FINDING OF NO SIGNIFICANT IMPACT
FOR THE CITY OF BOZEMAN
WATER TREATMENT PLANT IMPROVEMENTS PROJECT

TO: ALL INTERESTED PERSONS

Date: February 14, 2011
Action: Replace the city's existing water treatment plant with a new membrane filtration facility, upgrade the water intake on Sourdough Creek and construct a new flow control structure on the Sourdough Creek source water supply line.
Location of Project: Bozeman, Montana
DWSRF Funding: $19,500,000
Total Project Cost: $40,720,000

An environmental review has been conducted by the Montana Department of Environmental Quality for the proposed improvements to the water system serving the city of Bozeman. The purpose of the project is to make improvements to the city's water system that are needed to ensure an adequate supply of water meeting state and federal drinking water rules.

The affected environment will be primarily on the sites of existing water system facilities at the Sourdough Creek intake and the water treatment plant. The human environment affected will include the Bozeman water and wastewater service area. Based on the information provided in the references below, the project is not expected to have any significant adverse impacts upon terrestrial and aquatic life or habitat, including endangered species, water quality or quantity, air quality, geological features, cultural or historical features, or social quality.

This project will be funded in part with a low-interest loan from the Montana Drinking Water State Revolving Fund (DWSRF) Program, administered by the Montana Department of Environmental Quality and the Montana Department of Natural Resources and Conservation.

The Department of Environmental Quality utilized the following references in completing its environmental review of this project:

- City of Bozeman Water Facility Plan, 2005, prepared by Allied Engineering Services, Bozeman, Montana, and Robert Peccia and Associates, Helena, Montana.

- City of Bozeman Hyalite/Sourdough WTP Replacement Project Preliminary Design Report, October 2010, prepared by HDR, Missoula, Montana, and Morrison-Maierle, Bozeman, Montana.
- Uniform Application Form for Montana Public Facility Projects, submitted to the Montana Department of Environmental Quality by the City of Bozeman on January 3, 2011.
- Sustainability and Climate Action Plan Technical Memorandum, October 15, 2010, prepared by Nathan Kutil, HDR, Missoula, Montana, and James Nicholson, Morrison-Maierle, Bozeman, Montana.

These references are available for review upon request by contacting:

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Comments on this finding or on the environmental assessment may be submitted to the Department of Environmental Quality at the above address. Comments must be postmarked no later than April 1, 2011. After evaluating all substantive comments received, the department will revise the environmental assessment or determine if an environmental impact statement is necessary. Otherwise, this finding of no significant impact will stand if no substantive comments are received during the comment period or if substantive comments are received and evaluated and the environmental impacts are still determined to be non-significant.

Signed,

_____
Todd Teegarden, Chief
Technical & Financial Assistance Bureau

c: file

CITY OF BOZEMAN
WATER TREATMENT PLANT

ENVIRONMENTAL ASSESSMENT

I. COVER SHEET

A. PROJECT IDENTIFICATION

Applicant:	City of Bozeman
Address:	P.O. Box 1230 Bozeman, MT 59771

B. CONTACT PERSON

Name:	Bob Murray City of Bozeman
Address:	P.O. Box 1230 Bozeman, MT 59771
Telephone:	(406) 582-2269

C. ABSTRACT

The water system serves the city of Bozeman, Montana, as shown on Figure 1, by providing drinking water to 17,124 households with a total population of 39,442. While remaining in regulatory compliance, the city's water treatment plant has three limitations:

1. Many key components are at the end of their useful lives and some replacement equipment is no longer manufactured,
2. The plant's direct filtration process is effective most of the year, but efficiency drops to 70 percent when source water turbidity is high during spring runoff or thunderstorms, and
3. Rapid population growth has increased water demand to the point where the plant operates at its maximum capacity during peak day use.

The city proposes to replace the existing water treatment plant with a new facility capable of treating 22 million gallons per day (MGD) and expandable to 36 MGD. The proposed facility, which will be housed in a new energy-efficient building adjacent to the existing plant, will continue to be supplied by the source water intake on Hyalite Creek, along with an upgraded water intake on Sourdough Creek and a new flow control structure on the Sourdough Creek source water supply line.

The City of Bozeman Water Facility Plan prepared by Allied Engineering Services and Robert Peccia and Associates in 2005 included consideration of

water treatment plant improvements with present worth capital costs ranging from $2,553,250 for a short-term upgrade to $33,876,961 for a new facility using contact adsorption clarification (CAC) treatment technology. In an October 2010 preliminary design report prepared by HDR and Morrison-Maierle, construction costs for the chosen treatment alternative, a membrane filtration treatment plant, were refined and adjusted upward for inflation to $34,448,304. When engineering and administration costs were included the total project budget was estimated to be $40,874,104.

