Final

DeWitt Pipeline Rehabilitation/Replacement Project Environmental Assessment

Prepared for

U.S. Forest Service

Wasatch-Cache National Forest
Logan Ranger District

and

Utah Department of Environmental Quality
Division of Drinking Water

September 2007

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Contents

Section **Page**

Appendixes

Figures

Tables **Page**

Tables **Page**

1.0 Purpose and Need

1.1 Introduction

The existing DeWitt Pipeline is critical to the City of Logan (City) because it supplies 70 percent of the City's potable water, including nearly all of the City's winter supply and half of its summer supply (Figure 1-1). The DeWitt facilities provide the City its lowest-cost water, and have operated continuously since their construction in 1934, with only minor shutdowns for essential repairs. Steel pipe segments constructed in 1934 were upgraded with reinforced concrete pipe (RCP) in 1949.

The existing pipeline is 5 miles long, and consists of 1 mile (upstream to downstream) of 36-inch RCP, 2 miles of 24-inch RCP, 0.7 mile of 24-inch steel pipe, and 1.3 miles of 20-inch steel pipe. A study for the City by CH2M HILL (2005) on the condition of the Logan DeWitt Pipeline and the Dewitt Spring capture site concluded that the existing steel sections of pipe leak 3 cubic feet per second (cfs) under normal operating conditions; this raises concerns about the future reliability of this valuable supply, in addition to the loss of the water itself.

The pipeline and spring development have been authorized under a Forest Service Special Use Permit since their inception. The most recent Special Use Permit was issued in 1997 with a term of 20 years.

This Environmental Assessment (EA) has been prepared to evaluate the potential environmental effects from implementation of the Proposed Action or alternatives. This EA has been prepared in accordance with the National Environmental Policy Act (NEPA), as amended (PL 91-190).

This Final EA is organized into eight chapters as follows:

- *Chapter 1. Purpose and Need.* This chapter includes background information about the proposal and the purpose and need for the project.
- *Chapter 2. Project Description.* This chapter provides a more detailed description of the Proposed Action and alternatives to the Proposed Action.
- *Chapter 3. Affected Environment and Environmental Consequences.* This chapter describes the human and natural environments in the analysis area. Impacts—including direct, indirect, and cumulative—for each resource area are also addressed. The chapter is organized by resource area.
- *Chapter 4. List of Recipients.* The agencies, individuals, and organizations that received the public scoping letter and EA are listed in this chapter.
- *Chapter 5. Response to PEA Comments.* This chapter presents the responses to comments received on the Preliminary EA.
- *Chapter 6. Literature Cited.* This chapter presents the references consulted during development of the EA.

- *Chapter 7. Acronyms, Abbreviations, and Glossary.* All acronyms and abbreviations, as well as terms specific to this document, are defined in this chapter.
- *Chapter 8. List of Preparers.* Individuals contributing to the EA are listed with areas of contribution noted.

1.2 Proposed Action

Upon selection of an alternative alignment for the proposed pipeline rehabilitation and replacement, the Forest Service would issue a new, 30-year Special Use Permit to the City of Logan authorizing a water transmission pipeline. This section presents a brief overview of the Proposed Action for the pipeline. A detailed description of the Proposed Action and alternatives is presented in Chapter 2.

Six air valve vaults will be rehabilitated in the 3 upper miles of the pipeline. The rehabilitation will require a small excavation roughly 8 foot by 8 foot square, mechanical work on the valves and piping, setting a pre-cast concrete manhole or box over the pipeline, and backfilling with the rock and the materials that were excavated prior to construction and temporarily stored onsite.

Moving downstream, the replacement portion of the DeWitt Pipeline will begin approximately 600 feet upstream of what is locally known as "Red Bridge." Red Bridge is located approximately 0.5-mile downstream of Second Dam. New, 36-inch welded steel pipe (WSP) will replace the existing 24-inch steel pipe in the River Trail for approximately 750 feet, to a location just upstream of the Smithfield Canal Diversion Dam. A 20-foot-wide corridor within the trail area will be required to install this section of the pipeline. A minimum buried depth of 3 to 5 feet below the trail will be required throughout the project, and it is anticipated that the trench will be at least 7 or 8 feet wide. The trail will be closed during construction in the late spring through fall months.

A river crossing will occur near Red Bridge, where the river flow will be collected in a small pool (behind soldier piles constructed across the river) and temporarily piped across the open trench. The buried pipeline trench will be backfilled with native riverbed materials. The pipeline crossing will be constructed during the low-flow periods of the river in the fall months from September to mid-November. The materials removed from the riverbed will be stockpiled outside of wetland areas and then used to fill the trench and return the river to its original grade and alignment with a natural-looking riverbed. An air valve vault will also be constructed near the pipeline crossing.

After crossing the Logan River, the pipeline will be within the Utah Department of Transportation (UDOT) easement for Highway 89. The pipeline will cross under both Highway 89 and the Smithfield Canal. The alignment is within the shoulder of the roadway, with the centerline of the pipeline approximately 20 feet north of the centerline of the roadway.

Figure 1-1 (color, 2 pages)

Figure 1-1 (color, 2 pages)

At Second Bridge, the pipeline jogs north of the bridge and crosses under the north bank of the Logan River. The alignment generally parallels the corridor of existing power lines for approximately 1,100 feet, where it then follows within an existing canal access road for 1,200 feet to the gate at the east end of the hydropower plant site. This construction will be scheduled for the spring and summer months.

The pipeline travels approximately 400 feet to cross the hydropower plant site between two buildings, under the penstock, and up a slope behind the two buildings into the alignment of the hydro plant penstock access road. It follows the access road alignment until it rejoins the original pipeline alignment at the base of the steep rock slope, which is approximately 1,500 feet of pipe. This construction may be in the spring, summer, or fall.

After traveling around the hydropower plant, the pipeline alignment is in an abandoned access road north of the hydropower plant. The abandoned access road meets the Ray Hugie Hydro Park entrance road until it makes a jog and climbs a very steep rock slope, crosses under the Smithfield Canal, and enters the existing tank site at the southeast corner. This construction may be in the spring, summer, or fall.

Upon completion of construction, disturbed lands, permanent roads, and other facilities disturbed during construction will be restored. Erosion control measures will be specified to protect Logan River water quality, including a requirement that initial and final site restoration be undertaken as soon as an area is no longer needed for construction, stockpiling, or access.

All but 500 feet of the 5 miles of rehabilitated pipeline are located within the W-CNF.

1.3 Purpose and Need for Action

City of Logan—The **purpose** of this project is to provide a reliable pipeline system, increase system capacity, and increase pressure gradients of culinary water from developed facilities at Dewitt Spring to meet the present and future demands of the City.

The **needs** for the proposed project result from the existing system's condition, including 1) the lower 2 miles of existing pipeline that has a present leakage rate of about 3 cfs and 2) the loss of gradient differential from the spring to the City's water tanks in the lower 2 miles. These conditions constrain the pipeline's capacity, which results in increased pumping needs. These needs are discussed in detail below.

Forest Service—The Forest Service has a need to respond to the proposal submitted by the City to approve a new special use authorization to allow for replacement and realignment of a water transmission pipeline. The purpose is to allow necessary permitted uses on the Forest while minimizing environmental harm.

Utah Division of Drinking Water—The Utah Division of Drinking Water (UDDW) needs to evaluate the City's request for a loan from the Utah Federal State Revolving Fund Program to rehabilitate the DeWitt Pipeline. The Federal State Revolving Fund Program was created under the 1996 amendments to the Federal Safe Drinking Water Act. The majority of these funds originate from the Federal government. The UDDW has been authorized by the Environmental Protection Agency (EPA) to administer the financial assistance program that

originates from the Federal Grant Program. The City has requested a loan total of $3,345,000 for planning and construction of the proposed project.

1.3.1 Increase Firm Yield Capacity Need

Historic DeWitt system capacity is well established by the official flow records at DeWitt Spring's Venturi meter, and confirmed by the City's pressure-regulating station meter at their tanks. Table 1-1 shows the average July flows for the last 8 years for these two meters.

TABLE 1-1
Summary of Average Flows from July Records from DeWitt Spring and Regulating Station Meters

Meter	Maximum 8 year* Average July Flow	Minimum 8 year* Average July Flow
DeWitt Spring	21.5 cfs	21.0 cfs
River Commissioner Reports	22.3 cfs "used"	21.1 cfs "used"
Pressure Regulating Station City Records	21.4 cfs**	21.1 cfs**

* Most recent 8 years used are 1997 through 2004.
** Because of increasing leakage patterns, these values are only for the 1995 to 1997 window (when leakage appears to have been in the 0 cfs to 1 cfs range).

The general conclusion is that the records for the two meters show that the historic "firm yield" flows from the spring and in the pipeline have consistently been over 21 cfs.

Using the demand growth trends in the City's 1995 Master Plan, the City will need approximately 50 million gallons per day (MGD) peak demand for culinary water over the next 50 to 75 years. The City needs to rehabilitate DeWitt supply facilities to provide higher flows and gradients to meet the future anticipated City needs.

The DeWitt system currently has a firm summer yield of approximately 21 cfs, or 14 MGD (ignoring pipeline leaks). Opportunities for adding new culinary-quality water capacity also exist near DeWitt Spring in Logan Canyon. These include:

- 2 to 6.7 cfs (City estimate) currently spilled to the Logan River at DeWitt Spring because of the capacity constraints of the existing pipeline
- 1 to 8 cfs of flows that now arise at DeWitt Spring outside the existing spring box (uncaptured flows)

These are real opportunities for increasing the firm yield of culinary-quality water through the DeWitt Pipeline from 21 cfs to approximately 35 or 40 cfs. The City has considered these options in sizing the facilities recommended in the pipeline rehabilitation and replacement project.

1.3.2 Higher Gradients Needs

The hydraulic profile for the existing pipeline, when it is operating at its current peak flow capacity (approximately 21 cfs), shows that all 160 feet of hydraulic gradient differential between the spring and the tanks is used to deliver the peak flow capacity. Of special note is the fact that 70 percent of the head losses in the existing DeWitt Pipeline occur in the lower

40 percent of the pipeline—the 2 miles of 24-inch and 20-inch steel pipelines. This means that more pumping energy is needed to make up for the loss of energy that gravity is no longer providing.

City growth patterns indicate that the City will need higher-pressure gradients in the future, in both the steady development along the mountain benches and the steady history of the City raising the high water levels in their main reservoirs. The net result of these raised tank gradients with a fixed-diameter pipeline is a potential reduction in the ability to use the full capacity of DeWitt Spring with full reservoirs.

Thus, providing a 36-inch-diameter pipe to replace the existing lower 2 miles of 20-inch and 24-inch steel pipe (where 70 percent of current pipe head losses occur) allows future gradients in the pipe at the City tanks to be 100 feet higher than in the existing system, which can reduce pumping costs.

This project will not result in additional dewatering of diversion from the Logan River. The project is designed to capture the water that is now leaking from the pipeline, not to add new water to the pipeline.

1.3.3 Improved System Reliability Need

The lower 2 miles of the existing DeWitt Pipeline have been actively failing by corrosion for more than two decades. In the last 10 years, this 2-mile segment of pipe has leakage rates that have increased at approximately 0.3 cfs per year, such that the average present leakage rate is approximately 3 cfs. For this reason, the existing pipeline is highly unreliable and will increasingly be so. Five times in the last 20 years, existing pipe leaks have caused pavement failures in the highway that required digging up and repairing the pipe and then the pavement. This will continue to occur until the pipe is replaced.

As the size and value of the City's businesses and population grow, so does the value of reliability. Thus, the long-term reliability of the system will be increasingly important in the coming 70 years.

1.4 Forest Plan Direction

Forest Plans establish guidance for project-level decisions. The Wasatch-Cache National Forest (W-CNF) Revised Forest Plan (RFP) was approved March 19, 2003 (USFS 2003a). The Forest Service Interdisciplinary Team (IDT) has incorporated management direction, standards, and guidelines from the RFP into the Proposed Action and alternatives for this EA. To clarify the purpose and need for action, the following text contains the most pertinent Forest-wide goals, management area desired future conditions, and management prescriptions that apply to this project.

The riparian zone around the Logan River is classified as a Class I Riparian Area. The Class I rating indicates that the riparian areas should be given special management considerations to protect or enhance the high resource value(s) of the area. This might include exclusion or intensive management of activities such as livestock grazing, concentrated recreation, road construction, dam construction, etc., as appropriate, to maintain or enhance the area for the

identified resource values. Any stream with riparian-dependent Threatened, Endangered, or Sensitive species is classified as a Class I riparian area.

1.4.1 Forest-Wide Goals and Subgoals

- Forest-wide Goal 2—Watershed Health: Maintain and/or restore overall watershed health (proper functioning of physical, biological, and chemical conditions). Provide for long-term soil productivity. Watershed health should be addressed across administrative and political boundaries.
- Forest-wide Goal 12—Non-recreation Authorizations (Special Uses): Manage the non-recreation authorizations program to balance priorities commensurate with the greater long-term public interest.
- Forest-wide Subgoal 3s -- Greatly reduce known infestations of **noxious weeds** and rigorously prevent their introduction and/or spread.

1.4.2 Management Area Desired Future Conditions

1.4.2.1 Cache-Box Elder

Logan Canyon Scenic Byway (Highway 89) travels along the Logan River and Beaver Creek and drops down into the Bear Lake Valley below, providing outstanding opportunities for scenery viewing. Recreation is a major feature in these canyons.

Logan Canyon Special Interest Area (SIA) will be maintained to ensure continuance of ongoing natural conditions and processes. It is desirable to maintain habitat for pollinators here and to continue carrying out the recovery plan for *Primula* species.

1.4.3 Management Prescriptions

The proposed project is located within *Management Prescription 2.5 (Scenic Byways)*, which dictates: "manage scenic byways to protect and maintain their outstanding scenic quality" (USFS 2003a). On the adjacent, north side of the scenic corridor is *Management Prescription 2.6 (Undeveloped)*, while on the south side is Logan Canyon SIA, which is managed under *Management Prescription 2.7 (Special Interest Areas and Special Areas)*.

1.5 Scoping

Public scoping for the DeWitt Pipeline Rehabilitation/Replacement project included a combination of mailing scoping letters to the Logan Ranger District (RD) mailing list; a news release placed in the *Herald Journal*; Public Service announcements aired on KVNU, KLGN, and KUSU; and public meetings. Appendix 1 details the scoping methods, dates, and results.

Appendix 1 also details the results of the scoping content analysis and summarizes specific comments carried forward within the EA. A total of seven individuals or organizations responded with 25 written or verbal comments. Each comment was placed into one (or more) of nine categories based on the subject matter, context, content, and intent. The IDT reviewed the nine categories of comments to determine the disposition of comments and whether or not they represent issues that will be addressed in the EA. Approximately

32 percent (eight comments) of the 25 total comments identified during public scoping represent issues that will be addressed in the EA. Of these, four comments are preliminary issues (PI) and are addressed or were considered in the development of the alternatives, including the Proposed Action; two are significant issues (SI); and two are issues (I) that will be developed and tracked through the EA (Appendix 1, Table 1-2). The significant issues cover the following four resource topics:

- **Issue 1: Fisheries:** Effect of construction of the pipeline on fish spawning areas.
- **Issue 2: Threatened, Endangered, and Candidate (TE&C) Species:** The proposed project's effect on Threatened, Endangered, and Candidate animal and plant species.
- **Issue 3: Wetlands:** The proposed project's effect on wetland resources.
- **Issue 4: Logan River:** The proposed project's effect on water quality (turbidity) of the Logan River.

Two additional significant issues raised by the IDT were:

- **Issue 5: Scenic Value:** The proposed project's effect on the existing visual quality of the river corridor.
- **Issue 6: Management Indicator Species (MIS), USFS Sensitive Species, Migratory Birds, and Big Game Winter Range:** The proposed project's effect on MIS, sensitive species, migratory birds, and wintering big game.

In addition to the issues identified as significant (and shown in Table 1-2), concerns about effects on other resources were identified during public scoping, but did not rise to the level of a significant issue (Table 1-3). An issue of concern raised by the IDT is the project's potential effect in contributing to the spread of noxious weeds.

TABLE 1-2
Issues Identified as Significant During Scoping[a]

Issue	Indicators	Effects
Issue 1—Fisheries. Effects of pipeline construction on fish spawning areas.	Relative amount of fish spawning habitat that will be affected through rehabilitation and construction of the pipeline.	Direct and indirect effects of pipeline rehabilitation/construction on fish spawning areas.
Issue 2—Threatened, Endangered, and Candidate Species. Effects of pipeline rehabilitation/ construction on threatened, endangered, and candidate animal and plant species.	Percent of total and distribution of threatened, endangered, and candidate species habitats lost to or modified by pipeline rehabilitation/ construction.	Direct and indirect effects of pipeline rehabilitation/construction on threatened, endangered, and candidate species habitats.
Issue 3—Wetlands. Effects of pipeline rehabilitation/ construction on wetlands.	Area of jurisdictional wetlands to be permanently affected by pipeline rehabilitation/ construction.	Direct and indirect effects of pipeline rehabilitation/construction on jurisdictional wetlands.
Issue 4—Logan River. Effects of pipeline rehabilitation/construction on water quality of the Logan River.	Potential increase in turbidity due to sediment entering the Logan River during construction.	Direct and indirect effects of pipeline rehabilitation/construction on water quality of the Logan River during construction.

TABLE 1-2
Issues Identified as Significant During Scoping[a]

Issue	Indicators	Effects
Issue 5—Scenic Value. Effects of pipeline rehabilitation/ construction on scenic quality of the Logan River corridor.	Loss of scenic quality due to construction and rehabilitation of the pipeline and resulting pipeline corridor.	Effects on scenic values from construction and rehabilitation of the pipeline and resulting pipeline corridor and the ability to maintain a naturally appearing setting.
Issue 6: Management Indicator Species (MIS), USFS Sensitive Species, Migratory Birds, Big Game Winter Range. Effect of pipeline construction on MIS, sensitive species, neotropical migrants, and wintering big game.	Adverse disturbance affecting ability to breed or occupy habitat to the extent the local population will not survive.	Direct and indirect effects of pipeline rehabilitation/construction on MIS, sensitive species, migratory birds, and wintering big game.

TABLE 1-3
Resource Issues of Concern, but Not Significant

Environmental Component	Indicators	Effects
Recreation—Effects of pipeline rehabilitation and construction on recreation activities.	Temporary inconvenience or loss of recreation opportunity because of recreation closures during construction.	Effects of pipeline construction and rehabilitation on recreation activities (access to areas, ability to participate and enjoy activity).
	Potential to improve recreation opportunities following construction activities.	
Safety—Effects of pipeline construction and rehabilitation on safety.	Ability of emergency services to continue operations during construction.	Effects on public safety during construction and rehabilitation of the pipeline.
	Protection of recreationists and other public users during project implementation.	
Noxious Weeds—Effects of pipeline rehabilitation and construction on noxious weed spread.	Increase in noxious weed abundance and distribution in the pipeline corridor.	Effects of pipeline construction and rehabilitation on native vegetation from noxious weeds.

A public review meeting to listen to public comments on the PEA was held in Logan, Utah at the Logan City Justice Center. The meeting was held on June 21, 2007 after a 30-day notice period. No member of the public attended the meeting. Two comment letters providing public comment were received relative to the request for comment on the PEA. The letters are shown in Appendix 3. Responses to comments are listed in Chapter 5

1.6 Decision to be Made

The W-CNF Forest Supervisor will decide whether the W-CNF will issue a 30-year-term Special Use Permit to the City for the proposed rehabilitation of the DeWitt Pipeline across National Forest System (NFS) lands on the Logan RD, and if so, under what terms and conditions.

The UDDW will decide whether to provide the City of Logan with a loan from the Utah Federal State Revolving Fund Program to rehabilitate the DeWitt Pipeline.

2.0 Project Description

The DeWitt Pipeline Rehabilitation/Replacement Project would rehabilitate the upper 3 miles of RCP and install 2 miles of 36-inch-diameter WSP. As shown in Figures 2-1, 2-2, and 2-3, two different alignments are being considered; Alternative 2, the South Alignment, and Alternative 3, the North Alignment. The difference between the two action alternatives, discussed below, is that Alternative 3 (Proposed Action) diverges from Alternative 2 for a portion of the alignment from the Second Bridge to just after the First Bridge river crossing of Alternative 2. A No Action Alternative (Alternative 1) is also addressed.

2.1 Alternative 1—No Action

Under the No Action Alternative, the DeWitt Pipeline would not be rehabilitated nor have sections replaced. The pipeline would continue to leak. The City would not be able to develop sufficient culinary water to accommodate forecasted growth in the City and its service area. A revised Special Use Permit would not be required from the W-CNF.

2.2 Features Common to Alternatives 2 and 3 (Upper 4 Miles of DeWitt Pipeline Rehabilitation and Replacement)

2.2.1 Features Common to All Action Alternatives

2.2.1.1 Upper Three Miles of Reinforced Concrete Pipe

During the pre-design phase of the project, a limited portion of the upper 3 miles of RCP was inspected. Inspected sections were in excellent condition, with no pipe wall corrosion, and limited joint degradation. However, to ensure proper pipeline ventilation, the project will replace the existing air valves with new air/vacuum valves. Six air valve vaults will be rehabilitated in the upper 3 miles of pipeline, all using a standard design (Figure 2-4). The rehabilitation will require a small excavation roughly 8 foot by 8 foot square, mechanical work on the valves and piping, setting a pre-cast concrete manhole or box over the pipeline, and backfilling with the rock and the materials that were excavated prior to construction and temporarily stored onsite. Excavated material that needs to be temporarily stored in vegetated areas will be placed on the native topsoil covered with thick straw matting or geotextile fabric to protect the vegetations' roots. Excavated material will not be stockpiled in jurisdictional wetlands adjacent to the river. All manholes constructed within the trail will be constructed with the top of the manhole at grade. In some cases, the grade over the new box may be raised by 6 inches to ensure the tops of the manholes remain at grade.

2.2.1.2 Pipeline in the Existing Trail

The replacement portion of the DeWitt Pipeline will begin approximately 600 feet upstream of what is locally known as "Red Bridge" (Figure 2-2). Red Bridge is located approximately 0.5-mile downstream of Second Dam. The tie-in point will be where the 24-inch RCP

transitions to 24-inch steel pipe, and is located in the River Trail. New 36-inch WSP will replace the existing 24-inch steel pipe in the trail for approximately 750 feet, to a location just upstream of the Smithfield Canal Diversion Dam. A 20-foot-wide corridor within the trail area will be required to install this section of the pipeline, as well as for additional work areas shown on the construction plans. Figure 2-5 shows a typical cross section of the pipeline, and shows the pipe location relative to the trail surface. One area of concern in this reach is the protection of the existing historic structure. The foundation wall will be protected during construction, as shown by the cross section in Figure 2-6. A minimum buried depth of 3 to 5 feet will be required throughout the project and it is anticipated the trench will be at least 7 or 8 feet wide. The excavated materials will be placed alongside the trench during construction. Excavated material will be stockpiled in the previously disturbed area to the extent practicable. Where excavated material needs to be temporarily stored in vegetated areas, it will be placed on native topsoil covered with thick straw matting or geotextile fabric to protect the vegetations' roots. Earth stockpiles, straw, and geotextile will be removed prior to reseeding the disturbed work areas outside of vegetation root protection areas. All woody vegetation needing to be removed will be cut down during fall months after September 30 to avoid destroying nesting migratory bird nests during construction. The trail will be closed for up to two weeks during construction, with no re-routing of the trail possible to maintain safety along Highway 89. Notice will be provided to the public as described in *Section 2.7.4, Recreation*. Construction will be scheduled from late spring through fall to the extent practicable, with the exact timing to be determined by the contractor.

2.2.1.3 Logan River Crossing at Red Bridge

A river crossing will occur near Red Bridge. At this location, the river flow will be collected in a small pool behind soldier piles constructed across the river and temporarily piped across the open trench (Figure 2-7). The buried pipeline trench will be backfilled with native riverbed materials. The pipeline crossing will be constructed during the low-flow periods of the river from September through mid-November. Construction in November will be limited to the time period between 9:00 am and 4:00 pm. The materials removed from the riverbed will be stockpiled outside of wetland areas and then used to fill the trench and return the river to its original grade and alignment with a natural-looking riverbed. Where excavated material needs to be temporarily stored in vegetated areas, it will be placed on a temporary matt of straw or geotextile over the native topsoil to protect the vegetations' roots. An air valve vault will also be constructed near the pipeline crossing. It will consist of a cast-in-place concrete vault similar to the rehabilitated vaults (Figure 2-8). If the manhole for the vault is constructed within the roadway or berm, it will be constructed with the top of the manhole at grade.

Figure 2-1 (2 pages, color)

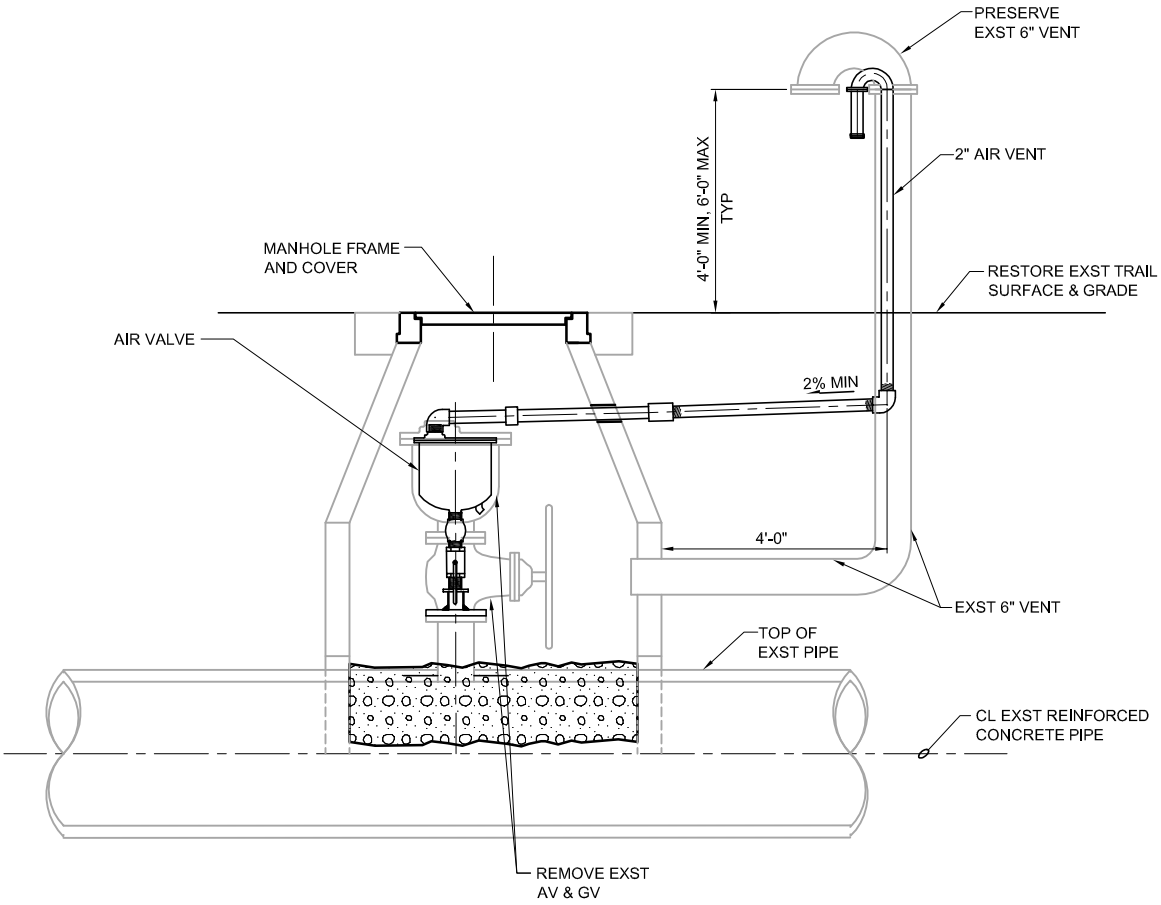
Figure 2-1 (2 pages, color)

Figure 2-2 (2 pages, color)

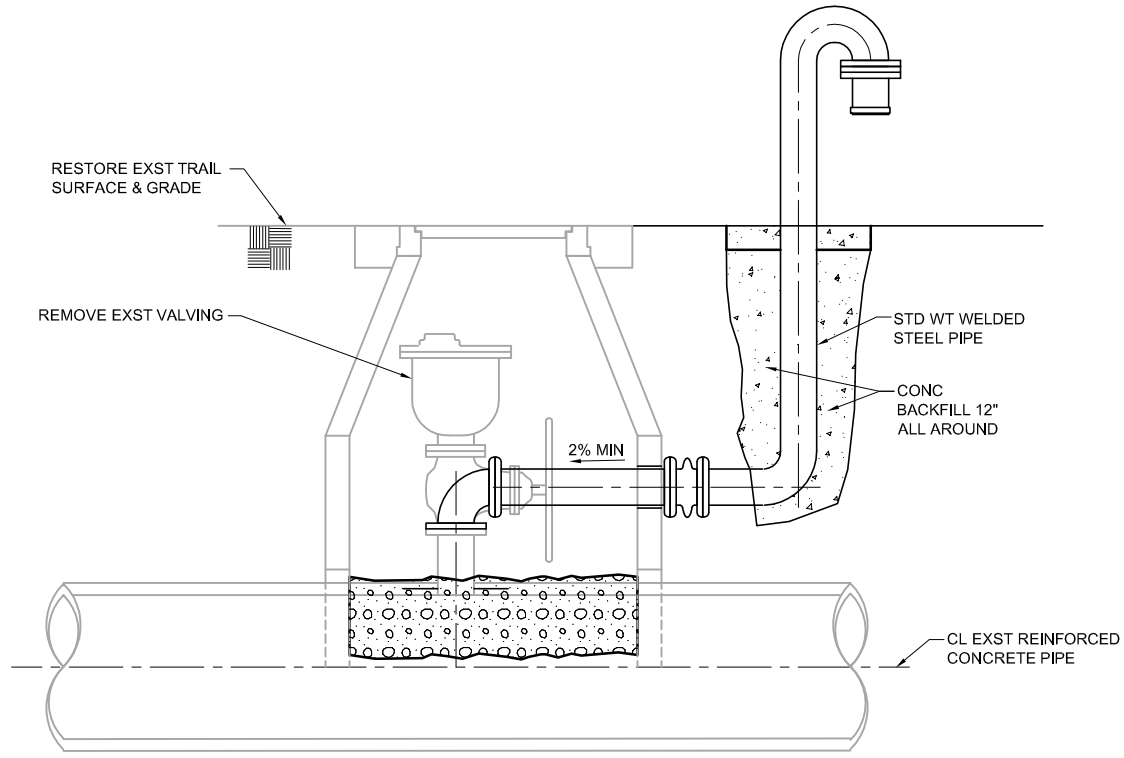
Figure 2-2 (2 pages, color)

Figure 2-3 (2 pages, color)

Figure 2-3 (2 pages, color)



REHABILITATED AV STRUCTURE
NTS



REHABILITATED LOW HEAD AV VENT PIPE
NTS

FIGURE 2-4
AIR VALVE REHABILITATION

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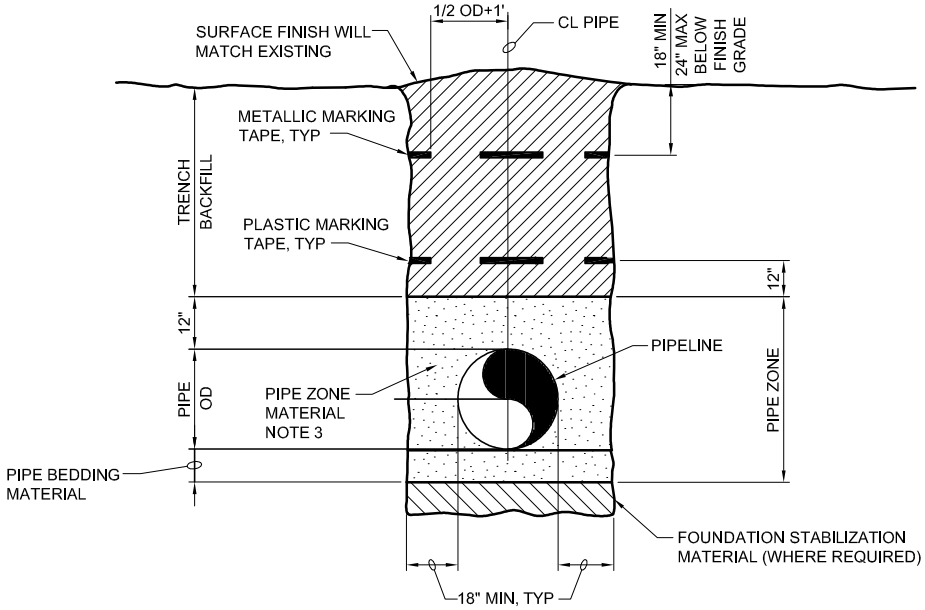

FIGURE 2-5
TYPICAL PIPELINE TRENCH

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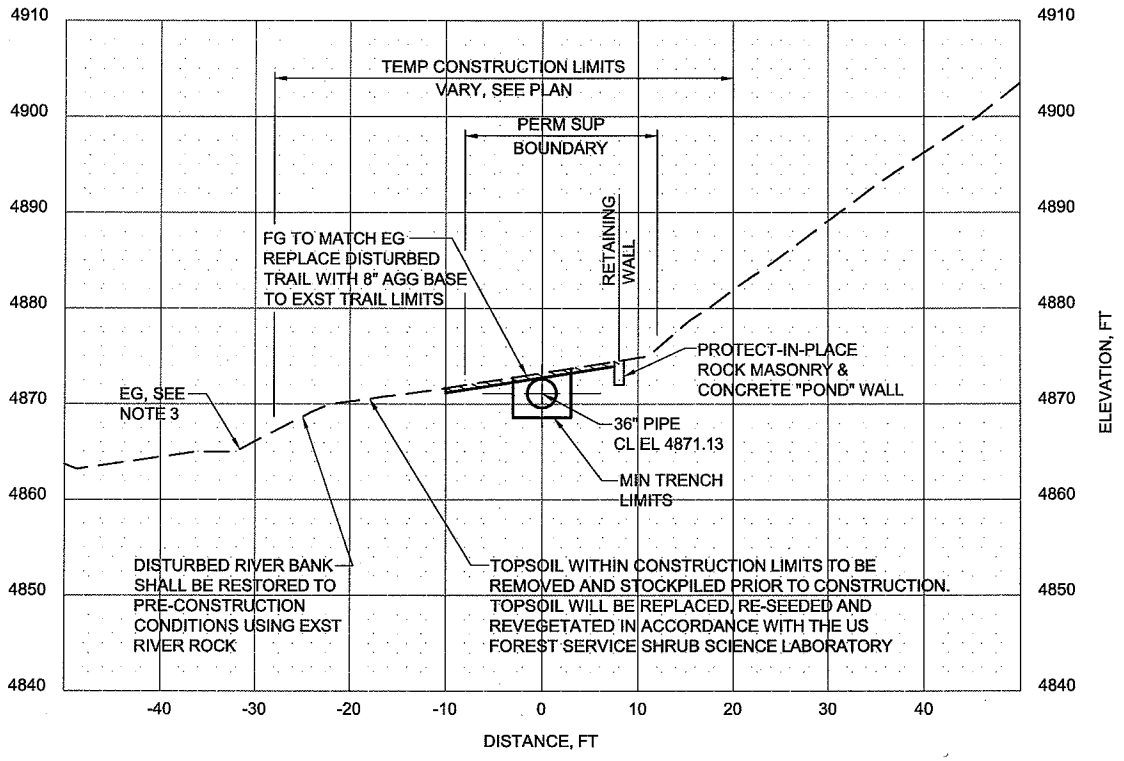

NOTE:

SEE FIGURE 2-1 FOR GENERAL NOTES REGARDING PROTECTION OF EXISTING FEATURES AND REVEGETATION.

