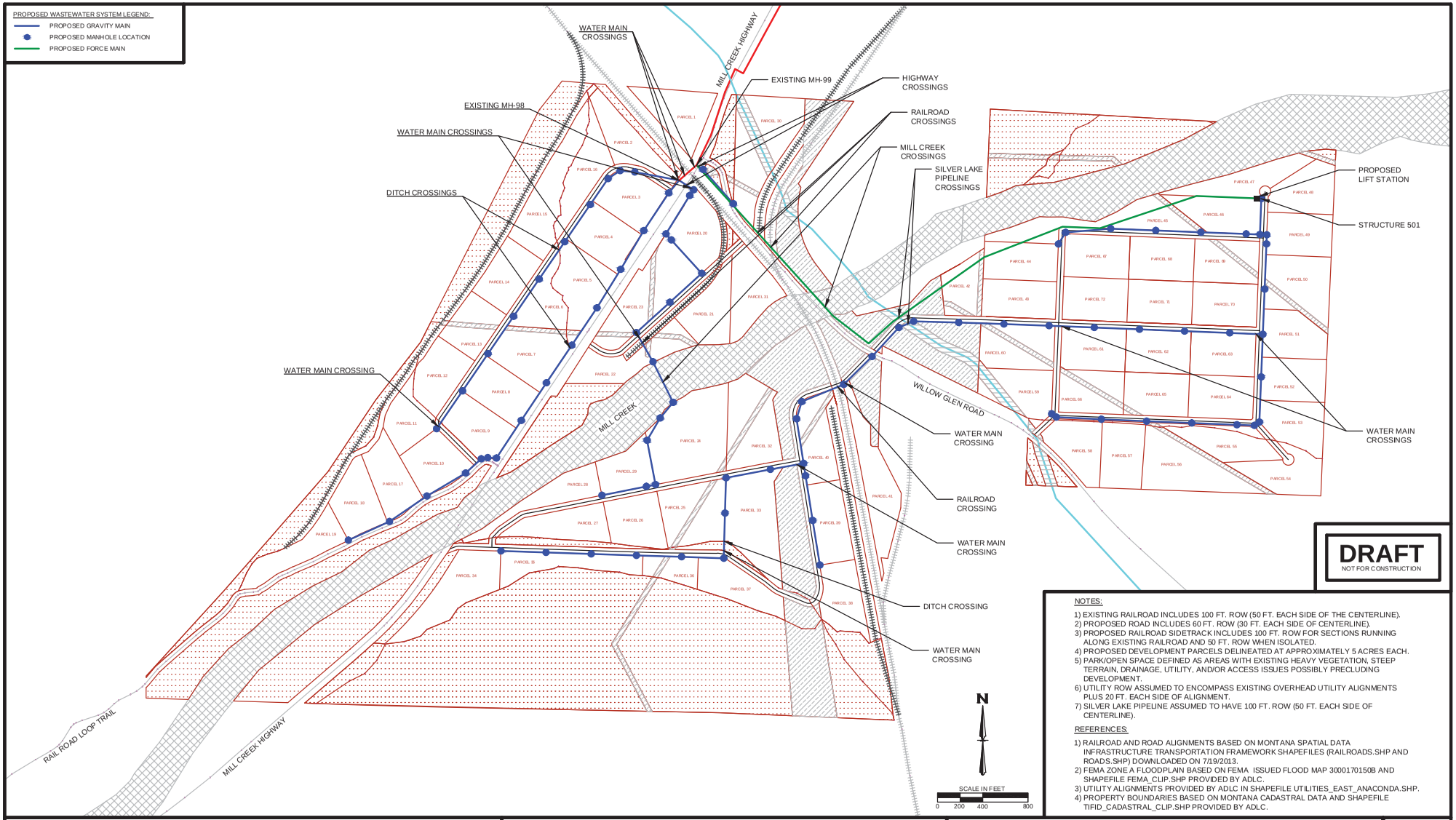
MDEQ, 2012, *Circular DEQ 2 – Design Standards for Public Sewage Systems*, Rev. 2, Montana Department of Environmental Quality.

RPA, 2011, *As Constructed Drawings - Mill Creek Industrial Complex Water & Wastewater System Extensions*, Robert Peccia & Associates.

RPA, 2008, Mill Creek Industrial Complex Water and Wastewater System – Preliminary Engineering Report, Robert Peccia & Associates.

Water & Environmental Technologies, 2013, *Northwestern Energy Mill Creek Substation – Mill Creek Base Flood Elevation Determination*.

Figures



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NOT FOR CONSTRUCTION

NOTES:

1) EXISTING RAILROAD INCLUDES 100 FT. ROW (50 FT. EACH SIDE OF THE CENTERLINE).
2) PROPOSED ROAD INCLUDES 60 FT. ROW (30 FT. EACH SIDE OF CENTERLINE).
3) PROPOSED RAILROAD SIDETRACK INCLUDES 100 FT. ROW FOR SECTIONS RUNNING ALONG EXISTING RAILROAD AND 50 FT. ROW WHEN ISOLATED.
4) PROPOSED DEVELOPMENT PARCELS DELINEATED AT APPROXIMATELY 5 ACRES EACH.
5) PARK/OPEN SPACE DEFINED AS AREAS WITH EXISTING HEAVY VEGETATION, STEEP TERRAIN, DRAINAGE, UTILITY, AND/OR ACCESS ISSUES POSSIBLY PRECLUDING DEVELOPMENT.
6) UTILITY ROW ASSUMED TO ENCOMPASS EXISTING OVERHEAD UTILITY ALIGNMENTS PLUS 20 FT. EACH SIDE OF ALIGNMENT.
7) SILVER LAKE PIPELINE ASSUMED TO HAVE 100 FT. ROW (50 FT. EACH SIDE OF CENTERLINE).

REFERENCES:

1) RAILROAD AND ROAD ALIGNMENTS BASED ON MONTANA SPATIAL DATA INFRASTRUCTURE TRANSPORTATION FRAMEWORK SHAPEFILES (RAILROADS.SHP AND ROADS.SHP) DOWNLOADED ON 7/19/2013.
2) FEMA ZONE A FLOODPLAIN BASED ON FEMA ISSUED FLOOD MAP 3000170150B AND SHAPEFILE FEMA_CLIP.SHP PROVIDED BY ADLC.
3) UTILITY ALIGNMENTS PROVIDED BY ADLC IN SHAPEFILE UTILITIES_EAST_ANACONDA.SHP.
4) PROPERTY BOUNDARIES BASED ON MONTANA CADASTRAL DATA AND SHAPEFILE TIFID_CADASTRAL_CLIP.SHP PROVIDED BY ADLC.

LEGEND:

- EXISTING ROAD
- EXISTING RAILROAD (SEE NOTE 1)
- PROPOSED ROAD CENTERLINE (SEE NOTE 2)
- PROPOSED RAILROAD SIDETRACK CENTERLINE (SEE NOTE 3)
- PROPOSED DEVELOPMENT PARCELS (SEE NOTE 4)
- PARK/OPEN SPACE (SEE NOTE 5)
- FEMA ZONE A FLOODPLAIN
- OVERHEAD UTILITY RIGHT-OF-WAY (ROW) (SEE NOTE 6)
- SILVER LAKE PIPELINE RIGHT-OF-WAY (ROW) (SEE NOTE 7)
- EXISTING GRAVITY SEWER LINE
- SILVER LAKE PIPELINE

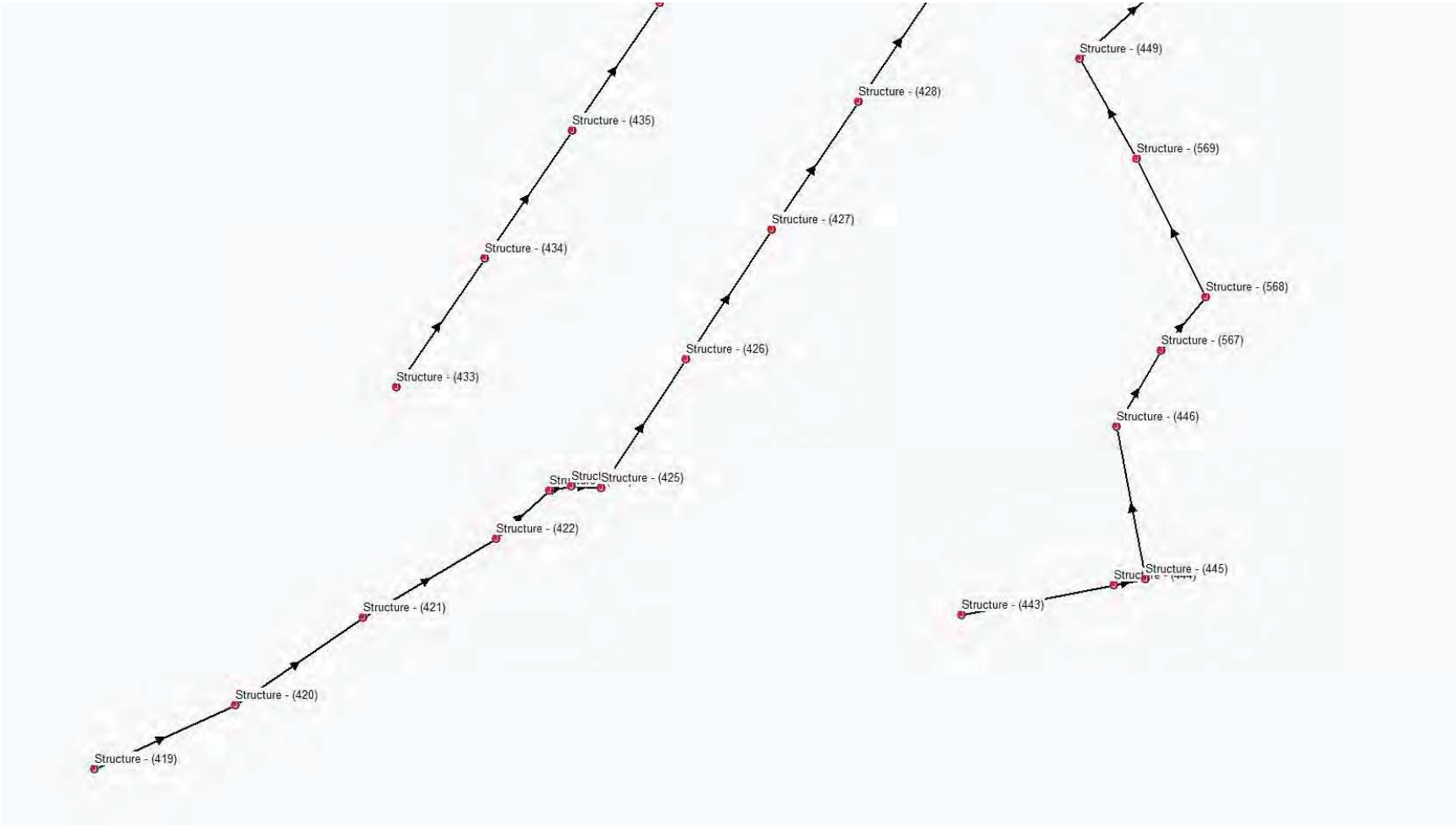
Copper Environmental Consulting, LLC

COPPER ENVIRONMENTAL CONSULTING, LLC.
406 East Park Avenue Suite 2
Anaconda, MT 59711
(406) 563-2700

WASTEWATER SYSTEM ALTERNATIVE 1: CONNECT TO CITY OF ANACONDA WASTEWATER SYSTEM MILL CREEK TIFID PER
PREPARED FOR:
ANACONDA-DEER LODGE COUNTY

FIGURE
17

Model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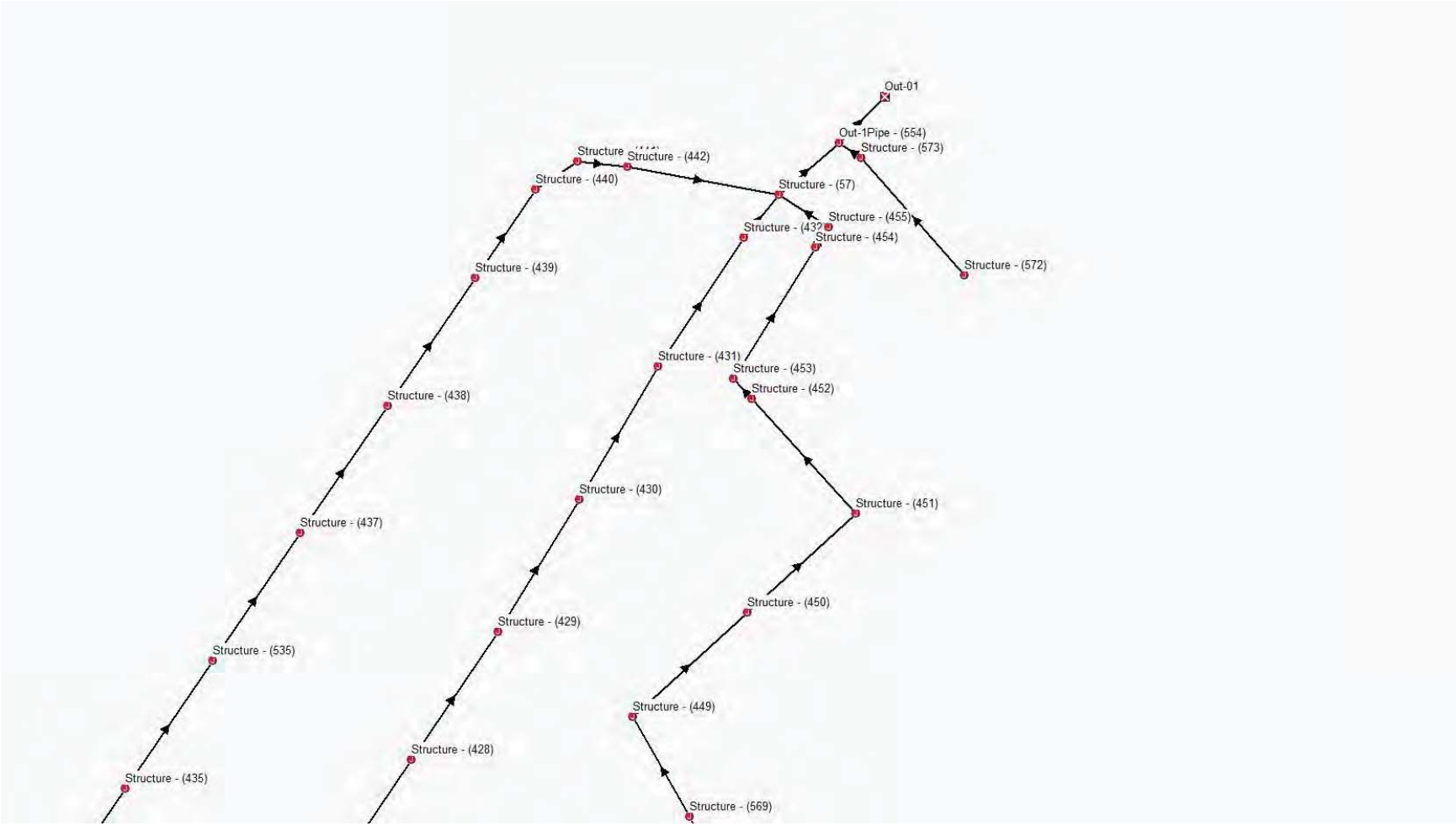
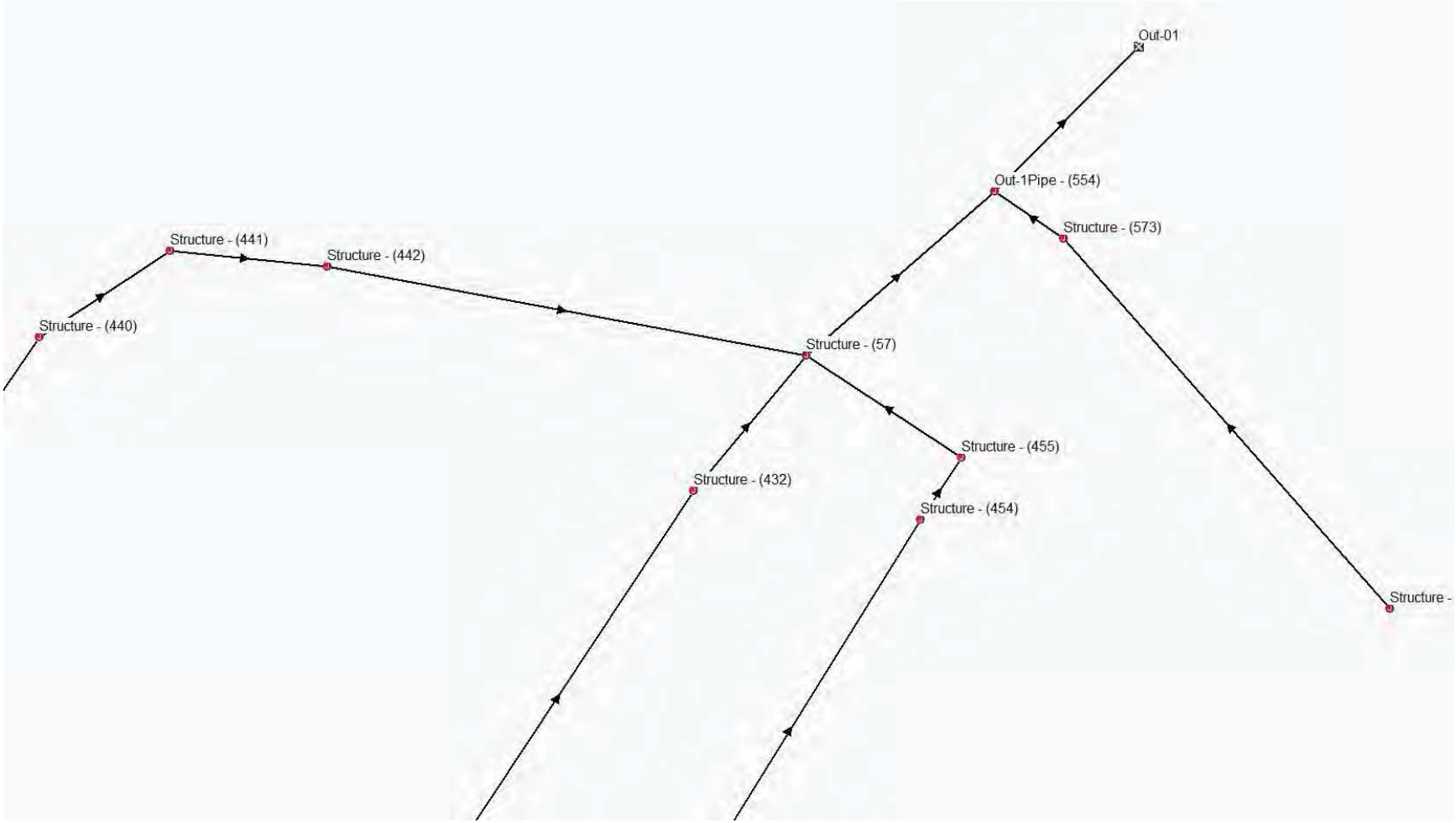


Autodesk Storm and Sanitary Analysis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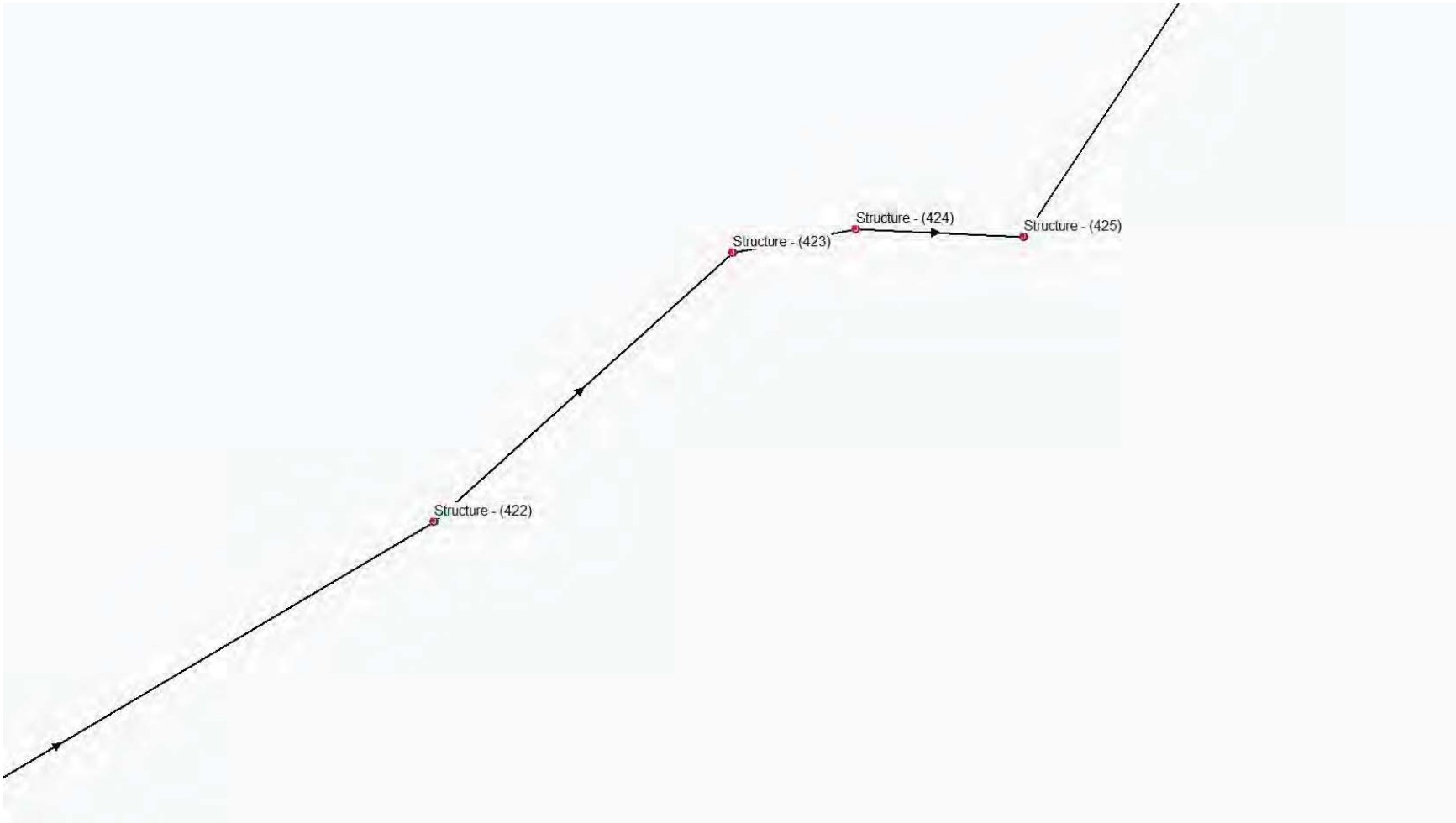
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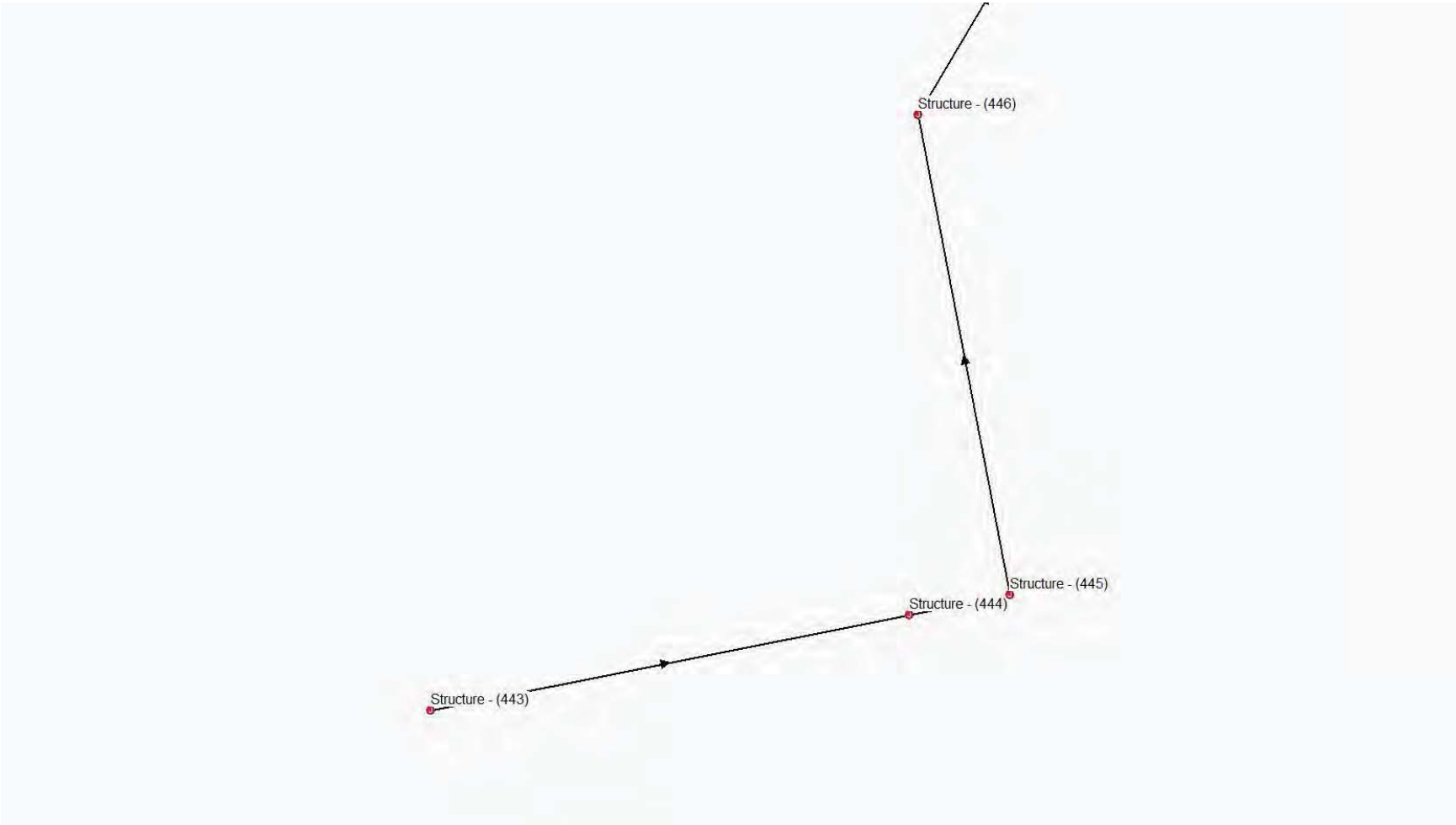
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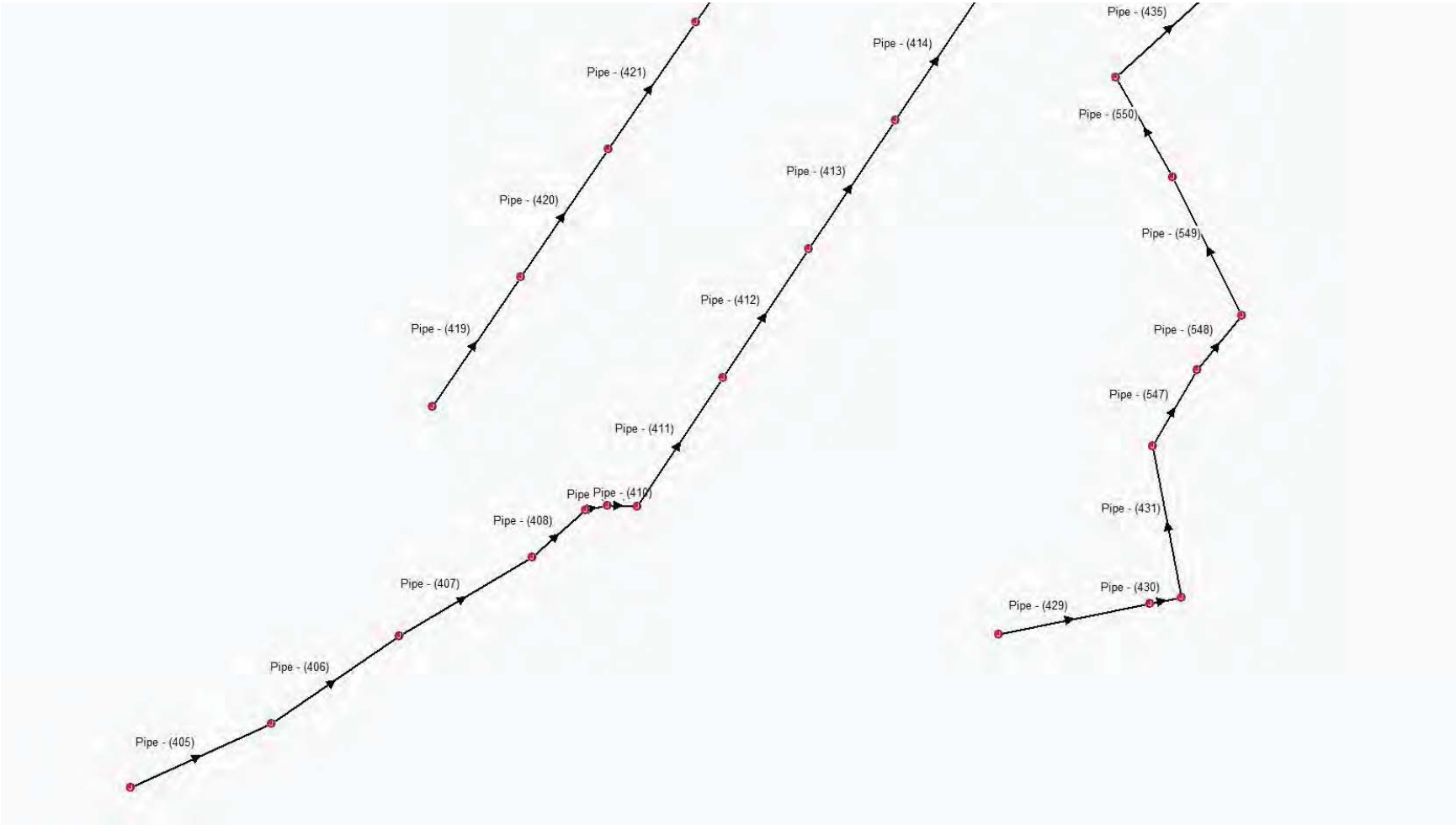
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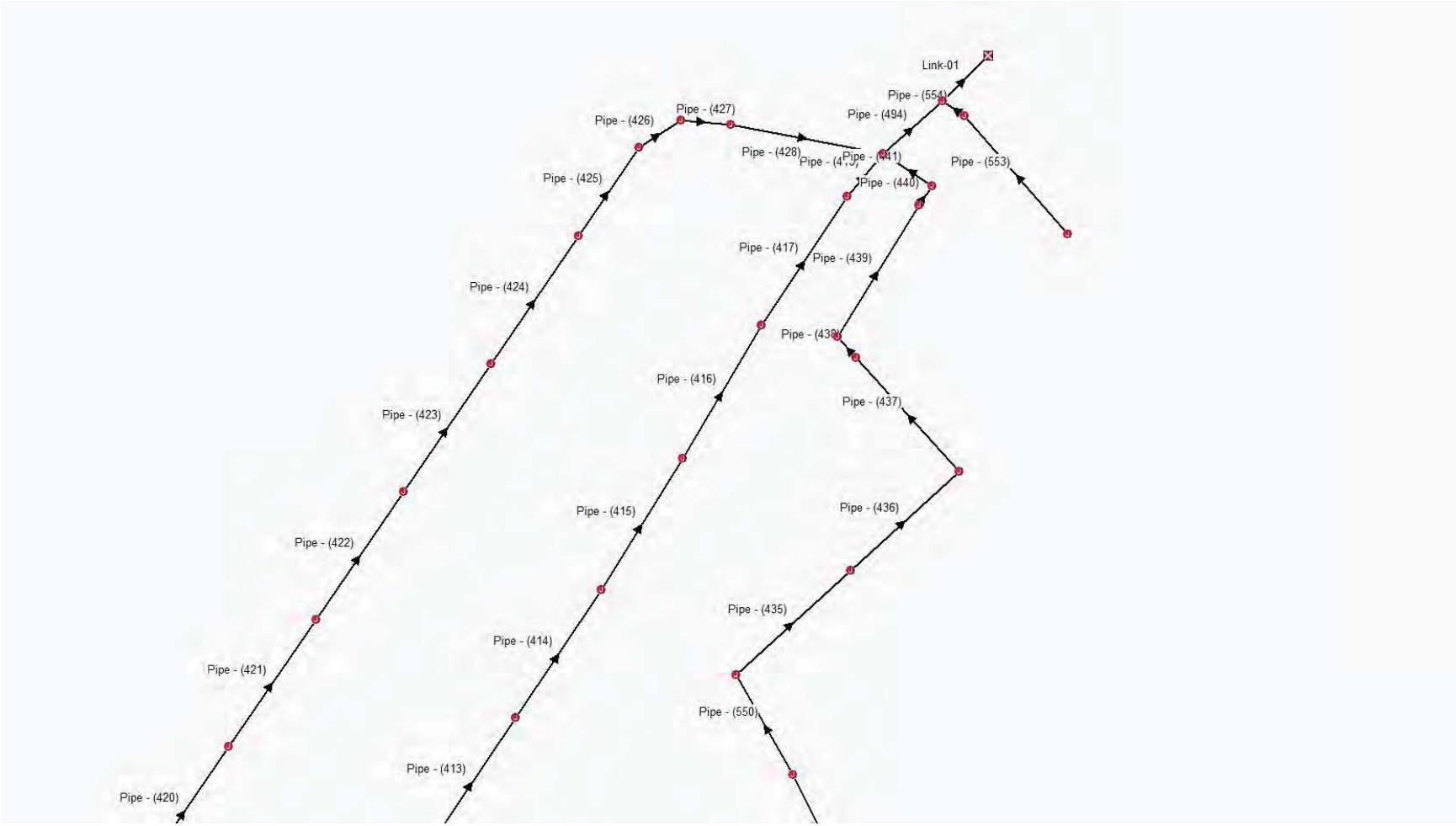
Link-01
Pipe - (554)
Pipe - (494)
Pipe - (553)
Pipe - (426)
Pipe - (427)
Pipe - (428)
Pipe - (441)
Pipe - (440)
Pipe - (425)
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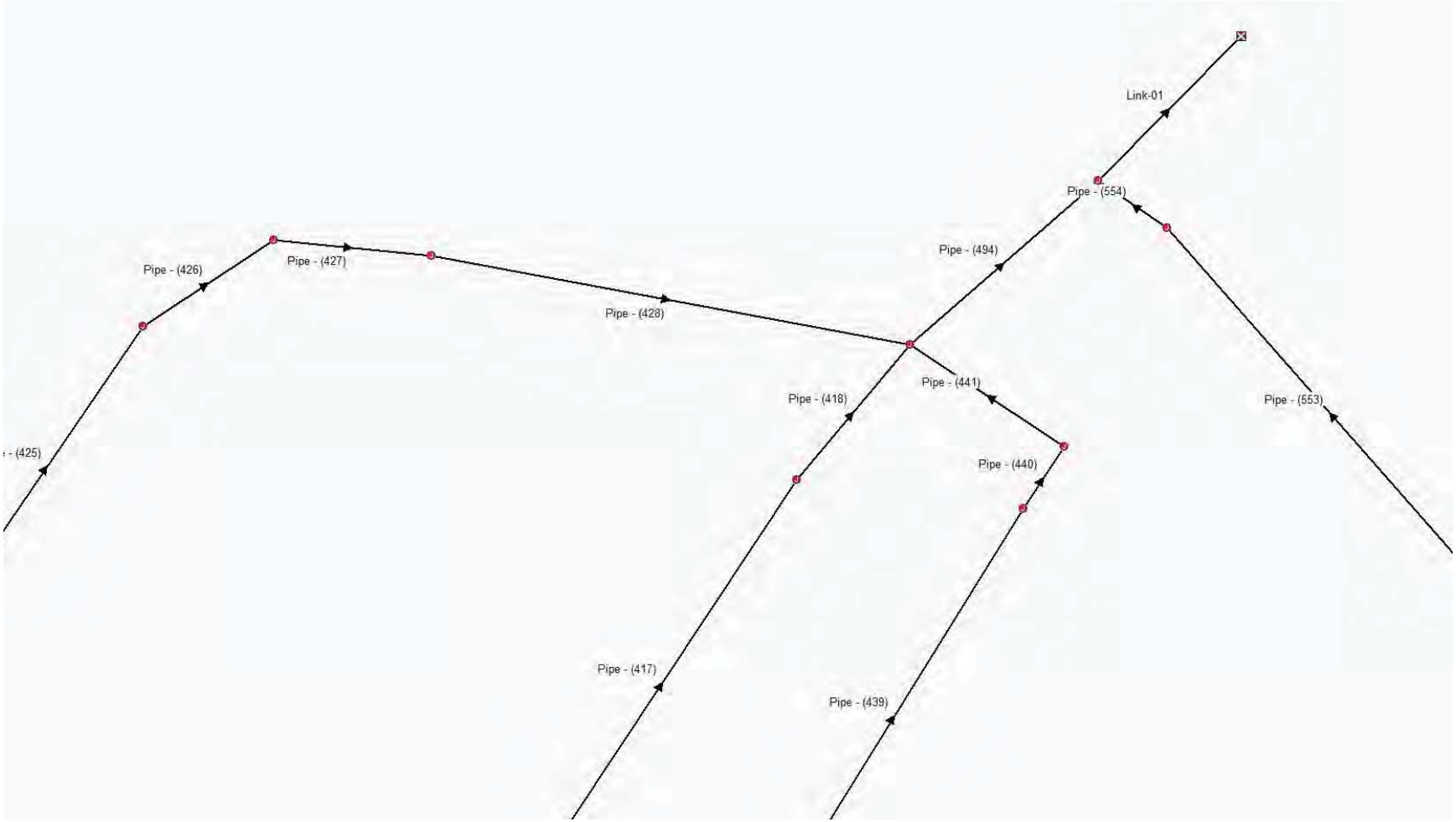
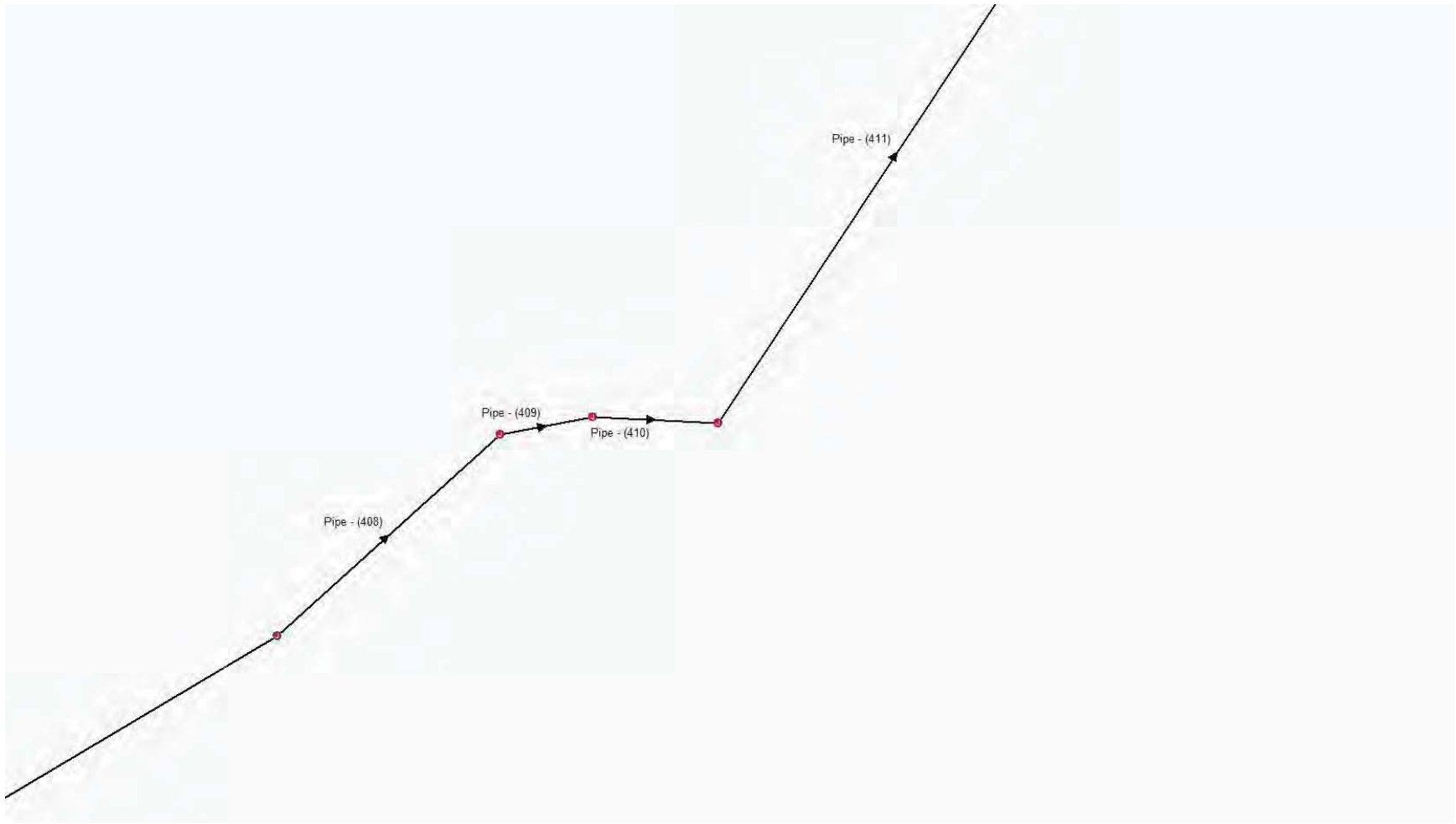
Pipe - (439)
Pipe - (424)
Pipe - (416)
Pipe - (437)
Pipe - (423)
Pipe - (436)
Pipe - (415)
Pipe - (422)
Pipe - (435)
Pipe - (414)
Pipe - (421)
Pipe - (550)
Pipe - (413)
Pipe - (420)