Constructed in 1983, the existing treatment plant uses a direct filtration process. The original facility, which had twin flocculation basins and eight filter units, was increased to a treatment capacity of 15 MGD in 1993 with the addition of four filters. The treatment facility, including coagulant feed, fluoridation and chlorination facilities, is housed in a single-story metal building.

Five treatment process and facility alternatives were evaluated in the water facility plan. After comparison using the technical, financial and environmental criteria, construction of a new membrane filtration plant emerged as the preferred alternative. A public hearing on the 2005 Water Facility Plan was held during a regularly scheduled meeting of the Bozeman City Commission on Monday, October 9, 2006. Although no members of the public attended the meeting, it was broadcast over the public television station. After presentations by city staff and the city's consultant, the commission voted unanimously to adopt the plan.

Based on the recommendations of the facility plan and preliminary design report, the following project scope of work was selected:

1. Replace the existing Hyalite/Sourdough Water Treatment Plant with a new membrane filtration facility with a peak capacity of 22 MGD.
2. Upgrade the intake on Sourdough Creek.
3. Provide a new flow control valve on the Sourdough source waterline.

The city conducted a pilot study in 2010 to determine the acceptable membrane manufacturers for the new treatment facility. Based on the results of that study and a competitive bidding process, membranes manufactured by the Pall Corporation were selected. Subsequently, the Montana Department of Environmental Quality (MDEQ) conditionally approved the use of Pall's Microza UNA-620A membranes for installation at the plant. The proposed water treatment process will consist of grit removal, coagulant injection, flocculation, sedimentation and membrane filtration followed by disinfection with sodium hypochlorite, pH adjustment with sodium hydroxide, and fluoridation. Solids from the pretreatment operations will be processed in a gravity thickener, with the addition of sodium bisulfate, sodium hydroxide and polymer if needed to promote settling. Clarified effluent from the settling process will be discharged to Sourdough Creek or pumped to the headworks of the plant. Dried solids will be trucked to a landfill or disposed of per MDEQ regulations.

The proposed water treatment improvements will enable the city to remain in compliance with the Safe Drinking Water Act and will ensure that drinking water meeting state and federal regulations will continue to be reliably provided to all consumers.

Since the project will be funded in part by a Drinking Water State Revolving Fund loan, this environmental assessment was prepared to satisfy the requirements of the Montana Environmental Policy Act and the National Environmental Policy Act. Environmentally sensitive characteristics such as wetlands, floodplains and threatened or endangered species are not expected to be adversely impacted as a consequence of the proposed project. No significant long-term environmental impacts were identified during the preparation of this document.

D. COMMENT PERIOD

Thirty (30) calendar days.

II. PURPOSE AND NEED FOR ACTION

A. EXISTING WATER SUPPLY SYSTEM

The existing water treatment plant is nearing the end of its useful life. The plant was designed to take advantage of relatively clean source water; however, turbidity spikes from storms and high runoff limit the treatment efficiency and capacity of the plant. Designed to treat 15 MGD, the plant operates at its maximum capacity during peak days of water demand, and additional population growth is expected to increase the need for more water treatment capacity. Furthermore, much of the plant equipment is old and difficult to maintain and replacement parts are hard to find.

B. PROPOSED PROJECT

The proposed project includes the following improvements:

1. A new building on city property adjacent to the existing water treatment plant,
2. New office, laboratory, workshop and maintenance facilities,
3. Reconstruction of the existing Sourdough Creek intake,
4. New Sourdough Creek source water flow control facilities,
5. Grit removal facilities,
6. Chemical rapid mix, coagulation, flocculation and sedimentation facilities,
7. A membrane filtration system with 22 MGD capacity, expandable to 36 MGD, including membrane feed pumping, source water strainers, compressed air, reverse filtration pumping, chemical cleaning, cleaning waste neutralization and instrumentation and controls,

8. Hypochlorination, fluoridation, sodium hydroxide and aluminum chlorohydrate chemical feed systems,
9. Backwash waste handling facilities, including a waste sump, a dissolved air flotation thickener, gravity thickener flexibility, drying beds and a system upset standby lagoon,
10. Standby power generation, instrumentation and control and security systems.

Proper water treatment is essential for the protection of public health and safety. By constructing replacement treatment facilities for the city's water system, adequately treated water will continue to be delivered to the users of the system and public health and safety with respect to the water supply will be ensured.

