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**DOE/EA - 1262**

**FINDING OF NO SIGNIFICANT IMPACT**

**McKay Bypass Canal Extension**

U.S. Department of Energy  
Rocky Flats Field Office  
Golden, Colorado



September 1998

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**U. S. DEPARTMENT OF ENERGY**

**FINDING OF NO SIGNIFICANT IMPACT**

**McKAY BYPASS CANAL EXTENSION AT  
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE**

**SUMMARY:** The Department of Energy (DOE) has prepared an environmental assessment (EA) (DOE/EA-1262) to extend the McKay Bypass Canal on the east side of the Rocky Flats Environmental Technology Site (Site), located north of Golden, Colorado. The McKay Bypass Canal Extension (Extension) is needed to route water from the existing canal around the Walnut Creek drainage, thus preventing potential co-mingling of Broomfield city water (collected from the Coal Creek drainage) with Site runoff water.

The EA describes and analyzes the environmental effects of the Proposed Action (using a buried pipeline for the extension), and the alternatives of taking no action, using an open ditch for the extension, and using an aboveground pipeline for the extension. The EA was the subject of a public comment period from July 22 to August 6, 1998. Written comments regarding the EA were received from the City of Broomfield and the Colorado Department of Public Health and Environment.

**PROPOSED ACTION:** The Proposed Action is to construct and operate the Extension using a buried pipeline as the conveyance structure. The Extension will consist of a splitter box (located in the existing McKay Bypass Canal upstream of its confluence with Walnut Creek), a 3300 foot buried pipeline (extending from the splitter box to a point north of the existing Walnut Creek/Broomfield Diversion Ditch splitter box), a new pipe under Indiana Street, and a discharge structure at the east end of the pipeline.

Flows through the McKay Bypass Canal, and the Extension, will depend on water rights and on the quantity of water available in Coal Creek. The City of Broomfield estimates that typical flows will be 20 to 40 cubic feet per second (cfs), with peak flows up to 110 cfs.

The Extension piping will be installed in an excavated ditch, and sized to accommodate 110 cfs. Pipe will be buried from 2.5 to 12 feet deep. Surplus fill will be graded to reproduce pre-construction slopes and surface drainage conditions. Underground bentonite dam walls will be installed in the excavation trench to prevent channeled groundwater seepage, and outflow structures will allow collected water to seep to the ground surface. Manholes will be installed to allow access to the pipeline.

Standard construction methods for pipe installation will be used. Construction time is expected to be 8 to 10 weeks, projected for September through December 1998. City of Broomfield employees will operate the Extension, using existing roads. Although changes in future water routing will be dependent on the final cleanup of the Site, the Extension could be operated indefinitely.

**ALTERNATIVES CONSIDERED:** DOE considered constructing the Extension as an open ditch. The ditch would be similar in design and capacity to the existing reach of the McKay Bypass Canal. It would include a splitter box at the west end of the Extension, and discharge structure at the east end of the Extension. The Extension would be 5 feet wide at the bottom, 20 to 30 feet wide at the top, and 3.5 to 8 feet deep. Drop structures and a transition structure would be installed along the ditch. A pipeline would carry flows under Indiana Street, and would connect to the discharge structure. The ditch would be constructed using standard methods, taking about 10 to 12 weeks. Operation of the ditch would require occasional maintenance, such as mowing weeds and periodic removal of silt or other debris. Most environmental effects would be minimal and similar to the Proposed Action, although a high potential for a weed infestation would exist with this alternative, and additional maintenance (e.g., removal of silt and debris) would be necessary.

DOE considered an aboveground pipeline as an alternative conveyance structure. This pipeline was eliminated from detailed consideration because it would not have cost or design advantages, and would require additional engineering efforts. This alternative would also have environmental concerns not present with other actions, such as significant visual impacts on views from Indiana Street, difficulties in obtaining proper drainage, additional difficulty in operational access, potential pipe freezing in winter months, and potential interference with wildlife movement.

DOE also considered a No Action Alternative. If no action were to be taken, the new water conveyance structures would not be installed. Existing water management and drainage maintenance practices would be followed, and a continued potential for co-mingling of Site discharges and City of Broomfield waters would exist. Other environmental conditions would not change; there would be no impact to air quality, ecological resources, soils, cultural resources, or the noise environment.

**ENVIRONMENTAL EFFECTS:** Most potential environmental effects will be minimal and short-term.

The Proposed Action will generate minor amounts of criteria pollutants during construction. Colorado regulations that regulate smoke, opacity, and fugitive particulate emissions will apply to the project. The Proposed Action will be exempt from Air Pollutant Emissions Notice and air permitting regulatory requirements in consideration of the following requirements:

- use of all available practical methods that are technologically feasible and economically reasonable to minimize fugitive dust emissions without chemical impacts on the land;
- limit smoke emissions (not to exceed 20 percent opacity) from compressors, pumps or generators; and
- notification of the Site's air quality compliance organization if non-electric compressors, pumps, or generators will be used in conjunction with the project.

DOE will perform another evaluation once project plans are finalized and will continue to consult with regulatory representatives as needed. Projected emissions from the Proposed Action will not

affect conformity with the State Implementation Plan, nor impact Prevention of Significant Deterioration requirements. No hazardous air pollutants or ozone depleting substances will be released.

The Proposed Action will have little effect on water resources, although construction activities could temporarily increase soil erosion and sedimentation of nearby surface waters. Walnut Creek is typically dry during the summer, autumn, and winter months when construction is to occur, but erosive soils and sloped areas exist along the proposed pipeline corridor. These conditions present the greatest potential for erosion. Best management practices (e.g., siltation berms) will be implemented during construction to minimize the potential for soil erosion. The surface will be recontoured to match the existing topography and will be revegetated, minimizing erosion. Downstream water quality in Walnut Creek (east of Indiana Street) will benefit from the isolation of City of Broomfield supply waters from Site waters.

Walnut Creek does not contain aquatic threatened and endangered species or special concern species; potentially increased water flows may be beneficial for downstream aquatic species. Terrestrial animal species in the pipeline vicinity include the threatened Preble's meadow jumping mouse. Measures to minimize potential impact to the Preble's meadow jumping mouse have been incorporated. The pipeline route is generally located more than 100 yards from the mouse's habitat (at the toe of one hill, the line will be 70 yards from Walnut Creek). In addition, the mouse will be hibernating during the projected construction period. The construction and operation of the pipeline, therefore, will not disturb the Preble's meadow jumping mouse. One red-tailed hawk nest site and one great horned owl nest site are located along Walnut Creek, but these nest sites will not be directly impacted, and the birds will not be disturbed during nesting season. No plant species of concern are currently found in the construction area. However, a high potential for a weed infestation exists, given the extended area that will be disturbed and existing weed infestations. The disturbed area will be revegetated as per Site ecologists' recommendations, and weed controls instituted as appropriate. Wetland areas are at sufficient distances from the proposed route to preclude being impacted by the Proposed Action.

Cultural resources will not be affected. The Rocky Flats Plant Historic District (5JF1227) is more than a mile from the pipeline. Site 5JF513, the McKay Ditch, which is adjacent to the western terminus of the Proposed Action, was deemed ineligible for the *National Register of Historic Places*. Construction activities will generally occur within previously disturbed areas and will be unlikely to impact archaeological resources.

No adverse transportation impacts are expected. While the pipeline will cross Indiana Street, the line will be bored under the street and the street will not be closed. Construction vehicles will temporarily use the side of the street for parking and access, and will not block or impede traffic. Minimal pipeline maintenance is anticipated, and existing access roads and entrances will be used. Current procedures will be used, and Broomfield employees will be required to meet Site security measures.

There will be no health or safety impacts to the public during construction, since air emissions will negligibly change at the Site boundary. Impacts will be limited to occupational illness or injury

associated with construction activities. In view of Site construction procedures and safety history, impacts are likely to be less than the overall construction industry experience. Operation of the pipeline is not expected to affect health and safety.

Noise levels will increase slightly during construction operations, but will be evident only in the immediate area of operations. Sensitive human receptors are not found near the construction area, and wildlife will not likely be disturbed. The species of most concern, nesting raptors and the Preble's meadow jumping mouse, will not be nesting or active during the construction period.

Soils will be disturbed along the length of the pipeline. Soil slumping on hillsides and erosion during construction (soils range from moderately to severely erosive) could occur. These potential impacts will be mitigated as a result of the route selection and the use of standard operating procedures (e.g., covering stockpiled soils and revegetating exposed areas). Additional precautions, including bentonite plugs around the pipeline, weep structures, and riprap and a concrete stilling structure at the outfall, will be incorporated. A recent soil contamination survey in the Walnut Creek drainage showed very low levels of radioactive material, and no remediation or special construction techniques are required.

**FOR FURTHER INFORMATION  
ABOUT THIS ACTION, CONTACT:**

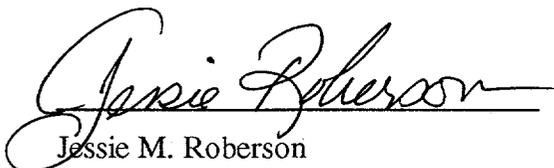
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**DETERMINATION:** Based on the information and analyses in the EA, DOE has determined that the Proposed Action to extend the McKay Bypass Canal at the Rocky Flats Environmental Technology Site does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969, as amended. Therefore, an environmental impact statement is not required, and DOE is issuing this Finding of No Significant Impact for the Proposed Action.

Signed at Golden, Colorado, this 24 day of September, 1998.