Link-01
Pipe - (554)
Pipe - (494)
Pipe - (426)
Pipe - (427)
Pipe - (428)
Pipe - (441)
Pipe - (418)
Pipe - (553)
- (425)
Pipe - (440)
Pipe - (417)
Pipe - (439)


Pipe - (411)
Pipe - (409)
Pipe - (410)
Pipe - (408)

Project Description

File Name	county sewer simulation version 4.SPF

Project Options

Flow Units	GPM
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Oct 02, 2013	00:00:00
End Analysis On	Oct 04, 2013	00:00:00
Start Reporting On	Oct 02, 2013	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	0
Nodes	43
Junctions	42
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	0
Links	42
Channels	0
Pipes	42
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	2 year(s)

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (gpm)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Out-1Pipe - (554)	Junction	5177.49	5180.87	5177.49	5180.87	0.00	27.60	5177.61	0.00	3.26	0 00:00	0.00	0.00
2	Structure - (419)	Junction	5262.34	5267.03	5262.34	5267.03	0.00	0.89	5262.35	0.00	4.68	0 00:00	0.00	0.00
3	Structure - (420)	Junction	5243.94	5260.05	5243.94	5260.05	0.00	1.78	5243.98	0.00	16.08	0 00:00	0.00	0.00
4	Structure - (421)	Junction	5242.18	5250.28	5242.18	5250.28	0.00	2.67	5242.22	0.00	8.06	0 00:00	0.00	0.00
5	Structure - (422)	Junction	5238.31	5243.99	5238.31	5243.99	0.00	3.56	5238.34	0.00	5.65	0 00:00	0.00	0.00
6	Structure - (423)	Junction	5231.91	5240.98	5231.91	5240.98	0.00	3.56	5231.96	0.00	9.03	0 00:00	0.00	0.00
7	Structure - (424)	Junction	5231.58	5240.26	5231.58	5240.26	0.00	3.56	5231.63	0.00	8.63	0 00:00	0.00	0.00
8	Structure - (425)	Junction	5230.58	5240.01	5230.58	5240.01	0.00	3.56	5230.61	0.00	9.40	0 00:00	0.00	0.00
9	Structure - (426)	Junction	5225.48	5234.14	5225.48	5234.14	0.00	3.56	5225.52	0.00	8.62	0 00:00	0.00	0.00
10	Structure - (427)	Junction	5219.78	5226.40	5219.78	5226.40	0.00	3.56	5219.81	0.00	6.58	0 00:00	0.00	0.00
11	Structure - (428)	Junction	5210.08	5218.36	5210.08	5218.36	0.00	3.56	5210.11	0.00	8.24	0 00:00	0.00	0.00
12	Structure - (429)	Junction	5200.38	5208.75	5200.38	5208.75	0.00	3.56	5200.42	0.00	8.33	0 00:00	0.00	0.00
13	Structure - (430)	Junction	5194.68	5200.20	5194.68	5200.20	0.00	3.56	5194.72	0.00	5.48	0 00:00	0.00	0.00
14	Structure - (431)	Junction	5188.98	5196.53	5188.98	5196.53	0.00	3.56	5189.02	0.00	7.51	0 00:00	0.00	0.00
15	Structure - (432)	Junction	5183.28	5189.29	5183.28	5189.29	0.00	3.56	5183.31	0.00	5.98	0 00:00	0.00	0.00
16	Structure - (433)	Junction	5242.93	5247.72	5242.93	5247.72	0.00	0.89	5242.94	0.00	4.78	0 00:00	0.00	0.00
17	Structure - (434)	Junction	5233.23	5238.24	5233.23	5238.24	0.00	1.88	5233.25	0.00	5.00	0 00:00	0.00	0.00
18	Structure - (435)	Junction	5219.53	5229.64	5219.53	5229.64	0.00	3.56	5219.56	0.00	10.08	0 00:00	0.00	0.00
19	Structure - (437)	Junction	5212.13	5217.25	5212.13	5217.25	0.00	7.12	5212.16	0.00	5.09	0 00:00	0.00	0.00
20	Structure - (438)	Junction	5198.43	5207.07	5198.43	5207.07	0.00	8.90	5198.48	0.00	8.59	0 00:00	0.00	0.00
21	Structure - (439)	Junction	5192.73	5200.07	5192.73	5200.07	0.00	9.79	5192.78	0.00	7.28	0 00:00	0.00	0.00
22	Structure - (440)	Junction	5188.73	5195.47	5188.73	5195.47	0.00	11.57	5188.82	0.00	6.65	0 00:00	0.00	0.00
23	Structure - (441)	Junction	5188.12	5192.93	5188.12	5192.93	0.00	11.57	5188.18	0.00	4.75	0 00:00	0.00	0.00
24	Structure - (442)	Junction	5186.20	5191.30	5186.20	5191.30	0.00	12.46	5186.26	0.00	5.04	0 00:00	0.00	0.00
25	Structure - (443)	Junction	5223.51	5228.20	5223.51	5228.20	0.00	1.78	5223.53	0.00	4.67	0 00:00	0.00	0.00
26	Structure - (444)	Junction	5213.81	5220.98	5213.81	5220.98	0.00	4.01	5213.86	0.00	7.12	0 00:00	0.00	0.00
27	Structure - (445)	Junction	5213.37	5219.46	5213.37	5219.46	0.00	5.34	5213.41	0.00	6.05	0 00:00	0.00	0.00
28	Structure - (446)	Junction	5205.92	5210.61	5205.92	5210.61	0.00	5.34	5205.95	0.00	4.66	0 00:00	0.00	0.00
29	Structure - (449)	Junction	5192.35	5204.77	5192.35	5204.77	0.00	7.12	5192.42	0.00	12.35	0 00:00	0.00	0.00
30	Structure - (450)	Junction	5190.63	5200.13	5190.63	5200.13	0.00	7.12	5190.68	0.00	9.45	0 00:00	0.00	0.00
31	Structure - (451)	Junction	5187.53	5193.05	5187.53	5193.05	0.00	8.90	5187.58	0.00	5.47	0 00:00	0.00	0.00
32	Structure - (452)	Junction	5182.92	5194.28	5182.92	5194.28	0.00	8.90	5182.99	0.00	11.29	0 00:00	0.00	0.00
33	Structure - (453)	Junction	5182.53	5194.35	5182.53	5194.35	0.00	8.90	5182.61	0.00	11.75	0 00:00	0.00	0.00
34	Structure - (454)	Junction	5180.83	5186.68	5180.83	5186.68	0.00	8.90	5180.91	0.00	5.77	0 00:00	0.00	0.00
35	Structure - (455)	Junction	5180.49	5185.49	5180.49	5185.49	0.00	8.90	5180.56	0.00	4.93	0 00:00	0.00	0.00
36	Structure - (535)	Junction	5213.83	5222.06	5213.83	5222.06	0.00	5.34	5213.89	0.00	8.17	0 00:00	0.00	0.00
37	Structure - (567)	Junction	5198.04	5205.26	5198.04	5205.26	0.00	5.34	5198.08	0.00	7.18	0 00:00	0.00	0.00
38	Structure - (568)	Junction	5195.42	5201.37	5195.42	5201.37	0.00	5.34	5195.48	0.00	5.89	0 00:00	0.00	0.00
39	Structure - (569)	Junction	5193.64	5202.62	5193.64	5202.62	0.00	5.34	5193.70	0.00	8.92	0 00:00	0.00	0.00
40	Structure - (57)	Junction	5179.65	5186.42	5179.65	5186.42	0.00	24.92	5180.24	0.00	6.17	0 00:00	0.00	0.00
41	Structure - (572)	Junction	5176.86	5181.55	5176.86	5181.55	0.00	1.78	5179.64	0.00	1.91	0 00:00	0.00	0.00
42	Structure - (573)	Junction	5178.00	5181.86	5178.00	5181.86	0.00	1.81	5178.03	0.00	3.84	0 00:00	0.00	0.00
43	Out-01	Outfall	5175.89					27.60	5175.89					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (gpm)	Design Flow Capacity (gpm)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	Link-01	Pipe	Out-1Pipe - (554)	Out-01	290.70	5177.49	5175.99	0.5200	8.000	0.0120	27.60	422.07	0.07	1.54	0.11	0.17	0.00	Calculated
2	Pipe - (405)	Pipe	Structure - (419)	Structure - (420)	400.00	5262.34	5243.94	4.6000	8.000	0.0120	0.89	1260.20	0.00	1.00	0.02	0.04	0.00	Calculated
3	Pipe - (406)	Pipe	Structure - (420)	Structure - (421)	400.00	5243.94	5242.34	0.4000	8.000	0.0120	1.78	371.61	0.00	0.65	0.03	0.05	0.00	Calculated
4	Pipe - (407)	Pipe	Structure - (421)	Structure - (422)	400.00	5242.18	5238.31	0.9700	8.000	0.0120	2.67	578.11	0.00	1.02	0.03	0.05	0.00	Calculated
5	Pipe - (408)	Pipe	Structure - (422)	Structure - (423)	185.26	5238.31	5232.01	3.4000	8.000	0.0120	3.56	1083.43	0.00	1.58	0.03	0.04	0.00	Calculated
6	Pipe - (409)	Pipe	Structure - (423)	Structure - (424)	57.78	5231.91	5231.58	0.5700	8.000	0.0120	3.56	444.80	0.01	0.80	0.04	0.07	0.00	Calculated
7	Pipe - (410)	Pipe	Structure - (424)	Structure - (425)	77.59	5231.58	5231.20	0.4900	8.000	0.0120	3.56	411.87	0.01	0.87	0.04	0.06	0.00	Calculated
8	Pipe - (411)	Pipe	Structure - (425)	Structure - (426)	400.08	5230.58	5225.58	1.2500	8.000	0.0120	3.56	656.57	0.01	1.11	0.04	0.05	0.00	Calculated
9	Pipe - (412)	Pipe	Structure - (426)	Structure - (427)	400.13	5225.48	5219.88	1.4000	8.000	0.0120	3.56	695.11	0.01	1.15	0.03	0.05	0.00	Calculated
10	Pipe - (413)	Pipe	Structure - (427)	Structure - (428)	400.05	5219.78	5210.18	2.4000	8.000	0.0120	3.56	910.20	0.00	1.39	0.03	0.05	0.00	Calculated
11	Pipe - (414)	Pipe	Structure - (428)	Structure - (429)	399.39	5210.08	5200.48	2.4000	8.000	0.0120	3.56	910.96	0.00	1.39	0.03	0.05	0.00	Calculated
12	Pipe - (415)	Pipe	Structure - (429)	Structure - (430)	399.79	5200.38	5194.78	1.4000	8.000	0.0120	3.56	695.40	0.01	1.15	0.03	0.05	0.00	Calculated
13	Pipe - (416)	Pipe	Structure - (430)	Structure - (431)	400.00	5194.68	5189.08	1.4000	8.000	0.0120	3.56	695.22	0.01	1.15	0.03	0.05	0.00	Calculated
14	Pipe - (417)	Pipe	Structure - (431)	Structure - (432)	400.00	5188.98	5183.38	1.4000	8.000	0.0120	3.56	695.22	0.01	1.15	0.03	0.05	0.00	Calculated
15	Pipe - (418)	Pipe	Structure - (432)	Structure - (57)	144.51	5183.28	5179.85	2.3800	8.000	0.0120	3.56	905.74	0.00	0.08	0.21	0.32	0.00	Calculated
16	Pipe - (419)	Pipe	Structure - (433)	Structure - (434)	405.35	5242.93	5233.33	2.3700	8.000	0.0120	0.99	904.23	0.00	0.96	0.02	0.02	0.00	Calculated
17	Pipe - (420)	Pipe	Structure - (434)	Structure - (435)	400.00	5233.23	5219.63	3.4000	8.000	0.0120	1.78	1083.43	0.00	1.28	0.02	0.03	0.00	Calculated
18	Pipe - (421)	Pipe	Structure - (435)	Structure - (535)	400.00	5219.53	5213.96	1.3900	8.000	0.0120	3.56	693.16	0.01	1.15	0.03	0.05	0.00	Calculated
19	Pipe - (422)	Pipe	Structure - (535)	Structure - (437)	400.00	5213.83	5212.23	0.4000	8.000	0.0120	5.34	371.61	0.01	0.91	0.05	0.08	0.00	Calculated
20	Pipe - (423)	Pipe	Structure - (437)	Structure - (438)	400.00	5212.13	5198.53	3.4000	8.000	0.0120	7.12	1083.43	0.01	1.95	0.04	0.06	0.00	Calculated
21	Pipe - (424)	Pipe	Structure - (438)	Structure - (439)	400.00	5198.43	5192.83	1.4000	8.000	0.0120	8.90	695.22	0.01	1.53	0.05	0.08	0.00	Calculated
22	Pipe - (425)	Pipe	Structure - (439)	Structure - (440)	277.95	5192.73	5188.83	1.4000	8.000	0.0120	9.79	695.22	0.01	1.58	0.06	0.08	0.00	Calculated
23	Pipe - (426)	Pipe	Structure - (440)	Structure - (441)	128.63	5188.73	5188.22	0.4000	8.000	0.0120	11.57	371.61	0.03	1.13	0.08	0.12	0.00	Calculated
24	Pipe - (427)	Pipe	Structure - (441)	Structure - (442)	129.81	5188.12	5186.30	1.4000	8.000	0.0120	11.57	695.22	0.02	1.64	0.06	0.09	0.00	Calculated
25	Pipe - (428)	Pipe	Structure - (442)	Structure - (57)	400.00	5186.20	5179.85	1.5900	8.000	0.0120	12.46	740.49	0.02	1.62	0.23	0.34	0.00	Calculated
26	Pipe - (429)	Pipe	Structure - (443)	Structure - (444)	400.00	5223.51	5213.91	2.4000	8.000	0.0120	2.23	910.26	0.00	1.13	0.02	0.03	0.00	Calculated
27	Pipe - (430)	Pipe	Structure - (444)	Structure - (445)	84.02	5213.81	5213.47	0.4000	8.000	0.0120	3.56	371.61	0.01	0.81	0.04	0.07	0.00	Calculated
28	Pipe - (431)	Pipe	Structure - (445)	Structure - (446)	400.00	5213.37	5205.92	1.8600	8.000	0.0120	5.34	802.11	0.01	1.71	0.04	0.06	0.00	Calculated
29	Pipe - (435)	Pipe	Structure - (449)	Structure - (450)	400.41	5192.35	5190.75	0.4000	8.000	0.0120	7.12	371.61	0.02	0.98	0.06	0.09	0.00	Calculated
30	Pipe - (436)	Pipe	Structure - (450)	Structure - (451)	380.11	5190.63	5187.59	0.8000	8.000	0.0120	7.12	525.54	0.01	1.18	0.05	0.08	0.00	Calculated
31	Pipe - (437)	Pipe	Structure - (451)	Structure - (452)	400.00	5187.53	5183.02	1.1300	8.000	0.0120	8.90	623.86	0.01	1.42	0.06	0.08	0.00	Calculated
32	Pipe - (438)	Pipe	Structure - (452)	Structure - (453)	70.80	5182.92	5182.63	0.4000	8.000	0.0120	8.90	371.61	0.02	1.05	0.07	0.10	0.00	Calculated
33	Pipe - (439)	Pipe	Structure - (453)	Structure - (454)	400.00	5182.53	5180.93	0.4000	8.000	0.0120	8.90	371.61	0.02	1.05	0.07	0.10	0.00	Calculated
34	Pipe - (440)	Pipe	Structure - (454)	Structure - (455)	61.29	5180.83	5180.59	0.4000	8.000	0.0120	8.90	371.61	0.02	1.05	0.07	0.10	0.00	Calculated
35	Pipe - (441)	Pipe	Structure - (455)	Structure - (57)	152.18	5180.49	5179.85	0.4200	8.000	0.0120	8.90	380.31	0.02	0.61	0.23	0.35	0.00	Calculated
36	Pipe - (494)	Pipe	Structure - (57)	Out-1Pipe - (554)	204.93	5179.65	5180.11	-0.2300	8.000	0.0120	24.92	279.83	0.09	0.30	0.35	0.52	0.00	Calculated
37	Pipe - (547)	Pipe	Structure - (446)	Structure - (567)	228.79	5205.92	5198.14	3.4000	8.000	0.0120	5.34	1083.43	0.00	1.78	0.03	0.05	0.00	Calculated
38	Pipe - (548)	Pipe	Structure - (567)	Structure - (568)	179.78	5198.04	5195.52	1.4000	8.000	0.0120	5.34	695.22	0.01	1.31	0.04	0.06	0.00	Calculated
39	Pipe - (549)	Pipe	Structure - (568)	Structure - (569)	400.00	5195.42	5193.82	0.4000	8.000	0.0120	5.34	371.61	0.01	0.91	0.05	0.08	0.00	Calculated
40	Pipe - (550)	Pipe	Structure - (569)	Structure - (449)	296.99	5193.64	5192.45	0.4000	8.000	0.0120	5.34	371.61	0.01	0.91	0.05	0.08	0.00	Calculated
41	Pipe - (553)	Pipe	Structure - (572)	Structure - (573)	405.05	5179.60	5178.00	0.4000	8.000	0.0120	1.81	369.29	0.00	0.79	0.03	0.05	0.00	Calculated
42	Pipe - (554)	Pipe	Structure - (573)	Out-1Pipe - (554)	68.36	5178.00	5177.49	0.7500	8.000	0.0120	1.79	507.51	0.00	0.19	0.07	0.11	0.00	Calculated

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
1	Out-1Pipe - (554)	5177.49	5180.87	3.38	5177.49	0.00	5180.87	0.00	0.00	0.00
2	Structure - (419)	5262.34	5267.03	4.69	5262.34	0.00	5267.03	0.00	0.00	0.00
3	Structure - (420)	5243.94	5260.05	16.11	5243.94	0.00	5260.05	0.00	0.00	0.00
4	Structure - (421)	5242.18	5250.28	8.09	5242.18	0.00	5250.28	0.00	0.00	0.00
5	Structure - (422)	5238.31	5243.99	5.68	5238.31	0.00	5243.99	0.00	0.00	0.00
6	Structure - (423)	5231.91	5240.98	9.07	5231.91	0.00	5240.98	0.00	0.00	0.00
7	Structure - (424)	5231.58	5240.26	8.68	5231.58	0.00	5240.26	0.00	0.00	0.00
8	Structure - (425)	5230.58	5240.01	9.43	5230.58	0.00	5240.01	0.00	0.00	0.00
9	Structure - (426)	5225.48	5234.14	8.65	5225.48	0.00	5234.14	0.00	0.00	0.00
10	Structure - (427)	5219.78	5226.40	6.61	5219.78	0.00	5226.40	0.00	0.00	0.00
11	Structure - (428)	5210.08	5218.36	8.27	5210.08	0.00	5218.36	0.00	0.00	0.00
12	Structure - (429)	5200.38	5208.75	8.36	5200.38	0.00	5208.75	0.00	0.00	0.00
13	Structure - (430)	5194.68	5200.20	5.51	5194.68	0.00	5200.20	0.00	0.00	0.00
14	Structure - (431)	5188.98	5196.53	7.55	5188.98	0.00	5196.53	0.00	0.00	0.00
15	Structure - (432)	5183.28	5189.29	6.01	5183.28	0.00	5189.29	0.00	0.00	0.00
16	Structure - (433)	5242.93	5247.72	4.80	5242.93	0.00	5247.72	0.00	0.00	0.00
17	Structure - (434)	5233.23	5238.24	5.02	5233.23	0.00	5238.24	0.00	0.00	0.00
18	Structure - (435)	5219.53	5229.64	10.12	5219.53	0.00	5229.64	0.00	0.00	0.00
19	Structure - (437)	5212.13	5217.25	5.13	5212.13	0.00	5217.25	0.00	0.00	0.00
20	Structure - (438)	5198.43	5207.07	8.64	5198.43	0.00	5207.07	0.00	0.00	0.00
21	Structure - (439)	5192.73	5200.07	7.34	5192.73	0.00	5200.07	0.00	0.00	0.00
22	Structure - (440)	5188.73	5195.47	6.74	5188.73	0.00	5195.47	0.00	0.00	0.00
23	Structure - (441)	5188.12	5192.93	4.81	5188.12	0.00	5192.93	0.00	0.00	0.00
24	Structure - (442)	5186.20	5191.30	5.10	5186.20	0.00	5191.30	0.00	0.00	0.00
25	Structure - (443)	5223.51	5228.20	4.69	5223.51	0.00	5228.20	0.00	0.00	0.00
26	Structure - (444)	5213.81	5220.98	7.17	5213.81	0.00	5220.98	0.00	0.00	0.00
27	Structure - (445)	5213.37	5219.46	6.09	5213.37	0.00	5219.46	0.00	0.00	0.00
28	Structure - (446)	5205.92	5210.61	4.69	5205.92	0.00	5210.61	0.00	0.00	0.00
29	Structure - (449)	5192.35	5204.77	12.42	5192.35	0.00	5204.77	0.00	0.00	0.00
30	Structure - (450)	5190.63	5200.13	9.51	5190.63	0.00	5200.13	0.00	0.00	0.00
31	Structure - (451)	5187.53	5193.05	5.52	5187.53	0.00	5193.05	0.00	0.00	0.00
32	Structure - (452)	5182.92	5194.28	11.36	5182.92	0.00	5194.28	0.00	0.00	0.00
33	Structure - (453)	5182.53	5194.35	11.82	5182.53	0.00	5194.35	0.00	0.00	0.00
34	Structure - (454)	5180.83	5186.68	5.85	5180.83	0.00	5186.68	0.00	0.00	0.00
35	Structure - (455)	5180.49	5185.49	5.00	5180.49	0.00	5185.49	0.00	0.00	0.00
36	Structure - (535)	5213.83	5222.06	8.23	5213.83	0.00	5222.06	0.00	0.00	0.00
37	Structure - (567)	5198.04	5205.26	7.22	5198.04	0.00	5205.26	0.00	0.00	0.00
38	Structure - (568)	5195.42	5201.37	5.95	5195.42	0.00	5201.37	0.00	0.00	0.00
39	Structure - (569)	5193.64	5202.62	8.98	5193.64	0.00	5202.62	0.00	0.00	0.00
40	Structure - (57)	5179.65	5186.42	6.77	5179.65	0.00	5186.42	0.00	0.00	0.00
41	Structure - (572)	5176.86	5181.55	4.69	5176.86	0.00	5181.55	0.00	0.00	0.00
42	Structure - (573)	5178.00	5181.86	3.86	5178.00	0.00	5181.86	0.00	0.00	0.00

