

# Rocky Flats Site, Colorado, Surface Water Configuration Environmental Assessment

**Final**

**May 2011**



U.S. DEPARTMENT OF  
**ENERGY**

Legacy  
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- Appendix B Engineering Drawings—Dam Specific
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- Appendix F *Determination of Peak Flow Rates and Floodplain Delineation for Dam Breaches at the Rocky Flats Site*



## Abbreviations

AADT	average annual daily traffic
Am	Americium
AMP	Adaptive Management Plan
APEN	Air Pollution Emission Notice
BDD	Broomfield Diversion Ditch
BO	Biological Opinion
CAD	Corrective Action Decision
CCR	Code of Colorado Regulations
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
CHWA	Colorado Hazardous Waste Act
COU	Central Operable Unit
CWQCC	Colorado Water Quality Control Commission
DOE	U.S. Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESCO	ESCO and Associates, Inc.
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
ft	foot/feet
GWR	Great Western Reservoir
in.	inches
LM	Office of Legacy Management
m <sup>3</sup>	cubic meter
MAP	Mitigation Action Plan
MG	million gallons
NAAQS	National Ambient Air Quality Standards

NEPA	National Environmental Policy Act
NPB	NEPA Planning Board
NREL	National Renewable Energy Laboratory
O <sub>3</sub>	Ozone
OU	Operable Unit
PBA	Programmatic Biological Assessment
PL	Public Law
PLF	Present Landfill
PM <sub>10</sub>	Particulate matter less than 10 microns
PM <sub>2.5</sub>	Particulate matter less than 2.5 microns
POC	Point of Compliance
POE	Point of Evaluation
POU	Peripheral Operable Unit
ppm	parts per million
Pu	Plutonium
RCRA	Resource Conservation and Recovery Act
Refuge	Rocky Flats National Wildlife Refuge
RFLMA	<i>Rocky Flats Legacy Management Agreement</i>
RFS	Rocky Flats Site
RFSC	Rocky Flats Stewardship Council
ROD	Record of Decision
SH	State Highway
SHPO	State Historic Preservation Officer
SID	South Interceptor Ditch
T&E	threatened and endangered
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WCR	Woman Creek Reservoir
WWE	Wright Water Engineers, Inc.

## Executive Summary

The following sections provide a summary of the Rocky Flats Site (RFS), the purpose and need for the Proposed Action, the description of the Proposed Action and No Action alternatives, the potential impacts associated with the two alternatives, and mitigation measures associated with the Proposed Action. A detailed analysis and all figures and tables are provided in the body of this environmental assessment and are not recreated for this Summary.

### Introduction

The RFS is owned by the United States and is located in northern Jefferson County, Colorado, approximately 16 miles northwest of Denver. The RFS was formerly used to process and manufacture nuclear weapons components, but cleanup and closure of Rocky Flats by the U.S. Department of Energy (DOE) was completed in 2005. The Office of Legacy Management (LM) has jurisdiction and control of portions of Rocky Flats as discussed below.

The cleanup and closure of RFS was completed via a cleanup agreement under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); a Compliance Order on Consent under the Resource Conservation and Recovery Act (RCRA); and the Colorado Hazardous Waste Act (CHWA). RCRA and CHWA are administered by the State of Colorado through the Colorado Department of Public Health and Environment (CDPHE). The final response action for RFS is specified in the final Corrective Action Decision/Record of Decision (CAD/ROD) for Rocky Flats issued on September 29, 2006 (DOE 2006a). Implementation of the final response action is regulated under the *Rocky Flats Legacy Management Agreement* (RFLMA) (DOE 2007a).

The original Rocky Flats property occupied approximately 6,200 acres. Under the CAD/ROD, two Operable Units (OUs) were established within the boundaries of the Rocky Flats property: the Central OU (COU, or the current RFS) and the Peripheral OU (POU). The COU is centrally located within the Rocky Flats boundary and occupies approximately 1,300 acres. The POU surrounds the COU and occupies the remaining acreage. Transfer of jurisdiction and control of most of the land in the POU by DOE to the U.S. Fish and Wildlife Service (USFWS) was completed on July 12, 2007, for use as the Rocky Flats National Wildlife Refuge (Refuge).

Twelve dams were constructed on the RFS during operation of the Rocky Flats Plant. Seven dams were breached by constructing notches in the dam embankments. Five dams remain, but surface water retention is not required at RFS, and the dams are not a functional part of the final CAD/ROD remedy.

The remaining dams include the following:

- Present Landfill (PLF) Dam on No Name Gulch
- Dams A-3 and A-4 on North Walnut Creek
- Dam B-5 on South Walnut Creek
- Dam C-2 near Woman Creek

Surface water points of compliance (POCs) are established under the CAD/ROD immediately downstream of dams A-4, B-5, and C-2. These are called the terminal pond dams, because the

water released from these dams flows off the site. Currently, these ponds are operated in batch-and-release mode and are discharged 0 to 2 times a year. Woman Creek currently flows around Pond C-2 in the Woman Creek Diversion Canal north of the pond and continues unimpeded beyond Pond C-2 to the downstream reaches of Woman Creek. The contribution of water to Woman Creek resulting from the infrequent releases from Pond C-2 is minimal due to the relatively small drainage basin area (South Interceptor Ditch basin) tributary to Pond C-2.

DOE has signed a lease agreement with the City and County of Broomfield to comply with the water law and regulations of the State of Colorado as they apply to the holding ponds at the site. The State of Colorado requires that stream depletions resulting from out-of-priority storage of water be replaced, and Broomfield agreed to lease to DOE a certain amount of Broomfield’s reusable Windy Gap effluent (Augmentation Plan) (DOE 2006b). This water is to be released by Broomfield to the Big Dry Creek Basin to replace depletions resulting from out-of-priority storage in ponds at Rocky Flats. The Augmentation Plan is described in detail in the body of this Environmental Assessment (EA).

The dams are not required to maintain adequate protection of human health and the environment under the final CAD/ROD remedy. Activities proposed in this EA do not fall within the scope of the CAD/ROD or the *Environmental Assessment Comment Response and Finding of No Significant Impact, Pond and Land Configuration* (DOE 2004). The 2004 EA only considered alternatives related to breaching the dams in North and South Walnut Creek upstream of ponds A-3, A-4, and B-5. The breaching of remaining dams was not anticipated at that time, and the possible environmental impacts of breaching all remaining dams, including cumulative impacts were not addressed. This EA evaluates the direct, indirect, and cumulative impacts of breaching all remaining dams.

## Purpose and Need

The purpose of the Proposed Action is to reduce or eliminate the retention of surface water to return the RFS surface water flow configuration to the approximate conditions existing prior to construction of the dams. The Draft EA described that the Proposed Action would be implemented in two timeframes, with the PLF, A-3, and C-2 breaching to occur in 2011, and A-4 and B-5 breaching to be completed within the 2015 to 2018 timeframe. The regulations for implementing the National Environmental Policy Act (NEPA) allow for modifications between a Draft and Final EA in response to public comments (40 CFR 1503.4 (a)). Based on public concern statements, DOE has postponed breaching dam C-2 to coincide with breaching the two other terminal dams A-4 and B-5. Also, based on public concerns, the Proposed Action for this Final EA changes the schedule for breaching the terminal dams A-4-, B-5, and C-2 to the 2018 to 2020 timeframe throughout this Final EA (Table ES–1). Under the Proposed Action for this EA, dams A-4, B-5, and C-2 would be operated in a flow-through configuration until breached.

Table ES–1. Comparison of Timeframes for Breaching Between Draft EA and Final EA

Dam	Draft EA Timeframe	Final EA Timeframe
PLF	2011	2011
A-3	2011	2011
A-4	2015–2018	2018–2020
B-5	2015–2018	2018–2020
C-2	2011	2018–2020

Although completing the proposed action in 2011 is a valid option, DOE would complete part of the Proposed Action at a later date as suggested by the public. The timing for breaching of all dams was mainly determined based on project management, funding availability, expected costs, and public acceptance for breaching related to each of the individual dams. Therefore, all direct, indirect, and cumulative impacts would not change from impacts reported in the Draft EA, as the Proposed Action impacts have been assessed assuming the breaching of all the dams.

DOE is responsible for the long-term management of the water discharges at the RFS in an environmentally acceptable manner and in compliance with local, state, and federal regulations. To accomplish this long-term responsibility, the drainage system resulting from the Proposed Action should require less active management and maintenance than the current system while preserving existing wetlands and habitat as available water allows. Reestablishing flows to approximate pre-retention conditions would provide ecological benefits by improving riparian habitat and promoting wetland formation.

Breaching the dams would reduce the Rocky Flats management efforts related to the continuous determination of evaporative depletions while also reducing the costs to water rights holders responsible for downstream augmentation replacements. The reduction/elimination of depletions would reduce or eliminate the following:

- Costs incurred by Broomfield,
- Depletion reporting costs, and
- Costs to water rights holders responsible for downstream augmentation.

In addition, the live flows currently retained in the ponds would be available to downstream users.

LM is directed by DOE to ensure protection of human health and the environment through effective long-term stewardship of land, structures, and facilities and to be responsible for the cost-effective management of this directive. Water discharged from the terminal pond dams meets applicable RFLMA surface water quality standards, which are based on the Colorado Water Quality Control Commission (CWQCC) Code of Colorado Regulations (CCR) Regulation No. 31: Basic Standards and Methodologies for Surface Water (5 CCR 1002-31) and on the site-specific standards in the CWQCC Regulations No. 38: Classifications and Numeric Standards South Platte River Basin Laramie River Basin Republican River Basin Smoky Hill River Basin (5 CCR 1002-38). DOE has maintained the dams in accordance with the dam safety requirements of the State of Colorado, Office of the State Engineer.

The State of Colorado Division of Water Resources (State Engineer) has jurisdiction over the RFS dams. The site incurs dam maintenance costs resulting from vegetation control, structure/infrastructure maintenance, inspections, and data collection in order to ensure dam safety in compliance with dam safety regulations. Operational costs are incurred due to the batch-and-release water management protocols. The remaining dams at RFS are more than 30 years old, and maintenance and operation costs are expected to rise as the dams age. Construction costs associated with the actual breaching would also be expected to increase over time. By preserving the proposed breach schedule, maintenance, operational, and construction costs would be nearly eliminated. Accordingly, DOE would reduce and/or eliminate the inspection and reporting costs associated with meeting dam safety requirements and the

management and maintenance costs for operation of the dams, by completing the breaching of the remaining five dams.

The dams are no longer needed for the original purpose, and breaching of the dams would reduce DOE costs (and by association taxpayer costs), and would not change DOE's obligations to monitor surface water and meet standards as required by RFLMA.

## **Description of Alternatives**

### **Proposed Action**

The Proposed Action is divided into two timeframes. Breaching the dams at ponds A-3 and PLF is proposed to start in 2011 and be completed by the end of that fiscal year; breaching the dams at ponds A-4, B-5, and C-2 is proposed to be completed during the 2018 to 2020 timeframe. Dams A-4, B-5, and C-2 would be operated in flow-through configuration until they are breached. The average construction duration for dam breaching at each structure is approximately 11 weeks.

To modify the dam, a "breach" or "channel" would be cut into each dam to reduce its jurisdictional height, thus creating a lower profile. The following design characteristics are similar among the five dams.

- Channel side slopes of 2H:1V (H:V is the ratio of the horizontal length to the vertical height)
- Channel flowline slope of 2 percent with a 5H:1V drop structure slope
- Channel design to accommodate peak flows from at least a 100-year/24-hour storm event with 2 foot (ft) freeboard
- Channel bottom and side slopes to be armored to resist future erosion

The inlet elevation (invert) for the channel would be located to provide positive drainage from the area upstream of the channel inlet. This would ensure a consistent flow of water and prevent ponding. The area upstream of each channel would be designed to preserve and enhance wetlands and habitat to the extent possible, while still providing positive flow.

Dam-specific information is provided in the text of the EA. The following generalized construction sequence is similar for all five dams.

- Dewater the pond using existing discharge valves, and/or pumping as necessary, several months prior to construction work (preceding winter/spring).
- Mobilize for construction: set up staging area, erosion controls, and stockpile area.
- Install a temporary coffer dam upstream for potential storm events (manage retained water upstream using pumps). A coffer dam is a temporary watertight enclosure that is pumped dry to expose the bottom of a body of water so that construction may be undertaken.
- Excavate soil from the breach channel and fill predefined fill areas (i.e., former spillways and roads to be reclaimed).

- Construct breach to engineering specifications (side slopes, flowline, drop structure); armor the channel as necessary for erosion resistance.
- Regrade area upstream of channel to provide positive flow, minimize ponding, and promote establishment of quality habitat.
- Reclaim all disturbed areas.

### **No Action**

The No Action Alternative involves no change to the existing configuration of the remaining five dams at the RFS. Water would be routed according to current configuration and managed using the current operating protocol. Environmental monitoring would continue in accordance with RFLMA. Operation and maintenance of the dams and necessary structures would continue to require maximum resources.

## **Environmental Consequences and Mitigation Summary**

Certain non-resource mitigation efforts are required, which are briefly described in the following section. Table ES–2 provides a comparison of resource impacts between the two alternatives and briefly describes the mitigation measures associated with the Proposed Action. This table also serves as the Mitigation Action Plan (MAP) per DOE Order 451.1B, Section 5(a)(9)(e) and (f). All potential impacts can be mitigated as appropriate to the resource, and no impacts are considered substantial.

As discussed previously, based on public concern statements, DOE has determined that postponing breaching Dam C-2 until the 2018 to 2020 timeframe would best serve to address concerns stated by local governments. Comments to DOE on the Draft EA indicated a desire from the communities adjacent to the RFS to have further input prior to the final decision to breach terminal dams A-4, B-5 and C-2. Accordingly, DOE has committed to working with the concerned communities toward developing an Adaptive Management Plan (AMP) to provide ongoing data prior to the breaching of the terminal dams. The AMP would provide guidance, suggestions, and recommendations developed by the communities and DOE (the AMP Group) to achieve consensus to the extent possible for implementing the Proposed Action. The AMP would not constitute formal policy or other requirements enforceable under RFLMA.

### **Mitigation Measures Similar to all Five Dams (not resource specific)**

Although the dams that are proposed to be breached are not required by the CAD/ROD, certain aspects of the work are subject to institutional controls within the COU and regulated by RFLMA requirements. Also, RFLMA establishes water quality standards and identifies the water monitoring and evaluation requirements applicable to implementation of the remedy. The current operation of ponds A-4, B-5, and C-2 is to retain water until approximately 40 to 50 percent of the capacity is reached, at which point discharge planning is initiated. Under RFLMA operational monitoring, the pond water is sampled prior to release to demonstrate that the discharged water would be expected to meet applicable RFLMA water quality standards. During discharge, the released water is monitored and compliance is determined at a RFLMA POC a short distance downstream of the dam outlet.

In addition, excavation within the COU deeper than 3 ft below the surface is prohibited by the remedy institutional controls unless approved in accordance with RFLMA requirements. Shallower soil disturbance within the COU is also prohibited by the remedy institutional controls unless the work is conducted in accordance with an approved erosion control plan. DOE has requested approval under the RFLMA requirements to perform the dam breach excavation and has documented that an approved erosion control plan would apply to the work. The RFLMA parties are consulting regarding clarification of the soil excavation and soil disturbance prohibitions. The RFLMA parties agree that it is appropriate to make the clarification by issuing an amendment to the CAD/ROD and modifying RFLMA Attachment 2, after consideration of public review comments. The final dam breach would not occur until after the CAD/ROD amendment and RFLMA modification clarifying the soil excavation and soil disturbance prohibitions is approved. DOE would then obtain any required approval to conduct the soil excavation and soil disturbance in accordance with RFLMA.

Following the finalization of this EA, and the associated decision document, DOE would continue to provide open reporting of mitigation/monitoring results to the public. Notification of availability of these documents will be electronically disseminated in the same manner as described in Section 2.2 of this EA. Additionally, prior to the initiation of the breaching of the terminal dams, DOE would schedule a public meeting to discuss monitoring and mitigation results. This meeting is not a NEPA requirement, but rather is being incorporated into the mitigation in the spirit of addressing unresolved conflicts, and providing the public with further assurance that water quality issues related to the flow through configuration would be thoroughly understood prior to any breaching activities.

Once the dams are breached, no pre-discharge sampling will occur, as the batch-and-release mode of operation will stop and the water would be in a constant flow-through configuration. Thus RFLMA operational pre-discharge monitoring will discontinue, but all other RFLMA monitoring will remain.

### **Resource-Specific Consequences and Mitigation**

Table ES–2 presents a brief comparison of resource impacts between the Proposed Action and the No Action alternatives and summarizes mitigation measures under the Proposed Action. Full details of possible impacts are presented in the body of the EA in Sections 5.0 and 6.0.



Table ES-2. Resource-Specific Impacts and Mitigation

Resource	Proposed Action	No Action
Wildlife	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Restore a more natural, seasonally variable flow system to provide more consistent water for downstream habitat.</li> <li>• Temporary disturbance from construction noise.</li> <li>• Eliminate surface water habitat for species.</li> <li>• Reduced disturbance from human activities for monitoring and maintenance.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• Water levels in the ponds will be drawn down prior to construction activities to provide the opportunity for species to use nearby habitats.</li> <li>• Vegetation at the construction footprint will be mowed to 6 inches or less to help encourage species to use other habitat locations.</li> </ul>	<p>Walnut Creek:</p> <ul style="list-style-type: none"> <li>• Long-term continuation of batch releases from the ponds, predominantly during the non-growing season, could alter the structure and composition of the downstream habitat.</li> </ul> <p>No Name Gulch and Woman Creek:</p> <ul style="list-style-type: none"> <li>• No change from current conditions.</li> </ul>
Migratory Birds	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Noise and construction activities to foraging and nesting activities in the adjacent habitat, but no fatalities are expected because of prescribed mitigation measures.</li> <li>• Reductions in the abundance of waterfowl at the ponds; however, these types of habitats are available within a few miles of the RFS.</li> <li>• Species that forage and nest in emergent and shrub wetland habitat types would potentially increase following reclamation.</li> <li>• Reduced disturbance from human activities for monitoring and maintenance.</li> </ul> <p>Mitigation:</p> <p>Activities are planned to occur throughout the primary nesting season for birds (April 1 through August 31), Therefore:</p> <ul style="list-style-type: none"> <li>• A qualified biologist will conduct field nest surveys prior to and regularly throughout construction.</li> <li>• If the survey identifies active nests that cannot be avoided, USFWS will be contacted immediately for guidance.</li> <li>• Results of the surveys and information regarding the qualifications of the biologist(s) will be documented and maintained on file for potential review by USFWS (if requested) until the Proposed Action activities have been completed.</li> <li>• Water levels in the ponds and vegetation clearing will occur as described under wildlife impacts.</li> </ul> <p>Based on the results of surveys, and determination from USFWS, additional nesting deterrents may be warranted.</p>	<p>Walnut Creek:</p> <ul style="list-style-type: none"> <li>• Long-term continuation of batch releases from the ponds, predominantly during the non-growing season, could alter the structure and composition of the downstream habitat.</li> </ul> <p>No Name Gulch and Woman Creek:</p> <ul style="list-style-type: none"> <li>• No change from current conditions.</li> </ul>

Table ES-2 (continued). Resource-Specific Consequences and Mitigation

Resource	Proposed Action	No Action
<p>Threatened &amp; Endangered Plant and Wildlife Species</p>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Approximately 1 acre of Preble's mouse habitat would be impacted during construction.</li> <li>• Increase in Preble's habitat expected with conversion from open water to emergent wetland/shrubland.</li> <li>• Possible minimal impacts to individual garter snakes and northern leopard frogs.</li> <li>• Minimal long-term effect is expected because the reestablished stream channels would provide habitat.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• In compliance with Section 7 of the Endangered Species Act, consultation with USFWS will be conducted via an amendment to the existing Programmatic Biological Assessment.</li> <li>• No earth-moving activities will be started until either the approval letter or Biological Opinion from USFWS has been obtained.</li> <li>• Mitigation for impacts will be conducted in situ and follow guidelines in the Programmatic Biological Assessment.</li> </ul>	<p>Walnut Creek:</p> <ul style="list-style-type: none"> <li>• In Walnut Creek, the Preble's mouse preferred multi-strata riparian woodland/shrubland habitat could change to a single story herbaceous habitat, which would limit the amount of quality habitat for the species.</li> <li>• Continued long-term reduction in creek flows below the dams in Walnut Creek may reduce the amount of existing wetland along this reach of creek, which would reduce available habitat.</li> </ul> <p>No Name Gulch and Woman Creek:</p> <ul style="list-style-type: none"> <li>• No change from current conditions.</li> </ul> <p>The lower South Platte River species would continue to be impacted by the retention of water upstream of the dams in the No Action Alternative.</p>
<p><b>Vegetation, Wetlands and Floodplains</b></p>		
<p>Vegetation</p>	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Clearing of 26 acres of vegetation (including noxious weeds) due to construction.</li> <li>• Reseeding of native species and ongoing weed control would provide a higher quality ecosystem.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• Use of appropriate erosion controls throughout and after the project.</li> <li>• The guidance in the <i>Erosion Control Plan for the Rocky Flats Property Central Operable Unit</i> (DOE 2007b) will be followed.</li> <li>• Temporarily disturbed areas will be reclaimed following project completion using native plant species.</li> <li>• Revegetation will occur as soon as possible.</li> <li>• Noxious weeds will be controlled using Colorado appropriate weed control measures.</li> <li>• A qualified ecologist, botanist, or environmental scientist will oversee all mitigation measures.</li> </ul>	<p>Walnut Creek:</p> <ul style="list-style-type: none"> <li>• Retention of the batch-and-release water flow may lead to continued changes in the existing wetlands downstream.</li> </ul> <p>No Name Gulch and Woman Creek:</p> <ul style="list-style-type: none"> <li>• No change from current conditions.</li> </ul>

Table ES-2 (continued). Resource-Specific Consequences and Mitigation

Resource	Proposed Action	No Action
Wetlands	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Less than 0.5 acre of palustrine emergent/shrubland wetland and approximately 4 acres of open water habitat.</li> <li>• Five to 6 acres of palustrine emergent/shrubland wetland created in the former open water habitat, which would increase the aquatic resources functions and services.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• A Section 404 permit in accordance with the Clean Water Act will be required and obtained prior to any earth-disturbing activities.</li> <li>• U.S. Army Corps of Engineers review comments indicated that a Nationwide Permit 27 will be applicable.</li> <li>• Impacts to jurisdictional waters will be mitigated according to USACE requirements.</li> </ul>	<p>Walnut Creek:</p> <ul style="list-style-type: none"> <li>• Retention of the batch-and-release water flow may lead to continued changes in the existing wetlands downstream.</li> </ul> <p>No Name Gulch and Woman Creek:</p> <ul style="list-style-type: none"> <li>• No change from current conditions.</li> </ul>
Floodplains	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Minimal and limited to construction areas.</li> <li>• Would approximately reestablish the historic floodplain and stream channel through the pond bottoms (except at Pond C-2).</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• Same as mitigation measures for wetlands.</li> </ul>	<p>Walnut Creek, No Name Gulch, and Woman Creek:</p> <ul style="list-style-type: none"> <li>• No change from current conditions.</li> </ul>
<b>Surface Water Resources</b>		
Surface water flow	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Larger flows and volumes downstream compared to current conditions with return to flood conditions prior to the original construction of the dams.</li> <li>• Short-term erosion associated with construction.</li> <li>• Would eventually eliminate evaporative depletions associated with the retention of out-of-priority water.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• A construction general permit for stormwater discharge from EPA will be required prior to commencing the work.</li> </ul>	<p>No change to existing conditions of either surface water flow or water quality. However, failure of a dam during a flood event would result in higher flood flows downstream and transport and deposition of large quantities of soil from the embankment structure. The remaining dams at the RFS are more than 30 years old.</p>
Surface water quality	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• No direct impacts on water quality.</li> <li>• Individual sample results downstream are expected to show increased variability. Data indicate that remedy-related soil and infrastructure removal, revegetation, land configuration, and reductions in runoff would continue to result in water quality summary statistics that meet applicable standards.</li> <li>• RFLMA monitoring requirements would remain the same.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• Monitoring in accordance with RFLMA requirements to continue.</li> <li>• A construction general permit for stormwater discharge from EPA would be required prior to commencing the work.</li> </ul>	

Table ES-2 (continued). Resource-Specific Consequences and Mitigation

Resource	Proposed Action	No Action
Air Quality	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Releases of particulate matter less than 10 microns (PM<sub>10</sub>), particulate matter less than 2.5 microns (PM<sub>2.5</sub>), and Ozone (O<sub>3</sub>) are expected to be minimal during construction.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• Contractor to obtain any required air quality construction permits prior to start of the construction work.</li> <li>• The contractor would provide proof of age of equipment, per CDPHE requirements.</li> <li>• Construction activities will stop during periods of high winds.</li> </ul>	No change from current conditions.

## 1.0 Introduction

This Environmental Assessment (EA) has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 USC 4321-4370d); the Council on Environmental Quality (CEQ) regulations implementing the procedural provisions of NEPA (40 CFR 1500-1508); and 10 CFR 1021, U.S. Department of Energy (DOE) regulations for implementing NEPA. The purpose of this 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) may be required.

### 1.1 Background

The Rocky Flats Site (RFS) is owned by the United States and is located in northern Jefferson County, Colorado, approximately 16 miles northwest of Denver. The RFS was formerly used to process and manufacture nuclear weapons components, but cleanup and closure of Rocky Flats by DOE was completed in 2005. The Office of Legacy Management (LM) has jurisdiction and control of portions of Rocky Flats as discussed below.

The cleanup and closure of RFS was completed via a cleanup agreement under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), a Compliance Order on Consent under the Resource Conservation and Recovery Act (RCRA), and the Colorado Hazardous Waste Act (CHWA). RCRA and CHWA are administered by the State of Colorado through the Colorado Department of Public Health and Environment (CDPHE). The final response action for RFS is specified in the Final Corrective Action Decision/Record of Decision (CAD/ROD) for Rocky Flats (EPA, DOE, and CDPHE) issued on September 29, 2006 (DOE 2006a). Implementation of the final response action is regulated under the *Rocky Flats Legacy Management Agreement* (RFLMA) (DOE 2007a).

The original Rocky Flats property occupied approximately 6,200 acres. Under the CAD/ROD, two Operable Units (OUs) were established within the boundaries of the Rocky Flats property: the Central OU (COU) and the Peripheral OU (POU) (Figure 1-1). An OU is a grouping of individual hazardous substance sites into a single administrative unit for purposes of efficiently managing cleanup activities. The COU is centrally located within the Rocky Flats boundary and occupies approximately 1,300 acres. The COU consolidated areas that required additional remedial or corrective actions, and also considered the practicalities of future land management. The CAD/ROD determined that the appropriate response actions for the COU were institutional controls, physical controls, and continued operation of groundwater treatment systems and groundwater and surface water monitoring. The COU is referred to as the RFS.

The POU surrounds the COU and includes the remaining, generally unaffected portions of the Rocky Flats property, approximately 4,900 acres. The final CAD/ROD indicated that conditions in the POU are suitable for unrestricted use, and no response action was required. The U.S. Environmental Protection Agency (EPA) subsequently published a Notice of Partial Deletion from the National Priorities List for the POU on May 25, 2007. Transfer of jurisdiction and control of most of the land in the POU by DOE to the U.S. Fish and Wildlife Service (USFWS) was completed on July 12, 2007, for use as a wildlife refuge pursuant to the Rocky Flats National Wildlife Refuge Act of 2001 (Public Law [PL] 107-107).

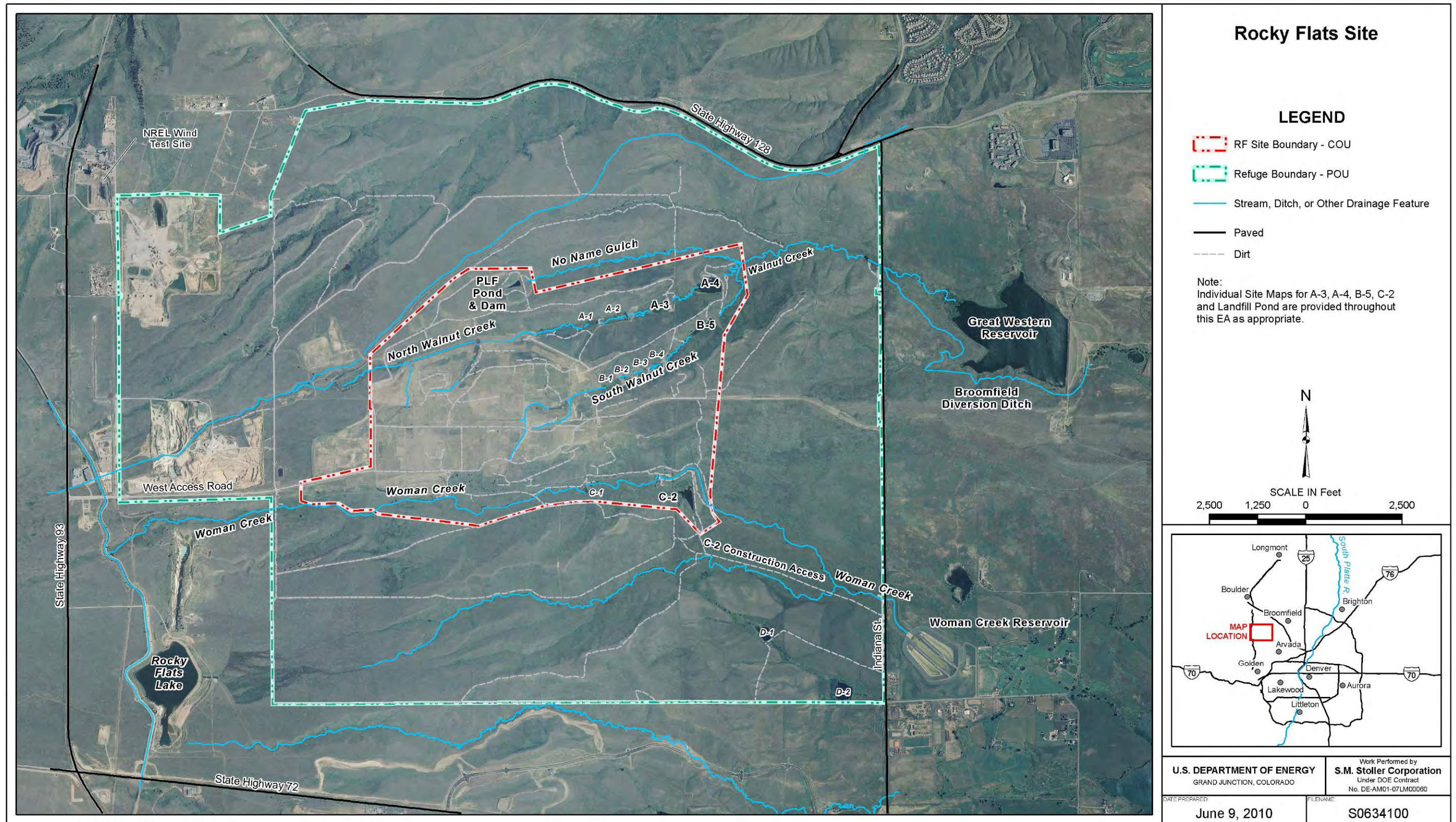
Twelve dams were constructed on the RFS during operation of the Rocky Flats Plant (Figure 1–1). The dams were constructed for stormwater control and to retain surface water so that it could be monitored and managed, if necessary, prior to downstream release. The Present Landfill (PLF) Dam was constructed in No Name Gulch. The A-Series dams (4 dams) were constructed in North Walnut Creek, and the B-Series dams (5 dams) were constructed in South Walnut Creek. These three drainages generally flow west to east and come together to form Walnut Creek just inside the eastern COU boundary. Walnut Creek continues east and passes under Indiana Street in a constructed culvert. At this point, a splitter box can currently direct Walnut Creek flows to Great Western Reservoir (GWR) and/or the Broomfield Diversion Ditch (BDD) (constructed by Broomfield in 1989). Water in GWR is currently used for irrigation and municipal purposes not as a drinking water supply. The BDD flows around GWR back to Walnut Creek to just below the GWR dam. Walnut Creek then flows east to its confluence with Big Dry Creek.

The C-Series dams (2 dams) were constructed within the Woman Creek basin. Dam C-1 is located on Woman Creek, and Dam C-2 is located at the end of the South Interceptor Ditch. When Pond C-2 is discharged, this water flows to Woman Creek just inside the eastern COU boundary. Woman Creek continues east and passes under Indiana Street in a constructed culvert. At this point, Woman Creek flows to the Woman Creek Reservoir (WCR) (constructed in 1996 as part of the Standley Lake Protection Project), which retains Woman Creek water and prevents it from reaching Standley Lake. Water in the WCR is periodically discharged to Walnut Creek to just below the GWR dam.

On September 26, 2006, DOE signed a lease agreement with the City and County of Broomfield to comply with the water law and regulations of the State of Colorado as they apply to the holding ponds at the site (DOE 2006b). Since DOE has implemented a system of holding ponds for the purpose of controlling and testing surface water that collects on the RFS, and the water law and regulations of the State of Colorado require that stream depletions resulting from out-of-priority storage of water be replaced, Broomfield agreed to lease to DOE a certain amount of Broomfield's reusable Windy Gap effluent (Augmentation Plan). This water is to be released by Broomfield to the Big Dry Creek Basin to replace depletions resulting from out-of-priority storage in ponds at Rocky Flats.

Seven dams were breached by constructing notches in the dam embankments. Five dams remain, but surface water retention is not required at RFS, and the dams are not a functional part of the final CAD/ROD remedy. Figure 1–1 shows the location of the dams. Dam C-1, located on Woman Creek, was breached in 2004 to address safety issues that were identified during inspections. That action was evaluated in a Categorical Exclusion (DOE 2003). In 2004, DOE assessed the breaching of dams A-1, A-2, B-1, B-2, B-3, and B-4 located on North and South Walnut Creek in the *Environmental Assessment Comment Response and Finding of No Significant Impact, Pond and Land Configuration* (DOE 2004). The work to breach these dams was begun in 2008 and completed in 2009.