Jessie M. Roberson  
Rocky Flats Field Office  
U. S. Department of Energy

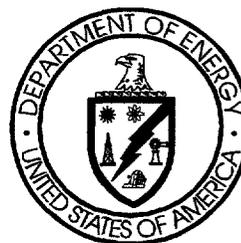
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**DOE/EA - 1262**

**ENVIRONMENTAL ASSESSMENT**

**McKay Bypass Canal Extension**

U.S. Department of Energy  
Rocky Flats Field Office  
Golden, Colorado



September 1998

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## 1.0 INTRODUCTION

This Environmental Assessment (EA) has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C 4321-4370d), and the Council on Environmental Quality (CEQ) regulations implementing the procedural provisions of NEPA (40 CFR 1500-1508); and 10 CFR 1021, Department of Energy (DOE) regulations for implementing NEPA. The purpose of the EA is to provide DOE with sufficient information to determine whether a Finding of No Significant Impact (FONSI) is supported for the Proposed Action or whether an Environmental Impact Statement (EIS) must be prepared.

### 1.1 Background

The City of Broomfield owns rights to transport water from Coal Creek, across Rocky Flats Environmental Technology Site (RFETS) real property, to the Great Western Reservoir. Water from the Great Western Reservoir is currently released by the City of Broomfield for use by downstream irrigators. The water is transported through the Upper Church Ditch, the McKay Ditch, and the McKay Bypass Canal. Water flows are dependent on City of Broomfield requirements and subsequent transfers, as well as storm events that add runoff from the surrounding drainage. The McKay Bypass Canal can handle flows in excess of 110 cubic feet per second (cfs).

The McKay Ditch originates near the mouth of Coal Creek Canyon and becomes the McKay Bypass Canal in the west buffer zone. Water in the ditch and canal flows east across RFETS north of the Industrial Area, and into Walnut Creek upstream (west) of Indiana Street. In its present configuration, the McKay Bypass Canal flows into Walnut Creek downstream from Ponds A-4 and B-5, which are designed to store stormwater runoff from the Site<sup>1</sup>. Following receipt of acceptable water quality results from the Colorado Department of Public Health and Environment (CDPHE), the Site releases water from Pond A-4 into Walnut Creek (via North Walnut Creek). If water is flowing in the McKay Bypass Canal when Pond A-4 is discharging, water from the two sources will co-mingle in Walnut Creek.

Discharges from Ponds A-4 and B-5 entering Walnut Creek, under the control of the water master and the City of Broomfield, are typically diverted around the Great Western Reservoir by the Broomfield Diversion Ditch via a splitter box located east of Indiana Street. Because the splitter box can be configured to route water from Walnut Creek directly into Great Western Reservoir, there is a potential for Site discharges to be co-mingled with City of Broomfield water in Great Western Reservoir. Such co-mingling may contradict Broomfield's agreement with some water users that their water will not be co-mingled with water from the RFETS.

### 1.2 Purpose and Need for Action

DOE is responsible for managing discharges generated at RFETS in an environmentally acceptable manner and in compliance with local, state, and federal regulations. To address

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<sup>1</sup> Discussions are currently being conducted between DOE, EPA, CDPHE, and the City of Broomfield regarding the option of direct discharges from Pond B-5 into South Walnut Creek using the newly upgraded Pond B-5 outlet works.

these objectives, DOE has committed to manage Site runoff at RFETS in a manner that allows transport of City of Broomfield water across RFETS boundaries in a fashion that eliminates co-mingling of Site discharges with Broomfield water. DOE plans to eliminate the potential for co-mingling of water discharged from the Site with waters the City of Broomfield is transferring from Coal Creek to Great Western Reservoir.

## 2.0 DESCRIPTION OF ALTERNATIVES

DOE proposes to extend the McKay Bypass Canal in order to route water from the existing Canal north of the Walnut Creek drainage on the east side of RFETS, thus preventing potential co-mingling of Broomfield city water (collected from the Coal Creek drainage) with Site runoff water. The Extension, shown in the context of existing RFETS drainage patterns, is depicted in Figure 2-1. An overall description of the Extension and its function is provided in the following paragraphs. DOE considered various alternatives that included a buried pipeline, an open ditch, an above ground pipeline, as well as continuing to route the McKay Bypass Canal water through Walnut Creek (the No Action Alternative).

### 2.1 Proposed Action – Buried Pipeline

The Proposed Action is to construct and operate the McKay Bypass Canal Extension using a buried pipeline as the conveyance structure. The proposed route and a typical cross-section for the pipeline structure are shown in Figures 2-2 and 2-3, respectively. The Extension would include the following components:

- a splitter box in the existing McKay Bypass Canal channel about 3300 feet west of Indiana Street, upstream of its confluence with Walnut Creek;
- a buried pipeline extending from the splitter box on the west side of Indiana Street to a point about 570 feet north of the existing Walnut Creek/Broomfield Diversion Ditch splitter box (a total distance of about 3300 feet);
- a new pipe under Indiana Street at that location, extending about 120 feet east from Indiana Street, and then turning south for about 600 feet; and
- a discharge structure at the end of the pipeline, approximately 12 feet wide by 60 feet long and 5 feet deep, which would empty into the Walnut Creek drainage (flowing into Great Western Reservoir) downstream of the existing splitter box.

Flows through the McKay Bypass Canal, and therefore through the Extension, would depend on water rights and on the water available in Coal Creek. The City of Broomfield estimates that typical flows would be 20 to 40 cubic feet per second (cfs), with peak flows up to 110 cfs. Accordingly, the Extension structure would be sized to accommodate the peak flow of 110 cfs.

From the McKay Bypass Canal Extension splitter box, a 48-inch diameter pipe would be installed. At a point approximately 800 feet east of the splitter box, a 48 – 42 inch reduction structure would be installed; the remainder of the Extension, from this point to the discharge structure east of Indiana Street (a distance of about 2500 feet), would consist of 42-inch diameter pipe. A 54-inch diameter steel casing would be installed around the pipe where the Extension is bored under the Indiana Street road grade.