Junction Results

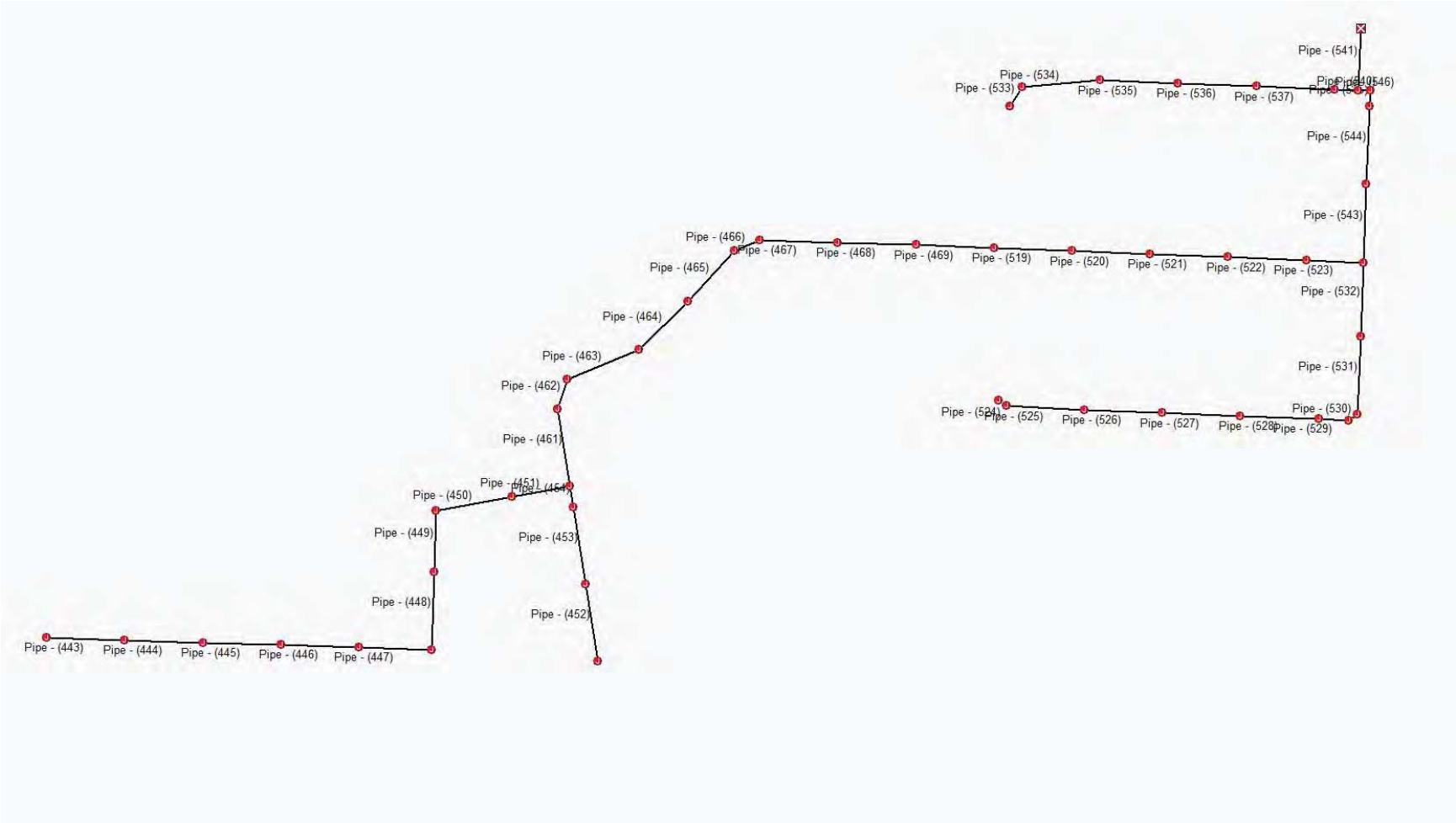
SN	Element ID	Peak Inflow (gpm)	Peak Lateral Inflow (gpm)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Out-1Pipe - (554)	27.60	0.89	5177.61	0.12	0.00	3.26	5177.60	0.11	0 03:05	0 00:00	0.00	0.00
2	Structure - (419)	0.89	0.89	5262.35	0.01	0.00	4.68	5262.35	0.01	0 23:47	0 00:00	0.00	0.00
3	Structure - (420)	1.78	0.89	5243.98	0.04	0.00	16.08	5243.98	0.04	1 06:55	0 00:00	0.00	0.00
4	Structure - (421)	2.67	0.89	5242.22	0.04	0.00	8.06	5242.22	0.04	1 04:38	0 00:00	0.00	0.00
5	Structure - (422)	3.56	0.89	5238.34	0.03	0.00	5.65	5238.34	0.03	1 15:14	0 00:00	0.00	0.00
6	Structure - (423)	3.56	0.00	5231.96	0.05	0.00	9.03	5231.96	0.05	1 14:02	0 00:00	0.00	0.00
7	Structure - (424)	3.56	0.00	5231.63	0.05	0.00	8.63	5231.63	0.05	1 16:48	0 00:00	0.00	0.00
8	Structure - (425)	3.56	0.00	5230.61	0.03	0.00	9.40	5230.61	0.03	1 11:37	0 00:00	0.00	0.00
9	Structure - (426)	3.56	0.00	5225.52	0.04	0.00	8.62	5225.52	0.04	1 04:36	0 00:00	0.00	0.00
10	Structure - (427)	3.56	0.00	5219.81	0.03	0.00	6.58	5219.81	0.03	1 05:40	0 00:00	0.00	0.00
11	Structure - (428)	3.56	0.00	5210.11	0.03	0.00	8.24	5210.11	0.03	1 18:13	0 00:00	0.00	0.00
12	Structure - (429)	3.56	0.00	5200.42	0.04	0.00	8.33	5200.42	0.04	0 15:45	0 00:00	0.00	0.00
13	Structure - (430)	3.56	0.00	5194.72	0.04	0.00	5.48	5194.72	0.04	1 07:56	0 00:00	0.00	0.00
14	Structure - (431)	3.56	0.00	5189.02	0.04	0.00	7.51	5189.02	0.04	1 08:55	0 00:00	0.00	0.00
15	Structure - (432)	3.56	0.00	5183.31	0.03	0.00	5.98	5183.31	0.03	0 15:02	0 00:00	0.00	0.00
16	Structure - (433)	0.89	0.89	5242.94	0.01	0.00	4.78	5242.94	0.01	0 09:08	0 00:00	0.00	0.00
17	Structure - (434)	1.88	0.89	5233.25	0.02	0.00	5.00	5233.25	0.02	1 16:10	0 00:00	0.00	0.00
18	Structure - (435)	3.56	1.78	5219.56	0.03	0.00	10.08	5219.56	0.03	0 22:00	0 00:00	0.00	0.00
19	Structure - (437)	7.12	1.78	5212.16	0.03	0.00	5.09	5212.16	0.03	1 16:59	0 00:00	0.00	0.00
20	Structure - (438)	8.90	1.78	5198.48	0.05	0.00	8.59	5198.48	0.05	0 14:41	0 00:00	0.00	0.00
21	Structure - (439)	9.79	0.89	5192.78	0.05	0.00	7.28	5192.78	0.05	1 01:02	0 00:00	0.00	0.00
22	Structure - (440)	11.57	1.78	5188.82	0.09	0.00	6.65	5188.82	0.09	1 20:36	0 00:00	0.00	0.00
23	Structure - (441)	11.57	0.00	5188.18	0.06	0.00	4.75	5188.18	0.06	0 20:40	0 00:00	0.00	0.00
24	Structure - (442)	12.46	0.89	5186.26	0.06	0.00	5.04	5186.26	0.06	1 06:09	0 00:00	0.00	0.00
25	Structure - (443)	1.78	1.78	5223.53	0.02	0.00	4.67	5223.53	0.02	0 02:34	0 00:00	0.00	0.00
26	Structure - (444)	4.01	1.78	5213.86	0.05	0.00	7.12	5213.86	0.05	1 04:41	0 00:00	0.00	0.00
27	Structure - (445)	5.34	1.78	5213.41	0.04	0.00	6.05	5213.41	0.04	0 06:55	0 00:00	0.00	0.00
28	Structure - (446)	5.34	0.00	5205.95	0.03	0.00	4.66	5205.95	0.03	1 03:52	0 00:00	0.00	0.00
29	Structure - (449)	7.12	1.78	5192.42	0.07	0.00	12.35	5192.42	0.07	0 10:27	0 00:00	0.00	0.00
30	Structure - (450)	7.12	0.00	5190.68	0.05	0.00	9.45	5190.68	0.05	0 12:36	0 00:00	0.00	0.00
31	Structure - (451)	8.90	1.78	5187.58	0.05	0.00	5.47	5187.58	0.05	1 05:55	0 00:00	0.00	0.00
32	Structure - (452)	8.90	0.00	5182.99	0.07	0.00	11.29	5182.99	0.07	0 15:55	0 00:00	0.00	0.00
33	Structure - (453)	8.90	0.00	5182.61	0.08	0.00	11.75	5182.61	0.08	0 07:25	0 00:00	0.00	0.00
34	Structure - (454)	8.90	0.00	5180.91	0.08	0.00	5.77	5180.91	0.08	0 19:12	0 00:00	0.00	0.00
35	Structure - (455)	8.90	0.00	5180.56	0.07	0.00	4.93	5180.56	0.07	0 13:54	0 00:00	0.00	0.00
36	Structure - (535)	5.34	1.78	5213.89	0.06	0.00	8.17	5213.88	0.05	1 16:09	0 00:00	0.00	0.00
37	Structure - (567)	5.34	0.00	5198.08	0.04	0.00	7.18	5198.08	0.04	0 11:18	0 00:00	0.00	0.00
38	Structure - (568)	5.34	0.00	5195.48	0.06	0.00	5.89	5195.48	0.06	0 03:47	0 00:00	0.00	0.00
39	Structure - (569)	5.34	0.00	5193.70	0.06	0.00	8.92	5193.69	0.05	1 11:00	0 00:00	0.00	0.00
40	Structure - (57)	24.92	0.00	5180.24	0.59	0.00	6.17	5180.23	0.58	1 03:48	0 00:00	0.00	0.00
41	Structure - (572)	1.78	1.78	5179.64	2.78	0.00	1.91	5179.56	2.70	0 02:45	0 00:00	0.00	0.00
42	Structure - (573)	1.81	0.00	5178.03	0.03	0.00	3.84	5178.03	0.03	0 03:00	0 00:00	0.00	0.00

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (gpm)	Flap Gate	No. of Barrels
1	Link-01	290.70	5177.49	0.00	5175.99	0.10	1.50	0.5200	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
2	Pipe - (405)	400.00	5262.34	0.00	5243.94	0.00	18.40	4.6000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
3	Pipe - (406)	400.00	5243.94	0.00	5242.34	0.16	1.60	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
4	Pipe - (407)	400.00	5242.18	0.00	5238.31	0.00	3.87	0.9700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
5	Pipe - (408)	185.26	5238.31	0.00	5232.01	0.10	6.30	3.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
6	Pipe - (409)	57.78	5231.91	0.00	5231.58	0.00	0.33	0.5700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
7	Pipe - (410)	77.59	5231.58	0.00	5231.20	0.62	0.38	0.4900	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
8	Pipe - (411)	400.08	5230.58	0.00	5225.58	0.10	5.00	1.2500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
9	Pipe - (412)	400.13	5225.48	0.00	5219.88	0.10	5.60	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
10	Pipe - (413)	400.05	5219.78	0.00	5210.18	0.10	9.60	2.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
11	Pipe - (414)	399.39	5210.08	0.00	5200.48	0.10	9.60	2.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
12	Pipe - (415)	399.79	5200.38	0.00	5194.78	0.10	5.60	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
13	Pipe - (416)	400.00	5194.68	0.00	5189.08	0.10	5.60	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
14	Pipe - (417)	400.00	5188.98	0.00	5183.38	0.10	5.60	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
15	Pipe - (418)	144.51	5183.28	0.00	5179.85	0.20	3.43	2.3800	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
16	Pipe - (419)	405.35	5242.93	0.00	5233.33	0.10	9.60	2.3700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
17	Pipe - (420)	400.00	5233.23	0.00	5219.63	0.10	13.60	3.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
18	Pipe - (421)	400.00	5219.53	0.00	5213.96	0.13	5.57	1.3900	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
19	Pipe - (422)	400.00	5213.83	0.00	5212.23	0.10	1.60	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
20	Pipe - (423)	400.00	5212.13	0.00	5198.53	0.10	13.60	3.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
21	Pipe - (424)	400.00	5198.43	0.00	5192.83	0.10	5.60	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
22	Pipe - (425)	277.95	5192.73	0.00	5188.83	0.10	3.89	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
23	Pipe - (426)	128.63	5188.73	0.00	5188.22	0.10	0.51	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
24	Pipe - (427)	129.81	5188.12	0.00	5186.30	0.10	1.82	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
25	Pipe - (428)	400.00	5186.20	0.00	5179.85	0.20	6.35	1.5900	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
26	Pipe - (429)	400.00	5223.51	0.00	5213.91	0.10	9.60	2.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
27	Pipe - (430)	84.02	5213.81	0.00	5213.47	0.10	0.34	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
28	Pipe - (431)	400.00	5213.37	0.00	5205.92	0.00	7.45	1.8600	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
29	Pipe - (435)	400.41	5192.35	0.00	5190.75	0.12	1.60	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
30	Pipe - (436)	380.11	5190.63	0.00	5187.59	0.06	3.04	0.8000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
31	Pipe - (437)	400.00	5187.53	0.00	5183.02	0.10	4.51	1.1300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
32	Pipe - (438)	70.80	5182.92	0.00	5182.63	0.10	0.28	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
33	Pipe - (439)	400.00	5182.53	0.00	5180.93	0.10	1.60	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
34	Pipe - (440)	61.29	5180.83	0.00	5180.59	0.10	0.25	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
35	Pipe - (441)	152.18	5180.49	0.00	5179.85	0.20	0.64	0.4200	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
36	Pipe - (494)	204.93	5179.65	0.00	5180.11	2.62	-0.46	-0.2300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
37	Pipe - (547)	228.79	5205.92	0.00	5198.14	0.10	7.78	3.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
38	Pipe - (548)	179.78	5198.04	0.00	5195.52	0.10	2.52	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
39	Pipe - (549)	400.00	5195.42	0.00	5193.82	0.18	1.60	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
40	Pipe - (550)	296.99	5193.64	0.00	5192.45	0.10	1.19	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
41	Pipe - (553)	405.05	5179.60	2.74	5178.00	0.00	1.60	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
42	Pipe - (554)	68.36	5178.00	0.00	5177.49	0.00	0.51	0.7500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow (gpm)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (gpm)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-01	27.60	0 03:05	422.07	0.07	1.54	3.15	0.11	0.17	0.00		Calculated
2	Pipe - (405)	0.89	0 01:01	1260.20	0.00	1.00	6.67	0.02	0.04	0.00		Calculated
3	Pipe - (406)	1.78	1 06:22	371.61	0.00	0.65	10.26	0.03	0.05	0.00		Calculated
4	Pipe - (407)	2.67	0 11:48	578.11	0.00	1.02	6.54	0.03	0.05	0.00		Calculated
5	Pipe - (408)	3.56	1 15:28	1083.43	0.00	1.58	1.95	0.03	0.04	0.00		Calculated
6	Pipe - (409)	3.56	0 14:32	444.80	0.01	0.80	1.20	0.04	0.07	0.00		Calculated
7	Pipe - (410)	3.56	0 06:49	411.87	0.01	0.87	1.49	0.04	0.06	0.00		Calculated
8	Pipe - (411)	3.56	1 05:57	656.57	0.01	1.11	6.01	0.04	0.05	0.00		Calculated
9	Pipe - (412)	3.56	1 23:35	695.11	0.01	1.15	5.80	0.03	0.05	0.00		Calculated
10	Pipe - (413)	3.56	0 11:39	910.20	0.00	1.39	4.80	0.03	0.05	0.00		Calculated
11	Pipe - (414)	3.56	0 06:12	910.96	0.00	1.39	4.79	0.03	0.05	0.00		Calculated
12	Pipe - (415)	3.56	0 15:46	695.40	0.01	1.15	5.79	0.03	0.05	0.00		Calculated
13	Pipe - (416)	3.56	0 06:09	695.22	0.01	1.15	5.80	0.03	0.05	0.00		Calculated
14	Pipe - (417)	3.56	0 06:09	695.22	0.01	1.15	5.80	0.03	0.05	0.00		Calculated
15	Pipe - (418)	3.56	0 06:06	905.74	0.00	0.08	30.11	0.21	0.32	0.00		Calculated
16	Pipe - (419)	0.99	0 00:00	904.23	0.00	0.96	7.04	0.02	0.02	0.00		Calculated
17	Pipe - (420)	1.78	0 22:03	1083.43	0.00	1.28	5.21	0.02	0.03	0.00		Calculated
18	Pipe - (421)	3.56	0 03:04	693.16	0.01	1.15	5.80	0.03	0.05	0.00		Calculated
19	Pipe - (422)	5.34	1 02:04	371.61	0.01	0.91	7.33	0.05	0.08	0.00		Calculated
20	Pipe - (423)	7.12	0 02:41	1083.43	0.01	1.95	3.42	0.04	0.06	0.00		Calculated
21	Pipe - (424)	8.90	0 09:56	695.22	0.01	1.53	4.36	0.05	0.08	0.00		Calculated
22	Pipe - (425)	9.79	0 20:52	695.22	0.01	1.58	2.93	0.06	0.08	0.00		Calculated
23	Pipe - (426)	11.57	0 03:19	371.61	0.03	1.13	1.90	0.08	0.12	0.00		Calculated
24	Pipe - (427)	11.57	0 03:32	695.22	0.02	1.64	1.32	0.06	0.09	0.00		Calculated
25	Pipe - (428)	12.46	0 02:50	740.49	0.02	1.62	4.12	0.23	0.34	0.00		Calculated
26	Pipe - (429)	2.23	0 00:00	910.26	0.00	1.13	5.90	0.02	0.03	0.00		Calculated
27	Pipe - (430)	3.56	0 02:02	371.61	0.01	0.81	1.73	0.04	0.07	0.00		Calculated
28	Pipe - (431)	5.34	0 11:45	802.11	0.01	1.71	3.90	0.04	0.06	0.00		Calculated
29	Pipe - (435)	7.12	0 04:14	371.61	0.02	0.98	6.81	0.06	0.09	0.00		Calculated
30	Pipe - (436)	7.12	0 05:27	525.54	0.01	1.18	5.37	0.05	0.08	0.00		Calculated
31	Pipe - (437)	8.90	0 04:36	623.86	0.01	1.42	4.69	0.06	0.08	0.00		Calculated
32	Pipe - (438)	8.90	0 04:08	371.61	0.02	1.05	1.12	0.07	0.10	0.00		Calculated
33	Pipe - (439)	8.90	1 00:26	371.61	0.02	1.05	6.35	0.07	0.10	0.00		Calculated
34	Pipe - (440)	8.90	1 03:17	371.61	0.02	1.05	0.97	0.07	0.10	0.00		Calculated
35	Pipe - (441)	8.90	0 03:38	380.31	0.02	0.61	4.16	0.23	0.35	0.00		Calculated
36	Pipe - (494)	24.92	0 08:06	279.83	0.09	0.30	11.39	0.35	0.52	0.00		Calculated
37	Pipe - (547)	5.34	0 19:33	1083.43	0.00	1.78	2.14	0.03	0.05	0.00		Calculated
38	Pipe - (548)	5.34	0 02:29	695.22	0.01	1.31	2.29	0.04	0.06	0.00		Calculated
39	Pipe - (549)	5.34	1 14:42	371.61	0.01	0.91	7.33	0.05	0.08	0.00		Calculated
40	Pipe - (550)	5.34	0 07:42	371.61	0.01	0.91	5.44	0.05	0.08	0.00		Calculated
41	Pipe - (553)	1.81	0 02:51	369.29	0.00	0.79	8.55	0.03	0.05	0.00		Calculated
42	Pipe - (554)	1.79	0 03:00	507.51	0.00	0.19	6.00	0.07	0.11	0.00		Calculated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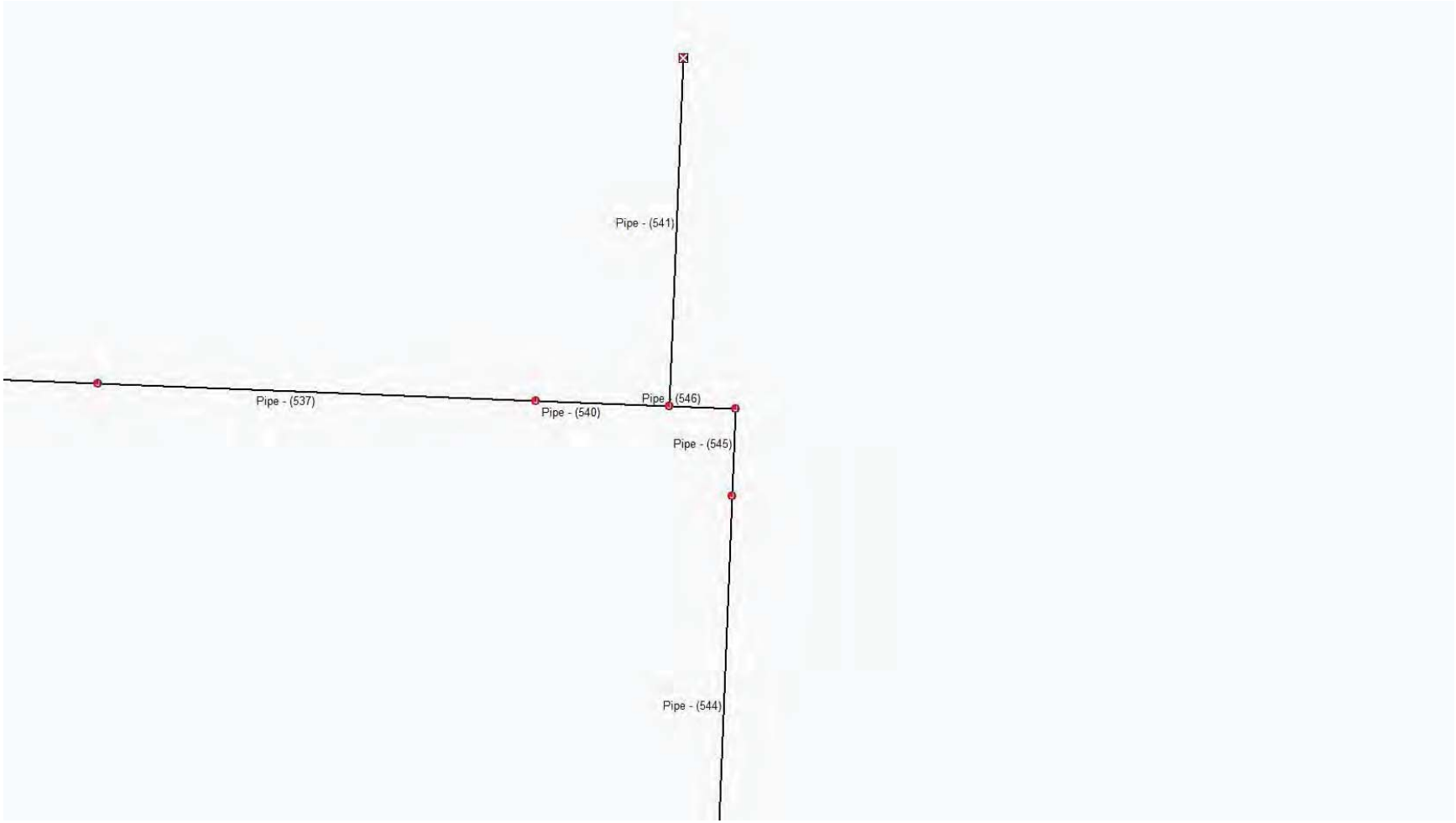
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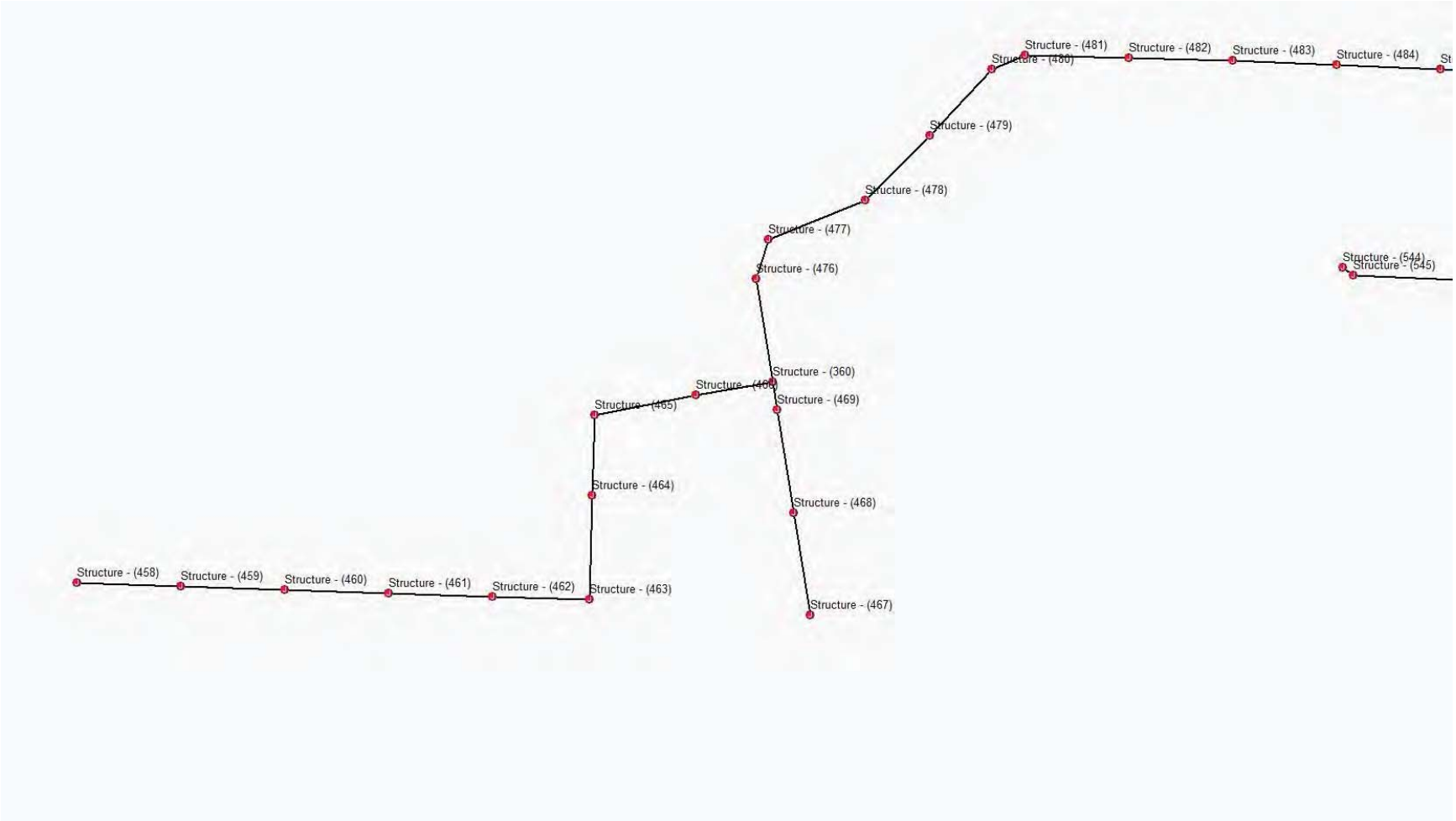
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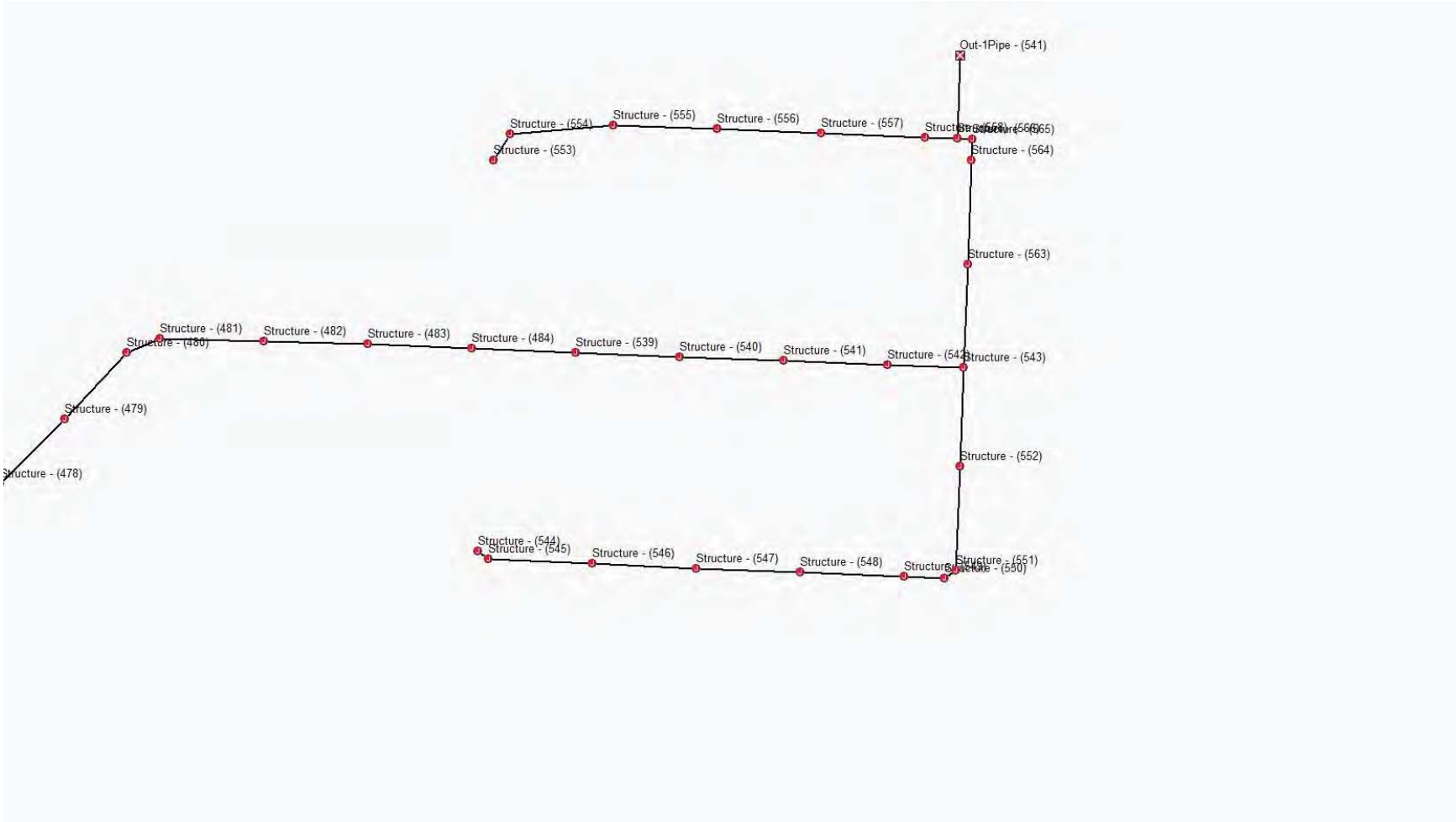
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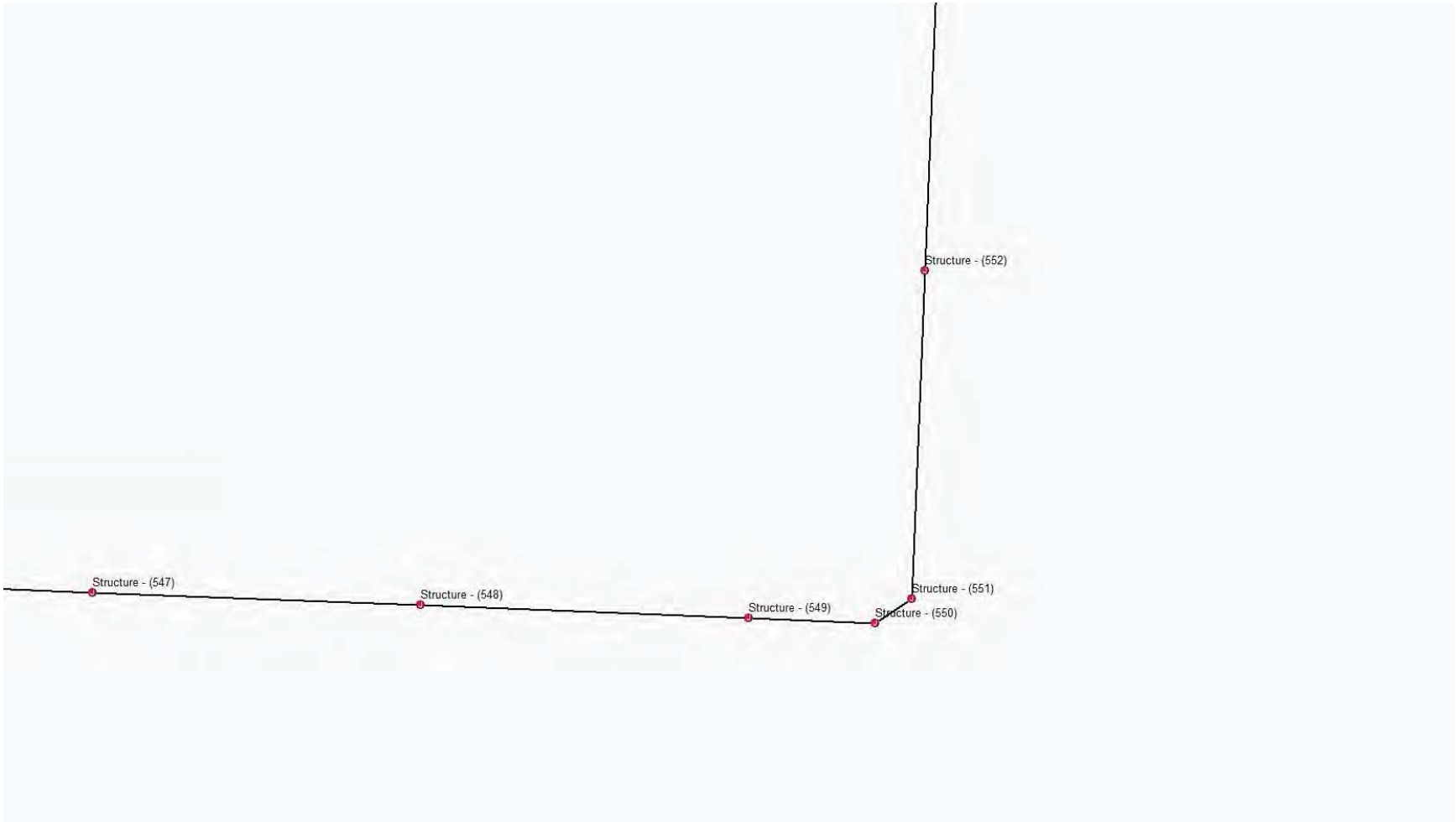
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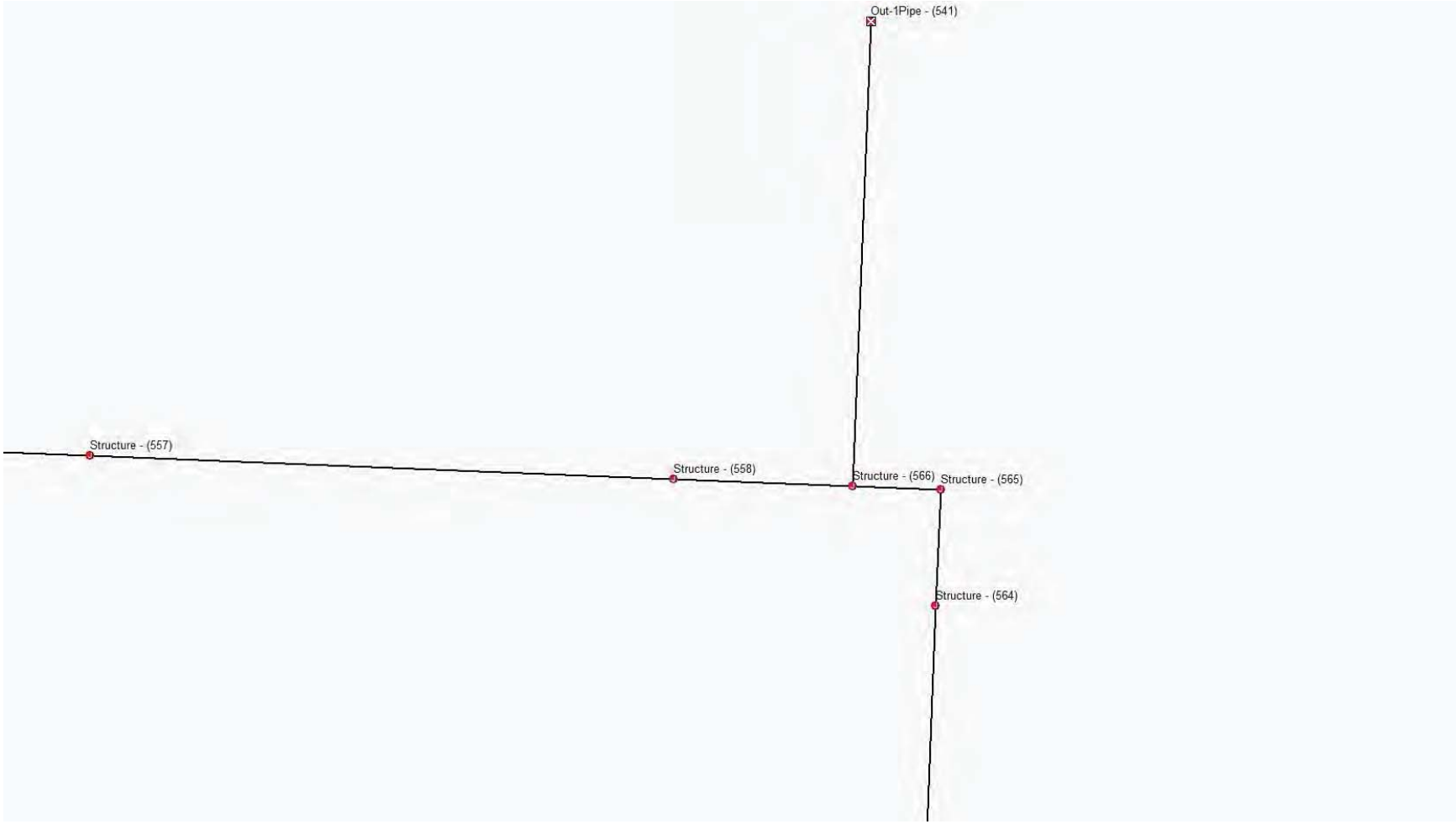
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Structure - (564)