The remaining dams include the PLF Dam on No Name Gulch, dams A-3 and A-4 on North Walnut Creek, Dam B-5 on South Walnut Creek, and Dam C-2 near Woman Creek. These are referred to as the terminal pond dams, because the water released from these dams flows off the site. Currently, these ponds are operated in batch-and-release mode and are discharged 0 to 2 times a year. Woman Creek currently flows around Pond C-2 in the Woman Creek Diversion



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Figure 1-1. Rocky Flats Site

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Canal north of the pond and continues unimpeded beyond Pond C-2 to the downstream reaches of Woman Creek. The contribution of water to Woman Creek resulting from the infrequent releases from Pond C-2 is minimal due to the relatively small drainage basin area (South Interceptor Ditch basin) tributary to Pond C-2. Surface water points of compliance (POCs) are established under the CAD/ROD immediately downstream of dams A-4, B-5, and C-2.

The dams are not required to maintain adequate protection of human health and the environment under the final CAD/ROD remedy. Activities proposed in this EA do not fall within the scope of CAD/ROD or FONSI under the *Environmental Assessment Comment Response and Finding of No Significant Impact, Pond and Land Configuration* (DOE 2004). The 2004 EA only considered alternatives related to breaching the dams in North and South Walnut Creek upstream of ponds A-4 and B-5. The breaching of all remaining dams was not anticipated at that time, and the possible environmental impacts of breaching all remaining dams, including cumulative impacts, were not addressed. This EA evaluates the direct, indirect, and cumulative impacts of breaching all remaining dams.

## 1.2 Purpose and Need

This EA is being prepared to assess the impacts associated with breaching the remaining five dams and the associated impacts that would occur as a result of the Proposed Action or No Action alternatives. The Draft EA described that the Proposed Action would be implemented in two timeframes, with the PLF, A-3, and C-2 breaching to occur in 2011, and A-4 and B-5 breaching to occur in the 2015 to 2018 timeframe. The regulations for implementing NEPA allow for modifications between a Draft and Final EA in response to public comments (40 CFR 1503.4 (a)). Based on public concern statements, DOE has postponed breaching dam C-2 to coincide with breaching the two other terminal dams A-4 and B-5. Also, based on public concerns, the Proposed Action for this Final EA changes the schedule for breaching the terminal dams A-4 and B-5 has been changed to 2018 to 2020 throughout this Final EA. Table 1–1 provides a comparison between the timeframes. Under the Proposed Action, dams A-4, B-5, and C-2 would be operated in a flow-through configuration until breached.

Table 1–1. Comparison of Timeframes for Breaching Between Draft EA and Final EA

Dam	Draft EA Timeframe	Final EA Timeframe
PLF	2011	2011
A-3	2011	2011
A-4	2015–2018	2018–2020
B-5	2015–2018	2018–2020
C-2	2011	2018–2020

Although completing the proposed action in 2011 is a valid option, DOE would complete part of the Proposed Action at a later date as suggested by the public. The timing for breaching of all dams was mainly determined based on project management, funding availability, expected costs, and public acceptance for breaching related to each of the individual dams. Therefore, all direct, indirect, and cumulative impacts would not change from impacts reported in the Draft EA, as the Proposed Action impacts have been assessed assuming the breaching of all the dams.

The purpose of the Proposed Action is to reduce or eliminate the retention of surface water to return the RFS surface water flow configuration to the approximate conditions existing prior to construction of the dams. It is DOE policy to manage its land and facilities as valuable natural resources, and its stewardship is based on the principle of ecosystem management and sustainable development (DOE 1994). DOE is responsible for the long-term management of the water discharges at the RFS in an environmentally acceptable manner and in compliance with local, state, and federal regulations.

To accomplish this long-term responsibility, the drainage system resulting from the Proposed Action should require less active management and maintenance than the current system while preserving existing wetlands and habitat as available water allows. Returning flows to approximate pre-retention conditions would provide ecological benefits by improving riparian habitat and reestablishing wetland formation.

Breaching the dams would reduce the Rocky Flats management efforts related to the continuous determination of evaporative depletions while also reducing the costs to water rights holders responsible for downstream augmentation replacements. By preserving the proposed breach schedule, the evaporative depletions associated with the Rocky Flats dams would be reduced or eliminated as soon as possible. The reduction/elimination of depletions would reduce or eliminate the costs incurred by Broomfield to replace water in Big Dry Creek according to the associated Augmentation Plan. Senior water rights holders are the appropriators with the oldest water rights and have been allocated by the State of Colorado in a “first in time, first in right” basis. Those with senior rights can require that others stop taking water so that the senior water right holder can obtain their allocated water. In times of water shortage, the senior water rights holder can “call” (or demand) that their water be allowed to flow to the rights holder. Therefore, the live flows formerly detained in the ponds would be available to downstream users in time, place, and amount, precluding any injury to calling senior water rights holders.

LM is directed by DOE to ensure protection of human health and the environment through effective long-term stewardship of land, structures, and facilities and to be responsible for the cost-effective management of this directive. Water discharged from the terminal pond dams meets applicable RFLMA surface water quality standards, which are based on the Colorado Water Quality Control Commission (CWQCC) Code of Colorado Regulations (CCR) Regulation No. 31: Basic Standards and Methodologies for Surface Water (5 CCR 1002-31) and on the site-specific standards in the CWQCC Regulation No. 38: Classifications and Numeric Standards South Platte River Basin Laramie River Basin Republican River Basin Smoky Hill River Basin (5 CCR 1002-38).

DOE has maintained the dams in accordance with the dam safety requirements of the State of Colorado, Office of the State Engineer. The State of Colorado Division of Water Resources (State Engineer) has jurisdiction over the RFS dams, which must be managed according to the Rules and Regulations for Dam Safety and Dam Construction (State of Colorado 2007). The site incurs dam maintenance costs resulting from vegetation control, structure/infrastructure maintenance, inspections, and data collection in order to ensure dam safety in compliance with dam safety regulations. Operational costs are incurred due to the batch-and-release water management protocols. The remaining dams at RFS are more than 30 years old, and maintenance and operation costs are expected to rise as the dams age. Construction costs associated with the actual breaching would also be expected to increase over time. By preserving the proposed

breach schedule, maintenance, operation, and construction costs increases would be nearly eliminated. Accordingly, DOE would reduce and/or eliminate the inspection and reporting costs associated with meeting dam safety requirements and the management and maintenance costs for operation of the dams, by completing the breaching of the remaining five dams as part of DOE's intention to breach all 12 dams.

The dams are no longer needed for the original purpose, and breaching of the dams would reduce DOE costs (and by association taxpayer costs), and would not change DOE's obligations to monitor surface water and meet standards as required by RFLMA.

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## 2.0 Issues and Concerns

The CEQ regulations require that “agencies shall make diligent efforts to involve the public in preparing and implementing their NEPA procedures” (40 CFR 1506.6). However, public participation concerning an EA is not considered mandatory, and the level of public participation is left to the discretion of the agency. DOE guidance allows individual discretion in public participation (DOE 1988). DOE’s intention for this project has been to openly provide as much information as possible during the planning stages prior to implementation of this EA and to solicit comments from the public. Accordingly, meetings have been held by DOE with interested parties and organizations.

The internal and public meetings are discussed below.

### 2.1 Issue Identification

The following sections describe the process used to identify issues.

#### 2.1.1 Internal Scoping

The contractor NEPA team conducted an internal scoping meeting on January 7, 2010, to discuss potential issues and concerns that require consideration in the EA. Participants identified the potential cooperating and/or commenting agencies, summarized the NEPA process and documentation, and outlined the roles and responsibilities of the team.

The team identified the following issues to be addressed in the EA:

- Schedule for the proposed construction work
- Potential impacts to wetlands
- Floodplains
- Threatened and endangered (T&E) species
- Engineering approaches to meet State Engineer’s requirements for breaching dams
- Adding fill to existing pond bottoms to raise elevations
- Surface water quality monitoring, including downstream sediment (the team noted that surface water quality is a key known concern for neighboring communities)
- Offline water storage, Colorado water court, and current augmentation plan for depletion of flows to downstream water rights holders
- Transportation during construction
- Compliance with CAD/ROD-required institutional controls (which are also incorporated in RFLMA)

The team discussed referencing the results of the Comprehensive Risk Assessment in the *RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study Report for the Rocky Flats Environmental Technology Site* (DOE 2006c) to document the human health and ecological risk evaluation for soil and sediment residual contamination. The relevance

of the risk evaluation for soil excavation to implement the Proposed Action is discussed in Section 3.1.7 of this EA.

The team also discussed the alternatives that would be included in this EA. The identified alternatives were to breach dams A-3, C-2 and PLF, and then operate terminal dams A-4 and B-5 in flow-through configuration until they are breached. The No Action Alternative was also discussed. No other alternatives were identified at this meeting.

### **2.1.2 NEPA Planning Board Scoping Meeting**

The LM NEPA Planning Board (NPB) and the contractor NEPA team conducted a scoping meeting on January 20, 2010, to further discuss potential issues.

The group evaluated whether there were any viable potential alternatives beyond those that had been identified. No additional alternatives were proposed, but it was determined that the public would have the opportunity to suggest additional alternatives during the public scoping period of the EA process.

Additional discussion of the water rights issue focused on the potential to reduce or eliminate evaporative depletion reporting and the need to augment losses to downstream users. The NPB also determined that the public would be given a 30-day public comment period on the draft EA.

## **2.2 Public Participation Process**

The Rocky Flats Stewardship Council (RFSC) is the congressionally chartered Local Stakeholder Organization for the RFS. The council consists of elected officials (or their appointed designees) of the nine communities neighboring Rocky Flats and four at-large members who are either individual members of the public or represent interested community organizations. The Stewardship Council is directed to facilitate communication between DOE and the public on Rocky Flats issues and conducts quarterly public meetings where DOE regularly presents information on quarterly and annual reports and other topics of interest. These meetings are announced in the local media and through various communication outlets within each local government and organization, as well as direct email notifications to a distribution list of stakeholders and individuals interested in Rocky Flats and Stewardship Council activities.

Public involvement was initiated by posting a *Notification of Intent to Prepare an Environmental Assessment (EA) of the Surface Water Configuration Project at the Rocky Flats Site*, and a presentation titled *The Introduction to the Rocky Flats Surface Water Configuration EA* on the Community Involvement page of the Rocky Flats Legacy Management website at [http://www.lm.doe.gov/Rocky\\_Flats/Sites.aspx?view=5](http://www.lm.doe.gov/Rocky_Flats/Sites.aspx?view=5). A community notification announcing the postings was distributed electronically by email to the Rocky Flats public distribution list, and a news release was sent to the local media to accompany the posting. This communication was used to invite the public to attend the quarterly public meeting of the RFSC at 9:45 a.m. February 1, 2010, at the Rocky Mountain Metropolitan Airport Terminal Building, 11755 Airport Way, Broomfield, CO, where the proposed EA would be discussed. Emails were distributed to 61 members of the public, consisting of individuals and representatives of organizations that have expressed interest in Rocky Flats issues. In addition, emails were sent to 21 members of local media and national news services.

DOE presented *The Introduction to the Rocky Flats Surface Water Configuration EA* to the public at the Stewardship Council meeting on February 1, 2010. The presentation briefly described the NEPA process and identified the proposed and the no-action alternatives. Following the presentation, the DOE site manager answered questions and invited the public to propose additional alternatives that could be evaluated in the EA. DOE set a 2-week deadline for suggested alternatives to be submitted to DOE for inclusion and evaluation in the draft EA. DOE also announced that DOE would again discuss the Proposed Action and EA process in greater detail, including a technical presentation on the hydrology and surface configuration of the site to be provided at a future Stewardship Council meeting. DOE agreed to provide email notification of this meeting to be distributed to the public and media, and the presentation materials to be posted to the DOE website.

DOE presented the *Rocky Flats Surface Water Configuration EA and RFLMA POC Relocation Brief* to the public at the Stewardship Council quarterly meeting on April 4, 2010. The briefing provided the EA schedule and the results of the request for input from the public on additional alternatives to be addressed in the draft EA. The majority of the presentation addressed proposed relocation of several POCs that will be conducted under RFLMA concurrently with, but not part of, this EA.

Notification of the start of the 30-day comment period and posting of the Draft EA on the DOE website was sent via email as described above on April 30, 2010. Additionally, a notification was published in two local newspapers and a news release distributed regionally to solicit comments and provide the DOE website and email addresses. The 30-day public comment period ended June 1, 2010.

An informational public meeting was held the evening of May 18, 2010, at the Broomfield City and County Building. A newspaper advertisement was published in a local newspaper, and the invitation was posted to the LM website and distributed to the stakeholder distribution list via broadcast email. A second advertisement was published in a second local newspaper on May 13, 2010.

Seventeen members of the public, the majority of whom were employed by local community governments, attended the meeting and asked questions and provided comments during a DOE presentation on the Draft EA.

## 2.3 Results

Verbal comments received during the February 1, 2010, public meeting included the concern that not enough time has elapsed since completion of cleanup and closure and implementation of the final response action to provide sufficient monitoring data to support the proposed change in the surface water configuration.

- Several council members were concerned that the monitoring regime at the site would change or be reduced as a result of the Proposed Action. Several other council members indicated they would like to see additional information on the criteria that DOE would consider before breaching the dams at terminal ponds A-4 and B-5 (as originally proposed during the 2015 to 2018 timeframe). Another member spoke of concerns that the ongoing

groundwater treatment and current groundwater conditions could adversely affect surface water if the Proposed Action is implemented.

- One council member asked how the City and County of Broomfield augments downstream flows to make up for evaporative loss at the current impoundments and whether the Proposed Action would have an effect on the augmentation requirements.
- The DOE site manager said that prior to breaching the terminal A-4 and B-5 dams, DOE would consider the CAD/ROD requirements regarding compliance with RFLMA water quality standards at the POCs. He added that the change from batch and release to flow-through operation of the terminal pond dams would be discussed in detail in the EA.

DOE received five letters from representatives of downstream local government units in response to its request for input on additional alternatives for this EA. Four letters supported the No Action Alternative for various reasons, primarily because of concern that breaching the dams would negatively impact downstream surface water quality. The fifth letter also supported the No Action Alternative but suggested an additional alternative to evaluate the impact of breaching the dams after 10-, 15-, and 25-year increments from the present.

Verbal comments received during the April 4, 2010, Stewardship Council meeting focused primarily on the POC relocation issue. Several speakers opposed the dam breaches and POC relocations because:

- Not enough data were available
- Future monitoring requirements were not known
- The original site cleanup was insufficient

Verbal comments received during the May 18, 2010, informational meeting were written on flip charts for all to view. Verbal responses were also written on the flip charts. Appendix A provides a transcript of these flip charts.

DOE received 18 letters during the 30-day comment period, which contained 186 comments. All comments have been placed in a Comment Response table (Appendix A). Many of the comments received were similar in nature, and a Common Concern Statement document, with appropriate DOE response has been developed and is also presented in Appendix A.



## **3.0 Description of the Proposed Actions and Alternatives**

This EA assesses the Proposed Action and No Action alternatives only, and a description of each of these alternatives is provided in this section. A discussion of other alternatives that were considered but eliminated from further action is also provided in this section.

### **3.1 Proposed Action**

As stated in Section 1.2, the general purposes of the proposed dam modifications are to:

- Create a pond and drainage system that minimizes or eliminates maintenance and operation of the existing dams,
- Preserve and enhance wetlands and habitat to the extent practicable,
- Modify (breach) the dams such that they can be reclassified from jurisdictional to non-jurisdictional structures under State Engineer's Office regulations, if possible, while achieving the first two objectives, and
- Reduce or eliminate the off-line storage of surface water at the site and the resultant need for a Substitute Water Supply Plan (and subsequent Augmentation Plan) to replace out-of-priority depletions via the Broomfield Water Lease and ultimately, filings with the water court for storage rights.

Presently, ponds A-4 and B-5 are periodically discharged using batch and release, and discharge has been infrequent since closure. In addition to the dam modifications described in more detail in this section, the Proposed Action includes opening the discharge valves for ponds A-4, B-5, and C2 to operate the dams as flow-through structures prior to breaching. The rate of discharge would be controlled by periodically adjusting the discharge valves in response to varying inflow to establish more consistent downstream flow. The discharge rates would be adjusted as necessary to maintain lower pond levels than normally encountered in the previous batch-and-release mode. These lower pond levels would promote revegetation within the former pond bottom areas prior to the regrading and revegetation during the breach construction. This part of the Proposed Action would serve to reestablish continuous creek flows prior to completion of the breaches.

#### **3.1.1 Design Characteristics and Sequence of Events Similar to all Five Dams**

The Proposed Action is divided into two timeframes: breaching the dams at ponds A-3 and PLF in 2011 and breaching the dams at ponds A-4, B-5, and C-2 in the 2018 to 2020 timeframe. Dams A-4, B-5, and C-2 would be operated in flow-through configuration until they are breached. In general, pond water levels would be maintained at the elevation of the inlet to the discharge pipes, with outflow rates equaling inflow rates. In the event that high runoff influent volumes exceed the capacity of the discharge pipes, and the pool levels rise correspondingly, the rate of discharge would then be controlled by periodically adjusting the discharge valves such that pool levels would not be drawn down greater than 1 foot per day in order to ensure dam safety.

The average construction duration for dam breaching at each structure would be approximately 11 weeks. The project duration and areas of disturbance for each dam are shown on Table 3-1.

Figure 3–1 presents a typical breach cross section rendering as it is cut through the profile of the dam embankment. Figure 3–2 presents a typical breach profile cut through the cross section of the dam embankment. The channel bottom slope is shown along with a drop structure to reduce the flow line to match in with the existing outlet channel. These figures are not dam specific but provide a conceptual representation of the breach design for each of the dams. Appendix B provides preliminary design drawings specific to each dam with a plan view of the existing dam with the proposed breach location, a cross-section cut through the dam along the breach channel flowline, and a profile cut along the center of the dam showing the cross-section of the breach. The final drawings would be completed prior to construction and may contain site-specific changes due to ground truthing land surveys but would not include any additional disturbance than assessed in this EA.

Table 3–1. Dam Breach—Estimated Summations per Dam

Dam Name	Estimated Total Cubic Yards to be Excavated	Est. Project Duration (wks)	Area of Disturbance Breach Work (acre)	Area of Disturbance - Laydown and Road Area (acre)	Average Supervisory Personnel On Site Daily (inc. sub foreman)	Average Trade Personnel On Site Daily	Average Delivery & Specialty Personnel On Site Daily	Average Qty of Vehicles & Equipment Pcs. on Site Daily
Dam A-3	5,900	9.4	3.0	0.9	3.6	5.0	0.3	14.0
Dam A-4	7,305	11.2	5.9	3.2	3.6	5.0	0.3	14.0
Dam B-5	10,471	15.1	3.0	1.1	3.6	5.0	0.3	14.0
Dam C-2 <sup>a</sup>	7,004	10.7	2.6	4.8	3.6	5.0	0.3	14.0
Present Landfill Dam	5,909	9.4	2.6	0.9	3.6	5.0	0.3	14.0

<sup>a</sup> Dam C-2 Area of Disturbance—Lay down and Road Area (acre) value includes the access road from Indiana Street.

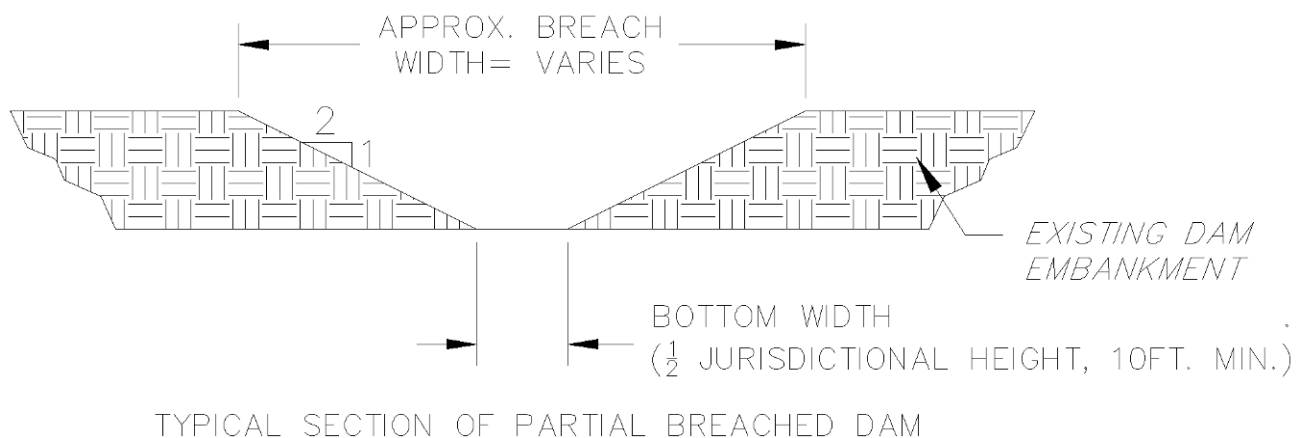


Figure 3–1. Typical Section of Partial Breached Dam

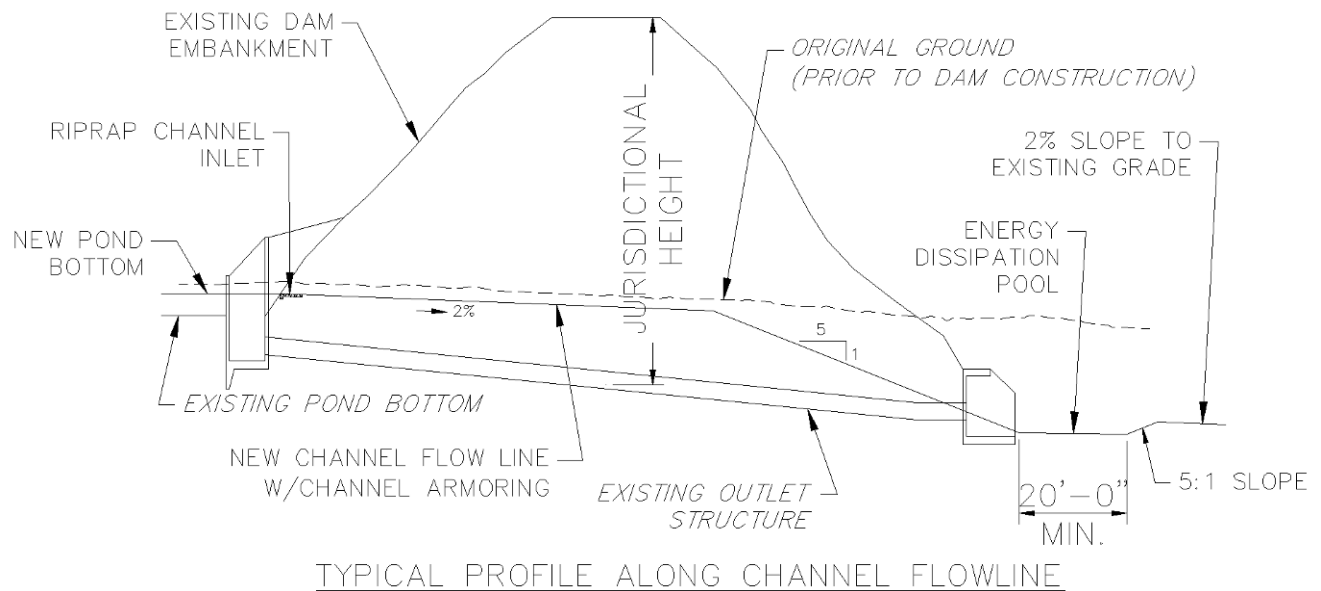


Figure 3–2. Typical Profile Along Channel Flowline

To modify the dam, a “breach” or “channel” would be cut into each dam to reduce its jurisdictional height, thus creating a lower profile. The following design characteristics are similar among the five dams.

- Channel side slopes of 2H:1V (H:V is the ratio of the horizontal length to the vertical height)
- Channel flowline slope of 2 percent with a 5H:1V drop structure slope
- Channel design to accommodate peak flows from at least a 100-year/24-hour storm event with 2 foot (ft) freeboard
- Channel bottom and side slopes to be armored as needed to resist future erosion

The inlet elevation (invert) for the channel would be located to provide positive drainage from the area upstream of the channel inlet. This would ensure a consistent flow of water and prevent ponding. The area upstream of each channel would be designed to preserve and enhance wetlands and habitat to the extent possible, while still providing positive flow. Table 3–1 provides a summary of the estimated disturbance, project duration, and resource requirements for each dam.

The following generalized construction sequence is similar for all five dams.

- Dewater the pond using existing discharge valves and/or pumping as necessary, several months prior to any construction work (preceding winter/spring).
- Mobilize for construction: set up staging area, erosion controls, and stockpile area.
- Install a temporary coffer dam upstream for potential storm events (manage retained water upstream using pumps). A coffer dam is a temporary watertight enclosure that is pumped dry to expose the bottom of a body of water so that construction may be undertaken.

- Excavate soil from the breach channel and fill predefined fill areas (i.e., former spillways and roads to be reclaimed).
- Construct breach to engineering specifications (side slopes, flowline, drop structure); armor the channel for erosion resistance, as needed.
- Regrade area upstream of channel to provide positive flow, minimize ponding, and promote establishment of quality habitat.
- Reclaim all disturbed areas.

### **3.1.2 A-3 Dam Specific Project Description**

North Walnut Creek Pond A-3 currently has an approximate storage capacity of 12.4 million gallons (MG). The operating outlet is a 12-inch (in.)-diameter iron pipe. The jurisdictional dam height is approximately 32.5 ft as measured from the dam crest to the bottom of the outlet pipe at the dam centerline. Access to Dam A-3 would come from the RFS west entrance (Highway 93) and via existing dirt roads west and north of Pond A-3. Other physical characteristics of the dam are as follows:

- Dam crest length = 382 ft
- Emergency spillway description = 55 ft wide × 6 ft depth, 20 ft bottom width

Pond A-3 is periodically discharged to Pond A-4 depending on runoff volumes. In addition to the characteristics similar to all dam breaches, Dam A-3 would have a breach channel width of approximately 17 ft (preliminary design based on the State Engineer Office criteria of one-half the jurisdictional height of the existing dam but not less than 10 ft).

### **3.1.3 A-4 Dam Specific Project Description**

North Walnut Creek Pond A-4 currently has an approximate storage capacity of 32.1 MG. The operating outlet is an 18-in.-diameter concrete pipe. The jurisdictional dam height is approximately 40 ft as measured from the dam crest to the bottom of the outlet pipe at the dam centerline. Access to Pond A-4 would come from the RFS west entrance (Highway 93) and via existing dirt roads west and south of A-4. Other physical characteristics of the dam are as follows:

- Dam crest length = 470 ft
- Emergency spillway description = 162 ft wide × 4 ft depth, 138 ft bottom width

Dam A-4 is operated using the current batch-release protocol to manage terminal pond discharges. Discharges have been infrequent since site closure. In addition to the characteristics similar to all dam breaches, Dam A-4 would have a breach channel width of approximately 20 ft (preliminary design based on the State Engineer Office criteria of one-half the jurisdictional height of the existing dam but not less than 10 ft).

### **3.1.4 B-5 Dam Specific Project Description**

South Walnut Creek Pond B-5 currently has an approximate storage capacity of 23 MG. The operating outlet is an 18-in.-diameter concrete pipe. The jurisdictional dam height is

approximately 49.5 ft as measured from the dam crest to the bottom of the outlet pipe at the dam centerline. Access to Pond B-5 would come from the RFS west entrance (Highway 93) and via existing dirt roads west and north of B-5. Other physical characteristics of the dam are as follows:

- Dam crest length = 470 ft
- Emergency spillway description = 116 ft wide × 6 ft depth, 80 ft bottom width

Dam B-5 is operated using the current batch-release protocol to manage terminal pond discharges. Discharges have been infrequent since site closure. In addition to the characteristics similar to all dam breaches, Dam B-5 would have a breach channel width of approximately 25 ft (preliminary design based on the State Engineer Office criteria of one-half the jurisdictional height of the existing dam but not less than 10 ft).

### **3.1.5 C-2 Dam Specific Project Description**

South Interceptor Ditch Pond C-2 currently has an approximate storage capacity of 23 MG. Pond C-2 currently retains water from the South Interceptor Ditch and does not receive direct Woman Creek inflow. The operating outlet is an 18-in.-diameter concrete pipe. The jurisdictional dam height is approximately 34 ft as measured from the dam crest to the bottom of the outlet pipe at the dam centerline. Access to Pond C-2 would come from the east side of the Refuge (Indiana Street) and via existing dirt roads east and south of C-2. Other physical characteristics of the dam are as follows:

- Dam crest length = 1,213 ft
- Emergency spillway description = 380 ft wide × 12 ft depth, 236 ft bottom width

Dam C-2 is operated using the current batch-release protocol to manage terminal pond discharges. Discharges have been infrequent since site closure. In addition to the characteristics similar to all dam breaches, Dam C-2 would have a breach channel width of approximately 17 ft (preliminary design based on the State Engineers Office criteria of one-half the jurisdictional height of the existing dam but not less than 10 ft).

### **3.1.6 PLF Dam Specific Project Description**

The PLF Pond currently has an approximate storage capacity of 8.7 MG. The operating outlet is a 12-in.-diameter iron pipe. The jurisdictional dam height is approximately 36.5 ft as measured from the dam crest to the original ground at the dam centerline. Access to the PLF would come from the RFS west entrance (Highway 93) and via existing dirt roads west and south of the PLF. Other physical characteristics of the pond and dam are as follows:

- Dam crest length = 461 ft
- Emergency spillway description = 30 ft wide × 2 ft depth, 22 ft bottom width

The PLF Dam is currently operated with the valve open in a flow-through mode. In addition to the characteristics similar to all dam breaches, the PLF Dam would have a breach channel width of approximately 18 ft (preliminary design based on the State Engineer Office criteria of one-half the jurisdictional height of the existing dam but not less than 10 ft).

### **3.1.7 Institutional Controls Similar to all Five Dams (not resource specific)**

Although the dams that are proposed to be breached are not required by the CAD/ROD, certain aspects of the work are subject to institutional controls within the COU and regulated by RFLMA requirements. Also, RFLMA establishes water quality standards and identifies the water monitoring and evaluation requirements applicable to implementation of the remedy. The current management of ponds A-4, B-5, and C-2 is to retain water until approximately 40 to 50 percent of the capacity is reached, at which point discharge planning is initiated, which is referred to as batch-and-release operation. Under RFLMA operational monitoring (pre-discharge sampling), the water in the ponds is sampled prior to release. Pre-discharge sampling is completed to demonstrate that the discharged water would be expected to meet applicable RFLMA water quality standards. If the results suggest RFLMA standards might be exceeded at the downstream POC, the RFLMA parties consult on appropriate pond management actions. However, the dams are operated to maintain dam safety regardless of the status of pre-discharge sampling. During discharge, the released water is monitored at a RFLMA POC a short distance downstream of the dam outlet. Compliance with water quality standards is determined based on sample results at the RFLMA POC. Water quality and monitoring results are discussed in detail in Section 4.3.5.

In addition, excavation within the COU deeper than 3 ft below the surface is prohibited by the remedy institutional controls unless approved in accordance with RFLMA requirements. Shallower soil disturbance within the COU is also prohibited by the remedy institutional controls unless the work is conducted in accordance with an approved erosion control plan. DOE has requested approval under the RFLMA requirements to perform the dam breach excavation and has documented that an approved erosion control plan would apply to the work.

Once the dams are breached, no pre-discharge sampling will occur, as the batch-and-release mode of operation will stop, and the water would be in a flow-through configuration. Thus RFLMA operational pre-discharge monitoring will discontinue, but all other RFLMA monitoring will remain. Information regarding the RFLMA party consultation for the proposed RFLMA modifications, the soil disturbance/excavation work, and the regulatory approval process is contained in RFLMA Regulatory Contact Record 2010-02, which is included in Appendix C. Contact Record 2010-02 includes a summary of the characterization and risk evaluation documentation developed during cleanup and closure of RFS relevant to the soil excavation work to implement the Proposed Action.

Due to comments from local communities that because the proposed excavation was not remedy related, CDPHE withdrew approval of Contact Record 2010-02 on October 15, 2010 to allow the RFLMA parties to consult regarding clarification of the soil excavation and soil disturbance prohibitions. The RFLMA parties agree that it is appropriate to make the clarification by issuing an amendment to the CAD/ROD and modifying RFLMA Attachment 2, after consideration of public review comments. The dam breaching would not occur until the appropriate RFLMA amendment is approved.

DOE is aware that because the terminal ponds have been operated in a batch-and-release mode for many years, the dams are perceived by some in the community as features that may be used to mitigate potential impacts to downstream water quality. Appendix A provides a General Statement Concerning Risk to help the reader understand the relationship between the dams and onsite water quality.

## **3.2 No Action Alternative**

The No Action Alternative involves no change to the existing configuration of the remaining five dams in North and South Walnut Creek, No Name Gulch, and Woman Creek (Figure 1-1). Water would be routed according to current configuration and managed at ponds A-3, A-4, B-5, C-2, and the PLF using the current operating protocol. Environmental monitoring would continue in accordance with RFLMA. Operation and maintenance of the dams (batch operation and predischage sampling would remain), and appurtenant structures would continue to require maximum resources.

## **3.3 Other Alternatives Considered**

One alternative action was suggested as a result of the initial request for public comments. This alternative suggested that DOE delay breaching the remaining dams or terminal dams until some point in the future (10, 25, or 50 years) and conduct further water quality and sediment analysis. Additionally, breaching the dams should require long-term monitoring of downstream flows.

This alternative is essentially the same as the No Action Alternative in that no dams would be breached in the foreseeable future, and environmental monitoring would continue in accordance with RFLMA. Because this suggestion does not provide a new alternative to this EA, it is not considered further.

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## 4.0 Description of the Affected Environment

This section provides a general description and a regional context of the RFS. Additionally, specific discussion of existing environmental resources is provided as necessary for DOE to reach a reasoned choice between the Proposed Action and the No Action alternatives. Resources that are not present or would not be impacted by the Proposed Action are discussed briefly, with an explanation as to why the resources were not carried forward for further environmental analysis. Environmental resources known to occur, or with the potential to occur, and that may be impacted in the Proposed Action are identified and carried forward for further analysis.