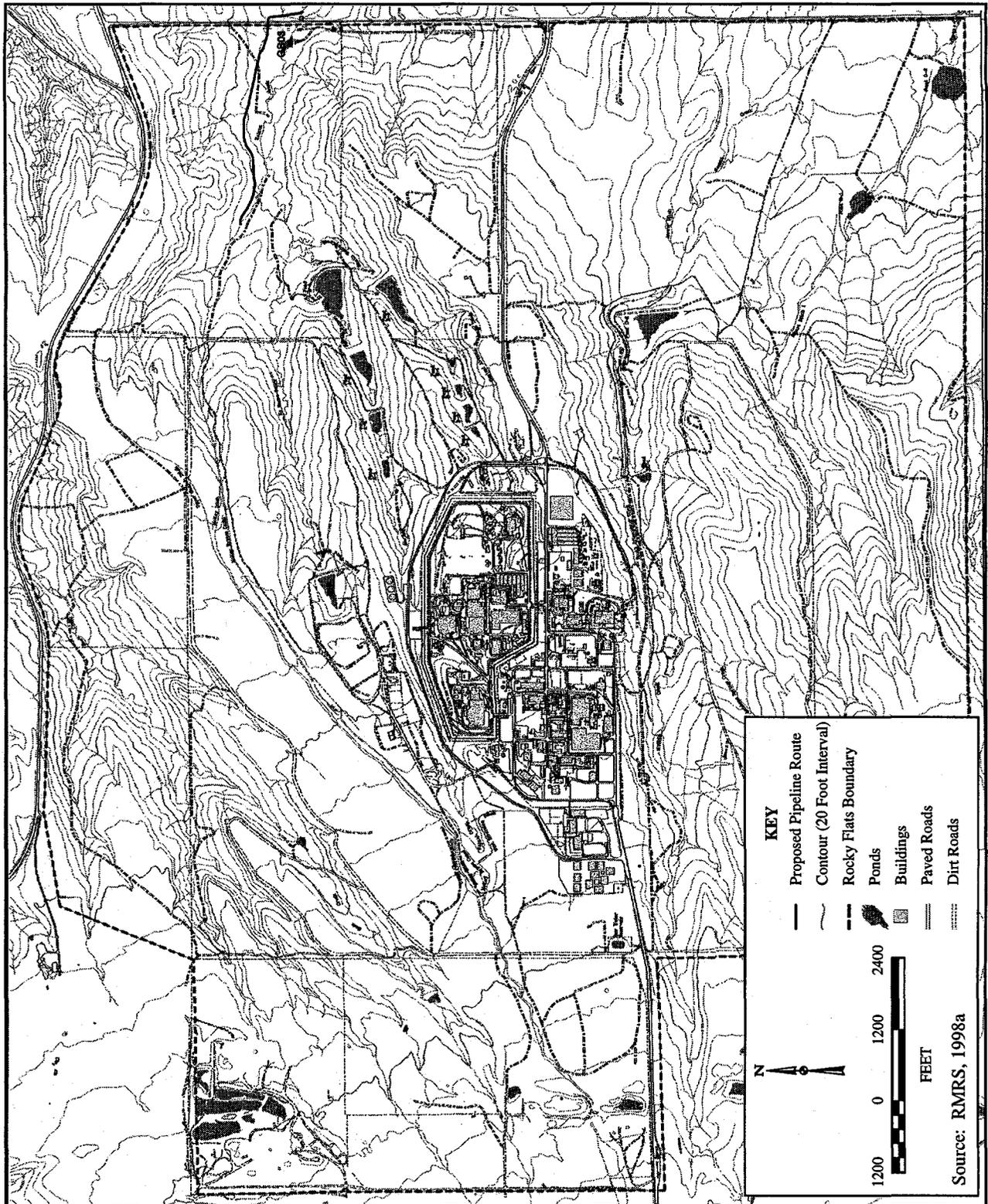


Figure 2-1. RFETS Site Map

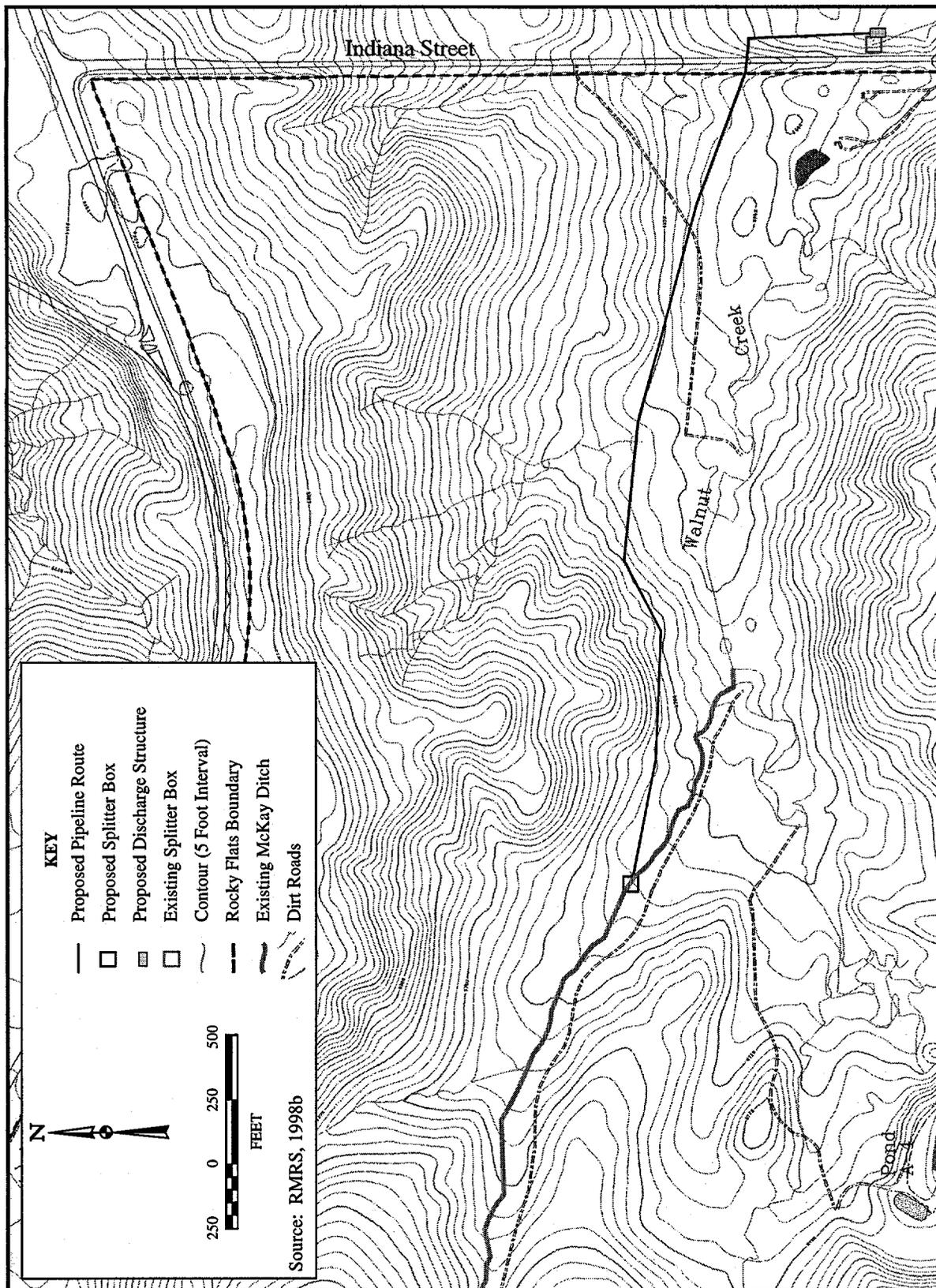


Figure 2-2. McKay Bypass Canal Extension Route - Proposed Buried Pipeline



The Extension piping would be installed in an excavated ditch. The ditch bottom would be lined with gravel to provide structural support, and the excavation back-filled with screened excavated soil. Burial would be at a depth of 2.5 to 12 feet from the top of the pipe to the existing ground surface. Surplus fill would be graded as required to reproduce native (pre-construction) slopes and surface drainage conditions.

Underground bentonite dam walls would be installed in the excavation trench at three locations along the pipe route to prevent channelized ground water seepage along the pipe structure. Outflow structures would also be installed at these locations to allow collected water to seep to the ground surface. Four manholes would be installed at appropriate locations along the pipe west of Indiana Street. An additional manhole would be installed immediately east of Indiana Street.

Construction methods would employ standard practices for pipe installation and would comply with applicable industry, regulatory, and Site procedures. Equipment would include typical earth-moving machines (e.g., back-hoes, trenching equipment, road graders), as well as large-scale pipe-handling equipment (e.g., cranes). Construction time for the buried pipe alternative is expected to be 8 to 10 weeks, and is currently projected for September through December 1998.

When the Extension is complete, City of Broomfield employees would be granted access to the channel within the Site boundaries to perform all tasks associated with routing water through the new pipeline. Access to the Extension would be via existing roads, and no additional access roads would be constructed. Little maintenance equipment is likely to be needed; pickup trucks carrying personnel and equipment would normally be sufficient.

Current plans are for the Extension to be operated indefinitely. However, after the Site has been closed, Broomfield could revert back to running the McKay Bypass Canal water through Walnut Creek. Any such changes in future water routing would be dependent on the final cleanup of the Site.

## 2.2 Alternative Actions

### 2.2.1 Open Ditch

In this alternative, the Extension structure would be constructed as an open ditch, similar in design and capacity to the existing reach of the McKay Bypass Canal. The splitter box at the west end of the Extension and the discharge structure would be constructed as described in Section 2.1. The proposed route and a typical cross-section for the open ditch structure are shown in Figures 2-4 and 2-5, respectively.

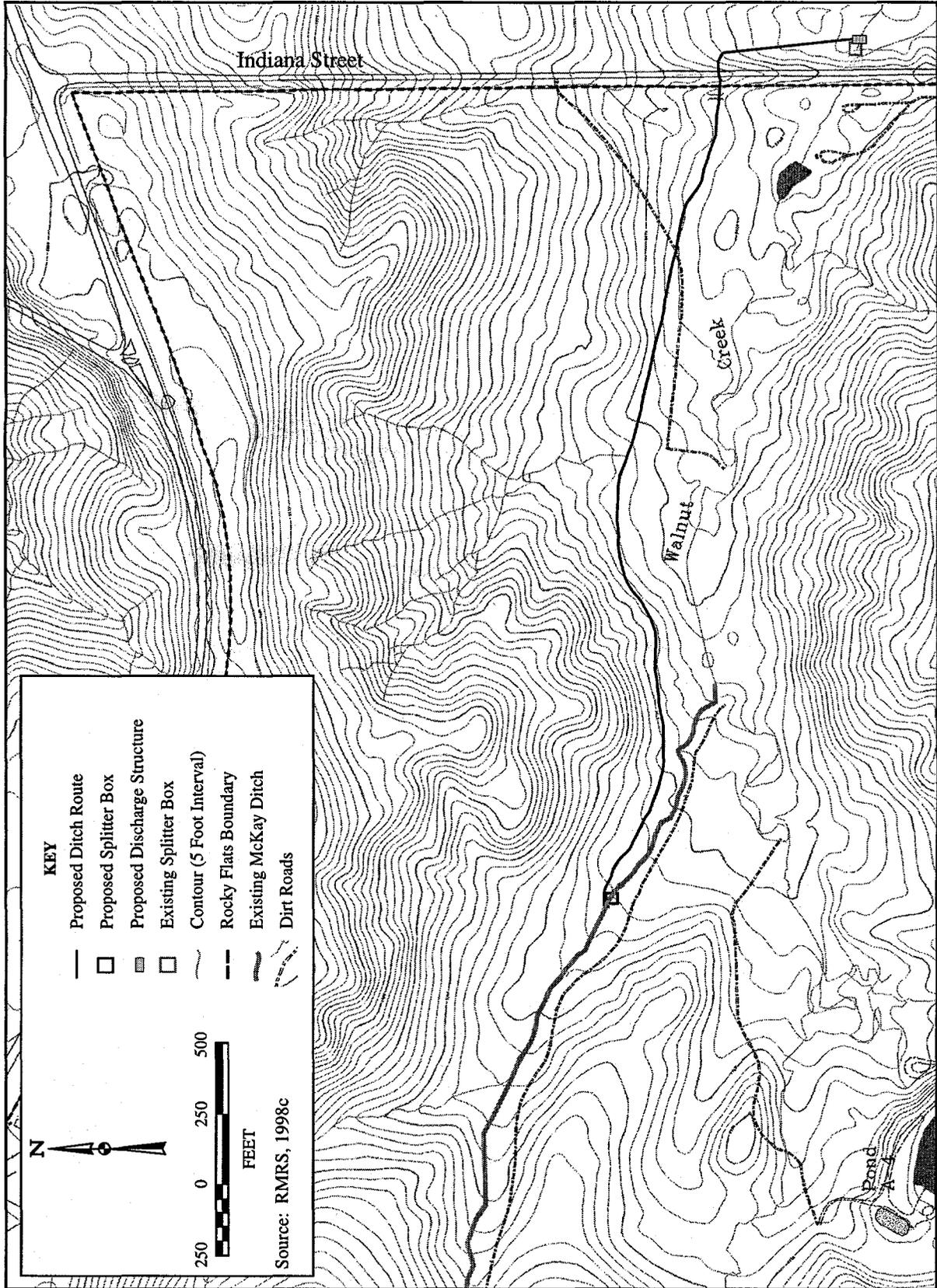


Figure 2-4. McKay Bypass Canal Extension Route - Open Ditch Alternative

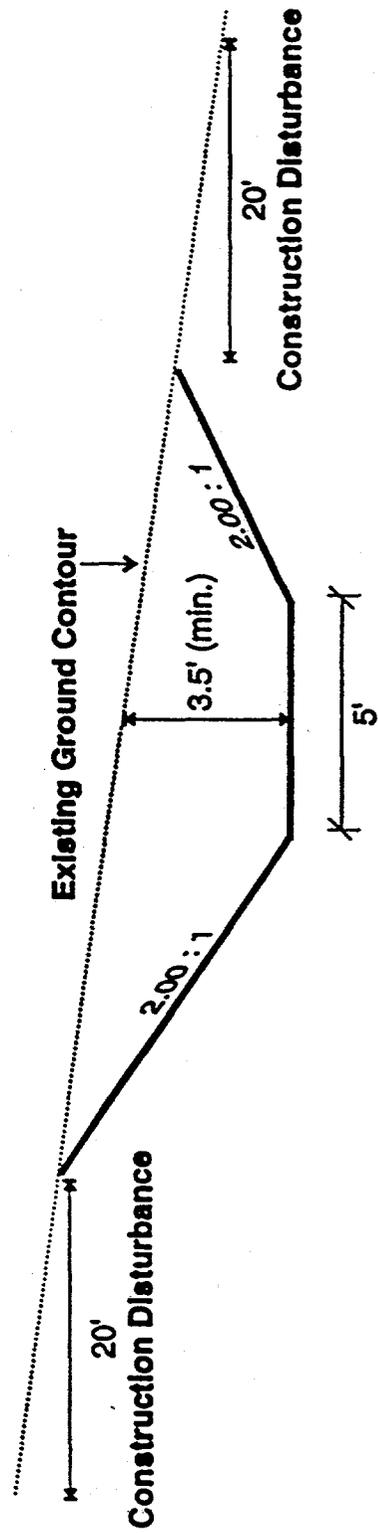


Figure 2-5. Open Ditch Alternative, Typical Cross Section  
(not to scale)