FIGURE 2-6
CROSS SECTION AT HISTORIC STRUCTURE

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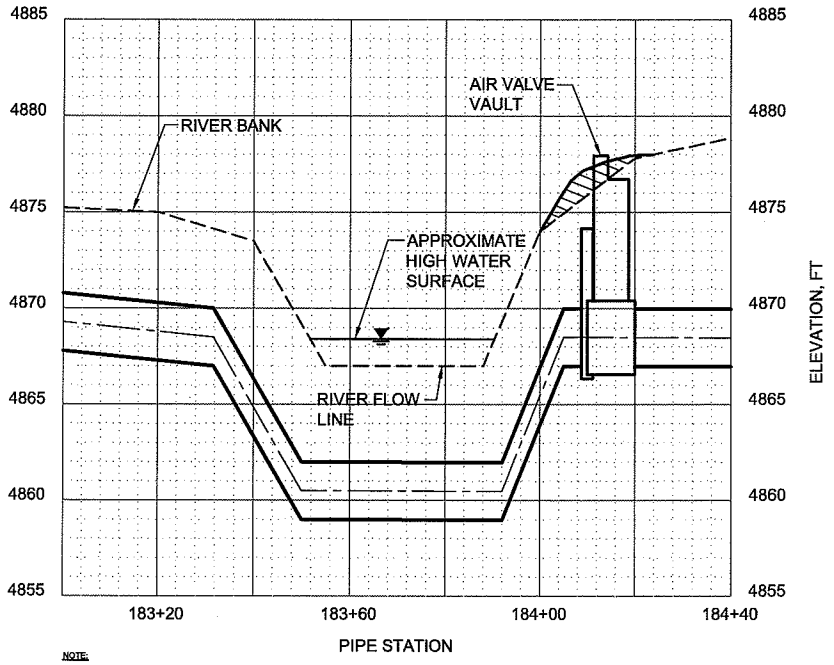
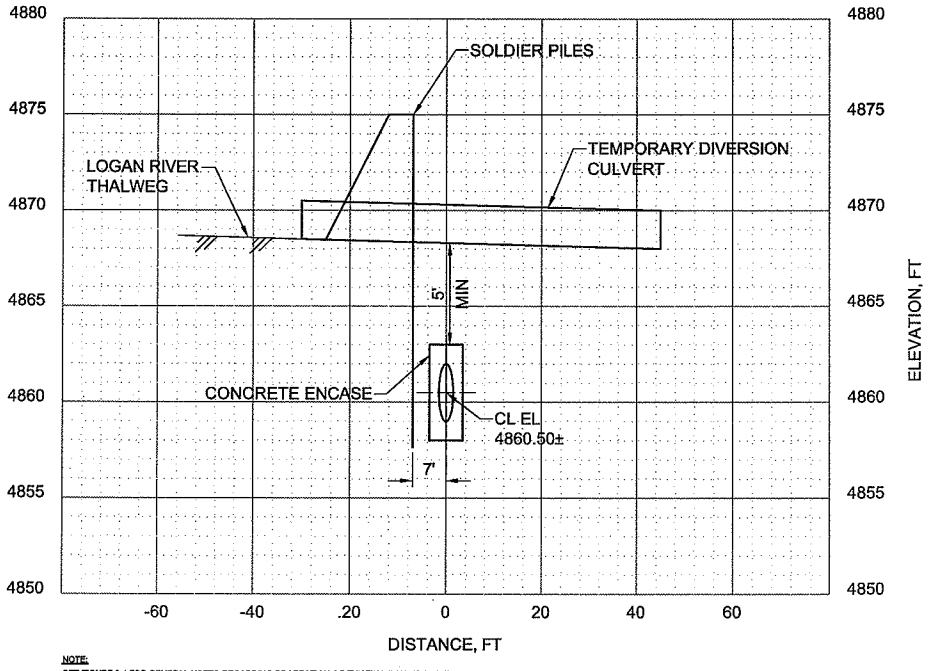


NOTE:
SEE FIGURE 2-1 FOR GENERAL NOTES REGARDING PROTECTION OF EXISTING FEATURES AND REVEGETATION.

LOGAN RIVER CROSS SECTION



NOTE:
SEE FIGURE 2-1 FOR GENERAL NOTES REGARDING PROTECTION OF EXISTING FEATURES AND REVEGETATION.

SECTION ALONG LOGAN RIVER BOTTOM

FIGURE 2-7
LOGAN RIVER CROSSING NEAR RED BRIDGE

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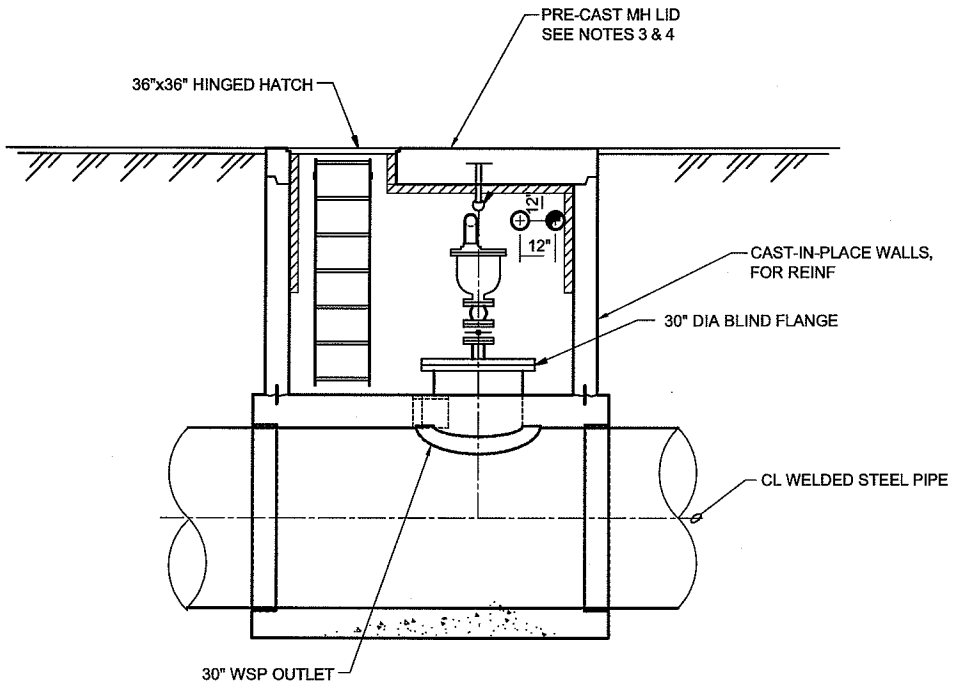

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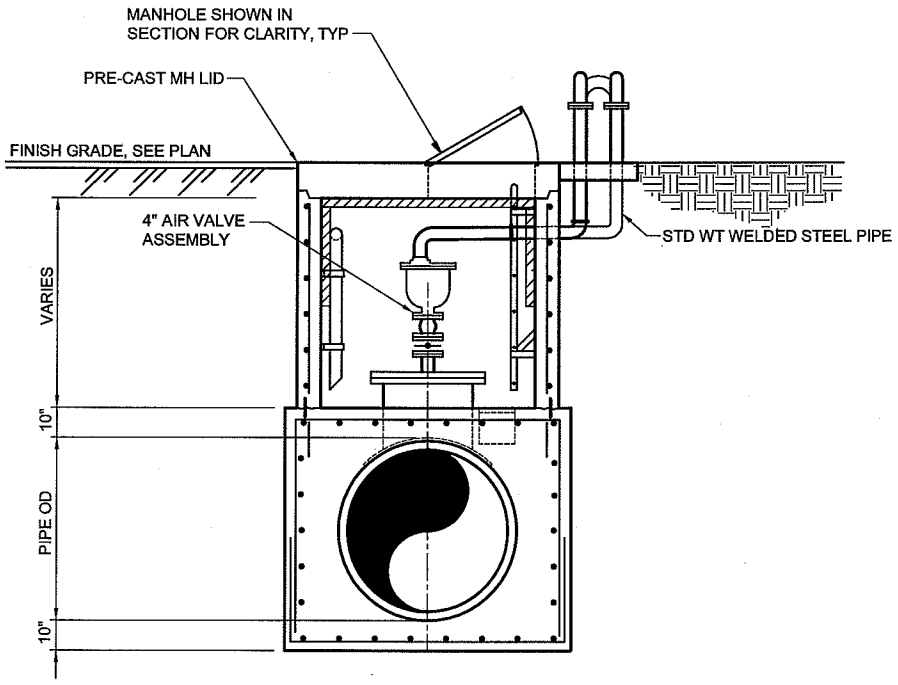

SECTION
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FIGURE 2-8
AIR VALVE VAULT

CH2MHILL

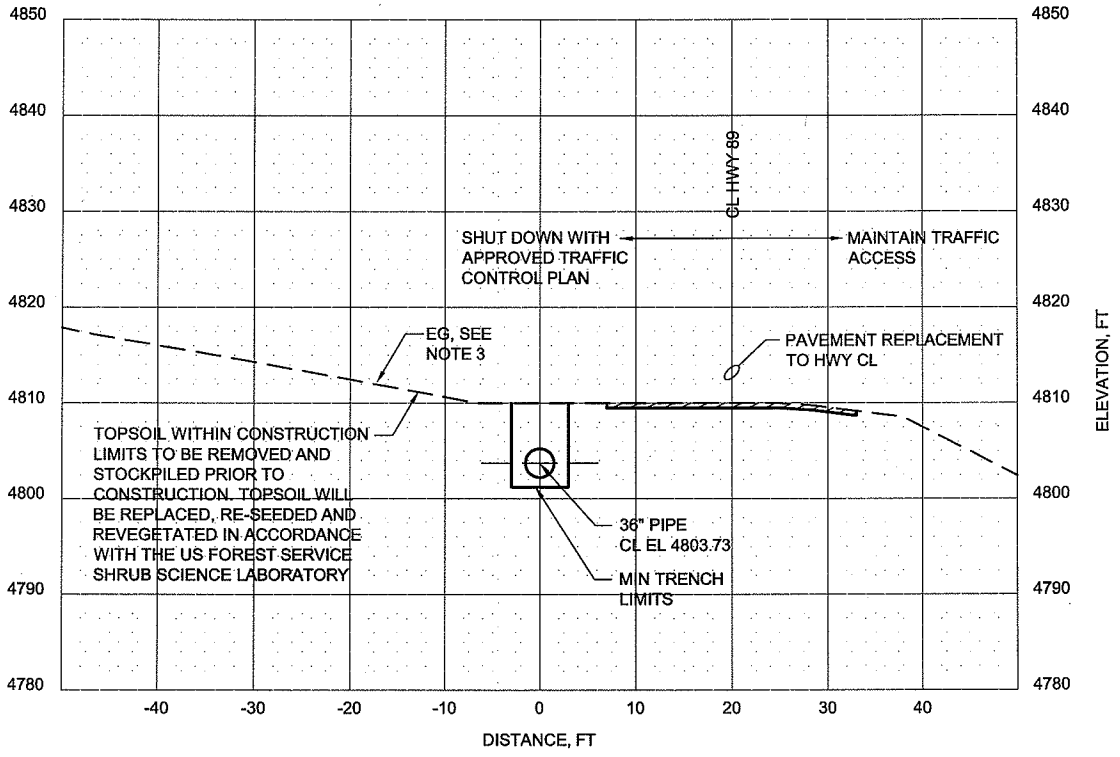
2.2.1.4 Pipeline Red Bridge River Crossing to Second Bridge

After crossing the Logan River, the pipeline will be within the UDOT easement for Highway 89. The pipeline will cross Highway 89 and cross under the Smithfield Canal. The alignment is within the shoulder of the roadway, with the centerline of the pipeline approximately 20 feet north of the centerline of the roadway. The pipeline alignment remains in this configuration for a little less than 0.75 mile. Alternative 2 and Alternative 3 (Proposed Action) alignments diverge approximately 250 feet east of Second Bridge (UDOT structure number F-723). The new 36-inch WSP will maintain the minimum buried depth of 5 feet with a trench width of 7 or 8 feet (Figure 2-9). The excavated materials will be placed in previously disturbed areas along side the trench, offsite, or in other disturbed areas along the highway shoulders during construction. Where excavated material needs to be temporarily stored in vegetated areas, it will be placed on a temporary matt of straw or geotextile over the native topsoil to protect the vegetations' roots. Lane closures on Highway 89 are anticipated during construction in the late spring, summer, and fall months, with the exact timing to be determined by the contractor. Construction from November 1 through March 30 will be limited to the time period between 9:00 am and 4:00 pm. Notice of lane closures will be provided to the public as described in *Section 2.7.4, Recreation*.

To supply culinary water to the River Trail Trailhead, a new pipeline will be run from the 36-inch pipeline across the Logan River approximately half way between the Red Bridge Crossing and Second Bridge. The pipeline will be 8 inches in diameter with a minimum 5-foot bury depth, as shown in Figure 2-10. The disturbances will be substantially less than at the other crossing because of the smaller pipeline diameter. The same protections as listed previously for existing vegetation will be implemented. The existing river rock will be stockpiled and used to reconstruct the river bed to the existing grade and conditions.

2.2.1.5 Site Restoration

As a general note, and upon completion of construction, disturbed lands and permanent roads and other facilities disturbed during construction will be restored. Erosion control measures will be specified to protect Logan River water quality, including a requirement that initial and final site restoration be undertaken as soon as an area is no longer needed for construction, stockpiling, or access. The specification will require land disturbed, but not permanently occupied by new facilities, to be graded to provide proper drainage and to blend with the natural contours of the land; covered with topsoil stripped from construction areas; and revegetated with plants native to the area and beneficial to wildlife. All seed used for restoration will be certified "noxious weed free" before use. The restoration plant mix will be developed in consultation with the Forest Service. Where excavated material needs to be temporarily stored in vegetated areas, it will be placed on a temporary matt of straw or geotextile over the native topsoil and then removed to protect the vegetations' roots.



NOTE:

SEE FIGURE 2-1 FOR GENERAL NOTES REGARDING PROTECTION OF EXISTING FEATURES AND REVEGETATION.

FIGURE 2-9
TYPICAL NORTH SIDE OF ROAD CROSS SECTION

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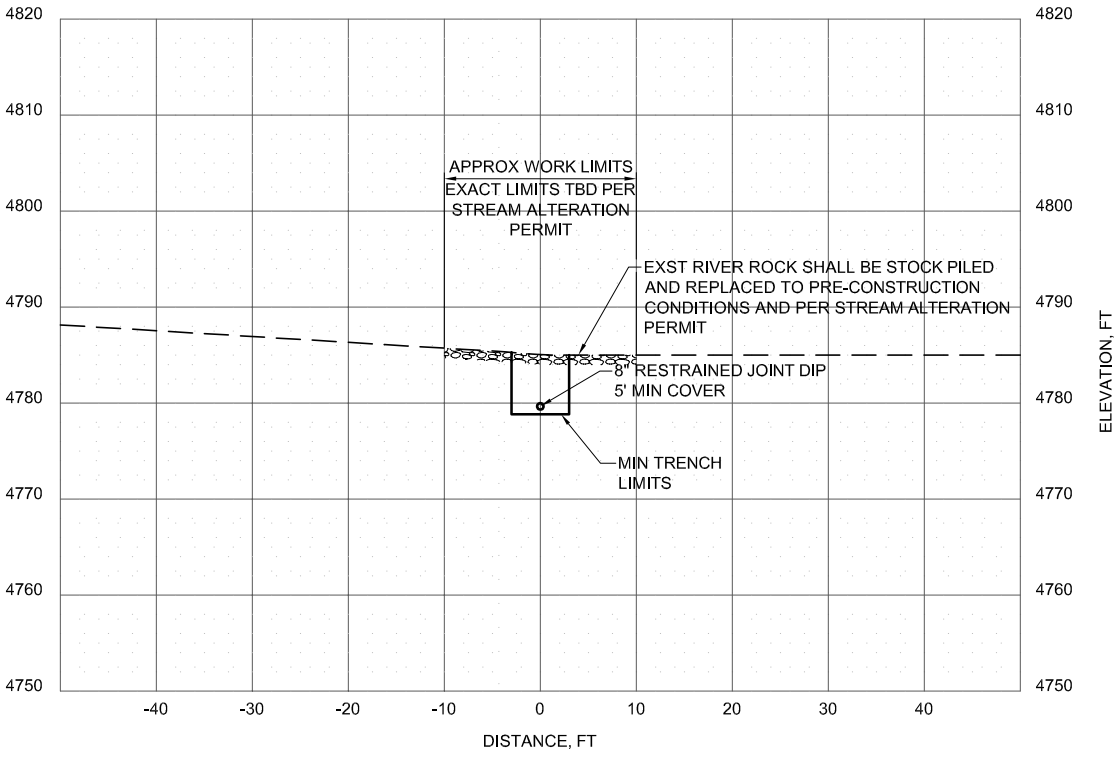


NOTE:

SEE FIGURE 2-1 FOR GENERAL NOTES REGARDING PROTECTION OF EXISTING FEATURES AND REVEGETATION.

FIGURE 2-10
RIVER TRAIL TRAILHEAD PIPELINE CROSS SECTION

CH2MHILL

2.3 Alternative 2—South Alignment

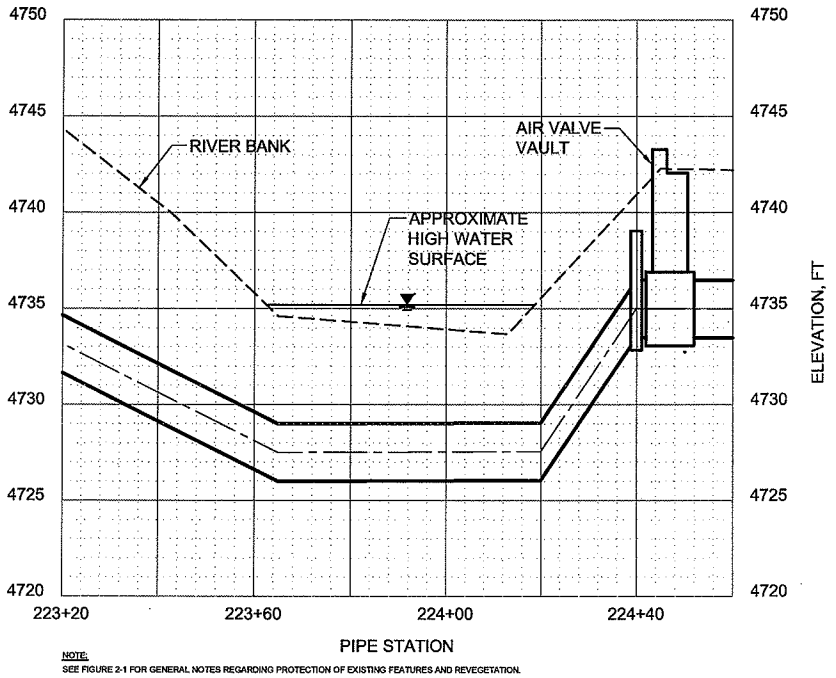
Alternative 2 includes rehabilitating the DeWitt Pipeline's upper 3 miles and replacing its lower 2 miles. The lower 2 miles include three crossings of Highway 89, three crossings of the Logan River, two canal crossings, three air valve vaults, and one blow-off vault (Figures 2-1, 2-2, and 2-3). The major components of this project alternative starting from the east end (upstream) going west (downstream) include:

- Replace air valves in the upper 3 miles of RCP (see *Section 2.2.1.1*)
- Pipeline in the existing trail (see *Section 2.2.1.2*)
- Logan River crossing at Red Bridge (see *Section 2.2.1.3*)
- Pipeline from Red Bridge river crossing to Second Bridge (see *Section 2.2.1.4*)
- Logan River crossing at Second Bridge
- Pipeline from Second Bridge to First Bridge
- Logan River crossing at First Bridge
- Pipeline from First Bridge river crossing to tank site

In addition to the project features common to all action alternatives (*Section 2.2.1*), Alternative 2 also includes a Logan River crossing at Second Bridge, a pipeline segment from Second Bridge to First Bridge, a Logan River crossing at First Bridge, and a pipeline segment from the First Bridge crossing to the tank farm. The features unique to Alternative 2 are described in the following subsections.

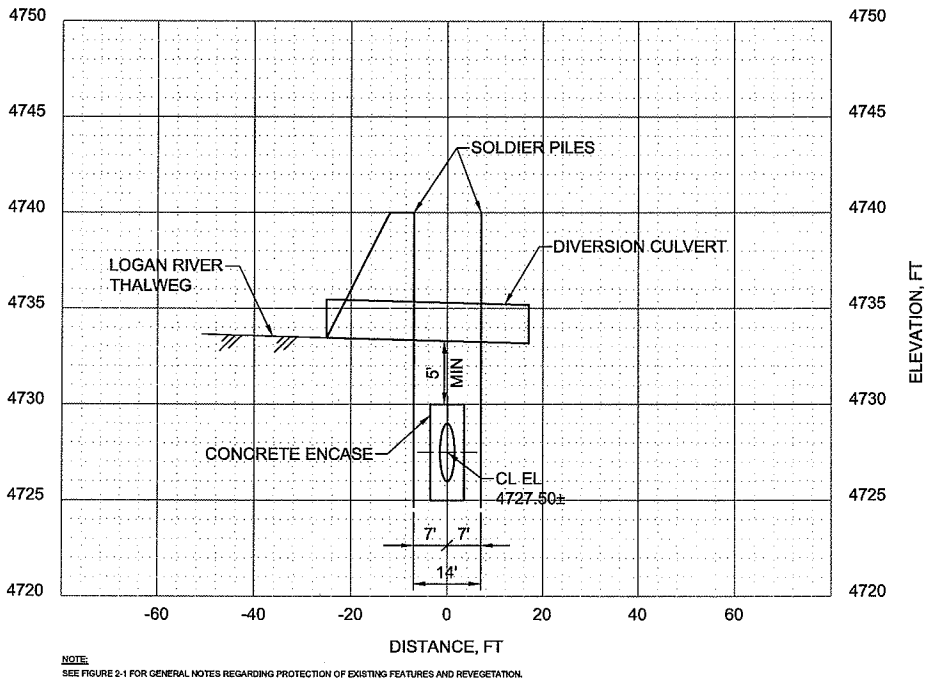
2.3.1 Logan River Crossing Second Bridge

After diverging from the common alignment 250 feet east of Second Bridge, the south alignment crosses Highway 89 and then beneath the Logan River, and then enters the River Trail Trailhead access gate area. As with the first crossing, the river flow will be collected in a small pool behind soldier piles and temporarily piped across the open trench (Figure 2-11). The pipeline crossing will be constructed during the low-flow periods of the river during September to mid-November. The materials removed from the riverbed will be stockpiled outside of wetland areas and then used to fill the trench and return the river to its original grade and alignment with a natural-looking riverbed. Where excavated material needs to be temporarily stored in vegetated areas, it will be placed on a temporary matt of straw or geotextile over the native topsoil to protect the vegetations' roots. An air valve vault will also be constructed near the pipeline crossing. The air valve vault will consist of a cast-in-place concrete vault similar to the rehabilitated vaults (Figure 2-8). If the manhole for the vault is constructed within the roadway or berm, it will be constructed with the top of the manhole at grade. The grade over the new box may be raised by 6 inches to ensure the top of the manhole remains at grade. Some of the large cottonwood trees located south of the bridge will be removed to allow for installation of the pipe. Woody vegetation will not be removed prior to September 30. It will be necessary to close the entrance to the Nature Center and the River Trail Trailhead for 1 or 2 days during construction. The closure will be scheduled for when the Nature Center is already closed. Notice of the closure will be provided to the public as described in *Section 2.7.4, Recreation*. The exact timing of the closure will be determined by the contractor, but would occur during the low flow period in September through mid-November to avoid disturbances to wintering eagles and big game. Construction in November will be limited to the time period between 9:00 am and 4:00 pm.



NOTE:
SEE FIGURE 2-1 FOR GENERAL NOTES REGARDING PROTECTION OF EXISTING FEATURES AND REVEGETATION.

LOGAN RIVER CROSS SECTION



NOTE:
SEE FIGURE 2-1 FOR GENERAL NOTES REGARDING PROTECTION OF EXISTING FEATURES AND REVEGETATION.

SECTION ALONG LOGAN RIVER BOTTOM

FIGURE 2-11
LOGAN RIVER CROSSING NEAR SECOND BRIDGE

CH2MHILL

2.3.2 Pipeline Second Bridge to First Bridge

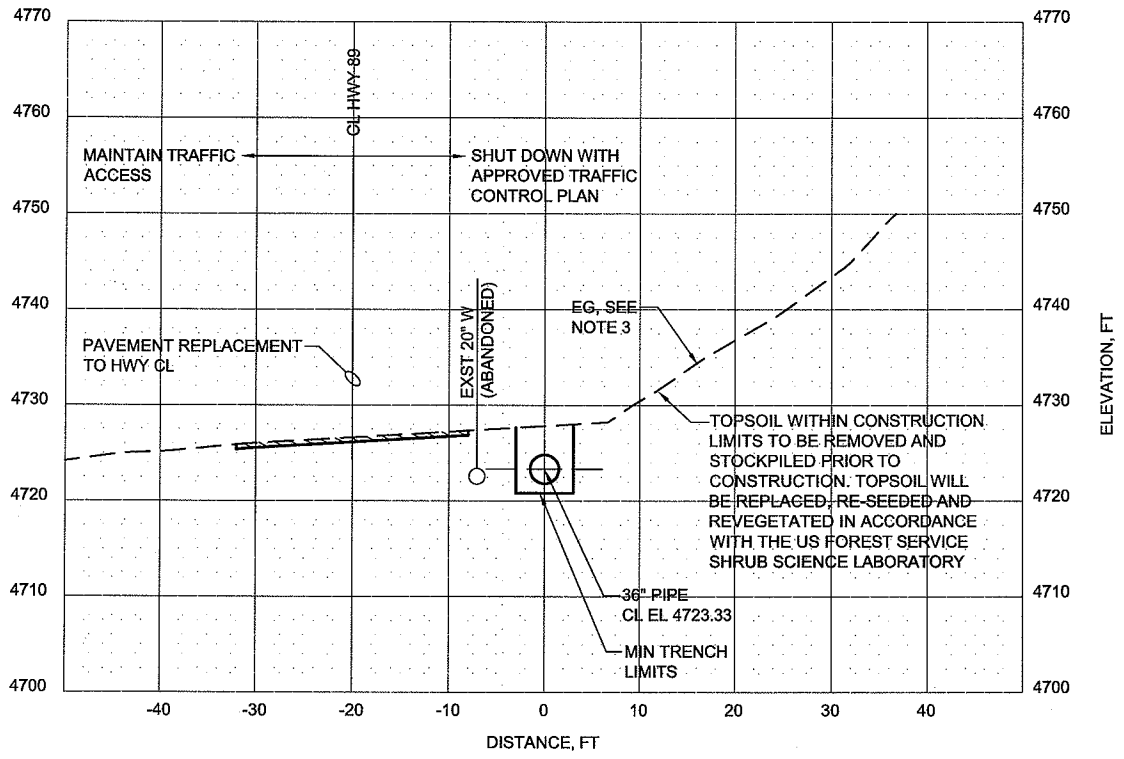
After exiting the River Trail Trailhead gate area, the pipeline alignment continues within UDOT's easement for Highway 89. The pipeline alignment is on the south side of Highway 89, within the shoulder of the roadway with the centerline of the pipe approximately 20 feet south of the centerline of the roadway. The pipeline alignment remains in this configuration for a little over 0.5 mile until approaching First Bridge (UDOT structure number F-729). The new 36-inch WSP will maintain the minimum buried depth of 5 feet with a trench width of 7 or 8 feet (Figure 2-12). The excavated materials will be placed alongside the trench during construction. It is expected that rock will be encountered in this area and will be removed by blasting. Construction will be scheduled for the late spring, summer and fall months, with anticipated lane closures on Highway 89, and with the exact timing to be determined by the contractor. Construction from November 1 through March 30 will be limited to the time period between 9:00 am and 4:00 pm. Notice of lane closures will be provided to the public as described in *Section 2.7.4, Recreation*. Near First Bridge, the alignment will cross back under the highway to the south side of Highway 89 before again crossing beneath the Logan River. Where the pipeline alignment is close to the rock slope, the slope will be protected.

2.3.3 Logan River Crossing at First Bridge

The third of three crossings will occur near First Bridge. After crossing Highway 89, the alignment crosses beneath the Logan River. This area is in the backwater of the dam and will require installing two sets of soldier piles, one on each side of the pipeline (Figure 2-13). A temporary pipe across the open trench will still be required to maintain the river flow. The buried pipeline will be encased in concrete to protect it from either moving debris or scouring. The pipeline crossing will be constructed during the low-flow periods of the river in the fall months (September through mid-November). Construction in November will be limited to the time period between 9:00 am and 4:00 pm. The materials removed from the riverbed will be stockpiled outside of wetland areas and then used to fill the trench and return the river to its original grade and alignment with a natural-looking riverbed. Where excavated material needs to be temporarily stored in vegetated areas, it will be placed on a temporary matt of straw or geotextile over the native topsoil to protect the vegetations' roots. An air valve vault will also be constructed near the pipeline crossing. If the manhole for the vault is constructed within the roadway or berm, it will be constructed with the top of the manhole at grade. The air valve vault will consist of a cast-in-place concrete vault similar to the rehabilitated vaults (Figure 2-8).

2.3.4 Pipeline First Bridge River Crossing to Tank Site

After the final river crossing, the pipeline alignment leaves the UDOT easement for Highway 89 and Forest Service land in a northwesterly direction, and crosses onto Logan City property. The pipeline alignment crosses through Ray Hugie Hydro Park and under the access road to the park. The alignment climbs a very steep rock slope, crosses under the Smithfield Canal, and enters the existing tank site at the southeast corner. It is expected that the rock encountered in this area will be removed by blasting. This work will be completed before snow accumulates to avoid impacts to wintering big game. The 36-inch pipeline will maintain the 5-foot minimum buried depth (except at shallow bedrock areas where the top of pipe may be as shallow as 3 feet) and be encased in concrete up the slope. To place the



NOTE:

SEE FIGURE 2-1 FOR GENERAL NOTES REGARDING PROTECTION OF EXISTING FEATURES AND REVEGETATION.