Many of the existing conditions as reported in the *Environmental Assessment Comment Response and Finding of No Significant Impact, Pond and Land Configuration* (DOE 2004) are still applicable, and baseline and monitoring information from the 2004 EA has been used.

### 4.1 General

As previously described in Section 1.1, the RFS is located in northern Jefferson County, Colorado, approximately 16 miles northwest of Denver, between the cities of Golden and Boulder. The RFS originally occupied approximately 6,200 acres. After site closure, management of the area was split between DOE and USFWS. DOE-retained the 1,300 acre COU, while most of the POU became the Rocky Flats Wildlife Refuge under USFWS management.

The RFS is surrounded by the Refuge. Numerous easements cross the COU and POU for utilities such as power, gas, and telephone. Water conveyance ditches for water rights owned by non-DOE parties cross the POU at various locations (e.g., McKay Ditch, Mower Ditch, and Smart Ditch – D-Series Ponds).

The communities of Arvada, Boulder, Broomfield, Golden, Leyden, Superior, and Westminster are located near the RFS. The land to the south of the Refuge is privately owned and is currently used for cattle grazing with plans to develop portions of these properties as residential subdivisions and business developments. The State of Colorado School Board land located in Section 16 (in the southwest corner of the Refuge) is also primarily rangeland, and gravel mining has occurred on this property in the past. An operating oil and gas well is located in Section 16.

The land between Highway 93 and the foothills to the west is largely comprised of City of Boulder, Boulder County, and Jefferson County open space properties, some of which are used for grazing and recreation activities. No development is currently planned for these areas. Between the Refuge and Highway 93 lies a narrow strip of private property used for grazing and business development.

On the western edge of the Refuge, within the POU boundary (but not part of the Refuge), two gravel mine operations are present, only one of which is active. The National Renewable Energy Laboratory (NREL) wind test site is located directly northwest of the POU (Figure 1–1). North of the Refuge is open space land owned and managed by the City of Boulder and Boulder County. Most of the land east of the Refuge and within the City and County of Broomfield and City of Westminster is open space property. A measure included in the Rocky Flats Wildlife Act

would allow a 300-ft corridor along the eastern edge of the Refuge for transportation improvements along Indiana Street (PL 107-107).

Elevations at the POU and COU range from approximately 5,700 ft in the east to approximately 6,100 ft along the western edge. The topography consists of gently east-sloping flat pediment (mesa) tops that have been dissected by intermittent and ephemeral streams, resulting in moderate to steep hillsides.

According to NREL, the average annual precipitation is approximately 15 in., most of which falls during April and May. The mean monthly temperature ranges from a low of approximately 34 °F in January to a high of approximately 71 °F during July. High winds, sometimes in excess of 90 miles per hour, frequently buffet RFS during the winter months (NREL 2010).

Plant communities range from xeric (dry) grassland communities to more hydric (wet) communities such as wet meadows and marshes. Diverse wildlife occurs at the RFS, and birds occur in all available habitats at RFS.

## **4.2 Resources Considered but not Present or Impacted by the Proposed Action**

### **4.2.1 Prime and Unique Farmlands**

Prime and unique soils are protected under the Farmland Protection Policy Act of 1981. The purpose of the law is to minimize the extent to which federal activities contribute to the irreversible and unnecessary loss of agricultural land to non-agricultural uses. No prime and unique soils or agricultural lands are present on the RFS; therefore, this resource is not considered further in this EA.

### **4.2.2 Environmental Justice**

Executive Order 12898 requires that each federal agency consider and address “disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” The results of individually or collectively breaching dams on the RFS as well as the associated employment and construction activities to breach the dams would not impact downstream minority communities or their environment; therefore, this element is not considered further in this EA.

### **4.2.3 Wild and Scenic Rivers**

The Wild and Scenic Rivers Act (PL 90-542) designates selected rivers of the United States for protection. No designated wild and scenic rivers cross the RFS or would be impacted by this project; therefore, this resource is not considered further in this EA.

### **4.2.4 Native American Concerns**

The proposed dam breach activities are not expected to affect historic tribal use areas or traditional cultural properties on the basis of cultural resource inventory results (Burney et al. 1989; Dames & Moore 1991). In accordance with 36 CFR 800.2 and 800.4,

DOE notified 18 identified tribes of its Proposed Action by letter sent via U.S. mail, dated March 23, 2010, and requested their assistance in identifying properties having religious or cultural significance. No responses were received. Appendix D provides copies of the consultation letters.

#### **4.2.5 Cultural Resources**

Class III cultural resource inventories of the RFS were conducted in 1989 and 1991 (Burney et al. 1989; Dames & Moore 1991). All cultural sites and isolated finds that were discovered during the inventories were found to be ineligible for inclusion on the National Register of Historic Places. Since the 1989 and 1991 inventories, the areas adjacent to the retention ponds have been minimally disturbed, with the exception of removing sediment from the bottom of the PLF Pond during construction of the nearby landfill, outlet works upgrades (A-4, B-5, C-2), spillway repair at A-3, and occasional sampling of sediment from the other ponds. With these exceptions, no surface-disturbing activities have occurred during the past 20 years. For this reason, DOE believes that the 1989 and 1991 inventories remain applicable and has recommended to the State Historic Preservation Officer (SHPO) that its proposed work would have “no effect.” SHPO concurred with this determination in a letter to DOE dated March 24, 2010. As a result, this resource is not considered further in this EA. Copies of the letter sent to SHPO, and the SHPO concurrence letter are included in Appendix D.

#### **4.2.6 Groundwater**

Breaching the remaining interior and terminal dams and reestablishing approximate original creek configurations on the RFS would not have a meaningful impact on groundwater. The associated ponds are well downstream of contaminant source areas, and concentrations of the pertinent contaminants in groundwater within these drainages are monitored upstream of the ponds that would be affected. Therefore, breaching the dams does not affect groundwater contaminant migration or distribution, and this resource is not considered further in this EA.

#### **4.2.7 Socioeconomic Considerations**

Employment needs were evaluated based on the expected average employment needs for breaching each dam. Overlapping of dam breach activities are expected; however, even doubling the employment would not affect the results of the following analysis.

Between eight to nine people would be needed to conduct, supervise, and provide oversight activities associated with breaching activities at each dam. Three to four individuals would be contractor-provided supervisory or professional positions (construction site supervisor, health and safety, environmental compliance, and engineer), and an average of five positions would be local hires in other work categories, such as laborers, truck drivers, and heavy equipment operators. Some of the positions would be part time. Dam breach activities are expected to take between 9 and as much as 15 weeks at each dam, which is related to the actual size of the dam and volume of material that would be removed.

The hiring of an average of five subcontractor labor workers would not influence local unemployment patterns, contribute substantially to local revenues, or affect existing school enrollment levels or utilities. Additionally, a job safety analysis is prepared for all onsite work,

and any contracted workers would be required to attend safety training. For these reasons, this subject is not considered further in this EA.

#### **4.2.8 State or National Parks, Forests, Conservation Areas, or Other Areas of Recreational, Ecological, Scenic, or Aesthetic Importance**

No state or national parks, forests, conservation areas, or other areas of recreational, ecological, scenic, or aesthetic importance occur on the RFS. However, DOE transferred most of the land in the POU to USFWS in 2007 (PL 107-107). As of this writing, USFWS has not begun development work in the Refuge. The RFS provides habitat for the federally listed Preble's meadow jumping mouse, which is further described and evaluated in Sections 5.2.3 and 6.3. None of the proposed or related actions described in this EA would affect use or the purposes of the Refuge; therefore, this subject is not considered further.

#### **4.2.9 Transportation**

The RFS is accessed daily by LM and contractor staff via State Highway (SH) 93. For work on dams A-3, A-4, B-5, and the PLF, area state highways would continue to be used to access the site. The small additional anticipated workforce of eight to nine individuals and expected miscellaneous delivery trips would not impact highway capacity or existing use patterns. In 2008, the average annual daily traffic (AADT) on SH-93 between SH-72 and SH-128 varied between 16,400 to 15,800 vehicles, which included truck and passenger vehicles. Between 6.1 and 7.4 percent of the vehicles using SH-93 consisted of single or combination trucks (CDOT 2010).

Work on dam C-2 is expected to require access from Indiana Street (County Road 5) either from SH-128 or SH-72. SH-128 at the McCaslin intersection near Indiana Street carried an AADT of 9,200 vehicles in 2008. SH-72 at the Indiana Street intersection north of 82nd Avenue recorded an AADT of 15,000 in 2008. Truck traffic varied at these locations between 3.2 and 4.8 percent (CDOT 2010). The Colorado Department of Transportation (CDOT) interactive maps showed traffic on Indiana Street between 10,500 to over 11,000 AADT; near Woman Creek, the AADT was 10,400. If accessing the site with heavy equipment or special deliveries becomes an issue related to highway safety, LM would consider safety options in conjunction with CDOT and Jefferson County recommendations.

The expected small work force, minor equipment and delivery requirements, and availability of state highways for most access requirements do not indicate that transportation would be an issue of concern. For that reason, this resource is not considered further in this EA.

#### **4.2.10 Intentionally Destructive Acts**

In the aftermath of the tragic events of September 11, 2001, DOE is required to consider measures to minimize the risk and consequences of a potential terrorist attack. It is not possible to predict whether sabotage events would occur and, if they did, the nature of such events. Nevertheless, the RFS, and associated dam structures present an unlikely target for an intentionally destructive act and has a low probability of attack. The dams are classified as low hazard or no public hazard by the State of Colorado Office of the State Engineer.

### 4.3 Resources Considered Further in this EA

Descriptions of the existing environments that could be affected by the Proposed Action are provided in this section.

#### 4.3.1 Wildlife

Considerable wildlife diversity occurs at RFS as well as the Refuge. Wildlife use in North and South Walnut Creek as well as Woman Creek is comparable to that documented in the riparian and grassland areas at RFS. Wildlife surveys were conducted throughout the 1990s and early 2000s across the property that documented the diversity of wildlife (K-H 1998; K-H 1999; K-H 2000; K-H 2001; K-H 2002). The project work would be on the stream bottoms and ponds, and the wildlife associated with those types of habitats and vegetation communities (e.g., riparian woodland/shrubland, wetlands, mesic mixed grassland, and mixed grassland) would be more prevalent.

Mule deer (*Odocoileus hemionus*) are common across the RFS with an occasional white-tailed deer (*O. virginianus*) mixed in the population. Deer population numbers range between 100 to 160 individuals on an annual basis. Elk (*Cervus elaphus*), mountain lion (*Puma concolor*), and black bear (*Ursus americanus*) are observed occasionally. The most commonly observed carnivore is the coyote (*Canis latrans*). Mid- to small-sized animals include desert cottontails (*Sylvilagus audubonii*), white-tailed (*Lepus townsendii*) and black-tailed (*Lepus californicus*) jackrabbits, raccoons (*Procyon lotor*), muskrats (*Ondatra zibethicus*), and black-tailed prairie dogs (*Cynomys ludovicianus*). Common small mammals include deer mice (*Peromyscus maniculatus*), prairie (*Microtus ochrogaster*) and meadow voles (*M. pennsylvanicus*), harvest mice (*Reithrodontomys sp.*), and shrews (*Sorex sp.*). The Preble's meadow jumping mouse (*Zapus hudsonius preblei*), a federally listed threatened species, also occurs at the RFS and is discussed in Section 4.3.3.

Amphibians have been observed across the RFS in the appropriate habitats for each species. Common species include boreal chorus frogs (*Pseudacris triseriatus maculata*), northern leopard frogs (*Rana pipiens*), and bullfrogs (*Rana catesbeiana*). Reptile species include the prairie rattlesnake (*Crotalus viridis*), western painted turtle (*Chrysemys picta*), and occasional observations of the eastern short-horned lizard (*Phrynosoma douglassi*) on the xeric tallgrass prairie. Fish are found in the intermittent streams and most ponds at the RFS. Common species include fathead minnows (*Pimephales promelas*), creek chubs (*Semotilus atromaculatus*), and an occasional small-mouth (*Micropterus dolomieu*) and large-mouth (*M. salmoides*) bass. Past sampling efforts have observed fathead minnows in the project ponds. The fluctuating water levels in the ponds may limit habitat suitability for the other species, which have not been observed there.

#### 4.3.2 Migratory Birds

Most birds are protected by the Migratory Bird Treaty Act of 1918 (16 USC 703-712; Ch. 128 *et seq.*). Birds occur in all available habitats at RFS, including potentially the areas in and around the dams. Song birds such as meadow larks (*Sturnella neglecta*) and vesper sparrows (*Pooecetes gramineus*) are common in the grassland areas of the Rocky Flats property (including the project areas). These birds and other animals living in the grassland areas provide forage for

raptors such as red-tailed hawks (*Buteo jamaicensis*), Swainson’s hawks (*Buteo swainsoni*), northern harriers (*Circus cyaneus*), great horned owls (*Bubo virginianus*), and American kestrels (*Falco sparverius*). All but the Swainson’s hawk are common year-round at RFS. In summer, the most common additional species are Swainson’s hawks, golden eagles (*Aquila chrysaetos*), and turkey vultures (*Cathartes aura*). Other raptors that occasionally visit RFS include the peregrine falcon (*Falco peregrinus*), ferruginous hawk (*Buteo regalis*), bald eagles (*Haliaeetus leucocephalus*), and burrowing owl (*Athene cunicularia*).

The riparian areas, including No-Name Gulch, North and South Walnut Creek, and Woman Creek, along the streams and drainage bottoms at RFS support a variety of song and neo-tropical migrant species of birds. Over 95 neo-tropical migrant species have been recorded at RFS. Some of the more common sightings in the project area include American goldfinch (*Carduelis tristis*), lesser goldfinch (*Carduelis psaltria*), Bullock’s orioles (*Icterus bullockii*), Brewer’s blackbirds (*Euphagus cyanocephalus*), yellow warblers (*Dendroica petechia*), western kingbirds (*Tyrannus verticalis*), common nighthawks (*Chordeiles minor*), and Cooper’s hawks (*Accipiter cooperii*). Other common neo-tropical birds include the Say’s phoebe (*Sayornis saya*), eastern kingbirds (*Tyrannus tyrannus*), cliff and barn swallows, American robins (*Turdus migratorius*), yellow warblers (*Dendroica* spp.), common yellowthroat (*Geothlypis trichas*), grasshopper sparrows (*Ammodramus savannarum*), and red-winged blackbirds (*Agelaius phoeniceus*). Raptors such as red-tailed hawks and great horned owls occasionally use the riparian woodlands for perches or nesting areas.

The ponds located in the project areas are used by waterfowl and shorebirds as breeding habitat or feeding areas. Among more than 45 species of waterfowl and shorebirds at RFS, mallards (*Anas platyrhynchos*), Canada geese (*Branta canadensis*), and great blue herons (*Ardea herodias*) are the most common. Other frequently observed waterfowl species include buffleheads (*Bucephala albeola*), blue-winged teal (*Anas discors*), green-winged teal (*Anas crecca*), common (*Mergus merganser*) and hooded mergansers (*Lophodytes cucullatus*), ring-necked ducks (*Aythya collaris*), redheads (*Aythya americana*), lesser scaups (*Aythya affinis*), black-crowned night herons (*Nycticorax nycticorax*), double crested cormorants (*Phalacrocorax auritus*), American coots (*Fulica americana*), American white pelicans (*Pelecanus erythrorhynchos*), and pied-billed grebes (*Podilymbus podiceps*).

### 4.3.3 Threatened and Endangered Plant and Wildlife Species

Table 4–1 lists the federally threatened or endangered species of plants that must be evaluated for potential impacts from projects at the RFS based on the species list received from USFWS (USFWS 2010).

Table 4–1. Federally Listed Threatened and Endangered Vegetative Species

Plants	Legal Status
Colorado butterfly plant ( <i>Gaura neomexicana coloradensis</i> )	T
Ute ladies'-tresses orchid ( <i>Spiranthes diluvialis</i> )	T
Western prairie fringed orchid ( <i>Platanthera praeclara</i> ) <sup>a</sup>	T

<sup>a</sup> Lower Platte River species

T = Listed threatened

Ute ladies'-tresses orchid and Colorado butterfly plant are both species listed as threatened but have not been documented on the RFS (ESCO 1993; ESCO 1994; DOE 1996). The western prairie fringed orchid occurs along the South Platte River in Nebraska; however, per USFWS requirements, it must be considered for potential water depletion issues (USFWS 2010).

Based on the species list received from USFWS (USFWS 2010), Table 4–2 lists the federally listed species must be evaluated for potential impacts from projects at the RFS.

Table 4–2. Federally Listed Threatened and Endangered Wildlife Species

Animals	Status
Interior Least tern ( <i>Sterna antillarum</i> ) <sup>a</sup>	E
Pallid sturgeon ( <i>Scaphirhynchus albus</i> ) <sup>a</sup>	E
Piping plover ( <i>Charadrius melodus</i> ) <sup>a</sup>	T
Preble's meadow jumping mouse ( <i>Zapus hudsonius preblei</i> )	T
Whooping crane ( <i>Grus americana</i> ) <sup>a</sup>	E

<sup>a</sup> Lower Platte River species

T = Listed threatened

E = Listed endangered

Of these species, only the Preble's mouse occurs at the RFS, generally along the stream channels in areas where multi-strata vegetation exists to provide food, shelter, and cover for the mouse. Other species shown on Table 4–2 are lower Platte River species that are to be considered for water depletion issues (USFWS 2010). The Preble's mouse has been documented and studied extensively in each of the main drainages at RFS. Studies at the RFS have focused on trapping and tagging Preble's mice, including mice in North and South Walnut Creek and Woman Creek drainages, and tracking their movements through the use of telemetry. In addition, habitat characterization has been completed to quantify habitat parameters for the mouse at the RFS. The data from these studies have yielded information on Preble's mouse habitat, areas of occupation, home ranges, and mouse movement at the RFS.

Currently a Programmatic Biological Assessment (PBA) and accompanying Biological Opinion (BO) exist for activities at RFS. On December 15, 2010, the USFWS finalized a ruling that designated critical habitat for the Preble's meadow jumping mouse (Preble's mouse; *Zapus hudsonius preblei*) at Rocky Flats (75 FR 78430). As a result, LM has re-initiated consultation with the USFWS to amend the PBA to address the critical habitat designation, remove completed activities from the PBA, and address ongoing and future DOE activities that may take place at the site.

No federal candidate species are present at the RFS or in the project areas (USFWS 2010).

In addition to the federally listed wildlife species, RFS has been known to support several species with special status designated by the Colorado Division of Wildlife (CDOW) because of their rare or imperiled status (CDOW 2010). Table 4–3 lists the Colorado State Threatened and Special Concern wildlife species that have been observed at RFS or reported to have been observed at RFS.

Table 4–3. Colorado State Threatened, Endangered, and Special Concern Wildlife Species

Animals	Status	Occurrence At RFS (COU) and POU
American Peregrine Falcon ( <i>Falco peregrinus anatum</i> )	SC	Observed infrequently
Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	ST	Observed infrequently
Black-Tailed Prairie Dog ( <i>Cynomys ludovicianus</i> )	SC	Found at selected locations in COU and POU
Burrowing Owl ( <i>Athene cunicularia</i> )	ST	Observed infrequently
Common Garter Snake ( <i>Thamnophis sirtalis</i> )	SC	Observed infrequently
Common Shiner ( <i>Luxilus cornutus</i> )	ST	Released in Rock Creek (POU) (USFWS)
Ferruginous Hawk ( <i>Buteo regalis</i> )	SC	Regular visitor
Greater Sandhill Crane ( <i>Grus canadensis tabida</i> )	SC	Observed infrequently
Long-Billed Curlew ( <i>Numenius americanus</i> )	SC	Observed infrequently
Mountain Plover ( <i>Charadrius montanus</i> ) <sup>a</sup>	SC	Listed in USFWS CCP for the COU and POU but not in ecology database as observed at RFS
Northern Leopard Frog ( <i>Rana pipiens</i> )	SC	Commonly observed around ponds and streams
Northern Redbelly Dace ( <i>Phoxinus eos</i> )	SE	Released in Rock Creek (POU) (USFWS)
Plains Sharp-Tailed Grouse ( <i>Tympanuchus phasianellus jamesii</i> ) <sup>a</sup>	SE	Listed in USFWS CCP for the COU and POU but not in ecology database as observed at RFS
Preble's Meadow Jumping Mouse ( <i>Zapus hudsonius preblei</i> )	FT, ST	Known to occur at several locations in COU and POU

<sup>a</sup> Listed in USFWS Comprehensive Conservation Plan for the RFNWR – not documented in RFS ecology database

FT = Federally listed threatened

SE = State listed endangered

ST = State listed threatened

SC = State special concern

USFWS published a 90-day finding on a petition to list the northern leopard frog as threatened in the Federal Register on July 1, 2009 (74 FR 31389). No ruling has been made concerning this species at the time of writing.

#### 4.3.4 Vegetation, Wetlands, and Floodplains

This section describes the existing vegetation communities, as well as a description of the wetlands and floodplains, both at the RFS and the study area. Two general types of plant communities exist in the study area: (1) upland grassland communities adjacent to the ponds, and (2) wetland communities within and around the ponds. Appendix E provides an in-depth technical report of the information provided below.

##### 4.3.4.1 Vegetation

The upland grassland areas around the ponds are generally classified as either mesic mixed grasslands or reclaimed grasslands (K-H 1997). Dominant species in the mesic mixed grassland include blue grama (*Boutelou gracilis*), western wheat grass (*Agropyron smithii*), green needle grass (*Stipa viridula*), Kentucky bluegrass (*Poa pratensis*), and Japanese brome (*Bromus*



*japonicus*). The reclaimed grasslands that were seeded after construction of the ponds is dominated by smooth brome (*Bromus inermis*), a non-native grass species. This includes the reclaimed grasslands at the A-3, A-4, B-5, and C-2 ponds. At the PLF, the reclaimed grassland is dominated by native species, which include western wheat grass, blue grama, side-oats grama (*Bouteloua curtipendula*), and switchgrass (*Panicum virgatum*).

#### 4.3.4.2 Wetlands

The Walnut Creek and Woman Creek drainages are intermittent streams with perennial reaches and have a narrow riparian corridor and limited wetlands. The wetland communities at RFS were delineated, characterized, and mapped by the U.S. Army Corps of Engineers (USACE) in 1994 (USACE 1994). Table 4–4 summarizes the wetland communities found in the vicinity of each of the ponds. Figure 4–1 through Figure 4–5 show the locations and types of existing wetlands in and around the study area ponds.

Table 4–4. Existing Pond Wetlands/Open Water Summary

Location	Wetland Type	Total Acreage	Total Wetland Acreage
A-3 Pond	Palustrine Emergent	0.896	4.187
	Palustrine Shrub	0.488	
	Open Water	2.802	
A-4 Pond	Palustrine Emergent	1.547	4.480
	Palustrine Shrub	0.006	
	Open Water	2.927	
B-5 Pond	Palustrine Emergent	0.592	3.036
	Open Water	2.445	
C-2 Pond	Palustrine Emergent	1.562	5.543
	Palustrine Shrub	0.113	
	Open Water	3.868	
PLF Pond	Palustrine Emergent	0.801 (0.478)	0.909 (3.058)
	Open Water	2.257 (0.431)	
<b>Total</b>		<b>20.304 (18.155)</b>	<b>18.155 (20.304)</b>

Acreage amounts are totals in area of each pond based on 1994 USACE wetland mapping report. Linear wetland features acreages calculated as: (Length x 2 ft)/43,560 square ft/acre.

PLF figures in parenthesis represent 2009 mitigation monitoring report values.

Small differences from the 1994 USACE wetland delineation may currently exist at the A-3, A-4, B-5, and C-2 ponds due to changes in environmental conditions. Therefore, the extent of the wetland mapping as delineated by USACE may no longer be accurate due to changes in the environmental conditions between 1994 and the present.

The PLF and wetlands were disturbed as part of site closure activities, and wetland reestablishment is ongoing. Accordingly, the first set of values under total acreage presented in Table 4–4 for the PLF are based on what was previously delineated by the 1994 USACE mapping. The values in parenthesis are based on the 2009 wetland mitigation monitoring report submitted to EPA.

Palustrine emergent wetlands are those dominated by herbaceous vegetation. Dominant species includes cattails (*Typha* spp.), arctic rush (*Juncus balticus*), sedges (*Carex* spp.), prairie cordgrass (*Spartina pectinata*), spikerushes (*Eleocharis* ssp.), redtop (*Agrostis stolonifera*), and Canada thistle (*Cirsium arvense*). Palustrine shrublands are dominated by shrub species such as wild indigo (or leadplant) (*Amorpha fruticosa*) and coyote willow (*Salix exigua*) with an understory of herbaceous species. Open water habitat is areas that are permanently inundated, and no rooted emergent or woody plant species are present.

#### **4.3.4.3 Floodplains**

The Federal Emergency Management Agency (FEMA) defines a 100-year flood event as a flood that has a 1 percent chance of being equaled or exceeded in any given year, and a 500-year floodplain as having a 0.2 percent chance of being equaled or exceeded in any given year (FEMA 2007).

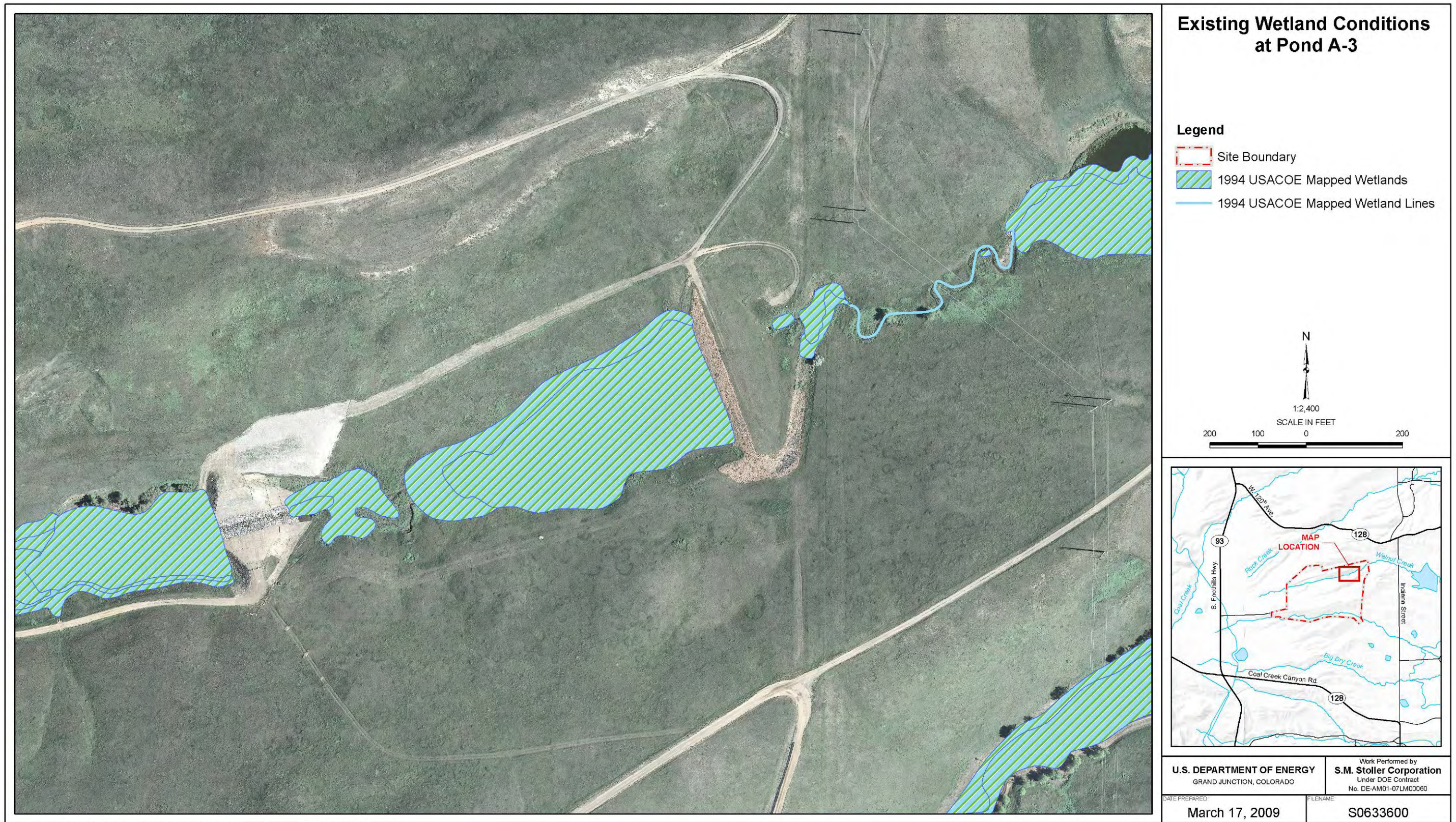
When maintained in a natural state, floodplains provide valuable services by moderating the extent of flooding, thereby (1) reducing the risk of downstream flood loss; (2) minimizing the impacts of floods on human safety, health, and welfare; and (3) providing support to wetlands, fish, and wildlife. For this assessment, the extent of the 100-year floodplains for RFS was derived from the following three sources:

- FEMA flood maps (FEMA 2010)
- *Rocky Flats Plant Drainage and Flood Control Master Plan* (EG&G 1992)
- *Determination of Peak Flow Rates and Floodplain Delineation for Dam Breaches at the Rocky Flats Site* (Wright Water Engineers [WWE] 2010)

Within the RFS, no floodplains are delineated by FEMA, because the extent of FEMA mapping does not extend into the current RFS boundaries. However FEMA flood maps developed for property adjacent to the RFS indicate that the RFS property is located in two flood zone designations—Zone A and Zone X (FEMA 2010). Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. Zone A locations are within the 100-year floodplain. Zone X locations are those outside the 100-year floodplain.

The *Rocky Flats Plant Drainage and Flood Control Master Plan* identified the 100-year floodplain at RFS based on the existing developed conditions in 1992 (EG&G 1992). Since the EG&G mapping, developed areas have been removed as part of the cleanup and closure activities at RFS, and reconfiguration activities have modified drainage basins at the site. Therefore the extent of the floodplains as delineated by this study is no longer relevant due to the site changes resulting from remediation activities.

The WWE 2010 report delineated the current floodplains across the eastern portion of the RFS. Based on this study, some of the proposed activities would be located in or adjacent to the 100-year floodplain. The final report, including mapping of the floodplain for the study area, is included as Appendix F.