Project Description

File Name	StormSTM.SPF

Project Options

Flow Units	GPM
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Oct 02, 2013	00:00:00
End Analysis On	Oct 04, 2013	00:00:00
Start Reporting On	Oct 02, 2013	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	0
Nodes	47
Junctions	46
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	0
Links	46
Channels	0
Pipes	46
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	2 year(s)

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (gpm)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Structure - (360)	Junction	5183.15	5192.42	5183.15	5192.42	0.00	7.12	5183.21	0.00	9.21	0 00:00	0.00	0.00
2	Structure - (458)	Junction	5251.81	5256.50	5251.81	5256.50	0.00	0.89	5251.82	0.00	4.68	0 00:00	0.00	0.00
3	Structure - (459)	Junction	5238.11	5246.23	5238.11	5246.23	0.00	1.41	5238.13	0.00	8.09	0 00:00	0.00	0.00
4	Structure - (460)	Junction	5236.41	5242.75	5236.41	5242.75	0.00	0.89	5236.43	0.00	6.33	0 00:00	0.00	0.00
5	Structure - (461)	Junction	5230.71	5238.22	5230.71	5238.22	0.00	1.78	5230.73	0.00	7.48	0 00:00	0.00	0.00
6	Structure - (462)	Junction	5225.01	5230.26	5225.01	5230.26	0.00	2.67	5225.03	0.00	5.23	0 00:00	0.00	0.00
7	Structure - (463)	Junction	5208.48	5217.48	5208.48	5217.48	0.00	3.56	5208.53	0.00	8.96	0 00:00	0.00	0.00
8	Structure - (464)	Junction	5206.78	5212.54	5206.78	5212.54	0.00	3.56	5206.81	0.00	5.73	0 00:00	0.00	0.00
9	Structure - (465)	Junction	5199.20	5206.34	5199.20	5206.34	0.00	5.34	5199.23	0.00	7.11	0 00:00	0.00	0.00
10	Structure - (466)	Junction	5189.50	5199.13	5189.50	5199.13	0.00	5.34	5189.54	0.00	9.59	0 00:00	0.00	0.00
11	Structure - (467)	Junction	5186.87	5191.56	5186.87	5191.56	0.00	0.89	5186.90	0.00	4.66	0 00:00	0.00	0.00
12	Structure - (468)	Junction	5185.28	5192.70	5185.28	5192.70	0.00	0.95	5185.31	0.00	7.39	0 00:00	0.00	0.00
13	Structure - (469)	Junction	5183.59	5192.76	5183.59	5192.76	0.00	1.78	5183.62	0.00	9.13	0 00:00	0.00	0.00
14	Structure - (476)	Junction	5181.58	5191.01	5181.58	5191.01	0.00	7.12	5181.65	0.00	9.36	0 00:00	0.00	0.00
15	Structure - (477)	Junction	5180.92	5189.00	5180.92	5189.00	0.00	8.01	5180.96	0.00	8.04	0 00:00	0.00	0.00
16	Structure - (478)	Junction	5174.00	5179.88	5174.00	5179.88	0.00	8.90	5174.05	0.00	5.83	0 00:00	0.00	0.00
17	Structure - (479)	Junction	5165.47	5172.67	5165.47	5172.67	0.00	8.90	5165.52	0.00	7.16	0 00:00	0.00	0.00
18	Structure - (480)	Junction	5160.47	5166.96	5160.47	5166.96	0.00	8.90	5160.52	0.00	6.44	0 00:00	0.00	0.00
19	Structure - (481)	Junction	5158.39	5164.02	5158.39	5164.02	0.00	8.90	5158.44	0.00	5.58	0 00:00	0.00	0.00
20	Structure - (482)	Junction	5148.69	5156.29	5148.69	5156.29	0.00	9.79	5148.74	0.00	7.54	0 00:00	0.00	0.00
21	Structure - (483)	Junction	5138.99	5147.78	5138.99	5147.78	0.00	11.57	5139.05	0.00	8.73	0 00:00	0.00	0.00
22	Structure - (484)	Junction	5133.27	5140.42	5133.27	5140.42	0.00	11.57	5133.33	0.00	7.09	0 00:00	0.00	0.00
23	Structure - (539)	Junction	5126.03	5134.05	5126.03	5134.05	0.00	13.35	5126.10	0.00	7.95	0 00:00	0.00	0.00
24	Structure - (540)	Junction	5120.33	5126.67	5120.33	5126.67	0.00	13.35	5120.39	0.00	6.28	0 00:00	0.00	0.00
25	Structure - (541)	Junction	5110.63	5118.66	5110.63	5118.66	0.00	15.13	5110.70	0.00	7.96	0 00:00	0.00	0.00
26	Structure - (542)	Junction	5104.93	5111.49	5104.93	5111.49	0.00	16.91	5105.01	0.00	6.48	0 00:00	0.00	0.00
27	Structure - (543)	Junction	5098.84	5106.86	5098.84	5106.86	0.00	27.59	5098.97	0.00	7.89	0 00:00	0.00	0.00
28	Structure - (544)	Junction	5139.13	5143.82	5139.13	5143.82	0.00	0.89	5139.15	0.00	4.67	0 00:00	0.00	0.00
29	Structure - (545)	Junction	5138.19	5143.24	5138.19	5143.24	0.00	0.89	5138.20	0.00	5.04	0 00:00	0.00	0.00
30	Structure - (546)	Junction	5128.49	5134.63	5128.49	5134.63	0.00	2.67	5128.51	0.00	6.12	0 00:00	0.00	0.00
31	Structure - (547)	Junction	5118.79	5126.74	5118.79	5126.74	0.00	4.45	5118.83	0.00	7.92	0 00:00	0.00	0.00
32	Structure - (548)	Junction	5113.09	5118.40	5113.09	5118.40	0.00	6.23	5113.13	0.00	5.27	0 00:00	0.00	0.00
33	Structure - (549)	Junction	5105.00	5111.50	5105.00	5111.50	0.00	7.12	5105.05	0.00	6.45	0 00:00	0.00	0.00
34	Structure - (550)	Junction	5103.69	5108.64	5103.69	5108.64	0.00	7.12	5103.74	0.00	4.90	0 00:00	0.00	0.00
35	Structure - (551)	Junction	5102.88	5107.65	5102.88	5107.65	0.00	8.90	5102.95	0.00	4.70	0 00:00	0.00	0.00
36	Structure - (552)	Junction	5100.41	5105.98	5100.41	5105.98	0.00	9.79	5100.48	0.00	5.50	0 00:00	0.00	0.00
37	Structure - (553)	Junction	5130.58	5135.27	5130.58	5135.27	0.00	0.89	5130.59	0.00	4.67	0 00:00	0.00	0.00
38	Structure - (554)	Junction	5127.56	5134.05	5127.56	5134.05	0.00	1.00	5127.58	0.00	6.48	0 00:00	0.00	0.00
39	Structure - (555)	Junction	5121.89	5127.33	5121.89	5127.33	0.00	2.67	5121.92	0.00	5.41	0 00:00	0.00	0.00
40	Structure - (556)	Junction	5113.80	5120.92	5113.80	5120.92	0.00	2.67	5113.83	0.00	7.09	0 00:00	0.00	0.00
41	Structure - (557)	Junction	5108.93	5114.88	5108.93	5114.88	0.00	3.56	5108.96	0.00	5.92	0 00:00	0.00	0.00
42	Structure - (558)	Junction	5100.40	5108.10	5100.40	5108.10	0.00	5.34	5100.43	0.00	7.67	0 00:00	0.00	0.00
43	Structure - (563)	Junction	5097.19	5105.00	5097.19	5105.00	0.00	28.48	5097.32	0.00	7.68	0 00:00	0.00	0.00
44	Structure - (564)	Junction	5095.55	5105.38	5095.55	5105.38	0.00	28.48	5095.68	0.00	9.70	0 00:00	0.00	0.00
45	Structure - (565)	Junction	5095.17	5104.95	5095.17	5104.95	0.00	29.37	5095.31	0.00	9.64	0 00:00	0.00	0.00
46	Structure - (566)	Junction	5094.83	5105.95	5094.83	5105.95	0.00	36.49	5094.98	0.00	10.97	0 00:00	0.00	0.00
47	Out-1Pipe - (541)	Outfall	5093.56					36.49	5093.69					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (gpm)	Design Flow Capacity (gpm)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	Pipe - (443)	Pipe	Structure - (458)	Structure - (459)	400.00	5251.81	5238.21	3.4000	8.000	0.0120	1.41	1083.43	0.00	1.04	0.01	0.02	0.00	Calculated
2	Pipe - (444)	Pipe	Structure - (459)	Structure - (460)	400.00	5238.11	5236.51	0.4000	8.000	0.0120	0.89	371.61	0.00	0.60	0.02	0.03	0.00	Calculated
3	Pipe - (445)	Pipe	Structure - (460)	Structure - (461)	400.00	5236.41	5230.81	1.4000	8.000	0.0120	0.89	695.22	0.00	0.84	0.02	0.03	0.00	Calculated
4	Pipe - (446)	Pipe	Structure - (461)	Structure - (462)	400.00	5230.71	5225.11	1.4000	8.000	0.0120	1.78	695.22	0.00	0.94	0.02	0.04	0.00	Calculated
5	Pipe - (447)	Pipe	Structure - (462)	Structure - (463)	373.44	5225.01	5208.58	4.4000	8.000	0.0120	2.67	1232.50	0.00	1.58	0.02	0.03	0.00	Calculated
6	Pipe - (448)	Pipe	Structure - (463)	Structure - (464)	400.00	5208.48	5206.88	0.4000	8.000	0.0120	3.56	371.61	0.01	0.81	0.04	0.07	0.00	Calculated
7	Pipe - (449)	Pipe	Structure - (464)	Structure - (465)	311.61	5206.78	5199.30	2.4000	8.000	0.0120	3.56	910.26	0.00	1.39	0.03	0.05	0.00	Calculated
8	Pipe - (450)	Pipe	Structure - (465)	Structure - (466)	400.00	5199.20	5189.60	2.4000	8.000	0.0120	5.34	910.26	0.01	1.58	0.04	0.05	0.00	Calculated
9	Pipe - (451)	Pipe	Structure - (466)	Structure - (360)	298.67	5189.50	5185.32	1.4000	8.000	0.0120	5.34	695.22	0.01	1.31	0.04	0.06	0.00	Calculated
10	Pipe - (452)	Pipe	Structure - (467)	Structure - (468)	400.00	5186.87	5185.28	0.4000	8.000	0.0120	0.95	370.57	0.00	0.67	0.03	0.04	0.00	Calculated
11	Pipe - (453)	Pipe	Structure - (468)	Structure - (469)	400.00	5185.28	5183.68	0.4000	8.000	0.0120	0.89	371.61	0.00	0.60	0.02	0.03	0.00	Calculated
12	Pipe - (454)	Pipe	Structure - (469)	Structure - (360)	111.01	5183.59	5183.15	0.4000	8.000	0.0120	1.78	371.61	0.00	0.66	0.05	0.07	0.00	Calculated
13	Pipe - (461)	Pipe	Structure - (360)	Structure - (476)	400.00	5183.15	5181.58	0.3900	8.000	0.0120	7.12	367.84	0.02	0.89	0.07	0.10	0.00	Calculated
14	Pipe - (462)	Pipe	Structure - (476)	Structure - (477)	159.13	5181.58	5180.94	0.4000	8.000	0.0120	7.12	371.61	0.02	0.98	0.06	0.09	0.00	Calculated
15	Pipe - (463)	Pipe	Structure - (477)	Structure - (478)	399.99	5180.92	5174.10	1.7000	8.000	0.0120	8.01	766.72	0.01	1.59	0.05	0.07	0.00	Calculated
16	Pipe - (464)	Pipe	Structure - (478)	Structure - (479)	351.62	5174.00	5165.57	2.4000	8.000	0.0120	8.90	910.26	0.01	1.84	0.05	0.07	0.00	Calculated
17	Pipe - (465)	Pipe	Structure - (479)	Structure - (480)	349.73	5165.47	5160.57	1.4000	8.000	0.0120	8.90	695.22	0.01	1.53	0.05	0.08	0.00	Calculated
18	Pipe - (466)	Pipe	Structure - (480)	Structure - (481)	141.17	5160.47	5158.49	1.4000	8.000	0.0120	8.90	695.22	0.01	1.53	0.05	0.08	0.00	Calculated
19	Pipe - (467)	Pipe	Structure - (481)	Structure - (482)	400.00	5158.39	5148.79	2.4000	8.000	0.0120	8.90	910.26	0.01	1.85	0.05	0.07	0.00	Calculated
20	Pipe - (468)	Pipe	Structure - (482)	Structure - (483)	400.00	5148.69	5139.09	2.4000	8.000	0.0120	9.79	910.26	0.01	1.90	0.05	0.07	0.00	Calculated
21	Pipe - (469)	Pipe	Structure - (483)	Structure - (484)	400.00	5138.99	5133.39	1.4000	8.000	0.0120	11.57	695.22	0.02	1.65	0.06	0.09	0.00	Calculated
22	Pipe - (519)	Pipe	Structure - (484)	Structure - (539)	400.00	5133.27	5126.13	1.7800	8.000	0.0120	11.57	784.96	0.01	1.80	0.06	0.08	0.00	Calculated
23	Pipe - (520)	Pipe	Structure - (539)	Structure - (540)	400.00	5126.03	5120.43	1.4000	8.000	0.0120	13.35	695.22	0.02	1.71	0.06	0.10	0.00	Calculated
24	Pipe - (521)	Pipe	Structure - (540)	Structure - (541)	400.00	5120.33	5110.73	2.4000	8.000	0.0120	13.35	910.26	0.01	2.09	0.06	0.08	0.00	Calculated
25	Pipe - (522)	Pipe	Structure - (541)	Structure - (542)	400.00	5110.63	5105.03	1.4000	8.000	0.0120	15.13	695.22	0.02	1.76	0.07	0.10	0.00	Calculated
26	Pipe - (523)	Pipe	Structure - (542)	Structure - (543)	292.89	5104.93	5100.83	1.4000	8.000	0.0120	16.91	695.22	0.02	1.80	0.07	0.11	0.00	Calculated
27	Pipe - (524)	Pipe	Structure - (544)	Structure - (545)	50.15	5139.13	5138.29	1.6800	8.000	0.0120	0.89	762.18	0.00	0.93	0.02	0.02	0.00	Calculated
28	Pipe - (525)	Pipe	Structure - (545)	Structure - (546)	400.15	5138.19	5128.59	2.4000	8.000	0.0120	0.89	910.09	0.00	0.96	0.02	0.02	0.00	Calculated
29	Pipe - (526)	Pipe	Structure - (546)	Structure - (547)	400.06	5128.49	5118.89	2.4000	8.000	0.0120	2.67	910.20	0.00	1.28	0.03	0.04	0.00	Calculated
30	Pipe - (527)	Pipe	Structure - (547)	Structure - (548)	399.99	5118.79	5113.19	1.4000	8.000	0.0120	4.45	695.23	0.01	1.24	0.04	0.06	0.00	Calculated
31	Pipe - (528)	Pipe	Structure - (548)	Structure - (549)	400.00	5113.09	5105.09	2.0000	8.000	0.0120	6.23	830.95	0.01	1.56	0.04	0.06	0.00	Calculated
32	Pipe - (529)	Pipe	Structure - (549)	Structure - (550)	154.47	5105.00	5103.76	0.8000	8.000	0.0120	7.12	525.53	0.01	1.18	0.05	0.08	0.00	Calculated
33	Pipe - (530)	Pipe	Structure - (550)	Structure - (551)	53.79	5103.69	5102.91	1.4500	8.000	0.0120	7.12	707.57	0.01	1.44	0.05	0.07	0.00	Calculated
34	Pipe - (531)	Pipe	Structure - (551)	Structure - (552)	400.43	5102.88	5100.48	0.6000	8.000	0.0120	8.90	455.13	0.02	1.16	0.06	0.10	0.00	Calculated
35	Pipe - (532)	Pipe	Structure - (552)	Structure - (543)	377.87	5100.41	5098.89	0.4000	8.000	0.0120	9.88	371.61	0.03	1.08	0.07	0.11	0.00	Calculated
36	Pipe - (533)	Pipe	Structure - (553)	Structure - (554)	120.23	5130.58	5127.69	2.4000	8.000	0.0120	1.00	910.26	0.00	0.98	0.02	0.02	0.00	Calculated
37	Pipe - (534)	Pipe	Structure - (554)	Structure - (555)	400.18	5127.56	5121.96	1.4000	8.000	0.0120	0.89	695.22	0.00	0.85	0.02	0.03	0.00	Calculated
38	Pipe - (535)	Pipe	Structure - (555)	Structure - (556)	400.00	5121.89	5113.89	2.0000	8.000	0.0120	2.67	830.95	0.00	1.20	0.03	0.04	0.00	Calculated
39	Pipe - (536)	Pipe	Structure - (556)	Structure - (557)	400.00	5113.80	5109.00	1.2000	8.000	0.0120	2.67	643.65	0.00	1.00	0.03	0.05	0.00	Calculated
40	Pipe - (537)	Pipe	Structure - (557)	Structure - (558)	400.00	5108.93	5100.48	2.1100	8.000	0.0120	3.56	854.01	0.00	1.33	0.03	0.05	0.00	Calculated
41	Pipe - (540)	Pipe	Structure - (558)	Structure - (566)	122.80	5100.40	5094.93	4.4500	8.000	0.0120	5.35	1239.87	0.00	1.95	0.04	0.06	0.00	Calculated
42	Pipe - (541)	Pipe	Structure - (566)	Out-1Pipe - (541)	318.33	5094.83	5093.56	0.4000	8.000	0.0120	36.49	371.61	0.10	1.56	0.14	0.21	0.00	Calculated
43	Pipe - (543)	Pipe	Structure - (543)	Structure - (563)	400.00	5098.84	5097.24	0.4000	8.000	0.0120	27.59	371.61	0.07	1.45	0.12	0.18	0.00	Calculated
44	Pipe - (544)	Pipe	Structure - (563)	Structure - (564)	400.00	5097.19	5095.59	0.4000	8.000	0.0120	28.48	371.61	0.08	1.46	0.12	0.18	0.00	Calculated
45	Pipe - (545)	Pipe	Structure - (564)	Structure - (565)	80.00	5095.55	5095.23	0.4000	8.000	0.0120	28.48	371.61	0.08	1.45	0.12	0.18	0.00	Calculated
46	Pipe - (546)	Pipe	Structure - (565)	Structure - (566)	60.00	5095.17	5094.93	0.4000	8.000	0.0120	29.37	371.61	0.08	1.45	0.12	0.19	0.00	Calculated