FIGURE 2-12
TYPICAL SOUTH SIDE OF ROAD CROSS SECTION

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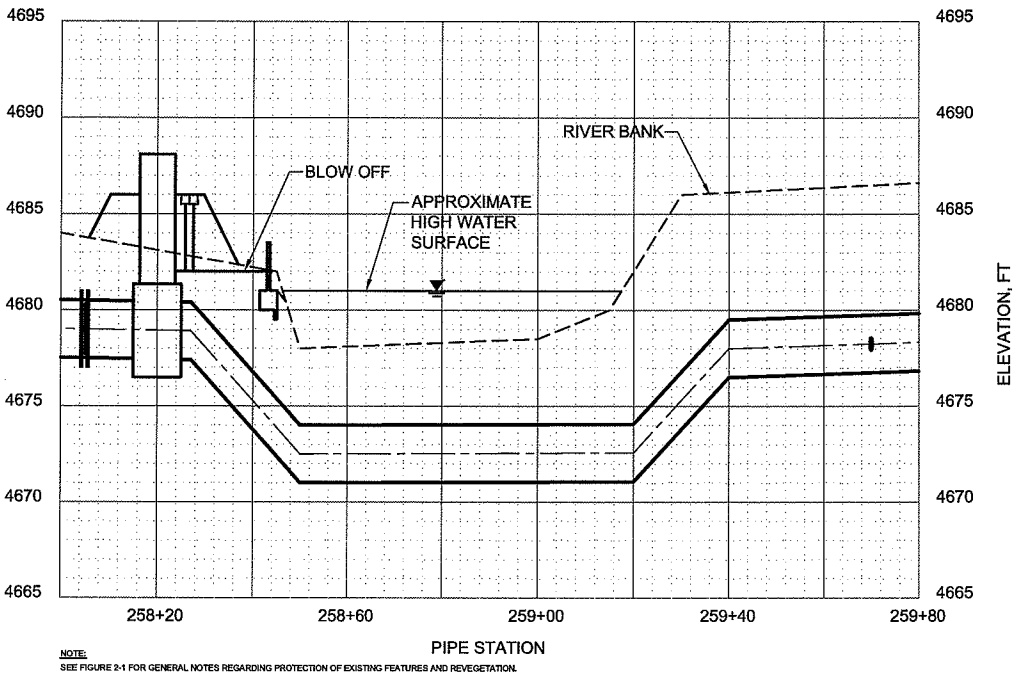
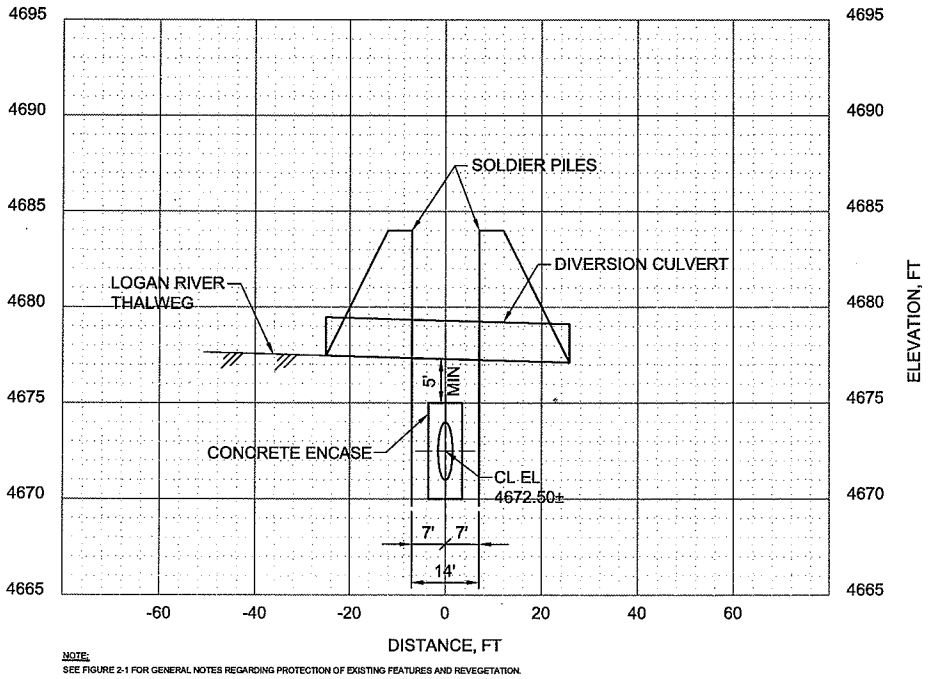


NOTE:
SEE FIGURE 2-1 FOR GENERAL NOTES REGARDING PROTECTION OF EXISTING FEATURES AND REVEGETATION.

LOGAN RIVER CROSS SECTION



NOTE:
SEE FIGURE 2-1 FOR GENERAL NOTES REGARDING PROTECTION OF EXISTING FEATURES AND REVEGETATION.

SECTION ALONG LOGAN RIVER BOTTOM

FIGURE 2-13
LOGAN RIVER CROSSING NEAR FIRST BRIDGE

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pipeline on the steep slope may require construction of a temporary access ramp. The ramp will be removed after construction is complete and the original grade restored. Surface restoration will include revegetation, as well as placement and securing of large boulders over the trenched area to approximate a natural rock look. The Ray Hugie Hydro Park will be closed for 4 weeks during construction to protect the public.

2.4 Alternative 3—North Alignment (Proposed Action)

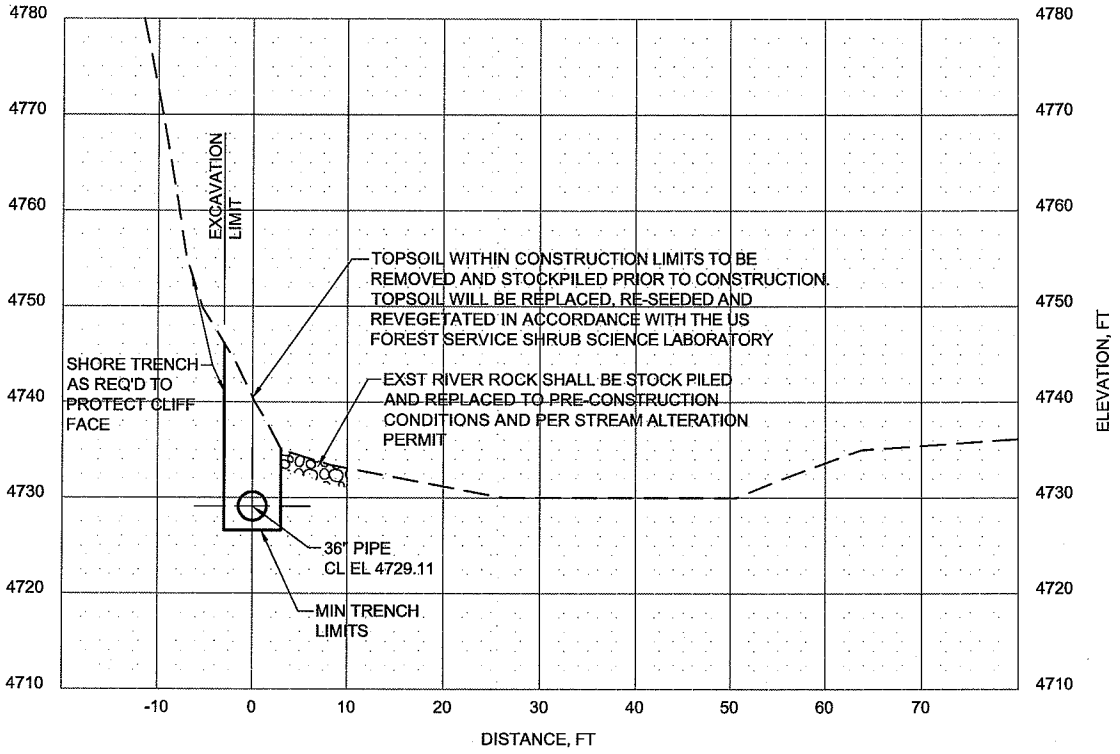
Alternative 3 includes rehabilitating the DeWitt Pipeline's upper 3 miles and replacing its lower 2 miles. The lower 2 miles include one Highway 89 crossing, one Logan River crossing, two canal crossings, four air valve vaults, and two pump well blow-offs (Figures 2-1, 2-2, and 2-3). The major components of this alternative starting from the east end (upstream) going west (downstream) include the following:

- Replace air valves in the upper 3 miles of RCP (see *Section 2.2.1.1*)
- Pipeline in the existing trail (see *Section 2.2.1.2*)
- Logan River crossing at Red Bridge (see *Section 2.2.1.3*)
- Pipeline from Red Bridge river crossing to Second Bridge (see *Section 2.2.1.4*)
- Pipeline from Second Bridge to the hydropower plant
- Pipeline alignment around the hydropower plant
- Pipeline from the hydropower plant to the tank site

In addition to the project features common to all action alternatives (*Section 2.2.1*), Alternative 3 includes a pipeline segment from Second Bridge to the hydropower plant, and from the hydropower plant to the tank farm. The features unique to Alternative 3 are described in the following subsections.

2.4.1 Second Bridge to Hydropower Plant

Approximately 250 feet east of Second Bridge, Alternative 3 diverges from the common alignment (Figure 2-3). Instead of crossing Highway 89, the pipeline remains within UDOT's easement. The alignment is within the shoulder of the roadway with the centerline of the pipe approximately 20 feet north of the centerline of the roadway. At Second Bridge, the pipeline jogs north of the bridge and crosses under the north bank of the Logan River near a steep cliff as seen in Figure 2-14. The alignment then generally parallels the existing power line corridor as it climbs across a rocky raveling slope for 300 feet before crossing open terrain for 800 feet. Over the next 1,100 feet, the alignment follows the remnants of the construction road for the powerline but is within a steeply sloped area. A slightly flattened surface about 10 feet wide will remain to provide access to the pipeline in the future as shown in Figure 2-15. The Alternative 3 alignment follows an existing canal access road for 1,200 feet to the gate at the east end of the hydropower plant site as shown in Figure 2-16. The new 36-inch WSP will maintain the minimum buried depth of 5 feet with a minimum trench width of 7 or 8 feet. The excavated materials will be placed alongside the trench during construction outside of jurisdictional wetland boundaries. Where excavated material needs to be temporarily stored in vegetated areas, it will be placed on a temporary matt of straw or geotextile over the native topsoil to protect the vegetations' roots. Once constructed, site restoration will match the existing vegetation and contours. A short segment of this alignment on the west end will be more level to allow motorized maintenance vehicle access to the air vault. Construction will be scheduled for the spring and summer months after snow cover has melted.



NOTE:

SEE FIGURE 2-1 FOR GENERAL NOTES REGARDING PROTECTION OF EXISTING FEATURES AND REVEGETATION.

FIGURE 2-14
NORTH ALIGNMENT RIVER CROSSING CROSS SECTION

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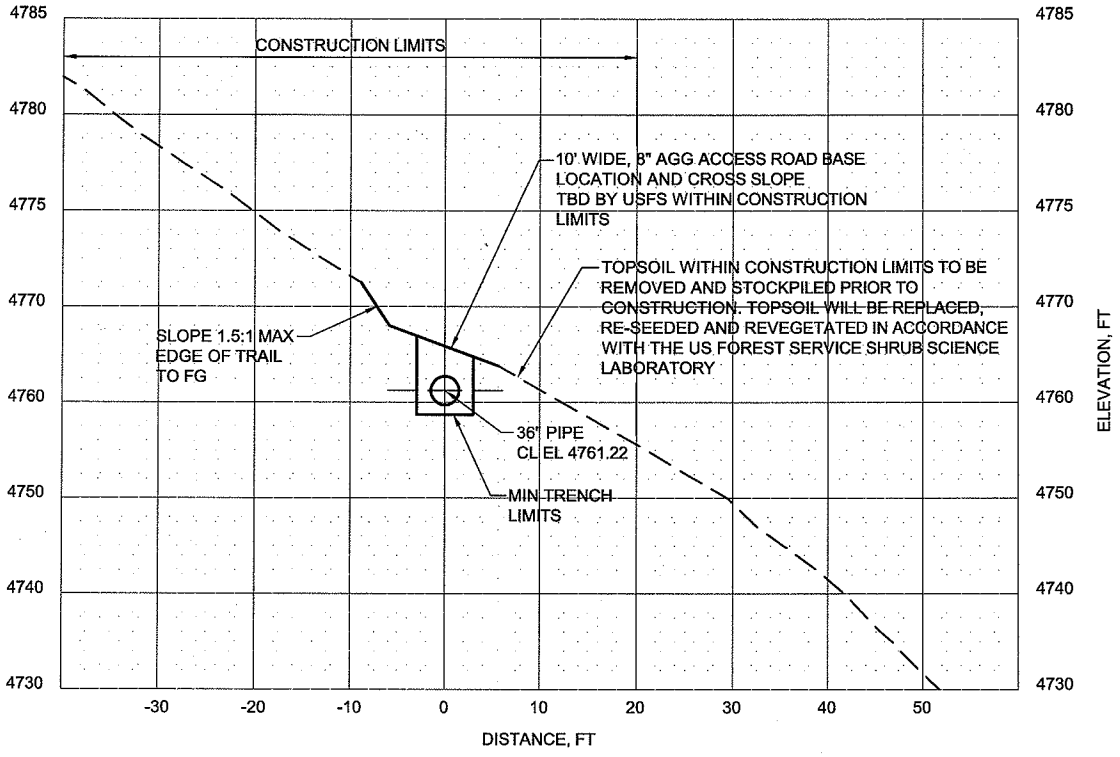
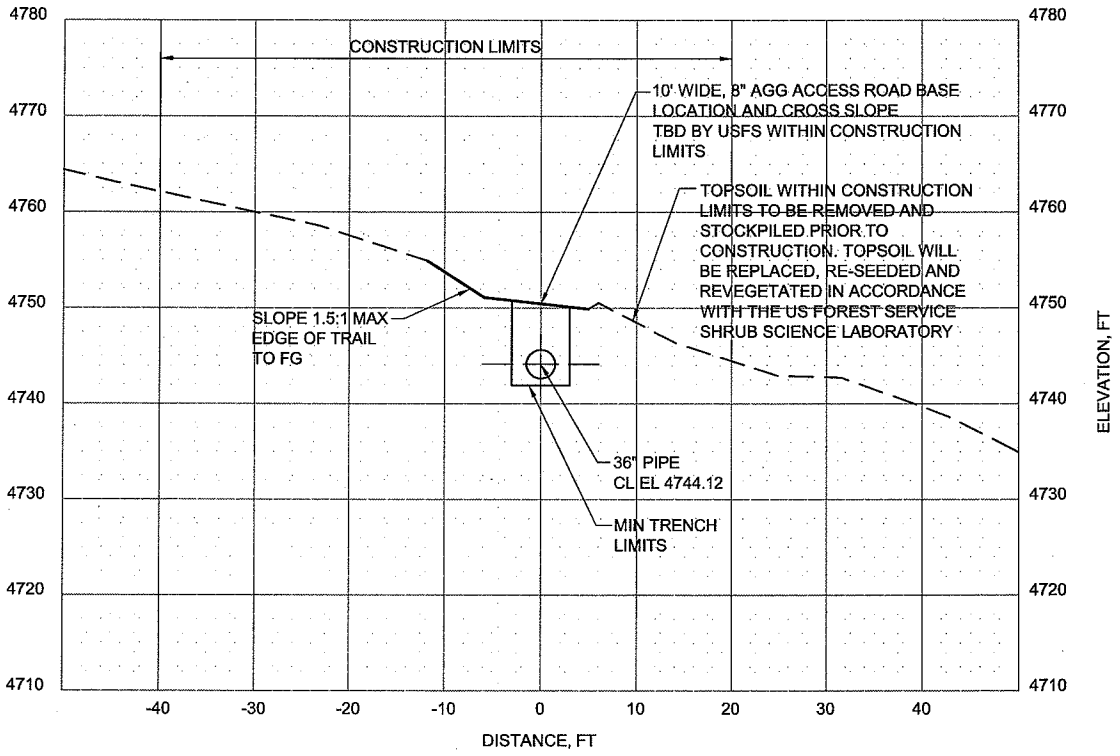


NOTE:

SEE FIGURE 2-1 FOR GENERAL NOTES REGARDING PROTECTION OF EXISTING FEATURES AND REVEGETATION.

FIGURE 2-15
NORTH ALIGNMENT AT STEEP SLOPE CROSS SECTION

CH2MHILL



NOTE:

SEE FIGURE 2-1 FOR GENERAL NOTES REGARDING PROTECTION OF EXISTING FEATURES AND REVEGETATION.

FIGURE 2-16
NORTH ALIGNMENT AT CANAL ROAD CROSS SECTION

CH2MHILL

2.4.2 Alignment Around Hydropower Plant

This alternative's pipeline alignment travels within Logan City property for approximately 400 feet to cross the hydropower plant site between two buildings, under the penstock, and up a slope behind the two buildings into the alignment of the hydro plant penstock access road. It follows the access road alignment until it rejoins the original pipeline alignment at the base of the steep rock slope, which is approximately 1,500 feet of pipe. The new 36-inch WSP will maintain the minimum buried depth of 5 feet with a minimum trench width of 7 or 8 feet wide. The excavated materials will be placed alongside the trench during construction. Once constructed, vegetation in the restored area will match the existing vegetation. Construction may be in the spring, summer, or fall when fairly rapid revegetation is possible and wildlife concerns are at their lowest.

2.4.3 Pipeline Hydropower Plant to Tank Site

After traveling around the hydropower plant, the pipeline alignment is in an abandoned access road north of the hydropower plant. The abandoned access road meets the Ray Hugie Hydro Park entrance road until it makes a jog into the alignment of Alternative 2 described previously at the base of the steep rocky slope. As described in *Section 2.3.4*, the alignment climbs a very steep rock slope, crosses under the Smithfield Canal, and enters the existing tank site at the southeast corner.

2.5 Alternatives Considered but Dismissed from Detailed Study

Several alternatives were examined that considered repair and replacement feasibility, as well as costs for the pipeline repair and rehabilitation project, and how well the alternative met the current and future demands of the facility and structures. Alternatives that were considered but eliminated from further consideration included:

- **Rehabilitate the 24-inch WSP or Construct a New 24-inch WSP in the Trail and/or Highway**—These options were dropped from further consideration because, although the 24-inch WSP offers more capacity than existing conditions, these options would provide less flow capacity and limit operational flexibility compared to the Proposed Action and action alternative. The 24-inch pipe would not meet the future demands on the water system or maximize the capability of the DeWitt Spring delivery, and, therefore, would not meet the project purpose and need.
- **Convert the Smithfield Canal Conveyance System into a Piped System**—This option was proposed by the associated irrigation companies as a teaming opportunity with the City. Although this alternative would meet the purpose and need, it is quite complex in that it would have additional permitting, coordination, funding, water rights, and constructability issues that would exceed those associated with the Proposed Action or action alternative, and, therefore, was not carried forward for detailed analysis. However, the potential for new culinary-quality water rights—perhaps the most attractive part of this option to the City—could be negotiated in the future, and the City might still participate in piping the canal if the new DeWitt Pipeline in the highway could carry any culinary water obtained from canal losses saved by piping the canal.

2.6 Forest Plan Direction

2.6.1 Revised Forest Plan (RFP)

The RFP contains restrictive limitations (**standards**) to be placed on management activities within the Plan area; they are within the authority and ability of the Forest Service to enforce. Adherence is mandatory and a project that varies from a relevant standard may not be authorized unless the Forest Plan is amended to modify, remove, or waive application of the standard. A **guideline** is a statement describing a preferred or advisable course of action that is generally expected to be carried out. Deviation from compliance does not require Forest Plan amendment, but the rationale for such deviation shall be documented in the project decision document. The number in parentheses before each standard or guideline references the RFP. Applicable RFP standards and guidelines for all alternatives are as follows:

2.6.1.1 Standards and Guidelines for Watershed, Riparian, and Aquatic Habitat Health

(S2) Apply runoff controls during project implementation to prevent pollutants including fuels, sediment, and oils, from reaching surface and groundwater.

(S4) Place new sources of chemical and pathogenic pollutants where such pollutants will not reach surface or groundwater.

(G3) Proposed actions analyzed under NEPA should adhere to the State Non-point Source Management Plan to best achieve consistency with both Sections 313 and 319 of the Federal Water Pollution Control Act.

(G4) At the end of an activity, allow no more than 15 percent of an activity area (defined in *Chapter 7, Acronyms, Abbreviations, and Glossary*) to have detrimental soil displacement, puddling, compaction, and/or to be severely burned.

(G5) Do not allow activities that could result in water yield increases that would degrade water quality and impact beneficial uses.

(G6) In Riparian Habitat Conservation Areas (defined in *Chapter 7, Acronyms, Abbreviations, and Glossary*) when projects are implemented, retain natural and beneficial volumes of large woody debris.

(G8) In stream channels, naturally occurring debris shall not be removed unless it is a threat to life, property, important resource values, or is otherwise covered by legal agreement.

(G9) Avoid soil disturbing activities (those that remove surface organic matter exposing mineral soil) on steep, erosive, and unstable slopes, and in riparian, wetlands, floodplains, wet meadows, and alpine areas.

(G11) Use Best Management Practices (BMPs) and Soil and Water Conservation Practices (SWCP) during project level assessment and implementation to ensure maintenance of soil productivity and minimization of sediment discharge into streams, lakes, and wetlands to protect designated beneficial uses.

(G12) Locate new actions (such as incident bases, fire suppression camps, staging areas, livestock handling facilities, recreation facilities, roads and improvements [including trails]) outside of Riparian Habitat Conservation Areas. If the only suitable location for such actions

is within Riparian Habitat Conservation Areas, sites will be located to minimize resource impacts.

(G17) Where snags or coarse woody debris are below the desired range, the felling of snags and transport of felled snags or coarse wood off-site including firewood gathering will not be allowed, except to reduce hazards to humans or property along roads, trails, and in or adjacent to developed facilities.

(G21) For projects that may affect Forest Service sensitive species, develop conservation measures and strategies to maintain, improve and/or minimize impacts to species and their habitats. Short-term deviations may be allowed as long as the action maintains or improves the habitat in the long term.

(G22) Use native plant species, preferably from genetically local sources (harvesting seed from a project area's native species prior to project implementation), in re-vegetation efforts to the extent practicable. If no native seed of suitable origin is available, then certified weed free, non-persistent, non-natives may be used.

(G23) Avoid actions on the Forest that reduce the viability of any population of plant species classified as Threatened, Endangered, Sensitive or recommended sensitive. Use management actions to protect habitats of plant species at risk from adverse modification or destruction. For species that naturally occur in sites with some disturbance, maintain the appropriate level of disturbance.

2.6.1.3 Standards and Guidelines for Wildlife

(G30) Avoid disruptive management activities (not public recreation activities) on deer, elk, mountain goat and bighorn sheep winter range from November 15 through April 30.

2.6.1.4 Standards and Guidelines for Roads, Trails, and Access Management

(S20) When constructing or maintaining roads, trails and facilities, use BMPs to minimize sediment discharge into streams, lakes and wetlands.

(G44) When constructing and reconstructing roads, trails, and facilities minimize potential effects on habitat of plant species at risk and key big game winter and spring ranges.

(G45) Access routes for heavy equipment should be selected to limit disturbance to riparian vegetation and to limit the number of stream crossings.

(G46) Specify and control locations for water supply points, service areas, and any other needs for road and facility construction projects.

(G47) Waste material should be handled in a manner to avoid side-casting materials to areas where they may enter a stream.

2.6.1.5 Standards and Guidelines for Recreation

(G48) Include motorized access in authorizations such as term grazing permits, communication sites, transmission lines, permits to drill, reservoirs, and weather stations when needed for management consistent with management prescription and coordinated to mitigate impacts.

(G49) Manage recreation opportunities consistent with Management Prescription Categories (MPCs), Recreation Opportunity Spectrum (ROS) Classes, Landscape Character Themes (LCTs), Scenic Integrity Objectives (SIOs), and in accordance with Winter Recreation Maps as well as District Travel Management Plans.

2.6.1.6 Standards and Guidelines for Scenic Resource Management

(S22) Management actions that would result in a scenic integrity level of Unacceptably Low (defined in Glossary [of W-CNF RFP]) are prohibited in all LCTs.

(G59) Manage Forest landscapes according to LCTs and SIOs as mapped.

(G60) Resource management activities should not be permitted to reduce SIOs stated for MPCs.

(G61) For management activities viewable from Concern Level 1 (defined site specifically) Scenic Byways (viewshed corridors 0-4 miles) and use areas, travelways, and Scenic Backways (viewshed corridors <1/2 mile) apply the LCT in which the management activity occurs and apply a SIO of *High*.

(G63) Duration of visual impacts to allow for herbaceous and woody plants are established and will be determined during project planning by the following criteria:

- Capability of the landscape to recover
- The relationship of management activity to the seen area of sensitive use areas and travel ways.

(G64) Establishment of herbaceous vegetation may extend to 3 years after project completion for foreground and middle-ground in Concern Levels 1 and 2 use areas and travel ways. Consider immediate initiation of reseeding in these areas where natural recovery is questionable.

2.6.1.7 Standards and Guidelines for Special Uses

(G81) Before issuing recreation or non-recreation special use authorizations, ensure that each proposal clearly demonstrates why use of National Forest System lands is necessary and why lands under other ownership cannot be used. Deny proposals for use when the request is based solely on affording the proponent a lower cost or less restrictive location than can be obtained on non-federal lands, or when reasonable options exist on non-National Forest System lands. Use the process identified in FSH 2709.11 to determine whether special use proposals will be accepted for detailed review under NEPA. Provide only for authorizations that meet the tests of prudent, reasonable, and absolutely in the public interest.

2.6.1.8 Standards and Guidelines for Heritage Resources

(S32) Review undertakings that may affect cultural resources to identify potential impacts. Compliance with Sections 106 and 110 of the National Historic Preservation Act (NHPA) shall be completed before the responsible agency official signs the project decision document.

(G88) Design any mitigation measures necessary to resolve adverse effects to sites in such a way that they provide the maximum public benefit that the sites (or the information derived from them) can offer.

2.7 Additional Regulatory Guidance, Management Practices, and BMPs Common to All Action Alternatives

Mitigation measures and BMPs, in addition to those discussed in Section 2.6 from the RFP, are included as part of all action alternatives. These measures are designed to avoid or minimize potential project-related effects.

2.7.1 Sensitive Species

The following mitigation measures are included to provide additional protection to State and W-CNF sensitive plant and wildlife species:

- Fence off *Primula* population at Red Bridge site to avoid adverse impacts during construction, and maintain a 50-foot buffer, fenced with construction fencing, from ground-disturbing actions.
- Maintain a 15-foot buffer, fenced with construction fencing, between potential *Primula* habitat at the outcropping and areas of construction impacts.
- Woody vegetation (trees and shrubs) will be cut during the fall months—after September 30—to avoid direct impacts from accidental "take" to nesting migratory (neotropical) birds, cavity nesting birds, and owls.
- Minimize construction to the extent possible in winter to protect wintering big game. River crossing work must be scheduled at low flow, which is between September and April. Canal crossings are restricted from October 15 to April 15. River and canal crossing construction will be done as early in each of these seasons as possible in order to complete construction prior to snowfall and to avoid stressing big game as much as possible in winter months. Construction will not occur directly in upland winter range habitat after snowfall in the winter.
- Blasting will occur during the non-nesting season to the extent practicable from June to early November. To prevent impacts to wildlife species from blast charges during construction, a loud noise-maker will be used to startle wildlife from the area immediately prior to the blast.
- As per USFWS direction, construction will limited to 9:00 am until 4:00 pm during the November through March period to avoid disturbing bald eagles that may roost in the canyon.

2.7.2 Visual Resources

2.7.2.1 Regulatory Guidance

Cache County Countywide Comprehensive Plan. The Cache County Countywide Comprehensive Plan (Plan) does not contain goals or objectives specifically related to scenery or visual/aesthetic resources (Cache County 1998). The Plan contains two general

goals that have strategies and/or objectives related to scenery or visual aesthetic resources that are pertinent to the area in which the proposed project is located. The two relevant goals and their strategies and/or objectives are described below.

- GOAL 6: Provide protection of the sensitive areas and sites, taking into account the public good and property owner rights:
  - Relevant Strategy (6.4): Consideration of historic or scenic sites, so that their cultural and educational value may be preserved and made available for the edification and enjoyment of all.
- GOAL 7: Maintain and protect the pristine and sensitive canyons and National Forest areas of Cache County:
  - Relevant Objective: Maintain the quality of the canyons and National Forest areas.

Logan City General Plan. The current Plan was adopted in 1995 (City of Logan 1995). A new Draft General Plan (Draft Plan) has been developed but has not yet been adopted. Until the Draft Plan is adopted, the 1995 Plan directs planning activities within City limits. The Plan contains goals, policies, and implementing programs related to development and preservation of the City of Logan. None of the Plan's goals, policies, or implementation programs refers directly to scenery or visual/aesthetic resources that would be affected by the proposed project. The Plan includes a Visually Sensitive Area (VSA) category, which directs and regulates development above certain elevations to protect the appearance of key hillsides and benches. None of these areas pertain to the proposed project. The Plan does recognize the importance of "gateways" that can give a visitor their first impression of the City. One of the gateways identified in the Plan is Highway 89 near the west end of Logan Canyon (including part of the project area). The Plan also states that the City has no review authority over the Logan Canyon gateway because the canyon is outside of the City limits.

Logan Canyon Corridor Management Plan. The Logan Canyon Scenic Byway is located along Highway 89. It travels 41 miles from Logan City and the Cache Valley in the west through the Bear Mountains to Garden City in the east. The byway includes a unique blend of natural and human features. The Logan Canyon Corridor Management Plan (Byway Plan) was adopted in 2002 (Hancock 2002). It was developed to protect, maintain, and enhance the intrinsic values of the byway through planning and cooperation between federal, state, county, and City agencies. Among the objectives of the Byway Plan, several relate directly to protecting and improving the physical setting of the canyon, including the canyon's scenic values. The Byway Plan identifies and reviews some of the intrinsic qualities that make the byway such a unique setting and resource. The first of the intrinsic values described in the plan is "Scenic Resources." For the portion of the byway in which the project area is located (Lower Canyon along the Lower Logan River), the plan identifies some of the important features that contribute to the visual setting. Natural features seen from the byway in this section include the limestone cliffs and outcroppings through which the byway passes and below, the Logan River, and an interesting mix of vegetation that includes spruce, fir, pine, and juniper in the higher elevations of the canyon and riparian vegetation along the river and near much of the byway near the project area, which the plan indicates is quite colorful in the fall.

The Byway Plan was developed by a number of participants including the Forest Service, state agencies (including the UDOT), local governments (including Cache County and the City of Logan), the business community, non-profit groups, and others. A Memorandum of Understanding (MOU) was entered into by many participants in 1994 for the development and implementation of the Byway Plan. The MOU lists responsibilities of the byway organization and identifies plan implementation actions, responsible parties, and planned dates for actions. Approximately 68 percent of the byway is within the W-CNF. These lands and the portion of the byway in the National Forest are managed under the W-CNF RFP.

2.7.2.2 BMPs

The following BMPs will be implemented to minimize the potential for project-related impacts on scenic resources on the W-CNF:

- Where possible, locate the proposed pipeline within the existing River Trail and Highway 89 cleared boundaries, or within the existing irrigation canal access road. This will minimize the amount of clearing needed for construction workspace, excavation storage, and permanent right-of-way (ROW). This will also minimize visual impacts by minimizing vegetation removal and vegetation community fragmentation.
- Minimize the width of the disturbed area; only that area required to safely conduct pipeline construction and appurtenant staging and storage will be cleared of vegetation.
- Minimize tree and vegetation removal within the existing cleared area of the River Trail, Highway 89 ROW, and irrigation canal access road, and attempt to not remove any vegetation outside of the corridor. Except for the pipeline trench and the adjacent adjoining work area, areas that require clearing for project activities will be cleared by mowing or hand cutting rather than by blading below the ground surface. This will maintain some plant roots and aid in revegetation.
- In areas where the pipeline will pass through groves of trees that will be highly visible from Highway 89 (two or three locations), the removal of the trees and the cutting back of vegetation will be coordinated with a Forest Landscape Architect. Attempts will be made to avoid a straight edge created by removing vegetation in a straight line. Instead, the cleared edges will be "feathered" or "scalloped" so that the edges seen from Highway 89 are not straight.
- Cleared large woody debris will be stockpiled and scattered over revegetated areas.
- Excavated material from pipeline trenching in areas where existing vegetation is not already disturbed (as determined by a Forest Landscape Architect) and where the existing grade will not be altered will be stored in the following manner. Willows may be cut to grade if necessary and other shrubs or trees will be cut so that approximately 4 inches of trunk remain above grade. After cutting, 6 to 9 inches of Certified Weed-Free straw will be placed over the cut vegetation and stumps. The straw will help prevent damage to plant roots during storage. It will also indicate to the contractor when the original grade is being approached when refilling the trench. Once the layer of straw is detected, the contractor will take care to not disturb the existing grade in refilling the trench (which may require refilling by hand). Upon completion of refilling the trench, all but approximately 1 inch of straw (which will remain as mulch) will be removed from the construction site.

- Grading performed during project construction and revegetation efforts will be done in a manner that minimizes erosion and conforms to the natural topography.
- Where sufficient quantity and/or quality exists, the top 6 inches of soil from pipeline trenching activities will be stockpiled separately from other excavation and will be spread on the project-disturbed area after trenching is complete, and prior to revegetation efforts.
- Soil and rock that is excavated, but is not used to backfill in the trench or in restored contours, or removed from the site, will be placed in natural-appearing clusters as directed by a Forest Landscape Architect or at a designated stockpile near Preston Valley Campground.
- In areas where blasting is required (if required), native soil and materials will be used for reclamation. Any rock that is introduced into the surface soil that is visually incompatible with the surrounding area will be buried within the project-disturbed area or hauled to an approved disposal site.
- Boulders that are replaced within the disturbed area of the portions of the pipeline that pass through steep slopes in areas that can be seen from Highway 89 will be placed so that the weathered (or darker) faces of the boulders face Highway 89. Freshly cut boulder faces that may face Highway 89 will be rubbed by hand with adjacent soil in an attempt to "weather" the freshly cut faces.
- Above-ground project structures will be painted a color that enables them to harmonize with the surrounding landscape, to the extent that it is standard for the industry and meets applicable federal, state, and local safety regulations. Colors will be approved by a Forest Landscape Architect. Equipment finishes will be specified to be of the non-glare type.
- Prior to the start of project construction, the City will consult with Forest Landscape Architects and Biologists to determine the appropriate mix of plant species, timing of plantings, and the locations where vegetation should be planted along the project-disturbed area. The intent of such plantings is two-fold: (1) revegetate the disturbed area so that color and texture are added back to the landscape, thus reducing the contrast in the existing pipeline corridor; and (2) soften the straight-edge effect that could be exhibited by the pipeline construction corridor.