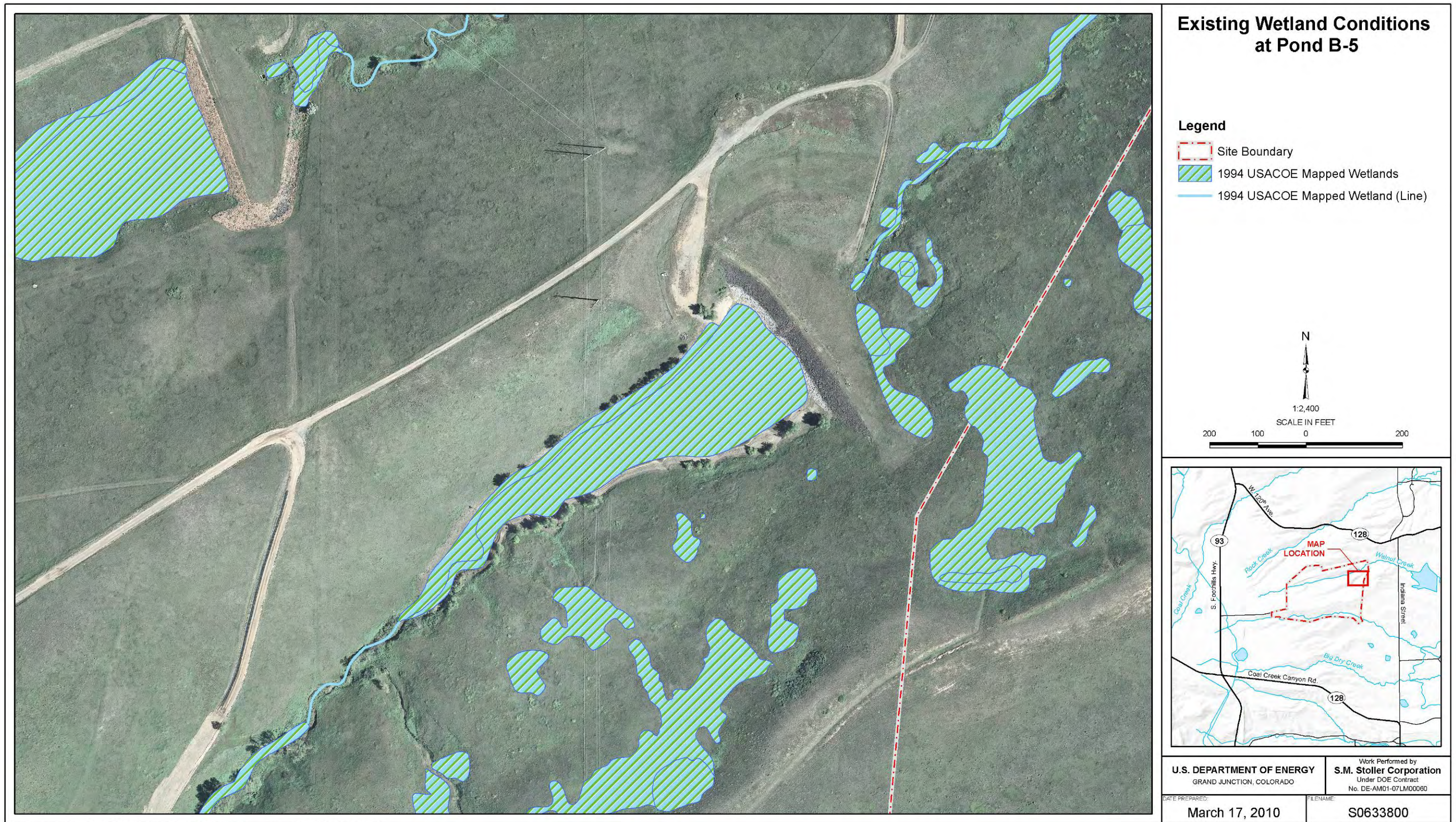
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Figure 4-1. Existing Wetland Conditions at Pond A-3



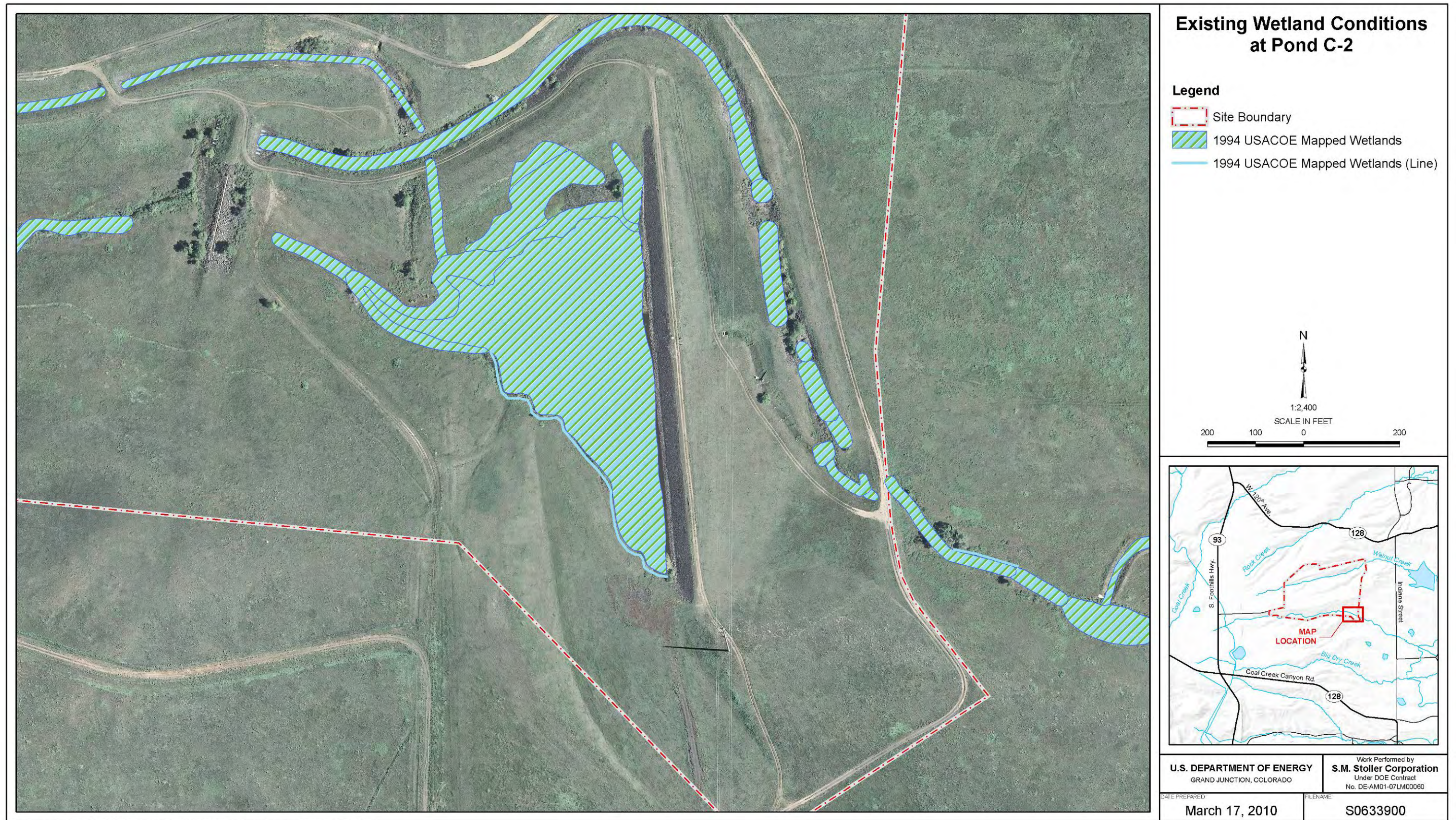
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Figure 4-2. Existing Wetland Conditions at Pond A-4



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Figure 4-3. Existing Wetland Conditions at Pond B-5



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Figure 4-4. Existing Wetland Conditions at Pond C-2



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Figure 4-5. Existing Wetland Conditions at the Present Landfill Pond

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### **4.3.5 Surface Water Resources**

Streams and seeps at the RFS are mostly ephemeral, with stream reaches gaining or losing flow depending on the season and precipitation amounts. Surface water flow across the RFS is primarily from west to east, with two major drainages traversing the site. Within the RFS, 12 retention ponds were constructed during the period of plant operations to collect surface water runoff; the C-1 Dam was breached in 2004, and dams for six other ponds were breached in 2008–2009 with flow-through stoplog structures installed in each breach. The remaining five ponds are maintained by LM. The reconfiguration, RFS drainages, and retention ponds are described below.

The major stream drainages leading off the RFS, from north to south, are Walnut Creek and Woman Creek. North Walnut Creek flows through the A-Series Ponds, and South Walnut Creek flows through the B-Series Ponds; both are tributaries to Walnut Creek. The South Interceptor Ditch flows to Pond C-2, which subsequently flows to Woman Creek when discharged (Figure 1–1).

#### ***4.3.5.1 Creeks and Drainages***

##### ***Walnut Creek***

Walnut Creek receives surface water flow from the majority of the RFS. It consists of several tributaries: No Name Gulch, North Walnut Creek, and South Walnut Creek. These tributaries join Walnut Creek upstream of the RFS eastern boundary. Walnut Creek then flows across Refuge lands to Indiana Street. East of Indiana Street, Walnut Creek flows through a diversion structure that can be configured, at the City and County of Broomfield’s discretion, to divert flow to the BDD and around GWR into Big Dry Creek. A description of the Walnut Creek tributaries, from north to south follows.

##### ***No Name Gulch***

No Name Gulch is located downstream of the PLF, referred to historically as the East Landfill Pond. A surface water diversion ditch is constructed around the perimeter of the PLF to divert surface water runoff around the landfill to No Name Gulch. Effluent from the Present Landfill Treatment System and runoff from the area surrounding the pond are the sole surface water sources to the PLF. The pond is normally operated in a flow-through configuration, although the pool level periodically drops below the outlet works.

##### ***North Walnut Creek***

Runoff from the northern portion of the RFS flows into North Walnut Creek, which has two retention ponds (ponds A-3 and A-4). Two former dams, A-1 and A-2, were breached in 2008 and now function as flow-through structures. The combined capacity of the two remaining A-Series Ponds is approximately 168,433 cubic meters (m<sup>3</sup>) (44.5 MG or 136.6 acre-feet). In the normal operational configuration, streamflow passes through former ponds A-1 and A-2 to maintain wetland habitat (water levels in these former ponds are controlled by evaporation or flow-through stoplog structures) and flows to Pond A-3 for retention. North Walnut Creek flow can also be diverted through the North Walnut Creek Bypass Pipeline around former ponds A-1

and A-2 to Pond A-3 for retention. Pond A-3 is discharged to the A-Series “terminal pond,” A-4. Pond A-4 is normally discharged when warranted in accordance with the *Operations and Maintenance Plan for the Rocky Flats Surface Water Control Project, Dams A-3, A-4, B-5, C-2, and the Present Landfill Dam Associated Diversion Structures, Bypass Pipelines, Canals, and Functional Channels* (DOE 2009a). Criteria for emergency discharge are detailed in the *Emergency Response Plan for the Rocky Flats Site Dams* (DOE 2010).

### ***South Walnut Creek***

Runoff from the central portion of the RFS flows into South Walnut Creek, which has one retention pond (B-5). Four former dams, B-1, B-2, B-3, and B-4, were breached in 2008–2009 and now function as flow-through structures. The capacity of Pond B-5 is approximately 87,434 m<sup>3</sup> (23.1 MG or 71 acre-feet). Streamflow passes through former ponds B-1, B-2, B-3, and B-4 to maintain wetland habitat (water levels in these former ponds are controlled by evaporation or flow-through stoplog structures) and flows to Pond B-5 for retention. South Walnut Creek flow can also be diverted through the South Walnut Creek Bypass Pipeline around former ponds B-1, B-2, and B-3 and into former pond B-4, which flows directly into “terminal pond” B-5. If routine discharge of retained water in Pond B-5 is warranted, discharge is performed in accordance with the *Operations and Maintenance Plan for the Rocky Flats Surface Water Control Project, Dams A-3, A-4, B-5, C-2, and the Present Landfill Dam Associated Diversion Structures, Bypass Pipelines, Canals, and Functional Channels* (DOE 2009a). Criteria for emergency discharge are detailed in the *Emergency Response Plan for the Rocky Flats Site Dams* (DOE 2010).

### ***Woman Creek***

Woman Creek is located in the southern portion of the RFS, which flows through former Pond C-1, bypasses Pond C-2, and flows off the RFS onto Refuge lands toward Indiana Street. The Woman Creek drainage basin extends eastward from the base of the foothills, near Coal Creek Canyon, to Standley Lake. In the current configuration, Woman Creek flows into the WCR located east of Indiana Street and upstream of Standley Lake, where the water is held until it is pump-transferred to Big Dry Creek downstream of the GWR by the Woman Creek Reservoir Authority.

### ***South Interceptor Ditch***

The South Interceptor Ditch drainage is located in the southern portion of the RFS and is a tributary to Woman Creek after passing through Pond C-2; Pond C-2 is periodically batch discharged to Woman Creek. Surface water runoff from the southern portion of the RFS is routed by the South Interceptor Ditch to Pond C-2. Woman Creek does not flow through Pond C-2. The capacity of Pond C-2 is approximately 85,920 m<sup>3</sup> (22.7 MG or 69.6 acre-feet). If routine discharge of retained water in Pond C-2 is warranted, discharge is performed in accordance with the *Operations and Maintenance Plan for the Rocky Flats Surface Water Control Project, Dams A-3, A-4, B-5, C-2, and the Present Landfill Dam Associated Diversion Structures, Bypass Pipelines, Canals, and Functional Channels* (DOE 2009a). Criteria for emergency discharge are detailed in the *Emergency Response Plan for the Rocky Flats Site Dams* (DOE 2010).

### 4.3.5.2 Water Quantity

The RFS currently operates 15 automated stream gauging locations that collect continuous records of streamflows at 15-minute intervals. Many of these locations have been collecting reliable data since the mid 1990s. The locations applicable to the PLF, A-3, A-4, B-5, and C-2 are described in Table 4–5.

Table 4–5. Automated Stream Gages at Rocky Flats

Location Code	Description	Period of Record
GS01	Woman Creek at Indiana Street	10/1/92 to current
GS03	Walnut Creek at Indiana Street	10/1/92 to current
GS08	Outlet of Pond B-5 (effluent from B-Series Ponds)	10/1/92 to current
GS10	South Walnut Creek above Pond B-1 (influent to B-Series Ponds)	10/1/92 to current
GS11	Outlet of Pond A-4 (effluent from A-Series Ponds)	10/1/92 to current
GS12	Outlet of Pond A-3	10/1/92 to current
GS13	North Walnut Creek above Pond A-1 (influent to A-Series Ponds)	10/1/05 to current
GS31	Outlet of Pond C-2 (effluent from SID/Pond C-2)	10/1/92 to current
GS33	No Name Gulch at confluence with Walnut Creek	10/1/97 to current
SW027	SID above Pond C-2 (influent to Pond C-2)	10/1/94 to current

Site closure included numerous activities such as Functional Channel construction, recontouring, revegetation, removal of impervious surfaces, and elimination of imported water. These changes served to reduce the amount of streamflow as compared to the closure period. Table 4–6 presents the average annual discharge volumes since closure at the Table 4–5 locations.

Table 4–6. Summary of Post-Closure Streamflow Information (CY 2006–2009 Period)

Location Code	Average Annual Discharge Volume (acre feet)	Maximum Measured Flowrate cubic feet per second (cfs)
GS01 (Woman Creek at Indiana St.)	217.1	73.1
GS03 (Walnut Creek at Indiana St.)	70.0	29.1
GS08 (B-5 outflow)	17.8	NA (controlled discharge)
GS10 (B-Series inflow)	26.7	23.7
GS11 (A-4 outflow)	28.3	NA (controlled discharge)
GS12 (A-3 outflow)	44.2	NA (controlled discharge)
GS13 (A Series inflow)	70.8	18.0
GS31 (C-2 outflow)	3.7	NA (controlled discharge)
GS33 (No Name Gulch outflow)	13.4	5.5
SW027 (SID to Pond C-2)	3.7	5.1

In support of this EA, a study was conducted by WWE (WWE 2010) to determine peak flow rates and delineate floodplains for a range of storm events at the RFS. The report is attached to this EA as Appendix E. The study used three computer models, including two models for the hydrologic analysis, and one to delineate floodplains:

- CUHP 2005, Version 1.3.3.6, was used to develop hydrographs for each individual catchment, and
- EPA SWMM, Version 5.0, was used to route the hydrographs developed in the CUHP. CUHP and SWMM were selected for the analysis to be consistent with the approach used for previous studies and to use an approach accepted by UDFCD.
- HEC-RAS Version 4.0 was used to calculate channel hydraulics to determine water surface elevations at various channel cross-sections for the floodplain delineation.

The study evaluated four storm events (Table 4–7) under three configuration scenarios. The details of the configuration scenarios are described in detail in Appendix E. The current surface water configuration, Scenario 1, is given in Table 4–8.

*Table 4–7. Storm Events Analyzed for Peak Flow Analysis*

<b>Storm Return Frequency</b>	<b>Duration</b>	<b>Depth</b>
2-year	24-hour	2.2 inches
50-year	24-hour	4.4 inches
100-year	6-hour	3.8 inches
100-year	24-hour	5.0 inches

Notes:

- 1) Precipitation depths for the 24-hour storm events were derived from NOAA Atlas II, Volume III (Colorado) (NOAA 1973).
- 2) The precipitation depth for the 100-year, 6-hour event is the as was used for the Drainage and Flood Control Master Plan for the Rocky Flats Plant (EG&G 1992), which was derived from the Urban Drainage and Flood Control District.

*Table 4–8. Current Dam Conditions Scenarios*

<b>Scenario</b>	<b>Dam Breach Conditions</b>	<b>Initial Condition Assumptions</b>
1 (Current Conditions)	Dams A-1, A-2, B-1, B-2, B-3, B-4, and C-1 are breached. A-3, A-4, B-5, PLF and C-2 intact	Breached dams have stop logs in place and are full. All other ponds have outlet works closed and are filled to maximum normal operating range (40% of capacity for A-3, A-4, B-5, and C-2; PLF is filled to 22%).

The modeled peak flow rates under current conditions, at each of the dams proposed for breaching and for each of the storm events, are presented in Table 4–9 through Table 4–12.

For comparison purposes, peak flows for the 50-yr and 100-yr events at model points comparable to selected automated stream gage locations are given in Table 4–13 through Table 4–15.

Table 4–9. Calculated Peak Flow Rates at North Walnut Creek Dams A-3 and A-4 (Current Conditions)

Scenario	Storm Event	Storm Event Depth (in.)	A-3 Pond Peak Inflow (cfs)	A-3 Spillway Peak Flow (cfs)	A-4 Pond Peak Inflow (cfs)	A-4 Spillway Peak Flow (cfs)
<b>Scenario 1</b> A-Series Ponds: Breached: A-1 and A-2 Not Breached: A-3, and A-4	2-yr, 24-hr	2.2	3	0	4	0
	50-yr, 24-hr	4.4	257	26	35	0
	100-yr, 24-hr	5.0	366	92	94	0
	100-yr, 6-hr	3.8	527	158	161	0

Table 4–10. Calculated Peak Flow Rates at South Walnut Creek Dam B-5 (Current Conditions)

Scenario	Storm Event	Storm Event Depth (in.)	B-5 Pond Peak Inflow (cfs)	B-5 Spillway Peak Flow (cfs)
<b>Scenario 1</b> B-Series Ponds: Breached: B-1 through B-4 Not Breached: B-5	2-yr, 24-hr	2.2	3	0
	50-yr, 24-hr	4.4	153	0
	100-yr, 24-hr	5.0	224	0
	100-yr, 6-hr	3.8	373	0

Table 4–11. Calculated Peak Flow Rates at Landfill Pond Dam (No Name Gulch; Current Conditions)

Scenario	Storm Event	Storm Event Depth (in.)	Landfill Dam Peak Inflow (cfs)	Landfill Dam Spillway Peak Flow (cfs)
<b>Scenario 1</b> Landfill Pond Drainage: Breached: None Not Breached: LF Pond Dam	2-yr, 24-hr	2.2	1	0
	50-yr, 24-hr	4.4	15	0
	100-yr, 24-hr	5.0	19	0
	100-yr, 6-hr	3.8	26	0

Table 4–12. Calculated Peak Flow Rates at Dam C-2 (South Interceptor Ditch; Current Conditions)

Scenario	Storm Event	Storm Event Depth (in.)	Dam C-2 Inflow (cfs)	Dam C-2 Spillway Peak Flow (cfs)
<b>Scenario 1</b> Woman Creek Drainage: Breached: C-1 Not Breached: C-2	2-yr, 24-hr	2.2	6	0
	50-yr, 24-hr	4.4	146	0
	100-yr, 24-hr	5.0	190	0
	100-yr, 6-hr	3.8	277	0

Table 4–13. Calculated Peak Flow Rates in No Name Gulch (Current Conditions)

Scenario	Storm Event	Storm Event Depth (in.)	GS33 Peak Flow (No Name Outflow) (cfs)
<b>Scenario 1</b> Landfill Pond Drainage: Breached: None Not Breached: LF Pond Dam	50-yr, 24-hr	4.4	207
	100-yr, 24-hr	5.0	282
	100-yr, 6-hr	3.8	459

Table 4–14. Calculated Peak Flow Rates in Walnut Creek (Current Conditions)

Scenario	Storm Event	Storm Event Depth (in.)	GS13 Peak Flow (North Walnut Inflow) (cfs)	GS10 Peak Flow (South Walnut Inflow) (cfs)	GS03 Peak Flow (Walnut Creek Outflow) (cfs)
<b>Scenario 1</b> A-Series Ponds: Breached: A-1 and A-2 Not Breached: A-3, and A-4 B-Series Ponds: Breached: B-1 through B-4 Not Breached: B-5 Landfill Pond Drainage: Breached: None Not Breached: LF Pond Dam	50-yr, 24-hr	4.4	214	123	376
	100-yr, 24-hr	5.0	281	166	580
	100-yr, 6-hr	3.8	396	249	919

Table 4–15. Calculated Peak Flow Rates in the SID/Woman Creek (Current Conditions)

Scenario	Storm Event	Storm Event Depth (in.)	SW027 Peak Flow (SID Outflow) (cfs)	GS01 Peak Flow (Woman Creek Outflow) (cfs)
<b>Scenario 1</b> Woman Creek Drainage: Breached: C-1 Not Breached: C-2	50-yr, 24-hr	4.4	128	605
	100-yr, 24-hr	5.0	166	961
	100-yr, 6-hr	3.8	240	1,443

### 4.3.5.3 Water Quality

DOE, EPA, and CDPHE have implemented the monitoring and maintenance requirements of the CAD/ROD as described in RFLMA (DOE 2007a). RFLMA Attachment 2 defines the COU remedy surveillance and maintenance requirements. The requirements include environmental monitoring and maintenance of the erosion controls, access controls (signs), landfill covers, groundwater treatment systems, and operation of the groundwater treatment systems.

RFLMA establishes water quality standards and identifies the water monitoring and evaluation requirements applicable to implementation of the remedy. The current best management practice for operation of ponds A-4, B-5, and C-2 is to retain water until approximately 40 to 50 percent of the capacity is reached, at which point the contents are released (DOE 2009b, 2010). Under RFLMA requirements, the pond water is sampled to determine that it meets RFLMA-applicable water quality standards prior to release. The released water is subsequently monitored for compliance with applicable standards at a RFLMA POC a short distance downstream of the dams. POC samples are currently analyzed for Plutonium (Pu) -239/240, Americium (Am)-241, total uranium, and nitrate+nitrite as nitrogen (N). Monitoring is also performed at upstream Points of Evaluation (POEs) and performance locations to provide additional data that are used to evaluate the continued effectiveness of the remedy.

Since physical completion of cleanup and closure activities in October 2005, automated samplers at POCs have collected 140 flow-paced composite samples, and these composite samples consist of more than 7,400 individual grab samples (through 2009). By the time this EA has been completed in 2010, there will be over 200 flow-paced composite samples, and over 10,000 individual grab samples. While analytical results vary according to season, flowrate, and climate, the calculated compliance values at all POCs have remained below the applicable RFLMA standards.

Similarly, automated samplers at POEs and performance locations have collected 237 flow-paced composite samples since physical completion. These composite samples consist of more than 10,500 individual grab samples. Numerous grab samples for nitrate+nitrite as N have also been collected. The post-closure results from POEs and performance locations are summarized in Table 4-16.

*Table 4-16. Summary of Analytical Results at POEs and Performance Monitoring Locations (October 2005 through 2009)*

Location	Pu-239,240		Am-241		Total Uranium		Nitrate+Nitrite as N	
	Results [N]	Average [pCi/L]	Results [N]	Average [pCi/L]	Results [N]	Average [µg/L]	Results [N]	Average [mg/L]
<b>POEs</b>								
GS10	68	0.016	68	0.014	68	16.9	NA	NA
SW027	4	0.095	4	0.020	4	2.8	NA	NA
SW093	64	0.039	64	0.018	64	8.5	5	1.9
<b>Performance</b>								
GS13	NA	NA	NA	NA	76	26.4	30	42.6
GS59	NA	NA	NA	NA	33	1.5	NA	NA



Data indicate that remedy-related soil and infrastructure removal, revegetation, land configuration, and reductions in runoff have been successful and have resulted in water quality that meets applicable standards. Supporting data and evaluation can be found in the 2006–2009 Annual Reports of Site Surveillance and Maintenance Activities (DOE 2008). The POE location GS10 showed reportable values for total U for a portion of 2009; as of April 30, 2009, total U concentrations at GS10 were no longer reportable. Evaluation has suggested that the reportable values are due to changes in hydrologic conditions, which have caused groundwater with naturally occurring U to make up a larger proportion of streamflow at GS10 (DOE 2009b).

Table 4-17 provides the range of compliance data from three POCs at each terminal pond (A-4, B-5, C-2) and the two POCs at Indiana Street (GS01, GS03) between 2005 and 2009. None of the data from POCs have exceeded compliance standards. Current RFLMA surface water standards are also shown on Table 4–17.

Table 4–17. Range of Compliance Values at POCs (October 2005 through 2009)

Location	Pu-239,240 [pCi/L]	Am-241 [pCi/L]	Total Uranium [µg/L]	Nitrate+Nitrite as N [mg/L]
GS01 (Woman Creek at Indiana Street)	0.0–0.012	0.0–0.046	0.9–10.2	NA
GS03 (Walnut Creek at Indiana Street)	0.0–0.018	0.0–0.025	1.1–8.0	0.19–1.86
GS08 (Pond B-5 Outlet)	0.0–0.045	0.0–0.034	4.3–14.9	0.01–0.43
GS11 (Pond A-4 Outlet)	0.0–0.007	0.0–0.022	2.5–6.6	0.12–5.92
GS31 (Pond C-2 Outlet)	0.011–0.030	0.004–0.012	3.6–6.1	NA
RFLMA Standard	0.15 pCi/L	0.15 pCi/L	16.8 µg/L	10 mg/L

#### 4.3.6 Air Quality

Air monitoring and emissions assessments have been performed at RFS beginning in the early 1950s. Although air monitoring is not required as part of the CERCLA remedy, it was performed for a period of time so that data could be available if needed during the early post-closure period. The air monitoring program at the RFS included ambient (Radioactive Ambient Air Monitoring Program), effluent, and meteorological monitoring activities. As of September 2005, only ambient monitoring was voluntarily performed at two locations along Indiana Street to confirm low emissions. LM ceased ambient air monitoring in September 2008.

EPA established the National Ambient Air Quality Standards (NAAQS) for criteria pollutants that could endanger public health and the environment under Section 108 of the Clean Air Act (1970).

The *Environmental Assessment Comment Response and Finding of No Significant Impact, Pond and Land Configuration* determined that all existing NAAQSs would be in compliance in connection with the breaching of the previous six dams (DOE 2004). The construction activities were found to elevate the PM<sub>10</sub> concentrations; however, the amount associated with this rise was considered well below EPA’s NAAQS. Construction activities involved with the breaching of the remaining five dams and the associated low elevation of concentrated PM<sub>10</sub> would be similar in nature, and therefore the PM<sub>10</sub> analysis is not carried further in this EA.

However, since 2004, EPA has modified the 8-hour standards for ozone (O<sub>3</sub>), and in 2007 EPA found the Denver area as being in nonattainment with the 8-hour O<sub>3</sub> standard. The RFS is located within the Denver area. The nonattainment designation will require local and state officials to submit a plan to reduce ground-level O<sub>3</sub> pollution. The formation of O<sub>3</sub> is through a combination of nitrogen oxides and volatile organic compounds reacting with sunlight in the atmosphere, and cars, trucks, power plants, and industrial facilities are the primary sources of O<sub>3</sub>.

The 8-hour standard for O<sub>3</sub> was changed from 0.08 parts per million (ppm) to 0.075 ppm. A monitoring station located at the north area of the RFS listed the O<sub>3</sub> 8-hour emission average from 2006 through 2008 as 0.086 ppm, with the highest emissions occurring in 2006–2007 (0.090 ppm). The 2008 average 8-hour emission levels have been reported as 0.079 ppm (CDPHE 2009).

The RFS is currently accessed by less than 20 field trucks and/or all terrain vehicles per day, performing routine monitoring and maintenance activities. More equipment and larger trucks are used sporadically for projects such as road maintenance.

## **5.0 Environmental Impacts**

This section identifies and evaluates the potential direct and indirect impacts of the Proposed Action and the No Action alternatives. The meaning of impacts or effects is the same, and impacts are considered in terms of direct (caused by the action), indirect (occurs later in time but is related to the action), or cumulative (occurs later in time but is related to the action). Direct and indirect impacts are discussed in Section 5.2, and cumulative impacts are discussed in Section 5.4.

An impact is further defined as adverse or beneficial. An impact is considered adverse when the outcome of the action results in undesirable effects. A beneficial impact could result if the current condition is improved or if an existing undesirable situation related to current management direction is changed.

### **5.1 Impact Assumptions**

Evaluating impacts involves relating the affected resource with the area or quantity of an affected resource relative to the currently available area or quantity of that resource. The intensity of an impact is dependent on the following:

- Potential for violation of laws or regulations
- Degree of uncertainty and controversy
- Degree of adverse effect to specific concerns, such as public health and safety uniqueness of the resource
- Threatened or endangered species
- Resilience of the resource

Where possible, impacts have been quantified and are reported in the appropriate resource section.

### **5.2 Impacts to Resources**

Potential impacts have been assessed according to the degree in which impacts may occur in magnitude in relation to the overall environment and associated resources. Some impacts are assessed based on professional judgment. Each section states if information is not available or uncertain.

During implementation of the Proposed Action, there would be the potential for short-term erosion and sedimentation associated with the construction disturbances and exposed areas in former pond bottoms. However, the dams are not a part of the final CAD/ROD remedy for RFS and are not designed or operated as sedimentation basins, but because water is retained in the ponds for long periods of time, some sediment carried into the ponds will tend to settle out. Long-term erosion control at the site is addressed through ongoing activities such as soil stabilization, erosion control best management practices, and revegetation throughout the drainage basins and would not be considered a separate mitigation measure as a result of the Proposed Action.

## 5.2.1 Wildlife

### 5.2.1.1 Proposed Action Alternative

The Proposed Action would result in restoring a more natural seasonally variable flow system through the ponds, which would provide more consistent water to the habitat downstream. This return to a more natural stream regime would benefit both the habitat and the wildlife species that rely on it.

Noise from construction activities could impact foraging and breeding/rearing activities in areas adjacent to the project areas. Mobile species such as mule deer, coyotes, or birds would be able to relocate to suitable habitat upstream or downstream of the project areas.

The type and degree of direct impacts would vary by species depending on wildlife populations present and their specific habitat requirements. It is expected that the permanent loss of a specific habitat type as a result of the proposed actions would not jeopardize the existence of any species. For example, adjacent upland grassland habitat is available at all five dams while additional ponds, wetland habitat, and riparian habitat exist within a mile of each of the project locations.

Breaching the dams would result in an estimated 95 percent reduction of available open surface water area at the RFS that is used by a variety of ducks and other avian species. However, as stated above, this type of habitat is readily available in surrounding areas. The open water habitat lost would be replaced by the more ecologically productive emergent/shrub wetlands that would potentially increase available habitat for other species, including the federally listed Preble's mouse (Section 5.2.3).

There would be a reduction in the abundance of fish (mostly minnows) in the remaining areas immediately upstream of the breaches. Aquatic species such as fish, frogs, or turtles, which live in and around the ponds, may not be able to relocate prior to dewatering actions. Fish would be released downstream as the waters are discharged from the dams, and frogs and turtles would likely move up or downstream as the ponds dry out. This draw down and drying out of the ponds would be similar to the conditions in late summer when evaporation naturally draws down many of the ponds at RFS. As a result of the elimination of the ponds related to the dam breaching, it is expected that some mortality would occur to various aquatic populations but would not affect overall population survival of any species; it is expected that over time population levels of given affected species would be restored to levels commensurate with the available resources.

Indirect impacts to wildlife would be beneficial and include reduced disturbance from human activities for monitoring and maintenance of the dams, including the elimination of annual dam safety inspections, inspecting monitoring equipment (piezometers, inclinometers, and other instrumentation), routine maintenance activities, and annual mowing and spraying of vegetation.

The reconfiguration of the creeks would result in additional wetland areas and creekside margins that would be considered more ecologically valuable than the current open surface water ponds. Elimination of fluctuations in water levels caused by routine pond discharges would allow for development of permanent vegetation communities where mudflats previously existed. This would provide nesting and foraging habitat for a variety of species.

Habitats that would be lost as a result of the Proposed Action are present in nearby areas, and species that would move into these areas could challenge existing residents, which could potentially create density issues. The spreading urbanization into rural areas continues to stress wildlife populations as they are forced to accommodate new residents. However, the loss of approximately 14 acres of open water habitat related to the proposed actions is not expected to result in species specific losses due to overcrowding.

#### ***5.2.1.2 No Action Alternative***

The No Action Alternative would potentially have a greater adverse impact than the Proposed Action in the Walnut Creek drainage. In Walnut Creek, the volume of flowing water has been reduced since RFS closure due to the elimination of imported water and the removal of impervious surfaces that formerly contributed storm runoff. As a result, the number of annual batch-and-release discharges from the ponds A-4 and B-5 has been reduced from approximately 10 annually prior to site closure to approximately less than two annually post-closure. This reduction in the amount and frequency of water flowing from the terminal ponds into Walnut Creek has the long-term potential to reduce the quality of the downstream riparian habitat to the eastern boundary of the Refuge. In addition, the releases are most often made when the water levels are highest in the spring, when the vegetation is dormant and are not able to use the water. If this release pattern continues, the reduced flow of water in the creek during the growing season would likely transform the existing riparian woodland/shrubland habitat below the terminal ponds to a single-story herbaceous riparian habitat.

The change to a single-story herbaceous riparian habitat may affect wildlife that uses Walnut Creek below the terminal ponds to the eastern edge of the Refuge. The existing riparian woodland/shrubland along the creek provides nesting habitat, cover, and foraging areas for a variety of wildlife. The loss of woody vegetation in these areas would potentially change the long-term wildlife composition for mule deer, Preble's mouse, and a variety of migratory birds that inhabit the shrubland/woodland along Walnut Creek.

The PLF dam is currently operated in a flow-through condition, and no impacts or changes to No Name Gulch habitat or wildlife would be expected.

Not breaching Dam C-2 would result in little to no change in impacts to habitat or wildlife along Woman Creek between Pond C-2 and the eastern Refuge boundary. Woman Creek currently flows around Pond C-2 in the Woman Creek Bypass Canal on the north side of the pond and continues unimpeded beyond C-2 to the downstream habitat. The contribution of water resulting from releases from Pond C-2 is minimal because of the small volume and infrequency of releases.

### **5.2.2 Migratory Birds**

#### ***5.2.2.1 Proposed Action***

Overall impacts to both habitat and migratory birds would be temporary. Noise and construction activities could directly impact foraging and nesting activities in the habitat adjacent to the project areas. Portions of the project areas would be cleared of vegetation, which would temporarily limit wildlife habitat and eliminate foraging opportunities in the immediate project

area. Clearing activities are unlikely to result in injury or death to migratory birds, and implementation of mitigation measures prior to construction would reduce the potential impacts to a negligible level. The amount of disturbance would be a small percentage of the habitat available to birds at the RFS because adjacent upland grassland habitat is available at all five dams. Additional ponds, wetland habitat, and riparian habitat exist within a mile of each of the project locations.

Indirect impacts to migratory birds would vary by species depending on habitat requirements. Potential adverse impacts may include long-term reductions in the abundance of waterfowl that use open water habitat for foraging at the RFS. This would likely occur due to the elimination of open water habitat available after project completion. Shorebirds that currently use the mudflats that are exposed on the perimeter of the ponds due to fluctuating water levels would no longer have this habitat available at these dams. The restored natural stream flows (i.e., flow-through system) and reconfigured land surface upstream of the breaches would reduce the available habitat for these types of species at RFS. However, these types of habitats are available within a few miles of the RFS. Species that forage and nest in emergent and shrub wetland habitat types would potentially increase because of the creation of habitat upstream of the breached dams.

Reduced disturbance from human activities that previously were required for monitoring and maintenance of the dams would represent a beneficial indirect impact. The activities include the elimination of annual dam safety inspections, monitoring of dam equipment (piezometers, inclinometers, and other instrumentation), valve maintenance/exercising, and annual mowing and spraying of vegetation. Elimination of fluctuations in water levels caused by routine pond discharges would allow for development of permanent vegetation communities where mudflats previously existed. This would provide nesting and foraging habitat for a variety of species of migratory birds.