III. ALTERNATIVES INCLUDING THE PROPOSED ACTION

A. WATER TREATMENT ALTERNATIVES

The following alternative approaches for addressing the city's water treatment needs were considered:

Alternative 1 – SHORT-TERM WATER TREATMENT PLANT UPGRADE – A number of improvements would be made to the building and facilities, treatment units, chemical feed systems, instrumentation and controls, pumps and compressors, and backwash water handling facilities. This alternative, when proposed in the 2005 facility plan, was projected to allow the existing plant to continue functioning for another five years.

Alternative 2A – ADD CONTACT ADSORPTION CLARIFICATION TO EXISTING WTP – In addition to the short-term upgrades of Alternative 1, new contact adsorption clarification (CAC) equipment, complete with mixed media filters, would be added to the existing plant. CAC is a solids removal process that would increase plant capacity whenever high seasonal turbidity is present in the source water. A new insulated metal building constructed on city property would house the new facilities. In the 2005 facility plan this alternative was projected to allow the existing plant to continue functioning for another ten years.

Alternative 2B – ADD MEMBRANE FILTRATION TO EXISTING WTP – This is a variation of Alternative 2A. In addition to the short-term upgrades of Alternative 1, new membrane filters would be added to the existing plant. Similar to the CAC proposal, membranes would be used to increase plant capacity whenever high seasonal turbidity occurs. The building to house the new facilities would be significantly smaller than under Alternative 2A. In the 2005 facility plan Alternative 2B was projected to allow the existing plant to continue functioning for another ten years.

Alternative 3 – NEW CONTACT ADSORPTION CLARIFICATION WTP – Under this alternative, the existing plant would be replaced with a completely new treatment facility employing the CAC process. A new 36,540 square foot building sited directly north of the existing plant would be needed to house the new CAC units and filter equipment, chemical feed systems, backwash water handling facilities, mechanical equipment and instrumentation and controls. The plant would have a capacity of 22 MGD, expandable to the 36 MGD needed to meet 2025 peak water demands.

Alternative 4 – NEW MEMBRANE FILTRATION WTP – Under this alternative, the existing plant would be replaced with a completely new treatment facility employing membrane filtration. Since membranes have a smaller footprint than CAC units, the new building constructed for the membrane facilities and related equipment would be half the size needed for Alternative 3. The membrane plant would have an initial capacity of 22 MGD, expandable to the 36 MGD needed to meet 2025 peak water demands.

NO ACTION – This alternative would involve the continued use of the existing facilities without any major modifications. Consequences of inaction would include increasingly inefficient plant operation due to outdated and aging equipment, difficulty providing safe and sufficient water during storms and spring runoff, and failure to provide sufficient water during peak demands from a growing population.

Detailed cost analyses were conducted on the treatment alternatives as part of the 2005 City of Bozeman Water Facility Plan.

B. CAPITAL COST COMPARISONS

Table 1 provides a summary of alternative costs and useful lives. All costs are taken from the City of Bozeman Water Facility Plan and are given as present worth capital costs as of 2005 using an interest rate of 6 percent. Although not shown in Table 1 here, the facility plan also listed estimated annual operating costs, annual equivalent costs (again, based on an interest rate of 6 percent) and annual equivalent costs per MGD capacity for each alternative. The annual equivalent cost per MGD capacity ranged from a low of $101,967 for Alternative 1 to a high of $134,519 for Alternative 3.

Table 1. Alternative Evaluation

Alternative	Useful Life	Present Worth Capital Cost
1. Short-Term WTP Upgrade	5+ years	$2,553,250
2A. Add CAC Peaking Plant to Existing WTP	10 years	$10,291,872
2B. Add Membrane Peaking Plant to Existing WTP	10 years	$10,565,582
3. New CAC Treatment Plant	20 years	$33,876,961
4. New Membrane Filter Treatment Plant	20 years	$30,245,549

These alternatives were subjected to further analysis with a comparative ranking for a range of criteria. The results of this ranking are listed in Table 2.

Table 2. Comparative Ranking of Water Treatment Plant Alternatives

Ranking Criteria	Alt. 1	Alt. 2A	Alt. 2B	Alt. 3	Alt. 4
Annual Equivalent Cost per MGD Capacity	5	3	3	1	3
Useful Life to Meet Long-Term Water Needs	1	3	3	5	5
Operational Requirements and Complexity	3	2	2	4	5
Energy Requirements per MGD Capacity	1	3	3	3	5
Regulatory Compliance Capability	2	3	4	4	5
Environmental Considerations	2	3	5	3	4
Constructability	2	4	4	5	5
Summation of Categorical Rankings	**16**	**21**	**24**	**25**	**32**

The selection of Alternative 4 was supported by the following factors:

1. It addresses the long-term needs for the city, whereas the first three alternatives provide only short-term solutions.
2. Membrane filtration is less costly than the CAC process, and offers better options for expansion to meet future water demands.
3. Membrane filtration provides a "positive barrier" to pathogens and is best able to comply with new regulations regarding particulate and pathogen removal in drinking water.