2.7.3 Water Quality and Soils

2.7.3.1 Utah Division of Water Quality Recommendations

The Utah Division of Water Quality (UDWQ) provided recommendations during public scoping to minimize the erosion-sediment load to any adjacent waters during project activities and operation of the facilities (UDWQ 2006). Further, UDWQ recommended that appropriate water quality parameters be monitored for effectiveness of sediment control and other applicable BMPs. These recommendations are as follows:

- Emphasis in design will avoid concentration of stormwater to fewer drainage locations. The intent should be to allow or mimic the natural flow patterns to the degree possible.

- Inclusion of the following conditions within the Stream Alteration Permit:
  - Whenever an applicant causes the water turbidity in an adjacent surface water to increase by 10 NTUs or more, the applicant shall notify the UDWQ.
  - The applicant shall not use any fill material that may leach organic chemicals (e.g., discarded asphalt) or nutrients (e.g., phosphate rock) into the receiving water.
  - Applicant shall protect any potentially affected fish spawning areas.
  - The following permits from our Division are required during the construction phase of the project:
    1. Construction activities that grade 1 acre or more per common plan are required to obtain coverage under the Utah Pollutant Discharge Elimination System (UPDES) Storm Water General Permit for Construction Activities, Permit No. UTR100000. The permit requires the development of a stormwater pollution prevention plan to be implemented and updated from the commencement of any grading activities at the site until final stabilization of the project. A fact sheet describing the permit requirements and application procedures is located on Web site waterquality.utah.gov.
    2. Dewatering activities, if necessary during the construction, may require coverage under the UPDES General Permit for Construction Dewatering, Permit No. UTG070000. The permit requires water quality monitoring every 2 weeks to ensure that the pumped water is meeting permit effluent limitations, unless the water is managed on the construction site.

In addition to these permitting requirements, UDWQ requires the submission of plan elements for permanent stormwater runoff control and treatment. The plan should include BMPs that will require revegetation with native plants in disturbed areas and a buffer strip along the road to filter petroleum, sediments, and other contaminants from entering waters of the State.

2.7.3.2 BMPs

The following BMPs will be implemented to minimize the potential for project-related impacts on water resources and soils on the W-CNF:

- To ensure effective implementation and adaptation of soil and water protection BMPs, the Forest Service will appoint an on-site Erosion Control Specialist.
- To control erosion and protect soil productivity, all lands disturbed by pipeline construction activity need to be stabilized by restoring an adequate ground protecting cover of native vegetation. Weed-free native seed mixes will be specified by the Forest Service Botanist, and should be applied to areas disturbed by construction activities at a minimum rate of 30 pounds per acre. Separate seed mixes will be specified for both upland areas and wetland/riparian areas. Seed should be applied anytime during the snow-free periods between September 1 and June 15, and as soon as final grading of the disturbed areas has been completed. A suitable wind-firm mulch material, with a performance period of at least one year, should be installed immediately following seed application.

- To prevent sediment delivery and protect water quality from areas of construction-related soil disturbance within 150 feet of the Logan River, a linear structure for trapping sediment must be installed prior to commencement of construction activities. This structure may consist of properly installed and anchored sediment retention fencing. This BMP may be waived by the on-site Forest Service Erosion Control Specialist for sections of the project where the Logan Canyon Highway provides an adequate barrier to sediment delivery into the Logan River.
- To prevent sediment delivery and protect water quality, temporary cross-trench pipe sections must be installed over the top of the trench to safely convey runoff flows from all Logan River tributary channels across the trench excavation. These temporary pipe crossings will remain in place until the trench has been backfilled to grade at these locations. Specific tributary locations along the alignment are listed in Table 2-1. Temporary cross-trench pipe sections may be added or deleted as needed and at the discretion of the on-site Forest Service Erosion Control Specialist.

TABLE 2-1
Locations of Temporary Cross-Trench Pipe Drain Structures

Alternative	Approximate Location
Alternative 2	171+80, 176+80, 181+00, 182+60, 192+50, 197+70, 204+20, 207+90, 216+50, 220+00
Alternative 3 (Proposed Action)	540+00, 541+00, 543+30, 550+80, 551+60, 555+70, 557+30

2.7.4 Recreation

Prior to the start of project construction (i.e., during project design when the timing and duration of construction of each pipeline segment is known), the City of Logan (i.e., the project applicant) shall consult with Forest Service Recreation Specialists to: (1) coordinate regarding methods to minimize impacts to recreationists during project construction; and (2) determine the methods to be used to preclude access to the selected pipeline alignment and construction areas during the project construction period, method for notifying the public of project construction activities and schedule, determining detours for hikers around the project construction area (where possible), and methods to minimize light scatter in the unlikely event that nighttime construction occurs. Pre-construction consultation would include, but would not be limited to, the following:

- Signs posted along Forest roads and at Forest entries indicating road closures, traffic delays, and a description of project construction activities and schedule.
- Notices and/or information mailings to local recreation groups that are known to use the Forest regarding the upcoming construction activities and schedule.
- Notices and/or information provided on the National Forest Web site.
- Fencing or otherwise blocking entry to work areas, staging areas, or other nearby construction-related locations.

- Specifying that the construction contractor use downward-directed, shielded construction lighting for nighttime construction, if this occurs. Lights should meet federal, state, and local requirements for safety and security of workers and the public.
- To the extent it is feasible and possible, use existing access roads to minimize the need to construct new roads.

2.7.5 Cultural Resources

Cultural sites will be marked on construction maps and indicated to construction managers. Sites will be flagged and staked in the field to ensure that no unintentional construction impacts occur.

2.7.6 Vegetation Resources

The City would make periodic inspections following revegetation of disturbed areas to locate and control populations of noxious weeds, if present

- All seed used for restoration will be certified "noxious weed free" before use.

2.8 Comparison of Alternatives

Table 2-2 summarizes and compares the potential environmental benefits and impacts of the No Action Alternative, Alternative 2, and the Proposed Action, for each resource area that has an associated significant issue. The No Action Alternative, while having the least impact, would not meet the purpose or need of the proposed project. Alternative 2 would have the least impact on undisturbed habitat, but includes three crossings of the Logan River by the DeWitt Pipeline. Under Alternative 3 (Proposed Action) the DeWitt Pipeline only crosses the Logan River once (with a second smaller water delivery pipeline crossing the Logan River to the Stokes Nature Center), but would impact undisturbed habitat and present a new pipeline corridor visual effect where no similar visual feature now exists.

TABLE 2-2
Comparison of Effects Among Alternatives as a Function of the Issue and Indicator

Resource Area	No Action Alternative	Alternative 2	Proposed Action
Biological Resources			
Fisheries Resources Indicators: Protection of spawning habitats.	No change in current conditions; however, the potential for sediment input from pipeline failure is highest with this alternative.	Highest potential for short-term sediment and turbidity impacts with three river crossings and construction adjacent to the river in the highway ROW. Also the highest direct impact to fish spawning habitat at the crossings. BMPs will prevent significant impacts.	Lowest action alternative potential for short-term sediment and turbidity impacts, as there is only one river crossing of the DeWitt Pipeline and a second smaller water delivery pipeline river crossing to the Stokes Nature Center. Construction away from the river from Second Bridge to the hydroelectric plant reduces the potential for sediment input to the river in this section. This alternative has the lowest direct impact on fish spawning habitat from an action alternative.
Threatened and Endangered Species Indicators: Adverse impact to species and their habitats.	No effects on threatened or endangered species would occur with implementation of the No Action Alternative.	Removal of five potential large cottonwood bald eagle perch trees may affect, but is not likely to adversely affect bald eagles. Construction near marginal yellow-billed cuckoo habitat may affect, but is not likely to adversely affect the cuckoo.	The large cottonwood trees would not be removed, but there would be construction related disturbance that may effect, but would not likely adversely affect bald eagles. Construction in marginal cuckoo habitat may affect, but is not likely to adversely affect the yellow-billed cuckoo.
Wetland Resources Indicators: Adverse impact to wetlands.	No impact to wetland resources.	While jurisdictional wetlands would not be disturbed with this alternative, the three river crossings would temporarily impact Waters of the U.S.	A small amount of wetland would be disturbed temporarily during construction adjacent to Second Bridge. However, impacts to Waters of the U.S. would be less with only one river crossing of the DeWitt Pipeline.
Logan River Indicators: Adverse impact (turbidity) to river resources.	No Logan River impacts with the No Action Alternative; however, the potential for sediment input from pipeline failure is highest with this alternative.	Highest potential for short-term sediment and turbidity impacts with three river crossings and construction adjacent to the river in the highway ROW. BMPs will prevent significant impacts.	Lowest action alternative potential for short-term sediment and turbidity impacts, as there is only one river crossing of the DeWitt Pipeline and a second smaller water delivery pipeline river crossing to the Stokes Nature Center. Construction away from the river from Second Bridge to the hydroelectric plant reduces the potential for sediment input to the river in this section.

TABLE 2-2
Comparison of Effects Among Alternatives as a Function of the Issue and Indicator

Resource Area	No Action Alternative	Alternative 2	Proposed Action
Scenic Resources Indicators: Effects of pipeline rehabilitation/ construction on scenic quality of the Logan River corridor.	No additional scenic resource impacts with the No Action Alternative.	Visitors and residents would notice changes in the visual character of the corridor particularly at each river crossing and on the steep slope from the hydroelectric plant to the tank farm.	Visual river crossing impacts would be less with this alternative, but a new corridor visible from Highway 89 would be constructed from Second Bridge on the north side of the river. The visual impact on the slope above the hydroelectric plant would be the same as for Alternative 2.
Management Indicator Species (MIS), USFS Sensitive Species, Migratory Birds, Big Game Winter Range Indicators: Adverse disturbance affecting ability to breed or occupy habitat to the extent the local population will not survive.	No additional MIS, Sensitive species, migratory birds, or big game winter range impacts with the No Action Alternative.	No impacts to MIS species are expected to occur under this alternative. None of the three terrestrial MIS species (beaver, northern goshawk, and snowshoe hare) are known or expected to breed in the project area. BMPs will be implemented to avoid sediment-related effects on the aquatic MIS species (Bonneville cutthroat trout). USFS sensitive bat species could potentially use the cottonwood trees proposed for removal under this alternative as day roosts. These cottonwoods together with any associated understory shrubs are likely to be used by neotropical migratory birds as nest sites. To avoid impacts to nesting birds, conservation measures will be implemented that include removal of woody vegetation during the non-breeding season in late fall or early winter. Crucial big game winter range will be impacted by this alternative and the impact could last for 3 to 5 years as restored native vegetation becomes established.	No impacts to MIS species are expected to occur under this alternative. None of the three terrestrial MIS species (beaver, northern goshawk, and snowshoe hare) are known or expected to breed in the project area. BMPs will be implemented to avoid sediment-related effects on the aquatic MIS species (Bonneville cutthroat trout).Large cottonwoods would not be removed under this alternative. Removal of woody shrub vegetation that is dense enough to serve as nesting substrate should be removed in the non-breeding season. Crucial big game winter range will be impacted by this alternative and the impact could last for 3 to 5 years as restored native vegetation becomes established.

3.0 Affected Environment and Environmental Consequences

3.1 Introduction

This chapter summarizes the physical, biological, and social environments of the affected project area and describes existing conditions relative to the resources issues that were listed in *Chapter 1, Purpose and Need,* in Tables 1-2 and 1-3. This chapter also the compares the effects among the No Action Alternative (Alternative 1), Alternative 2, and the Proposed Action (Alternative 3). As discussed in *Chapter 1, Purpose and Need*, the affected project area is contained within the lower 5-mile reach of Logan Canyon from DeWitt Spring to the City of Logan's (City) storage tanks at the mouth of Logan Canyon.

The W-CNF Schedule of Proposed Actions (SOPA) was reviewed to identify past, present, and reasonably foreseeable future projects The Forest Service IDT also identified projects with potential for cumulative effects; these are listed in Table 3-1. Fire suppression, Highway 89, Gateway Trail, and the three dams (First, Second, and Third) are projects listed in Table 3-1 that could potentially have a cumulative effect with the Proposed Action or alternatives.

Fire suppression would have the potential to remove vegetation and promote erosion in the short-term, which could combine with the small amount of sediment expected with the Proposed Action or alternatives. Fire location, frequency, and intensity are very speculative and not possible to predict. Storm water runoff containing petro-chemicals, deicing material, and other pollutants can flow from Highway 89 into the river. Roadside vegetation and design parameters make this an unlikely event, but it is possible during severe storms. The proposed Gateway Trail would follow the North Alignment's (Alternative 3, Proposed Action) footprint if that alternative is selected. If the South Alignment (Alternative 2) is selected, the trail would move through currently undisturbed ground. The trail tread would be gravel and the disturbed areas along the trail would be revegetated. BMPs will prevent significant amounts of sediment from moving into the river. The First, Second, and Third Dams have all resulted in some fish passage blockage. However, the reservoirs behind the dams tend to prevent downstream movement of sediment in the river.

The effects of other past and present projects on W-CNF resources shown in Table 3-1 are not expected to be significant and are reflected in Affected Environment discussions of W-CNF resources.

TABLE 3-1
Projects Considered in the Cumulative Effects Analysis

Project	Description	Cumulative Effect Expected	
		Yes	No
Tony Grove–Franklin Basin Winter Recreation	Motorized and non-motorized recreation use management		√
Millville Peak/Logan Peak Road Reconstruction	Road reconstruction		√
Franklin to Tony Over-the-Snow Connector Trail	Development of a winter use trail between parking areas		√
Logan Canyon Cattle Allotments	Livestock grazing		√
Fire Suppression	Active fire suppression of human-caused fires	√	
First Bridge Replacement (2006)	Replace First Bridge		√
First Dam Underpass (2006)	A pedestrian/bike trail under Highway 89 near First Bridge		√
River Trail Construction (1999)	The River Trail runs east from the Nature Center on the south side of the river.		√
Stokes Nature Center Permit	Nature Center operated under a Special Use Permit		√
Existing Highway 89	Scenic highway in Logan River Canyon	√	
Reconstruct Spring Hollow Campground (2004)	Reconstruction work on the Spring Hollow Campground		√
Bonneville Shoreline Trail	A new trail that currently ends at the Logan City Park near First Dam		√
Gateway Trail	Trail to be constructed on the north side of the Logan River from Ray Hugie Hydro Park to the River Trail Trailhead.	√	
Recreation Residences Special Use Permits	An evaluation for renewing these permits is being conducted Forest-wide. An EA is being prepared.		√
Dams 1, 2, and 3	Three dams were constructed in the project area on the Logan River many years ago.	√	

3.2 Project Area Setting

The Logan River lies within the Middle Bear-Logan Watershed of the Bear River Range. The river drains the eastern portion of the 880-square-mile watershed, originating as a high mountain stream in the Bear River Range in Idaho, and collecting tributary waters as it travels through Logan Canyon. The river then emerges on the valley bottom where it passes through the City, outlying agricultural areas, and finally flows into the Great Salt Lake (USU 2007).

The project would begin at the DeWitt Spring, adjacent to the Logan River and within the lower portion of Logan Canyon. The pipeline route then runs in a westerly direction along the Logan River, downstream, crossing the river occasionally (once for the Proposed Action) and continuing along the bottom of Logan Canyon downstream to the eastern edge of the City of Logan. At the mouth of the canyon, near First Bridge, the route turns northward and heads upslope to the City water storage facilities, where the project terminates.

3.2.1 Climate

This portion of the Bear River Basin receives approximately 30 inches of precipitation annually, with a range between 17 and 59 inches per year. Most of the moisture received is in the form of snow. Average high temperatures can range between 59 and 86 degrees Fahrenheit as the range between the mountains and the valley bottoms varies. The winter lows can be as low as 25 degrees Fahrenheit (USU 2007).

3.2.2 Geography

The geologic features in the Logan Canyon area are indicative of a hydrologic system that has developed within more than 3,000 feet of Paleozoic limestone and dolomite. Features in this alpine region include large springs that discharge along the Logan River with losing streams in tributary drainages, caves and pits, blind valleys, sinkholes, dolomite pavement, and surficial outcrops (Spangler 2001).

3.3 Biological Resources

3.3.1 Vegetation Resources

3.3.1.1 Existing Conditions

Only air valve replacement would occur in the upper 3 miles of the pipeline route. A mix of riparian and upland species, including weeds, is found at each air valve location. Weed species include Canada thistle (*Cirsium arvense*), prickly lettuce (*Lactuca serriola*), and smooth brome (*Bromus inerm*is). Native species include white clematis (*Clematis ligusticifolia*), box elder (*Acer negundo*), coyote willow (*Salix exugia*), rose (*Rosa* sp.), thin leaf alder (*Alnus incana*), reed canarygrass (*Phalaris arundinacea*), water birch (*Betula occidentalis*), gray rabbitbrush (*Chrysothamnus nauseosus)*, and Rocky Mountain maple (*Acer glabrum)*.

A variety of riparian species including coyote willow, horsetail (*Equisetum* sp.), water birch, Rocky Mountain maple, red-osier dogwood (*Cornus stolonifera*), box elder, and poison ivy (*Toxicodendron rydbergii*), are found where the pipeline would be replaced in the existing trail (from 600 feet upstream of Red Bridge to Red Bridge).

When the pipeline crosses the river at Red Bridge, the river is tightly confined within steep, rocky banks, with no wetland present. The river would be considered a Water of the U.S. The normal high water mark is the Water of the U.S. boundary. Several willows occur at this location including coyote willow and a planted weeping willow (*Salix* × *sepulcralis Simonkai*). Other plants include rabbitbrush, smooth brome, and white clematis.

Once the pipeline crosses the river and follows the highway ROW, vegetation in the corridor is sparse. Two riparian areas are adjacent to the pipeline corridor on the north side

of the highway between Red Bridge and Second Bridge. One is approximately across the highway from the River Trail Trailhead and has box elder in the over- and mid-canopy and maple, flowering dogwood *(Cornus nuttallii*), and choke cherry (*Prunus virginiana*) in the mid-canopy. The other riparian area is also on the north side of the highway and is similar in composition to the first riparian area.

The pipeline crossing just upstream of Second Bridge is dominated by five large narrowleaf cottonwoods (*Populus angustifolia*) and smaller water birch, non-native Chinese elm (*Ulmus parvifolia*), cottonwood, and Rocky Mountain maple. A species of shrub rose is located in the understory. No wetland is associated with this crossing, but the river would be considered a Water of the U.S. The boundary of the Water of the U.S. is the normal high water mark on both banks. Rocky islands through which channels flow are located within the riverbed itself.

The habitat from Second Bridge to the crossing by First Bridge along the south alignment (Alternative 2) is mostly rabbitbrush with upland grasses/forbs and some small areas with Rocky Mountain maple and choke cherry. After the pipeline crosses the river at the First Bridge, it passes through a turf grass area in the Ray Hugie Hydro Park by the hydroelectric plant and then climbs steep cliffs up to the water tanks. The cliff supports a sparse mountain brush community with sagebrush, choke cherry, rabbitbrush, and grasses (including the type location for Logan buckwheat [*Eriogonum brevicaule* var. *loganum*]).

Upland vegetation along the Proposed Action (Alternative 3) consists primarily of varying interspersed cover of gray rabbitbrush, big sagebrush (*Artemisia tridentata*), juniper (*Juniperus scopulorum* or *utahensis*), and rose. Slender wheatgrass (*Agropyron trachycaulum*) is found in many areas, sometimes with Oregon grape (*Berberis repens*). Vegetated areas are interspersed with areas of talus and rocks that hold little soil and almost no vegetation. Smooth brome, a non-native species, has invaded the toe of the slope in some areas.

The riparian/wetland area where the Proposed Action leaves the south alignment is dominated by coyote willow, red-osier dogwood, box elder, and a few cottonwood trees.

Threatened, Endangered, and Sensitive Plant Species

Botanical resources include the abundance and distribution of different vascular and non-vascular native plant species. The State of Utah has a remarkable diversity of native flora and is known for its large number of endemic and rare plant species.

This section provides a detailed analysis of rare plants that occur or that have the potential to occur in the analysis area. This discussion includes federally listed threatened plant species under the Endangered Species Act (ESA), as well as five Forest Service sensitive plant species.

Threatened and Endangered Plant Species

Maguire's Primrose (*Primula maguirie*). Maguire's primrose was first collected in Logan Canyon, Utah, in 1911 and was formally described as a new species in 1936 (Williams 1936). The USFWS officially listed Maguire's primrose as threatened in August 1985 (USFWS 1985). Currently, 14 element occurrences of Maguire's primrose have been identified within a corridor of Logan Canyon approximately 11.8 miles long and less than 0.6 mile wide. The total global population of Maguire's primrose is estimated at 3,000 individuals (USFWS 1990).

The narrow distribution and small population size of Maguire's primrose is likely a result of unique habitat requirements and the need for calcareous substrates, since there is no evidence that the range of Maguire's primrose is any more restricted at present than it was historically (USFWS 1990, Glisson 1995, Wolf and Sinclair 1997). It is likely a relict species that formerly had wider ranges when climatic conditions in North America were wetter and cooler. Current research and phylogenetic analyses of *Primula* spp. add support to this hypothesis (Richards 1993, Wolf and Sinclair 1997). The role of human intervention in the restricted range of this species is unknown. Potential and actual habitat within the canyon—especially along the canyon floor—has been significantly impacted by human activity (USFWS 1990).

Habitat. Maguire's primrose is categorized as a mesophytic calciphile and is restricted to cool, moss-covered shallow soils on dolomite cliffs and boulders of the Laketown and Fish Haven Dolomite formations (USFWS 1990, Glisson 1995). Populations of Maguire's primrose are restricted to an elevational range of 4,600 to 5,900 feet along the lower canyon walls of Logan Canyon (Padgett 1986). Plants are often found in cracks or crevices or amidst well-developed mats of moss and are most often found in areas of cool, moist microclimates. Apparent differences in the moisture regimes of up-canyon and down-canyon populations have been documented (Padgett 1990). Maguire's primrose also has been found in Logan Canyon in some drier settings that are atypical for this plant; this species is not always restricted to seep areas (Duncan, pers. comm., 2006). Extensive surveys of potentially suitable habitat (additional outcrops of Fish Haven and Laketown Dolomites) have been conducted in adjacent drainages and in other portions of the Bear River Range of northern Utah and southern Idaho. No additional populations of Maguire's primrose have been located (Franklin 1990).

Threats. The most significant threats facing Maguire's primrose and its habitat are recreational rock climbing activities and horticultural collection (USFWS 1990, Glisson 1995, UDWiR 1998). Climbing activity in Logan Canyon has increased dramatically in recent years. The climbing community has participated in conservation efforts with the Forest Service to identify potential conflict areas and to educate climbers about the presence of this species. With the understanding of the local climbing community, 21 climbs have been formally closed to ensure protection of this species (Glisson 1995). A local climbing guide discusses the presence of Maguire's primrose and urges the cooperation of climbers to further protect this species and its habitat (Monsell 1998). The Forest Service is responsible for ensuring that preventative measures are employed and that population viability is maintained. The cooperative efforts with local climbing groups to protect this species' habitat, as described above, is helping the Forest Service in their efforts to maintain population viability. Surveys for Maguire's primrose were completed along the proposed pipeline corridors in Spring 2007 using W-CNF rare plant survey protocols. No additional populations were discovered.

Current Management. The USFWS prepared a Recovery Plan for Maguire's primrose in 1990 (USFWS 1990). The general provisions of the Recovery Plan include inventorying suitable habitat, conducting minimum viable population studies, managing activities that could affect populations or habitats, and developing techniques for artificially propagating plants for possible population expansion or establishment. Additionally, a Conservation Strategy for the Bear River Range Endemics, which includes Maguire's primrose, was

prepared and signed in 1995 (Glisson 1995). The general provisions of this conservation strategy include implementation of population biology monitoring studies to assess stability, trends, impacts from climbing and grazing activities, and autecology of all endemics. Direct provisions for Maguire's primrose include the development and implementation of specific research aimed at determining habitat dynamics, germination requirements, and phylogenetic relationships within and among populations.

Forest Service Sensitive Plant Species

Frank Smith's Violet (*Viola frank-smithii*). Frank Smith's violet was first discovered in May 1989 by botanist Frank Smith and was formally described as a new species in 1992 by Holmgren (1994). Frank Smith's violet is known to occur only in the lower to middle portion of Logan Canyon and several of its main side canyons in the Bear River Range of northern Utah (Glisson 1995). Currently, there are 11 known element occurrences that comprise a total global population of approximately 10,000 individuals (Stone 1994). Little is known about the life-history characteristics of Frank Smith's violet. It apparently is a short-lived perennial species that reproduces only by seeds and not vegetatively like some other violets. Pollinators are likely required for seed set (Glisson 1995).

Habitat. Frank Smith's violet is one of the few rock-dwelling violets known in North America (Holmgren 1994). It is endemic to cliffs and near-vertical outcrops of carbonate rock, specifically limestone, and Fish Haven and Laketown Dolomites. The elevation range of known habitat is 5,400 to 6,800 feet with most populations occurring on cool, northerly exposures that are shaded most of the day (Stone 1994). Surrounding vegetation, including Douglas-fir (*Pseudotsuga menziesii*) and maples (*Acer* sp.), also provides additional shading for the microsites in which Frank Smith's violet is found. Rock outcrops and aspects other than steep, north-facing slopes appear to be too warm and dry to support populations of Frank Smith's violet. Frank Smith's violet is found in distinct microhabitats similar to those of Maguire's primrose, and these species are often found in immediate proximity (UDWiR 1998).

Threats. The most significant threat to Frank Smith's violet and its habitat is recreational rock climbing activities. As previously stated, climbing activity in Logan Canyon has increased dramatically in recent years. Efforts by the Forest Service and the local climbing community have focused on education and the conservation of this species (Monsell 1998).

Current Management. A Conservation Strategy for the Bear River Range Endemics, which includes Frank Smith's violet, was prepared and signed in 1995 (Glisson 1995). This conservation strategy includes provisions that would promote implementation of population biology monitoring studies to assess stability, trends, impacts from climbing and grazing activities, and autecology of all endemics. Additionally, this strategy provides direct provisions for Frank Smith's violet, which include the development and implementation of specific research aimed at determining habitat dynamics, germination requirements, pollination, seed set, and dispersal requirements.

Although there are no currently known populations in the analysis area, the following additional Forest Service sensitive species have potential to occur in the project analysis area. Similar habitats exist in areas with known populations. They are all covered by the same conservation strategy described above for Frank Smith's violet (Glisson 1995).

Cronquist's Daisy *(Erigeron cronquistii).* Cronquist's daisy grows in crevices in limestone cliffs and talus slopes between 5,740 and 9,880 feet in elevation where it flowers May through August (Atwood et al. 1991). It was first described by Basset Maguire in 1944 (Maguire 1944) and it is apparently endemic to Utah.

Cache Beardtongue *(Penstemon compactus).* This penstemon is restricted to the Bear River Range in Utah and Idaho. It is found in greatest abundance on higher peaks and ridgelines in the central Bear River Range (IHI Environmental 1995). It occurs in openings in mountain brush and coniferous communities at elevations between 6,955 and 9,450 feet (Atwood et al. 1991). This species is not known to occur in the project area, but surveys should include it because it has been found in Utah in rocky, shallow-soiled areas and growing with species that are present in the project area.

Logan Buckwheat. This buckwheat is found in sagebrush-bunchgrass habitats and rocky outcrops at elevations between 4,790 and 7,790 feet, where it flowers in May and June (Atwood et al. 1991). Type location for this species is found in the lower portion of the project area. June 2007 surveys were conducted along the proposed pipeline routes. No individuals were found on Forest Service-administered lands. A population was found on the east side of the City's water tank site on land owned by the City of Logan.

Maguire's Whitlow-grass *(Draba maguirei).* This draba was first collected in Logan Canyon in June 1928 by Hobson and Maguire (IHI Environmental 1995). It grows on talus slopes and rocky outcrops from 5,400 to 8,700 feet in elevation where it blooms in May and June (Atwood et al. 1991).

3.3.1.2 Environmental Consequences

The impact assessment of Alternatives 1, 2, and 3 is presented in the following text. Significant issues and indicators identified during public scoping that are being addressed in this EA are discussed in *Section 1.4*. Issue No. 2 identified during public scoping is concerned with threatened, endangered, and sensitive plant species, as follows:

- Effects of pipeline rehabilitation/construction on threatened, endangered, and candidate species.

The following indicator was used to evaluate the potential effects of Issue No. 2:

- Amount of total (considering distribution) of threatened, endangered, and candidate species habitats lost to or modified by pipeline rehabilitation/construction.

Issue No. 3 identified during public scoping is concerned with the project's effect on wetland resources, as follows:

- Effects of pipeline rehabilitation/construction on wetlands.

The following indicator was used to evaluate the potential effects of Issue No. 3:

- Area of jurisdictional wetlands to be permanently affected by pipeline rehabilitation/ construction.

Disturbance to native plant communities increases the potential for weed invasion. Disturbance to unstable steep slopes is more likely to result in erosion and slumping from above.

The Forest Service has identified two potential problems for rare plants in the project area (Duncan, pers. comm., 2006):

- Direct effects to plants, particularly Maguire's primrose, by digging it up or digging up its potential habitat.
- Inadvertently destroying populations and/or habitat by construction.

The Forest Service is especially concerned in regards to potential impacts to Maguire's primrose near the canal diversion near Red Bridge. There is a known population in this area and a very narrow construction corridor. Another population of primrose is located at the mouth of the canyon on the south side. It is in atypical habitat and in a drier setting. Maguire's primrose is not restricted to "seeps" areas, as only one of the known populations is near a seep. In addition to the federally listed primrose, the type location for *Eriogonum brevicule* var. *loganum* is in this area ((Duncan, pers. comm., 2006).

To locate suitable habitat and unknown populations of Maguire's primrose, two plant surveys for primrose and Forest Service sensitive plant species were conducted along the proposed alignments—one in May and one in June. To reduce impacts to native vegetation, post-construction seeding with species native to the canyon, weed monitoring, and weed control would be implemented.

Alternative 1: No Action

Direct and Indirect Impacts

Under the No Action Alternative, there would be no direct or indirect threats from construction-related activities to native plants, to Maguire's primrose, or Forest Service sensitive plants, as no construction would occur on the pipeline. The pipeline would continue to function as at present with further pipeline deterioration that may result in increasing volumes of leaked water, increasing the potential for adverse impacts through localized erosion and deposition of fine sediments into the project area. The extent of potential habitat degradation is speculative at this time.

No permanent effect would occur to wetlands with this alternative.

Cumulative Effects

The No Action Alternative would not result in project-related effects to vegetation resources; therefore, no cumulative impacts to vegetation would result from its implementation. However, impacts to vegetation resources from other ongoing actions would continue under the No Action Alternative and would likely affect the project area the same as at present.

Alternative 2: South Alignment

Direct and Indirect Impacts

Potential effects of pipeline construction on plant communities are shown in Table 3-2. Plant communities will be restored, but will take varying lengths of time for recovery depending

upon vegetation type. Ruderal and herbaceous vegetation would be expected to recover in one to two growing seasons, while mature riparian vegetation could take up to 20 years for full recovery.

TABLE 3-2
Vegetation Types and Other Areas To Be Disturbed During Construction

Land Category	Alternative 2 Acres of Potential Disturbance	Alternative 3 Acres of Potential Disturbance
Disturbed/road/trail	3.63	3.21
Mountain brush	0.34	0.48
Riparian	0.18	0.16
Park land	0.04	0
River crossing	0.23	0.04
Sagebrush/juniper	0	1.00
Rock face/talus	0.64	0.64
Wetland	0	0.03
Total	**5.06**	**5.56**

There would be no direct or indirect impacts to Maguire's primrose. Surveys prior to construction of the alignments will determine if any occurrences are along the lower toe of the slope. Mitigation measures and BMPs (see *Section 2.7*) are specifically included to avoid impacts to primrose habitats in the short-term and provide long-term restoration of construction-impacted bank and riparian vegetation.

No jurisdictional wetland would be affected under Alternative 2. However, three river crossings would temporarily disturb Waters of the U.S. Implementation of BMPs, including restoration of the river bottom following construction, would avoid permanent impacts to the Waters of the U.S. There would be temporary impacts to 0.34 acres of mountain brush, 0.18 acres of riparian vegetation and 0.18 acres of riparian vegetation (Table 3-2).

