

**CITY OF BOULDER
WATER RESOURCES ADVISORY BOARD
AGENDA ITEM**

MEETING DATE: September 21, 2009

AGENDA TITLE: Review of the Draft Community and Environmental Assessment Process (CEAP) Document for the Carter Lake Pipeline Project

PRESENTER/S:

Bob Harberg, Utilities Project Management Coordinator
Carol Ellinghouse, Water Resources Coordinator
Bret Linenfelser, Water Quality and Environmental Services Coordinator
Joe Taddeucci, Utilities Project Manager

EXECUTIVE SUMMARY:

The Carter Lake Pipeline would carry Colorado-Big Thompson and Windy Gap water from the St. Vrain Supply Canal below Carter Lake to the Boulder Reservoir Water Treatment Plant (WTP). Water is currently transported from Carter Lake to Boulder Reservoir and the WTP in the 21-mile-long, open, seasonally operated St. Vrain Supply and Boulder Feeder Canals. Delivery of water in a buried pipeline would result in improved water quality, greater protection of this source water from future degradation during transport and a year-round supply of water from Carter Lake to the Boulder Reservoir WTP. The project is a collaborative effort among Boulder, Left Hand Water District, Little Thompson Water District, Longs Peak Water District and the Town of Frederick. The project is also referred to as the Southern Water Supply Pipeline II.

Staff believes that completion of the CEAP is a necessary step to position the city for future consideration for federal stimulus funds. The current regulations require projects to be ready for construction within a short period of time in order to be considered for federal funding under the American Recovery and Reinvestment Act of 2009. The project participants have represented that the project can be ready for construction within 2 years. While project design could be completed in a relatively short period, the permitting and project approval process requires more time. Staff considers the relatively small investment of time and effort involved with completing the permitting requirements as a small risk for the city to take compared to losing the opportunity for federal project funding. Completion of the CEAP will also demonstrate the city's desire to continue collaboration and cooperation in this project to the other project participants.

Fiscal Impacts: The 2008-2009 budgets included \$1 million in funding for permitting and critical right-of-way acquisition for the Carter Lake Pipeline. The approved 2009 budget and 2009-2014 CIP slated the Carter Lake Pipeline for design funding of \$2,686,618 and construction funding of \$26,866,177 in 2013 and 2014, respectively. Staff is currently recommending delay of construction funding until 2016-2017 in the 2010 budgeting process. Project cost, timing and effect on water rates continue to be significant challenges.

Other Impacts:

Environmental: The preferred pipeline alignment, which coincides with the existing Southern Water Supply Pipeline I (completed in 1995) corridor for the majority of its length, was selected to minimize long term and adverse environmental impacts. Most environmental impacts are temporary and occur as a result of ground surface disturbance related to construction. Restoration of the disturbance areas to preconstruction condition as well as timing of disturbance to minimize effects to seasonally sensitive resources are proposed to mitigate temporary impacts.

Economic: The proposed Carter Lake Pipeline is a collaborative project among five water providers (participants) and the NCWCD to provide a mechanism to convey Windy Gap and C-BT water from Carter Lake to each of the individual participants. At present, the savings associated with collaborating with the other stakeholders is estimated to be about 25-30% of the total project cost. The preferred project alternative maximizes the use of existing infrastructure by utilizing existing NCWCD easements for the majority of its length. If other participants move forward with the project without the city, the availability of the existing NCWCD right-of-way for future pipeline construction will likely be affected. Businesses that rely on water from Boulder Reservoir WTP could see a positive economic effect from this project due to reductions in the level of additional industrial treatment required and reduced water use, water discharges to the sanitary sewer system and energy costs.

Community: The proposed Carter Lake Pipeline would eliminate the potential for water contamination during transport, which is considered beneficial to all residents who receive drinking water from the Boulder Reservoir WTP. The pipeline would also reduce or eliminate the changes in drinking water taste and odor which now occur when the BRWTP intake is switched from the Boulder Feeder Canal to Boulder Reservoir.

Other Board and Commission Feedback and Public feedback:

In Sept. 2007, WRAB and staff reached a joint proposal to continue preliminary work on the Carter Lake Pipeline Project while evaluating other project priorities, achieving superior performance, maximizing efficiency, providing outstanding customer service and minimizing the need for rate increases to the extent practical. It was recommended that staff continue to pursue federal funds for the Carter Lake Pipeline project funding and complete the Community and Environmental Assessment Process (CEAP) along with

other permitting activities, limited design and right-of-way acquisition to maintain forward progress on this project.

Northern Colorado Water Conservancy District (NCWCD), which is managing the project on behalf of the participants, submitted its Areas and Activities of State Interest (1041) Review application for the Southern Water Supply Project II to Boulder County in May 2009. The Planning Commission and Board of County Commissioners hearings have not yet been scheduled. A link to the 1041 application is available on the Utilities Division Carter Lake Pipeline Web page (www.boulderwater.net) under the projects and programs tab.

Staff Request:

Staff requests WRAB review and provide comments on the draft CEAP document. Staff will make changes and incorporate review comments as required and will return for a recommendation from WRAB at a future meeting, perhaps as soon as October 19 or November 16.

Analysis:

The CEAP would be used as a mechanism to decide how aggressively the city should attempt to position itself for possible future federal funding. This would include possible right-of-way/land acquisition, preliminary/final design and other possible strategies for funding. Approval of the CEAP would also constitute support for the preferred pipeline alignment, although minor adjustments would be possible as a result of Boulder County's 1041 review process and/or easement negotiations with landowners, including the City of Boulder.

Acceptance of the CEAP by the WRAB will not constitute final project approval. City Council would need to specifically approve the project and the project's funding.

Attachments:

Attachment A: Carter Lake Pipeline – Draft CEAP Document

City Of Boulder
Draft Community and Environmental Assessment Process
September 21, 2009
Carter Lake Pipeline

Cover Sheet:

1. DESCRIPTION AND LOCATION OF THE PROJECT

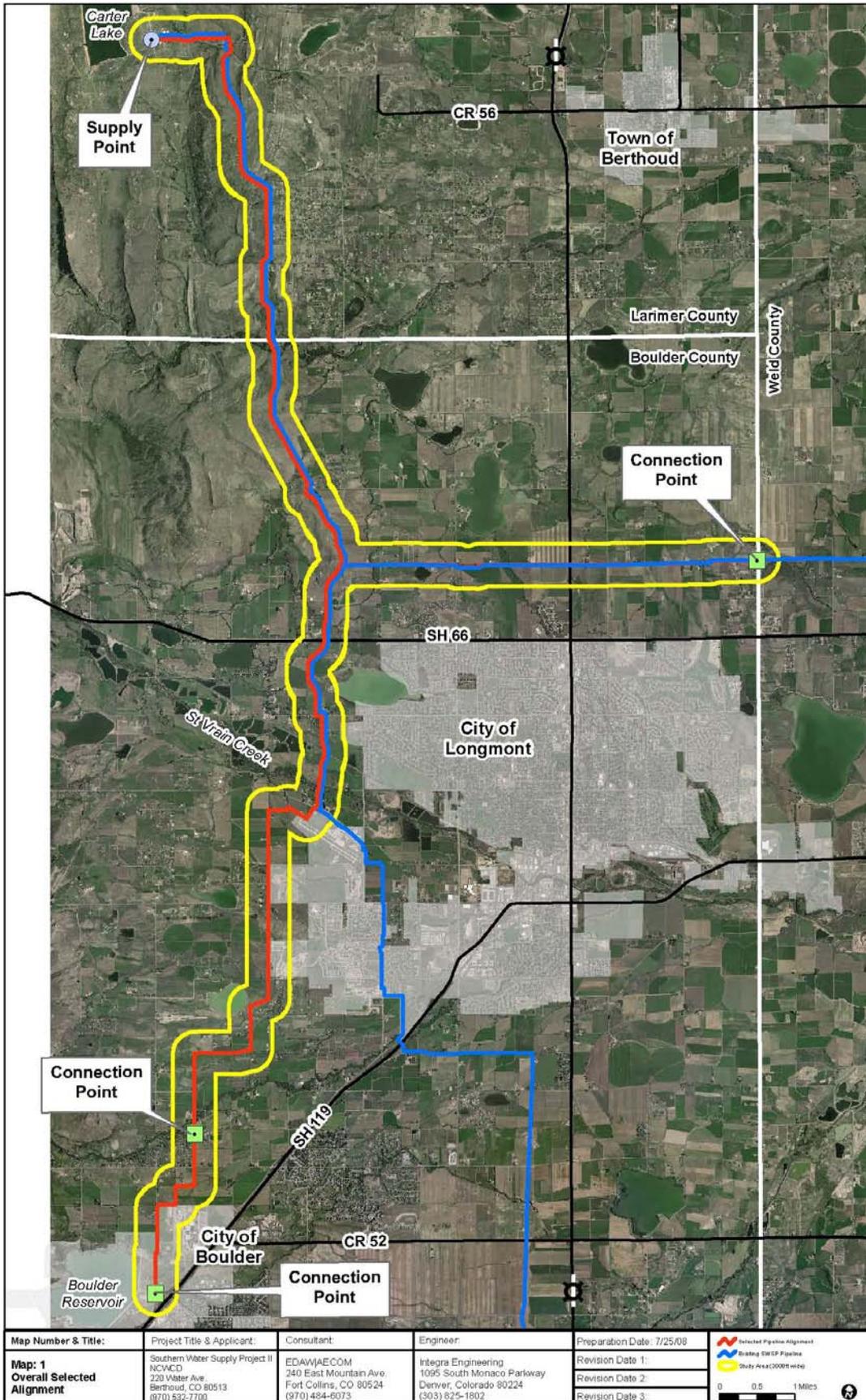
In 1995, the original Southern Water Supply Project Pipeline (SWSP) or Carter Lake to Broomfield Pipeline was constructed from the St. Vrain Supply Canal diversion structure at Carter Lake south to its terminus at the City of Broomfield's then new water treatment plant and storage reservoir located northeast of the intersection of Sheridan Boulevard and 144th Avenue, a length of approximately 33.5 miles. The original project was a collaborative effort among twelve project participants and the Northern Colorado Water Conservancy District (NCWCD) to convey Windy Gap and Colorado-Big Thompson project (CBT) water from Carter Lake to each participant delivery point. Since the construction of the original pipeline, the NCWCD has constructed two booster pumping stations along the existing pipeline to increase flow rates in order to meet additional water demands of the original project participants. The capacity of the original pipeline is now fully utilized.

Due to the interest shown by water providers within the NCWCD and Municipal Subdistrict boundaries to construct a second pipeline, the NCWCD and the project participants (consisting of some of the original project participants as well as new participants) have proposed to construct the SWSP II to protect source water quality, provide a year-round supply, and meet new demands. The current project, which the city refers to as the "Carter Lake Pipeline" is a collaborative effort among the city, Left Hand Water District, Longs Peak Water District and Little Thompson Water District (referred to collectively as the Southern Water Supply Water Activity Enterprise) and the NCWCD.

The Carter Lake Pipeline will deliver Windy Gap and CBT water from the existing diversion structure on the St. Vrain Supply Canal at Carter Lake to delivery locations, including the Boulder Reservoir Water Treatment Plant, the Left Hand Water District Dodd Treatment Plant, and a turnout for an eastern pipeline to serve the Town of Frederick and Little Thompson Water District.

The pipeline alignment will parallel the existing SWSP easement for the northern portion of the project extending from Carter Lake through Larimer County to where the alignments diverge at St. Vrain Road near the Longmont Vance Brand Municipal Airport (Figure 1). An initial feasibility study was prepared in January of 2006 (Integra Engineering) that examined potential alternative routes for the SWSP pipeline. The route evaluation considered 55 route alternatives and concluded that an alignment parallel to the existing pipeline is the best option, where possible. Significant benefits of a parallel

Figure 1: Proposed Carter Lake Pipeline Alignment



alignment include no new or limited new permanent easement acquisition, limited environmental and land use impacts, limited constructability issues, and potentially lower project costs. As a result, the existing SWSP pipeline route is the proposed alignment for the majority of the new pipeline. Just north of the Longmont airport, the two routes diverge; the existing SWSP line follows a more easterly route, while the Carter Lake Pipeline alignment would continue south to the delivery point near Boulder Reservoir. From the point where the two routes diverge, the Carter Lake Pipeline route is on a new alignment that will require the acquisition of additional right-of-way.

The pipeline will be constructed with welded steel pipe with an estimated useful life of 70 years. Beginning with a 60-inch pipe in the first leg paralleling West (Larimer) County Road 8E, the pipeline transitions to a 45-inch diameter pipe at the first southern turn and progressively decreases in diameter at each turnout. Due to the heavy congestion of utilities paralleling West CR 8E, it was decided to install a larger 60-inch line through this segment to minimize the need to install an additional line if a future project required it. The pipe diameters from this point forward would be 45 inches or less. The final diameter of the pipeline will depend upon the project participants and their associated delivery capacity requirements. The city's capacity in the pipeline would be 25 cfs. This represents approximately 52% of total capacity, if all participants remain invested in the project.

Another element of the project is a segment extending east from the main SWSP I pipeline from a point near its intersection with Vermillion Road. This pipeline, which will serve the Town of Frederick and the Little Thompson Water District, has a diameter of 24 to 26 inches, and will be located within and adjacent to the easement of the existing SWSP I pipeline that serves the City of Fort Morgan.