C. TOTAL ESTIMATED COSTS

The current total estimated construction cost of the proposed project, including administrative, legal, engineering, construction and contingency, is $40,720,000 based on implementation of the preferred alternative. In addition, the city will be required to maintain a reserve of $1,400,000 as a condition of the loan from the Montana Drinking Water State Revolving Fund loan program. The city plans to use $22,620,000 of its own funds for the project, with the remaining provided through a $19,500,000 low-interest loan from the Montana Drinking Water State Revolving Fund loan program.

IV. AFFECTED ENVIRONMENT

A. PLANNING AREA

The service area recommended in the 2005 City of Bozeman Water Facility Plan covers 42,400 acres (see Figure 2). The service area is based on the study area of the Bozeman 2020 Community Plan and includes all of the service area in the city's 1998 wastewater facility plan, along with some small additions based on growth trends. Most of the recommended service area is within current Bozeman city limits, but includes surrounding land where development is expected in the next 20 years.

The service area population is 39,442, according to the Drinking Water State Revolving Fund loan application submitted to the state on January 3, 2011. An annual growth rate of 5 percent was assumed in determining future water demands. Service connections are equipped with radio read meters to measure water usage.

Construction of the proposed project is expected to take up to two years following the award of a contract. Bid opening is anticipated in the spring of 2011, with construction beginning in summer of 2011.

B. FLOW PROJECTIONS

Projected water use is based on data presented in the 2005 City of Bozeman Water Facility Plan. Table 4.A.2 of that report lists a 2025 average day demand of 15.08 MGD and a peak day demand of 34.68 MGD. These numbers are based

on a per capita daily water use of 170 gallons, a 2025 population of 88,700 and a 2.30 ratio of peak to average day.

C. NATURAL FEATURES

Bozeman is located in southwest Montana along Interstate 90 in Gallatin County (see Figure 1) at an elevation of 4,820 feet in a large, open intermountain valley surrounded by the Bridger, Horseshoe Hills, Big Belt, Gallatin and Madison mountain ranges. The planning area generally consists of land that is moderately sloped from south to north, though the northeast corner of the planning area is steeper, with varied terrain. The area is bisected by a variety of ditches, creeks and rivers. Water bodies include the East Gallatin River, Bozeman Creek, Rocky Creek and Bridger Creek. A network of small creeks and irrigation ditches crosses the westerly side of the planning area. Groundwater is near the surface in many areas within the planning area, which provides for a significant amount of wetlands.

Bozeman experiences a dry, continental climate. Summer is generally pleasant, with cool nights; moderately warm, sunny days; and slight to moderate breezes. Most rainfall is in the form of showers or thunderstorms and usually occurs in the late spring or early summer months. High temperatures rarely reach 100 degrees F., and an average year will have only 15 days with maximums of 90 degrees F. or higher. Freezing does not occur in July, rarely in mid-June or August, and more often in May and September. However, on rare occasions frost may occur in low-lying areas at any time of the year. Subzero cold waves are common in the winter, and these periods may last for several days. Average annual precipitation is 19.3 inches, with April, May and June the wettest months. Hail is observed occasionally during summer rainsqualls and thunderstorms. Although the average annual precipitation is low enough to classify the area as semi-arid, about 70 percent of the annual total precipitation normally falls during the April to September growing season. The combination of ideal temperatures during the growing season, long hours of summer sunshine and 7 to 10 inches of precipitation from May through September make the climate favorable for dryland farming. Heavy fog seldom occurs and is limited to about one or two days per month, lasting only a small part of the day. Although the area does receive slight to moderate average wind speeds, strong or extremely strong winds of over 70 mph are not commonly observed.

Although there are designated floodplains within the service area, all of the proposed construction work on water system facilities is outside of the 500-year and 100-year floodplains, as defined by the Federal Emergency Management Agency maps. Similarly, none of the proposed construction is expected to affect streams or wetlands.