Cumulative Impacts

Fire suppression can remove some live vegetation during suppression activities. The construction of Highway 89 removed some vegetation, but revegetation and time have negated any negative impacts in non-built areas. Construction of the Gateway Trail would require vegetation removal, but it would be done in a way to minimize effects and there are no long-term significant negative effects expected. Construction of the First, Second and Third Dams initially removed vegetation at the construction sites, and additional vegetation losses occurred in the reservoir pools. New riparian vegetation has established along the pools and, to the extent possible, around the previous construction sites. Given that Alternative 2 would not permanently affect vegetation resources, no cumulative impacts to vegetation would result from its implementation However, impacts to vegetation resources from other ongoing actions would continue under Alternative 2 and would likely affect the project area the same as at present.

Alternative 3: North Alignment (Proposed Action)

Potential effects of pipeline construction on native vegetation are expected to be slightly higher with the Proposed Action. However, known populations of Maguire's primrose are at a greater distance upslope from this alignment, compared to Alternative 2, and south-facing slopes are suspected of being typically, although not always, too dry for this species.

Approximately 0.03 acres of jurisdictional wetlands on the north side of the Logan River adjacent to Second Bridge may be temporarily disturbed during pipeline construction. Restoration of original grades and re-establishment of removed vegetation will prevent permanent impacts to this wetland. Implementation of BMPs, including restoration of the river bottom at the one crossing included in this alternative following construction, would avoid permanent impacts to the Waters of the U.S. There would also be temporary impacts to approximately 1 acre of upland sage/juniper habitat, 0.16 acres of riparian habitat, and approximately 0.48 acres of mountain brush habitat (Table 3-2).

Cumulative Impacts

One difference from Alternative 2 is that the Gateway Trail would remove less vegetation from undisturbed areas with implementation of Alternative 3. This is because the Gateway Trail would be constructed within the footprint of the pipeline on the north side of the river. However, as with Alternative 2, Alternative 3 would not permanently affect vegetation resources; therefore, no cumulative impacts to vegetation would result from its implementation. Impacts to vegetation resources from other ongoing actions would continue under Alternative 3 and would likely affect the project area the same as at present.

3.3.2 Aquatic Resources

3.3.2.1 Existing Conditions

The Logan River runs southwest, entering the State of Utah in the northeast corner at an elevation of 8,530 feet. The river runs through Logan Canyon for 40 miles and then to the City, where it drops to an elevation of approximately 4,495 feet at the eastern City limits, and ultimately drains into the terminal Great Salt Lake system. The river is dominated by riffles and swift channels, with pools being sparse. Higher gradient sections are characterized by boulder and rubble stream substrate while lower gradient sections are dominated by gravel beds and sand; solid bedrock is also common throughout the length of the river (Budy et al. 2006).

The river within the project area contains a mix of substrates and aquatic habitat types that lends to the diversity of coldwater species (Budy et al. 2006). Resident fish species include endemic Bonneville cutthroat trout (*Oncorhynchus clarkii utah*; [BCT]), introduced brown trout (*Salmo trutta*), stocked rainbow trout (*O. mykiss*), endemic mountain whitefish (*Prosopium williamsoni*), and endemic mottled sculpin (*Cottus bairdi*). BCT spawn in the spring, primarily in tributaries to the Logan River, while brown trout and mountain whitefish spawn in the fall, primarily in the main-stem Logan River (Chase, pers. comm., 2007). Rainbow trout spawn in the spring but those stocked in the Logan River have been sterilized to eliminate possible hybridization with BCT (W-CNF 2006).

The Logan River supports one of the largest known populations of BCT remaining throughout their range. Densities of BCT range from a low of 77 fish per mile at

low-elevation sites occupied by non-native brown trout through the project area, to a high of 3,301 fish per mile at Red Banks, upstream of the project area (Budy et al. 2006). Some of the headwater and tributary areas are degraded, while the lowermost section of the river is impacted by: (1) three impoundments in the lower three miles of the canyon, and (2) channelization and run-off issues associated with urban development through the City. However, the BCT population is believed to have remained at high abundance levels because of the overall availability of relatively connected and intact habitat upstream of Third Dam, much of which also remains in high-quality condition (Budy et al. 2006). There is no connectivity below Third Dam with upstream areas, and any BCT that move downstream of Third Dam are effectively lost from the upstream population.

Introduced brown trout are the dominant recreational fish species in the lower Logan River Canyon (W-CNF 2006). Rainbow trout, which have been sterilized to eliminate possible hybridization with BCT, are stocked by the UDWiR to provide additional angling opportunities. BCT numbers have increased in this river reach since 1999 but are much lower than those of brown trout and are not expected to increase much more because of the effects of competition with and predation by brown trout (W-CNF 2006).

Disease and non-native fishes can potentially adversely affect endemic fish species, such as BCT. Whirling disease (*Myxobolus cerebralis*) was first detected in the Logan River drainage in 1999 and is now distributed throughout the drainage, at relatively high occurrence rates (de la Hoz, Franco and Budy 2004 *in* Budy 2006; Budy et al. 2005 *in* Budy et al. 2006). Whirling disease represents a potential threat to native as well as non-native salmonids. Budy et al. (2005) reported that even though BCT samples in the Logan River have tested positive for whirling disease, there has been no evidence of associated population declines. Non-native brown trout were introduced in the 1800s and potentially prey on and compete with endemic species such as BCT for food and space where their habitats overlap. Budy et al. (2005) noted the possibility of synergistic effects on BCT where whirling disease is present and where there is also the potential for food competition between BCT and brown trout. The two species demonstrate a distinct pattern of distribution with brown trout dominating low elevation sites in high densities, cutthroat trout dominating high elevation sites in high densities, and a transition zone where both species demonstrate low abundance. The project area is generally dominated by brown trout.

Temporal variability of the aquatic habitat within the subwatershed is considered limited by the presence of the diversions, dams, and confinement of the river by the highway. The overall threat to the long-term aquatic conditions is considered to be relatively flat in the future except where increased threats my stem from increased recreation activities and increased demands for water withdrawals (USFS 2003a).

Threatened, Endangered, and Sensitive Species

Fish species-at-risk (SAR) include those species that are listed as Regional Sensitive by Region 4 of the Forest Service as well as those that are federally listed under the ESA (USFS 1999). W-CNF SAR found in the proposed project area are identified in the W-CNF RFP (USFS 2003a) and only include BCT. BCT are used as the native fish indicator because of their viability requirements. The assumption is that by meeting the biological needs of cutthroat trout, the biological needs of other coldwater fishes will also be met. These native species, for which the BCT would be considered a "focal species" in the project area, are mountain whitefish and sculpin (C*ottus* sp.).

Management Indicator Species

BCT are identified as W-CNF Management Indicator Species (MIS) for aquatic communities. MIS are representative species whose condition and population changes are used to assess the impacts of management activities on similar species in a particular area (W-CNF 2006). As mentioned previously, BCT is used as the fish indicator because it represents other native coldwater fishes. The assumption is that by meeting the biological needs of BCT, the biological needs of the other coldwater fishes will also be met (W-CNF 2006).

Bonneville Cutthroat Trout (Oncorhynchus clarki utah)

The BCT has been petitioned for federal listing under the ESA, but was found not warranted at this time (66 FR 21151). This species has been identified as both a SAR and a MIS for the W-CNF (USFS 2003a, W-CNF 2006). For the range of the BCT, the Snake River drainage forms the boundary on the north, the Colorado River on the east and south, and the Nevada desert lands and drainages on the west. Historically, BCT occupied approximately 90 percent of the Bonneville Basin (Duff 1996 *in* USFS 2003a). BCT currently occupy approximately 2,380 miles of habitat, which is approximately 35 percent of the nearly 6,758 miles of historically occupied habitat. BCT currently occupy more than 1,515 miles in Utah (63.7 percent of current, range-wide occupied habitat and 31 percent of historical habitat within Utah); 540 miles in Idaho (22.7 percent of current, range-wide habitat and 47 percent of historical habitat in Idaho); 296 miles in Wyoming (12.4 percent of current, range-wide habitat and 49 percent of historical habitat in Wyoming); and, approximately 29 miles in Nevada (1.2 percent of current, range-wide habitat and 35 percent of historical habitat in Nevada) (May et al. 2005).

As noted previously, the Logan River supports one of the largest known populations of BCT remaining throughout their range. Budy et al. (2006) report that densities of BCT range from a low of 77 fish per mile at low-elevation sites through the project area, to a high of 3,301 fish per mile at Red Banks, upstream of the project area (Budy et al. 2006). The W-CNF (2006) reports that in 2004, there were an estimated 2,430 brown trout per mile and 113 BCT per mile in the Logan River just upstream of Third Dam. The population trend for both species in this reach was reported to be "up" (W-CNF 2006). Downstream of Third Dam at the Spring Hollow sampling site, there were an estimated 585 brown trout and 59 BCT per river mile in 2004; both species exhibited a "flat" population trend at this location (W-CNF 2006). In their most recent assessment, the W-CNF (2006) concluded that the overall metapopulation/population trend for BCT in the Lower Logan River Canyon is "down." Even though BCT density has increased since 1999, BCT still occur in low numbers and likely will not increase much more because of competition with and predation by brown trout in the Lower Logan River Canyon reach (W-CNF 2006).

A number of threats to BCT were identified on W-CNF lands, with the most critical being roads, trails, motorized trails, grazing, developed recreation sites, and special uses authorized in riparian zones (within 300 feet of streams) on National Forest System lands. Additional threats include introduced, non-native fishes and timber harvesting (W-CNF 2006).

A number of guiding documents, directives, and processes that are currently in-place will aid in the long-term conservation of aquatic ecosystems and are pertinent to the Bonneville

and Colorado River cutthroat trout on the W-CNF. Existing documents that provide direction for the long-term persistence of cutthroat trout include the following:

- *Fish Stocking and Transfer Procedures* of the Utah Division of Wildlife Resources (USFS 1997a, *in* USFS 2003a). This document describes the general policy and procedures for stocking and transplanting fish in the State of Utah. In its policy direction it states, "Fish stocking… will only be conducted in a manner that does not adversely affect the long-term viability of native aquatic species or their habitat, aids native species conservation, and enhances fish populations in existing aquatic habitats and aids the efficient and effective management of recreational fisheries to provide angling diversity and participation" (USFS 1997a, in USFS 2003a).
- *The Conservation Agreement and Strategy for Bonneville Cutthroat Trout in the State of Utah* (UDNR 1997). This conservation strategy identifies the major threats and actions to be taken to preserve this species. It is generally a fish management document with minimal emphasis on habitat protection and enhancement.
- *Range-wide status of Bonneville Cutthroat Trout (Oncorhynchus clarki utah): 2004 (*May et al. 2005) provides an update on interagency efforts for the conservation and distribution of the species within its range.
- *The Range-wide Conservation Agreement and Strategy for Bonneville Cutthroat Trout (Oncorhynchus clarki utah) (*Lentsch et al. 2000) provides an interagency approach for the conservation of BCT across its range.

No Bonneville cutthroat trout spawn below Third Dam; therefore, there would be no effect on Bonneville cutthroat trout spawning areas.

Recreational Fisheries
The Logan River, once considered one of the best trout streams in the region, supports a popular fishery for native BCT, brown trout, and stocked rainbow trout. A creel census conducted in 2002 revealed that the fishery receives consistent pressure and is fished by a wide variety of anglers. The great majority of the anglers ranked their fishing trip on the Logan River as "very satisfactory," the highest possible category, demonstrating the popularity of this fishery for recreation enthusiasts. In addition, most (94 percent) trout caught in the Logan River are released, further indicating a community commitment to the future sustainability of the resource (Budy et al. 2003).

3.3.2.2 Environmental Consequences

The impact assessment of Alternatives 1, 2, and 3 is presented in the following text. Significant issues and indicators identified during public scoping that are being addressed in this EA are discussed in *Section 1.5. Scoping.* Issues No. 1 and No. 6 identified during public scoping are concerned with aquatic resources, as follows:

- Issue No. 1—Effects of rehabilitation and construction of the pipeline on fish spawning areas.
- Issue No. 6—Effects of rehabilitation and construction of the pipeline on MIS (in this case BCT).

The following indicator was used to evaluate the potential effects of Issues No. 1 and No. 6:

- Relative amount of fish spawning habitat that will be affected through rehabilitation and construction of the pipeline.

The indicator for this issue is tied to two potential effects. The first is fine sediments and suspended sediment (that is, turbidity) generated during construction activities that have the potential to adversely affect fisheries habitats. Second, the indicator is tied to those river sections of stream crossings that would be temporarily dewatered during construction and may otherwise provide spawning habitat.

Alternative 1: No Action

Direct and Indirect Impacts

Under the No Action Alternative, there would be no direct or indirect impacts from construction-related activities to fish habitats including fish spawning areas or to MIS (BCT), as no construction would occur on the pipeline. There would be no project-related potential sedimentation of spawning areas and no temporary dewatering of possible spawning habitat. The pipeline would continue to function as at present with further pipeline deterioration that may result in increasing volumes of leaked water, with subsequent increased potential for adverse impacts through localized erosion and deposition of fine sediments into the Logan River.

Cumulative Effects

There would be no project-related cumulative impacts to fisheries resources under the No Action Alternative. However, impacts to fisheries resources from other ongoing actions would continue under the No Action Alternative and would likely affect the project area the same as at present. These effects include: (1) impoundments that have altered the channel substrate transport, aquatic habitat, and fish movement potential, and (2) the confinement of the river by the highway and other recreation developments that have likely changed the transport capacity of the channel. In addition, a number of threats to BCT have been identified on W-CNF lands and can cumulatively impact this species. These threats would likely continue under the No Action Alternative, with the most critical being roads, trails, motorized trails, grazing, developed recreation sites, and special uses authorized in riparian zones (within 300 feet of streams) on National Forest System lands. Additional threats include introduced, non-native fishes and timber harvesting (W-CNF 2006).

Alternative 2: South Alignment

Direct and Indirect Impacts

Pipeline construction activities that include re-alignment of the pipeline within the riparian area and open-cut crossings on the Logan River may result in impacts to fish habitat (spawning) areas. There is the potential for temporary direct and indirect impacts to fish spawning habitat from sediment and turbidity inputs under this alternative, because of direct impacts to the channel and banks, and the potential for indirect impacts from riparian habitat alteration adjacent to the Logan River and within the project area. These impacts would arise from sediment-laden runoff entering the river from construction areas. This potential is greatest during storm events immediately following construction activities. Spawning gravel can be indirectly affected by erosion-derived sediments as the interstitial spaces in the gravel become clogged with sediment. Sediment can also smother eggs that have been deposited in the gravel. BMPs described in *Section 2.7.3, Water Quality and Soils*, in

response to UDWQ recommendations and W-CNF BMP requirements would be implemented to avoid sediment and turbidity-related impacts on spawning habitat and to avoid the potential for sediment-related effects on BCT.

Three river crossings in Alternative 2 would directly and temporarily impact fish habitat and potential spawning habitat in the river during construction. They would consist of the following:

- Red Bridge River Crossing—4,488 square feet (44 feet wide X 102 feet long)
- Second Bridge River Crossing—2,860 square feet (44 feet wide X 65 feet long)
- First Bridge River Crossing—5,248 square feet (64 feet wide X 82 feet long)

The length of the Logan River within and adjacent to the pipeline construction/ rehabilitation area is approximately 8,100 feet. In-river construction during September to mid-November would disturb approximately 249 feet of river length at the three crossings as calculated from above, or approximately 3 percent of in-river habitat within and adjacent to the pipeline construction/rehabilitation area. Because brown trout and mountain whitefish are fall spawners, in-river construction activities would disrupt or prevent spawning by these species at the three in–river construction areas; also, eggs incubating in the gravels would be destroyed if spawning occurred prior to beginning construction activities. This would result in a slight localized reduction in spawning and rearing success by brown trout and mountain whitefish. Because of the relatively small percentage of in-river habitat impacted in the project area (approximately 3 percent) during a single spawning season, this effect would not be expected to result in permanent or substantive impacts to either of these species.

BCT would probably not be impacted by in-river construction activities because this species spawns during the spring, there is no spawning habitat below Third Dam, and in-river pipeline construction/rehabilitation activities would occur during fall. BMPs referenced in *Section 2.7.3, Water Quality and Soils* are intended to minimize and avoid adverse impacts to fish habitats during construction and provide long-term restoration of construction-impacted bank and riparian vegetation. These BMPs will minimize or avoid the potential for impacting spawning habitat and BCT.

Cumulative Impacts

Ongoing actions in the project area, plus the cumulative effects of other threats to BCT that have been identified on W-CNF lands, would continue. The potential construction of the Gateway Trail could deliver sediment to the Logan River, but this would occur after construction of Alternative 2. It is anticipated that the same types of BMPs that would be implemented for the proposed pipeline project would be implemented for the proposed recreation trail to avoid or minimize sedimentation effects on the Logan River. Potential cumulative impacts to brown trout and mountain whitefish from the proposed pipeline project combined with the effects of these other ongoing and proposed activities are expected to be localized, temporary, and minor compared to existing conditions. No cumulative impacts to BCT are anticipated as a result of implementing Alternative 2.

Alternative 3: North Alignment (Proposed Action)

Pipeline construction activities that include re-alignment of the pipeline within the riparian area and open-cut crossings on the Logan River may result in impacts to fish habitat areas.

The potential for direct and indirect impacts to fish (spawning) habitats from sediment and turbidity inputs are less than those described for Alternative 2 because fewer in-river areas would be disturbed and because BMPs would be implemented to minimize and avoid potential sediment and turbidity-related impacts. BMPs described in *Section 2.7.3, Water Quality and Soils*, in response to UDWQ recommendations and W-CNF BMP requirements would be implemented to avoid sediment and turbidity-related impacts on spawning habitat and to avoid the potential for sediment-related effects on BCT.

Direct impacts to fish (spawning) habitat in the Logan River also would be less than Alternative 2 with the Proposed Action. This is because there are only two crossings of the Logan River compared to Alternative 2. They would consist of the following:

- Red Bridge River Crossing—4,488 square feet (44 feet wide X 102 feet long)
- Water Pipeline to the Stokes Nature Center—1,100 square feet (44 feet wide X 25 feet long)

In-river construction during September to mid-November would disturb approximately 127 feet of the Logan River length as calculated above, or approximately 2 percent of the 8,100 feet of in-river habitat within and adjacent to the pipeline construction/rehabilitation area. For the same reasons as described for Alternative 2, this would result in a slight, localized and temporary reduction in brown trout and mountain whitefish spawning success during a single season. This would not be expected to result in permanent or substantive impacts to either of these species.

It is expected that BCT would not be impacted by in-river construction activities under the Proposed Action for the same reasons as given for Alternative 2. BMPs referenced in *Section 2.7.3, Water Quality and Soils,* are intended to minimize and avoid adverse impacts to fish habitats during construction and provide long-term restoration of construction-impacted bank and riparian vegetation. These BMPs will minimize or avoid the potential for impacting spawning habitat and BCT.

Cumulative Impacts

Cumulative impacts from Alternative 3 would be similar to those described for Alternative 2, except the degree of project-related impacts would be less because of fewer river crossings and less disturbed area. Potential cumulative impacts to brown trout and mountain whitefish from the proposed pipeline project combined with the effects of other ongoing and proposed activities described under the No Action Alternative are expected to be localized, temporary, and minor compared to existing conditions under Alternative 3. No cumulative impacts to BCT are anticipated as a result of implementing Alternative 3.

3.3.3 Wildlife Resources

3.3.3.1 Existing Conditions

Upland vegetation within the analysis area consists primarily of gray rabbitbrush with a few areas of big sagebrush, juniper, box elder, and rose. Slender wheatgrass is found in many areas, sometimes with Oregon grape and clematis. Vegetated areas are interspersed with areas of talus and rocks. Chokecherry is present in some areas and is a preferred fruit

species for some migratory birds. The project area is within crucial winter range designation for both elk and mule deer.

Threatened, Endangered, and Candidate Species

Three federally protected species are listed as occurring or having potential habitat in Cache County. These are listed in Table 3-3 along with habitat requirements and potential impact determination.

TABLE 3-3
Federally Listed Species for Cache County

Common Name	Scientific Name	Federal Status	Habitat Description	Suitable Habitat in Project Area	Project Impact Determination
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Nest near open water in mature forest with multiple perches, nest sites, and low levels of human disturbance. Winter habitat is near food sources, such as lakes, rivers, and uplands with big game winter range with large trees for night roosts.	Yes, potential winter foraging habitat.	Alternative 2 - May Affect, not Likely To Adversely Affect. Alternative 3 – No Effect (Winter Habitat)
Canada lynx	*Lynx canadensis*	Threatened	Isolated spruce, fir, and lodgepole pine forests, typically in areas with high prey populations, especially snowshoe hare.	No (LAUs are in Summit County; Cache County is linkage habitat only.)	No Effect.
Yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Candidate	Riparian areas with dense willows combined with mature cottonwoods. Also known to use wooded parks, cemeteries, tree islands, Great Basin shrub-steppe, and high elevation willow thickets.	Marginal	May Affect, Not Likely To Adversely Affect.

Forest Service Sensitive Species

Region 4 Forest Service sensitive wildlife species that may occur in this area are listed in Table 3-4 along with their habitat and viability determination. Impacts to sensitive wildlife species are not expected to be high, because of the proximity to the heavily traveled roadway and areas of intensive recreation activity.

TABLE 3-4
Forest Service Sensitive Wildlife Species and Viability Determination for Proposed Project

Common Name	Scientific Name	Habitat Association	Viability Determination
Northern goshawk	*Accipiter gentilis*	Variety of forest types including aspen, coniferous, and mixed conifer forests. Typically nests in mature and old forests.	No Impact
Boreal owl	*Aegolius funereus*	High elevation spruce-fir forest; nesting in highly dense trees with an open understory and multi-layered canopy.	No Impact
Pygmy rabbit	*Brachylagus idahoensis*	Closely associated with clumps of tall dense sagebrush coupled with deep, loose-textured soils for burrow construction.	No Impact
Greater sage grouse	*Centrocercus urophasianus*	Prefer relatively tall sagebrush for nesting areas and open sites surrounded by sagebrush for lekking (male breeding display) areas.	No Impact
Spotted bat	*Euderma maculatum*	Typically rocky, semi-arid to arid ponderosa pine, shrub-scrub, and open desert. None have been found to date within this Ranger District.	No Impact
Peregrine falcon	*Falco peregrinus*	Typically nests on cliffs (rarely in trees) near water.	No Impact
Wolverine	*Gulo gulo*	Alpine and arctic tundra, boreal, and mountain forests (primarily coniferous). Usually in areas with substantial snow cover during the winter.	No Impact
Flammulated owl	*Otus flammeolus*	Mature and old forests of Douglas-fir, ponderosa pine, mixed conifer, and moderate density of large trees and snags.	No Impact
Northern three-toed woodpecker	*Picoides tridactytus*	Mature and older conifer and aspen stands, especially after fire.	No Impact
Townsend's big-eared bat	*Plecotus townsendii*	Desert shrub, piñon and/or juniper mixed with sagebrush, mountain brush, mixed forest, and ponderosa pine forest.	May Impact Individuals or Habitat*
Great gray owl	*Strix nebulosa*	Mixed coniferous and hardwood forest bordering small openings or meadows.	No Impact
Columbian sharp-tailed grouse	*Tympauchus phasianellus columbianus*	Large areas of undisturbed low-elevation native shrub-grasslands year-round. Spring-Fall: mountain and riparian shrubs. Winter: clumps of trees or tall shrubs.	No Impact
Spotted frog	*Rana luteiventris*	Permanent calm water, such as small springs, ponds, or sloughs with a variety of herbaceous vegetation. In moist areas, may move away from water after breeding. Hibernates in holes near water or remains semi-active if water does not freeze.	No Impact

*May impact individuals or habitat, but not likely to lead to a trend toward federal listing or reduced viability for the species. With the implementation of conservation measures described below, most species are not likely to be detrimentally impacted.

W-CNF Management Indicator Species

Management Indicator Species (MIS) are species selected to help determine the effects of forest management activities on a single species that is closely tied to a specific habitat or community type. In this way, a single species, typically one that is relatively easy to

monitor, represents the range of species that use the key habitat or plant community and the impacts management activities have on that community. Wildlife MIS for the W-CNF are listed on Table 3-5, along with each associated vegetation community type (W-CNF 2006).

TABLE 3-5
Wildlife Management Indicator Species for the W-CNF and Associated Vegetative Community Type

Common Name	Scientific Name	Associated Vegetative Community Type
North American beaver	*Castor canadensis*	Riparian
Northern goshawk	*Accipiter gentiles*	Aspen, conifer, mixed conifer
Snowshoe hare	*Lepus americanus*	Pole/sapling aspen, conifer, and mixed conifer

North American beaver *(Castor canadensis)* have a strong affinity to aquatic systems, especially those adjacent to bottomland hardwood trees, wet meadows, willows (*Salix* spp.), and quaking aspen (*Populus tremuloides*) (W-CNF 2006). These habitats are of key importance in the life cycle of the beaver. Beaver play an important role in maintaining and enhancing riparian and aquatic ecosystems (Olsen and Hubert 1994)—they are important for creating and maintaining habitats for many species of fish, big game, waterfowl, and migratory birds. This species is considered to be a keystone species because of its ability to strongly influence their aquatic and riparian environment (Boyle and Owens 2007). The principal threats to beaver populations are habitat destruction and degradation because this species is sensitive to habitat changes such as loss of willow, aspen, or decreases in water flow (W-CNF 2006). Human population growth and increasing demands on water resources have detrimental impacts on beaver habitat because they affect water regimes that are crucial to beaver habitat function. Impacts from water storage, water diversion, channelization projects, and other types of water use cause short and long-term effects on beaver habitat by changing seasonal flow regimes and stream morphology, or by causing loss or degradation of riparian vegetation (Boyle and Owens 2007). Beaver numbers are believed to be stable on the Logan Ranger District (LRD). Within the project area, aquatic systems are constrained to channels between the current highway and narrow canyons. The aquatic system in the project area supports relatively narrow bands of bottomland hardwood trees—primarily cottonwood and willow—that would not provide much habitat support for beaver using the aquatic features.

Northern goshawks have a strong affinity to mature and old growth forests of aspen-conifer, aspen, lodgepole pine (*Pinus contorta*), mixed conifer, and Douglas-fir (*Pseudostuga menziesii*) (W-CNF 2006). Although they may appear to be forest generalists in regard to the wide variety of forest types they use, northern goshawks are primarily birds of mature and old growth stands. They are sensitive to changes that reduce mature and old growth characteristics, especially those that also impact prey abundance (W-CNF 2006). Table 3-6 provides information on the number of goshawk territories in the Ogden/Logan Ranger Districts of the W-CNF. The project corridor does not have high quality northern goshawk habitat of mature and old growth forest.

TABLE 3-6
Number of Northern Goshawk Territories and Their Occupancy on the Ogden/Logan Ranger Districts by Year

	1999	2000	2001	2002	2003	2004
Known territories	7	8	11	11	14	15
Territories monitored for occupancy	7	8	11	11	11	12
Occupied territories	2	4	4	6	6	6

Snowshoe hare have a strong affinity to younger age classes of aspen-conifer, lodgepole pine, mixed conifer, Douglas-fir, and spruce-fir stands, where the most important habitat factor is shrubby undergrowth (W-CNF 2006). Snowshoe hare are sensitive to changes in these habitat conditions. As forest stands mature, they typically have less dense understory vegetation with which to support hare populations. Snowshoe hare pellet count inventories were completed on the W-CNF in 2004. Results from these inventories for the LRD are provided on Table 3-7 by vegetation type. These results indicate that the highest densities of snowshoe hare on the LRD are in Douglas-fir and spruce-fir stands. The project corridor does not produce young stands of conifer and aspen.

TABLE 3-7
Snowshoe Hare Pellet Count Results by Vegetation Type for the Logan Ranger District (2004)

Vegetation Type	Total Pellet Count	Mean Pellet Count (m^2)	Hares/ha (Murray's Regression)
Douglas-fir	147	2.94	0.74-1.41
Spruce/fir	135	2.70	0.68-1.29
Aspen/conifer or Conifer/aspen	96	1.92	0.48-0.92
Mixed conifer	53	1.06	0.27-0.52
Lodgepole pine (mature)	52	1.04	0.27-0.51
Aspen	7	0.15	0.06-0.11

Big Game Winter Range

The project area is within an area that has been designated as crucial winter range habitat for both elk and mule deer by the Utah Division of Wildlife Resources (UDWiR). Wintering big game animals typically stay in areas with substantial winter forage, such as bitterbrush. In very severe winters, animals move further down in elevation in search of forage, which would likely make the project area even more important for wintering big game, particularly the south-facing slopes of the canyon. There are several critical migration corridors along Highway 89, but none are in the project area (West 2006). One segment of Highway 89 in Logan Canyon is listed as a Moderate area for vehicle impacts to deer and elk, but it is northeast of the project area near Bear Lake.

Migratory Birds

Migratory birds (including neotropical birds) are protected from "take" by the Migratory Bird Act Treaty of 1918 and Executive Order 13186 (January 10, 2001) on migratory birds. Additional direction comes from a Memorandum of Understanding (MOU) between the Forest Service and USFWS, signed January 17, 2001. The MOU identifies specific activities for bird conservation pursuant to EO 13186, including protecting, restoring, enhancing, and managing migratory bird habitats on Forest Service lands. Logan Canyon is a prime birding area, and many species of migratory birds are known to occur in the area. Diversity of habitats, especially the mixture of riparian, shrub-steppe, and forest habitat in close proximity are likely the primary factors resulting in diverse migratory bird species. The Wasatch Audubon Society website (http://www.wasatchaudubon.org/mapn_desc_1_10.htm#riverside) provides an extensive species list of migratory bird species for Logan Canyon. Table 3-8 lists species known to occur in Logan Canyon.

TABLE 3-8
Species Protected by the Migratory Bird Act that are Known to Occur in Logan Canyon*, Habitat Association, and Potential Habitat in the Project Area

Common Name	Scientific Name	Habitat Association	Potential Habitat in Project Area
White-throated swift	*Aeronautes saxatalis*	Cliffs and canyonlands.	Yes
Hermit thrush	*Catharus guttatus*	Coniferous and mixed woodlands and shrub areas.	Marginal
Swainson's thrush	*Catharus ustulata*	Coniferous, mixed woodlands, and shrub thickets along streams.	Marginal
Canyon wren	*Catherpes mexicanus*	Canyon wall, cliffs, boulder fields.	Yes
Belted kingfisher	*Ceryle alcyon*	Near water. Nests in holes in banks.	Yes
American dipper	*Cinclus mexicanus*	High velocity mountain streams.	Yes
Yellow warbler	*Dendroica petechis*	Shrubby areas, particularly of willow and alder.	Yes
Gray catbird	*Dumetella carolinensis*	Dense shrubs and thickets and woody edges.	Marginal
Cordilleran flycatcher	*Empidonax occidentalis*	Open woods and wooded canyons.	Yes
Northern pygmy owl	*Glaucidium gnoma*	Open woods and forest edges.	Yes
Lincoln's sparrow	*Melospiza lincolnii*	Bogs, wet meadows, riparian willows.	Yes
Mountain chickadee	*Parus gambeli*	Open coniferous forests in mountainous areas.	No
Fox sparrow	*Passerella iliaca*	Deciduous or coniferous woods, shrubby areas, wood edges with understory shrubs.	Yes
Lazuli bunting	*Passerina amoena*	Open shrubby areas, typically riparian.	Marginal
Golden-crowned kinglet	*Regulus satrapa*	Coniferous and mixed coniferous aspen forests.	No
Rock wren	*Salpinctes obsoletus*	Sparsely vegetated rocky areas, including talus slopes and road cuts.	Marginal
Broad-tailed hummingbird	*Selasphorus platycercus*	Open mountain woodlands and meadows.	Yes
Rufous hummingbird	*Selasphorus rufus*	Woodland edges, thickets, mountain meadows.	Marginal

TABLE 3-8
Species Protected by the Migratory Bird Act that are Known to Occur in Logan Canyon*, Habitat Association, and Potential Habitat in the Project Area

Common Name	Scientific Name	Habitat Association	Potential Habitat in Project Area
Calliope hummingbird	*Stellula calliope*	Open forests and mountain meadows.	Marginal
Violet-green swallow	*Tachycineta thalassina*	Open mountain woodlands.	Marginal
Winter wren	*Troglodytes troglodytes*	Coniferous forests, near streams.	No
Orange-crowned warbler	*Vermivora celata*	Dense shrub thickets, forest edges, brushy draws.	Marginal
Warbling vireo	*Vireo gilvus*	Deciduous trees, especially aspen, and riparian shrubs.	Yes

* Species listed for Logan Canyon on the Wasatch Audubon Society website (April 4, 2007) at http://www.wasatchaudubon.org/mapn_desc_1_10.htm#riverside

Of the species listed on Table 3-8 above, only the broad-tailed hummingbird is listed by Utah Partners in Flight as a Priority Species for conservation in Utah.

Broad-tailed Hummingbird

The broad-tailed hummingbird breeds in the Great Basin and is known to occur in Logan Canyon. It prefers wooded areas near creeks for nesting (Hering 1948). Nesting habitat varies. One study found nests between 1.5 and 12.7 meters above the ground in spruce (*Picea engelmannii*) and aspen (*Populus tremuloides*) (Calder 1973). Other studies have found this hummingbird nesting in ponderosa (yellow) pine (*Pinus ponderosa*) (Hering 1948) or oak (*Montgomerie and Redsell 1980*). Broad-tailed hummingbirds seem to prefer yellow avalanche lily (*Erythronium grandiflorum*), twolobe larkspur (*Delphinium nuttallianum/ nelsonii*), tall larkspur (*Delphinium barbeyi*) and scarlet gilia (*Ipomopsis aggregata*) as nectar sources (Inouye et al. 1991). They also eat insects (Montgomerie and Redsell 1980; Parrish 1988).