The Extension would be constructed as an open ditch with nominal cross-sectional dimensions of:

- bottom width: 5 feet
- side slopes (horizontal to vertical): 2:1
- depth: 3.5 to 8 feet, depending on existing topography
- top width: 20 to 30 feet, depending on existing topography

Basic slope for ditch reaches would be .007 foot vertical per foot horizontal. Six drop structures, varying in height from 3.5 to 6 feet, would be installed along the Extension to accommodate variations in natural topography. The bottom of the ditch would be at 2 to 10 feet below existing grade. A drop box/transition structure would be installed just west of Indiana Street, which would direct flow into a 48-inch reinforced concrete pipe jacked under the road grade. This pipe would transition through a base box on the east side of the road to a 42-inch pipe, which would connect with the discharge structure as described in Section 2.1.

Construction methods would employ standard practices for ditch construction and would comply with applicable industry, regulatory, and Site procedures. Equipment would include typical earth-moving machines (e.g., backhoes, trenching equipment, and road graders). Construction time for the ditch alternative is expected to be 10 to 12 weeks. Operation of the ditch would require occasional maintenance, typically including mowing or other control of vegetation growing in the ditch, and periodic removal of silt or other debris from the ditch. Needed equipment could include pickup trucks, mowers, and a small backhoe.

### 2.2.2 No Action

In the No Action Alternative, no new water conveyance structures would be installed. The possibility would continue to exist for the City of Broomfield water to co-mingle with water from the Walnut Creek drainage, which periodically flows from the RFETS industrial area as surface runoff. Existing water management and drainage maintenance practices would continue.

### 2.3 Alternatives Not Analyzed in Detail

An aboveground pipeline was considered as an alternative for the McKay Bypass Canal Extension conveyance structure. It was eliminated from detailed consideration because it does not present significant cost or design advantages, and would involve several additional engineering and environmental concerns not present with either of the action alternatives described above, including:

- significant visual impact on views from Indiana Street;
- additional difficulty in obtaining proper drainage slopes;
- additional difficulty in operational access;
- potential operational problems from in-pipe freezing in the winter months; and
- potential interference with wildlife movement.

## 2.4 Related Actions

In conjunction with construction of the McKay Bypass Canal Extension, DOE plans to grant to the City of Broomfield a permanent easement along the route of the Extension to allow maintenance and inspection of the Extension structure. This real estate action would produce no environmental effects, beyond those impacts from construction and operation of the Extension, as described in this EA.

### 3.0 AFFECTED ENVIRONMENT

RFETS is located on 6,266 acres in rural northern Jefferson County, Colorado, 16 miles northwest of downtown Denver. The Rocky Flats Industrial Area occupies approximately 400 acres in the middle of the Site. The remaining property forms a Buffer Zone around the active part of Rocky Flats. The Buffer Zone provides a distance of more than one mile between the developed portion of the Site and any public road or private property. The communities of Leyden, Boulder, Broomfield, Westminster, Arvada, Superior, and Golden surround the Site.

State Highway 128 borders the Site to the north, and Indiana Street borders the Site to the east. Land directly north of Highway 128 is largely dedicated to open space. Land east of Indiana Street is zoned industrial/commercial to the north, and open space to the south. The City of Broomfield owns the open space to the south of the Site, which includes Great Western Reservoir. The remaining land bordering the Site on the east is zoned agricultural, with a projected plan showing an open space designation. Previous Jefferson County open space east of RFETS is now owned by Westminster. To the south of the Site, privately owned land is used for grazing and hay production, and is zoned agricultural/commercial. To the west, the Site is bordered by private land between the west boundary and State Highway 93. The land to the west is used for quarrying and industrial development. The land southwest of RFETS is owned by the State of Colorado, and is permitted for grazing and mining.

#### 3.1 Environmental Resources Not Affected

Potential impacts to floodplains and socioeconomics, particularly minority and low-income populations (i.e., environmental justice) have not been analyzed in the EA given the nature of the proposed activities and/or the absence of these resources from the affected area.

Specifically, Rocky Flats is not located within the 100-year floodplain as classified by the U.S. Army Corps of Engineers (USCOE, 1992). With respect to socioeconomics, the proposed construction would require only a small crew derived from the local population, and project operation would require only a small maintenance crew currently employed by the City of Broomfield. No disproportionate adverse impacts on any minority or low income populations would be expected, for the following reasons:

- potential impacts from the Proposed Action would result primarily from construction activities which are expected to be minimal and short term in duration;
- the surrounding area is relatively undeveloped; and
- the Proposed Action would eliminate any co-mingling of Site water with City of Broomfield water, and result in a beneficial impact to downstream irrigation water supplies, including Great Western Reservoir, which serves the City of Broomfield for irrigation purposes.

#### 3.2 Potentially Affected Resources

Since the Proposed Action would involve new construction in a relatively undeveloped area, it could affect sensitive environmental resources such as wetlands, wildlife (including threatened and endangered species), and archaeological or cultural resources. Construction activities could

adversely affect air, water, and soil resources. Traffic flow along Indiana Street could also be affected during installation of the pipeline under Indiana Street, even if the installation is accomplished by boring rather than open pit construction. The specific resources that may be affected by the Proposed Action are grouped into the following areas for analysis in this EA:

- air quality;
- water quality and quantity;
- ecological (including wetlands and threatened and endangered species);
- cultural;
- transportation;
- noise; and
- soils.

### 3.2.1 Air Quality

Rocky Flats is located within the Metropolitan Denver Intrastate Air Quality Control Region No. 36 (Region). The Region is designated as nonattainment with respect to the National Ambient Air Quality Standards for particulate matter less than 10 microns in size ( $PM_{10}$ ), ozone, and carbon monoxide. The Region is listed as attainment for sulfur dioxide and nitrogen dioxide (40 CFR 81.306). The particulate matter standard is exceeded within the Region primarily because of fugitive dust. Vehicular traffic is a major contributor to the high concentration of ozone and carbon monoxide in the region (DOE, 1997a). The nearest offsite point source (a source of fugitive dust and other criteria emissions), located immediately west and northwest of RFETS, is an open pit gravel mining operation.

The air quality is generally better at Rocky Flats than in the urbanized portion of the Denver Metropolitan Area, and air emissions from Rocky Flats are within permitted limits for all pollutants for which there are standards (DOE, 1997a). The principal point sources of criteria pollutants at the Site historically have been the steam plant boilers. Minor combustion sources include smaller boilers and emergency generators. Other sources of criteria pollutants include coating operations and particulate matter from various manufacturing operations. Laboratories and waste management operations emit primarily toxic pollutants. Site cleanups and minor construction procedures can require dust suppression to control fugitive dust.

### 3.2.2 Water Resources

#### Surface Water

The Site is situated within the headwaters of two regional drainage basins: Boulder Creek basin and Big Dry Creek basin. Three intermittent systems within these basins drain the Site: Walnut Creek, Woman Creek and Rock Creek. The Proposed Action is located within the Walnut Creek drainage. The estimated long-term average annual yields of Walnut Creek at Indiana Street is 34.5 acre-feet (DOE, 1996). This natural yield is low and the stream is considered to be essentially dry most of the year, except during storm events and from May through June. Additionally, Walnut Creek receives RFETS pond discharges year round. Discharges average ten times per year and last approximately fourteen days per discharge.

Walnut Creek is an east-flowing stream that drains the central portion of the Site, including most of the Industrial Area and the Protected Area. It has been influenced by past production and disposal activities at the Site. Runoff from the developed areas to this drainage occurs faster and with greater volume than under natural conditions. Within Site boundaries, Walnut Creek includes three major branches: South Walnut Creek, North Walnut Creek, and a northern tributary locally referred to as the "unnamed tributary." These tributaries converge in the eastern portion of the Site. Portions of the North Walnut drainage are utilized for the McKay and Upper Church Ditches.

Walnut Creek headwaters are on the broad Rocky Flats pediment between Coal Creek and the western boundary of the Site. The drainage basin upgradient of Indiana Street covers approximately 2,375 acres. Water in Walnut Creek, including City of Broomfield water from Coal Creek, flows toward the Great Western Reservoir. These waters are currently released for use by downstream irrigators. A water diversion project, which has been in place since 1992, redirects discharges from the Site around this reservoir. Flow rates measured at Indiana Street in 1992 ranged from 0 to 11 cfs, and were highest during the spring. The stream is typically dry during much of the late summer, fall, and winter, except during pond discharges as discussed above.