The U.S. Fish and Wildlife Service identifies six species in Montana as endangered and seven species as threatened. The endangered animal species include the whooping crane, black-footed ferret, gray wolf, pallid sturgeon, white sturgeon and least tern. Threatened animal species in the state include the grizzly

bear, Canada lynx, piping plover and bull trout. Threatened plant species are the Spalding's campion, water howellia and Ute ladies'-tresses. Additionally, two animal species, the yellow-billed cuckoo and greater sage-grouse, are listed as candidates for threatened or endangered designation. No impact on any of these species is anticipated as a consequence of the proposed project.

Construction will take place on the sites of existing water system facilities, as shown on the Sourdough intake and water treatment plant sites on the attached location map (Figure 5-1 from the preliminary engineering report). Existing native trees, shrubs, brush and other vegetation will be preserved and native grasses will be seeded throughout the project sites. Furthermore, the sites are not considered prime habitat for wildlife, and as a result no impacts on wildlife are anticipated.

V. ENVIRONMENTAL IMPACTS OF PROPOSED PROJECT

A. DIRECT AND INDIRECT ENVIRONMENTAL IMPACTS

1. Housing and Commercial Development – Developed land use within the city limits is a mix of commercial, industrial and residential. The proposed improvements are not expected to have an impact on housing or any future commercial or industrial development.

2. Future Land Use – No adverse impacts to land use are expected from the proposed project.

3. Floodplains and Wetlands – As discussed previously, the construction sites are not in the 100-year and 500-year floodplains. No wetlands have been identified at the proposed construction sites.

4. Cultural Resources – The proposed construction sites are on previously disturbed land, so there is a low probability that cultural properties will be impacted, and a cultural resource inventory was not conducted. The state Historic Preservation Office will be immediately contacted in the event any cultural resources are identified during construction.

5. Fish and Wildlife – No impacts on biological resources in the area are anticipated as a result of the proposed project.

6. Water Quality – Impacts on water quality are expected to be minor and short-term. Short-term impacts on water quality can be controlled through proper construction practices.

7. Air Quality - Short-term negative impacts on air quality may occur from heavy equipment, dust and exhaust fumes during project construction. Proper construction practices and dust abatement measures will be implemented during construction to control dust, thus minimizing this problem.

8. Public Health – The proposed project is not expected to have adverse impacts on public health.

9. Energy – A number of energy and resource conservation measures will be incorporated into the project. Leadership in Energy and Environmental Design (LEED) accredited design professionals are included on the design team, and consideration will be given to energy-efficient heating, lighting and motor selection. The existing treatment plant building will be replaced with a well-insulated and efficiently heated and ventilated structure. During construction of the proposed project, energy will be consumed, causing a direct short-term impact on this resource. Although energy will be expended in the operation of the new treatment facilities, improved efficiency should be achieved by applying LEED principles.

10. Noise - Short-term impacts from increased noise levels may occur during construction of the proposed project improvements. Construction is anticipated to take about two years and should take place primarily during daylight hours.

11. Hazardous Facilities – There are no known hazardous waste sites or flammable hazards in the project area.

B. UNAVOIDABLE ADVERSE IMPACTS

Short-term construction-related impacts, such as noise, dust and traffic disruption, will occur but can be minimized through proper construction management. Energy consumption during construction and operation of the new facilities cannot be avoided.

VI. AGENCIES CONSULTED

No federal or state agencies were contacted for comments regarding the proposed construction of this project. This environmental assessment will be circulated to the following agencies during the public comment period:

A. The Montana Department of Fish, Wildlife and Parks.

B. The Montana Environmental Quality Council.

C. The Montana Department of Transportation.

D. The U.S. Fish and Wildlife Service.

E. The U.S. Army Corps of Engineers.

F. The Montana Historical Society's Historic Preservation Office.

G. The Montana Department of Natural Resources and Conservation.

H. The Montana Department of Environmental Quality.

VII. PUBLIC PARTICIPATION

The proposed project was considered at a public meeting of the city commission on October 9, 2006. There were no objections presented to the project at this meeting. Subsequently, the commission voted to proceed with the project.

VIII. REFERENCE DOCUMENTS

The following documents were used in the environmental review of this project and are considered to be part of the project file:

A. City of Bozeman Water Facility Plan, 2005, prepared by Allied Engineering Services, Bozeman, Montana, and Robert Peccia and Associates, Helena, Montana.

B. City of Bozeman Hyalite/Sourdough WTP Replacement Project Preliminary Design Report, October 2010, prepared by HDR, Missoula, Montana, and Morrison-Maierle, Bozeman, Montana.

C. Uniform Application Form for Montana Public Facility Projects, submitted to the Montana Department of Environmental Quality by the City of Bozeman on January 3, 2011.