As described in Section 5.2.1, the Proposed Action would potentially allow the riparian woodland/shrubland habitat below the terminal ponds in Walnut Creek to remain by returning the stream flows to a more natural flow-through system. This would allow water from precipitation events to reach the downstream habitats at the time of the events rather than only during batch releases.

In addition, the location of the RFS is near urban and agricultural environments where human disturbance is frequent, and activities continue to encroach up to the boundaries of the Refuge.

#### ***5.2.2.2 No Action Alternative Assessment***

The No Action Alternative would maintain the current conditions for migratory birds in No Name Gulch and Woman Creek. In Walnut Creek, however, as discussed in Section 5.2.1, long-term continuation of batch releases from the terminal ponds, predominantly during the non-growing season, could alter the structure and composition of the downstream habitat such that habitat requirements for some current bird species would not be met in the future.

## 5.2.3 Threatened and Endangered Plant and Wildlife Species

### 5.2.3.1 Proposed Action Alternative

With the exception of the Preble's mouse, no direct impacts to the federally listed species would occur, because none of these species listed in Section 4.3.3 have been documented at RFS. Removal of the dams and return of stream flows to a more natural flow-through regime should benefit the lower South Platte River species, because the water previously being withheld from flowing downstream could reach the lower South Platte River species when they need it, as was the case before the dams were built.

No direct impacts are expected to any of the Colorado-listed threatened, endangered, and special concern species other than the northern leopard frog and common garter snake. The northern leopard frog occurs at the ponds and along the streams at RFS. While pre-construction draw down of pond water levels may force the frog to move elsewhere, some mortalities may occur. Indirectly, little effect is expected long-term because the reestablished stream channels would provide habitat for the frog. The common garter snake occurs in a variety of habitats and could be near the ponds while foraging or drinking water. Individual snakes could be impacted by project activities if unable to leave the area before activities began. The two fish species, the common shiner and northern redbelly dace, occur only in Rock Creek in the Refuge and would not be impacted. Noise and construction activities could indirectly impact other species. However, habitat is available elsewhere at RFS and the Refuge. Black-tailed prairie dogs occur in the eastern portions of the RFS and the Refuge property, and some prairie dog towns are within a few hundred yards of Pond A-4 and Pond C-2. However, no towns are present in the construction footprint of the project. Given the urban nature of prairie dogs in eastern Colorado and their tolerance of human activity in metropolitan areas where they occur along roads, trails, and other high human use areas, it is unlikely they would be adversely impacted.

Approximately 1 acre of critical habitat for the Preble's mouse would be directly impacted by the Proposed Action activities during construction. Figure 5–1 shows the location of Preble's habitat areas within the estimated project boundaries, and DOE is consulting with FWS to accurately map the critical habitat at the RFS. Because the open water on the existing ponds is not considered habitat for the mouse, the conversion of open water to emergent wetland/shrubland would increase the amount of Preble's habitat in the project areas and at RFS. Elimination of fluctuations in water levels caused by routine pond discharges would also allow for development of permanent vegetation communities where mudflats previously existed. This would provide additional habitat for the Preble's mouse. Removal of the dams would also increase the connectivity of upstream and downstream habitat, thus reducing the fragmentation of Preble's mouse habitat that currently exists in the drainages.

### 5.2.3.2 No Action Alternative Assessment

Most of the Walnut Creek reach from the terminal ponds (A-4 and B-5) to the eastern Refuge boundary is protected habitat for the Preble's mouse. Because the Preble's mouse prefers a multi-strata habitat, the lack of water during the growing season (Section 5.2.3.1) could change the multi-strata riparian woodland/shrubland habitat in Walnut Creek to a single-story herbaceous habitat. The No Action Alternative could continue to negatively impact the population of Preble's mice known to occur along the creek. In addition, the continued long-term

reduction in creek flows below the dams in Walnut Creek may reduce the amount of existing wetland along this reach of creek.

The No Action Alternative would maintain the current conditions for the Preble's mouse in No Name Gulch and Woman Creek.

The lower South Platte River species would continue to be impacted by the retention of water upstream of the dams in the No Action Alternative.

## **5.2.4 Vegetation, Wetlands, and Floodplains**

### ***5.2.4.1 Proposed Action Alternative***

Appendix E, *Floodplain/Wetlands Assessment for the Surface Water Configuration Project at the Rocky Flats Site*, provides a detailed description of the anticipated impacts as a result of the Proposed Action Alternative. Following is a synopsis of the technical report.

The Proposed Action would result in disturbance to approximately 26 acres of vegetation, wetlands, and floodplains around the dams. These direct impacts would result from clearing, earthmoving, stockpiling, construction, and staging area activities. These acres are estimates based on the preliminary engineering drawings for the Proposed Action and represent a worst-case scenario. The actual acres of disturbance may vary by dam site but would not exceed a total of 26 acres of disturbance to vegetation, wetlands, and floodplains.

#### ***Vegetation***

Direct impacts to the upland vegetation would be largely temporary, except where the breach channel itself is located. Existing vegetation was established after the original dam construction and is predominantly composed of non-native species. After completion of all breach-related activities, revegetation with native species and managed weed control would enhance the quality of vegetation in the affected areas and would be considered a beneficial impact related to the Proposed Action.

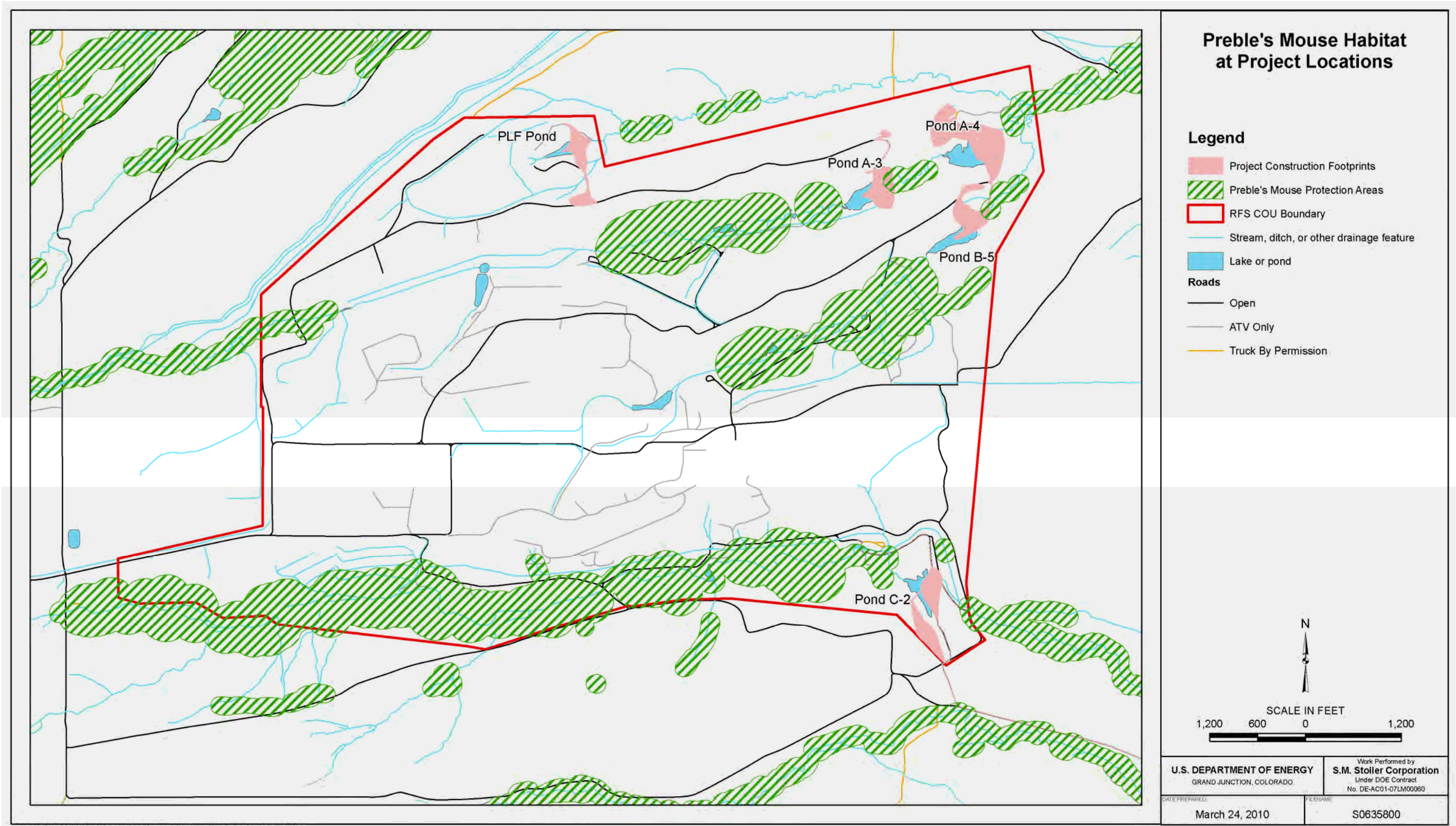
Most noxious weeds in the project areas would be removed during construction activities, and reseeded with native species and ongoing weed control would be necessary for the establishment of native upland grasslands.

#### ***Wetlands***

Direct impacts to wetlands would be minimal, because the areas immediately upstream of the dam breaches are predominantly open water. Downstream wetland areas would be impacted where the toe of the breach channel would be placed. Based on preliminary breach designs, less than 0.5 acre of palustrine emergent/shrubland wetland, and approximately 4 acres of open water habitat would be directly impacted by the Proposed Action activities (Figure 5–2).

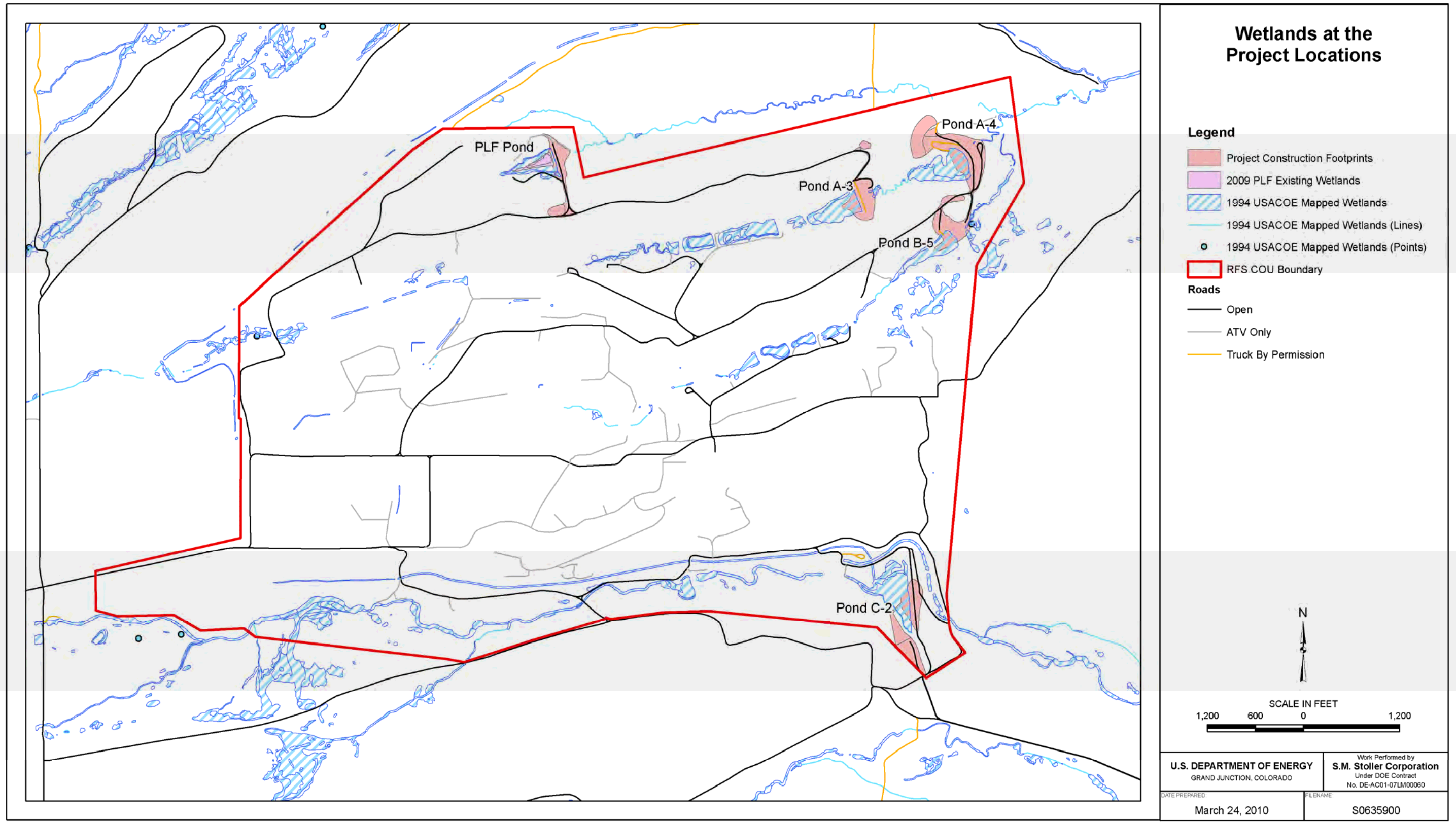
Indirect impacts to the wetlands and open water habitat are expected as the stream channels are reestablished upstream of the breaches and the open water habitat is replaced with emergent/shrubland wetland types and upland habitat. Open water habitat would be largely eliminated at each pond with the exception of the water flowing in the stream channel.





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Figure 5-1. Preble's Mouse Habitat at Project Locations



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Figure 5-2. Wetlands at the Project Locations

Additionally some current palustrine emergent/shrubland wetland around the perimeter of the ponds may be lost over time if water availability is not sufficient to support them after project completion. Approximately 5 to 6 acres of palustrine emergent/shrubland wetland would be created in the former open water habitat areas, which would exceed the amount directly impacted during construction activities. The conversion of the open water habitat to palustrine emergent/shrubland wetland would increase the aquatic resources functions and services. Wetlands function to improve water quality through wetland filtering, enhancing floodwater storage that can reduce flood risks, providing fish and wildlife habitat, and increasing biological productivity. These functions are expected at varying levels in the wetlands that would be created by the Proposed Action.

### ***Floodplains***

Approximately 5.7 acres of floodplain areas would be disturbed, and the majority of the disturbance would be limited to the construction footprints at each dam (Figure 5–3). Indirect impacts would alter the existing floodplains at each of the dams. Currently the floodplain for large storm events at Pond A-3 goes around the dam through the spillway. Breaching of the dams would approximately reestablish the historic floodplain and stream channels through the pond bottoms at each of the ponds with the exception of C-2 where Woman Creek would still flow around C-2 and through the diversion canal.

#### ***5.2.4.2 No Action Alternative***

The No Action Alternative would maintain the current floodplain configuration and conditions in Walnut Creek. As previously mentioned, however, the retention of the batch-and-release water flow regime in the Walnut Creek drainage may lead to changes in the existing wetlands downstream of the terminal ponds. No estimate is available on how long-term reductions in water in Walnut Creek might change the habitat over time.

The No Action Alternative would maintain the current vegetation, floodplain, and wetland conditions in No Name Gulch and Woman Creek at the RFS.

### **5.2.5 Surface Water Resources**

#### ***5.2.5.1 Proposed Action Alternative***

##### ***Surface Water and Drainage***

##### **Flood Hydrology**

In support of this EA, a study was conducted by WWE to determine peak flow rates and delineate floodplains for a range of storm events at the RFS (WWE 2010). The report is attached to this EA as Appendix E. The study used three computer models, including two models for the hydrologic analysis (flood flows and duration), and one to delineate floodplains. The study evaluated four storm events (2-year 24-hour, 50-year 24-hour, 100-year 6-hour, and 100-year 24 hour) under three configuration scenarios:

- Current conditions
- Dams A-3, C-2, and PLF breached
- Dams A-4 and B-5 breached (all dams breached)

Indirect impacts to peak flows downstream of the breached dams are expected. With the breached dams no longer able to attenuate peak flows and partially detain runoff volumes during flood events, larger flows and volumes are expected downstream compared to current conditions. However, the potential flood conditions after implementation of the Proposed Action are not expected to be different from flood conditions prior to the original construction of the dams.

### **Water Storage and Evaporative Depletions**

The Proposed Action is expected to have minimal direct impacts to storage and evaporative depletions during construction. The ponds would be drained prior to construction, and small reductions in storage and evaporative depletions are expected.

Indirect impacts from the Proposed Action are expected to eventually eliminate evaporative depletions associated with the retention of out-of-priority water upstream of the Rocky Flats dams on Walnut Creek (A-3, A-4, B-5, and PLF). The Proposed Action would be designed to detain no water upstream of the remaining structures.

Table 5–1 summarizes the out-of-priority storage and estimated evaporative depletions for calendar years 2008 and 2009.

*Table 5–1. Water Accounting Summary for Walnut Creek Ponds at Rocky Flats*

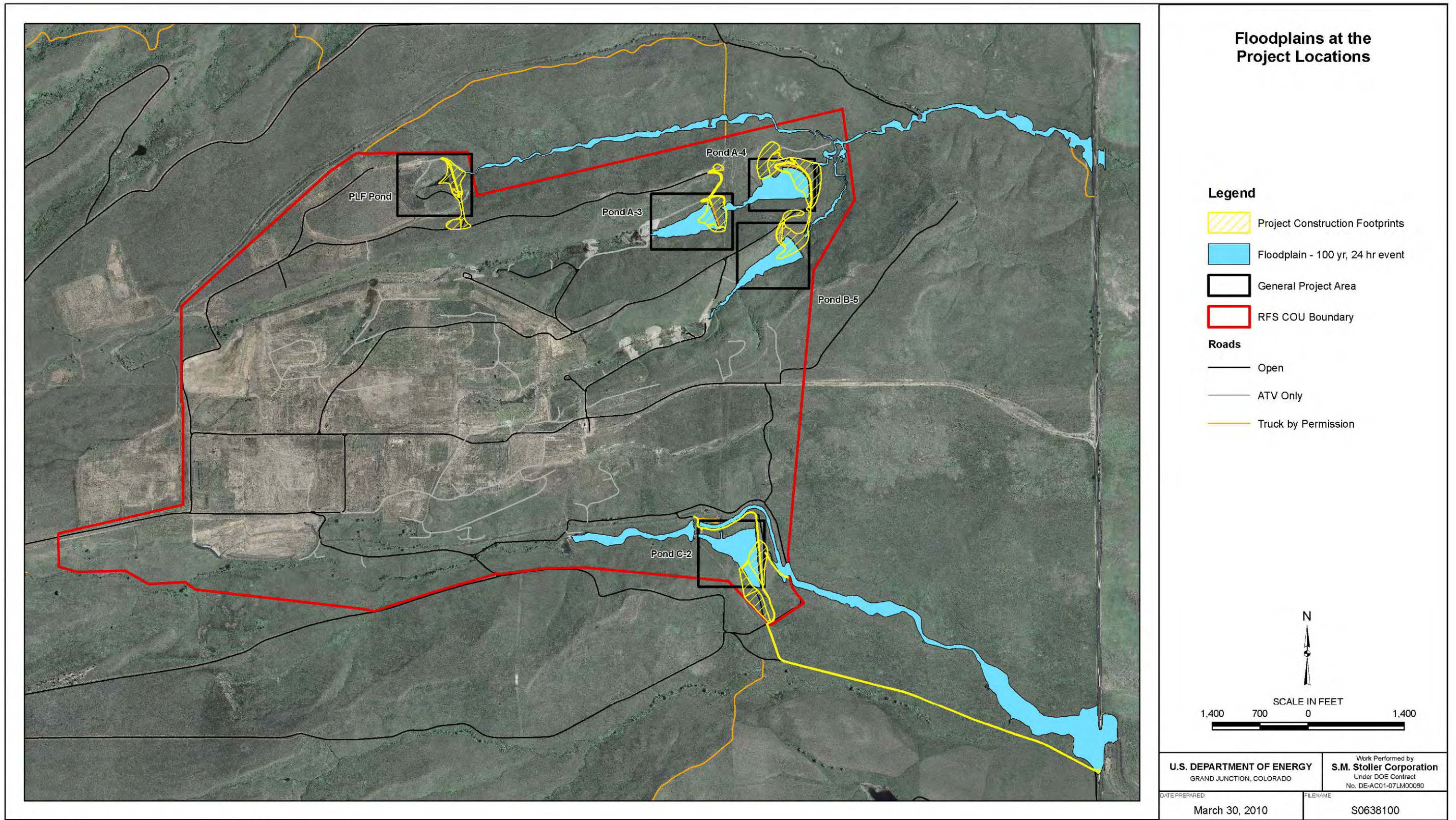
<b>Calendar Year</b>	<b>Evaporative Losses (ac-ft)</b>	<b>Total Detained Inflow (ac-ft)</b>
2008	26.4	16.4
2009	33.9	108.9

The reduction and eventual elimination of depletions would reduce or eliminate the costs incurred by Broomfield to replace water in Big Dry Creek according to the associated Augmentation Plan described in Section 1.1. In addition, the live flows formerly detained in the ponds would be available to downstream users in time, place, and amount, precluding any injury to calling senior water rights holders. As this would be considered a positive impact, associated mitigation measures are not warranted.

### ***Surface Water Quality***

Construction during the Proposed Action would have no direct impacts on DOE’s commitment or requirement to meet RFLMA water quality standards at downstream surface water POCs under the final CAD/ROD remedy. POCs and POEs would continue to be operated according to the RFLMA requirements and would not be disturbed by the construction activities.

After completion of the Proposed Action, water quality monitoring would continue according to the RFLMA requirements. The RFLMA water quality standards are based on the State’s basic and site-specific water quality standards. Water quality at any particular monitoring location varies temporally according to climate and hydrologic conditions (i.e., storm event characteristics, runoff, and groundwater seepage). Under the current batch-and-release discharge protocols, inflows to the ponds of varying water quality are effectively mixed prior to discharge.



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Figure 5-3. Floodplains at the Project Locations

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The resulting water quality measurements are essentially a synopsis of the inflow over an extended period. Once the dams are breached, water would pass through the remaining structures in a natural flow pattern. Therefore, individual sample results downstream of the breached dams are expected to show increased variability. However, compliance with water quality standards is based on specific summary statistics that evaluate water quality using multiple sample results over extended periods.

As stated in Section 4.3.5.3, since physical completion of cleanup and closure activities in October 2005, automated samplers at POCs have collected 140 flow-paced composite samples, and these composite samples consist of more than 7,400 individual grab samples (through 2009). By the time this EA has been completed, there will be over 200 flow-paced composite samples, and over 10,000 individual grab samples. While analytical results vary according to season, flowrate, and climate, the calculated compliance values at all POCs have remained below the applicable RFLMA standards.

Therefore, given the extensive sampling, the data indicate that remedy-related soil and infrastructure removal, revegetation, land configuration, and reductions in runoff have been successful and would continue to result in water quality summary statistics that meet applicable standards. Supporting data and evaluation can be found in the Annual Reports of Site Surveillance and Maintenance Activities (DOE 2008, 2009b). The data in the Annual Reports are extensive and the information provided in the above paragraphs is a synopsis of the surface water quality sampling. The URL address for the Annual Reports is provided in Section 8.0 of this EA.

Batch-and-release operation is not a requirement of the RFS remedy. In other words, the remedy is adequately protective of human health and the environment without the continued existence of the remaining dams and ponds. The RFLMA water quality standards are based on the State's water quality standards for all use classifications. These standards are based on the level of risk to human health and the environment using long-term exposure scenarios even though these exposure scenarios do not actually exist at or directly downstream of the RFS. RFLMA monitoring provides information to trigger timely investigation, evaluation, and mitigation under RFLMA requirements for any contamination that may be adversely impacting water quality above RFLMA standards to assure that the remedy remains adequately protective.

#### ***5.2.5.2 No Action Alternative***

The No Action Alternative is expected to have no impacts related to water storage, evaporative depletions, erosion, and water quality. However, if an existing dam were to fail during a flood event, the addition of pre-existing retained water would result in higher flood flows downstream. Also, failure of an earthen dam would result in the downstream transport and deposition of large quantities of soil from the embankment structure. The remaining dams at the RFS are more than 30 years old. While the expected lifespan of these earthen dams is not known, continued aging, regardless of rigorous maintenance, could necessitate the breach of these structures in the interest of dam safety.

## 5.2.6 Air Quality

### 5.2.6.1 Proposed Action

Impacts related to air quality would be considered direct in connection with construction and revegetation activities. Once these activities are completed, no additional impacts to air quality would occur from the Proposed Action.

Activities involved with the breaching of the remaining five dams would be similar in nature to the 2004 EA study for the breaching of dams, and therefore would be considered in compliance with the NAAQS.

Direct temporary construction emissions of particulate matter less than 10 microns (PM<sub>10</sub>) and particulate matter less than 2.5 microns (PM<sub>2.5</sub>) would be similar or less than those experienced and analyzed in the 2004 EA, wherein the breaching of six dams in a one-year period was assessed. Because the projected breaching of the remaining five dams would not occur at the same time and would occur over a longer period of time (2011 to as late as 2020), it is within reason to assume that the PM<sub>10</sub> and PM<sub>2.5</sub> emissions would be lower than the increase of 0.3 microgram per cubic meter determined in the 2004 EA (DOE 2004).

As discussed in Section 4.3.6, the Denver Front Range area has been determined to be in noncompliance with the 8-hour O<sub>3</sub> standard. Colorado was required to submit recommendations for activities under nonattainment for O<sub>3</sub> by March 2009, with EPA to review by March 2010. EPA will establish attainment dates between 2013 and 2030 for respective states in nonattainment. Until EPA sets attainment dates, the 1997 8-hour O<sub>3</sub> standard and associated regulatory requirements remain in place (CDPHE 2009). Among many criteria, CDPHE requires a submittal of an Air Pollution Emission Notice (APEN) in O<sub>3</sub> nonattainment areas for volatile organic compound sources emitting less than 100 tons per year, when a change in actual annual emissions of 1 ton or more, or 5 percent, whichever is greater above the level reported on the last APEN submitted to the Department (CDPHE 2008).

Based on estimated time involved, and the associated heavy equipment required for breaching the dams, the amount of O<sub>3</sub> emissions would be well below the threshold level for submitting an APEN.

### 5.2.6.2 No Action Alternative

There would be no change to air quality as a result of the No Action Alternative, because no construction activities would occur.

## 5.3 Comparison of Impacts Between Alternatives

Table 5–2 summarizes the potential impacts for all resources studied for this EA and provides a comparison between the Proposed Action and the No Action alternatives. This table is provided as a summary only. The individual resource sections provide a complete discussion of impacts. Cumulative impacts are those impacts that are assessed as a whole, rather than resource specific, and these impacts are discussed in Section 5.4. All potential impacts can be mitigated as appropriate to the resource.



Table 5–2. Summary of Comparison of Environmental Consequences Between the Proposed Action and No Action Alternatives

Resource	Environmental Consequences	
	Proposed Action	No Action
Wildlife	<p>Direct:</p> <ul style="list-style-type: none"> <li>Restore a more natural seasonally variable flow system to provide more consistent water downstream habitat.</li> <li>Construction noise would be a temporary disturbance.</li> <li>Eliminate surface water habitat for species.</li> </ul> <p>Indirect:</p> <ul style="list-style-type: none"> <li>Reduced disturbance from human activities for monitoring and maintenance.</li> </ul>	<p>Walnut Creek:</p> <ul style="list-style-type: none"> <li>Long-term continuation of batch releases from the ponds, predominantly during the non-growing season, could alter the structure and composition of the downstream habitat such that requirements for current species would not be met in the future.</li> </ul> <p>No Name Gulch and Woman Creek:</p> <ul style="list-style-type: none"> <li>No change from current conditions</li> </ul>
Migratory Birds	<p>Direct:</p> <ul style="list-style-type: none"> <li>Noise and construction activities may impact foraging and nesting in the adjacent habitat adjacent, but no fatalities expected because of prescribed mitigation measures.</li> </ul> <p>Indirect:</p> <ul style="list-style-type: none"> <li>Reductions in the abundance of waterfowl at the ponds; however, these types of habitats are available within a few miles of the RFS.</li> <li>Species that forage and nest in emergent and shrub wetland habitat types would potentially increase following reclamation.</li> <li>Reduced disturbance from human activities for monitoring and maintenance.</li> </ul>	<p>Walnut Creek:</p> <ul style="list-style-type: none"> <li>Long-term continuation of batch releases from the ponds, predominantly during the non-growing season, could alter the structure and composition of the downstream habitat such that requirements for current species would not be met in the future.</li> </ul> <p>No Name Gulch and Woman Creek:</p> <ul style="list-style-type: none"> <li>No change from current conditions.</li> </ul>
Threatened & Endangered Plant and Wildlife Species	<p>Direct Impacts:</p> <ul style="list-style-type: none"> <li>Approximately 1.1 acres of Preble's mouse habitat would be impacted.</li> <li>Increase in habitat expected with conversion from open water to emergent wetland/shrubland.</li> <li>Possible impacts to individual garter snakes, and northern leopard frogs.</li> </ul> <p>Indirect Impacts:</p> <ul style="list-style-type: none"> <li>Minimal effect is expected long-term because the reestablished stream channels would provide habitat.</li> </ul>	<p>Walnut Creek:</p> <ul style="list-style-type: none"> <li>In Walnut Creek, the Preble's mouse multi-strata riparian woodland/shrubland habitat could change to a single story herbaceous habitat, which would limit the amount of quality habitat for the species.</li> <li>Continued long-term reduction in creek flows below the dams in Walnut Creek may reduce the amount of existing wetland along this reach of creek, which would reduce available habitat.</li> </ul> <p>No Name Gulch and Woman Creek:</p> <ul style="list-style-type: none"> <li>No change from current conditions.</li> </ul> <p>The lower South Platte River species would continue to be impacted by the retention of water upstream of the dams in the No Action Alternative.</p>

Table 5-2 (continued). Summary of Comparison of Environmental Consequences Between the Proposed Action and No Action Alternatives

Resource	Environmental Consequences	
	Proposed Action	No Action
<b>Vegetation, Wetlands and Floodplains</b>		
Vegetation	<p>Direct Impacts:</p> <ul style="list-style-type: none"> <li>Clearing of 26 acres of vegetation (including noxious weeds) due to construction activities.</li> </ul> <p>Indirect Impacts:</p> <ul style="list-style-type: none"> <li>Reseeding of native species and ongoing weed control would provide a higher quality ecosystem.</li> </ul>	<p>Walnut Creek:</p> <ul style="list-style-type: none"> <li>Retention of the batch-and-release water flow may lead to changes in the existing wetlands downstream (and resultant vegetation changes).</li> </ul> <p>No Name Gulch and Woman Creek:</p> <ul style="list-style-type: none"> <li>No change from current conditions.</li> </ul>
Wetlands	<p>Direct Impacts:</p> <ul style="list-style-type: none"> <li>Removal of less than 0.5 acre of palustrine emergent/shrubland wetland and approximately 4 acres of open water habitat.</li> </ul> <p>Indirect Impacts:</p> <ul style="list-style-type: none"> <li>Five to 6 acres of palustrine emergent/shrubland wetland created in the former open water habitat, which would increase the aquatic resources functions and services.</li> </ul>	<p>Walnut Creek:</p> <ul style="list-style-type: none"> <li>Retention of the batch-and-release water flow may lead to changes in the existing wetlands downstream (and resultant vegetation changes).</li> </ul> <p>No Name Gulch and Woman Creek:</p> <ul style="list-style-type: none"> <li>No change from current conditions.</li> </ul>
Floodplains	<p>Direct Impacts</p> <ul style="list-style-type: none"> <li>Minimal and limited to construction areas</li> </ul> <p>Indirect Impacts:</p> <ul style="list-style-type: none"> <li>Would approximately reestablish the historic floodplain and stream channel through the pond bottoms (except at Pond C-2).</li> </ul>	<p>Walnut Creek, No Name Gulch, and Woman Creek:</p> <ul style="list-style-type: none"> <li>No change from current conditions.</li> </ul>
<b>Surface Water Resources</b>		
Surface water flow	<p>Direct Impacts</p> <ul style="list-style-type: none"> <li>Larger flows and volumes downstream compared to current conditions with return to flood conditions prior to the original construction of the dams.</li> <li>Short term erosion associated with construction.</li> </ul> <p>Indirect Impacts</p> <ul style="list-style-type: none"> <li>Would eventually eliminate evaporative depletions associated with the retention of out-of-priority water.</li> </ul>	<p>No change to existing conditions of either surface water flow, or water quality. However, failure of a dam during a flood event would result in higher flood flows downstream and transport and deposition of large quantities of soil from the embankment structure. The remaining dams at the RFS are over 30 years old.</p>
Surface water quality	<p>Direct Impacts</p> <ul style="list-style-type: none"> <li>No direct impacts on water quality.</li> </ul> <p>Indirect Impacts</p> <ul style="list-style-type: none"> <li>Individual sample results downstream are expected to show increased variability. Data indicate that remedy related soil and infrastructure removal, revegetation, land configuration, and reductions in runoff would continue to result in water quality summary statistics that meet applicable standards.</li> <li>RFLMA monitoring requirements would remain unchanged.</li> </ul>	
Air Quality	<p>Direct Impacts:</p> <ul style="list-style-type: none"> <li>Releases of PM<sub>10</sub>, PM<sub>2.5</sub>, and O<sub>3</sub> expected to be minimal during construction.</li> </ul> <p>Indirect Impacts:</p> <ul style="list-style-type: none"> <li>None.</li> </ul>	<p>No change from current conditions.</p>

## 5.4 Cumulative Impact Summary

Cumulative impacts represent the incremental impacts of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7). Cumulative impacts are most likely to arise when a relationship exists between a proposed alternative and other actions that have, or are expected, to occur in a similar location, time period, or involving similar actions. Projects that are in close proximity to the proposed alternative have more potential for cumulative impacts.