Surface water in the Walnut Creek drainage is collected and analyzed in a series of detention ponds prior to being discharged from the Site. The ponds were constructed as part of runoff control and pollution prevention programs at the Site. North Walnut Creek receives most of its flow from surface water runoff from the northern portion of the Site's industrial area. North Walnut Creek runoff is controlled through a series of four in-channel detention ponds referred to as the A-series ponds. South Walnut Creek receives most of its flow from surface water runoff from the central portion of the industrial area and discharges from the Site's wastewater treatment plant. South Walnut Creek runoff is controlled through a series of five in-channel detention ponds referred to as the B series. The existing McKay Bypass Canal diverts water from Coal Creek around the Site to a point downstream of Pond A-4, which is the terminal pond in the A series. The stream channels below each pond are usually dry, or almost dry, except during a batch release. Walnut Creek is typically dry from Pond A-4 to Indiana Street, except when water is being discharged from Pond A-4 (which occurs every 45 days on average).

Surface water monitoring at the Site focuses on Walnut Creek and Woman Creek drainages. Discharges from Ponds A-4 and B-5, the terminal pond on South Walnut Creek, are monitored under the National Pollutant Discharge Elimination System Permit Program and the Rocky Flats Cleanup Agreement.

More information on the surface water characteristics at the Site can be found in the Rocky Flats Environmental Technology Site Cumulative Impacts Document (DOE, 1997b). A map showing the proposed pipeline route with respect to surface water features at the Site appears in Figure 2-1.

### Groundwater

Two non-hydraulically connected groundwater systems are present at Rocky Flats. The upper unit exists as an unconfined aquifer and the lower unit as a confined aquifer. The contact separating the two units is identified as the base of the weathered zone.

Aquifer recharge occurs through direct infiltration or percolation, infiltration from surface water when the water table lies below a stream or canal, inter-aquifer leakage (or flow from one aquifer to another), and infiltration from artificial sources, such as detention ponds, surface water impoundment, sewer lines, and dry wells.

Groundwater monitoring has been conducted at Rocky Flats since 1960. The unconfined aquifer contains both radiological and nonradiological contaminants. It is highly unlikely that groundwater contamination could leave Rocky Flats and migrate into the confined aquifer system offsite (DOE, 1995; 1996b).

### 3.2.3 Ecological Resources

The Site consists of upland surfaces and gentle hillsides that support a diverse association of native grasses, forbs (wildflowers), subshrubs (low shrubs), and cacti typical of prairie environments in the Region. Vegetation in the area of the Proposed Action consists mainly of mesic (moderate moisture) mixed grassland, and scattered areas of short upland shrubland and riparian (river bank) woodland along Walnut Creek.

Wildlife at the Site is generally characteristic of prairie habitats. A variety of mammals (e.g., mule deer, white-tailed deer, rabbit, coyote, raccoon, beaver, mice), reptiles (e.g., bullsnake, garter snake, prairie rattlesnake, eastern fence lizard), and amphibians (e.g., chorus frog, tiger salamander) are found at the Site. Over 160 species of birds, including waterfowl (e.g., ducks, geese, and shorebirds) and raptors (e.g., red-tailed hawks, great horned owls) have been identified at the Site. Typical wildlife found in the area of the Proposed Action are species that frequent or intermittently use grasslands (e.g., meadowlarks, deer). Due to its intermittent nature, upper Walnut Creek does not support sizable amounts of aquatic species. Minnow species have been observed in small impoundments in Walnut Creek.

### Threatened and Endangered Species

There are 47 federal- and state-listed threatened, endangered, and other special status species that may be found on or in the vicinity of the Site. RFETS designates all state- and federal-listed species, as well as other species that have been noted as being of special value by Site ecology personnel, as special concern species. Two threatened or endangered species use the Site seasonally (bald eagle and American peregrine falcon). Ten federal species-of-concern and four Colorado species-of-special-concern have been documented at the Site. The only special concern species that has been observed in the project vicinity, however, is the Preble's meadow jumping mouse (*Zapus hudsonius preblei*).

The Preble's meadow jumping mouse was listed by the U.S. Fish and Wildlife Service as a threatened species in the May 13, 1998 *Federal Register* 26517-26530. Preble's meadow jumping mouse is a resident of many of the riparian areas at Rocky Flats, and has been recorded in all major drainages at the Site, including Walnut Creek in the vicinity of the proposed pipeline. The apparent preferred habitat for this species is moist riparian areas that contain willows. Critical habitat for the mice has not been determined, although it is postulated by Site biologists that the species is surviving and reproducing under current ecological conditions. Currently, further study is being conducted to clarify species specific habitat and occurrence at the Site (DOE, 1996).

No threatened and endangered plant species have been found in the potentially affected area. The RFETS Buffer Zone has habitat that is potentially suitable for the Ute Ladies'-tresses, a federally-listed threatened species (ESCO, 1993). Individuals of the species have not been found in annual Site-wide surveys. A small community of a Colorado plant species-of-special-concern, the forktip threeawn, has been identified along the railroad tracks near the west access road to the Site. Habitat suitable for a federally-proposed plant species, the Colorado Butterfly Plant, exists in the Buffer Zone, but no individual of the species has been found in Site surveys.

#### Wetlands

Eleven hundred wetlands at the Site were delineated in 1994 by the U.S Army Corps of Engineers. The reaches of Walnut Creek and its tributaries were found to contain vegetation within the active channel and were classified as palustrine wetlands. Specifically, Walnut Creek was found to contain 43 slope wetland areas totaling 8.06 acres, and 300 stream bottom wetland areas totaling 40.08 acres (DOE, 1996). Limited wetland areas exist along the Walnut Creek and McKay Bypass Canal in the vicinity of the proposed pipeline route.

#### 3.2.4 Cultural Resources

The Site includes important historic and cultural resources that have been identified through systematic surveys conducted by the Department of Energy. Systematic cultural resource surveys have been conducted in the entire Buffer Zone, including the project area (Burney, 1989; DOE, 1991). During the 1989 cultural resource survey, the McKay Ditch was registered with the Colorado State Historic Preservation Office as site 5JF513. The site, which consists of a bermed irrigation ditch constructed in 1882, extends west and east from the western terminus of the proposed pipeline. This site was determined not eligible for the National Register of Historic Places on February 28, 1989. Of greater historical significance is the Rocky Flats Plant Historic District (5JF1227), which was placed on the National Register of Historic Places on May 19, 1997. The site of the Proposed Action is more than a mile from the nearest Rocky Flats Plant Historic District Boundary.

#### 3.2.5 Transportation

Traffic in the immediate vicinity of the Site is served by four local highways: State Highways 72, 93 and 128 and Jefferson County Highway 17 (Indiana Street). Access to the Site is available from State Highway 93 on the west via the West Access Road and from Indiana Street on the east via the East Access Road. Maintenance of the McKay Bypass Canal is conducted

via existing dirt trails, which can be accessed from within RFETS and from Indiana Street at a point just north of Walnut Creek. The trails are shown in Figures 2-2 and 2-4. Broomfield personnel responsible for maintenance must obtain and use RFETS badges, and follow RFETS security measures as directed.

Local traffic resulting from Site activities includes both cargo-related and non-cargo related travel. Cargo-related traffic includes shipments of non-hazardous materials, such as supplies and construction materials, and waste shipments transported off Site to local commercial facilities. Non-cargo related travel consists primarily of private vehicle traffic by employees and contractor personnel. Commuter travel is the largest contributor to traffic.

### 3.2.6 Noise

No sound level measurements have been made at Rocky Flats to determine background sound levels. Major noise sources at Rocky Flats occur within the industrial facilities on the Site. These facilities are far enough from the Site boundary that their noise is barely distinguishable from background noise. Traffic is the primary source of noise at the Site boundary and at nearby residences. However, RFETS onsite traffic contributes little to overall traffic noise. Traffic noise from other sources dominates sound levels along major roads in the area.

### 3.2.7 Soils

Soils in the central and eastern portions of the Walnut Creek basin are fine grained and have low to moderate infiltration rates.

Soil types in the immediate project vicinity have the following characteristics:

- Denver clay loam, 2 to 5 percent slopes: deep, well-drained soil on high terraces, tablelands, and fans; slow permeability; high available water capacity and medium runoff; moderate hazards from water erosion and soil blowing; high shrink-swell potential.
- Englewood clay loam, 0 to 2 percent slopes: deep, well-drained soil on alluvial fans and in drainageways; slow permeability and high available water capacity; slow runoff; slight hazard from water erosion and moderate hazard from soil blowing; high shrink-swell potential.
- Haverson loam, 0 to 3 percent slopes: deep, well-drained soil on floodplains and low terraces; moderately slow permeability and high available water capacity; slow runoff; slight hazard due to water erosion and moderate hazard due to soil blowing; subject to very brief periods of flooding in spring and summer.
- Leyden-Primen-Standley cobbly clay loams, 15 to 50 percent slopes:
  - Leyden soil - found on hill slopes and convex ridges; moderately deep and well drained; formed in calcareous, cobbly, gravelly and clayey material derived from mixed sources; slow permeability and low water capacity; rapid runoff; severe

hazard from water erosion and slight hazard from soil blowing; high shrink-swell potential.

- Primen soil - slow permeability and low available water capacity; rapid runoff; severe hazards from water erosion; a slight hazard from soil blowing.
- Standley soil - deep and well-drained with a slow permeability; high available water capacity; rapid runoff; severe hazard from water erosion and slight hazard from soil blowing; moderate to high shrink-swell potential.

## 4.0 ENVIRONMENTAL IMPACTS

This chapter discusses the potential impacts from implementing the Proposed Action (buried pipeline), Alternative Action (open ditch), or the No Action Alternative. Impacts are usually defined as long-term (lasting well beyond the period of construction), or short-term (occurring during and immediately after construction activities). Long-term impacts can result from single events, or as the result of many small but cumulative impacts. Short-term impacts would be obvious and may be disruptive.

Adverse impacts can often be mitigated through avoidance, minimization, remediation, reduction, or compensation. Certain mitigation measures may be required by law. This document presents mitigation measures and best management practices that are necessary, or may be useful, in minimizing environmental impacts of the McKay Bypass Canal Extension Project. These discussions are located within each resource area.