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
1	Structure - (360)	5183.15	5192.42	9.28	5183.15	0.00	5192.42	0.00	0.00	0.00
2	Structure - (458)	5251.81	5256.50	4.69	5251.81	0.00	5256.50	0.00	0.00	0.00
3	Structure - (459)	5238.11	5246.23	8.12	5238.11	0.00	5246.23	0.00	0.00	0.00
4	Structure - (460)	5236.41	5242.75	6.34	5236.41	0.00	5242.75	0.00	0.00	0.00
5	Structure - (461)	5230.71	5238.22	7.51	5230.71	0.00	5238.22	0.00	0.00	0.00
6	Structure - (462)	5225.01	5230.26	5.25	5225.01	0.00	5230.26	0.00	0.00	0.00
7	Structure - (463)	5208.48	5217.48	9.01	5208.48	0.00	5217.48	0.00	0.00	0.00
8	Structure - (464)	5206.78	5212.54	5.76	5206.78	0.00	5212.54	0.00	0.00	0.00
9	Structure - (465)	5199.20	5206.34	7.15	5199.20	0.00	5206.34	0.00	0.00	0.00
10	Structure - (466)	5189.50	5199.13	9.63	5189.50	0.00	5199.13	0.00	0.00	0.00
11	Structure - (467)	5186.87	5191.56	4.69	5186.87	0.00	5191.56	0.00	0.00	0.00
12	Structure - (468)	5185.28	5192.70	7.42	5185.28	0.00	5192.70	0.00	0.00	0.00
13	Structure - (469)	5183.59	5192.76	9.17	5183.59	0.00	5192.76	0.00	0.00	0.00
14	Structure - (476)	5181.58	5191.01	9.43	5181.58	0.00	5191.01	0.00	0.00	0.00
15	Structure - (477)	5180.92	5189.00	8.08	5180.92	0.00	5189.00	0.00	0.00	0.00
16	Structure - (478)	5174.00	5179.88	5.88	5174.00	0.00	5179.88	0.00	0.00	0.00
17	Structure - (479)	5165.47	5172.67	7.21	5165.47	0.00	5172.67	0.00	0.00	0.00
18	Structure - (480)	5160.47	5166.96	6.49	5160.47	0.00	5166.96	0.00	0.00	0.00
19	Structure - (481)	5158.39	5164.02	5.62	5158.39	0.00	5164.02	0.00	0.00	0.00
20	Structure - (482)	5148.69	5156.29	7.59	5148.69	0.00	5156.29	0.00	0.00	0.00
21	Structure - (483)	5138.99	5147.78	8.79	5138.99	0.00	5147.78	0.00	0.00	0.00
22	Structure - (484)	5133.27	5140.42	7.15	5133.27	0.00	5140.42	0.00	0.00	0.00
23	Structure - (539)	5126.03	5134.05	8.02	5126.03	0.00	5134.05	0.00	0.00	0.00
24	Structure - (540)	5120.33	5126.67	6.33	5120.33	0.00	5126.67	0.00	0.00	0.00
25	Structure - (541)	5110.63	5118.66	8.03	5110.63	0.00	5118.66	0.00	0.00	0.00
26	Structure - (542)	5104.93	5111.49	6.55	5104.93	0.00	5111.49	0.00	0.00	0.00
27	Structure - (543)	5098.84	5106.86	8.01	5098.84	0.00	5106.86	0.00	0.00	0.00
28	Structure - (544)	5139.13	5143.82	4.69	5139.13	0.00	5143.82	0.00	0.00	0.00
29	Structure - (545)	5138.19	5143.24	5.06	5138.19	0.00	5143.24	0.00	0.00	0.00
30	Structure - (546)	5128.49	5134.63	6.14	5128.49	0.00	5134.63	0.00	0.00	0.00
31	Structure - (547)	5118.79	5126.74	7.95	5118.79	0.00	5126.74	0.00	0.00	0.00
32	Structure - (548)	5113.09	5118.40	5.31	5113.09	0.00	5118.40	0.00	0.00	0.00
33	Structure - (549)	5105.00	5111.50	6.51	5105.00	0.00	5111.50	0.00	0.00	0.00
34	Structure - (550)	5103.69	5108.64	4.95	5103.69	0.00	5108.64	0.00	0.00	0.00
35	Structure - (551)	5102.88	5107.65	4.77	5102.88	0.00	5107.65	0.00	0.00	0.00
36	Structure - (552)	5100.41	5105.98	5.57	5100.41	0.00	5105.98	0.00	0.00	0.00
37	Structure - (553)	5130.58	5135.27	4.69	5130.58	0.00	5135.27	0.00	0.00	0.00
38	Structure - (554)	5127.56	5134.05	6.49	5127.56	0.00	5134.05	0.00	0.00	0.00
39	Structure - (555)	5121.89	5127.33	5.44	5121.89	0.00	5127.33	0.00	0.00	0.00
40	Structure - (556)	5113.80	5120.92	7.12	5113.80	0.00	5120.92	0.00	0.00	0.00
41	Structure - (557)	5108.93	5114.88	5.95	5108.93	0.00	5114.88	0.00	0.00	0.00
42	Structure - (558)	5100.40	5108.10	7.70	5100.40	0.00	5108.10	0.00	0.00	0.00
43	Structure - (563)	5097.19	5105.00	7.81	5097.19	0.00	5105.00	0.00	0.00	0.00
44	Structure - (564)	5095.55	5105.38	9.83	5095.55	0.00	5105.38	0.00	0.00	0.00
45	Structure - (565)	5095.17	5104.95	9.77	5095.17	0.00	5104.95	0.00	0.00	0.00
46	Structure - (566)	5094.83	5105.95	11.11	5094.83	0.00	5105.95	0.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (gpm)	Peak Lateral Inflow (gpm)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Structure - (360)	7.12	0.00	5183.21	0.06	0.00	9.21	5183.21	0.06	1 06:41	0 00:00	0.00	0.00
2	Structure - (458)	0.89	0.89	5251.82	0.01	0.00	4.68	5251.82	0.01	0 01:54	0 00:00	0.00	0.00
3	Structure - (459)	1.41	0.00	5238.13	0.02	0.00	8.09	5238.13	0.02	0 17:38	0 00:00	0.00	0.00
4	Structure - (460)	0.89	0.00	5236.43	0.02	0.00	6.33	5236.43	0.02	0 18:44	0 00:00	0.00	0.00
5	Structure - (461)	1.78	0.89	5230.73	0.02	0.00	7.48	5230.73	0.02	1 07:32	0 00:00	0.00	0.00
6	Structure - (462)	2.67	0.89	5225.03	0.02	0.00	5.23	5225.03	0.02	1 10:25	0 00:00	0.00	0.00
7	Structure - (463)	3.56	0.89	5208.53	0.05	0.00	8.96	5208.53	0.05	1 10:37	0 00:00	0.00	0.00
8	Structure - (464)	3.56	0.00	5206.81	0.03	0.00	5.73	5206.81	0.03	1 13:50	0 00:00	0.00	0.00
9	Structure - (465)	5.34	1.78	5199.23	0.03	0.00	7.11	5199.23	0.03	0 05:42	0 00:00	0.00	0.00
10	Structure - (466)	5.34	0.00	5189.54	0.04	0.00	9.59	5189.54	0.04	1 16:33	0 00:00	0.00	0.00
11	Structure - (467)	0.89	0.89	5186.90	0.03	0.00	4.66	5186.90	0.03	0 00:26	0 00:00	0.00	0.00
12	Structure - (468)	0.95	0.00	5185.31	0.03	0.00	7.39	5185.31	0.03	0 06:44	0 00:00	0.00	0.00
13	Structure - (469)	1.78	0.89	5183.62	0.03	0.00	9.13	5183.62	0.03	1 09:59	0 00:00	0.00	0.00
14	Structure - (476)	7.12	0.00	5181.65	0.07	0.00	9.36	5181.65	0.07	1 02:44	0 00:00	0.00	0.00
15	Structure - (477)	8.01	0.89	5180.96	0.04	0.00	8.04	5180.96	0.04	1 15:36	0 00:00	0.00	0.00
16	Structure - (478)	8.90	0.89	5174.05	0.05	0.00	5.83	5174.05	0.05	0 08:23	0 00:00	0.00	0.00
17	Structure - (479)	8.90	0.00	5165.52	0.05	0.00	7.16	5165.52	0.05	1 14:10	0 00:00	0.00	0.00
18	Structure - (480)	8.90	0.00	5160.52	0.05	0.00	6.44	5160.52	0.05	1 04:11	0 00:00	0.00	0.00
19	Structure - (481)	8.90	0.00	5158.44	0.05	0.00	5.58	5158.44	0.05	1 06:31	0 00:00	0.00	0.00
20	Structure - (482)	9.79	0.89	5148.74	0.05	0.00	7.54	5148.74	0.05	1 04:18	0 00:00	0.00	0.00
21	Structure - (483)	11.57	1.78	5139.05	0.06	0.00	8.73	5139.05	0.06	1 04:57	0 00:00	0.00	0.00
22	Structure - (484)	11.57	0.00	5133.33	0.06	0.00	7.09	5133.33	0.06	0 18:39	0 00:00	0.00	0.00
23	Structure - (539)	13.35	1.78	5126.10	0.07	0.00	7.95	5126.10	0.07	1 06:49	0 00:00	0.00	0.00
24	Structure - (540)	13.35	0.00	5120.39	0.06	0.00	6.28	5120.39	0.06	1 22:18	0 00:00	0.00	0.00
25	Structure - (541)	15.13	1.78	5110.70	0.07	0.00	7.96	5110.70	0.07	0 22:51	0 00:00	0.00	0.00
26	Structure - (542)	16.91	1.78	5105.01	0.08	0.00	6.48	5105.01	0.08	1 00:58	0 00:00	0.00	0.00
27	Structure - (543)	27.59	0.89	5098.97	0.13	0.00	7.89	5098.97	0.13	1 16:32	0 00:00	0.00	0.00
28	Structure - (544)	0.89	0.89	5139.15	0.02	0.00	4.67	5139.15	0.02	0 05:41	0 00:00	0.00	0.00
29	Structure - (545)	0.89	0.00	5138.20	0.01	0.00	5.04	5138.20	0.01	1 20:53	0 00:00	0.00	0.00
30	Structure - (546)	2.67	1.78	5128.51	0.02	0.00	6.12	5128.51	0.02	1 21:40	0 00:00	0.00	0.00
31	Structure - (547)	4.45	1.78	5118.83	0.04	0.00	7.92	5118.83	0.04	0 14:42	0 00:00	0.00	0.00
32	Structure - (548)	6.23	1.78	5113.13	0.04	0.00	5.27	5113.13	0.04	0 05:10	0 00:00	0.00	0.00
33	Structure - (549)	7.12	0.89	5105.05	0.05	0.00	6.45	5105.05	0.05	0 12:35	0 00:00	0.00	0.00
34	Structure - (550)	7.12	0.00	5103.74	0.05	0.00	4.90	5103.74	0.05	0 14:42	0 00:00	0.00	0.00
35	Structure - (551)	8.90	1.78	5102.95	0.07	0.00	4.70	5102.95	0.07	0 06:23	0 00:00	0.00	0.00
36	Structure - (552)	9.79	0.89	5100.48	0.07	0.00	5.50	5100.48	0.07	0 01:13	0 00:00	0.00	0.00
37	Structure - (553)	0.89	0.89	5130.59	0.01	0.00	4.67	5130.59	0.01	0 00:39	0 00:00	0.00	0.00
38	Structure - (554)	1.00	0.00	5127.58	0.02	0.00	6.48	5127.58	0.02	1 04:31	0 00:00	0.00	0.00
39	Structure - (555)	2.67	1.78	5121.92	0.03	0.00	5.41	5121.92	0.03	1 01:43	0 00:00	0.00	0.00
40	Structure - (556)	2.67	0.00	5113.83	0.03	0.00	7.09	5113.83	0.03	0 12:09	0 00:00	0.00	0.00
41	Structure - (557)	3.56	0.89	5108.96	0.03	0.00	5.92	5108.96	0.03	0 08:28	0 00:00	0.00	0.00
42	Structure - (558)	5.34	1.78	5100.43	0.03	0.00	7.67	5100.43	0.03	0 01:08	0 00:00	0.00	0.00
43	Structure - (563)	28.48	0.89	5097.32	0.13	0.00	7.68	5097.32	0.13	0 12:26	0 00:00	0.00	0.00
44	Structure - (564)	28.48	0.00	5095.68	0.13	0.00	9.70	5095.68	0.13	1 12:30	0 00:00	0.00	0.00
45	Structure - (565)	29.37	0.89	5095.31	0.14	0.00	9.64	5095.31	0.14	1 12:30	0 00:00	0.00	0.00
46	Structure - (566)	36.49	1.78	5094.98	0.15	0.00	10.97	5094.98	0.15	1 13:12	0 00:00	0.00	0.00

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (gpm)	Flap Gate	No. of Barrels
1	Pipe - (443)	400.00	5251.81	0.00	5238.21	0.10	13.60	3.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
2	Pipe - (444)	400.00	5238.11	0.00	5236.51	0.10	1.60	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
3	Pipe - (445)	400.00	5236.41	0.00	5230.81	0.10	5.60	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
4	Pipe - (446)	400.00	5230.71	0.00	5225.11	0.10	5.60	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
5	Pipe - (447)	373.44	5225.01	0.00	5208.58	0.10	16.43	4.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
6	Pipe - (448)	400.00	5208.48	0.00	5206.88	0.10	1.60	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
7	Pipe - (449)	311.61	5206.78	0.00	5199.30	0.10	7.48	2.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
8	Pipe - (450)	400.00	5199.20	0.00	5189.60	0.10	9.60	2.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
9	Pipe - (451)	298.67	5189.50	0.00	5185.32	2.17	4.18	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
10	Pipe - (452)	400.00	5186.87	0.00	5185.28	0.00	1.59	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
11	Pipe - (453)	400.00	5185.28	0.00	5183.68	0.09	1.60	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
12	Pipe - (454)	111.01	5183.59	0.00	5183.15	0.00	0.44	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
13	Pipe - (461)	400.00	5183.15	0.00	5181.58	0.00	1.57	0.3900	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
14	Pipe - (462)	159.13	5181.58	0.00	5180.94	0.03	0.64	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
15	Pipe - (463)	399.99	5180.92	0.00	5174.10	0.10	6.81	1.7000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
16	Pipe - (464)	351.62	5174.00	0.00	5165.57	0.10	8.44	2.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
17	Pipe - (465)	349.73	5165.47	0.00	5160.57	0.10	4.90	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
18	Pipe - (466)	141.17	5160.47	0.00	5158.49	0.10	1.98	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
19	Pipe - (467)	400.00	5158.39	0.00	5148.79	0.10	9.60	2.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
20	Pipe - (468)	400.00	5148.69	0.00	5139.09	0.10	9.60	2.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
21	Pipe - (469)	400.00	5138.99	0.00	5133.39	0.12	5.60	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
22	Pipe - (519)	400.00	5133.27	0.00	5126.13	0.10	7.14	1.7800	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
23	Pipe - (520)	400.00	5126.03	0.00	5120.43	0.10	5.60	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
24	Pipe - (521)	400.00	5120.33	0.00	5110.73	0.10	9.60	2.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
25	Pipe - (522)	400.00	5110.63	0.00	5105.03	0.10	5.60	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
26	Pipe - (523)	292.89	5104.93	0.00	5100.83	1.99	4.10	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
27	Pipe - (524)	50.15	5139.13	0.00	5138.29	0.10	0.84	1.6800	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
28	Pipe - (525)	400.15	5138.19	0.00	5128.59	0.10	9.60	2.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
29	Pipe - (526)	400.06	5128.49	0.00	5118.89	0.10	9.60	2.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
30	Pipe - (527)	399.99	5118.79	0.00	5113.19	0.10	5.60	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
31	Pipe - (528)	400.00	5113.09	0.00	5105.09	0.09	8.00	2.0000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
32	Pipe - (529)	154.47	5105.00	0.00	5103.76	0.07	1.24	0.8000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
33	Pipe - (530)	53.79	5103.69	0.00	5102.91	0.03	0.78	1.4500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
34	Pipe - (531)	400.43	5102.88	0.00	5100.48	0.07	2.40	0.6000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
35	Pipe - (532)	377.87	5100.41	0.00	5098.89	0.05	1.51	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
36	Pipe - (533)	120.23	5130.58	0.00	5127.69	0.13	2.89	2.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
37	Pipe - (534)	400.18	5127.56	0.00	5121.96	0.07	5.60	1.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
38	Pipe - (535)	400.00	5121.89	0.00	5113.89	0.09	8.00	2.0000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
39	Pipe - (536)	400.00	5113.80	0.00	5109.00	0.08	4.80	1.2000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
40	Pipe - (537)	400.00	5108.93	0.00	5100.48	0.07	8.45	2.1100	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
41	Pipe - (540)	122.80	5100.40	0.00	5094.93	0.10	5.47	4.4500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
42	Pipe - (541)	318.33	5094.83	0.00	5093.56	0.00	1.27	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
43	Pipe - (543)	400.00	5098.84	0.00	5097.24	0.05	1.60	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
44	Pipe - (544)	400.00	5097.19	0.00	5095.59	0.04	1.60	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
45	Pipe - (545)	80.00	5095.55	0.00	5095.23	0.06	0.32	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1
46	Pipe - (546)	60.00	5095.17	0.00	5094.93	0.10	0.24	0.4000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow (gpm)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (gpm)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Pipe - (443)	1.41	0 00:00	1083.43	0.00	1.04	6.41	0.01	0.02	0.00		Calculated
2	Pipe - (444)	0.89	0 04:43	371.61	0.00	0.60	11.11	0.02	0.03	0.00		Calculated
3	Pipe - (445)	0.89	1 04:07	695.22	0.00	0.84	7.94	0.02	0.03	0.00		Calculated
4	Pipe - (446)	1.78	1 01:49	695.22	0.00	0.94	7.09	0.02	0.04	0.00		Calculated
5	Pipe - (447)	2.67	1 23:07	1232.50	0.00	1.58	3.94	0.02	0.03	0.00		Calculated
6	Pipe - (448)	3.56	1 18:20	371.61	0.01	0.81	8.23	0.04	0.07	0.00		Calculated
7	Pipe - (449)	3.56	0 23:02	910.26	0.00	1.39	3.74	0.03	0.05	0.00		Calculated
8	Pipe - (450)	5.34	0 05:13	910.26	0.01	1.58	4.22	0.04	0.05	0.00		Calculated
9	Pipe - (451)	5.34	0 05:51	695.22	0.01	1.31	3.80	0.04	0.06	0.00		Calculated
10	Pipe - (452)	0.95	0 00:42	370.57	0.00	0.67	9.95	0.03	0.04	0.00		Calculated
11	Pipe - (453)	0.89	0 06:45	371.61	0.00	0.60	11.11	0.02	0.03	0.00		Calculated
12	Pipe - (454)	1.78	0 06:44	371.61	0.00	0.66	2.80	0.05	0.07	0.00		Calculated
13	Pipe - (461)	7.12	0 06:28	367.84	0.02	0.89	7.49	0.07	0.10	0.00		Calculated
14	Pipe - (462)	7.12	0 06:58	371.61	0.02	0.98	2.71	0.06	0.09	0.00		Calculated
15	Pipe - (463)	8.01	0 07:15	766.72	0.01	1.59	4.19	0.05	0.07	0.00		Calculated
16	Pipe - (464)	8.90	0 06:33	910.26	0.01	1.84	3.18	0.05	0.07	0.00		Calculated
17	Pipe - (465)	8.90	0 07:17	695.22	0.01	1.53	3.81	0.05	0.08	0.00		Calculated
18	Pipe - (466)	8.90	0 11:52	695.22	0.01	1.53	1.54	0.05	0.08	0.00		Calculated
19	Pipe - (467)	8.90	1 19:34	910.26	0.01	1.85	3.60	0.05	0.07	0.00		Calculated
20	Pipe - (468)	9.79	1 11:21	910.26	0.01	1.90	3.51	0.05	0.07	0.00		Calculated
21	Pipe - (469)	11.57	0 15:07	695.22	0.02	1.65	4.04	0.06	0.09	0.00		Calculated
22	Pipe - (519)	11.57	0 09:37	784.96	0.01	1.80	3.70	0.06	0.08	0.00		Calculated
23	Pipe - (520)	13.35	0 14:10	695.22	0.02	1.71	3.90	0.06	0.10	0.00		Calculated
24	Pipe - (521)	13.35	1 07:16	910.26	0.01	2.09	3.19	0.06	0.08	0.00		Calculated
25	Pipe - (522)	15.13	0 10:01	695.22	0.02	1.76	3.79	0.07	0.10	0.00		Calculated
26	Pipe - (523)	16.91	0 10:48	695.22	0.02	1.80	2.71	0.07	0.11	0.00		Calculated
27	Pipe - (524)	0.89	0 00:52	762.18	0.00	0.93	0.90	0.02	0.02	0.00		Calculated
28	Pipe - (525)	0.89	0 02:22	910.09	0.00	0.96	6.95	0.02	0.02	0.00		Calculated
29	Pipe - (526)	2.67	0 01:56	910.20	0.00	1.28	5.21	0.03	0.04	0.00		Calculated
30	Pipe - (527)	4.45	0 02:14	695.23	0.01	1.24	5.38	0.04	0.06	0.00		Calculated
31	Pipe - (528)	6.23	0 02:31	830.95	0.01	1.56	4.27	0.04	0.06	0.00		Calculated
32	Pipe - (529)	7.12	0 07:22	525.53	0.01	1.18	2.18	0.05	0.08	0.00		Calculated
33	Pipe - (530)	7.12	0 11:15	707.57	0.01	1.44	0.62	0.05	0.07	0.00		Calculated
34	Pipe - (531)	8.90	1 09:14	455.13	0.02	1.16	5.75	0.06	0.10	0.00		Calculated
35	Pipe - (532)	9.88	0 01:24	371.61	0.03	1.08	5.83	0.07	0.11	0.00		Calculated
36	Pipe - (533)	1.00	0 00:00	910.26	0.00	0.98	2.04	0.02	0.02	0.00		Calculated
37	Pipe - (534)	0.89	0 05:35	695.22	0.00	0.85	7.85	0.02	0.03	0.00		Calculated
38	Pipe - (535)	2.67	0 03:10	830.95	0.00	1.20	5.56	0.03	0.04	0.00		Calculated
39	Pipe - (536)	2.67	0 02:34	643.65	0.00	1.00	6.67	0.03	0.05	0.00		Calculated
40	Pipe - (537)	3.56	0 21:51	854.01	0.00	1.33	5.01	0.03	0.05	0.00		Calculated
41	Pipe - (540)	5.35	0 01:09	1239.87	0.00	1.95	1.05	0.04	0.06	0.00		Calculated
42	Pipe - (541)	36.49	0 21:50	371.61	0.10	1.56	3.40	0.14	0.21	0.00		Calculated
43	Pipe - (543)	27.59	0 12:26	371.61	0.07	1.45	4.60	0.12	0.18	0.00		Calculated
44	Pipe - (544)	28.48	0 12:27	371.61	0.08	1.46	4.57	0.12	0.18	0.00		Calculated
45	Pipe - (545)	28.48	1 12:30	371.61	0.08	1.45	0.92	0.12	0.18	0.00		Calculated
46	Pipe - (546)	29.37	1 21:19	371.61	0.08	1.45	0.69	0.12	0.19	0.00		Calculated

Lift Station/Pump Information

P.O. BOX 20176, BILLINGS, MT 59104
325 16TH ST. WEST, BILLINGS, MT 59102
PHONE: (406)252-6671
FAX: (406)252-3941
TOLL FREE: (800)882-8831

Monday, October 7, 2013

Eric Olsen
Copper Environmental Consulting
406 East Park Avenue, Suite 2
Anaconda, MT 59711
Phone (406) 563-2700

Eric ,

Below is the price quote for the Mill Creek Lift Station project.

Qty (1) One Barnes Duplex Basin Package, Jobsite Wired
48" diameter x 218" (18ft) deep basin per attached catalog pages and station drawings for reference
(note: the basin diameter has to be 48" diameter)
(note: the pumps are Barnes Model No. XSGV7542L, explosion proof)
(note: duplex control panel shall be standard Stealth duplex with the following options: Dead face Stainless Steel Control Panel, Intrinsically safe, 4 float system, with dialer, run time clocks, alternating, with extra dry contacts for future SCADA connections.
Budget Price $ 45,959.00
Start Up Assistance One Trip, One Day.
Delivery 6-8 weeks

Terms:
1. Payment terms are net 30 days from date of shipment.
2. Pricing does not include taxes or insurance.
3. Proposal does not include installation connection sets, or misc. plumbing or wiring.
4. If additional Startup Assistance or Training not included if required, ADD $1,000.00 per Day.
5. Proposal pricing good for 60 days.
6. Pricing is FOB Factory.

Best Regards,

Scott Summers

Duplex

Jobsite Wired Basin Package Non-Sparking Stainless Rail
Non-Sparking, Class I, Group D, Division 1, with Steel Cover

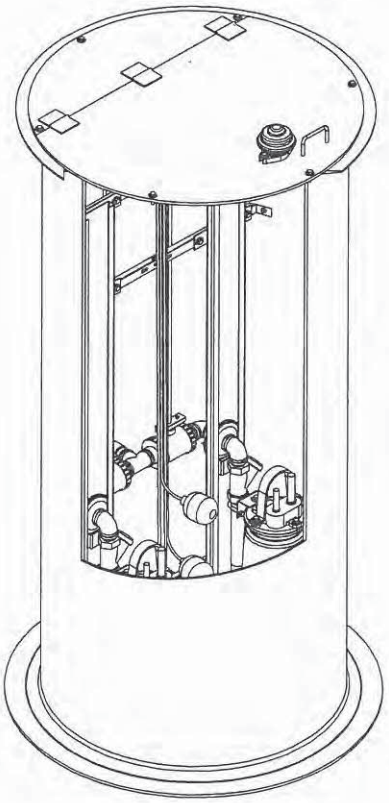
Specifications:

inches (mm)

BASIN ..... Fiberglass w/ 3" (76) Ballast Support Flange
DISCHARGE ..... Stainless Steel
Size ..... ~~1½"~~ or 2½" NPT, Female
INLET ..... 4" (102) PVC SDR35 Flexible Pipe Fitting, (For Field Installation)
COVER: *Steel* ..... Black Powder Coated, w/2" (51) Bug-Free Vent, Lockable hinged access door and stainless steel hinges and hardware
Fiberglass ..... ~~One-piece,Grass Green with 2" (51) Bug-Free Vent. 36" Dia.(0.9m) basins only.~~
RAIL SYSTEM ..... Qty. 2, 300 Series Stainless Steel "C" Channel
STATIONARY DISCHARGE FITTING:
Quantity ..... Two
Stationary ..... Powder Coated Cast Iron
Diaphragm ..... Fiber Reinforced Neoprene
ELECTRICAL COUPLING... Qty. of three, 1½" NPT, PVC Conduit hubs (Seal Fittings By Others)
FLOAT POLE ..... PVC
BALL VALVE:
Quantity ..... Two
Design ..... Full Port True Union
Material ..... PVC
Size ..... 1¼" NPT or 2" NPT
EXTENSION HANDLE. ..... Qty. 2, 3/8" Dia. (9.5) Stainless Steel
LIFTING ROPE ..... Qty. 2, 1/2" Dia. (13) Polypropylene with Knots in 12" (305) increments. Breaking Strength of 3750 lbs. (1701kg)
HARDWARE ..... 300 Series Stainless Steel
DISCHARGE PIPING ..... 300 Series Stainless Steel
LEVEL CONTROLS:
Floats ..... Quantity of four Separate Mercury Level Controls, Polypropylene Housings with 18-2, SJOW cord, mounted on PVC pipe

MOVABLE SUB-ASSEMBLY:
(2 Required, Supplied Separately, Ordered with Pump)
Ball Check Valve:
Housing ..... Cast Iron, with PVC plug
Ball ..... Natural Rubber
Upper Pump Brackets ..... 300 Series Stainless Steel
Lower Pump Brackets ..... Bronze
Moveable ..... 85-5-5-5 Bronze
Discharge Piping ..... Stainless Steel with anti siphon port

OPTIONS ..... Basin Depths, 4" (102) & 6" Sch 40 Flexible Pipe Fittings, Intermediate Support for depths 12Ft. (3.6m) and deeper, Aluminum Cover, Fiberglass Cover for 36" (0.9) only, Stainless Steel Flexible Discharge Connector, Stainless Steel Cable, Chain, Conduit Hubs



Series: DXSRS and LDXSRS
1½" NPT Discharge or
2½" NPT Discharge

For use with XSGV pumps

Sample Specification: Section 3E page 16

Submersible Wastewater Pump Association SWPA MEMBER

Specifications

Duplex Non-Sparking Basin Package Stainless Rail for Class I, Group D, Division 1, with Steel Cover

BARNES®

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Package Systems

FILE: SPEC3-4

SCOPE: Furnish and install a complete factory-built, Duplex Stainless Steel "C" Channel Non-Sparking Rail Package as shown on the plans. The package shall consist of a fiberglass basin, a cover with 2" NPT vent, Non-sparking "C" channel rail assembly, discharge piping and fittings, check valves, true union ball valves, level controls, and control panel.

PACKAGE DESIGN: The basin diameter shall be_____inches with a depth of _____inches. Construction shall be custom molded fiberglass reinforced polyester resin. The wall thickness shall be sufficient to withstand a water-saturated sand load of 120 lbs per cubic foot. A _____ inch Flexible pipe fitting or plastic pipe adapter for inlet shall be furnished with a location of _____inches from the top of the basin to the inlet centerline. The Flexible pipe fitting or pipe adapter and gasket material shall be shipped loose for field installation. A ballast support flange shall be provided as an integral part of the basin assembly, which shall extend a minimum of three inches (76.2mm) on the radius of the basin. Three electrical couplings shall be bolted to the basin wall, two for the pump cables and one for the float cables. The float coupling shall be a minimum of 2" (51mm) from the pump couplings.

The basin cover shall be of steel construction with a minimum thickness of three-eights inch (9.5mm), and shall have a minimum diameter four inches (102mm) greater than the basin. Both inside and outside surfaces of the cover shall be sandblasted to remove rust and scale and shall be completely coated with air dry asphalt bituminous coating for corrosion resistance. A hinged door shall be an integral part of the cover, and shall have locking provisions. The cover shall be securely mounted to the basin with a minimum of six (6) stainless steel bolts threaded into stainless steel inserts in the top collar of the basin. All hardware shall be stainless steel. The cover shall have a 2" NPT screened bug-free vent that is corrosion resistant.

The slide rail assemblies shall consist of, 300 series stainless steel upper pump guide brackets, lower pump guide brackets of brass and "C" channel rail assembly of 14 gauge 300 series stainless steel. The stationary portion of the hydraulically sealed discharge coupling assembly shall be machined cast iron and the movable fitting of 85-5-5-5 brass. The upper rail bracket shall mount to the basin wall and position the upper end of the stainless steel guide rail while the lower rail bracket positions the lower end of the guide rail. The stainless steel rail shall support the pump at the required distance from the basin floor to provide unrestricted flow of material into the pump. The guide brackets shall be attached to the pump for positioning of the unit on the guide rail during installation or removal of the unit within the basin. The stationary fitting shall have a fiber reinforced neoprene diaphragm clamped between the stainless steel rail and the stationary cast iron discharge. The brass moveable fitting, when in position shall be held against the stationary fitting by the construction of the stainless steel rail, aligning the movable fitting to the flexible diaphragm for proper sealing of the two surfaces under pressure. The discharge piping shall contain an anti-siphon device located below the check valve. A polypropylene rope with a minimum breaking strength of 3750 pounds shall be provided for each pumps installation and removal.

The discharge piping shall consist of _____inch schedule 40 stainless steel pipe. A ball check valve shall be installed in the vertical position between the pump discharge and the movable fitting. Each valve shall be _____inches in size and shall consist of three major components; body, access plug, and ball. The design of the valve shall be such that it keeps solids, stringy material, grit, rags, etc., moving without the need for back flushing. In the operating mode, the ball shall not impede flow through the check valve. The operating flow area shall be equal to the nominal size of the valve. The ball shall clear the waterway providing "full flow" equal to the nominal size. It shall be non-clog in design. There shall not be outside levers, weights, springs, dash pots or other accessories required for a swing (clapper) type check valve. The ball shall be natural rubber and be resistant to material normally found in sewage. The body shall be gray cast iron, ASTM Class 30, the plug shall be Sch. 40 PVC. Inlet and outlet ports shall be _____inch NPT.

A _____ inch PVC true union ball valve shall be installed in the discharge piping for each pump to provide shut-off capabilities during pump removal. The ball valve shall be full ported with a minimum rated pressure of 150 PSI (10.6kgs/sq. meter) and shall be fitted with an integral stainless steel extension handle. The extension handle shall extend up to within six (6) inches of the top of the basin for ease of access and operation, and shall be secured to the rail support bracket with a stainless steel bracket.

Pump and control wiring shall run continuously to the control panel through conduit and sealed fittings as required by state and local codes. All incoming power and control wires must pass through cord grips and sealed fittings with sealing compound as required by Underwriters Laboratories.

A quantity of four (4) liquid level controls with _____ft. of SJOW cable, shall be provided to control operation of the pumps and high-water alarm. The level sensors shall be mercury type pilot duty devices mounted in a corrosion resistant polypropylene housing. The level controls shall be mounted to a PVC support pole attached to the stainless steel rail assembly as shown in the plans. Sufficient cable shall be supplied to reach the control panel with no splices in the basin. Level controls shall be set at the elevations indicated on the plans.