As the owner of the pipeline terminating at BRWTP and the water pressure developed in the pipeline, the city may install a hydroelectric turbine/generator at the pipeline terminus. Preliminary analysis¹ indicates that the Carter Lake Pipeline would provide a viable opportunity for hydroelectric power generation. Based on estimates of the elevation difference between the St. Vrain Supply Canal and Boulder Reservoir WTP, pipeline diameter and pipeline flow, it appears that installation of a unit with an approximate capacity of 200 kilowatts (kW) would allow annual generation of approximately 1,200,000 kW-hours. This annual generation is equivalent to the average annual electricity demand of over 200 households. Based on current rates paid for hydroelectricity generated throughout the city's water system, sale of this power would result in approximately \$50,000 in annual revenue to the Water Utility. At an estimated construction cost of \$1 million, the facility would pay for itself in the 40-year time range of an estimated 50-year useful life.

¹ Preliminary hydro analysis was conducted by city staff with assistance from AECOM.

2. BACKGROUND, PURPOSE AND NEED FOR THE PROJECT

Background

City staff worked with Black & Veatch Consulting Engineers to complete the *Integrated Evaluation of BRWTP Source Water Protection and Treatment Improvements* in 2007. The study developed and evaluated alternatives for source water protection and treatment and proposes a long term capital improvement plan for the BRWTP. On March 19, 2007, staff presented the Integrated Evaluation of the Boulder Reservoir Water Treatment Plant Source Water Protection and Treatment Improvements to the Water Resources Advisory Board (WRAB) and requested that WRAB support the Carter Lake Pipeline as the preferred long term capital improvement alternative for the Boulder Reservoir Water Treatment Plant. On June 28, 2007, WRAB voted 3 to 2 to delay construction of the Carter Lake Pipeline primarily due to the costs, until other treatment alternatives have been constructed and practical and cost-effective improvements to the Boulder Feeder Canal have been completed. On September 17, 2007, WRAB approved a consensus proposal supporting continuing work related to pipeline planning and preliminary engineering and permitting and right-of-way acquisition, while evaluating other utility capital improvement and operating priorities with the goal of achieving superior performance, maximizing efficiency, providing outstanding customer service while minimizing the need for rate increases to the extent practical. The proposal also includes nine different work items including pursuing federal funding for the pipeline. On November 13, 2007, City Council approved the budget for 2008, which included \$1 million for permitting and right-of-way acquisition for the Carter Lake Pipeline.

On November 9, 2007, the Water Resources and Development Act of 2007 (WRDA) became law, authorizing federal spending on water development, infrastructure, flood control and other projects conducted by the Army Corps of Engineers and the Bureau of Reclamation. It contained funding authorization for \$10 million for construction of a water pipeline to protect drinking water quality and allow for year-round water delivery from Carter Lake to Boulder and other municipal area water providers. The project still is required to compete in the regular appropriations process in order to actually receive funds from the U.S. Army Corps of Engineers. This means the pipeline will need to be an appropriations request in subsequent years to actually receive funding.

Staff also pursued project funding under the American Recovery and Reinvestment Act of 2009. The Carter Lake Project was included on the U.S. Army Corps of Engineers list of projects considered for economic stimulus funding. The city was notified in April 2009 that it did not receive funding in the initial round. It is not clear at the present time whether additional projects may become eligible for stimulus funds at some future time. However, because of deadlines associated with the funding, it is likely that projects which are ready for construction will receive priority consideration should additional funding become available.

Purpose of and Need for the Proposed Project

The Carter Lake Pipeline continues to be staff's preferred alternatives for securing long term benefits for the BRWTP. The new pipeline would improve the reliability and safety of the city's drinking water for all citizens independent of ethnicity, culture, ability, age, income or family demographics. Purposes and needs for the project are:

- Water supply reliability and flexibility;
- Opportunity for collaboration/cost sharing;
- Water quality/multi barrier approach, and;
- Consistency of treated water quality.

Water System Reliability and Flexibility

Boulder depends on several different raw water sources to meet customer water demands. On average from year to year, about 65 percent of the city's water supply comes from the local Boulder Creek basin and 35 percent comes from Boulder Reservoir sources. As Boulder grows, the percentage of water delivered directly through the Boulder Reservoir Water Treatment Plant will increase to about 45 percent of the total municipal supply on average. The city owns enough additional water at Boulder Reservoir to meet all of Boulder's future needs.

The main source of supply for Boulder Reservoir is the Colorado-Big Thompson (CBT) Project. This raw water supply was developed by the Bureau of Reclamation from 1937 to 1957 and is presently operated by the Northern Colorado Water Conservancy District (NCWCD). The CBT Project diverts and stores water from the Colorado River on the west side of the Rocky Mountains. The water is then delivered through a series of tunnels, canals and reservoirs to northern Colorado Front Range communities, including Boulder. The other major source of supply for Boulder Reservoir is the Windy Gap Project which was jointly developed by northern Colorado municipalities to carry newly-developed water supplies through the CBT Project facilities as an alternative to the conversion of agricultural CBT water to municipal ownership and use. Boulder's water from these sources are delivered by the open, seasonally operated Boulder Feeder Canal (BFC)

The seasonal operation of the BFC limits flexibility of the city's operations. It may also limit the city's drought-year water yield and ability to draw sufficient water from the CBT system in a drought recovery year. The ability to access West Slope source water during the winter would maximize use of this source and may be necessary to fully utilize the city's Windy Gap water. The city's use of West Slope water during the winter is currently limited by the amount of storage space available to the city in Boulder Reservoir under the contracts with NCWCD. The ability to store water in Boulder Reservoir during the winter is further limited by the need to maintain winter water levels below the point where high winter winds can damage the rip-rap on the dam and cause erosion. While improvements to the Boulder Reservoir Water Treatment Facility have been discussed as an alternative to the proposed Carter Lake Pipeline, an expansion of the water treatment facility capacity would not eliminate Boulder Reservoir's storage

limitation. Full winter use of the current 16 MGD capacity at the BRWTP would require more water than can be stored in the city's Boulder Reservoir accounts during the winter (assuming that there is no Carter Lake Pipeline and that the city has the need to operate in such a manner). If BRWTP ran at its maximum capacity of 16 MGD for 180 days straight from October 15 to April 15 while pulling off of Boulder Reservoir because the canal was off, it would require 8,842 acre-feet (af) of water (180 days x 16 MGD x 3.07af/MGD). The city's winter storage account in Boulder Reservoir is 5,357 af, the city's long-term storage is 2,143 af and the city's emergency dead pool is 1,000 af. This totals 8,500 af, so the city would be short by 352 af even if it were to completely drain the reservoir.

Collaboration/Cost Sharing

The City of Boulder is currently participating in right-of-way acquisition plans and permit applications for the Carter Lake Pipeline. Other participants include Little Thompson Water District, Longs Peak Water District, the town of Frederick and Left Hand Water District. Combining raw water conveyance to BRWTF with that of other providers allows more efficient use of scarce regional water resources. Collaboration with other entities to achieve common objectives and promote efficient resource use was emphasized by the Community Study Group in the preparation of the 2009 *Source Water Management Plan*.

The pipeline was estimated to cost \$33.2 million by Integra Engineering in 2005. Boulder's share of the cost was estimated to be \$20.1 million in 2005. Assuming the current project participants would participate in the construction phase, Boulder's share of the cost could range from \$23 to \$25 million in 2009 dollars². At present, the savings associated with collaborating with the other stakeholders is estimated to be about 25-30% of the total project cost. Table 1 illustrates how the original estimated costs have been apportioned among project participants.

Maintenance costs for the pipeline are estimated at 0.2% of the initial construction cost. Boulder's portion of the annual operation and maintenance costs would therefore be approximately \$42,000. It will mostly likely be up to project participants to determine whether to annually contribute to a maintenance fund or be billed for actual costs as they occur.

Water Quality

The City has established a set of drinking water quality goals and operational treatment practices in order to ensure public health, minimize distribution system deterioration, and provide uniformly high quality water to all its customers. Several of the City's drinking water quality goals are more stringent than standards required by state and federal

² The CEAP uses costs as of the date they were originally developed to provide consistency with previous documents and discussions. Costs have not been adjusted to 2009 dollars. Staff acknowledges that some cost escalation is certain. Current indices suggest that construction costs have increased about 15% between the end of 2005 and July 2009.

drinking water regulations, in some instances based on prudent concerns related to public health and in others to enhance the palatability and uniformity of finished drinking water. Specific city drinking water goals that exceed mandated regulatory standards include turbidity (health), microbial pathogens (health), disinfection byproducts (health), taste and odor (aesthetic), sodium (uniformity), sulfate (uniformity), total dissolved solids (uniformity), fluoride (health), manganese (aesthetic), and pH (deterioration). Because the City relies on two separate facilities supplied with source waters of seasonally differing water quality, there are inherent operational challenges and potential cost implications associated with meeting its drinking water quality goals.

The barrier requirements for BRWTP, based on current state and federal regulatory requirements and city water quality goals, were identified through review of source water quality data for Carter Lake, BFC, and operational data from BRWTF. Barriers for microbial pathogens, disinfection byproducts (DBPs), organic micro-pollutants, manganese, taste and odor, and inorganic contaminant control were evaluated. The potential impacts of both long-term average water quality and short-term acute contamination episodes were considered. The Carter Lake Pipeline was the only alternative identified which provides at least one robust barrier for each contaminant category.

Consistency of Treated Water

There are multiple benefits from having finished water quality consistent between the Betasso WTP, which receives raw water from the Boulder Creek watershed, and the BRWTP. For Boulder residents who receive drinking water from the BRWTP, the current, noticeable differences in water taste and odor that occur when the source water is switched from the BFC to water from Boulder Reservoir would be significantly reduced. Consistent water quality between the city's two water treatment plants would enable the city to have a uniform corrosion control program to minimize corrosion of the interior of steel, iron and copper pipes. There are industries in Boulder, including IBM, Amgen and Roche Pharmaceuticals, that could benefit from having a consistent water quality equal to what the Betasso WTP provides. Consistent water quality could lower costs for additional treatment for some industries and could reduce water use, energy consumption, and the amount of water discharged to the sanitary sewer system for industries which use cooling towers.

3. DESCRIPTION OF PROJECT ALTERNATIVES AND SUMMARY OF MAJOR ISSUES

The 2007 *Integrated Evaluation of the BRWTP Source Water Protection and Treatment Improvements* analyzed 6 alternatives, including the Carter Lake Pipeline and five treatment upgrade scenarios. However, for the purposes of this CEAP, staff considers the two project alternatives to consist of:

- 1. Approval of the Carter Lake Pipeline CEAP**, with or without modifications, under the assumption that satisfactory funding can be procured to allow completion of the

Attachment A

**Table 1: Cost Sharing Among Carter Lake Pipeline Project Participants
(Based Upon January 2006 Integra Engineering Report)**

Participant	Capacity (cfs)	Percentage of Total
Little Thompson Water District	3	6.25%
Longs Peak Water District	3	6.25%
Frederick	6	12.50%
Left Hand Water District	11	22.92%
Boulder	25	52.08%
Total	48	100.00%

Pipe Segment	Description	Segment Cost
1	Carter to Eastern	\$ 15,693,084
2	Eastern to Left Hand	\$ 13,893,736
2.1	Left Hand W.D. Turnout	\$ 257,325
3	Left Hand to Boulder	\$ 3,366,459
	Total	\$ 33,210,604

Participant	Segment 1 Percent	Segment 1 Cost	Segment 2 Percent	Segment 2 Cost	Segment 2.1 Percent	Segment 2.1 Cost	Segment 3 Percent	Segment 3 Cost	Total Cost
Little Thompson Water District	6.25%	\$ 980,818	0	0	0	0	0	0	\$ 980,818
Longs Peak Water District	6.25%	\$ 980,818	0	0	0	0	0	0	\$ 980,818
Frederick	12.50%	\$ 1,961,636	0	0	0	0	0	0	\$ 1,961,636
Left Hand Water District	22.92%	\$ 3,596,855	30.56%	\$ 4,245,926	100.00%	\$ 257,325	0	0	\$ 8,100,106
Boulder	52.08%	\$ 8,172,957	69.44%	\$ 9,647,810	0	0	100.00%	\$3,366,459	\$ 21,187,226
Total	100.00%	\$15,693,084	100.00%	\$ 13,893,736	100.00%	\$ 257,325	100.00%	\$3,366,459	\$33,210,604

project with acceptable increases in water rates. Financial considerations, including the decision to advance to project design or construction, would be separately considered by WRAB and City Council at a future time. If the CEAP is approved, staff would continue with permitting and right-of-way acquisition, as well as continue to pursue federal funding for the project. In cooperation with the NCWCD and as funds are available, the city would continue to implement measures to control/prevent run-off to the Boulder Feeder Canal. The city will also complete the mid-term improvements to the BRWTP. It is possible that long-term improvements to the BRWTP could be delayed if the pipeline were constructed. Approval of the CEAP would also constitute support for NCWCD's preferred alignment for the project, although the final alignment could be subject to minor alterations through either the Boulder County 1041 process or easement negotiations with property owners, including the City of Boulder.

2. Disapproval of the Carter Lake Pipeline CEAP. This would be a clear indication to NCWCD and other participants that the city is not interested in pursuing the current project. The city would continue its efforts to mitigate run-off to the Boulder Feeder Canal, construct mid-term improvements to the BRWTP, and continue monitoring the canal and reservoir for contamination events. If water quality continues to degrade despite mitigation of run-off to the canal and implementation of mid-term treatment improvements, increased monitoring may be needed, and long-term improvements to the BRWTP could be needed sooner than if the pipeline were in operation; however, it is assumed that water treated at BRWTP would continue to meet all state and federal drinking water standards. The other treatment alternatives identified in the 2007 study or other alternative treatment scenarios could be considered as needed.

Staff recognizes that there are risks associated with either alternative. Risks associated with Alternative 1 include expenditure of funds that would not be necessary if the project is ultimately shelved or cancelled due to lack of acceptable funding, unacceptable water rate impacts or the development of other, currently unforeseen funding priorities within the water utility over the next several years.