This chapter is organized by resource element in the same order as introduced in Chapter 3. The analysis of the impacts of the Proposed Action is discussed for each resource section. These sections are followed by a discussion of the potential impacts of the Alternative Action and No Action Alternative. Cumulative impacts are addressed at the end of the section.

### 4.1 Proposed Action

#### 4.1.1 Air Quality

The Proposed Action would have short-term adverse impacts on ambient air quality from the generation of fugitive dust during construction activities.

The air quality analysis was based on a review of existing air quality in the region, information on RFETS air emission sources, and projections of emissions that would be generated during construction of the buried pipeline. An increase in criteria pollutant emissions that could affect regional air quality attainment standards, or a long-term exposure to a hazardous air pollutant (HAP) or any other air pollutant above the permissible exposure limit (PEL), would be considered adverse. A reduction in air pollutant emissions would be beneficial.

The Proposed Action would generate minor amounts of criteria pollutants during the construction of the pipeline. Exhaust emissions from the operation of construction equipment (e.g., dozer, trencher, trucks) would be minimal given the intermittent and short duration of use, and would not be expected to be a concern.

Uncontrolled total suspended particulates and PM<sub>10</sub> air emissions resulting from construction of the proposed pipeline are estimated to be 0.63 tons and 0.35 tons, respectively. Based on the Colorado Air Quality Control Commission (CAQCC) Regulation No. 3 (Part A, Section II.D.1.a), the Proposed Action would be exempt from Air Pollutant Emissions Notice (APEN) or air permitting regulatory requirements. Parts of CAQCC Regulation No. 1, which regulate

smoke, opacity, and fugitive particulate emissions, would apply to the proposed project. As such, DOE would comply with the following regulatory requirements:

- utilization of all available practical methods that are technologically feasible and economically reasonable to minimize fugitive dust emissions without chemical impacts on the land;
- limitations on smoke emissions (not to exceed 20 percent opacity) from compressors, pumps or generators; and
- notification of Air Quality Management if non-electric compressors, pumps, or generators would be used in conjunction with the project.

With implementation of the above measures (e.g., use of non-chemical dust suppression techniques), the proposed Extension is expected to be exempt from any air permitting requirements. DOE would perform another evaluation once project plans are finalized and will continue to consult with regulatory representatives as needed (Kaiser-Hill, 1998).

Projected emissions from the Proposed Action would not affect conformity with the State Implementation Plan, nor would they impact Prevention of Significant Deterioration requirements. No hazardous air pollutants or ozone depleting substances would be released.

There are no long-term adverse impacts to air quality associated with operation of the proposed pipeline, unless maintenance or replacement activities would include construction. If construction activities are necessary, the measures listed above would apply.

#### 4.1.2 Water Resources

Direct impacts to water resources would result from ground disturbing activities during and after construction, and from alterations to surface hydrology. Short-term disturbances from construction activities could increase soil erosion and lead to increased sedimentation of nearby surface waters. However, best management practices would be implemented during construction to minimize the potential for soil erosion. In addition, Walnut Creek is typically dry during the summer, autumn, and winter months when construction is currently proposed to occur (September through December).

To evaluate the potential water quality impacts, documents on the hydrology and hydrogeology of the area, construction methods, and maps showing topography, watersheds, and stormwater drainage were reviewed. The review focused on the proposed pipeline construction, topography and runoff, and water quality. Adverse effects would occur if water quality were degraded to a point where it does not meet the standards set for its designated uses, available water supplies were inadequate for projected needs, or the groundwater recharge area or yield were to decrease as a result of a Proposed Action. The impact would be beneficial if groundwater recharge, surface water storage, or water quality were improved.

Minor changes to surface waters and groundwater flow would occur along the proposed route as a result of the Proposed Action. Water flow offsite would increase, since there would be no evaporative loss for the length of the pipeline. Construction of the Extension would not otherwise affect the volume of water transferred across RFETS property, since the existing

McKay Bypass Canal could handle increased water volumes that may be transferred by the City of Broomfield. Only the means of conveyance (pipeline versus ditch), and location (the proposed pipeline paralleling Walnut Creek), would be different.

Groundwater recharge would remain essentially unchanged. Subsurface water flows in the watershed (i.e., from rain events) would be intercepted by the pipeline. However, this water would be released at weep structures, constructed as part of the pipeline, and would continue flowing downhill toward Walnut Creek. Generally, the McKay Bypass Canal has been dry, and has contributed very little to water flows in Walnut Creek (over 80 percent of the water flowing through Walnut Creek has been contributed by flows from Pond). Because very small changes in flows to Walnut Creek would occur, if any, and since water flows in Walnut Creek are infrequently and inconsequentially increased from the existing McKay Bypass Canal water flows, the Proposed Action would have little effect on water resources.

Construction activities could result in increased sedimentation of nearby surface waters (i.e., Walnut Creek) from soil erosion. Erosive soils and sloped areas, both of which exist along the proposed pipeline corridor, present the greatest potential for erosion. However, the proposed pipeline layout would avoid steeper slopes, and would be laid along generally level topographic contour lines. The surface would be recontoured to match the existing topography and would be revegetated, thereby minimizing any erosion. The potential for soil erosion would be short-term, lasting until the revegetation is successful, and would be mitigated by the use of standard construction erosion prevention techniques (e.g., siltation berms).

Downstream water quality in Walnut Creek (east of Indiana Street) would benefit from the isolation of City of Broomfield supply waters from Site water.

#### 4.1.3 Ecological Resources

Ecological resources include plants and animals that may be directly or indirectly impacted by the Proposed Action. There would be minimal short-term impacts to ecological resources as the result of the Proposed Action.

The ecological resource discussion includes plants and animals found at, and near, RFETS, with primary focus on the proposed pipeline location relative to the habitat of special concern species (i.e., Preble's meadow jumping mouse), and any raptor nesting sites which would be protected under an existing agreement with the U.S. Fish and Wildlife Service (Exponent, 1998). Wetlands and aquatic species were also considered. RFETS Site ecologists conducted an onsite review of the pipeline route and identified potential concerns. A review of vegetation types, Preble's meadow jumping mouse habitat, wetland maps, and water flow regimes was conducted. Impacts to ecological resources would be considered adverse, and may require mitigation, if a special concern species would be potentially disturbed, an animal population would be completely displaced with no potential re-establishment of the population after completion of the action, or wetlands would be disturbed. An increase in population numbers or increased viability of a species (though not a weed or pest species) would be beneficial.

Aquatic species found in Walnut Creek would not be substantially affected by the construction and operation of the pipeline. While current flows from McKay Bypass Canal to Walnut Creek

(the portion of Walnut Creek in the buffer zone) would be eliminated by the Proposed Action, this portion of the creek is of limited value for aquatic species due to intermittent and low flows. In addition, the McKay Bypass Canal has generally been dry, and has contributed little to water flows in Walnut Creek. Walnut Creek does not contain aquatic threatened and endangered species or special concern species.

Although the overall water flows to the area's drainages would not change, flows to Walnut Creek east of RFETS (Indiana Street) could increase as a result of rerouting water flows. Increased water flows would be beneficial for downstream aquatic species. The new flow regime would not be expected to increase or decrease flows to the upper Platte River drainage, and no impact to downstream threatened and endangered species would be expected to occur.

No plant special concern species are found in the potentially disturbed area. Terrestrial animal special concern species in the vicinity of McKay Bypass Canal Extension include Preble's meadow jumping mouse and two raptors: the red-tailed hawk (nest site) and the great horned owl (nest site).

Habitat for the endangered Preble's meadow jumping mouse is found along the Walnut Creek, as shown in Figure 4-1. Measures have been included in the project design to minimize potential impact to this species. The majority of the proposed pipeline route has been located at a distance of more than 100 yards from this habitat. Although the pipeline would, at the toe of one hill, come within 70 yards of Walnut Creek, the proposed construction activities would not affect the Preble's meadow jumping mouse. In addition, the Preble's meadow jumping mouse would likely be hibernating during the projected construction period (September through December). The construction and operation of the pipeline, therefore, would not disturb the Preble's meadow jumping mouse. Additionally, the project is designed to allow naturally occurring flows to continue down the existing ditch to Walnut Creek. The project is being reviewed through informal consultation with the U.S. Fish and Wildlife Service.

One red-tailed hawk nest site and one great horned owl nest site are located along Walnut Creek. A protective buffer is maintained around all active raptor nest sites on RFETS, and these nest sites would not be directly impacted by the pipeline construction or operation. The construction activities would not likely disturb the nesting birds, since the birds currently experience frequent human activities, including the presence of traffic along Indiana Street (located due east of the nest sites). Nesting lasts until about the end of June for the owls and the end of July for the hawks. The nesting birds, therefore, would not be disturbed during the proposed construction period (September to December).

Given the extended area that would be disturbed, and the existing weed infestations at RFETS (e.g., diffuse knapweed), a high potential for a weed infestation exists. Unless steps are taken to revegetate the disturbed area and to control weeds that may colonize the area, weeds may eventually infest the area. To help prevent this possible occurrence, the disturbed areas would be properly revegetated as per the recommendations of the RFETS ecologists, and appropriate weed controls instituted as needed.