Threats to this species include loss of riparian habitat within forest stands of conifer or aspen and lack of wildflowers as nectar sources.

3.3.3.2 Environmental Consequences

The impact assessment for wildlife resources, including federally listed and Forest Service sensitive species, MIS species, wintering big game species, and avian species protected under the Migratory Bird Act for Alternatives 1, 2, and 3 is presented in the following text. Significant issues and indicators identified during public scoping that are being addressed in this EA are discussed in *Section 1.5, Scoping*. Issue No. 2 identified during public scoping is concerned with threatened, endangered, and sensitive species, as follows:

- Effects of pipeline rehabilitation/construction on threatened, endangered, and candidate species.

Issue No. 6 identified during public scoping is concerned with MIS, USFS Sensitive Species, Migratory Birds, and Big Game Winter Range as follows:

- Effect of pipeline construction on MIS, sensitive species, migratory birds, and wintering big game.

The following indicator was used to evaluate the potential effects of Issue No. 2:

- Amount of total (considering distribution) of threatened, endangered, and candidate species habitats lost to or modified by pipeline rehabilitation/construction.

The following indicator was used to evaluate the potential effects of Issue No. 6:

- Adverse disturbance affecting ability to breed or occupy habitat to the extent the local population will not survive.

Alternative 1: No Action

Direct and Indirect Impacts

Under the No Action Alternative, there would be no direct or indirect threats from construction-related activities to wildlife habitats, because no construction would occur on the pipeline. However, the pipeline would continue to function as at present with further pipeline deterioration that may result in increasing volumes of leaked water, increasing potential for adverse impacts through localized erosion, and deposition of fine sediments into the project area.

Cumulative Effects

The No Action Alternative would not affect wildlife resources; therefore; no cumulative impacts to wildlife would result from its implementation. However, impacts to wildlife resources from other ongoing actions would continue under the No Action Alternative and would likely affect the project area the same as at present.

Alternative 2: South Alignment

Direct and Indirect Impacts

Potential effects of pipeline construction on wildlife habitat that may result from implementation of Alternative 2 include removal of large-diameter cottonwood trees that may serve as perch or roosting sites for bald eagle or northern goshawk. This alignment would have less impact on native upland vegetation than Alternative 3 (Proposed Action), but the impact of losing mature riparian trees is important because these trees currently provide habitat for a variety of riparian wildlife species and can eventually become nest trees for woodpeckers and other cavity users. Replacement of trees is a long-term effort.

Except for eight nesting pairs of bald eagles—none of which are on the W-CNF—bald eagles are considered winter visitants in Utah (USFWS 2006). Although roost trees and open water for foraging is present in Logan Canyon, the area receives only incidental use with the most activity along the Little Bear River west of the Forest in Cache Valley. Removal of the mature cottonwoods in this alternative may affect, but is not likely to adversely affect, bald eagles. If these trees are used, their loss would cause an adjustment of foraging patterns in this part of the river. Bald eagles would also be displaced during construction, if present. Implementation of conservation measures proposed by the USFWS would avoid significant impacts to bald eagles from construction noise.

Marginal yellow-billed cuckoo habitat is present along the river in certain locations, but this habitat would not be removed. However, construction noise would temporarily disturb, and possibly displace, cuckoos if they are present. This "may affect, but is not likely to adversely affect," the cuckoo.

Impacts to bats, small mammals, and nesting migratory birds may occur from blasting. Bats would most likely move from the area when disturbed during placing charges; small mammals that are present in the blast zone would likely be killed. There may also be some mortality of birds if they move into the blast zone as charges are detonated. No impacts to MIS species are likely to occur because none of the three (beaver, northern goshawk, and snowshoe hare) are known to occur in the project area. There is no suitable habitat for northern goshawk nest sites or snowshoe hare preferred forage. There is suitable habitat for beaver that would remain intact after the project is constructed.

The project area does not have extensive forage that would provide substantial winter range for big game animals and also has considerable human-related disturbance from traffic and recreation. This alternative would directly impact big game winter range on the slope leading from the Ray Hugie Hydro Park up to the City's water tanks. The remainder of the route does not leave the road or trail, and would not result in additional direct winter range habitat disturbance. Indirect disturbance will occur however if construction occurs in mid to late winter months. Winter construction will be limited to the extent possible. Noise associated with the winter construction is likely to disturb wintering big game during the construction period. As discussed below, construction will be focused from spring through early fall to the extent practicable, but any work in the winter is likely to disturb wintering big game until the construction is completed.

Migratory bird habitat would be impacted with the removal of large cottonwoods. Construction noise will likely disturb nesting birds temporarily, and possibly result in nest abandonment. If swifts and swallows nesting on cliffs are present during blasts, the adults would likely abandon the nests.

The potential for direct and indirect impacts to native upland habitats is less for this alignment than the Proposed Action, because the replacement pipeline follows Highway 89 for most of its route.

Conservation Measures

Blasting will occur during the non-nesting season to the extent practicable from June to early November. In order to prevent impacts to wildlife species from blast charges during construction, a loud noise-maker will be used to startle wildlife from the area immediately prior to the blast.

Woody vegetation (trees and shrubs) will be cut during the fall months after September 30 to avoid direct impacts from accidental "take" to nesting migratory (neotropical) birds, cavity nesting birds, and owls.

Construction in uplands during winter will be minimized to avoid impacts to big game during winter. River crossing work must be scheduled at low flow, which is between September and April. Canal crossings are restricted to October 15 to April 15. River and canal crossing construction will be done as early in each of these seasons as possible to complete construction prior to snowfall and to avoid stressing big game as much as possible in winter months. Construction will not occur directly in upland winter range habitat after snowfall in the winter.

As per USFWS direction, construction will limited from 9:00 am until 4:00 pm during the November through March period to avoid disturbing bald eagles that may roost in the canyon.

Cumulative Impacts

Removal of vegetation during fire suppression would interact with removal of vegetation for pipeline work, resulting in a different mix of wildlife habitat in the project area. The pipeline habitat disturbance would be of short-duration and should therefore not result in significant cumulative wildlife impacts. It the Gateway trail were to be constructed, winter range habitat would be permanently removed. However, winter range habitat disturbed in the pipeline corridor would be replanted with native vegetation and provide forage within 3 to 5 years and result in a short-term (3 to 5 years) cumulative effect. Impacts to wildlife resources from other ongoing actions would continue under Alternative 2 and would likely affect the project area the same as at present.

Alternative 3: North Alignment (Proposed Action)

Direct and Indirect Impacts

Potential effects of pipeline construction on upland wildlife habitat areas is greater with this alternative, but large-diameter cottonwood trees would not be affected. Most species that use uplands are not habitat-limited to the same extent as species using scarce, large-diameter cottonwood trees. Cottonwood trees take many decades to reach that stature, compared to the time it would take to restore upland plant communities through implementation of restoration BMPs. Blasting effects would be the same for all species, but would only occur on the slope leading to the water tanks, and not along Highway 89.

Bald eagle activity would be disturbed if construction extends into winter months, but the high volume of human intrusion already present in this corridor would marginalize the effects on bald eagles. The large cottonwoods would not be removed with this alternative, so that effect on bald eagles would be avoided. As stated above, construction will be scheduled from 9:00 am until 4:00 pm each day in the November through March period to avoid construction noise-related effects. Implementation of winter construction restrictions would result in no effect to bald eagles. Some marginal cuckoo habitat would be removed along the north side of the Logan River, adjacent to Second Bridge. This habitat is not known to be occupied, but the loss of habitat may affect, but is not likely to adversely affect, the cuckoo.

There would be fewer effects to migratory bird species for the Proposed Action than Alternative 2 because large, mature cottonwood would be preserved. Removal of marginal riparian shrubs along the north side of the Logan River would impact riparian nesting birds, but these shrubs are not dense enough to provide habitat for many species. Woody vegetation should be removed during the non-nesting season in late fall or early winter to avoid nesting impacts to migratory birds.

Conservation Measures

Blasting will occur during the non-nesting season to the extent possible from June to early November. In order to prevent impacts to wildlife species from blast charges during construction, a loud noise-maker will be used to startle wildlife from the area immediately prior to the blast.

Woody vegetation (trees and shrubs) will be cut during the fall months after September 30 to avoid direct impacts from accidental "take" to nesting migratory (neotropical) birds, cavity nesting birds, and owls.

Construction in uplands during winter will be minimized to avoid impacts to big game during winter. However, river crossing work must be done at low flow between September and April. Canal crossings are restricted to October 15 to April 15. River and canal crossing construction will be done as early in each of these seasons as possible in order to complete construction prior to snowfall and to avoid stressing big game as much as possible in winter months. Construction will not occur directly in upland winter range habitat after snowfall in the winter.

Impacts to bald eagles will be avoided by restricting construction from November 1 through March 30 to the period between 9:00 am and 4:00 pm.

Cumulative Impacts

The effects of turning the pipeline route into a trail after pipeline construction is completed will result in long term effects from the continuous close proximity of people using the trial and removal of forage. It the Gateway trail were to be constructed, winter range habitat in the pipeline corridor would be permanently removed. Winter range habitat disturbed during pipeline construction would be replanted with native vegetation and provide forage within 3 to 5 years. Construction of the trail may occur before the vegetation completely recovers, which would result in essentially removing the habitat over the pipeline from the start of pipeline construction. Impacts to wildlife resources from other ongoing actions would continue under Alternative 3 and would likely affect the project area the same as at present.

3.4 Physical Resources

3.4.1 Soils and Geology

3.4.1.1 Existing Conditions

The Bear River Range in northern Utah and southern Idaho is part of the Middle Rocky Mountains Physiographic Province (Stokes 1988, as cited in Spangler 2001). The range is part of a thrust sheet that was emplaced eastward by a deeply buried thrust fault during the Cretaceous period (Dover 1987, as cited in Spangler 2001). The Bear River Range consists, in large part, of a thick sequence of carbonate (limestone and dolomite) rocks that range in age from Cambrian to Mississippian (Dover 1987, as cited in Spangler 2001). More specifically, the part of the canyon affected by the pipeline has seven geological formations of Paleozoic Age. Beginning at the mouth of the canyon and going up canyon, formations present at road and river levels are: Ordovician Swan Peak Formation, Upper Ordovician Fish Haven Dolostone Formation, Silurian Laketown Dolostone, Devonian Water Canyon Formation, and Devonian Jefferson Formation. Mississippi rocks of the Lodgepole Limestone Formation can be seen higher up on the walls of the canyon.

A review of the geology within the project area finds that it lies within the Logan Peak Syncline, which runs north and south through the DeWitt Spring and Spring Creek areas. A syncline is a cup-shaped formation that sags in the middle. The Logan Peak Syncline

appears to collect groundwater in its low point and bring it to the surface in the bottom of Logan Canyon (CH2M HILL 2005).

Two main faults are located in the project area that may affect the DeWitt Pipeline. The largest fault in the vicinity is the Cache Valley normal fault, which dips westward and runs north-south beneath the golf course approximately 1,000 feet west of the City's water tanks. A lesser fault is the Providence Canyon contractional thrust fault, which crosses the canyon beneath Highway 89's First Bridge and then runs northward following the east side of a steep limestone rock outcropping (CH2M HILL 2005).

A Utah Geological Survey report (as cited in CH2M HILL 2005) finds that several small slumps exist at the base of steep slopes along the Logan River. These are classified as primarily pebble, cobble, and boulder gravels mixed with sand, silt, and clay deposited as hill slope colluvium with small areas of landslide deposits. This indicates some potential for slumping at the base of steep slopes such as along steep highway cut slopes, especially during a very wet year and/or a seismic event.

Geotechnical analysis was conducted along the pipeline route that characterizes the impacted soils. The survey found a dominance of porous angular boulders, cobbles, and gravel-sized dolomite mixed with alluvial gravels and sands with portions of the pipeline route containing weathered bedrock (BGFS 2006). Much of the alluvial material near the river is loose and saturated, so the risk of subsidence from ground-disturbing activities is high.

3.4.1.2 Environmental Consequences

The impact assessment of Alternatives 1, 2, and 3 is presented in the following text. No specific issues tied to soil resources were identified during scoping; however, the project would impact soil resources and could initiate erosion. Mitigation measures and BMPs described in *Section 2.7.3, Water Quality and Soils*, would be employed to minimize the potential for adverse impacts.

Alternative 1: No Action

Direct and Indirect Impacts

Under the No Action Alternative, there would be no direct or indirect threats from construction-related activities to soil resources. However, the pipeline would continue to function as at present with further pipeline deterioration that may result in increasing volumes of leaked water, and with subsequent increased potential for adverse impacts through localized surface soil erosion. Although there have been documented leaks, followed by repairs, the extent of potential soil degradation is speculative at this time.

Cumulative Effects

Cumulative impacts to soils resources are not expected under the No Action Alternative because no project-related soil-disturbing activities would occur under this alternative. However, impacts to soil resources from other ongoing actions would continue under the No Action Alternative and would likely affect the project area the same as at present.

Alternative 2: South Alignment

Direct and Indirect Impacts

Effects of pipeline construction on soil resources would occur from the re-alignment of the pipeline and open-cut crossings of the Logan River. Construction activity under this alternative would create bare soil conditions on approximately 5.1 acres. Approximately 3.6 acres of this disturbance would occur in lands that have been previously disturbed. The potential for sediment entering the Logan River would be greater than for Alternative 3 because there are more river crossings to potentially contribute sediment to the river.

The potential for direct and indirect impacts to soils resources is high in the short-term under this alternative, because of direct impacts to the river channel and banks. However, mitigation measures and BMPs identified previously (see *Section 2.7.3*) are specifically included to minimize and avoid adverse impacts to soil resources in the short-term and to provide long-term restoration and stabilization of construction-impacted bank and riparian vegetation. These measures include stabilizing disturbed lands by restoring an adequate ground-protecting cover of native vegetation.

Interception of perennial, intermittent, and ephemeral tributary channels to the Logan River by the pipeline trench presents a sediment hazard to the river. If the trench bottom and pipe bedding are eroded in these drainage ways, sediment could enter the river. BMPs, including temporary cross-trench piping, will help prevent this impact.

Replacement of the pipe would remove deteriorated segments that are currently, or which may have, a high potential for future leaking, and would reduce the potential for erosion from aging pipe segments.

Cumulative Impacts

Project-related contributions to cumulative effects on soils would be minor under Alternative 2 because of specific mitigation measures and BMPs described in *Section 2.7.3* that would be implemented to minimize and avoid adverse impacts to soils resources in the short-term, and to provide long-term restoration and stabilization of construction-impacted bank and riparian vegetation. Cumulative impacts under Alternative 2 also potentially include the effects of fire suppression, which would remove vegetation from burned areas and promote erosion from burned areas. This effect would be short lived, as the burned areas would be rehabilitated immediately following the fire. Impacts to soil resources from other ongoing actions would continue under Alternative 2 and would likely affect the project area the same as at present.

Alternative 3: North Alignment (Proposed Action)

Direct and Indirect Impacts

The potential for direct and indirect impacts to water quality and river habitats from sediment and turbidity inputs from soil erosion are similar to those of Alternative 2, because the construction-related activities are similar. Construction activity under this alternative would create bare soil conditions on approximately 5.6 acres, with about 3.2 acres of this total consisting of previously disturbed lands. Fewer river crossing and placement of the new pipeline further from the river would result in less potential for sediment-laden runoff to enter the river during high runoff events.

Interception of perennial, intermittent, and ephemeral tributary channels to the Logan River by the pipeline trench presents a sediment hazard to the river. If the trench bottom and pipe bedding are eroded in these drainage ways, sediment could enter the river. BMPs, including temporary cross-trench piping, would help prevent this impact.

In addition, the proposed construction of the Gateway Trail segment over a portion of the pipeline route would require soil re-surfacing, which would remove a small area of soil from supporting vegetation and would thereby slightly reduce overall productivity. However, this activity would occur later in time, after construction of the Alternative 3 pipeline route has been completed.

One river crossing by the DeWitt Pipeline proposed for this alternative compared to the three river crossings in Alternative 2 (see *Section 3.3.2.2, Aquatic Resources, Environmental Consequences*) would greatly reduce the potential for direct input of sediment into the river at river crossings.

Cumulative Impacts

Potential project-related contributions to cumulative impacts under Alternative 3 would be similar in nature but slightly less in effect than those described under Alternative 2, because the number of river crossings is reduced. Conversely, potential cumulative effects from fire are greater under Alternative 3 than Alternative 2 because of less buffering by the highway. The construction of the Gateway Trail, even though later in time, also has the potential to increase sediment input into the river. Mitigation measures and BMPs described in *Section 2.7.3* would be implemented under Alternative 3 to minimize and avoid the potential for project-related adverse cumulative impacts to soils resources in the short-term, and to provide long-term restoration and stabilization of construction-impacted bank and riparian vegetation. Impacts to soil resources from other ongoing actions would continue under Alternative 3 and would likely affect the project area the same as at present.

3.4.2 Surface and Groundwater

3.4.2.1 Existing Conditions

The Logan River runs southwest, entering the State of Utah in the northeast corner at an elevation of 8,530 feet. The river runs through Logan Canyon for 40 miles, and into the City of Logan, drops to an elevation of approximately 4,495 feet at the eastern City limits, and ultimately drains into the terminal Great Salt Lake system. The stream is dominated by riffles and swift channels, with pools being sparse. Higher-gradient sections are characterized by boulder and rubble stream substrate while lower-gradient sections are dominated by gravel beds and sand; solid bedrock is also common throughout the length of the river (Budy et al. 2006).

The sources for Logan River waters are from a combination of snowmelt surface inputs and recharge from groundwater inputs via the numerous springs along the canyon bottom and within the tributaries (Spangler 2001). Collective discharge of the springs provides a substantial component of stream flow in the Logan River that may make up as much as 20 percent of the discharge of the Logan River (Spangler 2001).

Water quality within the canyon reach of the Logan River is considered very good (USU 2007). Pollutants of concern enter the Logan River once it has left the canyon and is

impacted by agriculture runoff, grazed lands, urban stormwater influences, and the degraded riparian conditions of the open valley (UDEQ 2001, USU 2007).

Utah State standards for water quality are designated for each water body across the State and are applied based on their designated beneficial uses for that water body. The Logan River, within the project area, has defined designated uses for agriculture, coldwater aquatic life, wildlife habitat, and secondary recreation that apply to the main stem Logan River and its tributaries from Cutler Reservoir to the headwaters of the Logan River.

U. S. Geological Survey 7.5 Minute Series topographic maps were examined to identify water bodies in the pipeline rehabilitation/construction project area. Riparian areas and wetlands in the project area were discussed in *Section 3.3.1, Vegetation Resources*. The free-flowing Logan River and pools impounded by Third, Second, and First Dams are the prominent hydrologic features within or adjacent to the project area. The Smithfield Canal is north of and generally parallels the Logan River from approximately Red Bridge to Logan Bridge. Other water bodies in or near the project area consist of intermittent tributaries draining toward the Logan River and several springs. Tributaries located to the south and draining north toward the Logan River include the following:

- Two intermittent tributaries, Spring Hollow (and its associated springs) and Mill Hollow, draining to the north with their mouths at Third Dam pool
- Two unnamed intermittent tributaries draining to the north with their mouths between Third Dam and Second Dam
- Three unnamed intermittent tributaries draining to the north with their mouths between Second Dam and First Dam

Tributaries located to the north and draining south toward the Logan River include the following:

- The intermittent Clark Hollow and three unnamed intermittent tributaries draining to the south with their mouths between Third Dam and Second Dam
- One unnamed intermittent tributary draining to the south with its mouth between Second Dam and First Dam

3.4.2.2 Environmental Consequences

The impact assessment of Alternatives 1, 2, and 3 is presented in the following text. Significant issues and indicators identified during public scoping that are being addressed in this EA are discussed in *Section 1.5*. Issue No. 4 identified during public scoping is concerned with Logan River impacts, as follows:

- Effects of pipeline rehabilitation/construction on the Logan River.

The following indicator was used to evaluate the potential effects of Issue No. 4:

- Potential increase in turbidity due to sediment entering the Logan River during construction.

The indicator for this issue is tied to fine sediments and suspended sediment (that is, turbidity) generated during construction activities that have the potential to adversely affect water quality. Additional discussion on the potential impact to water quality and aquatic habitat is included within the discussion on fish habitats, in *Section 3.3.2, Aquatic Resources*.

Alternative 1: No Action

Direct and Indirect Impacts

Under the No Action Alternative, there would be no direct or indirect threats from construction-related activities to surface water quality or river resources, as no construction would occur on the pipeline. However, the pipeline would continue to function as at present with further pipeline deterioration that may result in increasing volumes of leaked water, with subsequent increased potential for adverse impacts through localized erosion and deposition of fine sediments into surface waters. Groundwater resources would not be altered from existing conditions, as water withdrawal from DeWitt Spring would continue to serve as the source of drinking water for the City.

Cumulative Effects

Cumulative effects are not expected under the No Action Alternative as no project-related surface or groundwater effects would accrue from this alternative. However, existing impacts to water quality and river resources would continue under the No Action Alternative. These ongoing impacts to the project area are from: (1) impoundments that have altered the channel substrate transport and fine sediment storage behind the impoundments, and (2) the confinement of the river by the highway and other recreation developments that have likely changed the transport capacity of the channel, potentially increasing stream bank erosion and turbidity.

Alternative 2: South Alignment

Direct and Indirect Impacts

Potential effects of pipeline construction on water quality may result from proposed activities that include re-alignment of the pipeline within the riparian area and open-cut crossings of the Logan River. Under both action alternatives, much of the proposed trench excavation disturbance area is within 150 feet of the Logan River. This does not represent a sufficient width of vegetation filter to contain and trap sediment from the disturbance area in the event of a storm. For these sections of the alignment, a linear structure that effectively traps sediment would be installed prior to commencement of construction activities. This BMP has been included in *Section 2.7.3, Water Quality and Soils,* to address this effect.

Under Alternative 2, a considerable portion of the proposed pipeline construction is located on the opposite side of the Logan Canyon Highway from the river. For these portions of the Alternative 2 alignment, there would be much less risk of sediment delivery to the river because the highway prism and ditch would serve to contain runoff on the side of the highway away from the river. Therefore, no other sediment trapping structures would be needed.

Under both action alternatives, the proposed pipeline trench would intersect all perennial, intermittent, and ephemeral tributary channels to the Logan River. Any water flow within these channels could be captured by the trench and would erode the trench bottom and pipe bedding material. These materials would become a sediment hazard to the Logan River when the flows eventually escape the trench. At specific tributary locations along the

alignment, temporary cross-trench pipe sections would be installed over the top of the trench to safely convey runoff flows from these channels across the trench excavation. This BMP has been included in *Section 2.7.3, Water Quality and Soils,* to address this effect.

The potential for direct and indirect impacts to water quality from sediment and turbidity inputs discussed in the preceding text are high in the short-term under this alternative, because of direct impacts to the channel and banks, and because of the potential for indirect impacts from riparian habitat alteration adjacent to the Logan River. However, mitigation measures and BMPs described above and in *Section 2.7.3, Water Quality and Soils* would be implemented to minimize and avoid adverse impacts to water quality in the short-term and provide long-term restoration of construction-impacted bank and riparian vegetation. Utah Division of Water Rights Stream Alteration Permit requirements include implementing mitigation measures and BMPs to prevent water turbidity in adjacent surface water from increasing by 10 NTUs or more. The Division of Water Rights has determined that meeting this requirement will avoid significant water quality impacts to surface water. The City, by adhering to the terms of the permit, would therefore avoid significant water quality impacts.

Further, Alternative 2 would not alter the free-flowing nature of the Logan River, adversely modify watershed health, or result in additional water withdrawal from the Logan River.

Cumulative Impacts

Alternative 2 would not permanently affect water resources because of BMPs and mitigation measures described above and listed in *Section 2.7.3, Water Quality and Soils,* that would be implemented to minimize and avoid adverse impacts to water quality and provide long-term restoration of construction-impacted bank and riparian vegetation. Therefore, no project-related cumulative impacts on water resources would result from implementation of Alternative 2. Impacts to water resources from other ongoing actions would continue under Alternative 2 and would likely affect the project area the same as at present.

Alternative 3: North Alignment (Proposed Action)

Direct and Indirect Impacts

Potential effects of pipeline construction on water quality and river resources may result from proposed activities that include re-alignment of the pipeline within the riparian area and open-cut crossings on the Logan River. Types of effects and causes would be the same as described in the preceding text for Alternative 2.

The potential for direct and indirect impacts to water quality and river habitats from sediment and turbidity inputs is less than that described for Alternative 2. This is because there are fewer crossings of the Logan River compared to Alternative 2. However, the type of impacts described for Alternative 2 would be similar, just lower in frequency.

The same mitigation measures and BMPs described for Alternative 2 and in *Section 2.7.3, Water Quality and Soils* in response to UDWQ recommendations and W-CNF BMP requirements would be implemented under Alternative 3 to minimize and avoid adverse impacts to water quality in the short-term and provide long-term restoration of construction-impacted bank and riparian vegetation.

Cumulative Impacts

Alternative 3 would not permanently affect water resources because the BMPs and mitigation measures described above and listed in *Section 2.7.3, Water Quality and Soils* would be implemented to minimize and avoid adverse impacts to water quality and provide long-term restoration of construction-impacted bank and riparian vegetation. Therefore, no project-related cumulative impacts on water resources would result from implementation of Alternative 3. The proposed construction of the Gateway Trail segment over a portion of the pipeline route would require soil re-surfacing, which would have the potential to degrade surface water quality by contributing sediment to the river until soil stabilization is complete. However, this activity would occur later in time, after construction of the Alternative 3 pipeline route has been completed. Impacts to water resources from other ongoing actions would continue under Alternative 3 and would likely affect the project area the same as at present.

3.4.3 Air Quality

3.4.3.1 Existing Conditions

Ambient air quality is protected by the federal clean air quality laws established by the 1970 Clean Air Act (CAA) and further modified by the 1977 and 1990 CAA Amendments. As a mechanism for attaining air quality levels that protect public health and the environment, the EPA sets air quality standards. These standards are based on scientific determinations of threshold levels below which no adverse effect will be experienced by humans or the environment. The current National Ambient Air Quality Standards (NAAQS) have been established for the criteria pollutants, which include carbon monoxide, sulfur dioxide, nitrogen dioxide, ozone, particulate matter, and lead.

States are required to adopt ambient air quality standards that are at least as stringent as the federal NAAQS; however, state standards may be more stringent. Areas of the country where air pollution levels persistently exceed the NAAQS may be designated "non-attainment." Areas that meet the ambient air quality standards are designated as "attainment" areas. Each state is required by the federal CAA to develop State Implementation Plans (SIPs) to bring non-attainment areas into attainment, as well as to keep the attainment areas from further degrading.

Federal regulations also require each state to adopt Prevention of Significant Deterioration (PSD) regulations in the SIPs to preserve existing air quality where the quality is below the NAAQS. Under the PSD regulations, attainment areas in the U.S. are separated into two categories, Class I and Class II. National Parks and Wilderness Areas are placed in the more restrictive Class I category. However, given the remoteness of the Logan River canyon corridor and the lack of air pollution generating facilities, there is no reason to believe that the existing conditions along the project corridor are not meeting the EPA air quality standards. Effects of Forest Service-related activities on air quality in this area are likely driven by short-term recreation activities on Forest lands. No long-term emissions-producing facilities are located on this portion of the W-CNF.

3.4.3.2 Environmental Consequences

The impact assessment of Alternatives 1, 2, and 3 is presented in the following text. Although no issues were identified during scoping (*Section 1.5*), temporary air quality

effects on Forest lands would be generated by construction vehicle emissions and earth-disturbing activities associated with construction activities. All construction, operation, and maintenance activities would be conducted in accordance with applicable state and federal laws and regulations for the protection of air quality.

Alternative 1: No Action

Direct and Indirect Impacts

Under the No Action Alternative, there would be no short-term, construction-related emissions generated, because there would be no associated construction activities.

Cumulative Effects

Cumulative impacts to air quality are not expected under the No Action Alternative because no project-related air quality effects would result from this alternative. Impacts to air quality from other ongoing actions would continue under the No Action Alternative and would likely affect the project area the same as at present.

Alternative 2: South Alignment

Direct and Indirect Impacts

Potential air quality impacts from pipeline construction are expected to be localized and temporary in nature. Temporary air quality effects on Forest lands would be generated by construction vehicle emissions and earth-disturbing activities associated with construction activities. The types and numbers of pieces of equipment that would be used to construct the proposed project are at the discretion of the contractor and are unknown at present. However, it is anticipated that construction work would likely include the use of heavy, diesel-powered equipment such as earth trenchers, scrapers, front-end loaders, dump trucks, bulldozers, and pickups. Equipment would be maintained in good operating condition and tuned to manufacturers' specifications to minimize effects of exhaust emissions during equipment operation. Generation of fugitive dust emissions during excavation and earthwork construction activities would be minimized by using a water truck or other wet dust suppressant, where appropriate, to spray or stabilize actively disturbed areas. As noted previously, resultant effects of equipment operation on air quality would be temporary and localized, being limited to the period of project construction in the immediate area of construction activities. All construction, operation, and maintenance activities would be conducted in accordance with applicable state and federal laws and regulations for the protection of air quality.

Cumulative Impacts

Air emissions during construction would combine with emissions from vehicles traveling on Highway 89. The project-related emissions would be minor, because they would be consistent with applicable regulations, and localized, and therefore would not be expected to contribute to significant cumulative effects. Impacts to air quality from other ongoing actions would continue under Alternative 2 and would likely affect the project area the same as at present.

Alternative 3: North Alignment (Proposed Action)

Direct and Indirect Impacts

The potential for direct and indirect impacts to air quality is similar to that of Alternative 2 because the impacts to air quality would be similar.

Cumulative Impacts

Cumulative impacts from Alternative 3 would be similar to those described under Alternative 2. The additional emissions generated from the proposed construction of the Gateway Trail segment over a portion of the disturbed pipeline route would contribute additional particulate matter in the air from machinery operation and construction activities. Cumulative effects are not expected because all construction, operation, and maintenance activities would be consistent with applicable state and federal laws and regulations for the protection of air quality, and this activity would occur later in time relative to pipeline construction. Impacts to air quality from other ongoing actions would continue under Alternative 3 and would likely affect the project area the same as at present.

3.4.4 Paleontological Resources

3.4.4.1 Existing Conditions

Literature Review

Records at the Paleontology Office at the Utah Geological Survey include two localities in the part of Logan Canyon that would be affected by the pipeline (Hamblin 2006). Clark (1934, 1935) reported the first: (42Ca00581). The location was described as a shoulder of the cliff opposite the power station near the entrance of the canyon. Graptolites, braciopods, cephalopods, trilobites, and phyllocarids were observed on the cliffs 10 to 200 feet above the road. Williams and Taylor (1964) reported the second locality (42Ca0041VP) at 1.7 miles east of the mouth of the canyon. Fish, plants, and pelecypods were found in the Water Canyon Formation at this locality. The geologic map by Davis (1985) seems to show this location on the south side of the canyon, while the proposed pipeline is on the north side of the canyon at this location.

Although not reported in the USGS records, several Logan Canyon road logs describe "mud mounds" or "mini reefs" produced by sponges and algae (Morgan 1992; Liddell and Ohlhorst 2006). This locality will be recorded and reported as locality (42CA0212IP) (Appendix 2). Lidell and Ohlhorst (2006) have also reported that chain corals (*Halysites*) from the Laketown Dolomite are found approximately 2 miles up the canyon.

Fossil brachiopods, bryozoans, crinoids, and horncorals from the Mississippi Lodgepole Limestone can be found in talus slopes (Morgan 1992). Pleistocene mammals and other fossils have been found in Quaternary Lake Bonneville deposits in other parts of Utah and could also be found in the Lake Bonneville deposits in Logan Canyon.

Field Survey

No new fossil localities were identified during the survey of the pipeline route. Chain corrals were noted in talus below the Laketown Dolomite and Mississippi invertebrate fossils were seen on other talus slopes. While not located, the locality reported by Clark (1935) south of the power plant at the mouth of the canyon is a very sensitive area. It is difficult to determine the precise location, given the elevation of the new highway.

The mud mounds or mini reefs are readily observable across the road from the power plant. These mud mounds or mini reefs are referenced, discussed, and pictured in Logan Canyon road logs as described previously. These mud mounds or mini reefs are visited each year by students on field trips and are easily visible today because natural erosion has created a relief around them.

Talus slopes, alluvium, and two geologic formations are found on the divergent segment of the north alignment. The Garden City Limestone (Lower Ordovician Age) has the potential for graptolites, brachiopods, cephalopods, trilobites, and phyllocarids (Clark 1935).

3.4.4.2 Environmental Consequences

No significant issues or indicators associated with paleontology were identified during public scoping. Potential exists, however, for effects on paleontological resources resulting from the proposed project. These effects are discussed in the following text.

Alternative 1: No Action

Direct and Indirect Effects

Under the No Action Alternative, the DeWitt Pipeline would not be reconstructed or rehabilitated. Therefore, there would be no project-related effects on paleontological resources.

Cumulative Effects

The No Action Alternative, when combined with other reasonably identifiable projects, would have no cumulative effect on paleontology in Logan Canyon. Impacts to paleontological resources from other ongoing actions would continue under the No Action Alternative and would likely affect the project area the same as at present.