Risks associated with Alternative 2 include potential loss of federal funding a result of the project being in its preliminary stages. While the precise meaning of the term "shovel-ready" can be debated, completion of preliminary project planning and approval may place the city in an advantageous position in terms of future federal funding opportunities. Alternative 2 may also result in loss of the opportunity to collaborate with other providers in the project. Some or all of the other project participants may decide to proceed with this project without the city's participation. In the event that the city decides to construct a Carter Lake Pipeline at some more distant point in the future, cost sharing opportunities may not be available. In addition, existing easements proposed for use in the current project may not be available in the future.

In 2007, WRAB conditionally recommended approval of an increment of project funding while evaluating other utility capital improvement and operating priorities, including 6 specific items. The status of the 6 other priorities established by WRAB is summarized below:

1. **Peer Review** - A peer review of the Utilities Division of the Public Works Department was completed by the American Water Works Association (AWWA) and the Water Environment Federation (WEF) in October 2008. The review included a 420-question employee self-assessment survey that, in part, created the basis for a week-long peer review of the water and wastewater utilities. The Peer Review Team, composed of four volunteer utility professionals from across the country, toured the utility facilities, interviewed staff and generated a final report of their experienced views. Staff worked with WRAB to prioritize opportunities for improvement into three tiers. The 2010 budget recommendation defers four of the 30 recommended Tier 1 improvement opportunities which require additional resources to implement. These items will be reconsidered in the 2011 budget process.
2. **20-year CIP** – A 20-year CIP for source water facilities was developed and included in the Source Water Master Plan (SWMP). WRAB recommended acceptance of the SWMP on January 12, 2009, and City Council accepted the plan on April 7, 2009.
3. **Alternative Scenarios and Revenue Requirements for the 20-year CIP** – Alternative scenarios for completing the projects identified in the 20-year CIP are investigated as a component of the annual budgeting process.
4. **Barker Water System** – City Council approved the development of an Intergovernmental Agreement with the Town of Nederland and one-time capital and annual operation and maintenance cost contributions for upgrading the Nederland Wastewater Treatment Plant on Nov. 25, 2008. The IGA is scheduled for consideration by City Council during 2009 (currently scheduled for the September 15, 2009 City Council meeting). Barker system security upgrades have been installed. Security and vulnerability issues will continue to be addressed. Staff is in the process of finalizing a grant application for federal funding to complete additional security upgrades in 2010.
5. **Boulder Feeder Canal** - In 2008, the following activities to mitigate run-off to the Boulder Feeder Canal took place:
 - Outfalls 79 and 90 located within the Cemex cement plant property were graded to an existing underpass;
 - Outfalls 370 and 357 north of Prospect Road were graded to existing crossings;
 - Outfall 364 north of Prospect Road was crossed, and;
 - Crossings of outfalls 379 and 372 were planned, but have not progressed due to down gradient landowner requests.

During 2009, six outfalls between Boulder Reservoir and Niwot Road will either be crossed (620, 643 and 655) or graded to existing crossings (594, 609 and 616). Due to fiscal constraints, funding reduction for additional outfall mitigation

projects planned for 2010 has been recommended. These efforts will be revisited during the 2011 budget process based on the actual cost of on-going diversion work and the perceived importance of this work.

- 6. **Minor additional treatment barriers at Boulder Reservoir WTP – WRAB** was updated on the status of mid-term improvements to the Boulder Reservoir WTP in 2008. This project includes several improvements: a sodium hypochlorite feed system, a third dissolved air floatation (DAF) pre-filtration unit, effluent flow meter replacement, additional raw water pump installation and yard piping modifications to allow wasting backwash water to the sludge drying lagoons. Carbon dioxide pretreatment for pH adjustment will be installed based on its value in reducing Total Organic Carbon (TOC). Although not currently part of the mid-term improvement project, potassium permanganate will be piloted in the near future to determine its effectiveness for taste and odor control.

Proposed water rate impacts from the Carter Lake Pipeline were last analyzed in 2007. At that time, proposed rate increases were projected as follows:

Alternative	2009	2010	2011
No Pipeline Project	5%	5%	6%
Pipeline with \$10 million in federal funding	8%	9%	10%
3. Pipeline without federal funding	10%	10%	12%

The 2009-2014 Capital Improvements Program slated the Carter Lake Pipeline for design funding of \$2.7 million and construction funding of \$26.9 million in 2013 and 2014, respectively. Staff is recommending delay of construction funding until 2016-2017 in the 2010 budgeting process. By 2016, approximately \$7.2 million in existing water and wastewater revenue bonds will have been retired, with an additional \$25 million to retire in 2019. Staff will present current information regarding water rate impacts at the time it seeks approval for project funding.

The current 2010 budget recommendation includes no rate increase for 2010, with projected 4 percent rate increases in both 2011 and 2012.

Property Acquisition

The portions of the proposed Carter Lake Pipeline alignment which parallel the existing SWSP Broomfield Pipeline are anticipated to be constructed within the existing permanent easement, requiring no new permanent easement acquisition. The existing permanent easement ranges between 80-90 feet in width and should provide adequate space to construct a parallel pipeline. The portions of the alignment that diverge from the existing SWSP pipeline alignment will require the acquisition of new permanent easement, typically 80 feet in width.

The original SWSP Broomfield Pipeline project typically utilized an additional 20 feet of temporary construction easement. It is anticipated that 20 feet of temporary construction easement will also be obtained for the proposed Carter Lake Pipeline. The 20 feet of temporary construction easement will have to be acquired for the entire length of the proposed alignment, even in those portions where the proposed pipeline will parallel the existing SWSP Pipeline.

It is anticipated that all new permanent and temporary easements needed for this project will be obtained and held by NCWCD.

Other Permitting Requirements

Northern Colorado Water Conservancy District (NCWCD), which is managing the project on behalf of the participants, submitted its 1041 application for the Southern Water Supply Project II to Boulder County in May 2009. Planning Commission and Board of County Commissioners hearings have not yet been scheduled. A link to the 1041 application is available on the Utilities Division Carter Lake Pipeline Web page (www.boulderwater.net) under the projects and programs tab. The 1041 process will result in a final alignment for the Carter Lake Pipeline, although minor alignment adjustments, particularly on city-owned lands, will presumably still be possible through easement negotiations with the property owners.

NCWCD completed a Larimer County location and extent review process for the Carter Lake Pipeline. That process included a public open house sponsored by NCWCD. Approval was received in May 2009. While the location and extent review process was sufficient for the current Carter Lake Pipeline Project, Larimer County is currently considering changing its Land Use Code to require an Areas and Activities of State Interest (1041) permitting process for future 24-inch diameter or larger pipelines.

The 1041 permit application submitted to Boulder County details proposed wetlands impacts subject to regulation by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. A Pre-Construction Notification for the pipeline impacts was sent to the U.S. Army Corps of Engineers and the project has been permitted under Nationwide Permit (NWP) 12 for utility lines. NWP 12 permits up to half an acre of permanent impact to waters of the U.S. at each crossing.

Normally, the Utilities Division obtains a municipal wetland permit for projects outside the city boundaries which affect wetlands and stream buffers regulated under the city's wetland ordinance. Although technically, the Carter Lake Pipeline is an NCWCD project, it will be completed with significant monetary contributions from the city, and it is assumed that all impacts to areas regulated by the city under the municipal wetland ordinance will be subject to standard municipal wetland permitting. The Carter Lake Pipeline will involve temporary disturbance of regulated areas, and no permanent effects are anticipated. .

There are a variety of construction permits required for pipeline projects, which would either be obtained by NCWCD or the construction contractor. These permits include:

- County building permits
- CDOT/County Utility/Special Use
- Air Pollution Emission Notice
- Stormwater Discharge-Construction
- Construction Dewatering

It is not clear at the present time whether receipt of federal funding would require National Environmental Policy Act (NEPA) compliance for the Carter Lake Pipeline. With regard to funding under the American Recovery and Reinvestment Act of 2009, Section 1609 of the act states:

“Adequate resources within this bill must be devoted to ensuring that applicable environmental reviews under the National Environmental Policy Act are completed on an expeditious basis and that the shortest existing applicable process under the National Environmental Policy Act shall be utilized.”

While this would seem to imply NEPA compliance will be required for economic stimulus projects, NCWCD believes that completion of the NEPA process will not be necessary even if federal funding is obtained, because construction of Carter Lake Pipeline would not be considered a federal action. Regardless, completion of the 1041 and CEAP processes will provide significant environmental information as well as records of public concerns and opinions, both of which would facilitate expeditious completion of any required NEPA documentation.

4. Preferred Project Alternative

Staff continues to support moving forward with the Carter Lake Pipeline, and therefore, supports approval of the CEAP as a necessary step in the project planning and approval process. The pipeline alignment has been carefully selected to minimize community and environmental impacts, and most impacts to the preferred alignment are temporary in nature and can be acceptably mitigated.

Approval of the CEAP may better position the city to receive federal funding for the construction of the Carter Lake Pipeline, whether through the Water Resources and Development Act of 2007 or the American Recovery and Reinvestment Act of 2009. Approval of the CEAP will not constitute final project approval, as City Council would still need to specifically approve project funding including probable rate increases either as part of the annual budget process or as a budget supplemental request.

The pipeline would also provide opportunities and flexibility for improvements in the management and operation of the city’s raw water facilities. These include possible hydroelectric power generation as well as improvements in the flexibility of use of the city’s various water sources for the BRWTP. This increased flexibility could provide a slight increase in the drought year yield of the city’s water rights portfolio.

Water source selection flexibility would be improved by providing a redundant means of supplying BRWTP. At present, source options include drawing directly from the Boulder Feeder Canal or pumping from Boulder Reservoir. Since the canal is shut down from about November to April of each year, the Carter Lake Pipeline would provide a second option for water delivery to BRWTP in the winter months. If one of the present source options is unavailable for operational reasons, such as a power outage to the pumps or herbicide spraying on the canal, the Carter Lake Pipeline would provide the flexibility of an additional means of providing water.

It is likely that if the Carter Lake Pipeline were built it would be used as the sole means of supplying BRWTP at most times, but the options of using Boulder Reservoir water or canal water would remain for use during drought or emergency. This increased flexibility in water supply facilities at BRWTP might provide a slight increase in the yield of the City's Windy Gap water supplies during drought periods. If the City is able to access its CBT allotment directly from the storage pool in Carter Lake during the winter, the City's winter Boulder Reservoir account can be filled with Windy Gap water each year. At present, it is filled with CBT water from the allotment given in the year that is closing. If this close-out CBT allotment can be accessed from Carter Lake during the winter, it would no longer need to be placed in Boulder Reservoir storage before the canal shuts down in the fall. If the Windy Gap water that is then stored in Boulder Reservoir for the winter is not delivered into the BRWTP over the course of the winter, it can be exchanged up to Barker Reservoir in the spring for later use at Betasso WTP. The increased availability of storage space for Windy Gap water and the increased ability to exchange Windy Gap effluent back into the City's water system until it is fully consumed might provide a slight increase in water yield during moderately dry periods when exchange potential exists. This in turn would allow the City to carryover higher amounts of CBT water under the City's account within the CBT storage reservoirs that could be used during drought periods.

Protection of the BRWTP source water through investing in the construction of the Carter Lake Pipeline will provide long-term benefits to the city. The city is placing a greater reliance on this facility than in the past due to continued planned growth in the city's water service area. Investing in a pipeline that will protect the source water for the BRWTP far into the future is a worthwhile investment similar to that undertaken by prior generations with the Silver Lake Watershed.

The Carter Lake Pipeline would also provide a much more uniform water quality, substantially simplifying the treatment optimization and increasing treatment process reliability. Although the capital cost of the Carter Lake Pipeline is significant, it is comparable to the cost of treatment technologies that afford a similar level of water quality protection, with the assurance that contaminants will be prevented from entering the city's source water in the first place, rather than attempting to remove these contaminants via treatment.

The cost of the pipeline as currently proposed is less than it might be at a later time because of the opportunity to share costs in constructing the Carter Lake pipeline with

other communities. Additionally, on-going construction cost inflation suggests that the cost of constructing the pipeline will only increase in the future. A significant portion of the pipeline right-of-way (ROW) has been previously secured by the NCWCD. Continued development pressure along this ROW may make future construction more difficult. Securing the remaining ROW for a pipeline at this time is also considered important because of these development pressures.

5. Public Input to Date

WRAB discussed the Carter Lake Pipeline at its May 21, June 28 and September 17, 2007 meetings. City Council discussed the Carter Lake Pipeline at study sessions on July 31, August 23 and September 27, 2007. Carter Lake Pipeline was also discussed by City Council in the context of the 2010 budget.

Carter Lake Pipeline was discussed by the Community Study Group for the Source Water Master Plan in the context of watershed management for Boulder Reservoir and Boulder Feeder Canal, recommended facilities improvements and the Capital Improvements Program.

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Goals Assessment:

The key policies in the BVCP addressed by the Carter Lake Pipeline are:

1.13 Collaboration in Service Delivery.

The city and county will support consolidation and collaboration among service providers to reduce duplication of efforts, maximize economic and resource efficiencies and provide the public with reliable and equitable levels of service.

The Carter Lake Pipeline will be a collaborative project undertaken by the NCWCD and other northern Colorado water providers.

4.26 Protection of Water Quality.

Water quality is a critical health, economic and aesthetic concern. The city and county will protect, maintain and improve water quality within the Boulder Creek basin and Boulder Valley watersheds as a necessary component of existing ecosystems and as a critical resource for the human community. The city and county will seek to reduce point and nonpoint sources of pollutants. Special emphasis will be placed on regional efforts such as watershed planning and protection.