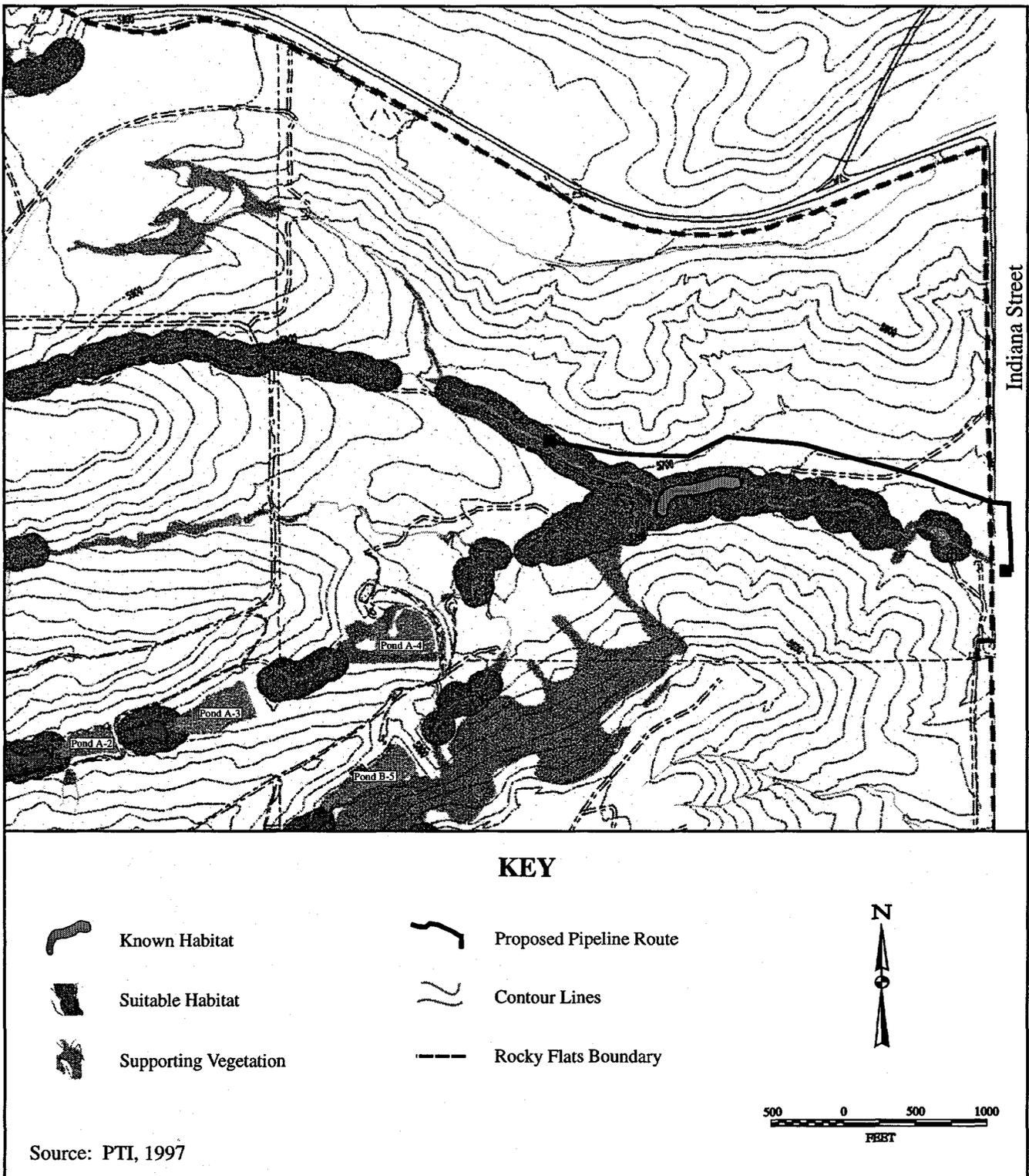


Figure 4-1. Preble's Meadow Jumping Mouse Designated Protection Areas and McKay Bypass Canal Route

Although limited wetland areas exist along Walnut Creek and the proposed route, they are at sufficient distance from the proposed route such that they are not expected to be directly impacted by the Proposed Action. Figure 4-2 shows wetlands found in the vicinity of the proposed pipeline.

While wetlands along Walnut Creek could be indirectly affected by sedimentation during or following the pipeline construction, proper construction practices, as discussed previously, would mitigate the potential for adverse impacts.

#### 4.1.4 Cultural Resources

No impacts to cultural resources would occur.

To evaluate potential impacts to cultural resources, cultural resource studies were reviewed for the area, and the potential to disturb existing cultural resources (and future research potential) was evaluated. An adverse effect could occur if the action resulted in the physical alteration, destruction, or loss of a valued cultural resource. The impact would be less adverse if only slight portions of the resource were affected or if the value of the resource was not very important. The impact of the Proposed Action could be beneficial if it protected or reconstructed a resource.

The nearest boundary of the Rocky Flats Plant Historic District (5JF1227) lies more than a mile from the site of the Proposed Action, and would not be impacted by the construction activities. Site 5JF513, the McKay Ditch, which is adjacent to the western terminus of the Proposed Action, was deemed ineligible for the *National Register of Historic Places*. The Proposed Action will not impact the historic significance of the Site, nor impact its future eligibility for the *National Register*. Construction activities would largely occur within previously disturbed areas and would be unlikely to impact archaeological resources. No buildings or historic sites would be impacted as part of this action.

#### 4.1.5 Transportation

The discussion of transportation is based on a review of the project activities and current traffic levels on Indiana Street.

While the pipeline would cross Indiana Street, the line would be bored under the street and the street would not be closed. Construction vehicles and trucks may use the side of the street for parking and access; this activity would be temporary and would not block or impede traffic. Minimal pipeline maintenance would be anticipated, and the existing access roads and entrances would be used for maintenance. Broomfield employees conducting pipeline maintenance would follow procedures currently used for maintaining the ditch, and would continue to be required to meet RFETS security measures. Therefore, no adverse transportation impacts are expected.

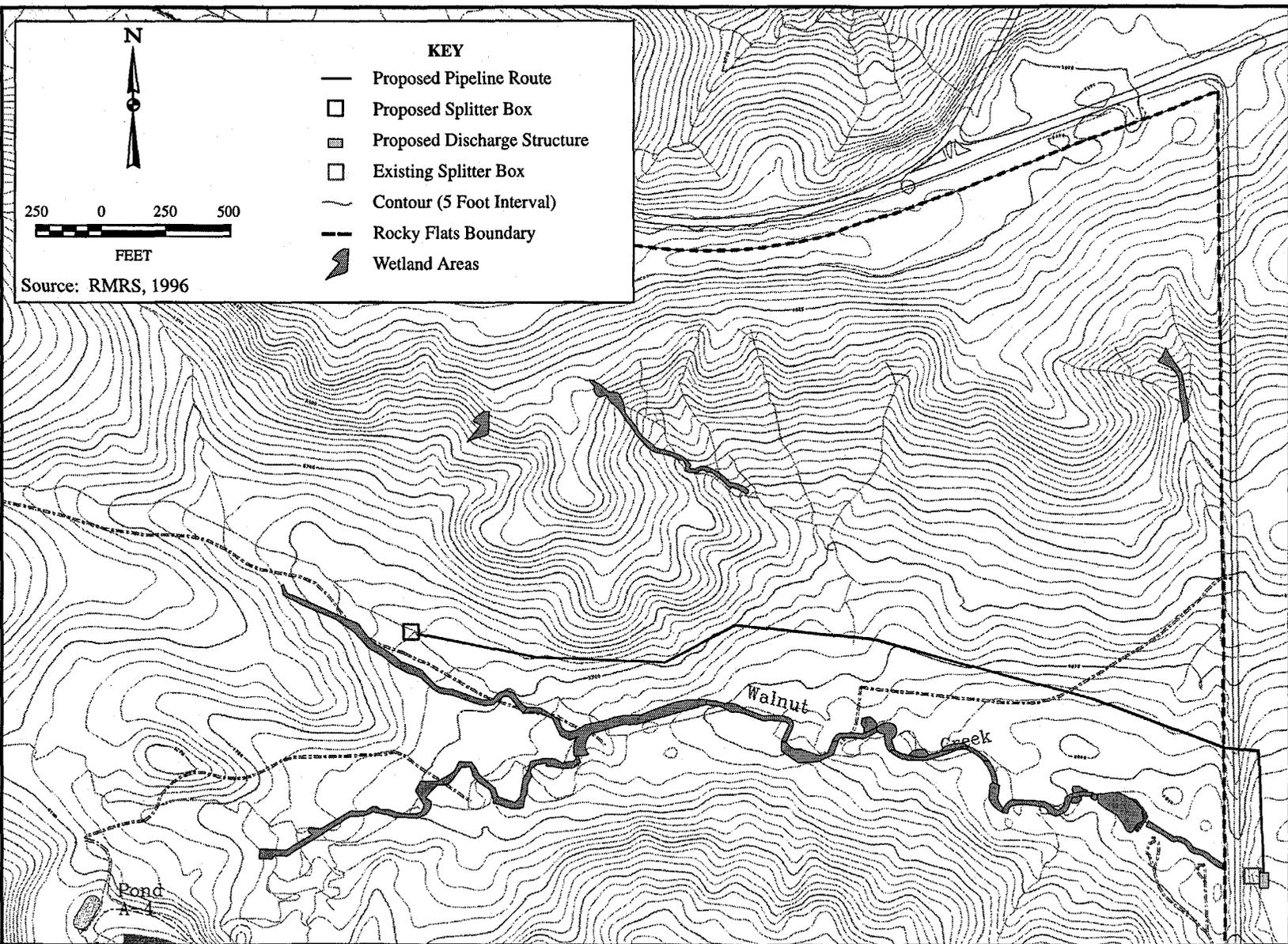


Figure 4-2. Wetland Areas Along the Proposed Route

#### 4.1.6 Human Health and Safety

The analysis was based on a review of health and safety issues, and the potential for hazards to result in illness or injuries. The analysis considered the hazard/accident mechanism, the likelihood of an accident, and the severity of consequences if an accident were to occur. A health issue would arise if workers or the general public would be exposed to a health hazard above criteria levels, or if a permanent disability or loss of life would occur.

Since air emissions would be expected to produce negligible changes in concentrations at the Site boundary, there would be no impacts to the public from construction. Human health impacts would be limited to occupational illness or injury associated with construction activities themselves. Such impacts would be no greater than those from similar construction projects, and, in view of RFETS construction procedures and Site safety history, would likely be less than overall industry experience. Operation of the pipeline would essentially be a passive activity, with no significant impacts expected.

#### 4.1.7 Noise

Noise levels would increase slightly during construction operations. The increase would be temporary.