A duplex control panel shall be furnished in NEMA 4X fiberglass enclosure for _____Volts,_____Phase, 60 Hertz power supply. For each pump motor there shall be included; a combination circuit breaker/ overload unit providing overload protection, short circuit protection, reset and disconnect for all phases, across-the-line magnetic contactors, push button start, overload relay properly sized for motor characteristics (except XSGV2022L), 120 volt control panel pilot circuitry. A 120 volt control transformer with fused overload protection for external pilot circuitry shall be included (when required). An automatic electric alternator shall be included to provide alternating operation of the pumps under normal conditions, or simultaneous operation in cases of high level. Single phase panels shall be provided with a start capacitor, run capacitor, and start relay for each pump motor if not provided in the pump. A panel mounted moisture sensor relay with warning light shall be included for each pump to indicate moisture in the pump seal cavity. The moisture sensor relay shall have a test circuit consisting of a push-to-test button with neon indicating lamp for checking the moisture sensing components. Each panel shall be equipped with terminals for temperature sensors. These thermostats are wired in line with the pump motor starter coil and will turn the motor off with temperature rise. Intrinsically Safe relays shall be included for reducing voltage power supply to the level controls, one required for start & stop, one for lag start and one for alarm function. A high-water alarm_____(Horn,Light, etc.,) shall be included to indicate extreme high levels of liquid in the wet well. The control panel assembly and all components therein shall be UL listed.

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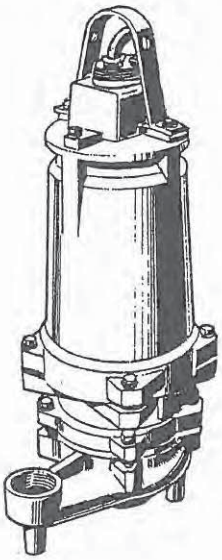
Submersible Grinder XP



Series: XSGV-L
3, 5 & 7.5HP, 3450RPM, 60Hz

Submersible Wastewater Pump Association SWPA MEMBER

Underwriters Laboratories Inc ®
File No. E73842

Sample Specifications: Section 3 Page 14.

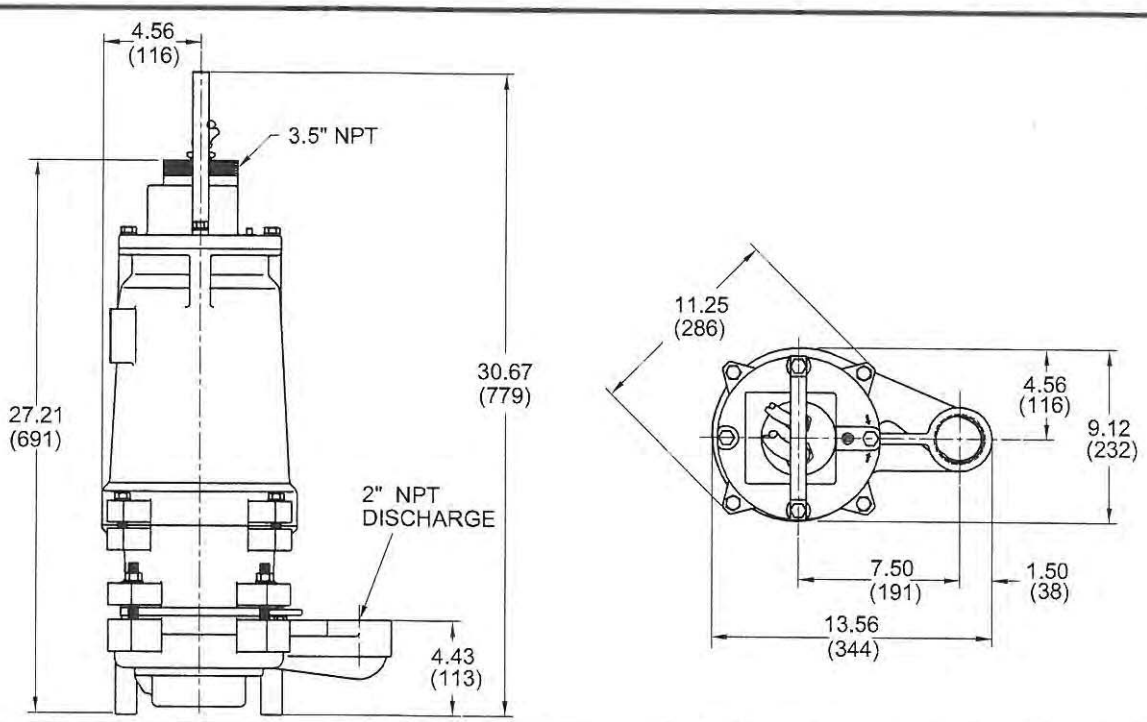
DESCRIPTION:

THE GRINDER PUMP IS FOR USE IN **HAZARDOUS** LOCATIONS AND IS DESIGNED TO REDUCE DOMESTIC, COMERCIAL, INSTITUTIONAL AND LIGHT INDUSTRIAL SEWAGE TO A FINELY GROUND SLURRY.

Specifications:

DISCHARGE .....2" NPT, Vertical
LIQUID TEMPERATURE .....104°F (40°C) Continuous
VOLUTE .....Cast Iron ASTM A-48, Class 30.
MOTOR HOUSING .....Cast Iron ASTM A-48, Class 30.
SEAL PLATE .....Cast Iron ASTM A-48, Class 30.
IMPELLER: *Design* .....12 Vane,Vortex, With Pump Out Vanes On Back Side. Dynamically Balanced, ISO G6.3.
Material .....Cast Iron
SHREDDING RING .....Hardened 440C Stainless Steel Rockwell® C-55.
CUTTER .....Hardened 440CStainless Steel, Rockwell® C-55.
SHAFT .....416 Stainless Steel
SQUARE RINGS .....Buna-N
HARDWARE .....300 Series Stainless Steel
PAINT .....Air Dry Enamel.
SEAL: *Design* .....Tandem Mechanical, Oil Filled Reservoir.
Material .....Rotating Faces - Carbon
Stationary Faces - Ceramic
Elastomer - Buna-N
Hardware -300 Series Stainless
CORD ENTRY.....30 ft. (9.1 m) Std. Cord. Epoxy Sealed Housing with Secondary Pressure Gromment for Sealing and Strain Relief.
UPPER BEARING:
Design .....Single Row, Ball, Oil Lubricated
Load .....Radial
LOWER BEARING:
Design .....Single Row, Ball, Oil Lubrication
Load.....Radial & Thrust
MOTOR: *Design* .....NEMA L-Single Phase, NEMA B-Three Phase Torque Curve. Oil-Filled, Squirrel Cage Induction.
Insulation .....Class F.
SINGLE PHASE: Capacitor Start/Capacitor Run. Requires Overload Protection to be Included In control panel, Requires Barnes® Starter or Control Panel which Includes Capacitors, or Capacitor pack.
THREE PHASE: Dual Voltage 230/460; Requires Overload Protection to be Included in control panel.
MOISTURE SENSORS.....Normally Open (N/O), Requires relay in control panel
TEMPERATURE SENSORS.....Normally Closed (N/C), Requires relay in control panel
OPTIONAL EQUIPMENT.....Seal Material, Impeller Trims, Cord Length

Submersible Grinder XP



MODEL NO	PART NO	HP	VOLT/PH	Hz	RPM (Nom)	NEMA START CODE	FULL LOAD AMPS	LOCKED ROTOR AMPS	CORD SIZE	CORD TYPE	CORD O.D inch (mm)
XSGV3002L	127330	3	200/1	60	3450	G	25.2	86.0	10/4	SOW	0.745 (19)
XSGV3022L	127331	3	230/1	60	3450	G	21.7	75.0	10/4	SOW	0.745 (19)
XSGV3062L	127332	3	200/3	60	3450	J	17.0	65.0	10/4	SOW	0.745 (19)
XSGV3032L	127333	3	230/3	60	3450	K	14.5	62.0	10/4	SOW	0.745 (19)
XSGV3042L	127334	3	460/3	60	3450	K	7.2	31.0	10/4	SOW	0.745 (19)
XSGV3052L	127335	3	575/3	60	3450	J	5.6	22.6	10/4	SOW	0.745 (19)
XSGV5002L	127336	5	200/1	60	3450	F	42.0	134.0	6/4	SOW	1.030 (26)
XSGV5022L	127337	5	230/1	60	3450	H	39.0	136.0	8/4	SOW	0.930 (24)
XSGV5062L	127338	5	200/3	60	3450	K	25.0	122.0	10/4	SOW	0.745 (19)
XSGV5032L	127339	5	230/3	60	3450	L	21.9	120.0	10/4	SOW	0.745 (19)
XSGV5042L	127340	5	460/3	60	3450	L	11.0	60.0	10/4	SOW	0.745 (19)
XSGV5052L	127341	5	575/3	60	3450	L	8.8	46.0	10/4	SOW	0.745 (19)
XSGV7532L	127342	7.5	230/3	60	3450	J	22.3	136.0	10/4	SOW	0.745 (19)
XSGV7542L	127343	7.5	460/3	60	3450	J	11.2	68.0	10/4	SOW	0.745 (19)
XSGV7552L	127344	7.5	575/3	60	3450	G	8.2	45.0	10/4	SOW	0.745 (19)

Moisture and Temperature sensor cord for all models is 18/5 SOW, 0.476 (12mm) O.D.

IMPORTANT !

1.) MOISTURE AND TEMPERATURE SENSORS MUST BE CONNECTED TO VALIDATE THE UL LISTING.
2.) A **NON-SPARKING** BREAK AWAY FITTING MUST BE USED TO VALIDATE THE UL LISTING.
3.) A SPECIAL MOISTURE SENSOR RELAY IS REQUIRED IN THE CONTROL PANEL FOR PROPER OPERATION OF THE MOISTURE SENSORS. CONTACT BARNES PUMPS FOR INFORMATION CONCERNING MOISTURE SENSING RELAYS FOR CUSTOMER SUPPLIED CONTROL PANELS.
4.) THESE PUMPS ARE UL LISTED FOR PUMPING WATER AND WASTEWATER. **DO NOT USE TO PUMP FLAMMABLE LIQUIDS.**
5.) INSTALLATIONS SUCH AS DECORATIVE FOUNTAINS OR WATER FEATURES PROVIDED FOR VISUAL ENJOYMENT MUST BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE ANSI/NFPA 70 AND/OR THE AUTHORITY HAVING JURISDICTION. THIS PUMP IS NOT INTENDED FOR USE IN SWIMMING POOLS, RECREATIONAL WATER PARKS, OR INSTALLATIONS IN WHICH HUMAN CONTACT WITH PUMPED MEDIA IS A COMMON OCCURRENCE.

Series XSGV-L

Performance Curve
3, 5 & 7.5HP, 3450RPM, 60Hz

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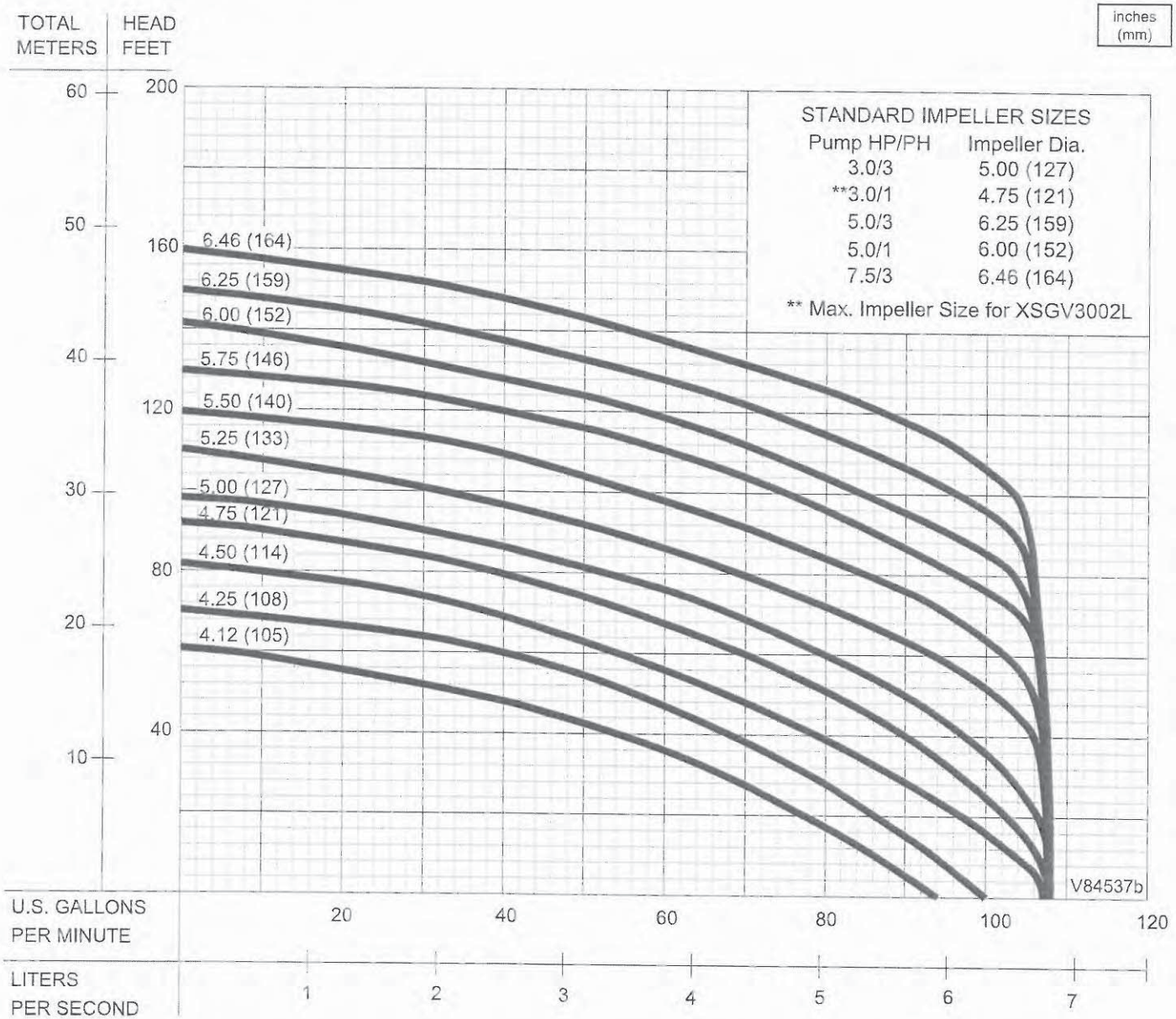
Submersible Grinder XP



Testing is performed with water, specific gravity 1.0 @ 68° **F @ (20°C), other fluids may vary performance**

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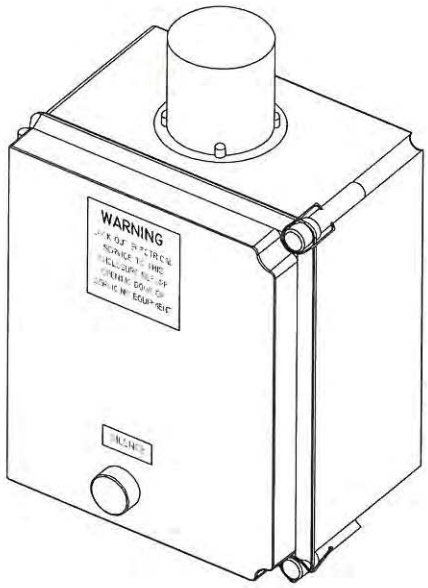
Specifications:

XR Series

Listed by Underwriters Laboratories, simplex and duplex pump control panels provide reliable grinder pump station operation and potential malfunction warning.

STANDARD FEATURES:

- UL 508A Listed
- NEMA 4X Fiberglass Enclosure
- Padlockable Latch
- Pump/Panel Circuit Breaker
- IEC Rated Motor Contactor
- Ambient Compensated Current Overload
- Pump Start Pushbutton
- Individually Fused Circuits for Alarm and Control Components
- 25 Watt High Water Alarm Light with NEMA 4X Lens
- Pre-Installed Capacitor Kit
- Terminal Strip and Ground Lug for Incoming Connections
- Pump Alternator (200 Series Duplex Panels Only)
- Intrinsic Barriers
- 90 db alarm horn with NEMA 4X silence pushbutton.



Wall Mounted Series:
Stealth-XR-100 & 200

STEALTH™
CONTROL PANELS

File No. LR142177

Submersible Wastewater Pump Association
SWPA
MEMBER

Stealth Control Panels

Simplex and Duplex, Wall Mounted Series
XR Series for XSGV Grinder Pumps

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Control Panels

SIMPLEX				
VOLTAGE PHASE	2HP XSGV	3HP XSGV	5HP XSGV	7.5HP XSGV
104 - NEMA 4X Fiberglass Enclosure, Operating Controls, Seal Leak Detection, Audio Alarm w/Push Button Silence & Alarm Light				
240/1	XR-104-22 P/N: 111021	XR-104-32 P/N: 111025	XR-104-52 P/N: 111029	N/A
200/1	N/A	XR-104-37 P/N: 111024	XR-104-57 P/N: 111028	N/A
240/3	XR-104-23 P/N: 111022	XR-104-33 P/N: 111026	XR-104-53 P/N: 111030	XR-104-73 P/N: 111032
480/3	XR-104-24 P/N: 111023	XR-104-34 P/N: 111027	XR-104-54 P/N: 111031	XR-104-74 P/N: 111033

IMPORTANT! Control panel sizes and options will vary depending on contract specifications. When ordering control panels, use the Nomenclature Chart on page 13 for Model designation.
(*) Consult factory for availability

DUPLEX				
VOLTAGE PHASE	2HP XSGV	3HP XSGV	5HP XSGV	7.5HP XSGV
204 - NEMA 4X Fiberglass Enclosure, Operating Controls, Seal Leak Detection, Audio Alarm w/Push Button Silence & Alarm Light				
240/1	XR-204-22 P/N: 113475	XR-204-32 P/N: 111038	XR-204-52 P/N: 111042	N/A
200/1	N/A	XR-204-37 P/N: 111037	XR-204-57 P/N: 111041	N/A
240/3	XR-204-23 P/N: 111035	XR-204-33 P/N: 111039	XR-204-53 P/N: 111043	XR-204-73 P/N: 111045
480/3	XR-204-24 P/N: 111036	XR-204-34 P/N: 111040	XR-204-54 P/N: 111044	XR-204-74 P/N: 111046

IMPORTANT! Control panel sizes and options will vary depending on contract specifications. When ordering control panels, use the Nomenclature Chart on page 13 for Model designation.
(*) Consult factory for availability

Options (as note below) to be included to the Duplex Control Panel, XR-204-74, part no. 111046

-Dead Face Stainless Steel Control Panel
-Intrinsically safe
-4 float system
-Auto Dialer
-Run Time Clock (one per pump)
-Alternating (standard and not an option)
-2 Dry Contacts for future SCADA connections (SCADA is provided by others)

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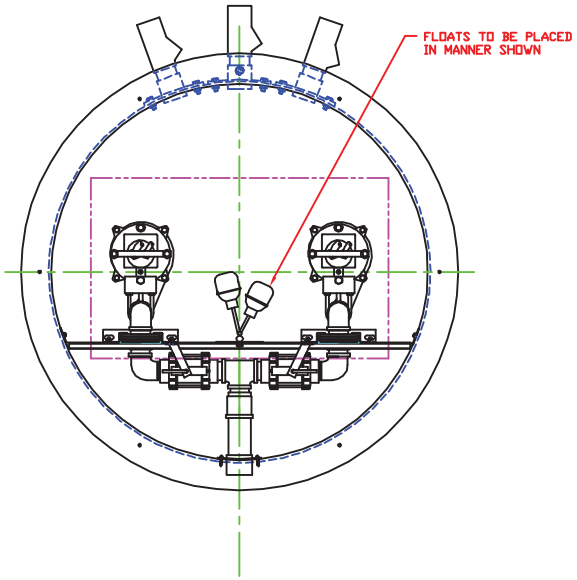

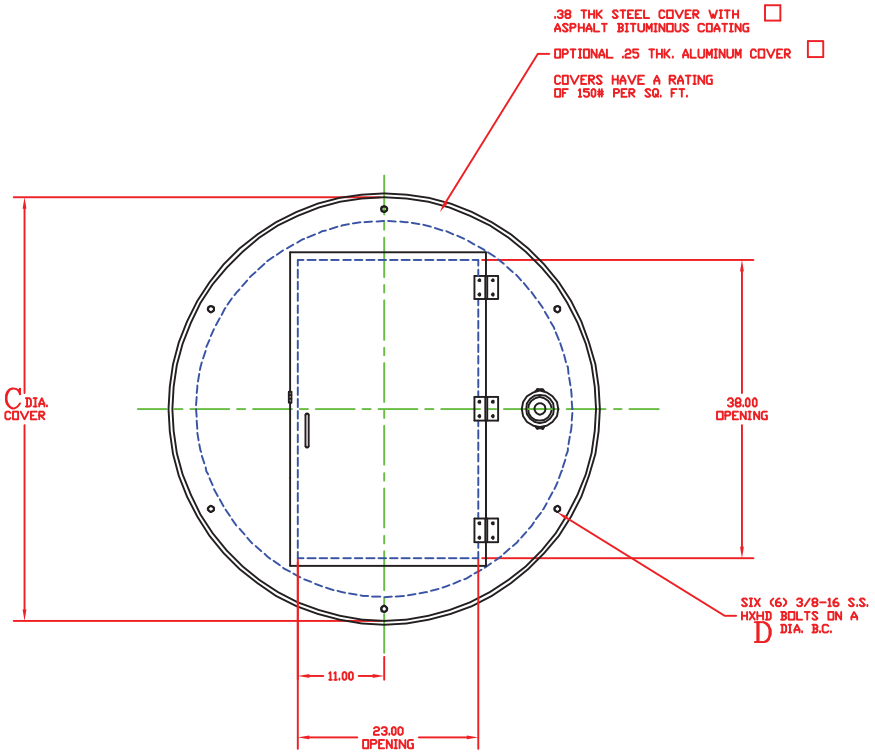

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TITLE

DUP, NON-SPARKING, DXSRS FOR 3, 5, 7.5 XSGV GRINDER

CAGE NO 96046

DWG NO CD95135

REV A

CRANE® PUMPS & SYSTEMS BARNES®

NOTE:

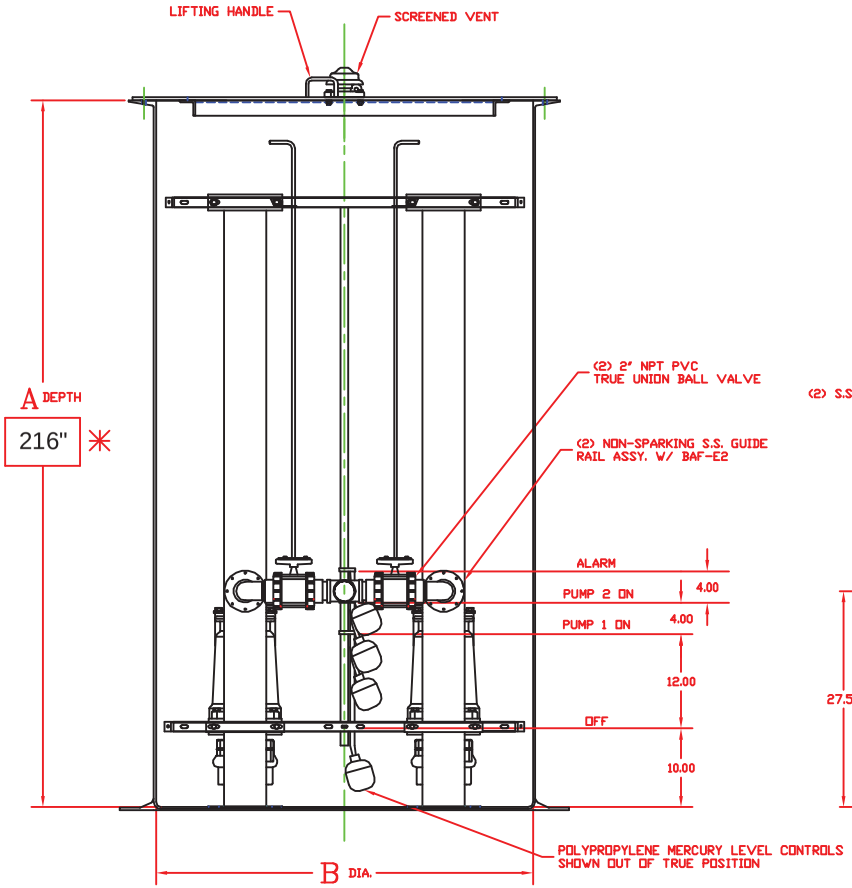
ALL DIMENSIONS TO BE ±.13 UNLESS OTHERWISE SPECIFIED.

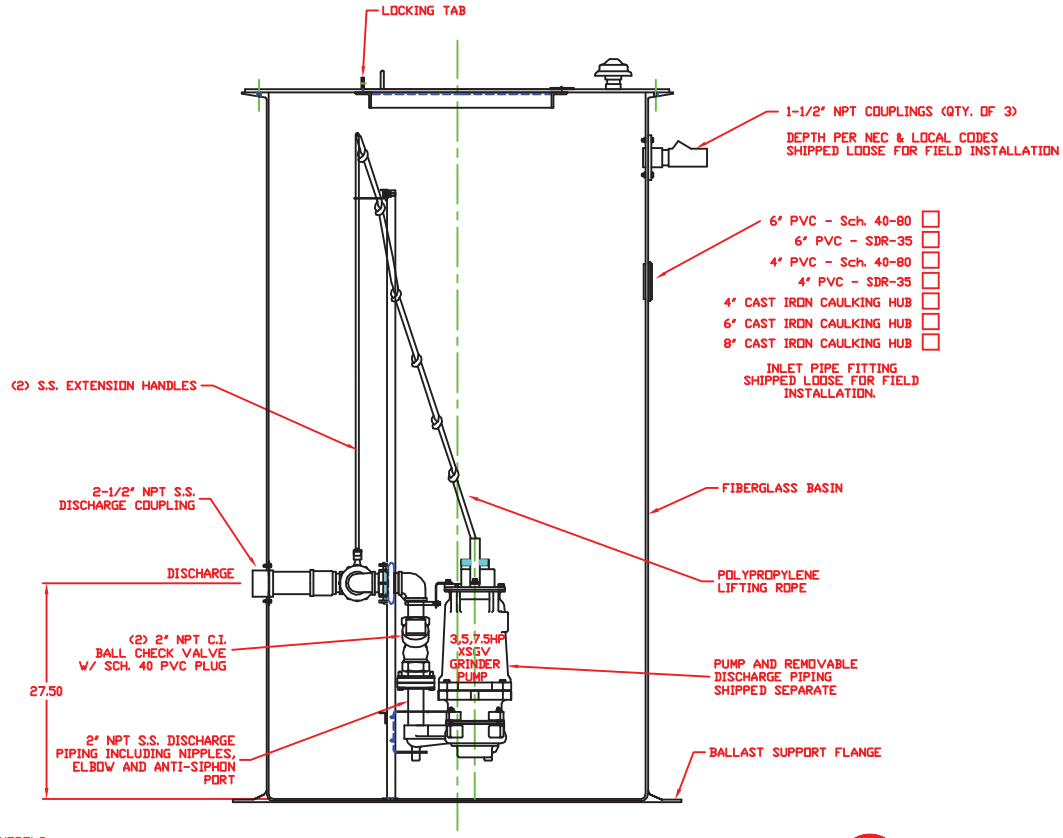
✳ BASIN DEPTHS IN 6 INCH INCREMENTS UP TO 96 INCHES, THEN IN 12 INCH INCREMENTS. CONSULT FACTORY FOR OTHER DEPTHS

INTERMEDIATE SUPPORT REQUIRED FOR BASINS 12 FT. AND DEEPER.

48" DIA. SHOWN

A	B	C	D
✳	48.00	54.00	51.00
✳	60.00	66.00	63.00





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SHEET 1 OF 2

TITLE: DUP, NON-SPARKING, DXSRS FOR 3, 5, 7.5 XSGV GRINDER

CAGE NO: 96046

DWG NO: CD95135

REV: A

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Appendix J

Stormwater System Calculations

Preliminary Engineering Report
Mill Creek TIFID

Purpose:

The purposes of this calculation brief include:

- Perform a preliminary evaluation of Mill Creek TIFID stormwater management, including existing and estimated post-development conditions, in accordance with Montana Department of Environmental Quality's, 'Circular DEQ 8, Montana Standards for Subdivision Storm Drainage'.

- Determine the relative difference between existing and post-development stormwater discharge.

- Based on the preliminary stormwater evaluations, determine estimated hydraulic structures necessary to manage stormwater post-development.

Methods:

The Mill Creek TIFID preliminary stormwater analysis is based on the following general assumptions:

- The actual development plan for Mill Creek TIFID is unknown; this stormwater analysis is based on estimated development of five acre parcels with assumed values for ground cover, access roadways, and water routing. Actual development conditions may significantly vary from this evaluation.

- Due to the unknown nature of Mill Creek TIFID development, only a cursory relative evaluation was performed of existing and estimated post-development stormwater management. Assumptions were made regarding existing routing and hydraulic features based on general site topography and notes gathered during one site visit. Actual surveys of existing drainages and structures were not performed.

- This relative evaluation of stormwater management calculates only the relative difference between existing and post-development stormwater flows, and therefore may not exactly represent actual discharge flows.

- Detention basin design is based on attenuating the entire 100-year, 24 hr. storm event based on post-development conditions. This is considered conservative, as actual detention volumes may decrease based on more detailed flood routing and attenuation evaluations performed in detailed design. Detention basins would be designed to attenuate the 100-year, 24 hr. storm and eventually discharge at flows no greater than existing discharge for the 2-year, 24 hr. storm flowrate.

- Based on visual inspection during a site visit, it is assumed that all off-site stormwater run-on is diverted from the Mill Creek TIFID by existing berms, channels and ditches maintained on surrounding properties. This evaluation estimates on-site stormwater runoff only. Off-site stormwater run-on should be evaluated and verified during detailed engineering prior to property development.

Stormwater Evaluations

- Drainage basins within the Mill Creek TIFID were divided based on available topography and visually inspected site features. **NOTE**: more recent topography may change basin and drainage delineation.

- Basin information, including boundary delineations, assumed drainage routing and topographic information were entered and modeled within Aquaveo's Watershed Modeling System (WMS), version 9.1.

- Time of concentration and peak runoff (2yr, 10yr and 100yr-24 hr. storm events) for each basin was determined using National Resources Conservation Service TR-55 tabular methods.

- Precipitation for the 2yr, 10yr and 100yr-24 hr. storm were determined from National Oceanic and Atmospheric Association precipitation atlas data:

    - 2yr – 24 hr. Storm: 1.2 inches
    - 10yr – 24 hr. Storm: 1.8 inches
    - 100yr – 24 hr. Storm: 2.8 inches

- Channel sizes were estimated in WMS's channel calculation tool as part of the TR-55 time of concentration analysis.

- Post-development channels, culverts and detention basins were designed based on the 100 year-24 hr. storm event.