The Carter Lake Pipeline would protect the city’s CBT and Windy Gap source waters from degradation during transport from Carter Lake to the BRWTP.

4.27 Water Resource Planning.

The city and county will work together and with other governmental agencies to develop and implement appropriate water quality standards, water resource allocations, and water quality protection programs. Water resource planning efforts will include such things as water quality master planning, surface and ground water conservation, and evaluation of pollutant sources.

Subject to budget considerations, the city will continue its current efforts to mitigate run-off and outfall to the Boulder Feeder Canal where practical and cost effective, at least until the pipeline is constructed.

4.29 Drinking Water.

The city and county will protect the quality of its water sources and will meet all State of Colorado drinking water standards and source water protection requirements. It is also the goal of the city to meet secondary drinking water standards established by the United States Environmental Protection Agency and to evaluate additional voluntary standards as appropriate. The city and county will continually seek to improve the quality of drinking water and work with other water and land use interests as needed to assure the integrity and quality of its drinking water supplies.

Construction of the Carter Lake Pipeline would provide significant protection for the quality of the city’s CBT and Windy Gap water sources while in transit from Carter Lake to the BRWTP.

4.39 Energy Conservation and Renewable Energy.

The city and county will implement policies and programs that enhance opportunities for individuals, businesses and public organizations to limit the use of non-renewable energy resources by conserving energy and converting to renewable resources. The city will set goals for the use of non-renewable energy that are consistent with an orderly transition to a sustainable energy economy in order to preserve fossil fuels for future generations. The city will support private decisions to use renewable energy, will publicly develop local renewable energy resources where economical, and will preserve future options for renewable energy so that they may be developed when they become cost effective.

Preliminary analysis indicates that the proposed Carter Lake Pipeline would have economically viable hydroelectric power generation potential.

The city's *Source Water Management Plan* (SWMP) was completed and approved by City Council in April 2009. The plan recognizes that the city's water supplies are one of its most important resources. The SWMP documents the current status of the city's water resources and raw water facilities and defines issues to be addressed to provide for the city's future water supply needs. The SWMP and its recommended projects and programs provide a framework for sustainable management of the city's source waters so that future water supply needs are met through drought periods without violating adopted water supply reliability criteria.

One of the key goals of the SWMP was to identify ways to increase water system reliability and flexibility to provide value that is sustainable for the future without causing unnecessary impacts to water rates. These opportunities are referred to as "no regrets" actions, in that they would be considered good now and still good if underlying assumptions change in the future. Construction of the Carter Lake Pipeline is categorized in the SWMP as a no-regrets action, assuming an acceptable funding/water rate plan can be accomplished.

The city's 2009 Water Quality Strategic Plan identifies five basic water quality goals:

- Provide safe and high quality drinking water.
- Control point source pollutants from wastewater and other sources.
- Control pollutants from stormwater and other non-point sources.
- Protect preserve and restore natural water systems.
- Conserve water resources.

The source water quality goals described in the Water Quality Strategic Plan are intended to help integrate water quality considerations into capital projects and decisions regarding land use policies and activities. The plan recommends that the city contain and secure treatment plant and water supplies from potential contamination as recommended in the water system vulnerability assessment. The open Boulder Feeder Canal was ranked as one of the most vulnerable components of the city's water system in the current vulnerability assessment. Containment of CBT water en route to the BRWTP is consistent with the city's practice of containing its other drinking water supplies during transport.

Utilities Division staff has no knowledge that this project would conflict with any departmental master plans.

Colorado drinking water regulations include the National Primary Drinking Water Standards (NPDWS) that consist of all regulated contaminants and the Maximum Contaminant Level (MCL) or the Treatment Technique (TT) that must be met for each contaminant in drinking water supplies. In addition to the NPDWS list of contaminants, the EPA maintains a list of National Secondary Drinking Water Standards, which are non-enforceable guidelines for contaminants that may cause cosmetic or aesthetic effects in drinking water. Colorado recommends secondary standards to water systems as "reasonable goals" but does not require compliance. The city's drinking water, regardless of source, consistently meets regulatory standards.

The city has established a set of drinking water quality goals and operational treatment practices in order to ensure public health, minimize distribution system deterioration and provide uniformly high quality water to all its customers. Several of the city's drinking water quality goals are more stringent than standards required by state and federal drinking water regulation. Construction of the Carter Lake Pipeline would facilitate meeting the city's goals for total dissolved solids (including sodium and sulfate), taste and odor and manganese for water treated at the BRWTP.

The pipeline construction corridor will not only be impacted by initial pipeline construction but future maintenance, repair and replacement activities as well, although re-disturbance should not occur until well into the future. It is assumed that comprehensive mitigation and restoration programs, such as proposed for the construction, would prevent any cumulative impacts related to disturbance.

City Of Boulder Community and Environmental Assessment Process

Checklist

- + Positive effect
- Negative effect
- 0 No effect

Project Title: Carter Lake Pipeline	Preferred Alternative	Alternative 2
A. Natural Areas or Features		
1. DISTURBANCE TO SPECIES, COMMUNITIES, HABITAT, OR ECOSYSTEMS DUE TO:		
a. Construction activities	- *	0
b. Native vegetation removal	- *	0
c. Human or domestic animal encroachment	0	0
d. Chemicals (including petroleum products, fertilizers, pesticides, herbicides)	0	-
e. Behavioral displacement of wildlife species (due to noise from use activities)	- *	0
f. Habitat removal	- *	0
g. Introduction of non-native plant species in the site landscaping	0	0
h. Changes to groundwater or surface runoff	0	0
i. Wind erosion	0	0
2. Loss of mature trees or significant plants?	-	0
B. Riparian Areas/Floodplains		
1. Encroachment upon the 100-year, conveyance or high hazard flood zones?	0	0
2. Disturbance to or fragmentation of a riparian corridor?	- *	0

* An asterisk indicates impacts which are temporary in nature.

Project Title:		Preferred Alternative	Alternative 2
Carter Lake Pipeline			
C. Wetlands			
1.	Disturbance to or loss of a wetland on site?	- *	0
D. Geology and Soils			
1.	a. Impacts to unique geologic or physical features?	0	0
	b. Geologic development constraints?	0	0
	c. Substantial changes in topography?	0	0
	d. Changes in soil or fill material on the site?	0	0
	e. Phasing of earth work?	- *	0
E. Water Quality			
1.	Impacts to water quality from any of the following?		
	a. Clearing, excavation, grading or other construction activities	- *	0
	b. Change in hardscape	0	0
	c. Change in site ground features	0	0
	d. Change in storm drainage	0	0
	e. Change in vegetation	0	0
	f. Change in pedestrian and vehicle traffic	0	0
	g. Pollutants	0	0
2.	Exposure of groundwater contamination from excavation or pumping?	0	0
F. Air Quality			
1.	Short or long term impacts to air quality (CO2 emissions, pollutants)?	-	0
	a. From mobile sources?	-	0
	b. From stationary sources?	+	0
G. Resource Conservation			
1.	Changes in water use?	0	0
2.	Increases or decreases in energy use?	0	0
3.	Generation of excess waste?	0	0

Project Title:		Preferred Alternative	Alternative 2
Carter Lake Pipeline			
H. Cultural/Historic Resources			
1.	a. Impacts to a prehistoric or archaeological site?	-*	0
	b. Impacts to a building or structure over fifty years of age?	0	0
	c. Impacts to a historic feature of the site?	-*	0
	d. Impacts to significant agricultural land?	-*	0
I. Visual Quality			
1.	a. Effects on scenic vistas or public views?	0	0
	b. Effects on the aesthetics of a site open to public view?	-*	0
	c. Effects on views to unique geologic or physical features?	0	0
	d. Changes in lighting?	0	0
J. Safety			
1.	Health hazards, odors, or radon?	0	0
2.	Disposal of hazardous materials?	0	0
3.	Site hazards?	-*	0
K. Physiological Well-being			
1.	Exposure to excessive noise?	0	0
2.	Excessive light or glare?	0	0
3.	Increase in vibrations?	0	0
L. Services			
1.	Additional need for:		
	a. Water or sanitary sewer services?	0	0
	b. Storm sewer/Flood control features?	0	0
	c. Maintenance of pipes, culverts and manholes?	-	0
	d. Police services?	0	0
	e. Fire protection services?	0	0

Project Title: Carter Lake Pipeline		Preferred Alternative	Alternative 2
f.	Recreation or parks facilities?	0	0
g.	Library services?	0	0
h.	Transportation improvements/traffic mitigation?	0	0
i.	Parking?	0	0
j.	Affordable housing?	0	0
k.	Open space/urban open land?	0	0
l.	Power or energy use?	+	0
m.	Telecommunications?	0	0
n.	Health care/social services?	0	0
o.	Trash removal or recycling services?	0	0
M. Special Populations			
1.	Effects on:		
a.	Persons with disabilities?	+	0
b.	Senior population?	+	0
c.	Children or youth?	+	0
d.	Restricted income persons?	+	0
e.	People of diverse backgrounds (including Latino and other immigrants)?	+	0
f.	Neighborhoods	0	0
g.	Sensitive populations located near the project (e.g. schools, hospitals, nursing homes)?	0	0
N. Economy			
1.	Utilization of existing infrastructure?	+	+
2.	Effect on operating expenses?	-	-
3.	Effect on economic activity?	+	0
4.	Impacts to businesses, employment, retail sales or city revenue?	+	0

PROJECT EFFECTS³

A. Natural Areas or Features

Biologists completed an inventory of the natural resources within the project alignment. A summary of the sensitive environmental issues is provided in Table 2 and discussed in subsequent sections of this report. The project avoids all areas identified in the Boulder County Comprehensive Plan as critical wildlife habitat areas. However, Carter Lake Pipeline does cross the St. Vrain riparian corridor near an area designated as a significant riparian corridor in the comprehensive plan. This crossing is within the existing SWSP easement, which is being used as a drivable stream crossing. The selected route also crosses near a Great Plains Salt Meadows and the Left Hand Creek Critical Wildlife Habitat; however, these specific areas are avoided.

Table 2. Summary of Sensitive Environmental Issues

	Criteria	Determination
Federally Threatened and Endangered (T&E) Species	Critical or potential habitat for federally designated threatened or endangered species	Potential habitat present. None found.
State T & E Species and Species of Concern	Potential habitat for state T&E species or species of special concern	None affected
Colorado Natural Heritage Program (CNHP)	Documented occurrence of rare or imperiled CNHP species	None present
Migratory Bird Treaty Act	Occurrence of nesting sites for raptors or other protected species	Several raptor nests present

Threatened and Endangered Species

Preble's Meadow Jumping Mouse

The Preble's meadow jumping mouse (PMJM) is listed as threatened under the federal Endangered Species Act. Previous studies indicate that a number of riparian corridors crossed by the selected route may contain suitable habitat. PMJM inhabit areas containing riparian vegetation with extensive tree and shrub cover that provide good potential habitat. Potential high quality habitat exists at Dry Creek, Little Thompson River, St. Vrain Creek and Left Hand Creek. These areas were trapped in accordance with the U.S. Fish and Wildlife Service protocol. Other areas were disqualified due to

³ Information on project effects is taken from *Southern Water Supply Project II Boulder County 10410 Application*, prepared by EDAW/AECOM for the Southern Water Supply Water Activity Enterprise of the Northern Colorado Water Conservancy District, July 2009.

the lack of habitat or lack of connectivity. No PMJM were found, and the project is not expected to have any effect on this species.

Ute Ladies' Tresses Orchid

The Ute ladies' tresses orchid is a federally threatened plant species under the Endangered Species Act. The Ute ladies tresses orchid occurs in seasonally moist alluvial soils and wet meadows near springs, lakes, and streams and their associated floodplain below 6,500 feet elevation. A number of wetlands crossings fit this description along the selected route. All of the crossing locations were surveyed for Ute ladies' tresses orchids during the orchid's blooming period (August 9 and 17). A reference site was visited near Cherryvale Road in Boulder for comparison. No orchids were found and the project is not expected to have any effect on this plant species.

Brassy Minnow

The brassy minnow (*Hybognathus hankinsoni*) is a small, state-threatened species of fish that prefers cool, gravelly streams with a sediment overlay and aquatic vegetation. It has been found in the lower St. Vrain River and is predicted to occur at river crossings within the selected alignment. Best management practices (BMPs) will be applied to river and stream crossings to minimize any potential impacts to this fish or its habitat and minimize the duration of temporary impact. Streams will be crossed using the open trench method during the winter months when stream flows are at their lowest levels. Sediment control measures, such as berms, silt fence, or filter fabrics will be used to minimize the downstream migration of sediments and the inadvertent trapping of aquatic species.

Common Shiner

The common shiner (*Notropis cornutus*) is a small, state-threatened species of fish that prefers cool gravelly streams, which are not covered with sediment but are shaded by overhanging vegetation. Shiners are only found in tributary streams to the South Platte River, including the St. Vrain River, and this species is predicted to occur at river crossings within the selected alignment. Dead common shiners were observed by field personnel in a side pool of the Little Thompson River. BMPs will be applied to river and stream crossings to minimize any potential impacts to this fish or its habitat. Minimization measures discussed for the brassy minnow will also be used.

Bell's Twinpod

The Bell's twinpod, a member of the Mustard family, is a former Category 2 candidate species. This classification no longer exists; however, surveys were specifically performed for this species in all areas with suitable habitat, including shaley outcrops. One population of Bell's twinpod was located near the selected route in Larimer County. This population is located near the end of Larimer County Road 6 and is outside of the proposed easement. No Bell's twinpod were found within the selected route within Boulder County.