While assessing the cumulative impacts in association with the Proposed Action, the following questions were addressed:

- Does a relationship exist so the impacts from the Proposed Action might affect or be affected by the impacts of the other actions?
- If such a relationship exists, does this assessment reveal any potentially adverse impacts not identified when the Proposed Action is considered alone?

The following activities have been identified to have the potential for contributing to cumulative impacts on resources within the vicinity of the Proposed Action.

### 5.4.1 Past Actions

Section 1.1 describes the background of the RFS and the subsequent cleanup and successful closure of the site. Successful closure of this site has led to the gradual shift from an industrial processing site, and associated human activities, to an open grassland environment. As a result of this shift, wildlife use of the areas has continued to escalate.

Section 1.1 also describes the C-1 dam, evaluated under a Categorical Exclusion (DOE 2003) and the breaching of dams A-1, A-2, B-1, B-2, B-3, and B-4, which were evaluated in the *Environmental Assessment Comment Response and Finding of No Significant Impact, Pond and Land Configuration* (DOE 2004). Modification of seven ponds at the RFS was completed in 2009. Reconfiguring the ponds was accomplished by constructing a notch in each of the modified dams. Measured water quality was not adversely affected by these actions (Section 4.3.5.3).

The continued urban sprawl in the Denver metropolitan area and creation of the Refuge that surrounds the RFS maintains an area that has generally remained undisturbed since its acquisition by the federal government. Although the intention of retaining the COU was to maintain the COU as an area that requires additional remedial or corrective actions, the transfer and jurisdiction of control of the majority of the POU to USFWS for the Refuge has resulted in an expanded use of the entire area by wildlife and contributes to maintaining the existing natural buffer surrounding the COU.

### 5.4.2 Present Action

As described in Section 1.1, DOE continues to routinely estimate out-of-priority storage and evaporative depletions under the lease agreement with the City and County of Broomfield (and the associated Substitute Water Supply Plan).

All upstream POEs and downstream POCs are maintained, and automated samples are continuously collected at regular intervals. Since closure of the RFS in 2005, calculated compliance values have not exceeded water quality standards.

Parallel to the completion of this EA, DOE has proposed that the RFLMA be modified to change some of the current RFLMA monitoring points, including POCs downstream of the dams. The proposed RFLMA modification is subject to CDPHE and EPA approval. The RFLMA modification is not considered a part of this EA but is a part of the remedy for the RFS. Appendix C includes the Regulatory Contact Records for the proposed RFLMA modifications.

### **5.4.3 Reasonably Foreseeable Future Actions**

In addition to establishing the Refuge, Subtitle F of PL 107-107 set aside a 300-ft right-of-way along Indiana Street for transportation improvement (PL 107-107). In 2003, the Federal Highway Administration, in cooperation with CDOT, initiated a NEPA process to study the need, merits, and possible impacts of potential transportation improvements in the Northwest Corridor of the Denver metropolitan area (CDOT 2010). Due to declining funding and a lack of consensus, CDOT decided not to complete the Northwest Corridor EIS. Instead, data collected have been used to create a new Northwest Corridor Transportation Planning and Environmental Study that is available to the public and can be used by a governmental agency or the private sector should an entity decide to move forward with a future project that does not involve federal funding (CDOT 2010). This study included the use of Indiana Street for the project. This project has public controversy, and as of the date of completion of this EA, has not been scheduled for construction.

As stated in Section 4.1, land to the south of the Refuge is privately owned and is currently used for cattle grazing with portions of this property under development for residential, commercial, and light industrial uses.

If the RFLMA is modified to change the location of the POCs downstream of the dams, ground disturbance would occur with the closure of the current POCs and development of new monitoring points.

Under current conditions, flows in Woman Creek originating west of Pond C-2 are diverted around Pond C-2 by the Woman Creek Diversion Dam and through the Woman Creek Diversion Canal. DOE has no plans to modify either the Woman Creek Diversion Canal or the dam. However, DOE may choose to maintain, modify, run to failure, or remove these structures in the future. The Woman Diversion Dam, a sheet pile cutoff wall with a concrete cap, is located west of Pond C-2 and designed to adequately divert the 100-year flood. Recent flood hydrology modeling indicates that this structure will divert 100-year flood flows (Appendix E). Although the failure of the Woman Creek Diversion Dam is not anticipated, the breach in the C-2 dam would be engineered to accommodate this possibility.

## **5.4.4 Cumulative Resource Impacts**

### ***5.4.4.1 Wildlife, Migratory Bird, and Threatened and Endangered Species***

Past actions of site cleanup has served to enhance habitat for all species at the RFS. No additional impacts to resources have occurred as a result of present operating conditions. Future actions discussed in Section 5.4.3 could potentially further reduce habitat for wildlife, birds, and T&E species.

### ***5.4.4.2 Vegetation, Wetlands, and Floodplains***

Recent past actions have served to enhance habitat for vegetation and wetlands. Historic configuration of floodplains is in the process of being reestablished. Current operating conditions present no additional impacts to resources. Although impacts are expected to the vegetation resources, additional ponds, wetland habitat, riparian habitat, and upland vegetation exist adjacent to or within a mile of each of the projected future actions. Therefore, minimal impacts to these habitat types are expected.

### ***5.4.4.3 Surface Water Resources***

No cumulative impacts to Walnut Creek are anticipated, because DOE has completed closure and reclamation of the site and has no plans to modify the drainage that would affect flow routing or flood hydrology in this drainage system at the RFS.

Under the Proposed Action, the Dam C-2 breach would be designed to accommodate the entire Woman Creek flood flow under the assumption that the Woman Creek Diversion Dam and the Woman Creek Diversion Canal may not be functional at some future date. While this potential change in flood routing would not be expected to alter downstream flood volume, small changes to peak flows and flood duration (increases or decreases) may occur if the Woman Creek Diversion structures are modified.

### ***5.4.4.4 Air Quality***

The Proposed Action would be in compliance with the NAAQS requirements and would not contribute substantially to the cumulative air quality in the western Front Range area.

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## 6.0 Mitigation Measures and Resource Protection Activities

All potential impacts from the Proposed Action can be mitigated, as appropriate to the resource, and no impacts are considered substantial. Mitigation measures may be imposed by regulation or through the final CAD/ROD for Rocky Flats (DOE 2006a).

Section 3.1.7 of this EA describes mitigation measures (institutional controls) that are specific to all dam breaching activities, and these mitigation measures will be followed. The Executive Summary Environmental Consequences and Mitigation Summary section, and Table ES-1 provides activity and resource specific mitigation measures, and serves as the Mitigation Action Plan (MAP) per DOE Order 451.1B, Section 5 (a)(9)(e) and (f). The MAP for this EA does not serve to render the impacts of the proposed action as not significant because, based on the extensive monitoring data, breaching of all dams could safely be completed in 2011.

As discussed previously, based on public concern statements, DOE has determined that postponing breaching Dam C-2 until the 2018 to 2020 timeframe would best serve to address concerns stated by local governments. The terminal dams would be operated in a flow-through configuration from 2011 until the final breaching. Comments to DOE on the Draft EA indicated a desire from the communities adjacent to the RFS to have further input prior to the final decision to breach terminal dams A-4, B-5 and C-2. The concerns that the communities have expressed are addressed in Appendix A, Common Concern Statements. Based on these comments, the resource-specific mitigation measures have been further clarified and expanded for this Final EA. Additionally, DOE has committed to working with the concerned communities toward developing an Adaptive Management Plan (AMP) to provide ongoing data prior to the breaching of the terminal dams. The AMP would provide guidance, suggestions, and recommendations developed by the AMP Group for implementing the Proposed Action. The AMP Group would consist of representatives from interested parties. Additionally, CDPHE and EPA would be invited to participate in the development of the AMP, but the AMP would not describe policy or other requirements enforceable under RFLMA.

Development and implementation of the AMP will not in any way negate or change the regulatory requirements under RFLMA. Although the dams are not part of the RFLMA remedy, it is appropriate to address the RFLMA requirements in this section as they would pertain to the terminal dam breaching activities. Because the RFLMA requirements are CERCLA related, these are being described for informative purposes only and are not considered mitigation measures under this NEPA document. Appendix A, Common Concern Statements provides a comprehensive explanation of the RFLMA requirements as they relate to the terminal dam breaching.

Periodic CERCLA reviews are required to be conducted at least every five years, and DOE would have 15 years of post-closure monitoring data prior to the earliest dates for terminal dam breaching. Additionally, RFLMA ensures continuous review of environmental data to confirm protectiveness. Removal of the dams will not eliminate CERCLA-required periodic reviews or RFLMA-required monitoring.

While monitoring data do not indicate that a RFLMA standard would be exceeded at the downstream monitoring points (POCs), it is important to note that RFLMA provides the decision logic for evaluation, reporting, consultation, and mitigation requirements that are based on

meeting the remedy goals for protection of human health and the environment. Mitigation action under RFLMA, if any are warranted, are based on the outcome of RFLMA part consultation, evaluation, and investigation of the possible source(s) that may impact water quality. RFLMA standards at the POCs will continue to be applicable, and the results of water monitoring will continue to be reported in RFLMA quarterly and annual reports.

The following sections provide resource-specific mitigation measures.

## **6.1 Wildlife**

In general, most of the wildlife described in Section 4.3.1 would have the ability to relocate to adjacent areas during project construction. Mitigation measures for terrestrial and aquatic wildlife will not be necessary because of the abundance of nearby alternative habitat. However, for some species that cannot easily relocate, the following mitigation measures will be implemented.

- Water levels in the ponds will be drawn down prior to construction activities. This will move many of the fish from the ponds to downstream areas. Draw down will provide the opportunity for amphibians and reptiles to move elsewhere, while also encouraging other species that use the area as a water source or foraging area to use nearby habitats.
- Vegetation in the project footprint will be mowed to low levels (6 in. or less) to remove cover for wildlife needs. This will encourage species to use habitat at other adjacent locations.

## **6.2 Migratory Birds**

Migratory birds will have the ability to relocate to adjacent areas during project construction. However, the proposed construction activities are planned to occur throughout the primary nesting season for birds (April 1 through August 31). Therefore, to encourage birds that use the pond areas for nesting and forage to use other nearby habitats during the project construction period, the following USFWS directives will be implemented:

- A qualified biologist will conduct field nest surveys at each pond area during the nesting season prior to the project to identify the absence or presence of nesting migratory birds. Nesting surveys will also be conducted on a regular basis throughout the project construction period.
- If a field survey identifies the existence of one or more active nests that cannot be avoided by the planned construction activities, the USFWS Colorado Field Office will be contacted immediately for further guidance.
- Results of the surveys and information regarding the qualifications of the biologist(s) will be documented and maintained on file for potential review by USFWS (if requested) until the Proposed Action activities have been completed.



- Water levels in the ponds will be drawn down prior to construction activities. This will encourage bird species that use the pond areas as nesting habitat, foraging areas, or a water source to use nearby habitats.
- Vegetation in the project footprint (and perhaps outside the footprint) will be mowed to low levels (6 in. or less) to encourage wildlife to seek cover at adjacent locations. Mowing will begin before the nesting season for the birds and continue until project completion.

Based on the results of surveys, and determination from USFWS, additional nesting deterrents may be warranted.

### **6.3 Threatened and Endangered Plant and Wildlife Species**

The RFS has a PBA in place with USFWS to address impacts to T&E species, specifically with respect to the Preble's mouse. The PBA addresses various generic site activities and includes best management practices and mitigation measures. In compliance with Section 7 of the Endangered Species Act, consultation with USFWS was initiated in January 2011 because of the new designation of critical habitat. Depending on timing of completing the amended PBA referred to in Section 4.3.3, according to discussions with USFWS, either an amendment to the current PBA would be written, or the Amended PBA would address impacts from this project. USFWS would then respond with either a BO or letter for the amendment so that the project may proceed. At that time, USFWS will determine if additional species surveys would be required, and all terms and conditions included in the USFWS letter or BO will be followed during project construction.

No earth-moving activities will be started until either an approval letter or BO from USFWS has been obtained.

Mitigation for impacts will be conducted in situ and follow guidelines in the PBA.

Based on the abundance of available habitat, no other mitigation measures are required for other species.

### **6.4 Vegetation, Wetlands, and Floodplain**

#### **6.4.1 Vegetation**

The potential adverse affects of erosion and sedimentation will be minimized through the use of appropriate erosion controls (erosion blankets, wattles, straw bales, GeoRidges, riprap, etc.) throughout and after the project. The following mitigation measures will be implemented by a qualified ecologist, botanist, or environmental scientist to avoid and reduce impacts to vegetation:

- Erosion controls will be used to reduce the potential for erosion and sedimentation during and after construction. The guidance in the *Erosion Control Plan for the Rocky Flats Property Central Operable Unit* (DOE 2007b) will be followed,
- Temporarily disturbed areas will be reclaimed following project completion using native plant species,

- Revegetation will occur as soon as possible to establish vegetative cover and habitat for wildlife, while preventing the establishment of weeds, and
- Noxious weeds will be controlled using Colorado appropriate weed-control measures.

#### **6.4.2 Wetlands and Floodplains**

The Proposed Action will involve excavation and dredging and filling activities in the streams, ponds, and associated wetlands. This work requires a permit in accordance with Section 404 of the Clean Water Act and implementing regulations administered by USACE. A number of nationwide permits for dredge-and-fill activities based on the particular types and goals of the activities are provided by USACE regulations in 33 CFR 330. USACE staff has stated that the project would likely be permitted under a Nationwide Permit 27, Aquatic Habitat Restoration, Establishment, and Enhancement Activities (USACE 2010). This permit applies to activities in waters of the United States associated with the restoration, enhancement, and establishment of tidal and non-tidal wetlands and riparian areas and the restoration and enhancement of nontidal streams and other non-tidal open waters, provided those activities result in net increases in aquatic resource functions and services. The permit includes general and activity-specific conditions to control and mitigate the water quality impacts of the work, including post construction erosion controls and revegetation and requires notification of USACE of the intent to perform work in accordance with the permit prior to commencing the work. The appropriate USACE permit will be obtained prior to any earth-moving activities. Nationwide Permit verification letters are valid for a period of two years. Therefore the Proposed Action would most likely require two separate permits.

Impacts to jurisdictional waters will be mitigated according to USACE requirements. Mitigation for wetland impacts would be conducted in situ and follow the USACE permit requirements applicable to the construction activities.

If all three terminal dams are operated using a flow-through configuration prior to dam breaching, this would result in lower normal operating water levels in the terminal ponds. This may occur for several years prior to the actual breaching. In preparation for dam breaching and to minimize erosion potential from the exposed mud flats (both prior to and after breaching), revegetation of the exposed mudflats may be conducted after the flow-through operations are begun so that the vegetation at these locations has a headstart on establishment prior to breaching. Erosion controls may also be used where deemed necessary. This would minimize the amount of “bare” ground on the pond bottoms and further reduce the potential of soil movement if the dams are breached. Additional seeding of wetland and upland areas along with installation of erosion controls would be conducted after dam breach construction activities were completed. Monitoring of these areas would be conducted as part of the normal wetland and revegetation monitoring activities at RFS. Revegetation monitoring would be conducted following the guidance provided in the RFS Revegetation Plan (DOE 2009c) and would evaluate foliar vegetation cover and ground surface cover. Wetland monitoring would be conducted following the RFS Wetland Mitigation Monitoring and Maintenance Plan (DOE 2006d) and would evaluate hydrophytic vegetation, hydrology, and when the wetlands are delineated, hydric soils. Photomonitoring would also be used for documenting the establishment of the vegetation.

## 6.5 Surface Water Resources

The Proposed Action will involve construction activities that require a Clean Water Act permit for stormwater discharge. For federal facilities in Colorado, the stormwater permitting is regulated by EPA. A construction general permit for stormwater discharge is provided by EPA regulations in 40 CFR 122. Similar to the nationwide permitting program, the construction general permit includes general and activity-specific conditions to control and mitigate the water quality impacts of stormwater discharges, including post construction erosion controls and revegetation and requires notification of EPA of the intent to perform work in accordance with the permit prior to commencing the work. The construction general permit will be obtained prior to any earth moving activities. Institutional controls under RFLMA as described in Section 3.1.7 would continue to be implemented.

The potential for contaminants to migrate offsite in surface water once these dams are removed is a known concern of downstream cities. Any potential mitigation measure concerning contaminants is predicated by the institutional controls under RFLMA, and Appendix A addresses this concern further.

## 6.6 Air Quality

Air monitoring is not required as part of the final remedy, because levels of airborne contaminants are below NAAQs and do not pose a risk to humans or the environment. Air quality is not affected as a result of present operating conditions. Emissions of PM<sub>10</sub>, PM<sub>2.5</sub>, and O<sub>3</sub> would temporarily add to the overall emissions in the Denver Front Range area.

Based on the final design and construction statement of work, any applicable air quality construction permits will be obtained prior to the start of the construction. Applicable construction measures listed on the CDPHE website:

<http://www.cdphe.state.co.us/ap/down/generalpermGP03.pdf> will be followed.

The contractor performing the earth-moving work would provide proof of age of equipment, per CDPHE requirements.

Because the RFS is located in an area that can experience extreme wind, construction activities will be stopped during periods of high wind.

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## **7.0 Coordination and Consultation**

Appendix D provides copies of correspondence in relation to Coordination and Consultation.

### **7.1 Coordination**

On February 2, 2010, formal invitations to participate as cooperating agencies were mailed to USACE, USFWS, EPA, CDPHE, CDOW, and the Colorado Division of Water Resources.

Three agencies have responded to the invitation to be cooperating agencies. USACE and USFWS accepted the invitation to assist in evaluating alternatives and reviewing the draft EA. All comments received prior to the issuing of this Draft EA have been addressed and responses incorporated where applicable. The Colorado Division of Water Resources declined to be a reviewer; however, it did note that any modifications to the dams at the RFS are required to be reviewed and accepted by the Division's Dam Safety Branch, which administers the dam safety program, and DOE will coordinate with the Dam Safety Program Engineer as required prior to construction.

### **7.2 Consultation**

Letters requesting consultation on T&E species were mailed to USFWS and CDOW.

USFWS provided information on T&E species that potentially could be present on site. USFWS also indicated that DOE could amend the existing PBO to account for impacts to the Preble's meadow jumping mouse from the proposed activities.

CDOW responded to the request for consultation and the invitation to be a cooperating agency in one response letter and provided a review of Preble's mouse habitat and behavior and referred DOE to USFWS for additional consultation.

DOE notified 18 identified tribes of its Proposed Action by letter sent via U.S. mail, dated March 23, 2010, and requested their assistance in identifying properties having religious or cultural significance. DOE did not receive any response letters from the tribes. Appendix D provides copies of the consultation letters and responses.

USFWS and CDPHE provided comments on the Draft EA, and their comments and DOE responses are included in Appendix A.

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## 8.0 References

Code of Colorado Regulations, 5 CCR 1002-31. Regulation No. 31: Basic Standards and Methodologies for Surface Water.

Code of Colorado Regulations, 5 CCR 1002-38. Regulation No. 38: Classifications and Numeric Standards South Platte River Basin Laramie River Basin Republican River Basin Smoky Hill River Basin.

10 CFR 1021, 1996 *et seq.* National Environmental Policy Act Implementing Procedures; Final Rule. Part IV, U.S. Department of Energy. Federal Register, Vol 61, No. 132. July 9.

36 CFR 800.2 and 800.4, 2000 *et seq.* Protection of Historic Properties.

40 CFR 1500 through 1508, 1978. Regulations for Implementing the National Environmental Policy Act. Office of the Federal Register, National Archives and Records Administration, US Government Printing Office, Washington, D.C.

74 FR 31389, 2009. Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition to list the Northern Leopard Frog (*Lithobates [=Rana] pipiens*) in the Western United States as Threatened. Federal Register Vol 74, No. 125. July 1.

75 FR 78430, 2010. Endangered and Threatened Wildlife and Plants; Revised Critical Habitat for the Preble's Meadow Jumping Mouse in Colorado. Federal Register Vol 75, No. 240. December 15.

16 USC 703-712; Ch. 128 *et seq.* 1918. Migratory Bird Treaty Act of 1918.

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**Finding of No Significant Impact  
Rocky Flats Surface Water Configuration**

DOE/EA-1747  
LMS/RFS/S06335

**Errata Sheet**

On page 3 of the Finding of No Significant Impact (FONSI), Carol M. Borgstrom is the Director of the Office of NEPA Policy and Compliance which is GC-54, not GC-20.

**U.S. Department of Energy  
Finding of No Significant Impact  
Rocky Flats Surface Water Configuration**

**DOE/EA-1747  
LMS/RFS/S06335**

**May 2011**

**AGENCY:** U.S. Department of Energy

**ACTION:** Finding of No Significant Impact (FONSI)

**SUMMARY:**

The U.S. Department of Energy (DOE), Office of Legacy Management (LM) conducted an Environmental Assessment (EA), DOE/EA-1747, which analyzed the potential impacts associated with breaching of dams at ponds A-3, C-2, Present Landfill (PLF), A-4, and B-5 at the Rocky Flats Site (RFS) located in Jefferson County, Colorado. All discussion, analysis, and findings related to the potential impacts of construction and operation of the proposed project are documented in the Final EA and are incorporated herein by reference.

The RFS was formerly used to process and manufacture nuclear weapons components, and cleanup and closure of Rocky Flats by DOE was completed in 2005. LM has jurisdiction and control of portions of Rocky Flats as discussed below.

The cleanup and closure of RFS was completed via a cleanup agreement under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); a Compliance Order on Consent under the Resource Conservation and Recovery Act (RCRA); and the Colorado Hazardous Waste Act (CHWA). RCRA and CHWA are administered by the State of Colorado through the Colorado Department of Public Health and Environment (CDPHE). The final response action for RFS is specified in the final Corrective Action Decision/Record of Decision (CAD/ROD) for Rocky Flats issued on September 29, 2006. Implementation of the final response action is regulated under the *Rocky Flats Legacy Management Agreement* (RFLMA).

Twelve dams were constructed on the RFS during operation of the Rocky Flats Plant. Seven dams were previously breached by constructing notches in the dam embankments. The current project involves breaching the remaining five dams. Surface water retention is not required at the RFS, and the dams are not a functional part of the final CAD/ROD remedy.

The remaining five dams include the following:

- PLF Dam on No Name Gulch
- Dam A-3 on North Walnut Creek
- Dam A-4 on North Walnut Creek
- Dam B-5 on South Walnut Creek
- Dam C-2 near Woman Creek

In accordance with applicable regulations and policies, DOE invited federal and state agencies and Native American Tribes to participate in commenting on the Draft EA prior to public release. The U.S. Army Corps of Engineers (USACE), the U.S. Fish and Wildlife Service (USFWS), and CDPHE accepted the invitation. The Colorado Division of Water Resources declined to be a reviewer; however, it did note that any modifications to the dams at the RFS are required to be reviewed and accepted by the Division's Dam Safety Branch, which administers the dam safety program. DOE will coordinate with the Dam Safety Program Engineer as required prior to breaching. All comments received from these agencies prior to the issuing of the Draft EA were addressed and responses incorporated where appropriate.

USFWS provided information on threatened and endangered species that potentially could be present on site. USFWS also indicated that DOE could amend the existing Programmatic Biological Opinion (PBO) to account for impacts to the listed as "threatened" Preble's meadow jumping mouse from the proposed activities.

USACE staff has stated that the project would likely be permitted under Nationwide Permit 27, Aquatic Habitat Restoration, Establishment, and Enhancement Activities (USACE 2010). Nationwide permit verification letters are valid for a period of two years; therefore, the Proposed Action would most likely require two separate permits.

Class III cultural resource inventories of the RFS were conducted in 1989 and 1991. The State Historic Preservation Officer (SHPO) concurred with DOE's determination that these surveys were sufficient and that the Proposed Action would have "no effect" on cultural resources.

The Draft EA was made available for public and agency review on April 30, 2010. The review/comment period was 30 days. Additionally a public meeting was held on May 18, 2010, to solicit comments on the Draft EA. Public comments received during the 30-day comment period were addressed, and responses were incorporated where applicable. Many of the public comments were similar in nature, and a Common Concern Statement has been incorporated into the Final EA as Appendix A.

DOE has determined that the proposed project would not result in any significant environmental impacts, and preparation of an Environmental Impact Statement (EIS) is not required. The basis for this determination is described in this FONSI. Copies of the EA and this FONSI are available to all interested persons and the public through the following contact:

Tracy A. Riberio  
National Environmental Policy Act (NEPA) Compliance Officer  
U.S. Department of Energy  
Office of Legacy Management  
2597 Legacy Way  
Grand Junction, CO 81503  
720-248-6621  
Tracy.Ribeiro@lm.doe.gov

The documents are also available on the DOE website at:  
[http://nepa.energy.gov/environmental\\_assessments.htm](http://nepa.energy.gov/environmental_assessments.htm) or on the Rocky Flats website at:  
[http://www.lm.doe.gov/Rocky\\_Flats\\_NEPA.pdf](http://www.lm.doe.gov/Rocky_Flats_NEPA.pdf)

For general information regarding the DOE NEPA process contact:

Carol M. Borgstrom  
Director, Office of NEPA Policy and Compliance (GC-20)  
U.S. Department of Energy  
1000 Independence Avenue, SW  
Washington, D.C. 20585  
202-586-4600, or leave a message 800-472-2756.

### **SUPPLEMENTAL INFORMATION:**

#### **Purpose and Need:**

The purpose of the Proposed Action is to reduce or eliminate the retention of surface water to return the RFS surface water flow configuration to the approximate conditions existing prior to construction of the dams. The general purposes of the proposed dam modifications are to:

- Create a pond and drainage system that minimizes or eliminates maintenance and operation of the existing dams,
- Preserve and enhance wetlands and habitat to the extent practicable,
- Modify (breach) the dams such that they can be reclassified from jurisdictional to non-jurisdictional structures under the Office of the State Engineer regulations, if possible, while achieving the first two objectives stated above, and
- Reduce or eliminate the off-line storage of surface water at the site and the resultant need for a Substitute Water Supply Plan (and subsequent Augmentation Plan) to replace out-of-priority depletions via the Broomfield Water Lease and ultimately, filings with the water court for storage rights.



The dams are no longer needed for the original purpose. Breaching of the dams would reduce DOE costs and would not change DOE's obligations to monitor surface water and meet standards as required by RFLMA.

### **Description of the Proposed Action:**

The Draft EA described that the Proposed Action would be implemented in two timeframes, with the PLF, A-3, and C-2 breaching to occur in 2011, and A-4 and B-5 breaching to be completed within the 2015 to 2018 timeframe. However, based on public concern statements, DOE has determined that postponing breaching the terminal dams A-4, B-5, and C-2 until the 2018 to 2020 timeframe would best serve to address concerns stated by local governments. The regulations for implementing the NEPA allow for modifications between the release of the Draft and Final EA in response to public comments (40 CFR 1503.4 (a)). Therefore, the Proposed Action for this Final EA entails breaching the terminal dam C-2 during the same timeframe as breaching terminal dams A-4 and B-5 (2018 to 2020). Accordingly, the timeframe for breaching the terminal dams A-4, B-5, and C-2 has been changed to 2018 to 2020 throughout this Final EA. Dams A-4, B-5, and C-2 would be operated in a flow-through configuration until breached.

Although completing the proposed action in 2011 is a valid option, DOE will complete part of the Proposed Action at a later date as suggested by the public. DOE believes this represents a more sound course of action. The timing for breaching of all dams was mainly determined based on project management, funding availability, expected costs, and public acceptance for breaching related to each of the individual dams. Therefore, the Proposed Action is divided into two timeframes:

- Breaching the dams at ponds A-3 and PLF in 2011 and;
- Breaching the dams at ponds A-4, B-5, and C-2 in the 2018 to 2020 timeframe.

The average construction duration for dam breaching at each structure is approximately 11 weeks. To modify the dam, a "breach" or "channel" would be cut into each dam to reduce its jurisdictional height, thus creating a lower-profile.

DOE would operate Ponds A-4, B-5, and C-2 in flow-through mode prior to the construction work to breach these dams. The discharge rates would be adjusted as necessary to maintain lower pond levels than normally encountered in the previous batch-and-release mode. This will serve to reestablish a continuous flow to the creeks downstream of the dams, allow the areas to become dry enough for construction, and allow erosion controls and revegetation along the pond edges to be started before the dam breach construction work.

Dam-specific information is provided in the text of the EA. The following generalized construction sequence is similar for all five dams:

- Dewater the pond using existing discharge valves, and/or pumping as necessary, several months prior to construction work (preceding winter/spring).
- Mobilize for construction: set up staging area, erosion controls, and stockpile area.
- Install a temporary coffer dam upstream for potential storm events (manage retained water upstream using pumps).

- Excavate soil from the breach channel and fill predefined fill areas (i.e., former spillways and roads to be reclaimed).
- Construct breach to engineering specs (side slopes, flowline, drop structure); armor the channel as necessary for erosion resistance.
- Regrade area upstream of channel to provide positive flow, minimize ponding, and promote establishment of quality habitat.
- Reclaim all disturbed areas.

**Alternatives:**

NEPA regulations and DOE’s implementation guidelines require that an EA include a discussion of the No Action alternative. The No Action alternative provides a baseline against which the effects of the Proposed Action would not be implemented and the site-specific and direct impacts associated with the Proposed Action would not occur. Under the No Action alternative, water would be routed according to current configuration and managed using the current operating protocol. Environmental monitoring would continue in accordance with RFLMA. Operation and maintenance of the dams and necessary structures would continue to require maximum resources.

**Environmental Impacts:**

DOE’s conclusions about the Proposed Action’s environmental impacts are based on information contained in the EA. DOE examined potential impacts on the following resources:

- Wildlife
- Migratory birds
- Threatened & Endangered Plant and Wildlife Species
- Vegetation
- Wetlands
- Floodplains
- Surface water flow
- Surface water quality
- Air quality

DOE has concluded that all potential impacts from the Proposed Action can be mitigated, as appropriate to the resource, and no impacts are considered significant. Mitigation measures may be imposed by regulation or through the final CAD/ROD for Rocky Flats. Although the dams that are proposed to be breached are not required by the CAD/ROD, certain aspects of the work are subject to institutional controls within the Central Operable Unit (COU) and regulated by RFLMA requirements. The RFLMA requirements are focused on water quality standards, monitoring, sampling, and surface disturbing activities. All RFLMA required monitoring will remain. Section 3.1.7 of the EA describes institutional controls and associated mitigation measures that are specific to all dam breaching activities, and these mitigation measures will be followed.

Table ES-2 of the Final EA provides resource-specific impact and mitigation measures. The following Table 1 provides a summary of the expected impacts, and associated mitigation measures that will be conducted in connection with the Proposed Action.

*Table 1. Resource-Specific Impacts and Mitigation for the Proposed Action*

Resource	Proposed Action
Wildlife	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Restore a more natural, seasonally variable flow system to provide more consistent water for downstream habitat.</li> <li>• Temporary disturbance from construction noise.</li> <li>• Eliminate surface water habitat for species.</li> <li>• Reduced disturbance from human activities for monitoring and maintenance.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• Water levels in the ponds will be drawn down prior to construction activities to provide the opportunity for species to use nearby habitats.</li> <li>• Vegetation at the construction footprint will be mowed to 6 inches or less to help encourage species to use other habitat locations.</li> </ul>
Migratory Birds	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Noise and construction activities to foraging and nesting activities in the adjacent habitat, but no fatalities are expected because of prescribed mitigation measures.</li> <li>• Reductions in the abundance of waterfowl at the ponds; however, these types of habitats are available within a few miles of the RFS.</li> <li>• Species that forage and nest in emergent and shrub wetland habitat types would potentially increase following reclamation.</li> <li>• Reduced disturbance from human activities for monitoring and maintenance.</li> </ul> <p>Mitigation:</p> <p>Activities are planned to occur throughout the primary nesting season for birds (April 1 through August 31), therefore:</p> <ul style="list-style-type: none"> <li>• A qualified biologist will conduct field nest surveys prior to and regularly throughout construction.</li> <li>• If the survey identifies active nests that cannot be avoided, USFWS will be contacted immediately for guidance.</li> <li>• Results of the surveys and information regarding the qualifications of the biologist(s) will be documented and maintained on file for potential review by USFWS (if requested) until the Proposed Action activities have been completed.</li> <li>• Water levels in the ponds and vegetation clearing will occur as described under wildlife impacts. Based on the results of surveys, and determination from USFWS, additional nesting deterrents may be warranted.</li> </ul>
Threatened & Endangered Plant and Wildlife Species	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Approximately 1 acre of Preble's mouse habitat would be impacted during construction.</li> <li>• Increase in Preble's habitat expected with conversion from open water to emergent wetland/shrubland.</li> <li>• Possible minimal impacts to individual garter snakes and northern leopard frogs.</li> <li>• Minimal long-term effect is expected because the re-established stream channels would provide habitat.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• In compliance with Section 7 of the Endangered Species Act, consultation with USFWS will be conducted via an amendment to the existing Programmatic Biological Assessment.</li> <li>• No earth-moving activities will be started until either the approval letter or Biological Opinion from USFWS has been obtained.</li> <li>• Mitigation for impacts will be conducted in-situ and follow guidelines in the Programmatic Biological Assessment.</li> </ul>

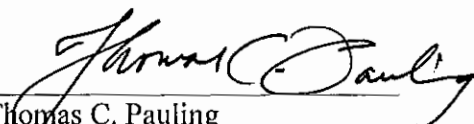
Table 1 (continued). Resource-Specific Impacts and Mitigation for the Proposed Action

Resource	Proposed Action
Vegetation	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Clearing of 26 acres of vegetation (including noxious weeds) due to construction.</li> <li>• Reseeding of native species and ongoing weed control would provide a higher quality ecosystem.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• Use of appropriate erosion controls throughout and after the project.</li> <li>• The guidance in the <i>Erosion Control Plan for the Rocky Flats Property Central Operable Unit</i> (DOE 2007b) will be followed.</li> <li>• Temporarily disturbed areas will be reclaimed following project completion using native plant species.</li> <li>• Revegetation will occur as soon as possible.</li> <li>• Noxious weeds will be controlled using appropriate weed control measures.</li> <li>• A qualified ecologist, botanist, or environmental scientist will oversee all mitigation measures.</li> </ul>
Wetlands	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Less than 0.5 acre of palustrine emergent/shrubland wetland and approximately 4 acres of open water habitat.</li> <li>• Five to six acres of palustrine emergent/shrubland wetland created in the former open water habitat, which would increase the aquatic resources functions and services.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• A section 404 permit in accordance with the Clean Water Act will be required and obtained prior to any earth-disturbing activities (U.S. Army Corps of Engineers' review comments indicate Nationwide Permit 27 will be applicable).</li> <li>• Impacts to jurisdictional waters will be mitigated according to USACE requirements.</li> </ul>
Floodplains	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Minimal and limited to construction areas.</li> <li>• Would approximately re-establish the historic floodplain and stream channel through the pond bottoms (except at Pond C-2).</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• Same as mitigation measures for wetlands.</li> </ul>
Surface water flow	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Larger flows and volumes downstream compared to current conditions with return to flood conditions prior to the original construction of the dams.</li> <li>• Short-term erosion associated with construction.</li> <li>• Would eventually eliminate evaporative depletions associated with the retention of out-of-priority water.</li> </ul> <p>Mitigation:</p> <p>A construction general permit for stormwater discharge from EPA will be required prior to commencing the work.</p>
Surface water quality	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• No direct impacts on water quality.</li> <li>• Individual sample results downstream are expected to show increased variability. Data indicate that remedy-related soil and infrastructure removal, revegetation, land configuration, and reductions in runoff would continue to result in water quality summary statistics that meet applicable standards.</li> <li>• RFLMA monitoring requirements would remain the same.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• Monitoring in accordance with RFLMA requirements to continue.</li> <li>• A construction general permit for stormwater discharge from EPA will be required prior to commencing the work.</li> </ul>
Air Quality	<p>Impacts:</p> <ul style="list-style-type: none"> <li>• Releases of particulate matter less than 10 microns (PM<sub>10</sub>), particulate matter less than 2.5 microns (PM<sub>2.5</sub>), and Ozone (O<sub>3</sub>) are expected to be minimal during construction.</li> </ul> <p>Mitigation:</p> <ul style="list-style-type: none"> <li>• Contractor to obtain any required air quality construction permits prior to start of the construction work.</li> <li>• The contractor would provide proof of age of equipment, per CDPHE requirements.</li> <li>• Construction activities will stop during periods of high winds.</li> </ul>

**Determination:**

Based on the EA analysis, and environmental protection measures identified for the Proposed Action, no mitigation beyond that already proposed would potentially have adverse environmental impacts. A separate mitigation action plan is not required for the Proposed Action. DOE has determined that the adoption of the Proposed Action would not constitute a major federal action significantly affecting the quality of the human environment, within the meaning of NEPA. Therefore, an EIS is not required, and DOE is issuing this FONSI for the Proposed Action.