Alternative 2: South Alignment

Direct and Indirect Effects

The alignment of this alternative would pass close by the mud mounds or mini reefs described previously. While no direct, physical disturbance of the features would occur, it would be necessary to blast through rock in the vicinity of the features. Depending on the force of the blast and the geology (i.e., connectivity of the blasting area to the features) in the immediate area of the blasting, there may be some indirect disturbance to the features. Every attempt would be made to limit the size of the explosions in this area to avoid harming the mud mounds or mini reefs.

Cumulative Effects

Impacts to paleontological resources from other ongoing actions would continue under Alternative 2 and would likely affect the project area the same as at present. No other past, present, or future projects have been identified that would cumulatively affect paleontological resources.

Alternative 3: North Alignment (Proposed Action)

Direct and Indirect Effects

Implementation of Alternative 3 would impact talus and alluvium. As discussed previously, graptolites, brachiopods, cephalopods, trilobites, and phyllocarids could be found in the Garden City Limestone formation. While work in rocks can have a positive effect by exposing these fossils, the fossils can be difficult to see in freshly broken rocks.

Cumulative Effects

Impacts to paleontological resources from other ongoing actions would continue under Alternative 3 and would likely affect the project area the same as at present. No other past, present, or future projects have been identified that would cumulatively affect paleontological resources.

3.5 Economic and Social Resources

3.5.1 Economic Resources

3.5.1.1 Existing Conditions

The existing DeWitt Spring collection facilities and pipeline are critical to Logan City as they supply 70 percent of the City's potable water, including nearly all of its winter supply and over half of its summer supply. Other wells supply the balance of its potable water. The DeWitt facilities also provide the City with its lowest-cost water. For this reason, the DeWitt Pipeline has been operated continuously for the last 70 years, with only brief shutdowns for essential repairs (CH2M HILL 2005).

The City's long-term growth patterns and its 1995 Master Plan both call for additional drinking water source capacity and higher gradients for the developing City areas (CH2M HILL 2005). For example, it is estimated the growth within the City of Logan will increase by more than 30 percent over the next 25 years (CMPO 2005 *in* CH2M HILL 2005), and with that growth follows increasing demands on drinking water that could potentially be met by the DeWitt Spring and facility development.

3.5.1.2 Environmental Consequences

The impact assessment of Alternatives 1, 2, and 3 is presented in the following text. No specific issues tied to economic resources were identified during scoping; however, the project would affect economic resources by providing a continuously reliable source of drinking water.

Alternative 1: No Action

Direct and Indirect Impacts

Under the No Action Alternative, there would be short-term and long-term direct or indirect impacts from not implementing the proposed project. Short-term impacts include continuous maintenance of the DeWitt water line facility and the continued costs associated with maintenance. Long-term impacts include the uncertainty of the life of the system in relation to its reliability as a drinking water source (CH2M HILL 2005). As mentioned previously, the DeWitt Pipeline supplies 70 percent of the drinking water demand from the City and the line currently experiences leaks along its older segment and the reliability of this older segment is in doubt (CH2M HILL 2005).

Cumulative Effects

Cumulative impacts to economic resources resulting from the proposed project would not occur under the No Action Alternative. Impacts to economic resources from other ongoing actions would continue under the No Action Alternative and would likely affect the project area the same as at present.

Alternative 2: South Alignment

Direct and Indirect Impacts

Upgrades to the DeWitt system are expected to provide an additional 50 years of service for the culinary needs to the City. Alternative 2 would result in both short- and long-term impacts. Short-term economic impacts would include brief disruptions in the water supply to City water users during construction activities. Long-term beneficial impacts would

include an upgraded, reliable water conveyance facility that would have increased capacity to meet future drinking water demands. It is expected that this reliable supply would result in a reduced cost to consumers, because the project would also result in upgrades to the capacity of the system, and would prevent the need to explore alternative sources for drinking water. Although the supply and demand benefits to the City are known, assigning specific cost-benefit analysis would be speculative. There would be no rate adjustments due to the project.

Indirect effects may include the capacity to absorb increased growth in the City's vicinity, because a reliable source and increased capacity of drinking water would be available.

Cumulative Impacts

Cumulative impacts to economics are tied to the potential for 30 percent growth in the City, where additional demands would be placed on sources of reliable water at a capacity that would meet the development needs. Impacts to economic resources from other ongoing actions would continue under Alternative 2 and would likely affect the project area the same as at present.

Alternative 3: North Alignment (Proposed Action)

Direct and Indirect Impacts

The potential for direct and indirect impacts to socioeconomics is similar to that of Alternative 2 because the development activities would be similar**.**

Cumulative Impacts

Cumulative impacts from Alternative 3 would be similar to those described under Alternative 2. Impacts to economic resources from other ongoing actions would continue under Alternative 3 and would likely affect the project area the same as at present.

3.5.2 Recreation Resources

3.5.2.1 Existing Conditions

The Forest Service has used the Recreation Opportunity Spectrum (ROS) since the 1980s as a management tool to describe and allocate outdoor recreation settings. The ROS has classified the W-CNF into six classes[1]. The Logan River corridor in which the project would be constructed is designated by the Forest Service as being *Roaded Natural* (USFS 2003b).

The theme for an ROS of *Roaded Natural* is: predominantly a natural-appearing and developed natural-appearing landscape character with nodes and corridors of development such as campgrounds, trailheads, boat launches, small-scale resorts, and recreation residences. A variety of recreation opportunities are provided in the Logan Canyon corridor. Camping, fishing, hunting, hiking, picnicking, all terrain vehicle (ATV)/off highway vehicle (OHV) use, other day use and winter recreation activities, and the River Trail Trailhead occur in the area. The Ray Hugie Hydro Park and Canyon Entrance Park are located at the mouth of the canyon.

[1] The ROS classes are: Primitive, Semi-Primitive Non-Motorized, Semi-Primitive Motorized, Roaded Natural, Rural, and Urban.

The W-CNF is a worldwide attraction for visitors seeking a variety of recreation settings. It is a primary provider of outdoor recreation settings for northern Utah. In general, there is a continuing and growing demand for a diversity of recreation opportunities on public lands.

Recreation is currently the predominant use in the Forest. In 2002-2003, the W-CNF ranked first in total National Forest visits in the Intermountain Region and fifth in the nation on National Forest System lands. Providing quality natural and natural-appearing settings has long been a focus of management to promote a quality recreational experience on the W-CNF.

Because of the relationship of the W-CNF to adjacent urban communities, it is highly influenced by the rapid population increases occurring in the area. This increased potential includes new user-created routes (both motorized and non-motorized), crowded trailheads and developed facilities, and dispersed areas of hunting, camping, and picnicking.

The W-CNF provides a variety of recreation opportunities to Forest visitors, including: day use and overnight stays, hiking, fishing, nature viewing, winter sports activities, and ATV/OHV use. The following recreation areas are in the vicinity of the project: Riverside Nature Trail, which extends from Spring Hollow Campground East; Spring Hollow Campground; Gus Lind Flat dispersed camping area; Gus Lind Flat summer homes; Bridger Campground; Zanavoo Lodge (private property); 2nd Dam Recreation site; and Stokes Nature Center. Activities that occur in these areas include biking, camping, fishing, hiking, backpacking, picnicking, wildlife viewing, and scenic driving. The campgrounds are developed facilities that have RV sites and provide drinking water and restrooms. The Stokes Nature Center is a lodge that provides hands-on nature educational programs to school children, community groups, families, and the general public.

The project generally parallels the Logan Canyon Scenic Byway[2] (Highway 89). The Logan River is not a formally designated river pursuant to the National Wild and Scenic Rivers System (Palmer 1993); the river near the eastern portion of the pipeline alignment is designated an eligible Recreational River (USFS 2003c).

The Logan RD manages most of the Cache-Box Elder Management Area. The District shares management of this area with the Ogden RD. The Logan RD is located in Cache Valley, Utah, with a population nearing 80,000. It is within a 1.5-hour drive of the Wasatch Front urban center. Visitors to the District participate in world-class rock climbing, mountain biking, horseback riding, canoeing, and kayaking, as well as the more traditional uses such as hunting and fishing.

Forestwide Recreation. The W-CNF is an urban Forest, which provides opportunities to nearly 1.7 million people living near it. People can drive 15 to 30 minutes from their homes and be at a ski area, developed recreation facility, trailhead, or Wilderness area. This part of the Forest is most commonly visited for day use or short trips. Generally, these areas are more developed and have more Recreational Visitor Days (RVDs) than other parts of the Forest.

[2] This 41-mile-long National Scenic Byway has been designated as a National Scenic Byway by the Federal Highway Administration National Scenic Byways Program since June 13, 2002. The highway was also designated as a Utah State Scenic Byway by the Utah Department of Transportation on April 9, 1990, and it was designated as a National Forest Byway by Recreation and Heritage Resources, U. S. Forest Service on February 16, 1989.

Types and Levels of Recreation Use. The W-CNF participated in the National Visitor Use Monitoring (NVUM) project from October 2002 through September 2003 to better understand the use and satisfaction of National Forest recreation opportunities. Data from that project, which are only available at the Forest level, were reviewed and are summarized below. Recreation use on the W-CNF during fiscal year 2003 was 4,946,915 visits[3]. The average length of stay for a visit was 11.2 hours, with more than 12 percent of visitors staying overnight. The average length of time spent at the different recreation sites varied considerably by site: 3.3 hours at developed day use sites, 46.4 hours at developed overnight use sites, 6.7 hours in the general Forest, and 5.2 hours in the Wilderness. The average recreation visitor went to 1.13 sites during his Forest visit. The top five recreation activities of visitors to the Forest included: viewing natural features, relaxing, hiking/walking, viewing wildlife, and downhill skiing. The five most-used constructed facilities and specially designated areas on the W-CNF were: Forest trails, downhill ski area, Forest roads, picnic area, and Scenic Byway (USFS 2004).

Developed Recreation. Developed recreation sites[4] are those areas containing a concentration of improvements, facilities, and services that are built primarily to invite, encourage, or enhance participation in a recreation activity or visitor experience. Table 3-9 shows the number of developed recreation sites in the Logan RD and on the W-CNF as a whole.

TABLE 3-9
Number of Developed Recreation Sites in the Logan Ranger District on the W-CNF and the Number of People at One Time (PAOTs) Sites are Designed to Accommodate

Site Type	Logan Ranger District	Forest Totals
Publicly Developed Facilities	**# of sites/PAOT**	**# of sites/PAOT**
Campgrounds	16/2,355	76/13,062
Picnic Areas	10/605	39/4,380
Interpretive/Observation	15/325	31/1,256
Boat Launch/Swim		3/758
Trailheads	18/1,497	67/6,016
Angler Parking		12/813
Winter Resorts		5/NA
Winter Play Area		1/420
Privately Developed Facilities (Under Special Use Permit)		
Recreation Residences	83/415	351/1,790
Organization Camps	2/100	8/400
Clubs	2/100	6/300

[3] A National Forest visit is defined as one person entering the National Forest to participate in recreation activities for an unspecified period of time.

[4] Improvements that are considered developed sites could range from campgrounds with water systems, flush toilets, and showers, to small trailheads with bulletin boards or barrier rocks, to delineated parking lots.

TABLE 3-9
Number of Developed Recreation Sites in the Logan Ranger District on the W-CNF and the Number of People at One Time (PAOTs) Sites are Designed to Accommodate

Site Type	Logan Ranger District	Forest Totals
Restaurants		1/100
Stores		1/25
Outfitters and Guides	5/na	15/NA

NA = not applicable

Undeveloped Recreation. Concentrated Use Areas are areas where undeveloped site(s) are located and management focuses on resource protection rather than user convenience. As developed campgrounds fill on summer weekends, visitors are displaced, often to undeveloped camping areas. Many other visitors choose an undeveloped setting for their desired activities or experiences. Some visitors, such as horseback and OHV groups, are often restricted from developed sites and must choose undeveloped recreation sites. These groups often select trailheads for their camp. Hunting is a seasonal and intense activity that places a high demand on undeveloped recreation settings. Fishing use occurs over a longer period with peak use on weekends.

The trail system is another important component of undeveloped recreation on the W-CNF. The Forest includes 1,808 miles of system trails. Motorized use by ATVs is also allowed on most of the approximately 1,600 miles of road within the Forest, many of which are relatively primitive and provide a rugged motorized experience.

Trails provide visitors access away from developed recreation sites and support many recreation activities such as backcountry camping, hiking, hunting, horseback riding, OHV use, and mountain biking. Most of the trails on the W-CNF receive very high use, except for a few more remote low-maintenance trails. Many trails now receive year-round use. Hiking, horseback riding, biking, and motorized use of trails are popular in the summer.

Recreation Special Uses. Many uses on the W-CNF require formal management authorization, and all commercial uses are regulated. These uses are generally authorized by Special Use Permits. Recreation special uses range from agreements with private entities to manage publicly developed facilities such as campgrounds and picnic areas to agreements regarding private facilities or activities such as ski areas, recreation residences, or outfitters and guides.

3.5.2.2 Environmental Consequences

Although no significant issues or indicators associated with recreation were identified during public scoping, there were non-significant issues raised as shown in Appendix 1. These issues include developing a trail over the pipeline following construction on the north side of the river, and safety concerns associated with recreationists crossing the highway near the River Trail Trailhead. Potential also exists for effects on recreation resources resulting from the proposed project. These effects are discussed in the following text.

Alternative 1: No Action

Direct and Indirect Effects

No recreation effects would occur as a result of pipeline rehabilitation with the No Action Alternative. However, safety concerns at the River Trail Trailhead, due to having to walk on the shoulder of or cross Highway 89, would continue to occur.

Cumulative Effects

No project-related recreation effects would occur, therefore no cumulative effects would result from the No Action Alternative. Impacts to recreation resources from other ongoing actions would continue under the No Action Alternative and would likely affect the project area the same as at present.

Alternative 2: South Alignment

Direct and Indirect Effects

Project construction would result in a short-term disruption to recreation activities in the vicinity of the pipeline alignment. These disruptions could be directly induced by project construction, or could be indirect effects of such activities. Because the existing River Trail is used year-round, short-term impacts on recreation opportunities offered along the trail are expected regardless of when pipeline construction activities would occur.

Direct impacts on recreation activities from project construction could include temporarily delaying access to nearby recreation areas and causing delays in travel on Highway 89 to the recreation areas. Areas within and near the pipeline alignment may be closed to recreation use during the project construction period for safety and security reasons. This includes closure of the River Trail near Red Bridge for up to 2 weeks and closure of the River Trail Trailhead for 1 or 2 days during construction. Construction would be timed to occur when the Stokes Nature Center is closed to avoid impacts to the nature center. The use of Forest facilities by construction vehicles, equipment, and workers may result in traffic delays in accessing Forest facilities used for recreation activities.

Rehabilitation of air valves and installing the pre-cast manhole covers would require the pipeline to be shut down. As in the past, the City would provide water to all users in the canyon using water trucks. Placement of each manhole may require the portion of the trail that is near each manhole to be closed for up to 1 or 2 days, depending on the location of the manhole relative to the trail. All manholes that are installed within the existing River Trail would be installed at grade or the grade would be raised to match the manhole to minimize the potential tripping hazard. Manholes that are installed outside of the trail or beyond the guard rails would be above grade so that they can be easily identified, maintained, and to minimize the amount of water that would collect in them.

Indirect impacts on recreation activities include potential effects on the enjoyment of such recreation activities from the presence of the construction vehicles, equipment, activities, and workers; the noise and odors that would be emitted during project construction from those activities; and the dust that may be generated from construction activities. The severity of the impact would depend on the proximity to the construction zone and the recreationists' expectations when engaging in recreation activities. Recreationists close to the construction activity would experience a higher level of disruption than those farther away. Recreationists expecting a solitary quiet experience while viewing wildlife or scenery may

perceive project construction as undesirable or intolerable, while recreation users passing through the area may notice the construction noise, dust, and activity to a lesser degree. In addition, in the unlikely event that nighttime project construction occurs, construction lights may affect the experience of recreationists camping within the Forest.

Some recreationists using culinary water are likely to experience disruptions in their water supply during rehabilitation of the air valves. Alternative water supplies would be provided to affected water users by the City during the pipeline shutdown period.

Forest users fishing in the Logan River are likely to be affected during project construction. Impacts would occur during construction of the river crossings because river flows would be locally affected. In-river construction may disturb fish and cause them to avoid anglers. Access to fishing areas may be curtailed in certain locations during construction.

After project construction and revegetation activities are completed, it is expected and recommended that access to areas along the pipeline alignment where revegetation has occurred would initially be controlled to avoid erosion and disturbance to young plants, and to minimize weed invasion. This would result in a long-term (several years) restriction to areas adjacent to the trail that are used by walkers, joggers, hikers, and bikers in the summer months, and by winter recreationists using the trail for walking, skiing, and snowshoeing. Because these restricted-access revegetated areas would not be located within the hard-surface trail, the restrictions would not affect use of the trail, but would only restrict access to the revegetated areas adjacent to it.

Installation of the manholes would take 1 to 2 days at each manhole location, and construction of the pipeline would likely last a couple of weeks, resulting in short-term closures of the River Trail. Alternative routes would be identified around manhole and air valve construction areas during proposed project implementation, if it can be done in such a way to ensure public safety. As mentioned previously, there is no way to route recreationists using the trail around the construction area at Red Bridge and the River Trail Trailhead.

Project implementation would not affect the Forest land's ability to be classified as *Roaded Natural*. Additional management practices and BMPs as discussed in *Section 2.7.4* would be implemented to minimize or avoid significant recreation impacts. Use of the Ray Hugie Hydro Park would be prohibited during construction to protect the public. This is a City owned facility.

Cumulative Effects

The project alternatives evaluated here would each result in only a short-term loss of recreation (1 to 2 days at each manhole if it is installed in the trail and a couple of weeks to lay approximately 600 to 800 feet of pipe within the trail). Because these impacts are short-term, they would not contribute significantly to cumulative impacts on recreation.

If the Gateway Trail is constructed as part of a separate project, a benefit to recreationists would occur.

Alternative 3: North Alignment (Proposed Action)

Direct and Indirect Effects

Alternative 3 would have fewer effects on recreation than Alternative 2. Traffic disruptions on Highway 89 would be less with this alternative because the DeWitt Pipeline would only cross the highway once, as opposed to three road crossings that would occur if Alternative 2 is implemented. The trail closure at Red Bridge and potentially at certain air valve/manhole locations would still occur with this alternative, but disruptions at the River Trail Trailhead would not occur with this alternative. Construction downstream of Second Bridge would occur on the hillside to the north, not in the roadway shoulder. Water disruptions to domestic Logan Canyon water users would be the same as for Alternative 2 with this alternative.

Cumulative Effects

Cumulative effects, as discussed for Alternative 2, would also occur with implementation of Alternative 3. Construction of the Gateway Trail would be an additional benefit to recreation users in the canyon.

3.5.3 Scenic Resources

3.5.3.1 Existing Conditions

Project Area Landscape Character and Scenic Integrity

The W-CNF RFP used the Forest Service's Scenery Management System (SMS) to classify the W-CNF into five Landscape Character Themes (LCTs)[5] and Scenic Integrity Objectives SIOs[6]. The area (Logan Canyon) where the proposed project is located has a LCT of Developed Natural Appearing with an SIO of *High* (USFS 2006a).

The following description was taken directly from or based upon the Cache-Box Elder management area description that is contained in the W-CNF LRMP. It provides a very good description of the landscape character of the project area.

> *The project area is located in the western end of Logan Canyon in the Cache Front Mountains of northern Utah. Logan Canyon is similar to other canyons along the Cache Front in that it is a deep canyon with sheer limestone walls and cliffs. These canyons provide unique habitats for a number of endemic plants. North-facing slopes support mixed conifer-aspen stands at the higher elevations contrasted with maple and mountain brush at lower elevations. Junipers dot the south- and west-facing grass covered slopes. Riparian vegetation such as narrowleaf cottonwoods, crack-willows, box elders, water birch, alder, and big tooth maples follow the Logan River along the canyon bottom. The contrast between these vegetation types is*

[5] Landscape Character gives a geographic area its visual and cultural image and consists of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. LCTs include Natural Evolving, Natural Appearing, Developed Natural Appearing, Resort Natural Setting, and Water Recreation Rural Appearing.

[6] Scenic Integrity indicates the degree of intactness and wholeness of the landscape character; it also is a measure of the degree of visible disruption of the landscape character. SIOs include Very High, High, Moderate, and Low. A landscape with very minimal visual disruption is considered to have high Scenic Integrity. Landscapes with increasingly discordant relationships among scenic attributes are viewed as having diminished Scenic Integrity.

especially apparent in the fall as the aspen, maple and oak leaves change colors, creating a remarkable scenic attraction.

Logan Canyon Scenic Byway (Highway 89) travels along the Logan River through the project area and beyond to the east. This area of the W-CNF and Utah is rich in human history and has a legacy of cultural resources that illustrates its past. The Logan Scenic Byway has always been a major travel corridor, for American Indians through the early European settlers of the valley to today's travelers as evidenced by many historic and prehistoric sites in the canyon. Scattered Forest Service administrative buildings display the historic role and presence of the Forest Service in the canyon. Several areas in Logan Canyon contain summer homes that have been used by generations of families. Recreation is a major feature in these canyons. Developed recreation facilities include campgrounds, summer homes, picnic areas and the River Trail. Popular recreation activities in this unit include fishing and hunting, kayaking, picnicking, biking, rock climbing, hiking, snowmobiling, and ATV riding, as well as scenery and wildlife viewing.

The strongest form in the project area is the distinctive "V" shape of Logan Canyon. The high steep walls of the canyon visually dominate and define much of the project area's viewshed. Other elements whose form, line, and texture influence the scenic character of the project area include:

- The Logan River and its meandering form, texture, and line during different times of the year
- Nearby hillside vegetation texture
- Riparian trees (willow and cottonwood) that overhang Highway 89 and the Logan River that create the form of a cathedral ceiling
- Highway 89 and its embankments, retaining walls, bridges, and blasted rock cliffs
- The Smithfield Irrigation Canal
- Summer homes at Gus Lind Flat
- The River Trail Trailhead
- Zanavoo Bed and Breakfast
- The Logan City Power Powerhouse and transmission lines

The variety in colors within Logan Canyon is heavily influence by vegetation and season. Colors include many shades of green (and vibrant autumn colors) from the various vegetation types along the river and on the hillsides, the tan and brownish-gray rock formations and soils of the hillsides and grasses, and the blues and reflected colors of the Logan River (and the several hydroelectric impoundments in the project area). Texture of varying degrees of roughness and smoothness is found throughout the canyon and adds greatly to the visual quality of the project area. Texture is provided and influenced by elements such as rock formations, the river, vegetation, and built elements.

As discussed in *Section 2.6*, the portion of Logan Canyon where the proposed project is located has an LCT of Developed Natural Appearing. Within a Developed Natural Appearing LCT, the roadway, recreation amenities, and development are anticipated features in the immediate foreground viewing distance zone (0 to 0.5 mile from the viewer). In this distance zone, people can distinguish details of the landscape such as tree trunks and large branches, individual shrubs, clumps of wildflowers, and so forth, and can be sensitive to changes in the viewed landscape. The SIO for an area with an LCT of Natural Appearing Landscape is *High*. In these areas the valued characteristic landscape should appear intact (although it may not currently be) and future actions should help reach the objective of an intact landscape. Most of the landscape in which the proposed project is located is intact and meets the *High* objective. Several areas where there are road cuts are not visually intact and do not meet an SIO of *High*.

Project Viewshed

A viewshed is the surface area that is visible from a given viewpoint or series of viewpoints. It is also the area from which that viewpoint or series of viewpoints may be seen. The viewshed aids in identifying the views that could be affected by a proposed project. The viewshed for this project includes views from parts of Logan City looking east toward the mountains and entrance to Logan Canyon, and views from adjacent Forest and non-Forest lands along the Logan Canyon Scenic Byway corridor. Areas within the viewshed from which the general public could see the proposed project's route include the Red Bridge River Trail Access, the River Trail itself, the River Trail Trailhead, Highway 89, areas of summer homes, Logan River, and several campgrounds. Most of the viewshed for this project is considered to be in the foreground distance zone (up to 0.5 mile away), although parts of the pipeline corridor may be visible in the middleground distance zone (between 0.5 and 4 miles away) from some areas of Logan Canyon or the adjacent hillsides and slopes.

Viewer Groups, Exposure, and Concern Level

The quality of the visual experience depends on the scenic resources and the viewer response to those resources. When characterizing viewers, the following must be considered: the type of viewer group; the viewer exposure (their location, number of people in group, and duration and frequency of their view); and viewer sensitivity (viewer activity, awareness, and values). For this project, the viewer groups can be classified into the following four general types:

- Drivers and passengers (driving for pleasure)
- Recreationists
- Summer residents
- Drivers and passengers (driving for purpose—that is, driving from point "a" to point "b")

Drivers and passengers driving for pleasure include those driving along the Logan Canyon Scenic Byway to enjoy its scenic splendor. The scenic byway attracts viewers year-round who may drive the entire length of the byway or may drive and stop at various locations along the way. They may view the landscape for brief or moderately long periods of time. The viewing sensitivity of these viewers is considered to be *High*.

Recreationists within the project area include people participating in activities such as hiking (along the River Trail or trails that depart from Logan Canyon), fishing, water play,

picnicking, and other activities. These viewers have views of long duration and appreciate the scenery of the canyon. Many have visited the canyon for years and are quite familiar with the canyon's visual environment. The viewing sensitivity of this type of viewer is considered to be *High*.

Summer residents are people who own or use summer cabins sprinkled throughout Logan Canyon. Many of these viewers have been using their cabins for years and are very familiar with the visual environment of the canyon. They can view parts of the project area for periods of long duration and their viewing sensitivity is considered to be *High*.

Drivers and passengers driving through the canyon as a transportation link are primarily interested in getting from point "a" to point "b." Their viewing duration is short and their viewing sensitivity is considered to be *Moderate*.

3.5.3.2 Environmental Consequences

Significant issues and indicators identified during public scoping that are being addressed in this EA are discussed in *Section 1.5, Scoping*. Issue No. 5 identified during public scoping is concerned with scenic integrity in the canyon, as follows:

- Effects of pipeline rehabilitation/ construction on the existing visual quality of the Logan River corridor.

The following indicator was used to evaluate the potential effects of Issue No. 5:

- Loss of scenic quality due to construction and rehabilitation of the pipeline and resulting pipeline corridor.

To help determine the effects the proposed project would have on scenic resources, it was important to determine how the proposed project would affect the short-term and long-term ability to maintain or enhance the current SIO of *High*. This section begins with a summary of the effects of the proposed project on SIO and then discusses the effects of the alternatives on specific parts of the landscape through which the pipeline would pass. It concludes with a summary of the proposed project's consistence with the existing management plans (the Regulatory Framework).

Alternative 1: No Action Alternative

Direct and Indirect Effects

Under the No Action Alternative, the DeWitt Pipeline would not be reconstructed or rehabilitated. Therefore, there would be no effects on scenic resources. However, with this alternative there would likely be occasional effects to scenery as a result of maintenance activities such as replacing air relief valves, responding to leaks, or other situations that might cause visible erosion. These effects would likely be localized and after being addressed, the affected areas would likely reach an SIO of *High* 3 to 5 years after site restoration.

Cumulative Effects

There would be no cumulative effects with the No Action Alternative. Impacts to scenic resources from other ongoing actions would continue under the No Action Alternative and would likely have the same effects (or no effects) to scenic resources that the ongoing actions currently have.

Alternative 2: South Alignment

Direct and Indirect Effect

Construction of the proposed project would cause short-term construction-related visual impacts because construction activities would be noticeable from Highway 89 and other locations from which the public would view the route. The visual impacts would be caused by vegetation removal, earthwork and grading, staging areas, the presence of heavy equipment, heavy equipment tracks, trenching, blasting, rock formation alteration or removal, pipe laying, backfilling the trench, installation of associated facilities, and temporary support machinery and tool storage. The temporary construction corridor would vary from 20 feet to 64 feet wide, depending on location, with some areas where equipment and materials would be staged or stored being wider. Project construction activities would result in the removal of the existing vegetation where the pipeline trench would be constructed, resulting in a temporary greater level of color and texture contrast than currently exists. The temporary presence of construction equipment, vehicles, workers, and activities within the corridor would also result in a variety of colors, forms, and textures when viewed from on- and off-Forest locations.

BMPs were developed for the proposed project to reduce the impacts to scenery associated with the activities previously described (see *Section 2.7.2.2*). The BMPs related to protecting and replanting vegetation and how to restore steep rocky terrain in particular will help to hasten the recovery of the intactness of the scenery along the construction corridor, river corridor, and portion of the Scenic Byway that passes near the project area. During construction, and for a year or two afterward, areas along most of the construction corridor would not meet the existing SIO of *High*. Within several years, protected existing plants would begin to reestablish themselves, newly planted vegetation would begin to mature, and the construction corridor would begin to resemble its current appearance. Within 3 to 5 years, the SIO of *High* would be met.

Upper 3 Miles of Reinforced-Concrete Pipe. The activities associated with Alternative 2 that would occur in the upper 3 miles of the project would have short-term impacts to scenery during and several years after construction. Installing the six 8-foot by 8-foot valve vaults (which would be buried except for the manhole structures) would require excavating, stockpiling, and filling areas along the River Trail that would be as wide as (but no wider than) 30 feet by 30 feet. After construction and site rehabilitation (regrading and planting), areas that were disturbed to install the valve vaults would not meet an SIO of *High*. Site rehabilitation (particularly vegetative screening) along with the weathering of the manhole structures would reduce the structures' foreground view dominance when viewed from the River Trail. Manholes would be finished at grade and may or may not be very visible from the trail, depending on location. Within 3 to 5 years after construction, an SIO of *High* would be met.

Replacing the Upstream Segment of the Pipeline in the Existing Trail. A 20-foot-wide construction corridor would be required to install this section of the pipeline (Figures 2-2 and 2-5). Construction would require some vegetation removal and trimming/cutting back on either side of the trail. During construction, the River Trail would be closed to protect public safety. Most people that would view construction activities would do so from the Scenic Byway. Views from the Scenic Byway that would normally be partially screened by vegetation would be more open during the spring and late fall construction periods because

of deciduous vegetation not having leaves. Upon completion of the installation of the new pipeline, areas within the construction corridor that were disturbed would be rehabilitated as described in the BMPs in *Section 2.7*. During and for a period of time after construction and site rehabilitation, the construction corridor area would not meet an SIO of *High*. Within 3 to 5 years after construction, vegetation would be reestablished enough to meet an SIO of *High* when viewed from the Scenic Byway and trail so there would be no long-term effects to scenery.

Logan River Crossing at Red Bridge. Construction near the Red Bridge crossing would require soldier piles constructed across the river (Figure 2-7). The pool created by the piles would be noticed by some observers from the Scenic Byway and from the River Trail (although parts of the trail where construction would occur would be closed to the public for safety reasons), as would the piles and excavated materials stockpiled nearby. This work would occur from September to mid-November after the peak summer season when visitation is lower. The trail would be closed to protect public safety. Although the activities would be seen, they would have temporary effects on scenic quality. Most of the impacts to visual quality at this crossing would be typical of the impacts that would occur at the other two river crossings. During and for a period of time after construction and site rehabilitation, the river crossing area would not meet an SIO of *High*. Within 3 to 5 years after construction, vegetation would appear to be reestablished. Although the manhole structure of the new air valve vault would be noticed by some observers (as would a fire hydrant near the Stokes Nature Center), the river crossing area should meet an SIO of *High* after 3 to 5 years when viewed from the Scenic Byway and trail. As a result, there would be no long-term effects to scenery.

Pipeline Segment from Red Bridge River Crossing to Second Bridge. This approximately 0.75-mile-long segment of the pipeline would be sited along the north side of Highway 89 and within its easement (Figure 2-9). Much of the easement where the pipeline would be located is shoulder or area with grasses and shrubs (and some trees) that would be cleared for construction. Some trees in and near the shoulder may be removed for construction and replanted with trees, shrubs, and grasses. During and for a period of time after construction and site rehabilitation, the shoulder area would not meet an SIO of *High*. Within 3 to 5 years after construction, vegetation would appear to be reestablished and the shoulder area would be similar to its existing appearance. As a result, there would be no long-term effects to scenery.

Highway 89 near the River Trail Trailhead. After crossing under Highway 89 and the Logan River, the pipeline would enter the River Trail Trailhead access gate area. Construction-related scenery impacts would be similar to the Red Bridge crossing described previously. An air valve vault would be constructed near the pipeline crossing and its manhole structure would be visible, although placement at grade would reduce the effect. The most significant impact to scenery at this crossing would be the removal of a number of large cottonwood trees located south of the highway and upstream from the bridge. The grove of cottonwoods is a visual landmark that identifies the entrance to the River Trail Trailhead. The removal of some of the large mature trees would be quite noticeable from Highway 89, the entrance to the River Trail Trailhead, and the River Trail by those who regularly use the canyon. Although the removal of the trees would be noticeable and undesirable to some viewers, the presence of numerous other trees (and the canopy over the

river they provide) near them would result in their removal not having much of an overall negative impact on the scenic integrity of the scenic highway. During and for several years after construction and site rehabilitation, this area would not meet an SIO of *High*. Within 3 to 5 years after construction, vegetation would appear to be reestablished. Although the manhole structure of the new air valve vault and fire hydrant would be noticed by some observers from the River Trail Trailhead area, the river crossing area should meet an SIO of *High* after 3 to 5 years when viewed from the trailhead area and entrance road to the Stokes Nature Center.