- Post-development channel armament assumed required for all channel velocities in excess of 3 fps. Assumes nominal 6 inch D50 riprap for all armament, to be verified during detailed design.

- Post-development culvert sizes were estimated based on existing conditions 2-year, 24 hour basin discharge and assumes all culverts are corrugated metal pipe, to be verified during detailed design.

- The following provides the design criteria used for existing and post-development evaluations:

Existing Evaluation

- Soil Conservation Service Curve Number: 71 (Fair to Good Herbaceous Cover).

- Hydrologic Soil Group: B.

- Manning's N values: Existing large channels/ditches (0.045), Floodplains (0.035), Road ditches (0.0285)

- Road ditches assumed to be 1:1 V-ditch channels.

- Mill Creek assumed to be 1:1 trapezoidal channel with 4 ft. bottom width.
- Smaller existing drainage channels assumed to be 1:1 trapezoidal channels with 2 ft. bottom width.

Post-Development Evaluation

- Soil Conservation Service Curve Number: Weighted curve number based on the following percentages of cover for each drainage basin (gross estimate):
    - One acre of good grass cover per lot: 20% at curve number 61.
    - Gravel Access Roads: 20% at curve number 85.
    - Newly Graded Areas: 30% at curve number 86.
    - Existing Conditions/No Change: 30% at curve number 71.
- Therefore: (61)(20%) + (85)(20%) + (86)(30%) + (71)(30%) = 76 weighted curve number.
- Hydrologic Soil Group: B.
- Manning's N values: Existing large channels/ditches (0.045), New road ditches (clean gravel at 0.025); Floodplains (0.035).
- New Road ditches assumed to be trapezoidal channels with 2:1 and 3:1 side slopes, 2 ft. bottom width to accompany access road shoulders and decrease flow depth along roadways.
- Mill Creek assumed to be 1:1 Trapezoidal Channel with 4 ft. bottom width.
- Smaller existing drainage channels assumed to be 1:1 Trapezoidal channels with 2 ft. bottom width.

Results

- Existing drainage basins are shown on Figure 1 with basin outfall information shown on Figure 2.
- Post-Development drainage basins are shown on Figure 3 with basin outfall information shown on Figure 4.
- Existing, post-development and existing vs. post-development discharge estimates are summarized on Table 1.
- Table 2 summarizes estimated existing discharge per basin.
- Table 3 summarizes estimated post-development discharge per basin, including estimated stormwater channel, culverts, retention basin and basin outlet pipe needs per basin.

- Evaluation design criteria backup materials, including TR-55 input values, design storm precipitation and curve number values are provided in the Appendix.

References

Montana Department of Environmental Quality, Circular DEQ 8, 2002, 'Montana Standards for Subdivision Storm Drainage'.

Figures

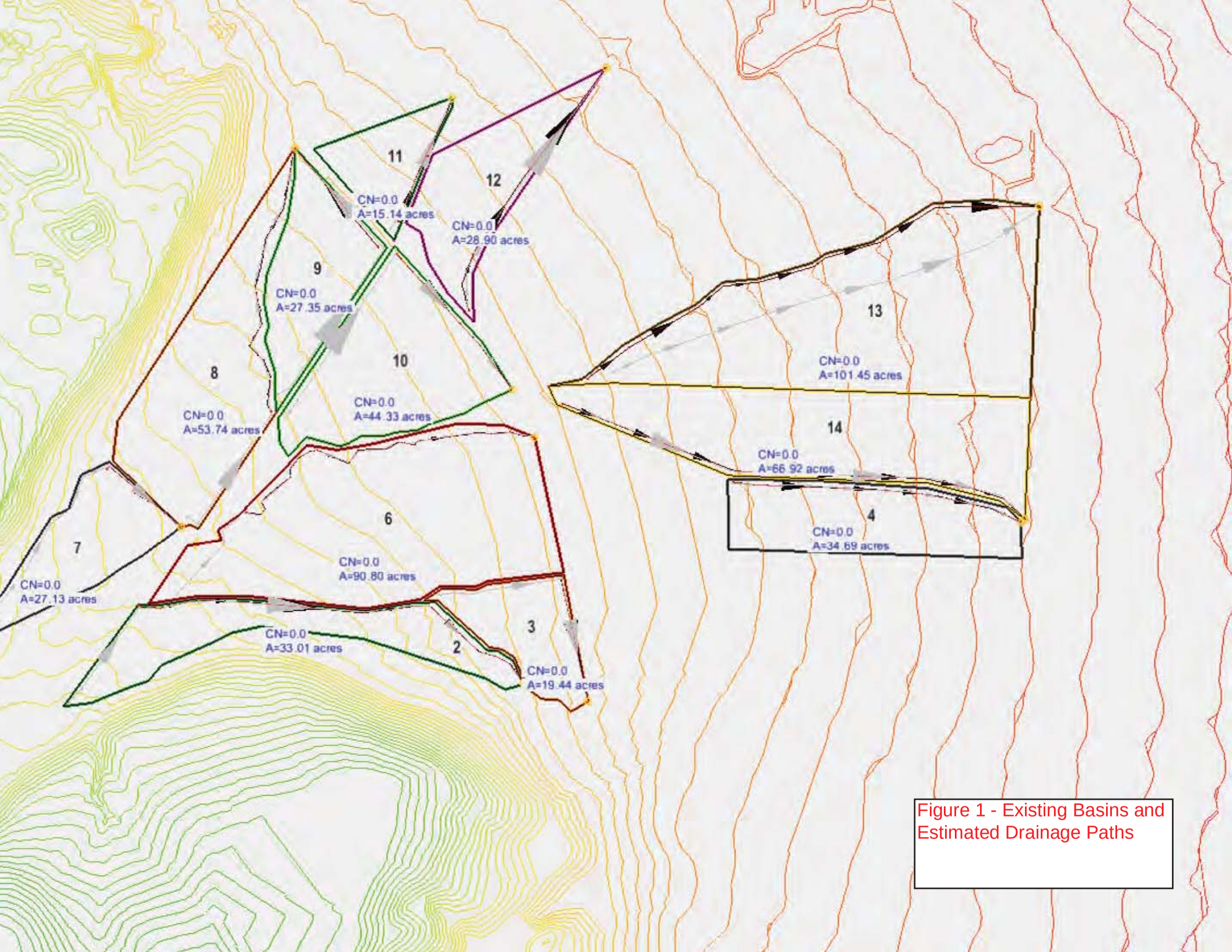


Figure 1 - Existing Basins and Estimated Drainage Paths

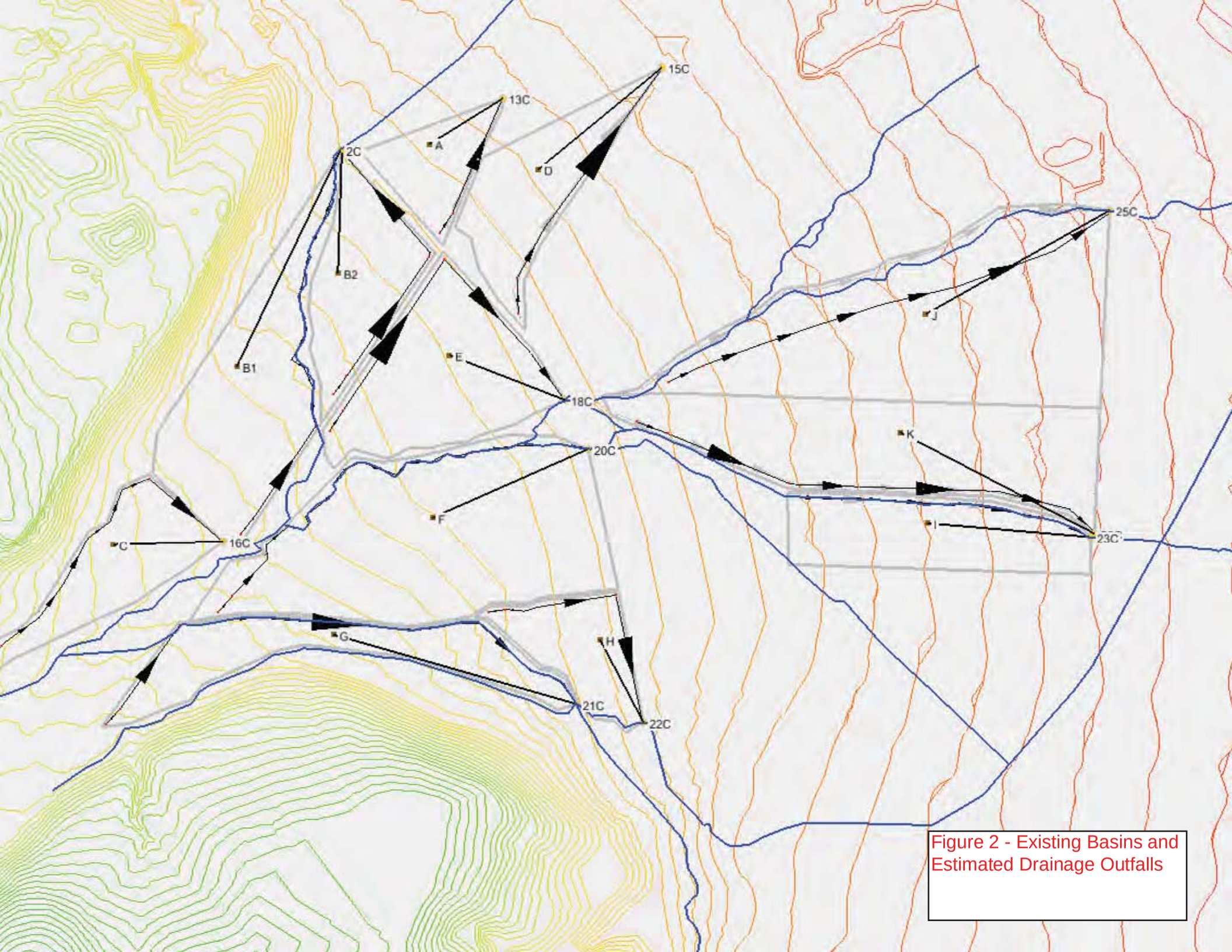


Figure 2 - Existing Basins and Estimated Drainage Outfalls

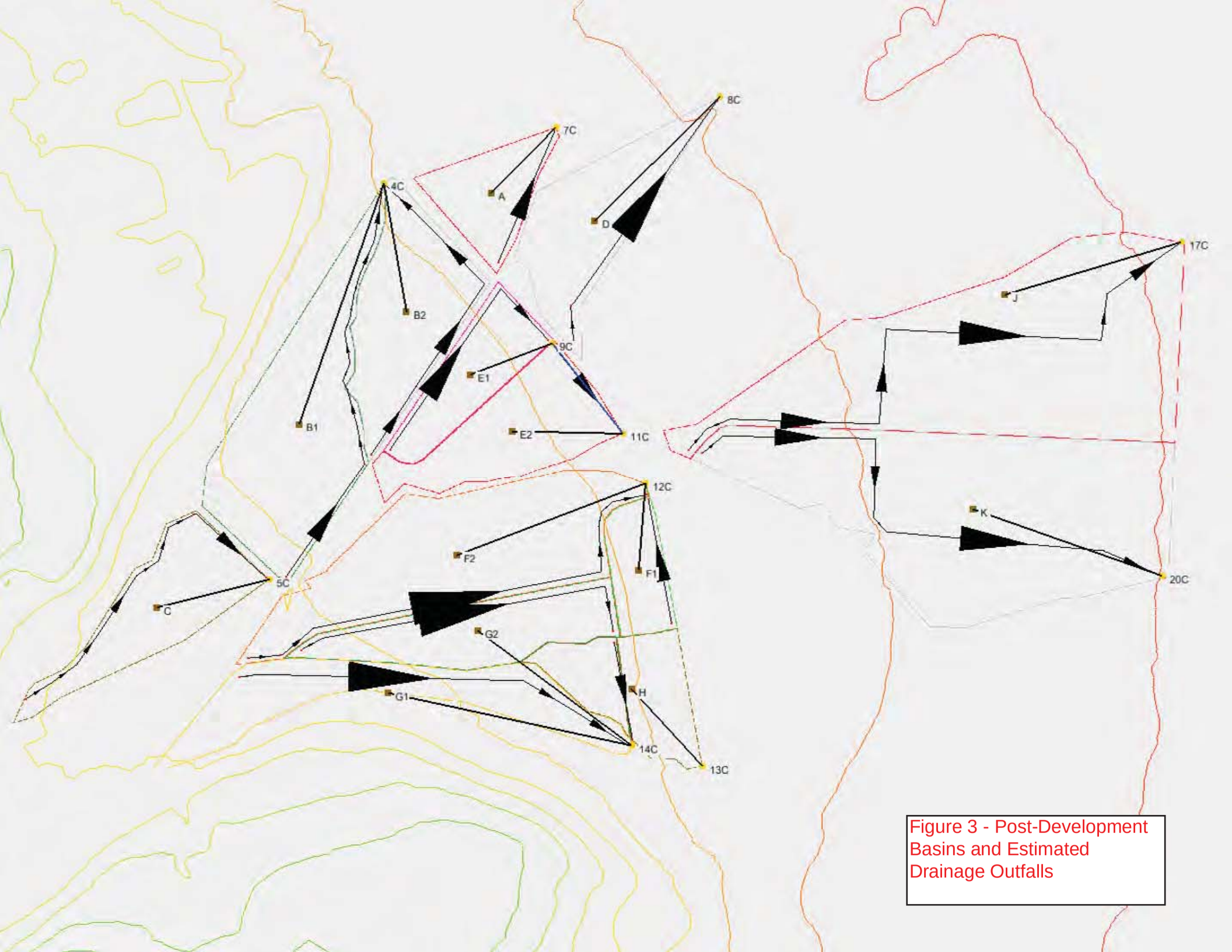


Figure 3 - Post-Development Basins and Estimated Drainage Outfalls

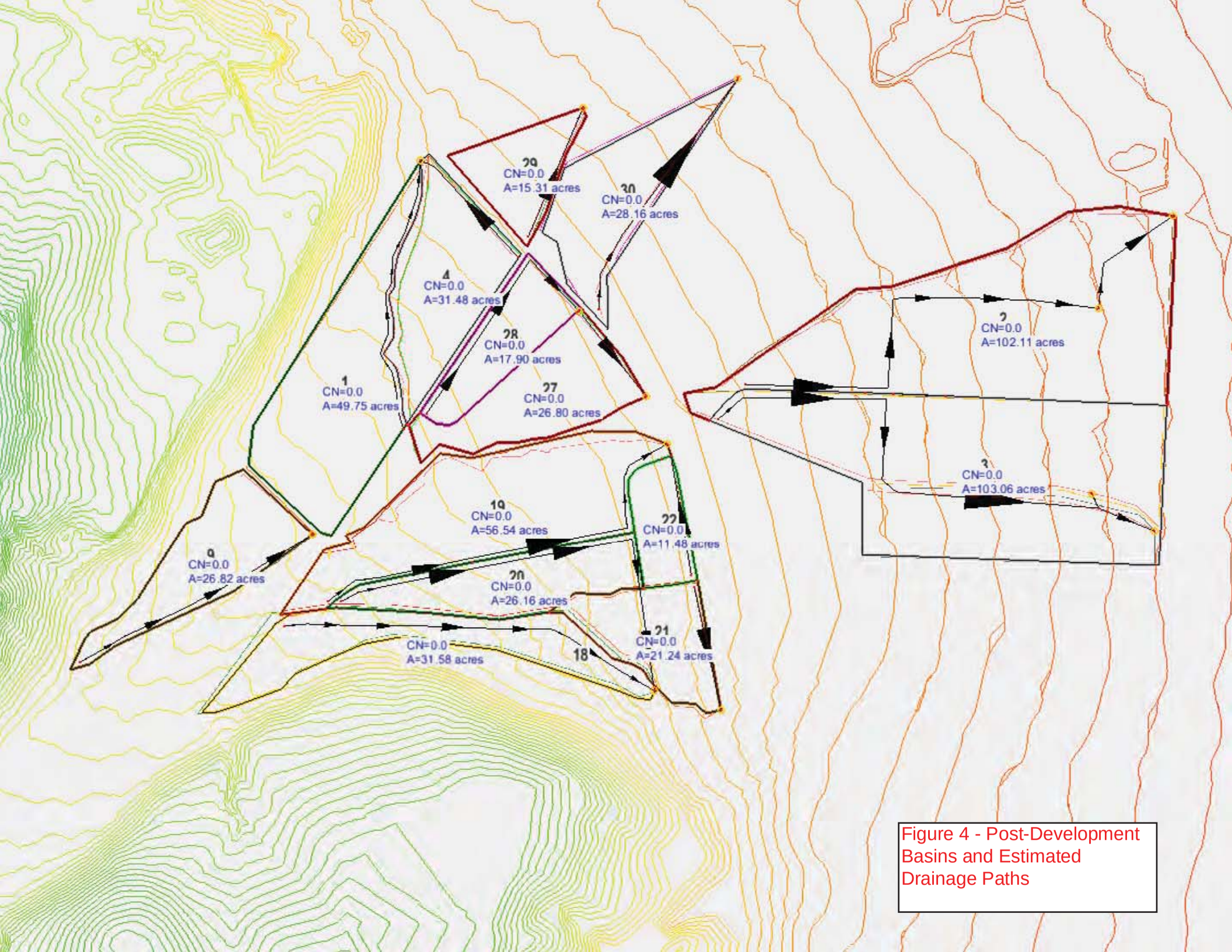


Figure 4 - Post-Development Basins and Estimated Drainage Paths

Tables

Table 1
Existing and Post-Development Discharge Estimates
Mill Creek TIFID Preliminary Engineering Report

	Existing (cfs)			Post-Development (cfs)			Existing vs. Post (cfs) (1)		
Basin ID	**2 Year**	**10 Year**	**100 Year**	**2 Year**	**10 Year**	**100 Year**	**2 Year**	**10 Year**	**100 Year**
A	0.09	1.751	9.119	0.728	7.339	24.251	0.638	5.588	15.132
B (2)	0.316	6.514	38.968	2.151	20.599	76.354	1.835	14.085	37.386
C	0.128	2.41	13.2	0.809	6.406	21.791	0.681	3.996	8.591
D	0.139	2.38	12.577	0.948	9.067	31.886	0.809	6.687	19.309
E (3)	0.183	3.471	19.913	1.789	18.022	62.138	1.606	14.551	42.225
F (4)	0.332	7.345	45.812	2.112	21.398	78.803	1.78	14.053	32.991
G (5)	0.11	2.34	14.94	1.584	16.322	62.346	1.474	13.982	47.406
H	0.086	1.813	10.721	0.82	8.274	28.953	0.734	6.461	18.232
I (6)	0.141	4.011	26.648	NA	NA	NA	NA	NA	NA
J	0.444	7.159	37.676	2.739	27.443	104.95	2.295	20.284	0.09
K (6)	0.171	2.447	15.155	2.885	28.836	109.123	2.714	26.389	93.968

Notes:

(1) Existing vs. Post = Existing Discharge - Post Development Discharge in cfs.

(2) Basin B includes sub-basins B1 and B2 for existing and post-development estimates.

(3) Basin E includes sub-basins E1 and E2 for post-development estimates.

(4) Basin F includes sub-basins F1 and F2 for post-development estimates.

(5) Basin G includes sub-basins G1 and G2 for post-development estimates.

(6) Post-development basin K includes existing sub-basins I and K.

Table 2
Existing Conditions Discharge Estimates
Mill Creek TIFID Preliminary Engineering Report

TR-55 Model Run												
Existing Conditions: 2 yr - 24 hr.												
Basin ID	**B2**	**K**	**J**	**I**	**H**	**G**	**F**	**E**	**C**	**D**	**A**	**B1**
Time of Concentration (TC) (hr)	0.865	3.955	0.695	0.874	0.66	1.627	1.214	0.824	0.546	0.526	0.283	1.055
Drainage Area (Am)(mi^2)	0.043	0.105	0.159	0.054	0.03	0.052	0.142	0.069	0.042	0.045	0.024	0.084
Rainfall (P) (in)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Runoff Curve Number (CN)	71	71	71	71	71	71	71	71	71	71	71	71
Rainfall Distribution	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II
Potential Maximum Retention (S) (in)	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085
Runoff (Q) (in)	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033
Initial Abstraction (Ia) (in)	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817
Initial Abstraction / Rainfall (Ia/P)	0.681	0.681	0.681	0.681	0.681	0.681	0.681	0.681	0.681	0.681	0.681	0.681
Unit Peak Discharge (Qu) (cfs/mi^2/in)	79.323	49.695	85.18	79.059	86.641	64.923	71.152	80.57	92.251	93.4	115.342	74.417
Peak Discharge (Qp = Qu*Am*Q*Fp) (cfs)	**0.111**	**0.171**	**0.444**	**0.141**	**0.086**	**0.11**	**0.332**	**0.183**	**0.128**	**0.139**	**0.09**	**0.205**
Channel Type	**V Ditch**	**V Ditch**	**NA**	**Trap**	**V Ditch**	**Trap**	**Trap**	**V Ditch**	**V Ditch**	**NA**	**NA**	**Trap**
Channel Slopes (H:V) (1)	**1:1**	**1:1**	**NA**	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**	**NA**	**NA**	**1:1**
Channel Width (ft) (1)	**NA**	**NA**	**NA**	**2**	**NA**	**2**	**4**	**NA**	**NA**	**NA**	**NA**	**2**
Flow Depth (ft)	**0.438**	**0.896**	**NA**	**0.083**	**0.391**	**0.074**	**0.096**	**0.446**	**0.336**	**NA**	**NA**	**0.119**
Flow Velocity (fps)	**0.589**	**0.211**	**NA**	**0.826**	**0.655**	**0.713**	**0.84**	**0.925**	**1.328**	**NA**	**NA**	**0.828**
TR-55 Model Run												
Existing Conditions: 10 yr - 24 hr.												
Basin ID	**B2**	**K**	**J**	**I**	**H**	**G**	**F**	**E**	**C**	**D**	**A**	**B1**
Time of Concentration (TC) (hr)	0.571	2.202	0.695	0.283	0.42	0.69	0.544	0.577	0.459	0.526	0.283	0.541
Drainage Area (Am)(mi^2)	0.043	0.105	0.159	0.054	0.03	0.052	0.142	0.069	0.042	0.045	0.024	0.084
Rainfall (P) (in)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Runoff Curve Number (CN)	71	71	71	71	71	71	71	71	71	71	71	71
Rainfall Distribution	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II
Potential Maximum Retention (S) (in)	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085
Runoff (Q) (in)	0.191	0.191	0.191	0.191	0.191	0.191	0.191	0.191	0.191	0.191	0.191	0.191
Initial Abstraction (Ia) (in)	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817
Initial Abstraction / Rainfall (Ia/P)	0.454	0.454	0.454	0.454	0.454	0.454	0.454	0.454	0.454	0.454	0.454	0.454
Unit Peak Discharge (Qu) (cfs/mi^2/in)	264.089	122.726	236.815	387.938	312.991	237.81	271.477	262.732	298.101	276.445	388.088	272.319
Peak Discharge (Qp = Qu*Am*Q*Fp) (cfs)	**2.153**	**2.447**	**7.159**	**4.011**	**1.813**	**2.34**	**7.345**	**3.471**	**2.41**	**2.38**	**1.751**	**4.361**
Channel Type	**V Ditch**	**V Ditch**	**NA**	**Trap**	**V Ditch**	**Trap**	**Trap**	**V Ditch**	**V Ditch**	**NA**	**NA**	**Trap**
Channel Slopes (H:V)	**1:1**	**1:1**	**NA**	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**	**NA**	**NA**	**1:1**
Channel Width (ft)	**NA**	**NA**	**NA**	**2**	**NA**	**2**	**4**	**NA**	**NA**	**NA**	**NA**	**2**
Flow Depth (ft)	**1.316**	**2.436**	**NA**	**0.59**	**1.151**	**0.455**	**0.6**	**1.337**	**0.951**	**NA**	**NA**	**0.7**
Flow Velocity (fps)	**1.227**	**0.41**	**NA**	**2.554**	**1.346**	**2.058**	**2.54**	**1.923**	**2.655**	**NA**	**NA**	**2.227**
TR-55 Model Run												
Existing Conditions: 100 yr - 24 hr.												
Basin ID	**B2**	**K**	**J**	**I**	**H**	**G**	**F**	**E**	**C**	**D**	**A**	**B1**
Time of Concentration (TC) (hr)	0.475	1.532	0.695	0.168	0.338	0.49	0.401	0.497	0.429	0.526	0.283	0.422
Drainage Area (Am)(mi^2)	0.043	0.105	0.159	0.054	0.03	0.052	0.142	0.069	0.042	0.045	0.024	0.084
Rainfall (P) (in)	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Runoff Curve Number (CN)	71	71	71	71	71	71	71	71	71	71	71	71
Rainfall Distribution	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II
Potential Maximum Retention (S) (in)	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085	4.085
Runoff (Q) (in)	0.648	0.648	0.648	0.648	0.648	0.648	0.648	0.648	0.648	0.648	0.648	0.648
Initial Abstraction (Ia) (in)	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817
Initial Abstraction / Rainfall (Ia/P)	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292
Unit Peak Discharge (Qu) (cfs/mi^2/in)	454.967	223.623	366.725	758.431	544.479	446.803	498.219	443.529	480.422	429.788	594.669	484.423
Peak Discharge (Qp = Qu*Am*Q*Fp) (cfs)	**12.603**	**15.155**	**37.676**	**26.648**	**10.721**	**14.94**	**45.812**	**19.913**	**13.2**	**12.577**	**9.119**	**26.365**
Channel Type	**V Ditch**	**V Ditch**	**NA**	**Trap**	**V Ditch**	**Trap**	**Trap**	**V Ditch**	**V Ditch**	**NA**	**NA**	**Trap**
Channel Slopes (H:V)	**1:1**	**1:1**	**NA**	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**	**NA**	**NA**	**1:1**
Channel Width (ft)	**NA**	**NA**	**NA**	**2**	**NA**	**2**	**4**	**NA**	**NA**	**NA**	**NA**	**2**
Flow Depth (ft)	**2.56**	**4.781**	**NA**	**1.673**	**2.262**	**1.25**	**1.752**	**2.538**	**1.791**	**NA**	**NA**	**1.857**
Flow Velocity (fps)	**1.911**	**0.643**	**NA**	**4.314**	**2.112**	**3.43**	**4.465**	**2.949**	**4.051**	**NA**	**NA**	**3.629**

Notes:

(1) Parameters estimated based on visual inspection during site visit. Actual dimensions should be surveyed for final verification and design.

Table 3
Post-Development Conditions Discharge Estimates
Mill Creek TIFID Preliminary Engineering Report

TR-55 Model Run														
Post Development Conditions: 2 yr - 24 hr.														
Basin Name	**B2**	**B1**	**J**	**K**	**G2**	**G1**	**H**	**F1**	**F2**	**E2**	**E1**	**D**	**A**	**C**
Time of Concentration (TC) (hr)	0.454	0.581	0.517	0.436	0.372	0.63	0.24	0.444	0.367	0.169	0.363	0.32	0.156	0.402
Drainage Area (Am)(mi^2)	0.049	0.078	0.16	0.155	0.041	0.049	0.033	0.018	0.088	0.042	0.028	0.044	0.024	0.042
Rainfall (P) (in)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Runoff Curve Number (CN)	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Rainfall Distribution	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II
Potential Maximum Retention (S) (in)	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158
Runoff (Q) (in)	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087
Initial Abstraction (Ia) (in)	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632
Initial Abstraction / Rainfall (Ia/P)	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526
Unit Peak Discharge (Qu) (cfs/mi^2/in)	209.819	186.296	197.077	214.115	230.917	179.162	285.045	212.115	232.646	336.73	233.705	248.436	350.777	222.566
Peak Discharge (Qp = Qu*Am*Q*Fp) (cfs)	**0.895**	**1.256**	**2.739**	**2.885**	**0.818**	**0.766**	**0.82**	**0.33**	**1.782**	**1.222**	**0.567**	**0.948**	**0.728**	**0.809**
Channel Type	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**
Channel Slopes (H:V)	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**1:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**
Channel Width (ft)	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
Flow Depth (ft)	**0.2**	**0.324**	**0.336**	**0.342**	**0.168**	**0.23**	**0.3**	**0.188**	**0.26**	**0.317**	**0.145**	**0.177**	**0.156**	**0.188**
Flow Velocity (fps)	**1.7**	**1.2**	**1.99**	**2.02**	**2.162**	**1.428**	**0.99**	**0.665**	**2.818**	**1.498**	**1.683**	**2.211**	**2.156**	**1.747**
TR-55 Model Run														
Post Development Conditions: 10 yr - 24 hr.														
Basin Name	**B2**	**B1**	**J**	**K**	**G2**	**G1**	**H**	**F1**	**F2**	**E2**	**E1**	**D**	**A**	**C**
Time of Concentration (TC) (hr)	0.228	0.376	0.276	0.236	0.191	0.315	0.128	0.221	0.197	0.093	0.179	0.191	0.08	0.343
Drainage Area (Am)(mi^2)	0.049	0.078	0.16	0.155	0.041	0.049	0.033	0.018	0.088	0.042	0.028	0.044	0.024	0.042
Rainfall (P) (in)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Runoff Curve Number (CN)	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Rainfall Distribution	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II
Potential Maximum Retention (S) (in)	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158
Runoff (Q) (in)	0.316	0.316	0.081	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316
Initial Abstraction (Ia) (in)	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632
Initial Abstraction / Rainfall (Ia/P)	0.351	0.351	0.351	0.351	0.351	0.351	0.351	0.351	0.351	0.351	0.351	0.351	0.351	0.351
Unit Peak Discharge (Qu) (cfs/mi^2/in)	598.131	461.23	542.621	587.951	654.071	506.586	789.961	608.624	643.973	913.68	674.186	652.899	972.292	484.536
Peak Discharge (Qp = Qu*Am*Q*Fp) (cfs)	**9.284**	**11.315**	**27.443**	**28.836**	**8.435**	**7.887**	**8.274**	**3.444**	**17.954**	**12.072**	**5.95**	**9.067**	**7.339**	**6.406**
Channel Type	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**
Channel Slopes (H:V)	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**1:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**
Channel Width (ft)	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
Flow Depth (ft)	**0.701**	**0.975**	**1.065**	**1.056**	**0.566**	**0.844**	**1.003**	**0.675**	**0.815**	**0.965**	**0.516**	**0.599**	**0.516**	**0.574**
Flow Velocity (fps)	**3.508**	**2.607**	**5.439**	**5.51**	**4.331**	**2.99**	**1.771**	**1.322**	**5.235**	**2.747**	**5.8**	**4.321**	**4.182**	**3.323**
Channel Armament Required (1)	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**

Table 3
Post-Development Conditions Discharge Estimates
Mill Creek TIFID Preliminary Engineering Report

TR-55 Model Run														
Post Development Conditions: 100yr - 24 hr.														
Basin Name	**B2**	**B1**	**J**	**K**	**G2**	**G1**	**H**	**F1**	**F2**	**E2**	**E1**	**D**	**A**	**C**
Time of Concentration (TC) (hr)	0.162	0.305	0.195	0.165	0.13	0.218	0.093	0.154	0.142	0.068	0.128	0.153	0.058	0.323
Drainage Area (Am)(mi^2)	0.049	0.078	0.16	0.155	0.041	0.049	0.033	0.018	0.088	0.042	0.028	0.044	0.024	0.042
Rainfall (P) (in)	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Runoff Curve Number (CN)	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Rainfall Distribution	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II	Type II
Potential Maximum Retention (S) (in)	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158	3.158
Runoff (Q) (in)	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883	0.883
Initial Abstraction (Ia) (in)	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632	0.632
Initial Abstraction / Rainfall (Ia/P)	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226
Unit Peak Discharge (Qu) (cfs/mi^2/in)	801.536	605.383	741.771	795.33	873.99	707.406	988.166	819.064	844.127	1093.926	878.986	820.71	1148.423	589.12
Peak Discharge (Qp = Qu*Am*Q*Fp) (cfs)	**34.807**	**41.547**	**104.95**	**109.123**	**31.533**	**30.813**	**28.953**	**12.965**	**65.838**	**40.434**	**21.704**	**31.886**	**24.251**	**21.791**
Channel Type	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**	**Trap**
Channel Slopes (H:V)	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**1:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**	**3:1; 2:1**
Channel Width (ft)	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
Flow Depth (ft)	**1.306**	**1.762**	**1.97**	**1.986**	**1.139**	**1.774**	**1.779**	**1.303**	**1.461**	**1.679**	**0.956**	**1.109**	**947**	**1.075**
Flow Velocity (fps)	**4.943**	**3.635**	**7.696**	**7.877**	**6.342**	**4.331**	**2.442**	**1.899**	**7.263**	**3.748**	**4.767**	**6.047**	**5.802**	**4.562**
Channel Length (ft)	**1,100**	**2,900**	**5,400**	**4,700**	**3,000**	**3,400**	**800**	**1,000**	**3,700**	**900**	**2,200**	**2,100**	**1,200**	**800**
Channel Armament Required (1)	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**NO**	**NO**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Culvert Requirements (at 2% slope) (2)	**2 X 24 in**	**2 X 36 in**	**6 X 36 in**	**6 X 36 in**	**2 X 24 in**	**NA**	**NA**	**1 X 24 in**	**2 X 36 in**	**NA**	**4 X 24 in**	**NA**	**NA**	**NA**
Volume (cf) (3)	**100,720**	**158,012**	**328,167**	**318,236**	**85,946**	**101,028**	**69,796**	**36,713**	**185,793**	**88,849**	**58,818**	**90,114**	**50,302**	**85,164**
Est. Detention Volume (acre-ft.)	**2.312**	**3.627**	**7.534**	**7.306**	**1.973**	**2.319**	**1.602**	**0.843**	**4.265**	**2.040**	**1.350**	**2.069**	**1.155**	**1.955**
Detention Pond Outlet Pipe (5)	**4" CMP**	**6" CMP**	**6" CMP**	**6" CMP**	**4" CMP**	**4" CMP**	**4" CMP**	**6" CMP**	**6" CMP**	**6" CMP**	**6" CMP**	**4" CMP**	**4" CMP**	**4" CMP**

Notes:

(1) Channel Armament Required based on calculated estimated channel average velocity. Assumes armoring required if channel average velocity is greater than 3 feet per second (fps).