The methods used to determine the noise impacts on the environment were based on identifying sensitive receptors near the proposed site, estimating the noise that could be generated from the site activities, and determining noise levels at receptor locations. Maps and site visits were used to determine the location of potential sensitive receptors. Noise levels would be adverse if sensitive human receptors are subjected to noise levels approximately 17 decibels above current background levels. Noise levels about 17 decibels above normal background levels result in widespread complaints (USEPA, 1971). Only sporadic complaints occur when noise levels average around 10 decibels above normal background levels. Noise levels may need to be mitigated if found to be disturbing to wildlife (especially threatened and endangered species).

Noise from operation of the construction equipment would be evident only in the immediate area of operations. Equipment would be limited to several heavy construction items, such as a dozer and trencher, and would be operated intermittently during the pipeline installation. Sound levels (for heavy diesel equipment) would be about 88 dB at 100 feet; for comparison, an automobile generates about 65 dB at 100 feet. The construction period would last about 8 to 10 weeks.

No sensitive human receptors are found near the construction area, since the area is principally located in the buffer zone of the RFETS. A small area east of Indiana Street would also be disturbed, but no homes or other facilities are located in the vicinity. Workers would perform normal duties, and would not experience unusual or unique noise hazards.

Wildlife found along the Little Dry Creek would not likely be disturbed. The pipeline would be located about 70 to 100 yards from Walnut Creek, and the species of most concern, nesting raptors and the Preble's Meadow Jumping Mouse, would not be nesting or active during the construction period (as discussed in Section 4.1.3).

#### 4.1.8 Soils

Although soils would be disturbed along the length of the pipeline, no significant impacts to soils would occur. The greatest potential impacts would be the potential for soil slumping on hillsides and erosion during construction until reclamation is successful.

Soil maps and descriptions, and a topographical map were used to characterize the existing environment. Construction activities that could influence soils were evaluated to predict the type and magnitude of potential effects. Activities were evaluated to determine if changes in existing conditions would occur. The effect of an action on soils could be substantially adverse if it depletes or damages prime or unique farmlands, causes a slumping event, accelerates the rate of soil erosion, or degrades soil characteristics. Protection of soils would be beneficial.

Although installation of the pipeline would disturb soils over about a 4,150 linear foot area, the impact to soils would not be substantial. Adverse effects, principally soil erosion, would be mitigated as a result of the route selection process and the use of standard operating procedures (e.g., covering stockpiled soils and revegetating exposed areas as soon as possible). No prime or unique farmlands would be affected.

An existing 12-foot wide access road would be used to access the pipeline. A small additional area of land would be disturbed at the inlet and outlet of the pipeline.

As described in Section 3.2.8, most of this land is classified as Denver clay loam, Haverson loam, and Leyden-Primen-Standley cobbly clay loams. These soils range from moderately erosive in wet conditions to severely erosive (on slopes of 15-50 percent). Because the soils are highly erosive, they can cause slumping on slopes. The pipeline route would avoid the most prominent slope by skirting around the toe of the slope. The route would not, therefore, cut into areas that are likely to lead to an erosion problem.

Additional precautions to prevent erosion would be incorporated. The completed pipeline would include several bentonite plugs around the pipeline, before reaching Indiana Street. At that point, a rock structure would allow water that has been flowing along the pipeline to seep out, preventing erosion along the pipeline. A riprap and concrete stilling structure would be constructed at the outfall of the pipeline and would mitigate the potential for water erosion at the outfall.

A recent soil contamination survey in the Walnut Creek drainage (DOE, 1998) indicates very low levels of radioactive material (generally less than 0.2 pico-Curies per gram plutonium); accordingly, no pre-construction remediation or special construction techniques would be required. Impacts associated with disturbing soil with these very low soil contamination levels would be negligible.

## 4.2 Alternative Action

### 4.2.1 Air Quality

The open ditch Alternative Action would have short-term adverse impacts on ambient air quality during the construction activities. The impacts would be similar to the Proposed Action impacts, and would also require the preparation of a permit and the use of dust suppression techniques. The impacts would be short-term; there would be no long-term adverse impacts to air quality.

### 4.2.2 Water Resources

The open ditch alternative would, like the Proposed Action, have short-term adverse impacts to water resources. Construction activities could increase soil erosion and result in increased sedimentation of Walnut Creek. Erosive soils and steep slopes would be avoided, and the ditch would be laid along generally level topographic contour lines. The potential for soil erosion would be short-term, lasting during the construction period and until reclamation is successful, and could be mitigated by the use of standard construction erosion prevention techniques (e.g., siltation berms). The ditch would not convey all uphill surface water flow intercepted since a spillway to bypass excess surface flow (above 110 cfs) to Walnut Creek would be constructed.

Water transferred via the McKay Bypass Canal ditch would be segregated from surface runoff from RFETS and would therefore eliminate the possibility of mixing with waters that flow to the water supply used for irrigation by the City of Broomfield.

### 4.2.3 Ecological Resources

The Alternative Action would have short-term and minor impacts to ecological resources.

Aquatic species would not be affected by the action. No aquatic threatened and endangered species or special concern species are found in the area of the McKay Bypass Canal. The McKay Bypass Canal has a very limited value for aquatic species. The ditch is dry for most of the year, and contains few standing pools of water that provide aquatic habitat. Construction of the open ditch alternative may result in the formation of small pools of water that would have a limited value for aquatic species.

The Alternative Action would have impacts similar to the Proposed Action on terrestrial special concern species (i.e., Preble's meadow jumping mouse, the red-tailed hawk, and the great horned owl).

A high potential for a weed infestation would also exist with the open ditch alternative. Unless steps are taken to revegetate the disturbed area, and to control weeds that may colonize the area, weeds may eventually infest the area. The ditch would require continued surveillance to identify and control weeds over a long-term period. Revegetation would be conducted per the recommendations of the RFETS Site ecologists.

Like the Proposed Action, there would be little potential to directly impact wetlands under the open ditch alternative, given their similar routes. While wetlands could also be indirectly affected by sedimentation during or following the ditch's construction, proper construction practices would be used to mitigate potential adverse impacts. Low spots in the ditch may support the new growth of wetland vegetation, but because the ditch would be maintained (periodically cleared of plant growth and debris), growth of wetland vegetation and establishment of artificial wetland areas would be limited.

#### 4.2.4 Cultural Resources

No impacts to cultural resources would occur under the open ditch alternative since it follows a similar route to the Proposed Action.

#### 4.2.5 Transportation

There would be no impacts to transportation. Under the open ditch alternative, a pipeline would be bored under Indiana Street, connecting the ditch on both sides of the road; the street would not be closed. Construction vehicles and trucks may use the side of the street for parking; this would be temporary and would not impede traffic.

#### 4.2.6 Human Health and Safety

Human health impacts under the open ditch alternative would be similar to those under the Proposed Action. They would be limited to occupational illness or injury associated with construction activities and would likely be less than overall industry experience given the Site history from similar construction projects.

#### 4.2.7 Noise

Noise impacts under the open ditch alternative would be very similar to noise impacts under the Proposed Action. Noise levels would increase slightly during construction operations. The increase would be temporary and insignificant. Wildlife would not likely be disturbed (as discussed under the Proposed Action).

#### 4.2.8 Soils

Although soils would be disturbed along the length of the ditch, adverse effects to soils would be limited. Soil slumping on hillsides and erosion along the length of the pipeline would be the greatest concerns.

Similar to the Proposed Action, the installation of the open ditch alternative would disturb soils over about a 4,150 linear foot area. Adverse effects, principally soil erosion, would be mitigated by the route selection and use of standard operating procedures during construction. A riprap and concrete stilling structure would be constructed at the outfall of the pipeline (at the downstream end of the open ditch design) and would mitigate any potential for water erosion at the outfall.

The highest potential for erosive damage would occur during the construction of the ditch. Standard operating practices would be required to avoid excessive erosion in the event of rain storms. These measures would include, for example, covering stockpiled soils and revegetating exposed areas as soon as possible.

#### 4.3 No Action Alternative

If the No Action Alternative were selected, current conditions would not change and no impacts to air quality, ecological resources, soils, cultural resources, or the noise environment would occur. Although no change in existing conditions would be noted, the potential for co-mingling of Site discharges and City of Broomfield irrigation water would continue to exist.

#### 4.4 Cumulative Impacts

Cumulative impacts are those changes to the physical and biological environments which would result from the Proposed Action, Alternative Action, or No Action Alternative, in combination with other ongoing actions and reasonably foreseeable future actions.

There would be no significant cumulative impacts from the Proposed Action or the alternatives. The short-term increases in air emissions and noise during construction, and the minor impacts predicted for other resource areas, would be minimal when considered cumulatively with other ongoing activities at and in the vicinity of RFETS.

There may be a cumulative beneficial impact to downstream wetlands and aquatic species from the improved (increased or stabilized) water supply. This could be the result of efforts made by the City of Broomfield to increase or stabilize flows to city water reservoirs located downstream of the McKay Bypass Canal Extension.

#### 4.5 Summary of Impacts

Overall, environmental effects of the Proposed Action would be minor. Most would be short-term impacts associated with project construction and would not result in irreversible damages to natural resources. Some soil disturbance would occur, with associated fugitive dust emissions. The estimated offsite air quality impacts would be minor. Fugitive dust and soil erosion would be minimized by implementing appropriate construction procedures and post-construction re-vegetation. Surface water and near-surface groundwater flows would be slightly disturbed; however, the magnitude of these disturbances would be small and are not expected to affect ecological resources or water supplies. The proposed pipeline alternative would affect surface waters less than the ditch alternative, because the pipe would be buried and the ground surface returned to its original contour. The pipeline would also require less maintenance than the open ditch, which would have to be cleared on a regular basis. Impacts to wetlands, threatened or endangered species, cultural resources, transportation, human health and safety, and noise would be minimal under both alternatives.

## 5.0 AGENCIES AND PERSONS CONTACTED

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