Colorado State Species of Special Concern

Black-tailed Prairie Dog

Black-tailed prairie dogs (*Cynomys ludovicianus*) are undergoing review by USFWS for possible listing, and are currently listed as a Colorado species of special concern due to loss of habitat in the state, their function as prairie and grassland ecosystem cornerstone species, and widespread plague outbreaks that have dramatically reduced populations in some locations. Prairie dog colonies are located within the study area and, edges of their colonies cross into the selected alignment in several locations. Permits from the Colorado Division of Wildlife (CDOW) are required to relocate or eradicate prairie dogs. Boulder County makes efforts to relocate prairie dogs when practical; Northern Water will follow Boulder County guidelines in its management of prairie dogs where they exist within the selected easement.

Cylindrical Papershell

The cylindrical papershell (*Anodontoidea ferussacianus*) is a medium sized freshwater mussel found in muddy or sandy bottoms of lakes and quiet streams. The papershell is a species of special concern in Colorado. It has been observed in freshwater sources in the Hygiene, Niwot, and Longmont quads in Boulder County, and is predicted to occur in the St. Vrain River outside of the selected alignment. However, the last recorded observations of this species occurred in 1977. BMPs will be applied to river and stream crossings to minimize any potential impacts to this mollusk or its habitat in case it is still present. Minimization measures described for the brassy minnow will be used to minimize impacts to the cylindrical papershell. Additionally, surface alluvium and sediments excavated from within the stream will be replaced in the same order in which they are removed, preserving sediment horizons. If cylindrical papershell are found during construction, excavated alluvium will be kept moist while stockpiled, until material is placed back to post construction elevations.

Northern Leopard Frog

The Northern leopard frog, a state species of special concern, is found in both mountains and plains habitats throughout central and western Colorado. They can be locally common, but are rare or extirpated from a majority of the state, particularly in the mountains. They live and breed in and near shallow permanent water, wet meadows, and quiet streams and ditches, and are predicted to occur within the selected alignment in two locations. BMPs will be applied to river and stream crossings and adjacent habitats to minimize any potential impacts to this frog or its habitat. Minimization of the extent of disturbed area will be used when crossing aquatic habitats in order to minimize impacts to the Northern leopard frog.

Migratory Birds

In Colorado, all birds except for the European starling, house sparrow and rock dove are protected under the Migratory Bird Treaty Act. A Nest Depredation Permit, issued by the U.S. Fish and Wildlife Service, is needed to remove, disturb or destroy occupied nests. A number of raptor nests are located in proximity to the selected alignment. Raptors are

protected under the Migratory Bird Treaty Act of 1918, which prohibits the taking of migratory birds, eggs, and nests. Nesting raptors are covered by this act and can be sensitive to nearby activity. The Colorado Division of Wildlife has developed guidelines for seasonal buffers to prevent the disruption of nesting activities. These seasonal avoidance buffers will be used to schedule construction activities. For example, red-tailed hawk nests should be avoided within a 1/3-mile radius of the nest site between February 15 and July 15. Raptor nests identified near the proposed pipeline alignment are identified on Figures 2 through 9. No active nests will be directly disturbed by the project. Pre-construction surveys will be performed for all spring through fall construction activities to identify locally breeding migratory passerines and waterfowl within and immediately adjacent to the selected route. Locations where active breeding is observed (nest-building, mating behavior, incubation, presence of fledglings), will not be disturbed by construction activities.

In addition, prairie dog colonies have been identified along the proposed route and are identified on Figures 2 through 9. Prairie dog colonies provide nesting habitat for the burrowing owl. Burrowing owls are sensitive to human encroachment and should be avoided within 75 yards of the nest site from April 1 through August 15. Construction through prairie dog colonies will be scheduled between November 1 and March 1 to avoid any conflict with burrowing owls. Prior to construction, affected prairie dog colonies will be relocated consistent with County and City of Boulder requirements.

Wildlife and Fisheries

The primary riparian corridors crossed by the selected route, such as Little Thompson River, St. Vrain Creek, and Left Hand Creek, provide essential habitat for fish and wildlife. These riparian corridors provide cover and feeding opportunities for many terrestrial species, breeding habitat for birds, and aquatic habitat for fish. In addition, these riparian corridors provide important migration corridors for larger mammals such as mule deer (*Odocoileus hemionius*), black bear (*Ursus americanus*), and mountain lion (*Felis concolor*). These migration corridors are especially important in areas where the foothills are transitioning to the eastern plains. There will be temporary disturbance in these areas, probably only for a few days in any single location. Restoration of project disturbance with native vegetation species will be undertaken following construction. No long term disruption to these important habitats is anticipated.

Boulder County data indicate that there are critical wildlife habitats along these drainages. CDOW data identifies specific wildlife habitat including Bald Eagle Roost and Winter Concentration areas, Potential and Occupied PMJM Habitat, and Snow Goose Production area (Figures 2 through 9). Although these identified areas are seasonally sensitive, temporary disturbance associated with construction can be scheduled during non-sensitive periods. No long term effects to wildlife are anticipated.

Terrestrial and Aquatic Plant Life

The USGS GIS data set shows three plant communities, including forested, grassland, and natural herbaceous. The CDOW riparian habitat data set shows five vegetation types including forested, riparian shrub, willow, riparian herbaceous and open water. The Boulder County GIS data set identifies one area as Great Plains Salt Meadow. In addition to the wetland and riparian plant communities described above, mixed grassland and shrubland are also prevalent throughout the selected route.

Mixed Grassland

The upland grassland that exists along the selected route consists of a mixture of native and weeds plant species. The plant community is dominated by western wheatgrass (*Pascopyrum smithii*), smooth brome (*Bromus inermis*), Kentucky bluegrass (*Poa secunda*), sideoats grama (*Bouteloua curtipendula*), crested wheatgrass (*Agropyrum cristatum*) and cheatgrass (*Bromus tectorum*). Some of the forbs include field horsetail (*Equisetum arvense*), chicory (*Cichorium intybus*), alfalfa (*Medicago sativa*), lambs quarters (*Chenopodium album*), showy milkweed (*Asclepias speciosa*), kochia (*Kochia scoparia*), scarlet globe mallow (*Sphaeralcea coccinea*), horseweed (*Conyza canadensis*), asparagus (*Asparagus officinalis*), wild licorice (*Glycyrrhiza lepidota*), salsify (*Tragopogon dubius*), mullein (*Verbascum thapsus*), smooth groundcherry (*Physalis virginiana*), western tansy mustard (*Descurainia pinnata*).

Shrubland

Several areas of shrubland exist along the northern portion of the alignment. The shrubland is dominated by species such as rubber rabbitbrush (*Chrysothamnus nauseosus*), fringed sagebrush (*Artemisia frigida*), winterfat (*Krascheninnikovia lanata*), yucca (*Yucca glauca*), and broom snakeweed (*Gutierrezia sarothrae*). Grasses include western wheatgrass (*Pascopyrum smithii*) and blue grama (*Bouteloua gracilis*).

Great Plains Salt Meadow

Boulder County identifies a Great Plains Salt Meadow at a location near Lagerman Reservoir. Although the data shows a polygon of great plains salt meadow north of Pike Road (east side of N 75th St., opposite side of street as pipeline), there is an area along Dry Creek, downstream of Lagerman Reservoir with similar characteristics. This area is a saline wet meadow that is saturated to the surface. The vegetation at this location is dominated by inland saltgrass (*Distichlis stricta*), common spikerush (*Eleocharis palustris*), and includes annual rabbitsfoot grass (*Polypogon monspeliensis*), alkali sacaton (*Sporobolus airoides*), artic rush (*Juncus arcticus*), salt sandspurry (*Spergularia marina*), common foursquares, and jointleaf rush (*Juncus articulatus*).



Great Plains Salt Meadow located along Dry Creek, downstream of Lagerman Reservoir.

Forested Riparian

Most of the mature trees will be avoided by the selected route. Left Hand Creek has a very high density of mature trees. However, at the selected crossing, there is a small opening that can be used for the pipeline construction that will avoid the removal of trees. Some trees may need to be trimmed to avoid damage to the trees.



The pipeline route at Left Hand Creek would avoid the removal of any mature cottonwoods.

Noxious Weeds

Weeds listed in the Colorado Noxious Weeds Act are common along the pipeline alignment. Although no large patches of noxious weeds were identified, the following Boulder County noxious weeds were observed sporadically within the selected route:

List B

Canada thistle (*Cirsium arvense*)
 Common teasel (*Dipsacus fullonum*)
 Dalmatian toadflax, narrow-leaved (*Linaria genistifolia*)
 Diffuse knapweed (*Centaurea diffusa*)
 Leafy spurge (*Euphorbia esula*)
 Russian-olive (*Elaeagnus angustifolia*)

List C

Chicory (*Cichorium intybus*)
 Common mullein (*Verbascum thapsus*)
 Downy brome (*Bromus tectorum*)
 Field bindweed (*Convolvulus arvensis*)
 Perennial sowthistle (*Sonchus arvensis*)

In order to avoid the spread of these noxious weeds, topsoil will be kept locally and discretely segregated to prevent the spread of noxious weed seed. Following construction, restoration activities will occur and maintenance to treat any noxious weeds will occur until native vegetation is established.

B. Riparian Areas/Floodplains

The only identified hazard areas crossed by the pipeline are stream crossings and their associated floodplains. As previously described, the pipeline route crosses through a number of floodplain hazards that are identified from the Boulder County GIS data. The floodplains identified from the data include Little Thompson River, St. Vrain River, Dry Creek No. 1, Left Hand Creek, and Dry Creek No. 2. Although these hazards are present, the pipeline will not adversely affect the floodplain, nor will it be affected by flood events. The pipeline will be completely buried and will not change the ground topography or floodplain capacity. The pipeline will be constructed at river crossings to withstand any potential scouring. All structures, such as air-vents and blow off valves, will be installed below grade and accessed through flush level manholes. All grades will be returned to preconstruction conditions.

The Boulder County Comprehensive Plan Geologic Hazards and Constraints Map indicates that Little Thompson River, St. Vrain River, and Left Hand Creek all have a moderate geologic hazard with regard to flash-flooding. In addition, the Little Thompson River, St. Vrain River, Dry Creek No. 1, Left Hand Creek, and Dry Creek No. 2 all have defined 100-year floodplains. The majority of the project is located outside of these areas. The project will be designed to mitigate any potential risks associated with flashflooding and scouring. The pipeline will be buried and there will not be any above ground

structures in these areas. All necessary air-vents and blow off valves will be located below ground and accessed through a flush mounted manhole. The pipeline itself will be buried to a minimum of 4 feet. As a result of these measures, the project will not have any effect on the pattern or intensity of flooding.

Riparian corridors will be temporarily disturbed by pipeline construction. These impacts are discussed under “Wetlands,” below.

C. Wetlands

The project crosses riparian vegetation and wetlands at multiple locations, including perennial streams, intermittent and ephemeral drainages, irrigation ditches, isolated wetlands, and associated riparian areas. The vegetation within the riparian and wetland areas consists of three primary vegetation types, including riparian woodland, riparian shrubland, and emergent wetland. These plant communities are often intertwined and transition from one to the other along a hydrological gradient.

The riparian woodland plant community primarily consists of mature trees such as plains cottonwoods (*Populus deltoids*), narrow leaf cottonwood (*Populus angustifolia*), and crack willow, (*Salix fragilis*). These species occur where suitable hydrology occurs, primarily along natural drainages or irrigation ditches. Some of these species were planted as individual trees or as windbreaks along irrigation ditches. These woodlands and some individual trees provide nesting and roosting habitat for raptors and other bird species.

The riparian shrubland community primarily consists of wood rose (*Rosa woodsii*), coyote willow (*Salix exigua*), golden current (*Ribes aureum*), skunkbush (*Rhus trilobata*), virgin’s bower (*Clematis ligusticifolia*), and chokecherry (*Prunus virginiana*). The emergent wetland plant community is often dominated by species such as narrowleaved cattail (*Typha latifolia*), Nebraska sedge (*Carex nebrascensis*) or four squares, common threesquare (*Schoenoplectus pungens*), Emory’s sedge (*Carex emoryi*), and reed canarygrass (*Phalaris arundinacea*). Other species present include smooth brome (*Bromus inermis*), Canada wild rye (*Elymus canadensis*), foxtail barley (*Critesion jubatum*), western wheatgrass (*Pascopyrum smithii*), and Russian olive (*Elaeagnus angustifolia*).

The project will temporarily disturb areas within these wetland and riparian corridors. Many of these crossings have already been disturbed by previous projects, including the original SWSP that has been subsequently restored. A restoration plan will be developed for new disturbances at each crossing.

Jurisdictional waters of the United States (U.S.) and wetlands occur at several locations where the pipeline crosses a drainage. Impacts to these jurisdictional waters will require a Section 404 permit under the Clean Water Act. A Pre-Construction Notification for the pipeline impacts has been sent to the U.S. Army Corps of Engineers (Corps), and the project is expected to be permitted under Nationwide Permit (NWP) 12 for utility lines.

NWP 12 permits up to half an acre of permanent impact to waters of the U.S. at each crossing.

All impacts to waters of the U.S. will be temporary in nature and no permanent impacts will result. The ground contours will be restored, topsoil will be salvaged and replaced, and the disturbance will be revegetated with native species.

The city of Boulder also regulates disturbance of stream margins or buffers under its wetland ordinance. This ordinance applies to all wetlands within its incorporated boundary, land owned wholly or in part by the City of Boulder, or lands affected by city projects. Jurisdictional wetlands and crossings also meet the City of Boulder wetland criteria, and additional areas may be protected under the ordinance, which requires the presence of two of the three Corps wetland criteria (vegetation, hydrology, and soils). It is anticipated that a Municipal Wetlands Permit will be required for the entire pipeline construction area. .