(2) Culvert Requirements sizing calculated based on 100 year, 24 hr. peak flow at each noted road and rail crossing.

(3) Volume is the volume calculated from the storm hydrograph.

(4) Estimated Detention Volume assumes the entire 100 year, 24 hr. storm event water volume will be retained/attenuated and discharged at a flowrate no greater than the 2 year, 24 hr. flowrate for Existing Conditions.

(5) Detention Pond Outlet Pipe sizing based Existing Conditions 2 year, 24 hr. storm event discharge flowrate.

Appendix

Table 2-2a Runoff curve numbers for urban areas [1]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

1 Average runoff condition, and $I_a = 0.2S$.
2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.
3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.
4 Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.
5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands [1]

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment [2]	Hydrologic condition [3]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition, and I_a=0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4]	48	65	73
Woods—grass combination (orchard or tree farm). [5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

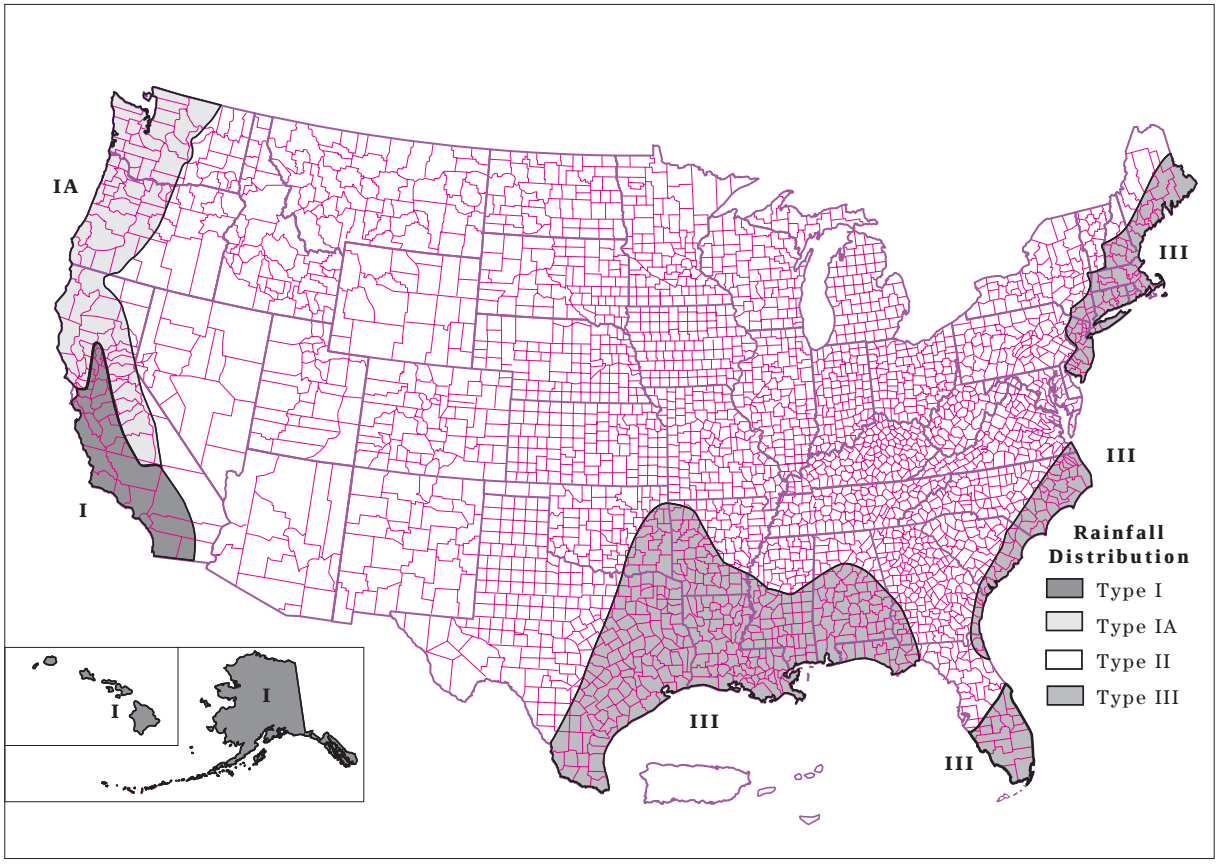
1 Average runoff condition, and $I_a = 0.2S$.
2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.
3 *Poor*: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.
4 Actual curve number is less than 30; use CN = 30 for runoff computations.
5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.
6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition [2]	A [3]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

1 Average runoff condition, and I_a, = 0.2S. For range in humid regions, use table 2-2c.
2 Poor: <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: > 70% ground cover.
3 Curve numbers for group A have been developed only for desert shrub.

Figure B-2 Approximate geographic boundaries for NRCS (SCS) rainfall distributions



Rainfall data sources

This section lists the most current 24-hour rainfall data published by the National Weather Service (NWS) for various parts of the country. Because NWS Technical Paper 40 (TP-40) is out of print, the 24-hour rainfall maps for areas east of the 105th meridian are included here as figures B-3 through B-8. For the area generally west of the 105th meridian, TP-40 has been superseded by NOAA Atlas 2, the Precipitation-Frequency Atlas of the Western United States, published by the National Ocean and Atmospheric Administration.

East of 105th meridian

Hershfield, D.M. 1961. Rainfall frequency atlas of the United States for durations from 30 minutes to 24 hours and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 40. Washington, DC. 155 p.

West of 105th meridian

Miller, J.F., R.H. Frederick, and R.J. Tracey. 1973. Precipitation-frequency atlas of the Western United States. Vol. I Montana; Vol. II, Wyoming; Vol III, Colorado; Vol. IV, New Mexico; Vol V, Idaho; Vol. VI, Utah; Vol. VII, Nevada; Vol. VIII, Arizona; Vol. IX, Washington; Vol. X, Oregon; Vol. XI, California. U.S. Dept. of Commerce, National Weather Service, NOAA Atlas 2. Silver Spring, MD.

Alaska

Miller, John F. 1963. Probable maximum precipitation and rainfall-frequency data for Alaska for areas to 400 square miles, durations to 24 hours and return periods from 1 to 100 years. U.S. Dept. of Commerce, Weather Bur. Tech. Pap. No. 47. Washington, DC. 69 p.

Hawaii

Weather Bureau. 1962. Rainfall-frequency atlas of the Hawaiian Islands for areas to 200 square miles, durations to 24 hours and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 43. Washington, DC. 60 p.

Puerto Rico and Virgin Islands

Weather Bureau. 1961. Generalized estimates of probable maximum precipitation and rainfall-frequency data for Puerto Rico and Virgin Islands for areas to 400 square miles, durations to 24 hours, and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 42. Washington, DC. 94 P.

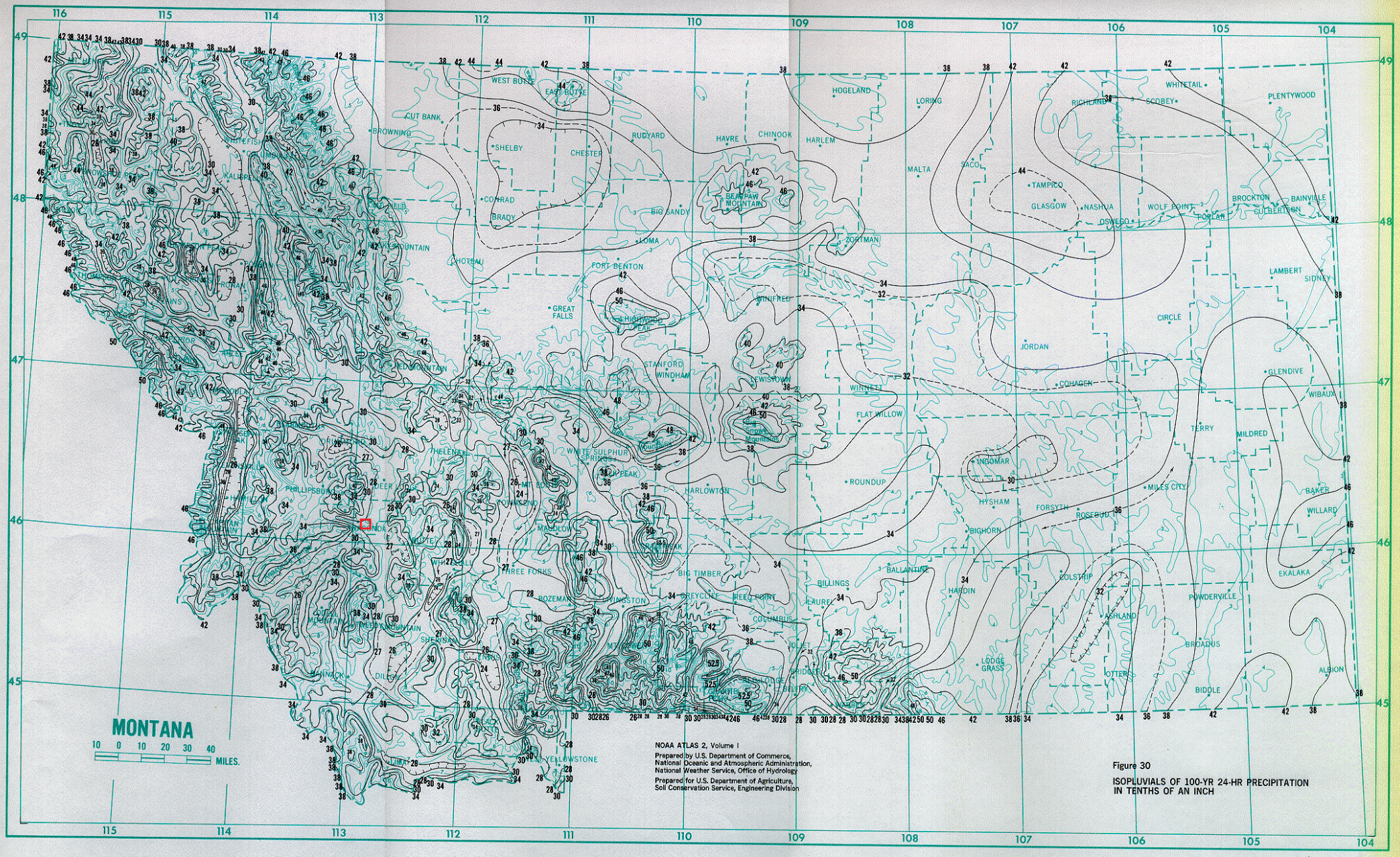
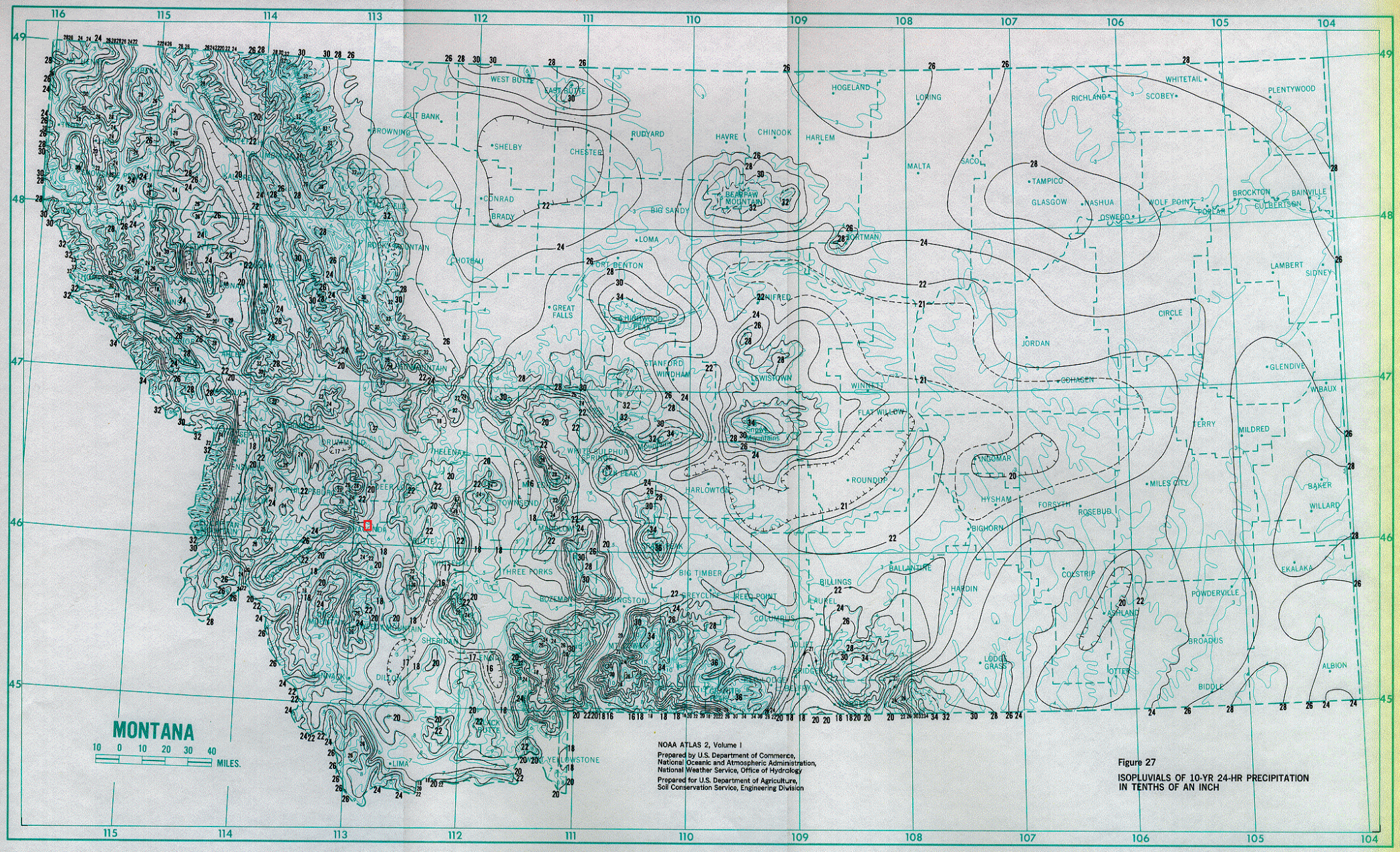


Figure 30

ISOPLUVIALS OF 100-YR 24-HR PRECIPITATION IN TENTHS OF AN INCH



NOAA ATLAS 2, Volume I

Prepared by U.S. Department of Commerce,
National Oceanic and Atmospheric Administration,
National Weather Service, Office of Hydrology

Prepared for U.S. Department of Agriculture,
Soil Conservation Service, Engineering Division

Figure 27

ISOPLUVIALS OF 10-YR 24-HR PRECIPITATION
IN TENTHS OF AN INCH

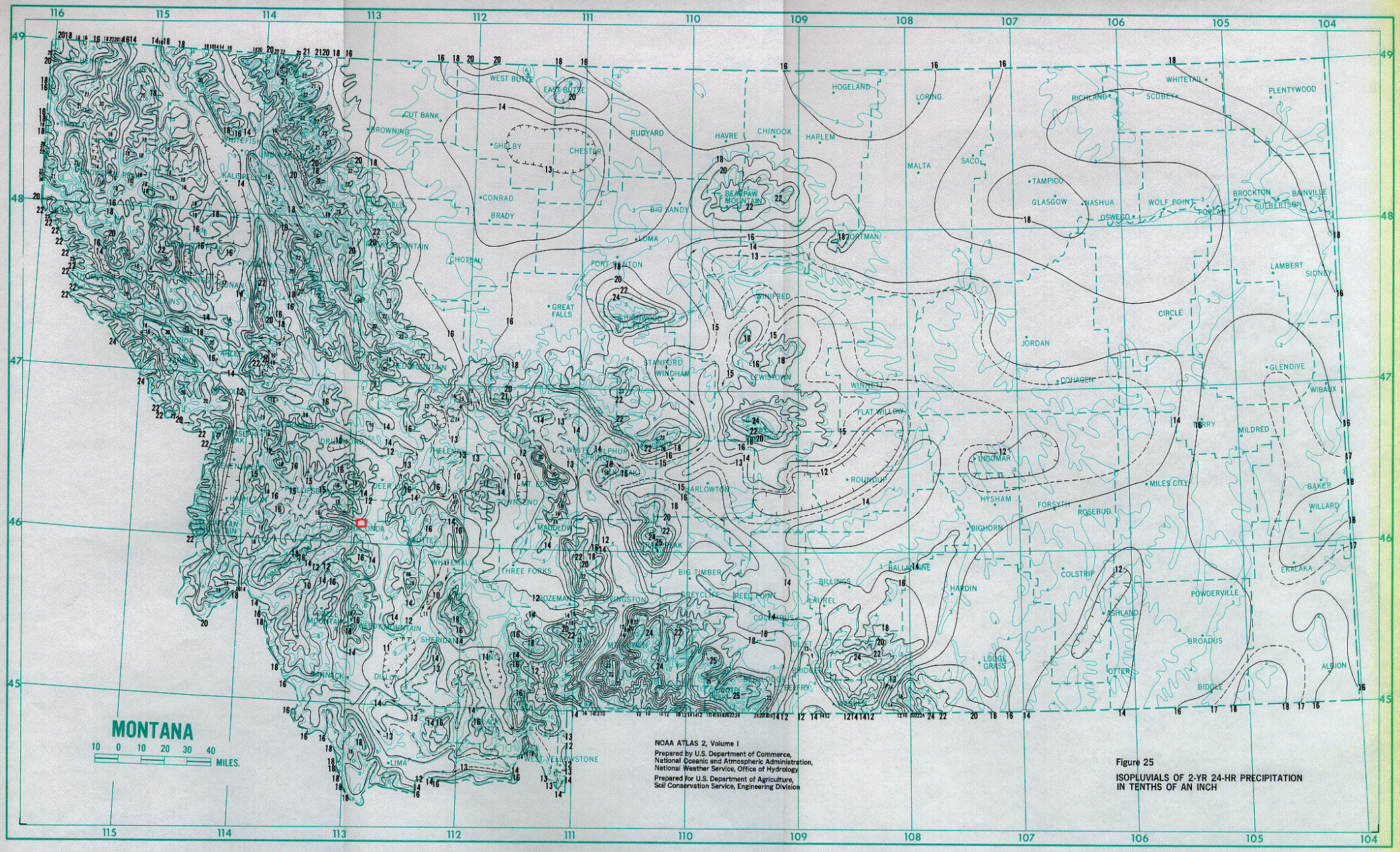


Figure 25

ISOPLUVIALS OF 2-YR 24-HR PRECIPITATION IN TENTHS OF AN INCH

Show

Manning's n Values

Reference tables for Manning's n values for Channels, Closed Conduits Flowing Partially Full, and Corrugated Metal Pipes.

Manning's n for Channels (Chow, 1959).

Type of Channel and Description	Minimum	Normal	Maximum
Natural streams - minor streams (top width at floodstage < 100 ft)			
1. Main Channels			
a. clean, straight, full stage, no rifts or deep pools	0.025	0.030	0.033
b. same as above, but more stones and weeds	0.030	0.035	0.040
c. clean, winding, some pools and shoals	0.033	0.040	0.045
d. same as above, but some weeds and stones	0.035	0.045	0.050
e. same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
f. same as "d" with more stones	0.045	0.050	0.060
g. sluggish reaches, weedy, deep pools	0.050	0.070	0.080
h. very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150
2. Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stages			
a. bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050
b. bottom: cobbles with large boulders	0.040	0.050	0.070
3. Floodplains			
a. Pasture, no brush			
1.short grass	0.025	0.030	0.035
2. high grass	0.030	0.035	0.050
b. Cultivated areas			
1. no crop	0.020	0.030	0.040
2. mature row crops	0.025	0.035	0.045
3. mature field crops	0.030	0.040	0.050
c. Brush			
1. scattered brush, heavy weeds	0.035	0.050	0.070
2. light brush and trees, in winter	0.035	0.050	0.060
3. light brush and trees, in summer	0.040	0.060	0.080
4. medium to dense brush, in winter	0.045	0.070	0.110
5. medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. dense willows, summer, straight	0.110	0.150	0.200

2. cleared land with tree stumps, no sprouts	0.030	0.040	0.050
3. same as above, but with heavy growth of sprouts	0.050	0.060	0.080
4. heavy stand of timber, a few down trees, little undergrowth, flood stage below branches	0.080	0.100	0.120
5. same as 4. with flood stage reaching branches	0.100	0.120	0.160
4. Excavated or Dredged Channels			
a. Earth, straight, and uniform			
1. clean, recently completed	0.016	0.018	0.020
2. clean, after weathering	0.018	0.022	0.025
3. gravel, uniform section, clean	0.022	0.025	0.030
4. with short grass, few weeds	0.022	0.027	0.033
b. Earth winding and sluggish			
1. no vegetation	0.023	0.025	0.030
2. grass, some weeds	0.025	0.030	0.033
3. dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
4. earth bottom and rubble sides	0.028	0.030	0.035
5. stony bottom and weedy banks	0.025	0.035	0.040
6. cobble bottom and clean sides	0.030	0.040	0.050
c. Dragline-excavated or dredged			
1. no vegetation	0.025	0.028	0.033
2. light brush on banks	0.035	0.050	0.060
d. Rock cuts			
1. smooth and uniform	0.025	0.035	0.040
2. jagged and irregular	0.035	0.040	0.050
e. Channels not maintained, weeds and brush uncut			
1. dense weeds, high as flow depth	0.050	0.080	0.120
2. clean bottom, brush on sides	0.040	0.050	0.080
3. same as above, highest stage of flow	0.045	0.070	0.110
4. dense brush, high stage	0.080	0.100	0.140
5. Lined or Constructed Channels			
a. Cement			
1. neat surface	0.010	0.011	0.013
2. mortar	0.011	0.013	0.015
b. Wood			
1. planed, untreated	0.010	0.012	0.014
2. planed, creosoted	0.011	0.012	0.015
3. unplaned	0.011	0.013	0.015
4. plank with battens	0.012	0.015	0.018
5. lined with roofing paper	0.010	0.014	0.017
c. Concrete			
1. trowel finish	0.011	0.013	0.015
2. float finish	0.013	0.015	0.016

3. finished, with gravel on bottom	0.015	0.017	0.020
4. unfinished	0.014	0.017	0.020
5. gunite, good section	0.016	0.019	0.023
6. gunite, wavy section	0.018	0.022	0.025
7. on good excavated rock	0.017	0.020	
8. on irregular excavated rock	0.022	0.027	
d. Concrete bottom float finish with sides of:			
1. dressed stone in mortar	0.015	0.017	0.020
2. random stone in mortar	0.017	0.020	0.024
3. cement rubble masonry, plastered	0.016	0.020	0.024
4. cement rubble masonry	0.020	0.025	0.030
5. dry rubble or riprap	0.020	0.030	0.035
e. Gravel bottom with sides of:			
1. formed concrete	0.017	0.020	0.025
2. random stone mortar	0.020	0.023	0.026
3. dry rubble or riprap	0.023	0.033	0.036
f. Brick			
1. glazed	0.011	0.013	0.015
2. in cement mortar	0.012	0.015	0.018
g. Masonry			
1. cemented rubble	0.017	0.025	0.030
2. dry rubble	0.023	0.032	0.035
h. Dressed ashlar/stone paving	0.013	0.015	0.017
i. Asphalt			
1. smooth	0.013	0.013	
2. rough	0.016	0.016	
j. Vegetal lining	0.030		0.500

Manning's n for Closed Conduits Flowing Partly Full (Chow, 1959).

Type of Conduit and Description	Minimum	Normal	Maximum
1. Brass, smooth:	0.009	0.010	0.013
2. Steel:			
Lockbar and welded	0.010	0.012	0.014
Riveted and spiral	0.013	0.016	0.017
3. Cast Iron:			
Coated	0.010	0.013	0.014
Uncoated	0.011	0.014	0.016
4. Wrought Iron:			
Black	0.012	0.014	0.015
Galvanized	0.013	0.016	0.017
5. Corrugated Metal:			
Subdrain	0.017	0.019	0.021
Stormdrain	0.021	0.024	0.030

6. Cement:			
Neat Surface	0.010	0.011	0.013
Mortar	0.011	0.013	0.015
7. Concrete:			
Culvert, straight and free of debris	0.010	0.011	0.013
Culvert with bends, connections, and some debris	0.011	0.013	0.014
Finished	0.011	0.012	0.014
Sewer with manholes, inlet, etc., straight	0.013	0.015	0.017
Unfinished, steel form	0.012	0.013	0.014
Unfinished, smooth wood form	0.012	0.014	0.016
Unfinished, rough wood form	0.015	0.017	0.020
8. Wood:			
Stave	0.010	0.012	0.014
Laminated, treated	0.015	0.017	0.020
9. Clay:			
Common drainage tile	0.011	0.013	0.017
Vitrified sewer	0.011	0.014	0.017
Vitrified sewer with manholes, inlet, etc.	0.013	0.015	0.017
Vitrified Subdrain with open joint	0.014	0.016	0.018
10. Brickwork:			
Glazed	0.011	0.013	0.015
Lined with cement mortar	0.012	0.015	0.017
Sanitary sewers coated with sewage slime with bends and connections	0.012	0.013	0.016
Paved invert, sewer, smooth bottom	0.016	0.019	0.020
Rubble masonry, cemented	0.018	0.025	0.030

Manning's n for Corrugated Metal Pipe (AISI, 1980).

Type of Pipe, Diameter and Corrugation Dimension	n
1. Annular 2.67 x 1/2 inch (all diameters)	0.024
2. Helical 1.50 x 1/4 inch	
8" diameter	0.012
10" diameter	0.014
3. Helical 2.67 x 1/2 inch	
12" diameter	0.011
18" diameter	0.014
24" diameter	0.016
36" diameter	0.019
48" diameter	0.020
60" diameter	0.021
4. Annular 3x1 inch (all diameters)	0.027
5. Helical 3x1 inch	
48" diameter	0.023
54" diameter	0.023
60" diameter	0.024
66" diameter	0.025

72" diameter	0.026
78" diameter and larger	0.027
6. Corrugations 6x2 inches	
60" diameter	0.033
72" diameter	0.032
120" diameter	0.030
180" diameter	0.028

FishXing Version 3.0 Beta, 2006

Appendix A Hydrologic Soil Groups

Soils are classified into hydrologic soil groups (HSG's) to indicate the minimum rate of infiltration obtained for bare soil after prolonged wetting. The HSG's, which are A, B, C, and D, are one element used in determining runoff curve numbers (see chapter 2). For the convenience of TR-55 users, exhibit A-1 lists the HSG classification of United States soils.

The infiltration rate is the rate at which water enters the soil at the soil surface. It is controlled by surface conditions. HSG also indicates the transmission rate—the rate at which the water moves within the soil. This rate is controlled by the soil profile. Approximate numerical ranges for transmission rates shown in the HSG definitions were first published by Musgrave (USDA 1955). The four groups are defined by SCS soil scientists as follows:

Group A soils have low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sand or gravel and have a high rate of water transmission (greater than 0.30 in/hr).

Group B soils have moderate infiltration rates when thoroughly wetted and consist chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission (0.15-0.30 in/hr).

Group C soils have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine texture. These soils have a low rate of water transmission (0.05-0.15 in/hr).

Group D soils have high runoff potential. They have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very low rate of water transmission (0-0.05 in/hr).

In exhibit A-1, some of the listed soils have an added modifier; for example, "Abrazo, gravelly." This refers to a gravelly phase of the Abrazo series that is found in SCS soil map legends.

Disturbed soil profiles

As a result of urbanization, the soil profile may be considerably altered and the listed group classification may no longer apply. In these circumstances, use the following to determine HSG according to the texture of the new surface soil, provided that significant compaction has not occurred (Brakensiek and Rawls 1983).

HSG	*Soil textures*
A	Sand, loamy sand, or sandy loam
B	Silt loam or loam
C	Sandy clay loam
D	Clay loam, silty clay loam, sandy clay, silty clay, or clay

Drainage and group D soils

Some soils in the list are in group D because of a high water table that creates a drainage problem. Once these soils are effectively drained, they are placed in a different group. For example, Ackerman soil is classified as A/D. This indicates that the drained Ackerman soil is in group A and the undrained soil is in group D.