Issued:

  
\_\_\_\_\_  
Thomas C. Pauling  
Director, Office of Site Operations

5/31/2011  
Date

**Appendix A**

**Common Concern Statements  
and  
Comments and Responses  
on the Draft EA**

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## **Rocky Flats Draft Environmental Assessment (EA) Common Concern Statements**

Many of the comments received on the Draft EA had similar concerns. Rather than address each comment individually, a Common Concern Statement reflecting the intent of these comments, and a corresponding response, have been generated.

General Comment:

- 1. There are uncertainties resulting from an insufficient post-closure period of record for assessing hydrologic conditions at the site. More CERCLA review cycles are needed before breaching the terminal pond dams.**

DOE understands from a portion of the public review comments that:

- A portion of the public would like the dams to remain in place so that the dams could continue to be used to some extent to manage surface water prior to release
- The dams may provide a means to address uncertainty regarding whether water quality fully reflects a relatively stable post-closure hydrologic condition.

DOE recognizes that in a cleanup and closure project of the scope completed at Rocky Flats, some level of uncertainty remains. However, DOE has implemented the features of the selected remedy, and the RFLMA Attachment 2 Legacy Management Requirements provide the approach to respond to unanticipated conditions to assure that the remedy remains protective.

Data from the existing approximately five years of post-closure monitoring results have been considered by DOE in developing the EA. Periodic CERCLA reviews are required to be conducted at least every five years. DOE currently has completed two CERCLA periodic reviews, and the next CERCLA five-year review is required to be completed by September 2012. The purpose of the periodic review is to determine whether the remedial actions remain protective of human health and the environment. The previous reviews have resulted in determination that the remedy remains protective. This means that at a minimum, DOE would have 10 years of post-closure monitoring data and another CERCLA five-year review completed prior to the breach of dams A-4, B-5, and C-2 in the 2018- 2020 timeframe. In addition, RFLMA also ensures continuous review of environmental data to confirm protectiveness. DOE is required to continue to monitor and evaluate data in accordance with RFLMA.

As explained in the Draft EA (Executive Summary 1.1, Section 1.1, Section 5.2, and Appendix B), surface water retention is not required at RFS, and the dams are not a functional part of the final CAD/ROD remedy; therefore, the protective measures identified in the remedy do not rely on the continued existence of the dams. The remedy in place at Rocky Flats neither depends on nor is linked to the presence of the ponds.

DOE has considered that hydrologic conditions are affected by the post-closure conditions of the site and may not reach long-term equilibrium (also referred to in comments on the Draft EA as “stabilization”) for some time. Hydrologic equilibrium does not mean hydrological conditions will no longer fluctuate, because these conditions are continuously influenced by factors such as precipitation amount, seasonality of the precipitation, and established vegetation. Rather, equilibrium means that the hydrological conditions have stabilized under the post-closure setting. Influences from features or conditions that were eliminated or removed during site closure (such



as buildings, impervious surfaces, importation of water, sewage treatment plant discharge, and storm water conveyances) are no longer evident, and influences from features that were modified through the closure process (such as the remaining subsurface infrastructure) have been incorporated into the hydrologic system. For example, a subsurface building slab may continue to influence groundwater movement, but in a consistent manner somewhat similar to a localized clay layer. To some extent, the retention ponds formed by the dams also influence local hydrological conditions, which won't reach equilibrium until the water is no longer retained.

The fate and transport of residual contaminants was evaluated in the Remedial Investigation/Feasibility Study (RI/FS). This study, as well as other information, including the results of the Comprehensive Risk Assessment (CRA) portion of the RI/FS, was considered by DOE, EPA, and CDPHE in selection of the final remedy.

CERCLA-required periodic reviews and RFLMA-required monitoring, evaluation, maintenance, and reporting will be conducted regardless of the EA determination. This required monitoring has been and will be conducted as long as required by the CAD/ROD and RFLMA.

**2. There is an inability to fully evaluate the effectiveness of the remedy due to the ongoing construction activities, recent operational changes and future plans for phased modifications at landfills and groundwater treatment systems.**

DOE, EPA, and CDPHE (the RFLMA parties) are the agencies charged with the responsibility to evaluate the effectiveness of the remedy. As discussed in the previous response, effectiveness is determined based on whether the remedy remains protective of human health and the environment. Operation, monitoring, and surveillance of the remedy components have resulted in a number of maintenance actions, including actions involving design and construction to maintain, repair, and/or improve operability or future maintenance of engineered components of the remedy.

Engineered components include four groundwater treatment systems and covers for two closed landfills. These types of activities were anticipated for the selected remedy and were considered in the overall operations and maintenance costs in evaluation of the relative cost-effectiveness of the remedy alternatives.

For modifications conducted at groundwater treatment systems; the goals of these modifications, and the results that have been confirmed via monitoring data, have resulted in improvements in treatment effectiveness. Improving groundwater treatment should not be seen as a reason to postpone removal of the ponds, because the ponds are not relevant to the remedy.

As stated in Section 4.2.6 of the Draft EA, the ponds are well downstream of the groundwater treatment systems (and the associated residual contamination). Groundwater at Rocky Flats is monitored to ensure the continued protection of surface water quality, and the engineered groundwater treatment systems are relevant to this objective.

The creeks that cross the COU convey much higher volumes of surface water flow than effluent volumes from the treatment systems. The quality of the surface water flowing through a breached dam would be negligibly affected by slight adjustments to the upstream treatment systems, which as stated previously in this response, have resulted in improvements in effluent water quality.

**3. Concern has been expressed regarding the removal of the terminal ponds and the subsequent establishment of new surface water points of compliance (POCs).**

The dams are not part of the CAD/ROD requirements, which is why the NEPA process, rather than the CERCLA process is being used to evaluate the breaching of the dams.

The CAD/ROD and RFLMA acknowledge that the terminal ponds may be removed at some point and anticipate the possible need to designate new POCs. The RFLMA parties have consulted regarding changes to the locations of POCs as well as other changes to RFLMA required monitoring points. A proposed modification to RFLMA Attachment 2 addressing changes to monitoring points has been released for public review and comment. DOE, along with the other RFLMA parties, will consider the public review comments regarding the proposed modification to RFLMA Attachment 2. The proposed changes are subject to regulatory approval under RFLMA paragraph 65.

The decision to breach dams is not dependent on changes to RFLMA monitoring points. Likewise, approval of changes to monitoring points is not dependent on the decision to breach dams, and is being pursued independent of any decision regarding the Proposed Action.

The connection with the POCs is discussed in the Cumulative Section 6.4.3 of the Draft EA.

**4. There is an absence of a contingency plan for containment if water is tested that contains levels of contaminants that are higher than the state standard.**

The ponds are not part of the remedy and were not intended to represent a contingency plan. Regardless of water quality conditions, if a pond must be discharged (for example, due to high water level or concerns about dam integrity), it will be discharged.

Sampling for levels of contaminants is required by RFLMA. DOE has considered whether removal of the terminal pond dams would pose an impact to human health and the environment and whether a contingency plan for surface water containment is a necessary element to conclude a finding of no significant impact (FONSI). Based on extensive monitoring as reported in Sections 4.3.5.2 and 5.2.5.1 of the EA, DOE has concluded that the current requirements under RFLMA used to address this general concern are preferable.

As described in Common Concern Statement #1, at a minimum, DOE would have 10 years of post-closure monitoring data and another CERCLA five-year review completed prior to the breach of dams A-4, B-5, and C-2 in the 2018 to 2020 timeframe. While DOE does not believe that a RFLMA standard would be exceeded at the POC, the RFLMA provides the decision logic for evaluation, reporting, consultation, and mitigation requirements that are based on meeting the remedy goals for protection of human health and the environment. Mitigation plans, if required, are based on the monitoring results and investigation of the possible source(s). DOE staff would continue to report and discuss the ongoing surface water, ground water, and wetland establishment monitoring activities at the RFS to interested parties through formal as well as informal meetings. The information would be available on the DOE website as well. This commitment has been added to Section 6.0 of the EA.

A table (4–17) has been added to Section 4.3.5.3 of the Final EA showing the RFLMA monitoring standard and POC monitoring data for comparison purposes with the point of evaluation (POE) data. This table shows that the RFLMA standards are all being met. Surface water data from POE and POC monitoring have demonstrated that elevated levels of some constituents, in particular uranium, are naturally occurring and are not related to Rocky Flats activities (Section 4.3.5.3 of the EA provides further discussion).

**5. How will any contaminants that may be in the sediment be contained?**

Over the period of the cleanup and closure of Rocky Flats, during activities to deconstruct the facilities and remove residual contamination, it became clear that in certain instances soil contaminated with plutonium and americium was mobilized by erosion. The pond sediments were characterized as part of the closure process. As part of the RCRA closure of the PLF, approximately 18 inches of sediment was excavated from the PLF pond and placed under the PLF closure cover. The other ponds included in this EA did not require remediation. The characterization information and reference documents are identified and discussed in Contact Record 2010-02, which is included in Appendix C of the EA.

When the extensive earth moving and demolition activities to perform cleanup and close the site were completed, levels of these contaminants and their mobilization through erosion processes decreased significantly. Since that time, recontouring of the site and extensive revegetation also serve to reduce erosion.

Some accumulation of sediments has occurred behind the dams, and sediments may be disturbed during construction of the notches to breach the dams and during heavy precipitation events after the dams are breached. However, the construction methods for each dam breach require additional soil to be placed over sediments directly upstream of the location of the breach and for the breaches themselves to be armored against erosion. This would act to immobilize those sediments.

**6. The draft EA states that the dams are no longer needed and breaching would reduce costs and by association taxpayers costs, but no estimates of cost savings were given. What are the annual costs?**

As stated in the public meeting on May 18, 2010, approximately \$135,000 per year is budgeted for annual operating and maintenance (O&M) only. The annual O&M cost provided in the public meeting was based on the lifecycle baseline cost estimates prepared in 2007. Table CCS 1–1 (below) provides updated estimates based on actual cost since closure. The estimated dollars shown are in 2010 dollars and are not adjusted for inflation.

Table CCS 1–1: Rocky Flats Pond Operation Estimate 2010–2022

Activity	FY 10 budget	FY 11 budget	FY 12 through FY 19 budget (cost per year)	FY 20 budget	FY 21 budget	FY 22 budget
Pond Operations	\$33,000	\$26,000	\$23,000	\$9,000	\$0	\$0
Water Lease Reporting	\$8,000	\$8,000	\$6,000	\$3,000	\$3,000	\$0
Dam Monitoring and Maintenance	\$71,000	\$57,000	\$54,000	\$18,000	\$0	\$0
<b>Total</b>	<b>\$112,000</b>	<b>\$91,000</b>	<b>\$83,000</b>	<b>\$30,000</b>	<b>\$3,000</b>	<b>\$0</b>
Note: This projection of dam operation and maintenance costs is in FY 10 dollars (rounded to the nearest thousand). For budgeting purposes the projection includes operation of dams A-4, B-5, and C-2 until 2020. Costs would be lower for 2018-2020 if dams are breached. Budget assumes breaching of dams PLF and A-3 in 2011.						

Although the dams allow surface water to be held, the continued O&M of the earthen dams and management of the retained water also entails uncertainty related to amounts of runoff, timing of high precipitation events, need to discharge for dam safety, and possible need for repairs based on the results of dam inspections and stability monitoring. In particular the cost of major repairs to the dams is not included in these estimates.

**7. Why is Terminal Dam C-2 scheduled to be breached earlier than the other two terminal dams? Why not operate the three terminal dams in flow-through state to get additional data on impacts?**

Although completing the proposed action in 2011 is a valid option, DOE would complete part of the Proposed Action at a later date as suggested by the public. The timing for breaching of all of the dams was mainly determined based on overall project management, funding availability, expected costs, and public acceptance for breaching related to each of the individual dams.

However, based on public concern statements, DOE has determined that postponing breaching the terminal dams A-4, B-5, and C-2 until the 2018 to 2020 timeframe would best serve to address concerns stated in the comments. Therefore, under the Proposed Action as described in the Final EA, along with dams A-4 and B-5, the C-2 dam would be operated in a flow-through configuration until breaching operations commence.

All direct, indirect, and cumulative impacts would not change from impacts reported in the Draft EA, as the Proposed Action impacts have been assessed assuming the breaching of all dams.

**8. What is the risk of exposure to contaminants at RFS?**

Based on the public comments, one general underlying concern relates to the level of possible risk of exposure to contaminants that have been identified and are being treated at the RFS and the relation to human health and safety.

Risk is defined as “the probability that an outcome will occur, times the consequence (or level of impact), should that outcome occur”. This means that the question in relation to the RFS

becomes “would the release of contaminants occur, and if it does, what would be the expected outcome?”

The RI/FS, including the results of the CRA, are referenced in this Common Concern Statement, as well as Common Concern Statement #1. The conclusions of the RI/FS were informed by a CRA, which included an evaluation of potential adverse impacts to both human health and the environment. This document can be accessed at the Legacy Management web site: [http://www.lm.doe.gov/Rocky\\_Flats/Regulations.aspx](http://www.lm.doe.gov/Rocky_Flats/Regulations.aspx).

Evaluations of the nature and extent of contamination considered soil, groundwater, surface water, sediment, and air. These evaluations were conducted to show the types of analytes of interest (AOIs) remaining in the environmental media and their extent at RFS following the completion of accelerated actions in accordance with the Rocky Flats Cleanup Agreement (RFLCA). The RI/FS concluded that institutional and physical controls would represent the best protection of human health and the environment. Institutional controls include legally enforceable and administrative land use restrictions and physical controls including signage to control access and activity within the COU. The actions recommended were then incorporated into the CAD/ROD as acceptance of Alternative 2 from the RI/FS and are part of the RFLMA.

The RI/FS document is extensive, but Table ES.2 of the Executive Summary in the RI/FS provides an analysis of the expected results of the three alternatives presented in the document. In Table ES.2, the columns addressing both Alternatives 1 and 2 are the expected results of the alternative identified in the CAD/ROD. Concerning the CRA, the findings concluded that any alternative that would be ultimately chosen for the final CAD would be protective of human health and the environment, because no unacceptable risks from residual contamination existed after the completion of all planned accelerated actions. Specifically, the CRA stated that:

- The incremental risk to the wildlife refuge worker (WRW) falls within the acceptable range of  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$  cancer risks and an HI (hazard index) of 1 for noncarcinogenic effects.
- There is no significant ecological risk from residual contamination within all environmental media across RFETS.
- Actions at the Present and Original Landfills provide protection of human health and the environment.
- Groundwater actions are operating as designed to remove contamination captured to meet appropriate surface water quality standards at surface water POCs.
- Monitoring of groundwater, surface water, sediment, and ecology provides data to verify that RFETS continues to be protective of human health and the environment. The IMP also includes environmental monitoring of the Present and Original Landfills, the Present Landfill seep treatment system, and the three groundwater treatment systems.

The RI/FS evaluated the WRW exposure over time. The CAD/ROD further stated that:

“Results of the CRA demonstrate that the risks posed by residual contamination at the site are within the EPA’s accepted risk range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  or below. For noncarcinogenic human health effects, all hazard indices are less than 1, and the calculated radiation doses posed by residual contamination are well below the acceptable annual radiation dose of 25 millirem specified in the Colorado Standards for Protection Against Radiation. Residual contamination at Rocky Flats poses no significant risk of adverse effects to ecological receptors.”

The CAD/ROD further stated that “Surface water leaving Rocky Flats, downstream of the terminal ponds in each drainage, is suitable for all uses.”

# Rocky Flats Surface Water Configuration Draft Environmental Assessment

## Comments DOE Responses

Note: The following table provides a comment/response to comments submitted on the Draft EA, which was posted on the DOE LM website. All comments are direct quotes from the letters received by DOE. Comments are numbered for easy identification and do not represent an assigned hierarchy.

No.	Comment	DOE Response
<b>U.S. Army Corps of Engineers</b>		
1	General comment. Regarding the timing of permit issuance, Nationwide Permit verification letters are valid for a period of two years. Therefore, this office would likely issue two separate permits, as needed for each phase.	Noted. Addressed in Section 6.4.2 and Table ES-1.
<b>Colorado Department of Public Health and Environment</b>		
2	Introduction, 4 <sup>th</sup> paragraph. In the first sentence capitalize “Plant”	Edit made as suggested.
3	Introduction, 3 <sup>rd</sup> sentence in the No Action. Seems to imply that additional sediment sampling is planned.	Changed to: Environmental monitoring would continue in accordance with RFLMA. Note: This was edited in Section 3.2, for the Draft EA, but overlooked in the Summary. This omission has been corrected.
5	Table ES-1, Surface Water. Under “Proposed Action”, it would be more straightforward to simply repeat the phrase for construction mitigation in the preceding box rather than say that it is “the same as surface Water Flow”.	Edit made as suggested.
6	Section 1.1, 3 <sup>rd</sup> paragraph, 3 <sup>rd</sup> sentence, which states that the “COU consolidates areas that require additional remedial or corrective actions” should be deleted.	The verb tense in this sentence has been changed to reflect the past tense.
7	Section 1.2, 4 <sup>th</sup> paragraph. Last sentence on this page is probably more appropriate for the next paragraph. The new last sentence for the 4 <sup>th</sup> paragraph could be a re-write of the last paragraph in this section “Breaching the dams would not change DOE’s obligations to monitor surface water and meet standards as required by RFLMA”.	In reading through these paragraphs, we assume that CDPHE meant the 5 <sup>th</sup> paragraph, which begins with “LM is directed by DOE”? The last sentence in this paragraph has been moved to the beginning of the 6 <sup>th</sup> paragraph, as it would fit with either paragraph. The requested repeat of DOE’s obligation to monitor was not added to the 5 <sup>th</sup> paragraph, as it is redundant to the last paragraph of this section.

No.	Comment	DOE Response
8	Section 1.2, last paragraph. The last paragraph in this section could be deleted.	This paragraph is intended to summarize the preceding paragraphs and provide the public with a definitive statement. No change made to the text.
9	Section 2.0, 1 <sup>st</sup> paragraph. This paragraph seems extraneous and could be deleted.	Agree that this paragraph is not necessary based on the detailed information provided in Section 2.1.1. Removed as suggested.
10	Section 2.1.1, 2 <sup>nd</sup> paragraph. The paragraph that starts at the end of page 2-1 mentions the risk evaluations for soil and sediment in the RI-FS. It would be useful to show those evaluations for the relevant ponds in this document. It might also be helpful to state here that the purposes for breaching the last 5 dams are similar/same as the first 7.	Added to text at end of this paragraph, “The relevance of the risk evaluation for soil excavation to implement the proposed action is discussed in Section 3.1.7.” Also added at end of 3.1.7, “Contact Record 2010-02 includes a summary of the characterization and risk evaluation documentation developed during cleanup and closure of Rocky Flats relevant to the soil excavation work to implement the proposed action.”  Concerning the purpose and need in relation to breaching the first seven dams discussed, this section is a recap of discussions held internally, and addressing the purpose and need in this section would not be considered appropriate. The relationship with the 2004 EA is discussed in Sections 1.1 and 4.3.5.
11	Section 3.3, last paragraph. Consider revising the last paragraph in this section: “This alternative is <del>really</del> <u>essentially the same as</u> the No Action Alternative in that no dams would be breached in the foreseeable future, and environmental monitoring would continue in accordance with RFLMA. Because this suggestion does not provide a new alternative <del>to consider in for</del> <u>the purposes of this EA</u> , it is not considered further”.	“Really” was changed as requested. The second change was addressed in internal comments, and the Draft EA released to the public read “Because this suggestion does not provide a new alternative to this EA, it is not considered further”.
12	Section 4.1, 1 <sup>st</sup> paragraph. The first paragraph in this section could be more clearly written: “As previously described in Section 1.1, the RFS is located in northern Jefferson County, Colorado, approximately 16 miles northwest of Denver, between the cities of Golden and Boulder, <del>Colorado</del> . The RFS originally occupied approximately 6,200 acres. <del>however</del> After site closure, <u>management of</u> the area was split between DOE and the USFWS <del>(the POU)</del> . <del>The DOE retained lands (the 1,300-acre COU) occupy approximately 1,300 acres</del> while most of the POU became the Rocky Flats Wildlife Refuge under USFWS management.”	Made all edits as suggested.



No.	Comment	DOE Response
13	Section 4.1, 3 <sup>rd</sup> paragraph. Might also mention that Section 16 had a producing oil and gas well?	Added to the end of this paragraph: There is also an operating oil and gas well in Section 16.
14	Section 4.3.5, 1 <sup>st</sup> paragraph. Re write: “Within the RFS, 12 retention ponds <del>originally existed</del> were constructed during the period of plant operations to collect surface water runoff. The C-1 Dam was breached in 2004 and dams for six other ponds....”	Change made as suggested.
15	Section 4.3.5.1, North Walnut Creek. The 4 <sup>th</sup> sentence could be revised: “In the normal operational configuration, streamflow passes through former ponds A-1 and A-2 to maintain wetland habitat (water levels in these <del>ponds</del> <u>wetlands</u> are controlled by evaporation or flow-through stoplog structures) and flows to Pond A-3 for retention.	While the wetland habitat is present in the former ponds, these are not delineated wetlands. Changed the wording to say “former ponds”, rather than just ponds.
16	Section 4.3.5.3, 2 <sup>nd</sup> paragraph. 4 <sup>th</sup> sentence “The released water is subsequently monitored at a RFLMA POC a short distance downstream of the dams <u>for compliance with applicable standards.</u> ”	Changed to read “The released water is subsequently monitored <u>for compliance with applicable standards</u> at a RFLMA POC a short distance downstream of the dams.”
17	Section 4.3.5.3, General. It would be useful to add a table with POC data so that terminal pond POC data could be compared with Indiana Street POC data.	Data from three POCs at each terminal pond (A-4, B-5, C-2) and the two POCs at Indiana St (GS01, GS03) have been added to a post-closure table that has been prepared for the Final EA (Table 4–17).
18	Section 4.3.5.3, 5 <sup>th</sup> paragraph. The sentence below Table 4-16 needs to be explained, since the average values shown in the table for uranium at GS10 and for uranium and nitrate/nitrite at GS 13 are above standards.	Added to the end of this paragraph: The POE location GS10 showed reportable values for total U for a portion of 2009; as of April 30, 2009, total U concentrations at GS10 have no longer been reportable under the RFLMA threshold. Evaluation has suggested that the reportable values were due to changes in hydrologic conditions, which caused groundwater with naturally occurring U to make up a larger proportion of streamflow at GS10 (DOE 2009b).
19	Section 4.3.6, 3 <sup>rd</sup> paragraph. At the end of the 3 <sup>rd</sup> paragraph, you could add that activities will be shut down during periods of high winds.	This statement is not appropriate for Section 4 (affected environment). However it has been added to Section 6.6 (mitigation) as follows: “Because the RFS is located in an area that can experience extreme wind, construction activities will be stopped, in accordance with RFS health and safety procedures during periods of high wind”. Table ES–1 has also been edited to reflect this addition.
20	Section 5.0, 1 <sup>st</sup> paragraph. The first part of the 2 <sup>nd</sup> sentence in the first paragraph seems extraneous: “ <del>The meaning of impacts or effects is the same,</del> and <del>+</del> Impacts are considered in terms of direct (caused by the action), indirect....”	This explanation was inserted into the document to help explain to the public the connection between “impacts and effects”, to avoid confusion. No change made to the text.

No.	Comment	DOE Response
21	Section 5.1, 2 <sup>nd</sup> paragraph, 2 <sup>nd</sup> sentence. Sedimentation may not have been an original or major purpose of most of the ponds, but it certainly is a prominent result. The Actinide Migration Evaluation Report remarks on how effective the ponds were at settling out radionuclides.	<p>We are assuming that CDPHE meant Section 5.2.</p> <p>Refer to Common Concern Statement Responses 4 and 5.</p> <p>Ponds are not part of the remedy and are not operated for sedimentation; revegetation and erosion control are implemented to prevent/minimize sediment from reaching the ponds.</p> <p>However, changed the sentence for clarity as follows: (change highlighted).</p> <p>However, the dams are not a part of the final CAD/ROD remedy for RFS and are not designed or operated as sedimentation basins, but because water is retained in the ponds for long periods of time, some sediment carried into the ponds would tend to settle out.</p>
22	Section 5.2.3.2, 1 <sup>st</sup> paragraph. The last sentence evaluates the Proposed Action Alternative, not the No Action Alternative.	Removed the sentence.
23	Section 5.2.5.1, 1 <sup>st</sup> paragraph – Flood Hydrology. The groupings in the 2 <sup>nd</sup> parenthetical section of the 4 <sup>th</sup> sentence in the 1 <sup>st</sup> paragraph would be clearer if some semi-colons were used: “...(current conditions; dams A-3, C-2 and PLF breached; dams A-4 and B-5 breached [all dams breached]).”	<p>Changed as follows to clarify:</p> <p>The study evaluated four storm events (2-year 24-hour, 50-year 24-hour, 100-year 6-hour, and 100-year 24 hour) under three configuration scenarios:</p> <ul style="list-style-type: none"> <li>• Current conditions</li> <li>• Dams A-3, C-2 and PLF breached</li> <li>• Dams A-4 and B-5 breached (all dams breached)</li> </ul>
24	Section 5.2.5.2, 2 <sup>nd</sup> paragraph, Surface Water Quality. The phrase, “which comply with State water quality standards”, could be added to the end of the 1 <sup>st</sup> sentence of the 2 <sup>nd</sup> paragraph in this section.	<p>Added a separate sentence after the 1<sup>st</sup> sentence as follows:</p> <p>The RFLMA water quality standards are based on the State’s basic and site-specific water quality standards.</p>
25	Section 5.2.5.1, Surface Water Quality. The potential for contaminants to migrate offsite in surface water once these dams are removed is a known concern of downstream cities. This section (and Table 5-2) could anticipate their comments by addressing this potential and then discussing how this potential is mitigated, e.g., 1) the nature of the standard (which reflects the exposure risk) allows averaging over an extended period; 2) upstream monitoring points; 3) decision framework that allows any issues to be quickly assessed and addressed.	<p>Refer to Common Concern Statement Response 4.</p> <p>The institutional controls are discussed in detail in Section 3.1.7, which includes the RFLMA requirements.</p> <p>DOE believes that Table 5–2 is not the appropriate table to address mitigation. However, Table ES–1 is, and reference to institutional controls has been added to the table. Also, in Section 6.5 the following was added to the last paragraph:</p> <p>“Institutional controls under RFLMA as described in Section 3.1.7 would continue to be implemented.</p>

No.	Comment	DOE Response
		<p>The following paragraph was added prior to the last paragraph in Section 5.2.5.1:</p> <p style="padding-left: 40px;">As stated in Section 4.3.5.3, since physical completion of cleanup and closure activities in October 2005, automated samplers at POCs have collected 140 flow-paced composite samples, and these composite samples consist of more than 7,400 individual grab samples (through the end of 2009). By the time this EA has been completed in 2010, there would be over 200 flow-paced composite samples, and over 10,000 individual grab samples. While analytical results vary according to season, flowrate, and climate, the calculated compliance values at all POCs have remained below the applicable RFLMA standards.</p> <p>Additionally the final paragraph of this section has been edited as follows (changes underlined).</p> <p style="padding-left: 40px;"><u>Therefore, given the extensive sampling, the data indicate that</u> remedy-related soil and infrastructure removal, revegetation, land configuration, and reductions in runoff have been successful and would continue to result in water quality summary statistics that meet applicable standards. Supporting data and evaluation can be found in the Annual Reports of Site Surveillance and Maintenance Activities (DOE 2008, 2009b). <u>The data in the Annual Reports are extensive and the information provided in the above paragraphs is a synopsis of the surface water quality sampling. The URL address for the Annual Reports is provided in Section 8.0 of this EA.</u></p> <p>DOE recognizes the public comments focus on water quality and has drafted the following text to be inserted into the Final EA in Section 3.1.7.</p> <p>DOE is aware that because the terminal ponds have been operated in batch-and-release mode for many years, the dams are perceived as features that may be used to mitigate potential impacts to downstream water quality. While the dams allow for holding surface water, the dams require maintenance and inspections. If inspections reveal problems, potentially costly repairs to maintain dam safety may be required. DOE</p>

No.	Comment	DOE Response
		<p>believes the proposed action, implemented in an orderly manner, is appropriate.</p> <p>Also see Common Concern Statement Response 4.</p> <p>DOE inserted the following text at the end of Section 5.2.5.1:</p> <p>Batch-and-release operation is not a requirement of the RFS remedy. In other words, the remedy is adequately protective of human health and the environment without reliance on the continued existence of the remaining dams and ponds. The RFLMA water quality standards are based on the State’s water quality standards for all use classifications. These standards are based on the level of risk to human health and the environment using long-term exposure scenarios even though these exposure scenarios do not actually exist at or directly downstream of RFS. RFLMA monitoring provides information to trigger timely investigation, evaluation, and mitigation under RFLMA requirements for any contamination that may be adversely impacting water quality above RFLMA standards to assure that the remedy remains adequately protective.</p>
26	Table 5-2. A word seems to be missing from the “No Action” column from Threatened & Endangered Pant and Wildlife Species: “The Preble’s mouse preferred multi-strata habitat could change <u>from</u> the multi-strata riparian...”	<p>Changed to read “In Walnut Creek, the Preble’s mouse preferred multi-strata riparian woodland/shrubland habitat could change to a single story herbaceous habitat....”</p> <p>Also changed Table ES–1.</p>
<b>Susan Clyne, Mayor Pro-tem, City of Northglenn, Colorado (May 18, 2010)</b>		
27	The proposed breaching of the dams increases the risk of contamination leaving off site. Sediment from the former ponds can be moved downstream during a precipitation event.	Refer to Response 25 and Common Concern Statement Responses 4 and 5.

No.	Comment	DOE Response
28	DOE proposes to establish wetlands to stabilize the soil in the pond footprint. Wetlands can take years to establish, should a large enough precipitation event occur before the wetlands are established, it is almost certain that contaminated sediment would be moved downstream. Northglenn suggests that water levels in the ponds be slowly reduced, allowing time for wetlands to become established prior to breaching the dams.	Refer to Common Concern Statement Response 5 concerning sediment. Additionally, DOE has successfully revegetated Rocky Flats and the revegetation includes establishing wetlands. In preparation for breaching of the terminal ponds, it is expected that drawdown of the ponds may be conducted in advance of the breaching to allow for seeding and installation of erosion controls in the areas previously covered by water. Based on the establishment of vegetation from the previous dam breaching, DOE expects that vegetation would develop successfully in these areas over a period of several years, and this would help stabilize these upper areas along the former pond bottoms. Then, during and post-breaching, additional seeding and erosion controls would be installed to stabilize the soils.
29	Once the dams are breached, water flowing off site can no longer be contained. In the event a water quality standard is violated, there is no way to capture the water.	Refer to Common Concern Statement Response 4.
30	The Draft EA states that the dams are no longer needed and breaching would reduce costs and by association taxpayers costs, but no estimates of cost savings were given.	Refer to Common Concern Statement Response 6.
31	Northglenn can not support the establishment of new surface water monitoring and compliance points due to the absence of a contingency plan to ensure downstream surface water quality are protected at all times.	Refer to Common Concern Statement Responses 3 and 4.
<b>Rocky Flats Stewardship Council</b>		
32	As the DOE designated local stakeholder organization for Rocky Flats, the Rocky Flats Stewardship Council is expressing its support of the downstream communities to advocate for the “No Action” alternative based on: <ul style="list-style-type: none"> <li>• Uncertainties resulting from an insufficient post-closure period of record for assessing hydrologic conditions at the site.</li> <li>• The inability to fully evaluate the effectiveness of the remedy due to the ongoing construction activities, recent operational changes, and future plans for passed modifications at landfills and groundwater treatment systems.</li> </ul>	Refer to Common Concern Statement Responses 1 and 2.
33	We request that DOE host a formal public meeting on the Rocky Flats Surface Water Configuration Environmental Assessment within the first two weeks after the document is published.	The meeting was held on May 19, 2010. Reference to the meeting, details, and a synopsis is provided in Section 2.0.