D. Sustainability and Climate Action Plan Technical Memorandum, October 15, 2010, prepared by Nathan Kutil, HDR, Missoula, Montana, and James Nicholson, Morrison-Maierle, Bozeman, Montana.

IX. AGENCY ACTION, APPLICABLE REGULATIONS AND PERMITTING AUTHORITIES

The city must receive approval from the Department of Environmental Quality to construct and operate the water system improvements outlined in this environmental assessment. In addition, the proposed action may require other permits that must be obtained by the city's construction contractor, as described in the project manual approved by the department. The contractor will be required to submit the necessary documentation, including a notice of intent and storm water pollution prevention plan, to the department's storm water permitting program prior to beginning construction.

X. RECOMMENDATION FOR FURTHER ENVIRONMENTAL ANALYSIS

☐ EIS ☐ More Detailed EA ☑ No Further Analysis

Rationale for Recommendation: Through this environmental assessment, the department has determined that none of the adverse impacts of the proposed project are significant.

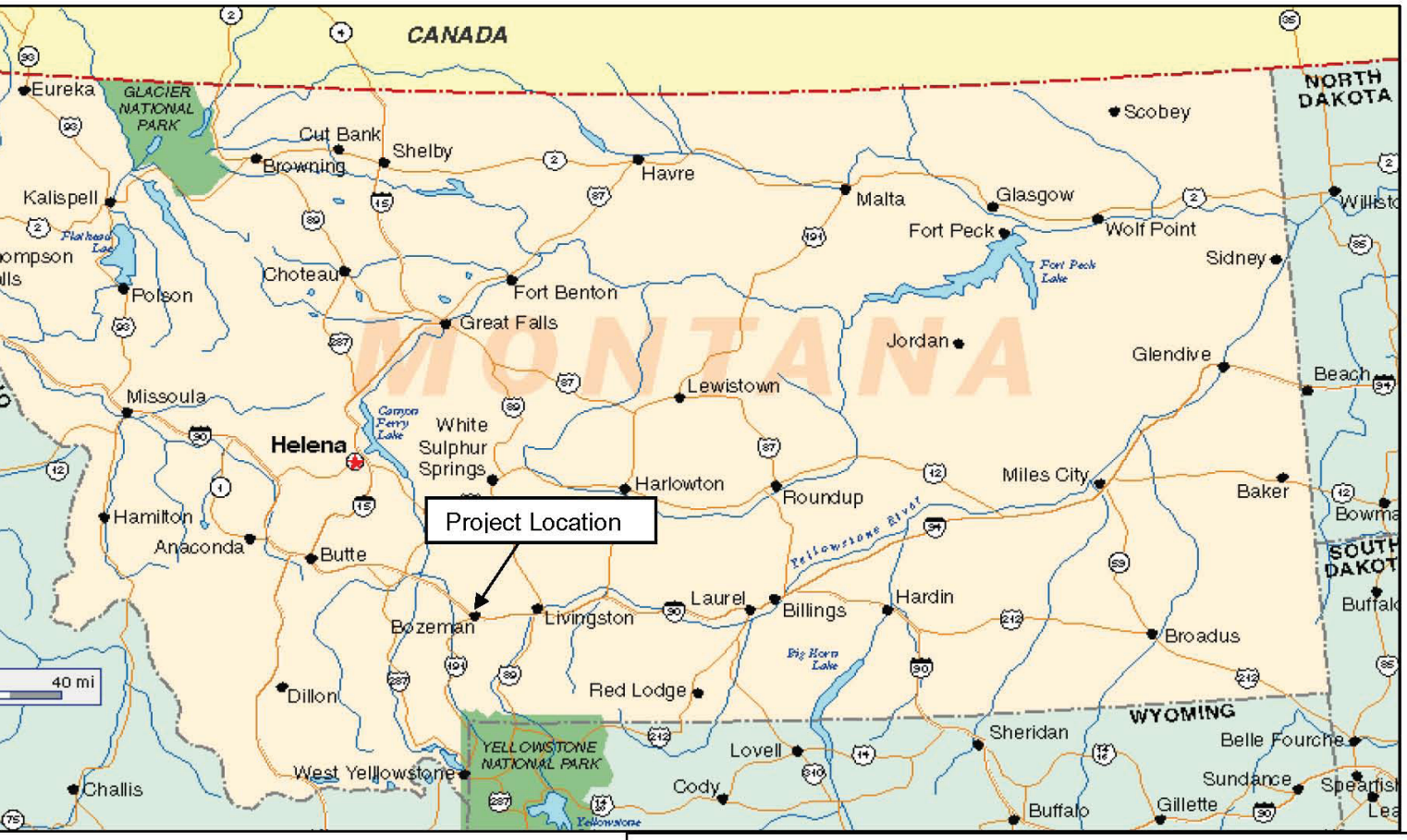
Therefore, an environmental impact statement is not required. The environmental review was conducted in accordance with the Administrative Rules of Montana (ARM) 17.4.607, 17.4.608, 17.4.609 and 17.4.610. The environmental assessment is the appropriate level of analysis because none of the adverse effects of the project are considered significant.