Wetlands and associated riparian buffers were avoided where possible; however, there is no way to avoid the crossing of all drainages, many of which have a generally west to east orientation, with a linear pipeline that generally runs north to south. Impacts were minimized where possible. For example, the crossing point of Left Hand Creek was selected to avoid most of the cottonwoods present.

CNHP has identified several areas as Network Conservation Areas (NCA) or Potential Conservation Areas (PCAs), including the Little Thompson River and St. Vrain Creek corridors. NCAs and PCAs have been identified because of their biological values, ecological processes, and habitat integrity. These areas provide large, well developed habitats that are used by a variety of wildlife and contain occurrences of rare species elements. Both of the PCA stream crossings were previously crossed by the original SWSP, and the Carter Lake Pipeline would be constructed in the existing easement.



Proposed crossing of the Little Thompson River



Proposed crossing of the St. Vrain River

D. Geology and Soils

Reclamation plans will be developed for hay pastures/irrigated agricultural lands. Grades will be restored to pre-construction conditions and any surficial irrigation will be graded to restore function. If post-construction soil settling occurs, additional correction will be made.

The Carter Lake Pipeline Project will follow the provisions of the SWSP Programmatic Agreement and Special Use Permit, which includes having a paleontologist present during trench excavation in geologic formations with a potential to contain significant fossils. If significant fossils are found, construction will be rescheduled to allow for resources recovery or the trench will be realigned. If fossils are noticed elsewhere, a paleontologist will be consulted.

Construction earthwork will be phased so that short stretches of the alignment and trench will be open at any one time. Restoration activities will follow closely behind pipe installation and trench backfilling to ensure that disturbed areas are promptly stabilized.

E. Water Quality

The project will have no adverse effects on water quality. Best management practices (BMPs) will be used during construction and following construction, the disturbed area will be restored with native vegetation, where applicable. A storm water discharge and construction dewatering permit will be obtained from the Colorado Department of Public Health and Environment for construction at drainage crossings. These permits will include the preparation of a Storm Water Management Plan (SWMP) and BMPs to prevent storm water runoff and sediment in disturbed areas from reaching nearby waterways. Typical measures employed may include detention basins, silt fences, hay bales, wattles, and hydro mulch. These measures will deflect runoff, collect sediment, and allow infiltration. Storm water and erosion control measures will be carefully monitored during construction to ensure their effectiveness.

The project will have a beneficial effect on the quality of the city's drinking water treated at BRWTP, because by transporting the water in an enclosed pipeline, there will be no opportunity for water quality degradation from external sources during transport from Carter Lake to the BRWTP.

Constituent levels in water remaining in the BFC if the pipeline is constructed (water that the city uses for exchange purposes, irrigation or city-owned Boulder Reservoir storage) could rise due to less dilution as a result of reduced flows, but these future effects will be somewhat counteracted by on-going efforts by NCWCD and the city to isolate existing outfalls to the BFC. The only two water utilities using the BFC for drinking water are Boulder and Left Hand Water District, and both are currently parties to the pipeline project. Dilution in the canal is of greater importance if the water is a direct drinking water supply, but it is not as great a concern if the water is used for irrigation or for reservoir storage.

The city would still monitor water quality in the BFC and Boulder Reservoir as needed. However, there would not be an urgent need to track and predict contaminant events in the BFC and reservoir if water destined for treatment is transported via a pipeline.

F. Air Quality

Construction vehicles and equipment will cause short term emissions of exhaust during construction. Traffic delays at road crossings will also cause temporary emissions of exhaust. These short terms effects will be minor and of short duration in any one location as construction progresses along the linear corridor. Short term effects will be minimized by using standard contract requirements concerning vehicle idling and by minimizing traffic delays.

The construction contractor will be responsible for developing and implementing a fugitive dust control plan. The plan will be submitted to the Boulder County Health Department and Colorado Department of Public Health and Environment prior to construction.

Development of hydroelectric power potential of the pipeline would also have a beneficial effect on air quality. This renewable energy production offsets the need to generate an equivalent amount of electricity at a fossil fuel fired power plant, and therefore results in the reduction of emissions of gases associated with the burning of fossil fuels. Based on a 200kW capacity and annual generation of 1,200,000 kW-hrs, the beneficial effects of a Carter Lake Hydroelectric facility are summarized in Table 3.

Table 3. Beneficial Effects of Carter Lake Hydro

	Annual Reductions (tons)	Life-of-Project Reductions (tons)
Coal Consumption	600	30,000
SO₂ Emissions	1	45
NO_x Emissions	2	90
CO₂ Emissions	600	30,000

G. Resource Conservation

The Carter Lake Pipeline will be a gravity flow pipeline, with no need to pump water to deliver it to the BRWTP. During the period of the year generally from April through mid-October, water is delivered to the BRWTP through the BFC by gravity. However, during the winter months when the BFC is not operating, water must be pumped from Boulder Reservoir to the treatment facility. The facility uses two large 60-hp raw water pumps and one smaller 30-hp pump to supply the treatment plant with water from the reservoir. Eliminating this pumping would reduce BRWTP annual energy use by an average of 100,000 kilowatt-hours with an average savings of \$7,000 per year.

If a hydroelectric facility is installed at the end of the pipeline, the Carter Lake Pipeline will be a net energy producer. Preliminary analysis indicates that a Carter Lake Hydro facility could generate 60 million kW-hrs of electricity over its assumed 50-year useful life while providing the Water Utility with approximately \$2.5 million in revenue.

Up to 25 cfs of the city's C-BT and Windy Gap water destined for treatment at BRWTP would be transported in the Carter Lake Pipeline. The pipeline would not carry water that the city uses for exchange purposes, irrigation or city-owned Boulder Reservoir storage. Such flows would continue to be conveyed through the feeder canal. Estimates of average Boulder Feeder Canal flows if the pipeline were to be constructed are summarized as follows:

Table 4: Carter Lake Pipeline Effects on Boulder Feeder Canal Flows

	Percent of Historical Canal Flow			
	April	May - August	September	October
Dry Year	80%	80%	47%	24%
Average Year	35%	85%	57%	9%
Wet Year	70%	70%	55%	20%

On an annual basis, BFC flows with the Carter Lake Pipeline in operation would be approximately 71.4%, 73.4% and 64.0% of historical canal flows for dry, average and wet years, respectively. The BFC will continue to be shut down in the winter and therefore, there will be no flow during the months of November through March.

Some industries that use water treated at the BRWTP need to provide additional treatment, especially when the source water is Boulder Reservoir, which has high hardness and alkalinity. If raw water was provided through the Carter Lake pipeline the

BRWTP could provide water lower in hardness and alkalinity, therefore requiring a reduced need for additional treatment.

For some industries the primary use of water is for the operation of cooling towers. From discussions with industry, receiving water lower in hardness and alkalinity increases the number of times cooling tower water can be cycled. Once cooling tower water reaches a certain level for various minerals it needs to be discharged to the city's sanitary sewer. City staff has been informed that the number of cooling water recycles can be increased 100 to 300 percent if the water is lower in hardness and alkalinity. Increasing the number of cycles allows less water to be used, less water discharged to the sanitary sewer, less energy usage and fewer cooling tower repairs due to scaling and mineral buildup.

H. Cultural/Historic Resources

Cultural and historic resources information was obtained from a file search of the State Historical Preservation Office (SHPO) and a review of known cultural resources by Peter Gleichman of Native Cultural Services. The file search for the entire project alignment revealed one prehistoric resource (isolated artifact) within the study area; however, isolated artifacts are not eligible for listing on the National Register of Historic Places (NRHP). The file search also revealed 17 historic resources, including irrigation ditches, railroads, and standing buildings. The pipeline route does not adversely affect any known cultural resources. All of the eligible buildings will be avoided. The alignment will cross the Clover Basin Ditch; not enough data were available in the records search to determine if it is eligible for nomination to the NRHP. In order to comply with Section 106 of the Historic Preservation Act, a field determination of the status of this ditch is needed before a Clean Water Act Section 404 permit can be obtained.

The SHPO files list the Boulder and Left Hand Railroad as occurring in the project vicinity and eligible for listing on the NRHP. However, Peter Gleichman, who performed the literature review, believes this information is erroneous and the Boulder and Left Hand Railroad may have been confused with the Middle Park and Pacific Railroad.

Given the potential for undocumented cultural resources to occur, a field survey of the alignment will be performed once the easement is acquired. Adverse effects to significant cultural properties from pipeline construction will be avoided or mitigated.

The Carter Lake Pipeline Project will follow the cultural mitigation measures identified in the SWSP Programmatic Agreement and Special Use Permit. A Class III resource inventory of the right-of-way will be conducted. Identified cultural resources within the right-of-way will be avoided to the extent practical. If avoidance is not possible, the SHPO will be consulted regarding eligibility of the subject sites for inclusion in the NRHP. Cultural resources reporting will include site forms and the results of archaeological testing.

I. Visual Quality

The Carter Lake Pipeline corridor is visible from a number of public roads. The construction will temporarily disturb the existing vegetation and associated land use. A restoration plan using native species will be developed for impacts to native habitats once the easement is acquired and final design is underway.

J. Safety

Construction can attract public curiosity and create a safety hazard for both workers and the public. Signing, fencing, and traffic control will be used to limit risk to the public and workers. A health and safety plan will be created and implemented during construction to further enhance public and worker safety. Emergency responders will be notified of the project, and regular progress updates will be reported to ensure first responders know the current location of workers.

K. Physiological Well-being

Construction will result in temporary construction noise. With a linear project such as a pipeline, any given location should only experience construction noise for a few days. Construction practices will comply with the following conditions to minimize noise disruptions:

- Construction shall not exceed 82 dB (average) during the hours of 7:00 a.m. and 7:00 p.m. for work of any type, and shall not exceed 75 dB (average) all other times. Variances may be granted by Boulder County.
- Sound from any moving vehicle source associated with the project shall not exceed 82 dB (A) at any time. Mufflers on equipment will be rated to fall below this level.

L. Services

The Carter Lake Pipeline will be owned by the project participants and operated on their behalf by NCWCD. NCWCD will be responsible for maintenance of the pipeline, which will be paid for by the project participants. Maintenance costs for the pipeline are estimated at 0.2% of the initial construction cost. Boulder's portion of the annual operation and maintenance costs would therefore be approximately \$42,000 (2005 dollars).

M. Special Populations

The Carter Lake Pipeline would protect the quality of the city's Colorado Big-Thompson and Windy Gap water supplies from contamination during transport to the Boulder Reservoir Water Treatment Plant (WTP). While there are treatment processes capable of removing contaminants from the water, it is better to preclude contamination from entering the water in the first place. The proposed pipeline would eliminate the potential

for water contamination during transport, which is considered beneficial to all residents who receive drinking water from the Boulder Reservoir WTP.

For Boulder residents who receive drinking water from the Boulder Reservoir WTP, there are noticeable differences in water taste and odor when the source water is switched from the Boulder Feeder Canal to water from Boulder Reservoir. This does not happen to residents that receive water from the Betasso WTP. From an equity standpoint, Boulder residents are paying the same rate for water that at times of the year has noticeable, significant differences in quality, although the quality from both WTPs meets state and federal drinking water requirements.

The effect of this project on water rates has been a key issue since its inception. Increases in water rates can have a negative effect on persons with restricted or fixed income. Currently, Boulder's average annual water utility bill is at the midpoint among Front Range communities.

N. Economy

The cost of the Carter Lake Pipeline and its effect upon water rates have been key issues with regard to this project. While most agree that the project would be beneficial in terms of protecting source and drinking water quality, there are differences of opinion concerning the current need for the pipeline and its priority in relation to other needed utility projects.

Staff supports proceeding with the project in the near term and believes that from a financial perspective, the following factors should be considered in evaluating the timing of its completion:

- The cost of the pipeline as currently proposed is less than it might be at a later time because there is currently an opportunity to share costs with other communities. At present, the savings associated with collaborating with the other stakeholders is estimated to be about 25-30% of the total project cost.
- On-going construction cost inflation suggests that the cost of constructing the pipeline will only increase in the future.
- A significant portion of the pipeline right-of-way has been previously secured by NCWCD. Continued development pressure along the existing and proposed new right-of-way may make future construction more difficult.
- The cost of borrowing money is currently low.

Utilization of Existing Infrastructure

NCWCD acquired the majority of the right-of-way needed to construct the pipeline along an alignment parallel to an existing pipeline that serves Broomfield and Superior. If other participants move forward with the project without the city, the availability of the existing NCWCD right-of-way for future pipeline construction will likely be affected.

Effect on Operating Expenses

Staff is recommending delay of construction funding until 2016-2017 in the 2010 budgeting process. By 2016, approximately \$7.2 million in existing water and wastewater revenue bonds will have been retired, with an additional \$25 million to retire in 2019. Staff will present current information regarding water rate impacts at the time it seeks approval for project funding.