Second Bridge to First Bridge. After exiting the River Trail Trailhead, the pipeline continues west along the south side of Highway 89 for approximately 0.5 mile. The Logan River is north of Highway 89 along this segment of the pipeline. This segment of the construction ROW contains a mixture of graveled shoulder, grasses, shrubs, and some trees that would be removed for construction and then replanted. During and for several years after construction and site rehabilitation, the shoulder area would not meet an SIO of *High* (and likely does not currently meet the objective). Within 3 to 5 years after construction, vegetation would appear to be reestablished and the shoulder area would be similar to its existing appearance. As a result, there would be no long-term effects to scenery.

Logan River Crossing at First Bridge. After crossing north under Highway 89, the pipeline would cross beneath the Logan River (Figure 2-13). Construction-related scenery impacts would be similar to the Red Bridge crossing described previously, although this crossing would be visible to more people who would see it from First Bridge and would require two sets of soldier piles, one on each side of the pipeline during construction (and the associated pond). An air valve vault would be constructed near the pipeline crossing and its manhole structure would be visible for the long-term, although placement at grade would reduce the effect.

First Bridge River Crossing to Tank Site. After the final river crossing, the pipeline would continue in a northwesterly direction through the Ray Hugie Hydro Park by the hydroelectric plant and under the access road to the park (Figure 2-3). The pipeline would then climb a very steep rock slope, cross under the Smithfield Canal, and enter the existing tank site at the southeast corner. The portion of the pipeline construction corridor that would pass through the park and the rock slope would be visible to the general public from the park and Highway 89 during construction. The segment of pipeline that would cross through the rock slope would be buried in a trench created by blasting. Installing the pipeline on the steep slope would require construction of a temporary access ramp. The ramp would be removed after construction and the original grade restored. Surface restoration (see *Section 2.7.2.2*) would include revegetation and placement and securing of large boulders over the trenched area to provide a natural rock look.

Cumulative Effects

As discussed previously, project-related visual impacts would be present for 3 to 5 years following construction. These short-term impacts would combine with existing visual impacts to reduce scenic integrity during the recovery period. These cumulative effects would disappear with vegetation recovery. Impacts to scenic resources from other ongoing actions would continue under Alternative 2 after vegetation recovery and would likely affect the project area the same as at present.

Alternative 3: North Alignment (Proposed Action)

Direct and Indirect Effects

Impacts as discussed previously for Alternative 2 would occur with implementation of this alternative except for the segment from Second Bridge through the Logan River crossing at First Bridge. The remaining discussion in this section addresses the unique effects related to this alternative.

Second Bridge to Hydropower Plant. With this alternative near Second Bridge, the pipeline would cross under the north bank of the Logan River and traverse (generally paralleling an existing power line) across a rocky raveling slope for 300 feet before crossing open-sloped terrain for 800 feet to an existing canal access road. The construction corridor would require removing shrubs and some trees in a grove of Utah junipers growing along the slope north of Highway 89. The removed vegetation would be noticed from Highway 89 and the River Trail Trailhead by viewers that are extremely familiar with the area. By following BMPs described in *Section 2.7.2.2* – which would prevent vegetation from being removed in a manner that would create straight, unnatural appearing lines between areas where the vegetation would be removed and areas where it would remain—the removal of the shrubs and trees could occur in a manner that would create the appearance of a relatively natural opening. The opening would not be noticeable as an opening to most viewers. A drivable surface about 10 feet wide would remain along the pipeline route to provide access to the pipeline in the future, but would be sloped and contoured to blend in to the extent possible. The access way would be revegetated but would not contain trees or shrubs that would hinder vehicles using the access way to service the pipeline. Part of the access way would be seen from some viewing angles when viewed from Highway 89. To some viewers the access way would appear as another human-made element in the landscape, whereas other viewers would likely not notice it. The access way would somewhat change the character of the landscape seen from some points along Highway 89 but by following the BMPs described in *Section 2.7.2.2*, the landscape the pipeline would pass though would still appear intact. This section of the pipeline would meet an SIO of *High* or *Moderately High* after vegetation becomes established after three to five years. Once in the canal access road, the pipeline route would not be seen from the highway or the river corridor. Construction would be scheduled for the spring and summer months when visitation in the canyon is at its highest.

Alignment around Hydropower Plant to Tank Site

The pipeline alignment would cross the hydropower plant site between two buildings, under the penstock, and up a slope behind the two buildings into the alignment of the hydro plant penstock access road. It follows the access road alignment until it rejoins the canal access road alignment to the base of the steep rock slope (near the entrance to the Ray Hugie Hydro Park by the hydroelectric plant). This section of the pipeline construction corridor would be relatively difficult to see from Highway 89. From the base of the slope, the construction ROW would cross approximately 1,500 feet of steep slope to the existing tank as described under Alternative 2.

Cumulative Effects

Construction of the Gateway Trail from the Ray Hugie Hydro Park to the River Trail Trailhead on top of the pipeline would tend to increase the visual impact of the pipeline. A trail surface would be more likely to attract the user's attention than the revegetated

pipeline corridor. A developed trail would also be consistent with the character of much of the landscape in the section of Logan Canyon the pipeline would be located in and would extend the influence of the existing River Trail to the lower part of the canyon. The character of this area is greatly influenced by recreational oriented elements such as roadside pull outs, park features, areas for swimming, and a new trail would be visually consistent with the other recreation elements. Other cumulative effects would be the same as described for Alternative 2. Impacts to scenic resources from other ongoing actions would continue under Alternative 3 after vegetation recovery and would likely affect the project area the same as at present.

Consistency with Regulatory Framework

U.S. Forest Service. As described in *Section 3.5.3.1*, the proposed project is located in an area of the W-CNF that has an LCT of Developed Natural Appearing and an SIO of *High*. Forest-wide guidelines G60 and G61 both require that management activities in the project area not reduce the SIO of the project area below that of *High*. For 2 or 3 years after the completion of construction, the proposed project would likely not meet the SIO of *High*. With the BMPs that were developed to manage scenery along the pipeline route, revegetation along the construction corridor would be expected to allow the proposed project to meet the SIO of *High* within 3 to 5 years.

Two other Forest-wide guidelines that pertain to the proposed project relate to vegetation. G63 states that the allowed duration of visual impacts from removing established herbaceous and woody plants is to be determined during project planning by understanding the capability of the landscape to recover after the management activity is complete and the relationship of the management activity to the seen area of sensitive use areas and travel ways. The proposed project would meet this guideline by developing BMPs that recognize the vegetation types through which the pipeline would pass, and by developing appropriate vegetation trimming, removal, and replanting BMPs as well as understanding how quickly the vegetation types would respond to rehabilitation (for example, the riparian areas would be expected to reestablish faster than upland areas).

G64 states that the establishment of herbaceous vegetation on and near the management activity may extend up to 3 years after project completion for the foreground and middleground in Concern Levels 1 and 2 use areas and travel ways. It encourages the consideration of immediate initiation of reseeding after the management activities are complete in areas where natural recovery is questionable. The proposed project would meet this guideline by planning reseeding activities for the various segments of the pipeline as soon as practical (some segments would be constructed during the winter), and by instituting the BMPs developed for scenery. Within 3 to 5 years, the proposed project would meet an SIO of *High* that was established to protect the scenic integrity of the Logan Canyon Scenic Byway.

Cache County. The proposed project would meet the goals, objectives, and strategies of the Cache County Countywide Comprehensive Plan (Cache County 1998).

Logan City. The proposed project would meet the goals, objectives, and strategies of the Logan City General Plan (City of Logan 1995).

Logan Canyon Scenic Byway Corridor Management Plan. The proposed project would meet the objectives of the Logan Canyon Scenic Byway Corridor Management Plan (Hancock 2002). The scenery of the portions of the Logan Canyon Scenic Byway that pass through the project area would be affected for several years as described previously, but within 3 to 5 years the construction corridor would recover sufficiently to appear very similar to the existing condition.

3.5.4 Transportation

3.5.4.1 Existing Conditions

Highway 89 runs through Logan Canyon—a National Scenic Corridor— is a primary arterial through the City of Logan, and serves as the main trucking freight route connecting the Logan Valley to Interstates 15 and 84 (CMPO *in* CH2M HILL 2005). Although traffic data are not available, traffic volumes through this segment appear to be highest in the summer with the associated recreation activity, but increasing with the local growth in and around the City.

3.5.4.2 Environmental Consequences

The impact assessment of Alternatives 1, 2, and 3 is presented in the following text. No specific issues tied to traffic resources were identified during scoping; however, the project would impact traffic, and mitigation measures and BMPs would be employed to minimize the potential for adverse impacts from construction activities.

Alternative 1: No Action

Direct and Indirect Impacts

Under the No Action Alternative, there would be no short-term direct or indirect impacts from construction-related activities to the transportation system. However, potential leaks that may occur in the aging pipeline under the highway may result in the need for temporary road closures as leak-related road damage and the pipeline are repaired.

Cumulative Effects

Cumulative transportation impacts resulting from the proposed project would not occur under the No Action Alternative.

Alternative 2: South Alignment

Direct and Indirect Impacts

Temporary, localized traffic effects would be generated in the project vicinity by construction-related vehicles and construction activities. Construction activities adjacent to and crossing the highway would also result in short-term delays in traffic or periodic lane closures. Limited blasting of slopes adjacent to Highway 89 would require road closures for limited periods. The length of closures and delays is currently uncertain. However, public notices as described in *Section 2.7.4 Recreation*, mitigation measures, and BMPs would be implemented to minimize the potential for adverse, project-related traffic effects.

Indirect effects may include the potential re-routing of traffic, depending on the delays, and could have wide-range impacts on other travel routes normally accessed via the project area.

Cumulative Impacts

None of the present projects would affect transportation in Logan Canyon; therefore, cumulative effects with the proposed project are not expected.

Alternative 3: North Alignment (Proposed Action)

Direct and Indirect Impacts

The potential for direct and indirect impacts to traffic is less than that of Alternative 2. There would only be one road crossing requiring traffic delays, compared to three road crossings in Alternative 2. Construction adjacent to Highway 89 from Second Bridge to the First Bridge crossing included in Alternative 2 would not happen in this alternative, resulting in less impacts to through traffic.

Cumulative Impacts

Cumulative impacts include the effects from construction of the Gateway Trail segment over a portion of the disturbed pipeline route that would require some additional construction equipment; thus impacting traffic in the short-term. However, because the trail would not be constructed until after the proposed project is complete and the absence of other traffic-delaying projects in the project area, cumulative impacts from Alternative 3 are not expected.

3.5.5 Noise

3.5.5.1 Existing Conditions

Noise resources along the project route are not documented. However, the noise resources within the project area are likely primarily affected by sound generated by traffic along Highway 89, activities associated with the hydropower facility, and activities associated with the urban interface. Current impacts to noise resources include short-term maintenance on canyon facilities and urban interface facilities, and seasonal increases in local highway vehicle use, increasing noise levels stemming from local population growth and an increase in the popularity of Logan Canyon as a scenic highway.

3.5.5.2 Environmental Consequences

The impact assessment of Alternatives 1, 2, and 3 is presented in the following text. No specific issues tied to noise resources were identified during scoping. However, the project would impact noise resources, and mitigation measures and BMPs would be employed to minimize the potential for adverse impacts.

Alternative 1: No Action

Direct and Indirect Impacts

Under the No Action Alternative, there would be no short-term direct or indirect noise impacts from construction-related activities. However, if leaks occur in the aging pipeline, repair of the leaks may result in noise-generating activity.

Cumulative Effects

Cumulative noise impacts associated with project activities would not occur under the No Action Alternative. Noise impacts from other ongoing actions would continue under the No Action Alternative and would likely affect the project area the same as at present.

Alternative 2: South Alignment

Direct and Indirect Impacts

Temporary, localized noise would be generated in the project vicinity by construction-related activities that include trenching and blasting. BMPs would be implemented to minimize the potential for adverse, project-related noise effects.

Indirect effects may include a temporary displacement of wildlife because of increased noise in the immediate proximity of high sound areas. Recreation use in the immediate vicinity of the construction area may also be temporarily displaced because of increased noise.

Cumulative Impacts

Noise impacts from other ongoing actions would continue under Alternative 2 and would combine with the effects of the proposed project to result in increased noise levels during construction. Specifically, traffic noise on Highway 89 and pipeline construction would likely combine to temporarily raise the noise level in the project area.

Alternative 3: North Alignment (Proposed Action)

Direct and Indirect Impacts

The potential for direct and indirect noise impacts is similar to that of Alternative 2 because the construction-related activities would be similar.

Cumulative Impacts

Cumulative impacts from Alternative 3 would be similar to those described under Alternative 2. Noise impacts from construction of the Gateway Trail would occur after completion of the proposed project and would not contribute to cumulative noise effects.

3.5.6 Cultural Resources

3.5.6.1 Existing Conditions

Four cultural properties are extant within or adjacent to the two action alternatives (Figures 3-1, 3-2, and 3-3). Descriptions of each of these properties follow.

Hercules/Logan Canyon Power Plant. The power plant was recorded on National Register of Historic Places (NRHP) nomination forms in 1971 and although it has not been nominated, the Utah State Historic Preservation Office (SHPO) has identified it as a significant property. The Penstock from the power plant intersects the area of potential effect (APE) directly across from the main plant building. The penstock in this location is of a modern vintage, having been replaced with modern pipe.

Two power lines run from the plant eastward up Logan Canyon. The power lines were likely constructed in 1932; however, the poles, wires, and insulators have all likely been replaced since that time (Hampton, pers. comm., 2007).

A small (6 feet x 6 feet), corrugated metal shed with a pyramidal roof is located to the east of the power plant, with various pieces of old machinery and fragments of riveted penstock lying nearby. The shed lies on wooden skids, and miscellaneous equipment and trash have been thrown inside the building. Although likely associated with the power plant, the shed and other artifacts appear to have been recently moved to this location.

Third Dam Complex (42CA138). This site, called the Third Dam, consists of a low concrete dam followed downstream by a series of eight energy dissipater stairs, or ladders. The complete structure measures approximately 70 feet wide by 100 feet long. In addition to the dam structure is the Dam House. The Dam House is a four-square wood frame structure with a pyramid roof. The building is covered in drop siding. The south side of the structure has double six light wooden windows. The west elevation features the same window configuration. A single-panel wooden door is located on the east side of the structure. The roof has exposed rafters and the pyramidal roof is covered in wooden shingles. The complex was constructed ca. 1890 and rebuilt in 1923. The reservoir was used by the Logan Power, Light and Heating Company to power the hydroelectric plant located just upstream from the Lower Second Dam (Nordstrom 1971, Part 8) The dam complex embodies the style and type of architecture associated with the late-formative years of water impoundment in Logan Canyon. The site retains integrity of location, design, setting, materials, workmanship, feeling, and association and is probably eligible for listing on the NRHP.

Lower Second Dam (42CA137). This dam was originally constructed ca. 1897 and rebuilt ca. 1923, likely at the same time the Third Dam was reconstructed. This dam was originally called the Hercules Power Dam and held water for the Hercules Power Plant, which is located at the mouth of Logan Canyon. This dam consists of a low dam with four steep energy dissipater stairs or ladders on the downstream side. A spillway is located on the north side of the stairs. The dam is constructed of poured concrete. A modern aluminum-sided building and modern equipment are located on the northeast corner of this structure. The site retains integrity of location, design, setting, materials, workmanship, feeling, and association and is likely eligible for listing on the NRHP.

Culvert (42CA139). This is a culvert that originally diverted water from the second dam under Highway 89 to the Hercules/Logan City Hydro Power Plant. The top of the culvert contains a Bureau of Public Roads marker dated 1933, indicating a likely date of construction. The culvert opening measures 11 feet 5 inches long by 6 feet high and 1 foot wide. Just west and downstream of the culvert is a rough concrete wall where the concrete has been poured over dirt and rock to stop erosion. Two concrete wing walls are located approximately 8 feet apart, approximately 50 feet downstream of the culvert. The culvert retains integrity of location, design, setting, materials, workmanship, feeling, and association and is likely eligible for listing on the NRHP. The area of impact for Alternative 3 is slightly different than for Alternative 2, in that it diverges from Alternative 2 only on the lower section of the project. Therefore, the sites described previously are also within or adjacent to the South Alignment. The Alternative 3 alignment additionally intersects the main Hercules/Logan Canyon Power Plant property rather than just the penstock as in Alternative 2.

3.5.6.2 Environmental Consequences

No significant issues or indicators associated with cultural resources were identified during public scoping (Appendix 1). However, cultural and historical resources are located in the project area and the NHPA requires that impacts to them be evaluated. These are discussed in the following text.

Alternative 1: No Action

Direct and Indirect Effects

The No Action Alternative would have no effects to the Hercules/Logan Canyon Power Plant, or to sites 42CA137, 42CA138, or 42CA139.

Cumulative Effects

The No Action Alternative, when combined with other reasonably identifiable projects, would have no effect on cultural resources in Logan Canyon.

Alternative 2: South Alignment

Direct and Indirect Effects

Hercules/Logan Power Plant. A portion of penstock from the Hercules/Logan Power Plant is located adjacent to the proposed pipeline corridor. However, construction of Alternative 2 would be completed in such a fashion as to avoid temporary or permanent direct or indirect effects to the penstock.

Lower Second Dam (42CA137). Reconstruction of an air vent would occur adjacent to this site. Construction and operation of the air vent would have no temporary or permanent effects on the site.

Third Dam Complex (42CA138). Reconstruction of an air vent would occur adjacent to this site. Construction and operation of the air vent would have no temporary or permanent effects on the site.

Culvert (42CA139). Construction and operation of Alternative 2 would have no effects of any kind on this site.

Cumulative Effects

Alternative 2, when combined with other reasonably identifiable projects, would have no effect on cultural resources in Logan Canyon.

Alternative 3: North Alignment (Proposed Action)

Direct and Indirect Effects

All effects described for Alternative 2 would be the same for Alternative 3 except for the potential for construction-related impacts near the Hercules/Logan Power Plant. Alternative 3 would pass through the Hercules/Logan Power Plant property. The power line associated with the plant has been modified and/or replaced over time, making it a non-contributing element to the historic site. The historic shed and materials have likely been moved from their original location and placed near the current facilities. Because these are not in situ, and because their original provenance is not known, these materials are recommended as non-contributing elements to this significant site. The project would not disturb the powerlines or the shed and trash scatter, as it will be located south of these elements. Although the construction will not adversely affect the significant historic powerplant, care should be taken when constructing within the plant site so that no historic resources are disturbed.

It is recommended that the power plant site be monitored by a professional archaeologist when work is conducted near the plant facilities.

Cumulative Effects

Alternative 3, when combined with other reasonably identifiable projects, would have no effect on cultural resources in Logan Canyon.

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Figure 3-1 (2 pages, color)

Figure 3-1 (2 pages, color)

Figure 3-2 (2 pages, color)

Figure 3-2 (2 pages, color)

Figure 3-3 (2 pages, color)

Figure 3-3 (2 pages, color)

4.0 List of Recipients

This chapter lists the recipients of the DeWitt Pipeline Rehabilitation/Replacement Project's Public Scoping Notice and the Preliminary Environmental Assessment.

Recipients of the Public Scoping Notice

TABLE 4-1
List of Public Scoping Notice Recipients

	First Name	Last Name	In Care of	Address	City	State	Zip	E-Mail Address
1	Russ	Akina		255 North Main	Logan	UT	84321	
2	Garth	Barker	White Pine Gallery	855 South Main	Logan	UT	84321	
3	Congressman Rob	Bishop	United States Congressman	324 25th Street, Suite 1017	Ogden	UT	84401	
4	John	Borg		1480 Highland Drive	North Logan	UT	84341	john@jborg.com
5		Bridgerland Audubon Society		P.O. Box 3501	Logan	UT	84323	
6	Ben	Boyce	Brigham Parks and Rec	P.O. Box 1005	Brigham City	UT	84302	cibcc.benb@state.ut.us
7		Cache Anglers		P.O. Box 0020	Logan	UT	84321	
8		Cache County Chamber of Commerce		160 North Main	Logan	UT	84321	croberts@cachechamber.com
9		Cache County Executive	Lynn Lemon	179 North Main, Suite 309	Logan	UT	84321	
10		Cache County Zoning Office		179 North Main	Logan	UT	84321	
11		Cache Valley Tourist Council	Julie Hollist	160 North Main	Logan	UT	84321	julie@tourcachevalley.com
12	Jim	Cane		1710 East, 1140 North	Logan	UT	84341	
13	John	Carter		P.O. Box 280	Mendon	UT	84325	wwshed@comcast.net
14	The	City of Lewiston	Mayor	P.O. Box 36	Lewiston	UT	84320	jbergeson@lewiston-ut.org
15	The	City of Logan	Mayor	255 North Main	Logan	UT	84321	
16	The	City of Logan—Engineering Division	Mr. Ron Johnson, P.E.	255 N. Main Street	Logan	UT	84321	

TABLE 4-1
List of Public Scoping Notice Recipients

	First Name	Last Name	In Care of	Address	City	State	Zip	E-Mail Address
17	The	City of North Logan	Mayor	2076 North, 1200 East	North Logan	UT	84341	mayor@ci.north-logan.ut.us
18	The	City of North Logan	Secretary	2076 North 1200 East	North Logan	UT	84341	northlogansec@hotmail.com
19	Charlie	Condrat	Wallace F. Bennett Federal Building	8236 Federal Building, 125 South State Street	Salt Lake City	UT	84138	
20	Newell	Crookston		1501 East 2300 North	North Logan	UT	84341	newell@abcoutah.com
21	Scott	Datwyler	City of Logan	707 Meadow Lark Lane	Smithfiled	UT	84335	
22		Division of Wildlife Resources	Habitat Manager	515 East, 5300 South	Ogden	UT	84405	
23	Paul	Dremann		2348 Lynwood Drive	Salt Lake City	UT	84109	pdremann@xmission.com
24		Garden City Library	Librarian	145 W. Logan Road	Garden City	UT	84208	
25	The	Herald Journal	Lance Frazer	75 West, 300 North	Logan	UT	84321	
26	Dr. Raymond	Hlavaty		1660 Saddlehill Drive	Logan	UT	84321	hlavatyray@att.net
27		JBR Environmental Consultants, Inc.	John Russell	8160 South Highland Dr	Sandy	UT	84093	jrussell@jbrenv.com
28	The	Leader		119 East Main Street	Tremonton	UT	84337	trent@tremontonleader.com
29	Richard	Justis	Logan Canyon National Scenic Byway	199 North Main	Logan	UT	84321	
30	Ron	Johnson	Logan City	912 West, 1000 South	Logan	UT	84321	
31	Dan	Miller		293 East Main	Richmond	UT	84333	
32	The	Nature Conservancy		559 East South Temple	Salt Lake City	UT	84102	jdegiorgio@tnc.org
33	Wendall and Sasha	Morse	Cache County	333 Red Fox Trace	Logan	UT	84321	
34		Northwestern Band of the Shoshone Nation	Patty Timbimboo	862 S Main Street, Suite 6	Brigham City	UT	84302	
35	Mark	Nielsen	Logan City	912 West, 1000 South	Logan	UT	84321	

TABLE 4-1
List of Public Scoping Notice Recipients

	First Name	Last Name	In Care of	Address	City	State	Zip	E-Mail Address
36	Dave	Rayfield	Cache Trails	740 East, 300 North	Hyde Park	UT	84318	
37		Resource Development Coordinator	Carolyn Wright	116 State Capitol Bldg.	Salt Lake City	UT	84114	carolynwright@utah.gov
38	Stuart	Reynolds and Barbara Farris		545 West 3200 South	Nibley	UT	84321	sreynolds58@msn.com
39	Kayo	Robertson		10 South 200 East	Smithfield	UT	84335	kayorobertson@hotmail.com
40		Shoshone-Bannock Tribes	Arnold Appeney, Chairman	P.O. Box 306	Fort Hall	ID	83202	
41	Jim	Steitz		1505 S Espina St. Apt 5	Las Cruces	NM	88001	jimsteitz@mac.com
42	Allen and Alice	Stokes Nature Center		P.O. Box 4204	Logan	UT	84323	
43		Stokes Nature Center		2696 East Highway 89	Logan	UT	84321	
44	USDI	Fish and Wildlife Service	Henry R. Maddux	2369 West Orgon Circle, Ste. 50	West Valley	UT	84119	
45		USU Dept. of Environment and Society	Mark Brunson	5215 Old Main Hill	Logan	UT	84322	Mark.Brunson@usu.edu
46		USU Forest, Range & Wildlife Sciences	Jim Long	5230 Old Main Hill	Logan	UT	84322	fakpb@cc.usu.edu
47		Utah Department of Transportation	Region 1	166 W. Southwell Street	Ogden	UT	84404	
48	Utah	Division of Drinking Water	Shelly Quick	288 North, 1460 West, Cannon Health Building, Third Floor	Salt Lake City	UT	84321	
49		Utah Environmental Congress	Kevin Mueller	1817 South Main Street #10	Salt Lake City	UT	84115	
50		Utah Farm Bureau	Spencer Gibbons	9865 South State Street	Sandy	UT	84070	skg@xmission.com
51		Utah State Parks and Recreation	Mary Tullius	P. O. Box 146001	Salt Lake City	UT	84114	marytullius@utah.gov
52	Matt	Westrich	Utah 4x4 Association					thebigsgt@hotmail.com

TABLE 4-1
List of Public Scoping Notice Recipients

	First Name	Last Name	In Care of	Address	City	State	Zip	E-Mail Address
53		Wildlife Management Institute	Len Carpenter	4015 Cheney Drive	Fort Collins	CO	80526	lenc@verinet.com
54	Gordon	Younker		2814 North 1600 East	North Logan	UT	84341	gordon.younker@ut.nacdnet.net
55		Zanavoo Restaurant and Lodge		4880 East Highway 89	Logan	UT	84321	

Recipients of the PEA

TABLE 4-2
List of PEA Recipients

	First Name	Last Name	In Care of	Address	City	State	Zip	E-Mail Address
1		Stokes Nature Center		2696 East Highway 89	Logan	UT	84321	
2	Utah	Division of Drinking Water	Shelly Quick	288 North, 1460 West, Cannon Health Building, Third Floor	Salt Lake City	UT	84321	
3	Mark	Nielsen	Logan City	912 West, 1000 South	Logan	UT	84321	
4		Garden City Library	Librarian	145 W. Logan Road	Garden City	UT	84208	
5	Charlie	Condrat	Wallace F. Bennett Federal Building	8236 Federal Building, 125 South State Street	Salt Lake City	UT	84138	
6	Julie	Hubbard	Wallace F. Bennett Federal Building	8236 Federal Building, 125 South State Street	Salt Lake City	UT	84138	
		Zanavoo Restaurant and Lodge		4880 East Highway 89	Logan	UT	84321	
7	Russ	Akina		255 North Main	Logan	UT 84321		
8	Garth	Barker	White Pine Gallery	855 South Main	Logan	UT	84321	
9	Congressman Rob	Bishop	United States Congressman	324 25th Street, Suite 1017	Ogden	UT	84401	
10	John	Borg		1480 Highland Drive	North Logan	UT	84341	john@jborg.com

5.0 Response to PEA Comments

This chapter describes how public comments on the DeWitt Pipeline Rehabilitation/Replacement Project's Preliminary Environmental Assessment were addressed in this EA. Public comment letters and emails are included in Appendix 3 of this document.

Comments

Russ Akina Email

Comment: I support the project.

Response: No response required.

Utah Environmental Congress Letter

Comment: Make sure the project does not allow additional dewatering and diversion of natural waters that flow into Logan River.

Response: There will be no additional dewatering or diversion; the project is designed to capture what is now leaking, not take additional water. Sections 1.3.2 and 3.4.2.2 have been modified to address this comment.

Comment: Use certified weed-free native seed mix for restoration activities.

Response: Seed to be used for restoration will be certified noxious weed free native seed. Clarifying language has been added to Section 2.2.1.5. Additional text has been added in Section 2.7.6 that specifically addresses noxious weed management. Forest-wide Subgoal 3s dealing with noxious weed control has been added to Section 1.4.1.

Comment: A specific date after which woody vegetation could be removed should be added to the PEA.

Response: Language has been added to indicate that woody vegetation would be removed after September 30, after the active nesting period has ended, to Sections 2.2.1.2, 2.3.1, 2.7.1, and 3.3.3.2.

Comment: Specifically protect big game wintering habitat by giving specific construction dates.

Response: Forest-wide Goal G44 from the Revised Forest Plan has been added to Section 2.6.1.4. In addition, text in Sections 2.7.1 and 3.3.3.2 states "River crossing work must be scheduled at low flow, which is between September and April. Canal crossings are restricted from October 15 to April 15. River and canal crossing construction will be done as early in each of these seasons as possible in order to complete construction prior to snowfall and to avoid stressing big game as much as possible in winter months. Construction will not

occur directly in upland winter range habitat after snowfall in the winter." The USFS believes these actions will protect wintering big game.

Comment: Specifically protect bald eagles by giving specific construction dates.

Response: Specific conservation measures have been added to Sections 2.2.1.3, 2.2.1.4, 2.3.1, 2.3.2, 2.3.3, 2.7.1 and 3.3.3.2 to limit construction activities during the period from November 1 through March 30 to the time period between 9:00 am to 4:00 pm to protect bald eagles.

Comment: Ensure complete avoidance of impacts to native cutthroat trout spawning habitat.

Response: A clarifying sentence has been added to Section 3.3.2.1 indicating that no Bonneville cutthroat trout spawn below Third Dam, so there would be no effect on Bonneville cutthroat trout spawning or spawning areas.

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7.0 Acronyms, Abbreviations, and Glossary

APE	area of potential effect
ATV	all terrain vehicle
BCT	Bonneville cutthroat trout
BMPs	best management practices
CAA	Clean Air Act
cfs	cubic feet per second
EA	Environmental Assessment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FSM	Forest Service Manuals
FSH	Forest Service Handbooks
HUC	hydrologic unit code
IDT	Interdisciplinary Team
IWWI	Inland West Watershed Initiative
LCT	Landscape Character Theme
LRD	Logan Ranger District
LRMP	Land and Resource Management Plans
MGD	million gallons per day
MIS	Management Indicator Species
MOU	Memorandum of Understanding
MPCs	Management Prescription Categories
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFS	National Forest System
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NTU	nephelometric turbidity unit
NVUM	National Visitor Use Monitoring

OHV	off highway vehicle
PAOT	People at One Time
PI	preliminary issues
PSD	Prevention of Significant Deterioration
RCP	reinforced concrete pipe
RD	Ranger District
RFP	Revised Forest Plan
ROS	Recreation Opportunity Spectrum
ROW	right-of-way
RVD	Recreational Visitor Day
SAR	species-at-risk
SHPO	State Historical Preservation Office
SI	significant issues
SIA	Special Interest Area
SIO	Scenic Integrity Objective
SIP	State Implementation Plan
SMS	Scenery Management System
SOPA	Schedule of Proposed Actions
SWCP	Soil and Water Conservation Practices
T&E	Threatened and Endangered
UDDW	Utah Division of Drinking Water
UDOT	Utah Department of Transportation
UDNR	Utah Division of Natural Resources
UDWQ	Utah Division of Water Quality
UDWiR	Utah Division of Wildlife Resources
UPDES	Utah Pollutant Discharge Elimination System
USU	Utah State University
VSA	visually sensitive area
W-CNF	Wasatch-Cache National Forest
WSP	welded steel pipe
WUI	Wildland Urban Interface

Activity Area: An area of land impacted by a management activity or activities. An activity area can range from a few acres to an entire watershed depending on the type of monitoring being conducted (R2 Supplement FSH 2509.18-92-1, Section 205). Commonly, timber-sale cutting units are considered activity areas.

Landscape Character: Landscape Character gives a geographic area its visual and cultural image and consists of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. Landscape Character Themes (LCTs), include Natural Evolving, Natural Appearing, Developed Natural Appearing, Resort Natural Setting, and Water Recreation Rural Appearing.

Riparian Habitat Conservation Area: Portions of a watershed that contribute to creation and maintenance of fish habitat. Riparian habitat conservation areas may include active channels, inner gorges, floodplains, riparian vegetation, perennial and intermittent streams, wetlands, ponds, lakes, reservoirs, and landslide areas.

Scenic Integrity: Scenic Integrity indicates the degree of intactness and wholeness of the landscape character; it also is a measure of the degree of visible disruption of the landscape character. SIOs include *Very High*, *High*, *Moderate*, and *Low*. A landscape with very minimal visual disruption is considered to have high Scenic Integrity. Landscapes with increasingly discordant relationships among scenic attributes are viewed as having diminished Scenic Integrity.

Wildland Urban Interface: WUI is composed of both interface and intermix communities. In both interface and intermix communities, housing must meet or exceed a minimum density of one structure per 40 acres (16 ha). Intermix communities are places where housing and vegetation intermingle. In intermix, wildland vegetation is continuous, more than 50 percent vegetation, in areas with more than 1 house per 16 ha. Interface communities are areas with housing in the vicinity of contiguous vegetation. Interface areas have more than 1 house per 40 acres, have less than 50 percent vegetation, and are within 1.5 mi of an area (made up of one or more contiguous Census blocks) over 1,325 acres (500 ha) that is more than 75 percent vegetated. The minimum size limit ensures that areas surrounding small urban parks are not classified as interface WUI.

8.0 List of Preparers

Table 8-1 lists the individuals who contributed to the development of this EA.

TABLE 8-1
List of Preparers

Name	Agency/Firm	Role	Location
Kent Bienlien	CH2M HILL	Engineer	Salt Lake City, Utah
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