Environmental Assessment prepared by:

_____	_____
Name	Date

Environmental Assessment reviewed by:

_____	_____
Name	Date



Montana Department of
ENVIRONMENTAL QUALITY

Figure 1 Site Location Map – Bozeman, MT

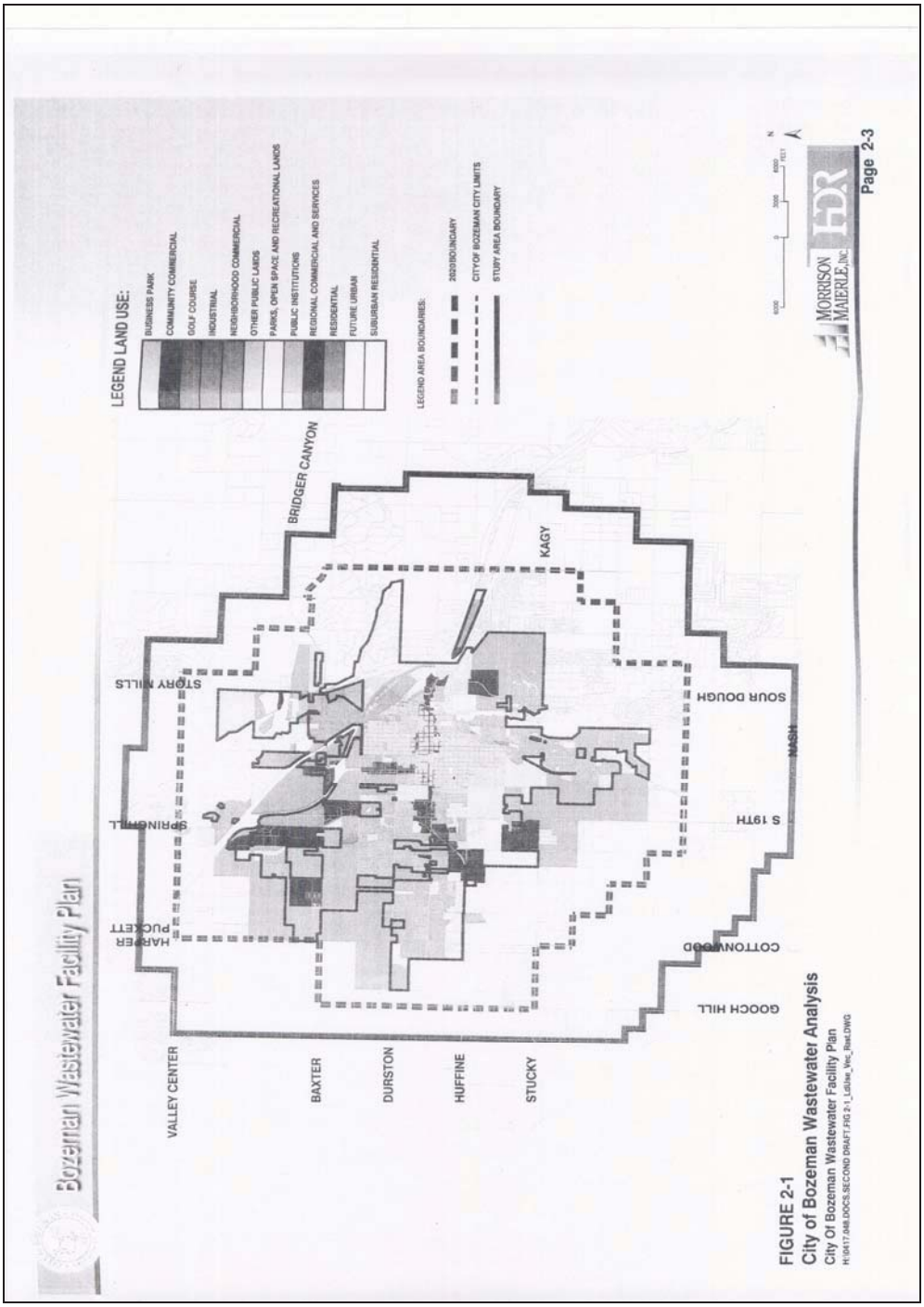
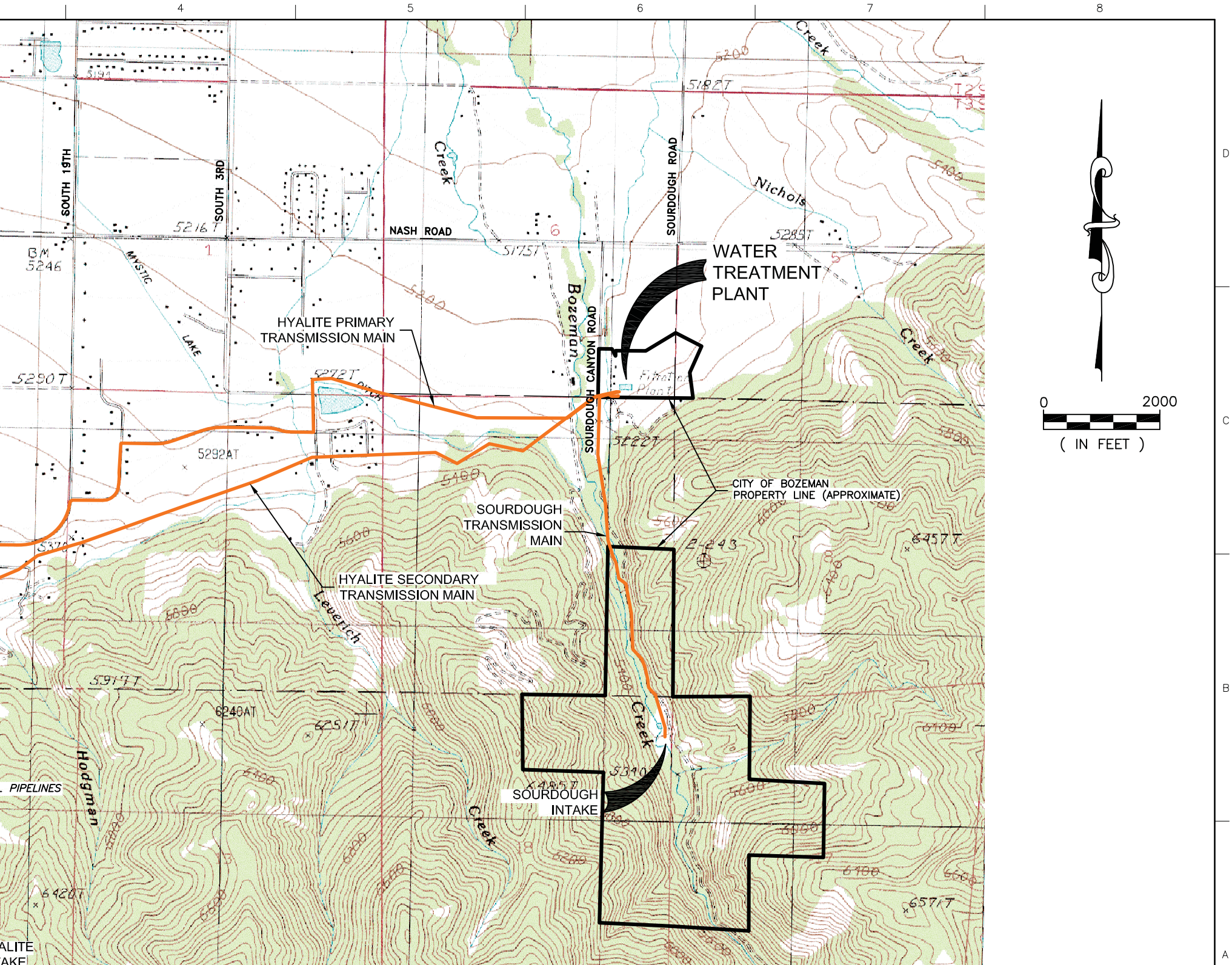


Figure 2
Planning Area



WATER TREATMENT PLANT
HYALITE PRIMARY TRANSMISSION MAIN
HYALITE SECONDARY TRANSMISSION MAIN
SOURDOUGH TRANSMISSION MAIN
CITY OF BOZEMAN PROPERTY LINE (APPROXIMATE)
SOURDOUGH INTAKE
SOURDOUGH ROAD
SOURDOUGH CANYON ROAD
NASH ROAD
SOUTH 19TH
SOUTH 3RD
Bozeman
Creek
Nichols
Leverich
Hodgman
MYSTIC LAKE
PIPELINES
0
2000
(IN FEET)