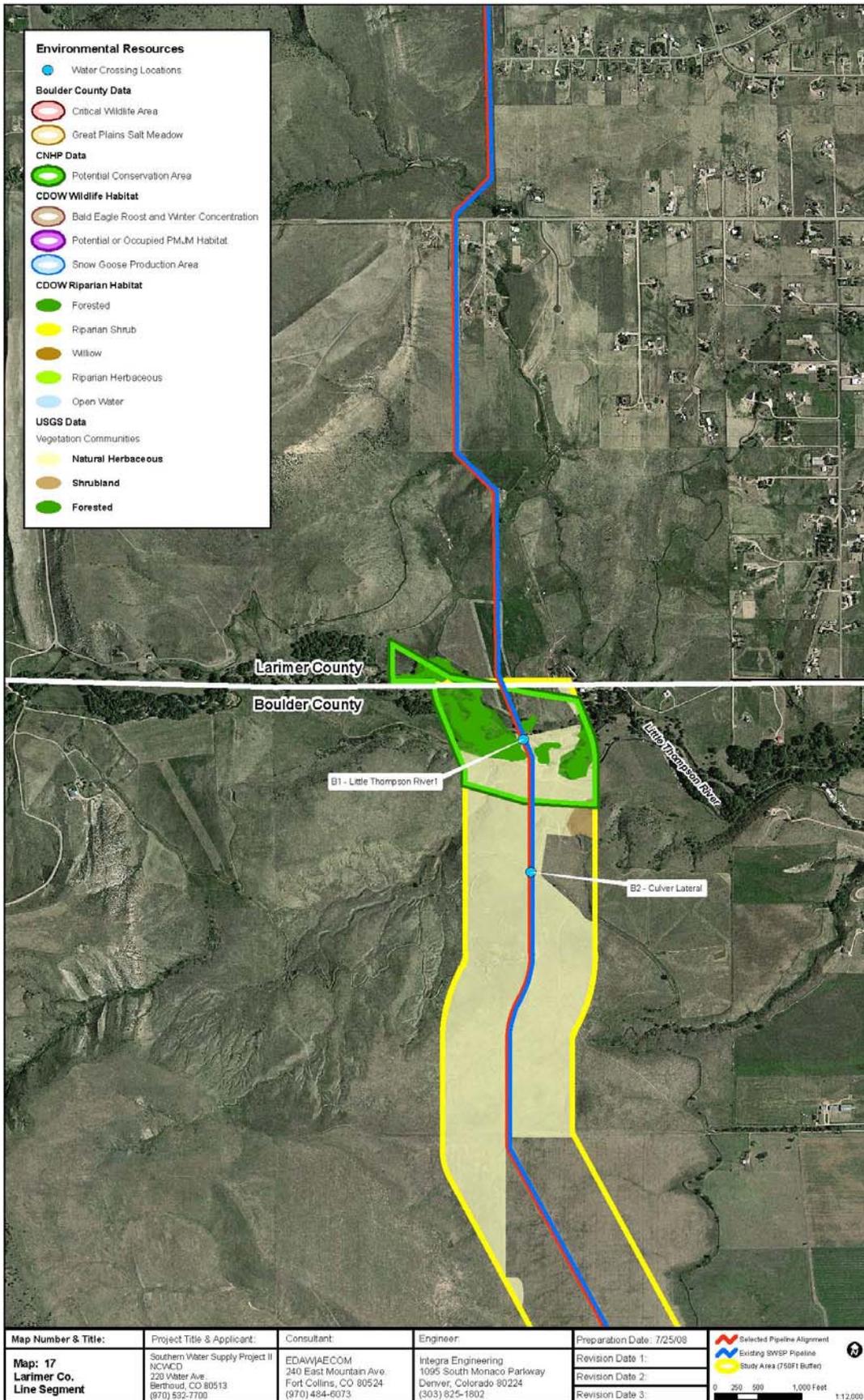
Annual operation and maintenance (O&M) costs are estimated at 0.2% of construction cost. Therefore annual O&M costs are estimated at \$42,000. These annual costs could be offset by revenues of approximately \$50,000 per year from a Carter Lake hydroelectric facility.

Impacts to Businesses

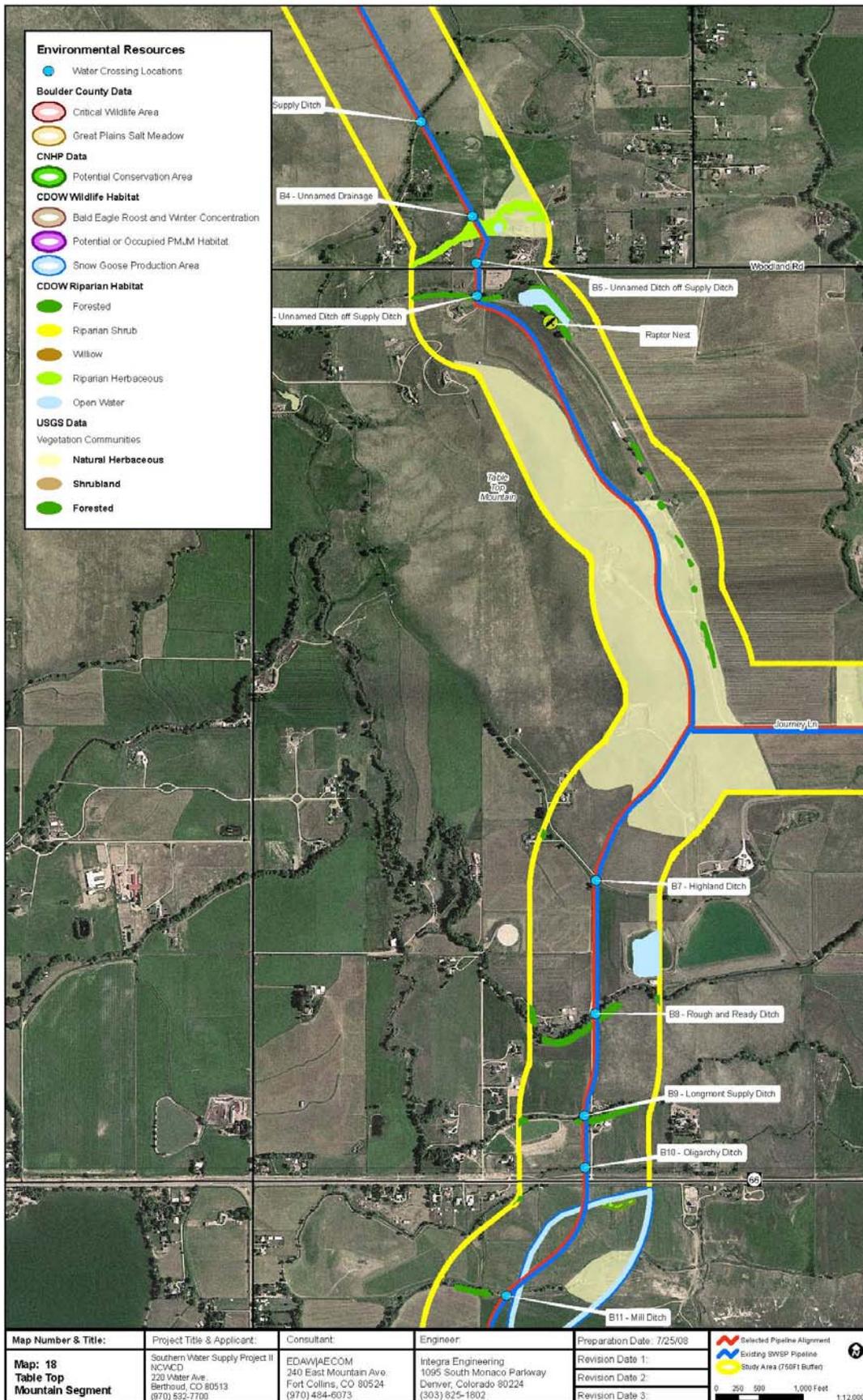
In Boulder, there are industries that can benefit from having water quality equal to what the Betasso WTP provides, compared to the Boulder Reservoir WTP. Currently, most all of the industries in Boulder that are affected by the quality of water they receive are located in the eastern portion of Boulder, which is served by the Boulder Reservoir WTP. From discussions with various industries, including IBM, Amgen and Roche Pharmaceuticals, benefits from having water provided by the Carter Lake Pipeline include:

- Consistent water quality,
- Reduced level of additional industrial treatment, and,
- Reduced water use, water discharges to the sanitary sewer system and energy costs.

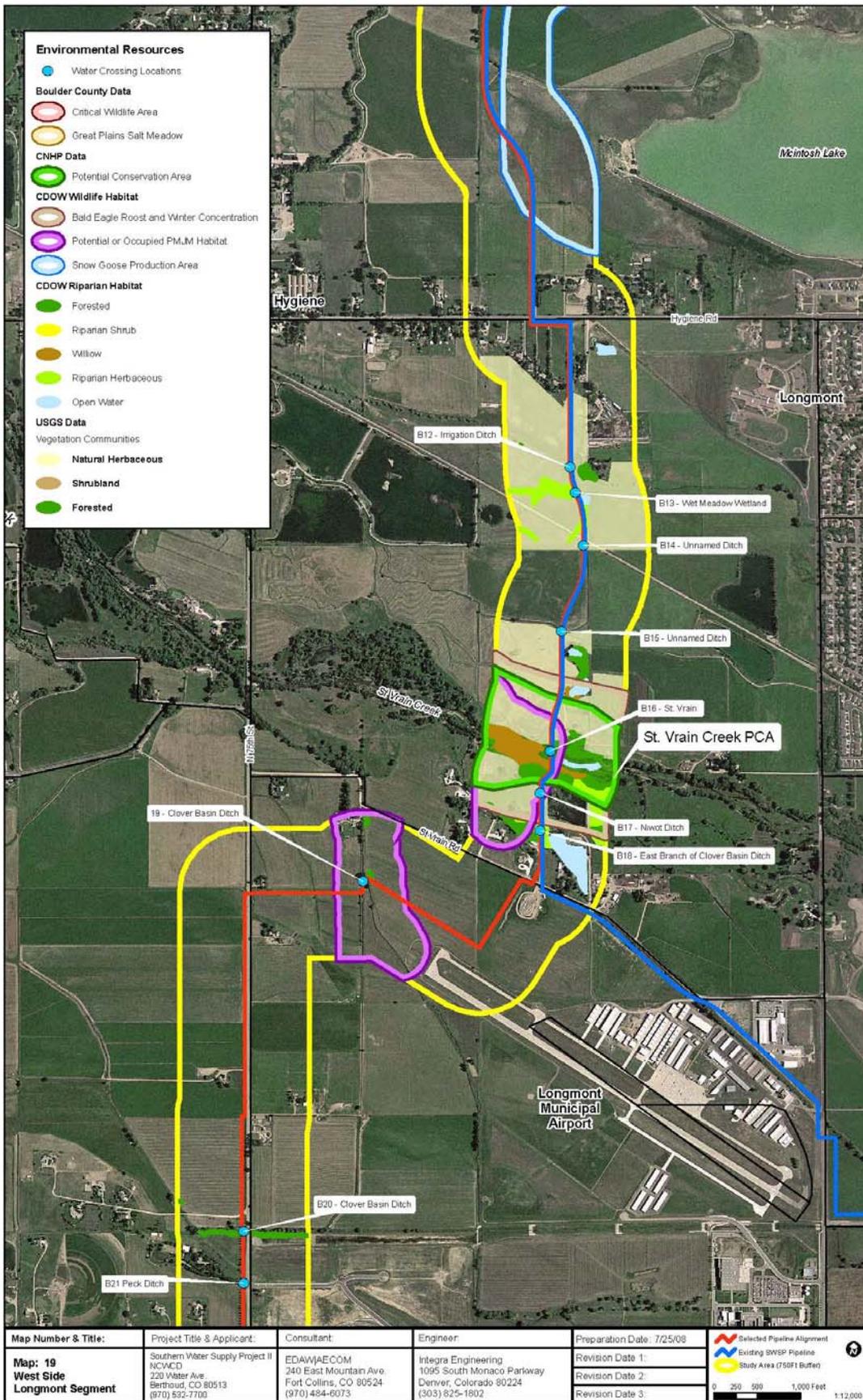
**Figure 2:
Environmental
Resources**



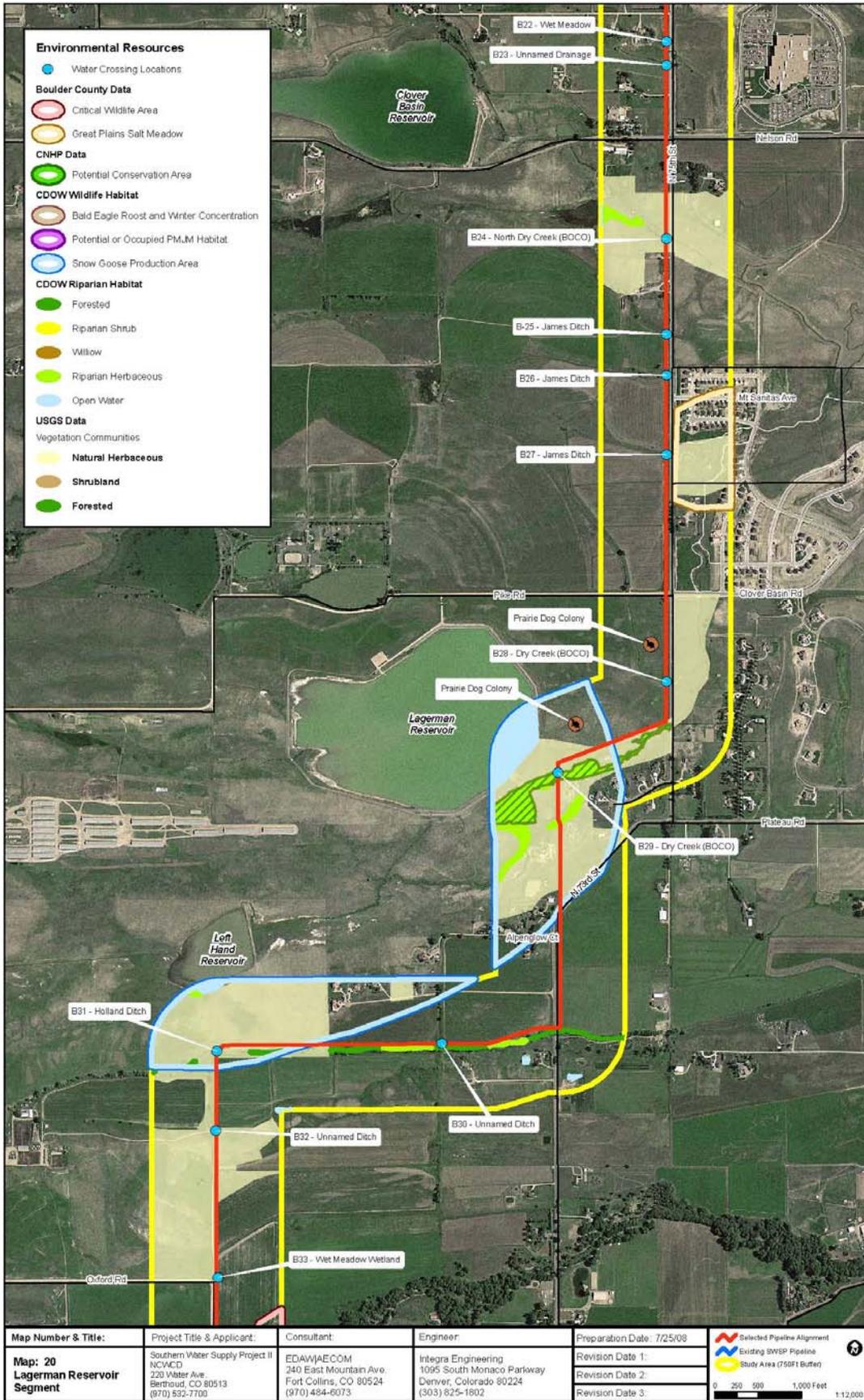
**Figure 3:
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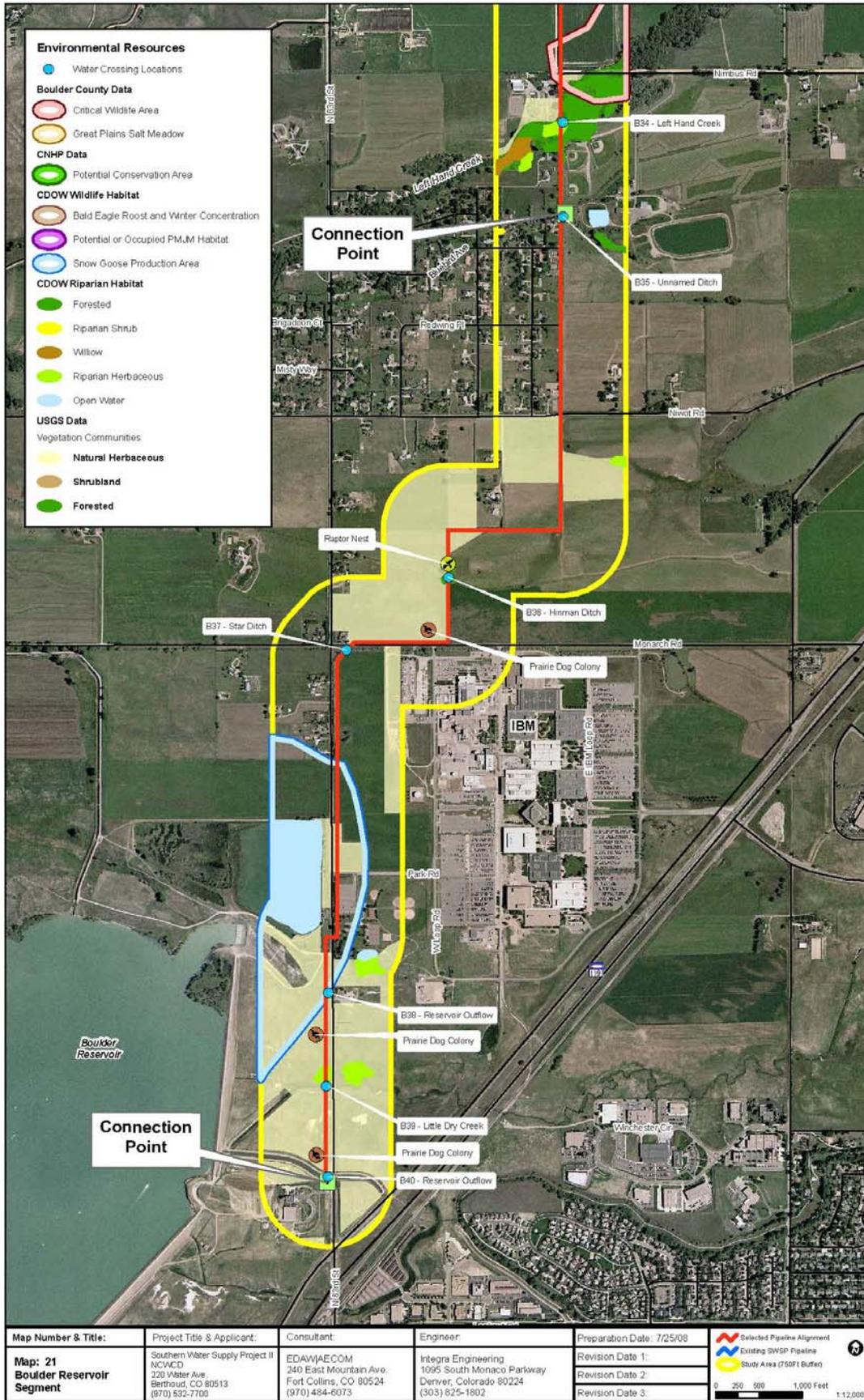
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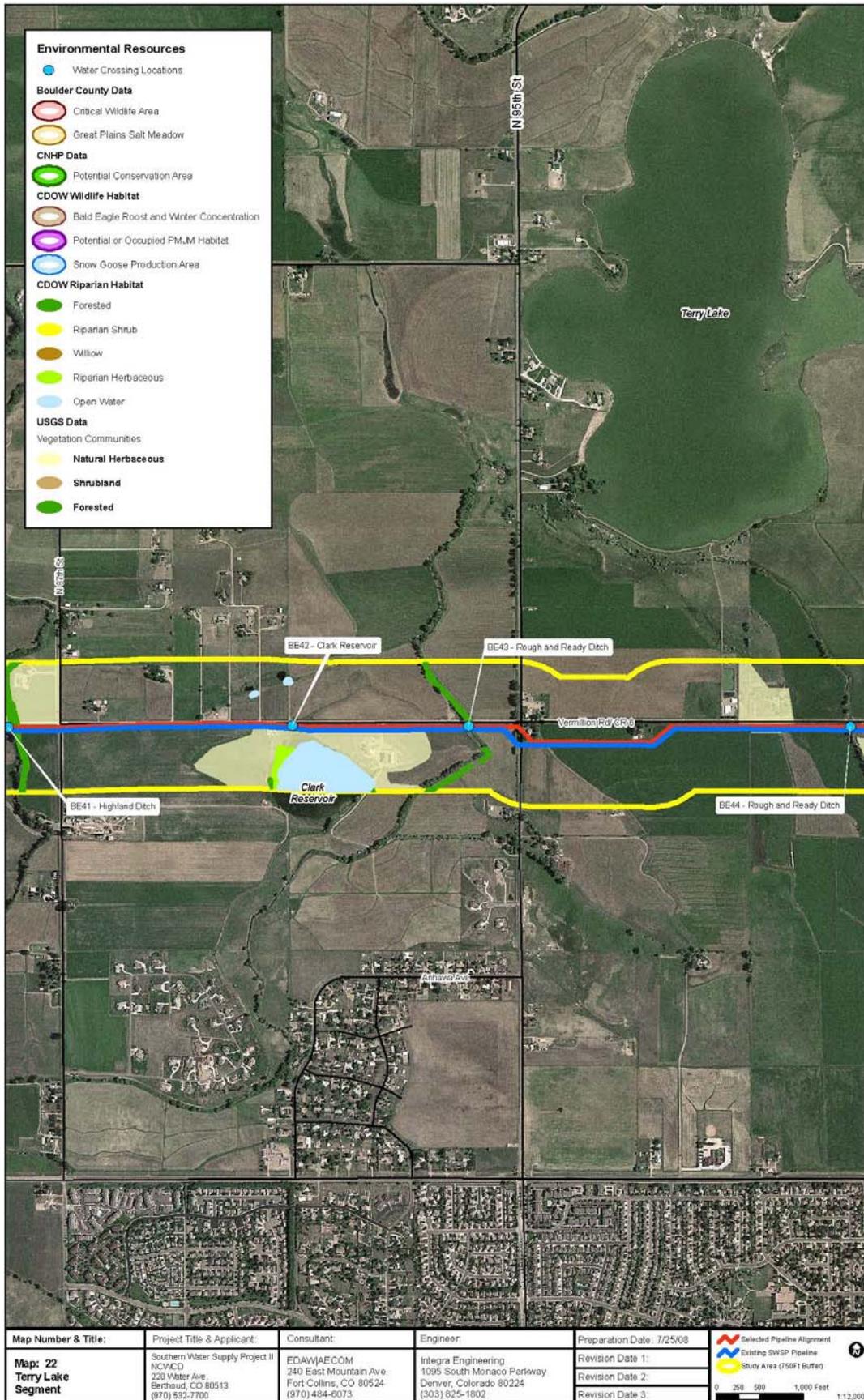
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**Figure 5:
 Environmental
 Resources**



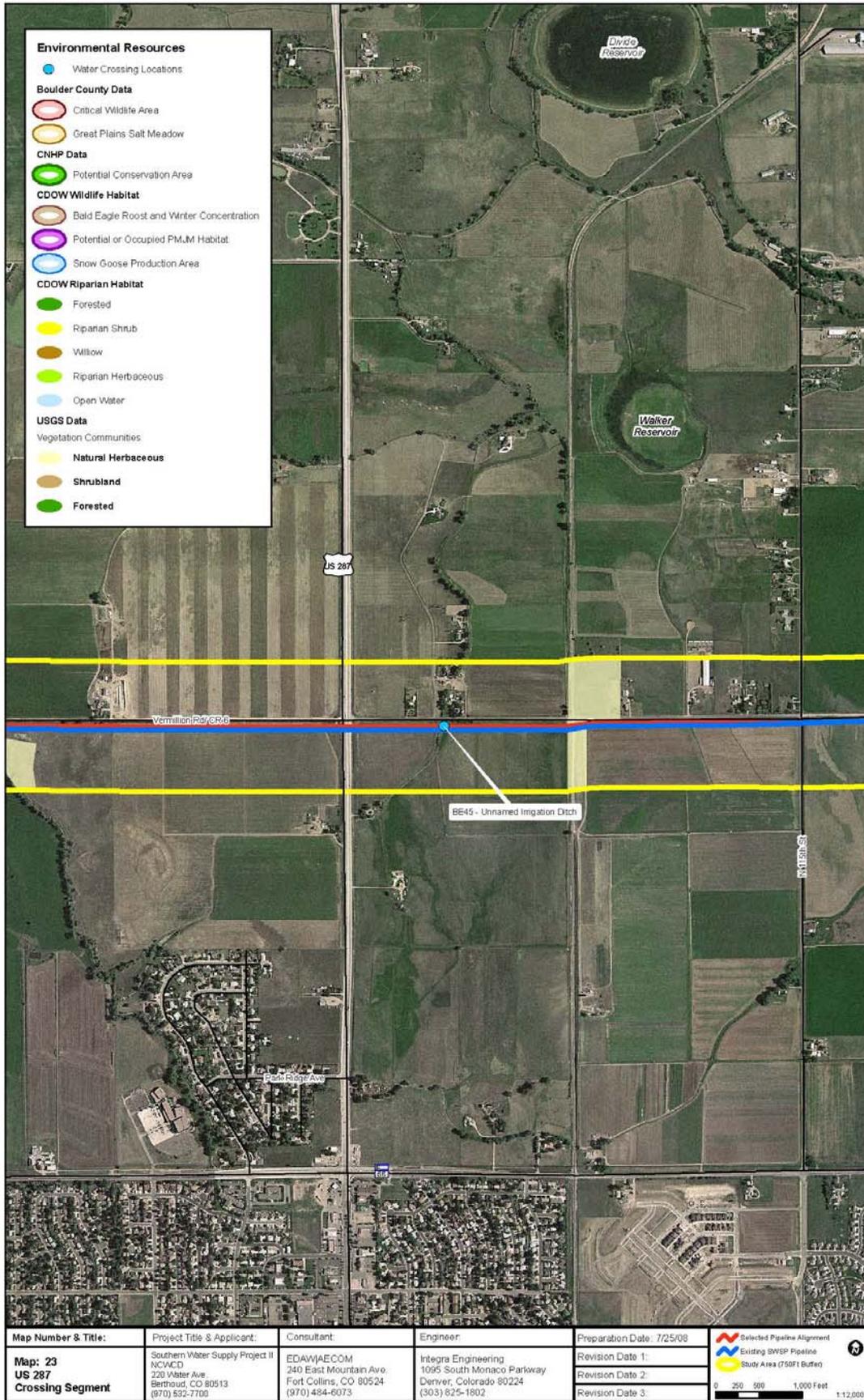
**Figure 6:
Environmental
Resources**



**Figure 7:
Environmental
Resources**



**Figure 8:
Environmental
Resources**



Map Number & Title: Map: 23 US 287 Crossing Segment	Project Title & Applicant: Southern Water Supply Project II NCVCD 220 Water Ave Berthoud, CO 80513 (970) 832-7700	Consultant: EDAWJAE.COM 240 East Mountain Ave Fort Collins, CO 80524 (970) 484-6073	Engineer: Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Preparation Date: 7/25/08 Revision Date 1: Revision Date 2: Revision Date 3:	
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**Figure 9:
Environmental
Resources**