No.	Comment	DOE Response
<b>LeRoy Moore, PhD., Rocky Mountain Peace and Justice Center</b>		
34	<p>What purpose is served by seeking public comment on a matter to which the regulators, EPA and CDPHE, have already given approval?</p> <p>The Rocky Flats site was remediated to a graduated set of Radionuclide Soil Action Levels for plutonium/americium for which the strictest level was 50 picocuries per gram of soil (50 pCi/g) for the top 3 feet of soil. A study done as part of the multi-year Actinide Migration Evaluation concluded that cleaning the Rocky Flats site to an RSAL of 10 pCi/g would not guarantee meeting the 0.15 pCi/L surface water standard for areas downstream of the 903 Pad (Kaiser-Hill, Report on Soil Erosion and Surface Water Sediment Transport Modeling for the Actinide Migration Evaluations at the Rocky Flats Environmental Technology Site [RF-00015], February 2001). This report underscored uncertainties regarding conditions at the site vis-à-vis the surface water standard. I am not aware that any further work of the AME or any other body refuted the conclusion of this report. I believe that it referred only to the Woman Creek watershed.</p>	<p>DOE has not received any approval from regulators EPA or CDPHE. As stated in the Draft EA, DOE has proposed that the RFLMA be modified to change some of the current RFLMA monitoring points, which is subject to CDPHE and EPA approval. Additionally, in Section 6.3 it is stated that no earth-moving activities will be started until either an approval letter or biological opinion (BO) from USFWS has been obtained. USACE has stated that a Nationwide Permit # 27 would be applicable to the Proposed Action, but notification of intent by DOE to USACE to conduct work under this permit has not yet been submitted for concurrence. This approval has been requested as a portion of scoping for the feasibility of the project, as was the USFWS and USACE approvals.</p> <p>DOE believes that this comment is at least partially based on RFLMA Contact Record 2010-02 (which is included as Appendix C in the EA) regarding the Proposed Action excavation work. The Contact Record provides the technical and regulatory information required to determine if excavation work, which is otherwise prohibited by institutional controls incorporated in the CAD/ROD and RFLMA, may be performed. As discussed in Section 3.1.7 of the Final EA, due to comments from local communities, CDPHE withdrew approval of Contact Record 2010-02. Pursuant to CERCLA implementing regulations and guidance, a Proposed Plan to amend the CAD/ROD clarifying the institutional controls and the regulatory approval process for soil disturbing activities will be issued for public review and comment when the RFLMA Parties have completed the consultative process regarding the Proposed Plan. The CAD/ROD amendment will consider public comments in relation to the evaluation criteria specified by CERCLA implementing regulations for making remedy decisions.</p> <p>DOE believes the comment is a fair synopsis of the conclusions of the AME study. The AME study is also considered by DOE in the RI/FS. To account for the possibility that soils that meet the Radionuclide Soil Action Levels (RSALs) may not preclude exceedance of RFLMA standards, one focus in post-closure stewardship is in minimizing and</p>

No.	Comment	DOE Response
		mitigating erosion. The revegetation of the site and final site land configuration after completion of cleanup are showing that these measures are effective, and several of the RFLMA control soil disturbance requirements work to minimize erosion.
35	<p>In 2004 there were reports that the surface water standard was twice exceeded not in Woman Creek but in Walnut Creek. CDPHE, I'm sure, could readily provide the records. The source of these exceedances, as I recall, was never identified. Is it not likely that such exceedances will occur again, especially in Woman Creek? If the holding-pond dams are breached, will exceedances be detected? If so, will there be any way to prevent the contaminated water from moving off the site? The Draft EA nowhere considers the issues posed by the referenced K-H report or the exceedances documented in 2004. (Reference documented refer to the K-H Report: Kaiser-Hill, Report on Soil Erosion and Surface Water Sediment Transport Modeling for the Actinide Migration Evaluations at the Rocky Flats Environmental Technology Site [RF-00015, February 2001.</p>	<p>Building demolition, removal of infrastructure, and excavation and grading work were being conducted on a large scale during the final years of the cleanup and closure project.</p> <p>This work did result in exceedances (at that time based on 30-day moving averages) for both Pu and Am at all three POEs; multiple investigations and reports regarding mitigation actions ensued. Most exceedances were determined to be caused by the increased soil transport due to soil disturbance associated with remediation. The only 'anomaly' to this was that water from the Building 771 footing drain resulted in the Am in N. Walnut Creek. This pathway was found quickly and subsequently eliminated. Even these cases were of short duration (~weeks) relative to the risk-based surface water standards (lifetime consumption of water at the Standard); short-term exceedances do not significantly increase the long-term risk.</p> <p>The flow through configuration and continued sampling for the terminal dams from 2011 to final breaching would supply added confirmation for meeting remedy standards.</p>
<b>Lori R. Cox, Mayor Pro-tem Broomfield City Council Ward 2 (May 19, 2010)</b>		
36	<p>....we are commenting on an environmental assessment however, every reference DOE makes to being protective of the environment include the words "human health" ~ DOE's own documents never separate the two thoughts therefore, it is consistent to consider protection of "human health" when considering whether or not an action is protective of the environment.</p>	Comment noted.

No.	Comment	DOE Response
37	<p>The DOE has been consistent with their message that the terminal ponds, whose dams you are seeking to breach, aren't and were never part of the remedy. It is worth noting; however, that testing the water captured in these terminal ponds provides assurance that the remedial actions remain protective "of human health and the environment." While they may not be part of the remedy, they provide an indication as to whether or not the remedies have been effective, which is one of the reasons a testing protocol was developed. If breached, the dams no longer capture the water, allowing any residual contamination contained in that water to move downstream and out of the "long term surveillance and maintenance area" for which Legacy Management has assumed responsibility.</p>	<p>Refer to Common Concern Statement Responses 1 and 4.</p>
38	<p>It should also be noted that each series of ponds has specific upstream sources of water thereby currently making it simple to determine the source of contamination, should any occur, in a sample taken at a single terminal pond. If water simply flows through each terminal pond to a single Point of Compliance and contamination is detected not only could that contamination have been significantly diluted by having been mixed with several water sources giving a false level of contamination, it would also mean having to analyze every upstream water source to determine the source of contamination because a single POC can't eliminate any source.</p>	<p>Refer to Common Concern Statement Response 3. POEs and other performance monitoring locations are located upstream of the ponds; these are RFLMA locations (Refer to Figure 1-1 in the Final EA). These locations are used to help determine the origination of contaminants should a POC exceedance occur. POEs: SW093 in N Walnut (upstream of A-Series); GS10 in S Walnut (upstream of B-Series); SW027 at the end of the SID (upstream of C-2). Performance locs: GS13 (downstream of SPPTS, upstream of A-Series); SW018 (downstream of carbon tet plume, upstream of SW093); PLFTS locs (at PLFTS system); GS10 (also POE, downstream of MSPTS); POM2 (downstream of ETPTS, upstream of B-5); GS05 and GS59 (upstream and downstream of OLF on Woman Creek).</p>
39	<p>I submit to you my opinion that it is premature to move forward with these changes while the site is still in the "stabilization" process..... and to move forward without documentation expressly showing that the remedial actions through several cycles of CERCLA reviews remains protective of human health and the environment is, simply, irresponsible. If future CERCLA reviews provide the necessary documentation supporting your proposed action, then by all means, we would support moving ahead but, until then, I respectfully request that, in an effort to be protective of human health and the environment, no changes are made to current conditions of the terminal ponds or the present landfill pond.</p>	<p>Refer to Response 25 and Common Concern Statement Response 1. The effectiveness of the remedy is continually evaluated as monitoring data become available, and not just during CERCLA reviews; this is one of the requirements of RFLMA. Refer to Section 8.0 of the EA for reference of all of the routine reports.</p>



No.	Comment	DOE Response
<b>Mary (Mickey) Harlow Citizen, City of Arvada</b>		
40	The Rocky Flats Site Regulatory Contact Record indicates that DOE requested Approval of Excavation Greater than 3 Feet below Grade to Breach Dams, A-3, A-4, B-5, C-2 and the Present Landfill Dam and the Contact Record was approved on April 15, 2010 by CDPHE. Carl Spreng, CDPHE, maintains that the contact record approval does not allow DOE to remove the ponds. However, would it not have been more appropriate to include this request as part of the EA and obtain public approval of this action? Breaching the dams, restoring stream configuration, and removing ponds are linked.	Refer to Common Concern Statement Response 3.
41	<u>I support the no action alternative.</u> Operation and maintenance of the dams and necessary structures must be continued until DOE can prove that the selected closure remedies are operating efficiently and that the cracking and sloughing in the Original Landfill Site in the Woman Creek drainage is no longer occurring. Additional peizometers need to be added to this hillside and movement monitored for at least ten additional years.	Refer to Common Concern Statement Response 1.  The OLF is within the Woman Creek basin, not the SID basin. C-2 is at the end of the SID and does not receive flows from Woman Creek. Breaching C-2 would not change the OLF's relationship with Woman Creek.
42	The remedy for the solar ponds has failed miserably to this point. DOE has not been able to meet the stream standard, which is also a drinking water standard, for nitrates in Walnut Creek. This remedy needs to be proven for at least five years.	The SPPTS is upstream of A-3 and A-4; the SPPTS discharge is tributary to these ponds. We continue to strive to meet surface water standards at the system effluent, but data suggest that system effluent WQ does not drive WQ in North Walnut. Refer to Common Concern Statement Response 2 concerning the comparison of a hose into a creek.
43	Without the dams, sedimentation will not occur. Although DOE has not mentioned the initial purpose of the dams citing that they were needed during operations, one must assume that they were used to settle out site surface contamination during runoff and storm events.	Refer to Response 25 and Common Concern Statement Response 5. The remedy is designed to prevent the movement of surface soil to the creeks and ponds; the ponds were not designed, nor are they intended to catch the surface soil.
44	The ponds are the only protection and early warning that the downwind communities have that the remedy's constructed during cleanup are working. Over time it is expected that contamination will surface either through, wind, erosion, burrowing animals or an earthquake. DOE cannot just consider \$\$\$.	Human health must also be considered.  Refer to Common Concern Statement Response 5.

No.	Comment	DOE Response
45	LM has instructed DOE to ensure protection of human health and the environment through effective long-term stewardship of land, structures and facilities. DOE has further been instructed to be responsible for the cost-effective management of this directive. DOE knew that the dams were 30 years old when they supported Kaiser-Hill closure of the site and accepted the liability for cleanup. DOE has not effectively demonstrated that they can currently meet the requirements set forth by LM for long-term stewardship.	Refer to Common Concern Statement Response 1.
46	A complete 5 year CERCLA review cycle has not occurred since regulatory closure.	Refer to Common Concern Statement Response 1.
47	A sufficient number of dry, normal and wet hydrological cycles have not occurred.	Refer to Common Concern Statement Response 1.
48	Monitoring results since closure have not been consistent and cannot be used to determine baseline conditions.	Refer to Common Concern Statement Response 1. Monitoring results show variability that is consistent with known natural processes; variability at POCs to date has resulted in compliance values all below standards; the RFLMA process to evaluate monitoring data is designed to address variability.
49	Additional soil samples of the sediments behind the ponds needs to be completed to determine if further changes to the remedy are required.	Refer to Common Concern Statement Responses 1 and 5.
50	In the event of large storm event at the site, the stream beds and sides will be eroded how does DOE plan to ensure the stream beds erosion of banks is repaired? Isn't another Institutional control required?	Section 3.1.1 explains erosion control measures for the construction and post-construction activities, including channel bottom and side slope armoring proposed for all dam breach activities. Site surveillance and maintenance work includes maintaining required erosion controls and other best management practices, including making repairs to minimize erosion. Additionally the ponds are not considered a part of the remedy, and therefore another institutional control would not be required.
51	What are the costs required for the inspection, maintenance, sampling, water purchases from Broomfield that are referred to in this document? Page 1-2 states that the ponds in both Walnut and Woman Creek are only discharged 0 to 2 times a year.	Refer to Common Concern Statement Response 6.

No.	Comment	DOE Response
52	DOE has undertaken sampling of the Original Landfill in order to shorten the 30 year post-closure care period. There is no mention of this in the draft EA. What is the outcome of this sampling? The Rocky Flats Site Regulatory Contact Record dated 2010-01 discusses the Targeted soil sampling at the Original Landfill to evaluate residual contamination levels in relation to the CDPHE August 2008 Policy, End of Post Closure Care. Contact Record approval was given as January 20, 2010. The OLF was closed in accordance with the March 10, 2005 Final Interim Measure/Interim Remedial Action for the Original Landfill. Under the Colorado Hazardous Waste Act, regulatory requirements, the generally applicable post-closure care period is 30 years, but this period may be shortened or extended. Has DOE been successful in shortening this time period?	<p>The RFLMA CR 2001-01 is a record concerning the Targeted soil sampling at the Original Landfill (OLF) to evaluate residual contamination levels in relation to the Colorado Department of Public Health and Environment’s (CDPHE’s) August 2008 Policy, End of Post-Closure Care.</p> <p>Because this CR is not connected with the Draft EA, responding to the question posed by the commentor concerning the outcome of the CR is not appropriate for this NEPA process.</p> <p>Refer to Response 41. The OLF is not tributary to any of the ponds addressed in the EA.</p>
53	Section 3.1.1. The average construction duration for dam breaching at each structure is approximately 11 weeks why are 14 vehicles required on the site. Why does C-2 require more area of disturbance lay down and road area than the other dam sites? Where is the lay down area in location to the drainage?	<p>Same as question 65. We assume the commentor is referring to Table 3–1. Dam Breach – Estimated Summations per Dam.</p> <p>As stated in the sentence directly above this table “The final drawings would be completed prior to construction and may contain site-specific changes due to ground truthing land surveys but would not include any additional disturbance than assessed in this EA.” These quantities are based on preliminary engineering estimates that reflect the maximum amount of disturbance that would occur as a result of the Proposed Action.</p> <p>C-2 has a larger area of disturbance because the access road from Indiana Street would need to be minimally upgraded. Laydown areas are included in Table 3–1 as part of the overall disturbance.</p>
54	Where will the earth removed be stockpiled? Will protection from storm events be provided to the stockpile? Will the removed soil be sampled? What are the locations that will receive the infill? DOE states that the excavated soil from the breach channel will fill predefined fill areas. These areas need to be detailed in this EA. Where will be the piping etc. removed from the dam sites be stored and disposed? Does DOE assume that this removed equipment will be free from contamination?	<p>Same as question 65. Any temporary stockpiling and storm water issues would be a part of the required NPDES permit.</p> <p>Please refer to the RFLMA Regulatory Contact Record 2010-02 (Appendix B of the Draft EA), provision question 1, concerning this comment.</p>

No.	Comment	DOE Response
55	<p>The channel bottom and side slopes are to be armored as need to resist future erosion. Armored with what? What is the life expectancy of the armor? Doesn't this require another institutional control?</p>	<p>These two same questions were asked twice in the comment letter.</p> <p>The final design would specify the exact final erosion control measures to be used. The erosion controls would be maintained until the revegetation is established. Refer to Response 50.</p> <p>As stated in various sections, the dams are not considered a part of the remedy. No additional remedy-related institutional controls are included in the Proposed Action. Armoring (reinforcing stream bottom and side slopes) would result in the reduction of erosion during storm events.</p>
56	<p>I am amazed that the decision was made by EPA, CDPHE to support of closure of the landfill as a CERCLA Municipal Landfill Presumptive Remedy to Military Landfills. The Original Landfill was not a municipal or military landfill. There were no environmental regulations at the site during its early operations. Everything was dumped into that landfill. I am also aware that classified shapes turned up in the original landfill during the late 1990's.</p> <p><i>Records detailing the waste that was put into this landfill are not available. Many important DOE documents related to site operations have been misplaced or destroyed. I base this observation on my work as Rocky Flats Coordinator for the City of Westminster during cleanup and closure of the Site. As co-chair of the Soil Action Level Oversight Panel I was made painfully aware of how difficult it would become to select a soil action level that was protective of human health and the environment due to the lack of background documents and sampling records that would have been very helpful in determining the extent of radionuclide contamination.</i></p> <p>The Rocky Flats Site Regulatory Contact Record dated 2010-01 states that the OLF's historical use is typical of solid waste dumps of the time and the wastes disposed of were plant trash and construction debris that based on sampling likely contained some chemical that subsequently were regulated as CERCLA hazardous substances.</p> <p>The document further states that the OLF was not a radioactive contaminated waste disposal area. However, there is a documented instance of placing a smoldering depleted uranium slab in the OLF to allow it to "burn out". When the burned slab was recovered not all of the DU mass was recovered. Surface</p>	<p>Comment noted. The OLF is not part of this EA and is addressed in CERCLA documents.</p> <p>Refer to Response 41. The OLF is located north of Woman Creek, which is not a tributary to any of the ponds addressed in this EA. Woman Creek is routed around Pond C-2.</p>

No.	Comment	DOE Response
	<p>soil monitoring at the site also located several hot spots. Before the soil cover was place on the OLF, the hot spots were removed.</p> <p>The OLF IM/IMRA contains environmental media, analytical results, including results from 57 surface soil locations and 22 subsurface soils (to bedrock) borehole locations. The OLF has never been tested for Thorium which was used at the site during its early history. It was used in three buildings on site. Thorium compounds were used in analytical procedures and development programs.</p>	
57	<p>A review of the Original Landfill Closure at RFETS by Stephen Dwyer, PhD, PE dated January 28, 2005 indicates that the remedy selected was a quick, cheap solution to a very complex landfill that poses significant environmental problems and consequences. VOC's, SVOC's metals, rads such as uranium and plutonium have been identified at or near the site.</p> <p>Groundwater passes through the subsurface waste while surface water passes over the OLF. The cover is not designed to minimize percolation through it into the underlying waste. There is no means to prevent biointrusion. Without the presence of a biointrusion layer burrowing animals will continue to surface. Plants can bring many of these contaminants to the surface and contamination can be blown away and spread, washed away by surface runoff or ingested by fauna. No peziometers installed the length of the hillside where the OLF is located to determine the extent of erosion and sloughing.</p> <p>Plutonium uptake by tumbleweeds at the Hanford Site, Washington State (EPA 1991) is a perfect example of this.</p>	<p>Comment noted. The OLF is not part of this EA and is addressed in CERCLA documents.</p> <p>Refer to Response 41. The OLF is located north of Woman Creek, which is not a tributary to any of the ponds addressed in this EA. Woman Creek is routed around Pond C-2.</p>
58	<p>Access to pond C-2 is on the east side of the Refuge (Indiana Street) and via existing dirt roads east and south of C-2. Does the expansion of the Northwest Parkway in the 300ft right of way given for Indiana roadway expansion in the Wildlife Refuge Bill have a bearing on DOE decision to remove the dam at C-2?</p>	<p>Access to the C-2 was determined because Indiana Street is closer to the C-2 dam. This shorter access route would result in less use of petroleum and would therefore represent an environmentally preferable access.</p> <p>The possible Indiana roadway expansion was not part of the equation in developing the EA.</p> <p>However, because it is required to consider possible connected and/or cumulative actions, the possible Indiana Street expansion was addressed, as stated in Section 5.4.3, "the Indiana Street project has public controversy, and as of the date of completion of the Draft EA, has not been scheduled for construction."</p>

No.	Comment	DOE Response
59	DOE states that since 1989 and 1991 inventories, the areas adjacent to the retention ponds have been minimally disturbed, with the exception of removing sediment from the bottom of the PLF Pond during construction of the nearby landfill; outlet works upgrades to the ponds, spillway repair and occasional sampling of sediment from the other ponds. With these exceptions no surface-disturbing activities have occurred during the past 20 years. For this reason DOE believes that the 1989 and 1991 inventories remain applicable and have no effect. The pond soils should be sampled prior to removal of any soil to ensure that radionuclide contamination has not settled out in the sediments during cleanup and post closure.	<p>The inventories the commentor is referring to are the cultural resources inventories, which are not related to the remedy. The reason DOE stated that it believes that the 1989 and 1992 inventories remain applicable and have no effect pertains to the communication between DOE and the State Historical Preservation Officer concerning specific surface inventories for cultural resources.</p> <p>Also please refer to Common Concern Statement Response 5 for information on sediments.</p>
60	Table 1, Resource-Specific Consequence and Mitigation Impacts to Wildlife. Restore a more natural, seasonally variable flow system to provide more consistent water for downstream habitat. Next bullet states that the action will eliminate surface water habitat for species and restore a more seasonally variable flow system to provide more consistent water for downstream habitat. Conflicting statements.	<p>We assume the commentor meant Table ES-1, Resource-Specific Consequences and Mitigation.</p> <p>The bullets under Impacts to Wildlife state as follows:</p> <ul style="list-style-type: none"> <li>• Restore a more natural, seasonally variable flow system to provide more consistent water for downstream habitat.</li> <li>• Temporary disturbance from construction noise.</li> <li>• Eliminate surface water habitat for species.</li> <li>• Reduced disturbance from human activities for monitoring and maintenance.</li> </ul> <p>It is not stated in this table or in the text that “restore a more seasonally variable flow system to provide more consistent water for downstream habitat” in any other bullet than the first bullet as stated above.</p>
61	Page 4-6 second paragraph. The ponds located in the project areas are used by waterfowl and shorebirds as breeding habitat or feeding areas. Isn't this habitat part of a Wildlife Refuge?	All ponds are located in the COU and are not part of the Wildlife Refuge.
62	US Fish and Wildlife has not designated critical habitat for the Preble' Mouse. According to Fish and Wildlife an amendment to the Programmatic Biological Assessment will be written to address impacts from this project. An amendment to the PBA would be written to address impacts from this project. USFWS would then respond with either a BO or letter for the amendment. Fish and Wildlife should designate the critical habit for the Preble' Mouse before this project begins not afterward.	<p>Critical habitat is considered when a species is proposed for listing as endangered or threatened under the Endangered Species Act. Therefore, at the time of listing for the Preble's Mouse, the USFWS did not designate the RFS as containing any critical habitat.</p> <p>Also as stated in the Draft EA: No critical habitat was designated at the RFS by USFWS in its final ruling on critical habitat for the Preble's mouse, because RFS remains under federal ownership and management after closure in 2005. Additionally, Preble's mouse protection areas at RFS were designated in the Programmatic Biological Assessment as part</p>

No.	Comment	DOE Response
		of the consultation with the USFWS. Since the release of the Draft EA, the USFWS has released a Draft EA for the designation of critical habitat for the Preble's mouse. Refer to Section 5.4.4.1 of the Final EA for the USFWS and DOE consultation information. An amendment to the PBA is necessary because most of these dams were not consulted on when that document was written.
63	Breaching the dams would result in an estimated 95 percent reduction of available open surface water area at the RFS that is utilized by a variety of ducks and other avian species. There would be a reduction in the abundance of fish, aquatic species such as fish, frogs, or turtles which live in and around the ponds may not be able to relocate prior to dewatering actions. It would seem appropriate to maintain habitat for these species. Does Fish and Wildlife concur?	USFWS is neither required nor expected to concur on habitat issues regarding these species. They are required only to evaluate the issues regarding threatened and endangered species. The only species within this category is the Preble's mouse and its habitat at RFS. Refer to response for comment 62.
64	<p>Section 4.3.4.2 Wetlands....The table in this section lists the existing pond wetlands/open water summary. However DOE states small difference from the 1994 USACE wetland delineation may currently exist at the remaining ponds due to the changes in environmental conditions. Therefore the extent of wetland mapping as delineated by USACE site closure activities result in disturbances to wetlands. The values listed may no longer be accurate due to changes in the environmental conditions between 1994 and present. <i>The 2009 wetland mitigation monitoring report submitted to EPA shows no changes in wetland acreage for C-2 or the other ponds only the Primary landfill pond is noted.</i> An increase in wetlands from removing the ponds and allowing flow through will not occur. Increase in wetlands from removing the ponds and allowing flow through will not occur.</p> <p>Page vii of the document states that “the contribution of water to Woman Creek resulting from the infrequent releases from Pond C-2 is minimal due to the relatively small drainage basin area (South Interceptor Ditch basin) tributary to Pond C-2.”</p> <p>Based on the above information why is it necessary to eliminate C-2 Pond?</p>	<p>The text the commentor is referring to states:  “Small differences from the 1994 USACE wetland delineation may currently exist at the A-3, A-4, B-5, and C-2 ponds due to changes in environmental conditions. Therefore the extent of the wetland mapping as delineated by USACE may no longer be accurate due to changes in the environmental conditions between 1994 and the present.”</p> <p>It is not stated in this section that the wetland mapping as delineated by USACE site closure activities would result in disturbances to wetlands. The reason the change may have occurred is related to fluctuations and changes in the ponds between 1994 and the present.</p> <p>The reference to the 2009 reporting on wetlands referred to the PLF changes and is not applicable to C-2. Please refer to EA Section 4.3.4.2 concerning the explanation of the 2009 wetland mitigation monitoring report as follows: “The PLF and wetlands were disturbed as part of site closure activities, and wetland re-establishment is ongoing. Accordingly, the first set of values under total acreage presented in Table 4-4 for the PLF are based on what was previously delineated by the 1994 USACE mapping. The values in parenthesis are based on the 2009 wetland mitigation monitoring report submitted to EPA.” Also please refer to Appendix B of the Draft EA, provision question 2.</p>

No.	Comment	DOE Response
		<p>The commentor’s statement “<u>An increase in wetlands from removing the ponds and allowing flow through will not occur</u>” or “<u>increase in wetlands from removing the ponds and allowing flow through will not occur</u>” was not stated in the Draft EA.</p> <p>Please refer to the Purpose and Need section of the EA for a description of why the dams (including C-2) are being proposed for breaching. A summary is provided starting on page viii, and the full text is in the body of the EA, Section 1.2.</p>
65	<p>Section 3.1.1 The average construction duration for dam breaching at each structure is approximately 11 weeks why are 14 vehicles required on the site. Why does C-2 require more area of disturbance lay down and road area than the other dam sites? Where is the lay down area in location to the drainage? This information should be included in the EA.</p> <ol style="list-style-type: none"> <li>1. Where will the earth removed be stockpiled?</li> <li>2. Will protection from storm events be provided to the stockpile?</li> <li>3. Will the removed soil be sampled?</li> <li>4. What are the locations that will receive the infill? DOE states that the excavated soil from the breach channel will fill predefined fill areas. These areas need to be detailed in this EA.</li> <li>5. Where will be the piping etc. removed from the dam sites be stored and disposed? Does DOE assume that this removed equipment will be free from contamination?</li> </ol>	<p>Same as questions 53 and 54. We assume the commentor is referring to Table 3–1. Dam Breach – Estimated Summations per Dam.</p> <p>As stated in the sentence directly above this table “The final drawings would be completed prior to construction and may contain site-specific changes due to ground truthing land surveys but would not include any additional disturbance than assessed in this EA.” These quantities are based on preliminary engineering estimates that reflect the maximum amount of disturbance that would occur as a result of the Proposed Action.</p> <p>Concerning parts 1 and 2 of this comment; any temporary stockpiling and storm water issues would be a part of the required NPDES permit.</p> <p>Please refer to the RFLMA Regulatory Contact Record 2010-02 (Appendix B of the Draft EA), provision question 1, concerning parts 3, 4, and 5 of this comment.</p>
66	<p>The channel bottom and side slopes are to be armored as need to resist future erosion. Armored with what? What is the life expectancy of the armor? Doesn’t this require another institutional control?</p>	<p>See response to comment 55.</p> <p>As stated in various sections, the dams are not considered a part of the remedy. Armoring (reinforcing channel bottom and side slopes) is designed to protect the channels through the remaining embankments; the dams are not being fully removed, they are being breached by constructing an engineered channel through the embankment.</p>



No.	Comment	DOE Response
<b>Steve Berendzen, Project Leader, Rocky Mountain Arsenal NWR Complex, U.S. Fish and Wildlife Service</b>		
67	The area of damage from breaching 26 acres seems a little excessive, but the EA does state that this is a worst case estimate. I assume this area included disturbance caused by construction and removal of coffer dams as well as the pond breaching.	Section 3.1.1 states that the final drawings would be completed prior to construction and may contain site-specific changes due to ground truthing land surveys but would not include any additional disturbance than assessed in this EA. Also, Table 3-1 provides a breakdown of activities and the associated acreage with the activities.
68	The EA states that breaching will take about 11 weeks per dam. This seems a bit excessive, but I am not an engineer and the time may be necessary. As a biologist, though, I feel that a shorter period would be better for the wildlife.	Section 3.1.1 states that the average time construction duration for dam breaching at each structure is approximately 11 weeks. Table 3-1 provides a specific estimated timeframe for each individual dam breach project duration.
69	The EA promotes the use of native vegetation, and I am very comfortable with this as long as Jodi Nelson is directing this aspect of the project. I have full confidence in his ability to know what should be planted where.	Comment noted. DOE thanks USFWS for their confidence in Jody Nelson as a qualified ecologist. In response to this comment, and with the recognition for an ongoing need for such a person the following was added to Section 6.4.1 Vegetation Mitigation, as well as Table ES-1 (addition underlined): The following measures will be implemented <u>by a qualified ecologist, botanist, or environmental scientist</u> to avoid and reduce impacts to vegetation:
70	The EA suggests that the work will benefit Preble's meadow jumping mouse. I suspect that the long-term restoration of riparian habitat will provide benefit, but defer to the Ecological Services branch of the Fish and Wildlife Service on this issue.	Comment noted.
71	The Rocky Flats National Wildlife Refuge supports this project.	Comment noted.
<b>Gail MacCabe, Broomfield, CO</b>		
72	Please don't breach the dams at Rocky Flats! They were put their (sic) for our protection and need to stay in place. Please, please don't breach them!	Comment noted.

No.	Comment	DOE Response
<b>Morgan Davies, Golden, CO</b>		
73	I am concerned that the EA does not discuss the potential mobilization of radionuclides from the sediment as a result of the breaching of the dams. The draft EA mentions but does not review the pertinent elements of the “Erosion Control Plan for Rocky Flats Property Central Operable Unit July 2007”. The erosion control plan states that “no grading, excavation, digging, tilling, or other disturbance of any kind of surface soils is permitted, except in accordance with an erosion control plan approved by CDPHE or EPA”. One of my principal concerns is the mobilization of radionuclides as a result of increased erosion from the banks of the creeks. The erosion control plan notes that plutonium 239/240 could reach surface water as the result of disturbance of the surface soils.	Refer to Common Concern Statement Responses 4 and 5.
74	It is my understanding that breaching the dams will result in increased flow in the creeks and erosion during major storm events. I am also concerned that by breaching the dams the ability to measure and mitigate pollution from storm water runoff will be inhibited. After reading the erosion control plan, it seemed that performing batch and release management of the waters was inherent to ensuring that there were no significant releases of radionuclides as a result of storm water runoff.	Refer to Common Concern Statement Response 4 and 8. Increased peak flood flows would be increased below the dams; these areas were not targeted for remediation based on characterization data; the sediments are not a substantial source term from a risk perspective.
75	I would also like to call your attention to section 7.1 of the erosion control plan which states that it is important to “minimize the project activities in wet areas and wet conditions to avoid damage to the Preble’s mouse habitat.” I understand that one objective of the breaching of the dams is to improve the Preble’s mouse habitat, but I am concerned that the construction activities could have detrimental affects to critical habitat for the Preble’s mouse.	The final project design and construction activities would be conducted to minimize disturbance to wetlands and Preble’s mouse areas. The commentor states the “construction activities could have detrimental affects [sic] to critical habitat for the Preble’s mouse.” There is no critical habitat designated for the Preble’s mouse currently at RFS. As a point of further clarification; however, one of the reasons that the breaching would potentially improve the habitat for the Preble’s mouse is that open water is not considered Preble’s habitat. Therefore, conversion of the open water areas to a vegetated plant community would actually increase the amount of Preble’s habitat at RFS.
<b>Portia Buchanan, Broomfield, CO</b>		
76	Under no circumstances should the DOE, breach the dams, at Rocky Flats. They must find a safer water supply to restore the wetlands and riparian habitat. URANIUM238 has a half life of 4.5 billion years, i.e, URANIUM235 i.e, URANIUM.	Comment noted. Refer to Common Concern Statement Response 1 concerning water quality.

No.	Comment	DOE Response
77	<p>Around 5 years ago, an unidentifiable person, who worked on the clean up of Rocky Flats, said that Rocky Flats will NEVER BE SAFE!!!!!!! The elements of RADIOACTIVE CONTAMINATION would be detrimental, given the fact, URANIUM238 HAS A HALF LIFE OF 4.5 billion years!!</p>	<p>Comment noted.</p>
<b>Susan Clyne, Mayor Pro-tem City of Northglenn (May 27, 2010)</b>		
78	<p>Plutonium 239/240 and americium 241 are primarily transported as insoluble particles associated with suspended sediments. In a study of actinide loads in and out of the Rocky Flats Site, Walnut Creek ponds 69% of Pu 239,240 and 85% of Am241 were removed (Squibb, Patton, The Rocky Flats Environmental Technology Site BMP Experience and Implications for Site Closure.” April 9, 2003). These sediments are currently safely trapped behind the five dams.</p>	<p>Refer to Common Concern Statement Response 5.</p> <p>These dams did remove load during closure, but with the other aspects of the closure: soil removal, source removal, erosion control, and revegetation, the dams do not need to do this anymore and the remedy was designed without consideration of the dams.</p>
79	<p>DOE proposes to establish wetlands to stabilize the soil in the pond footprint. Stabilizing polluted sediments using wetlands is uncertain at best. Wetlands can take years to establish, their ability to slow runoff and trap associated sediment is seasonal and environmental conditions such as drought and disease reduce plant vigor and density which diminishes the effectiveness of sediment stabilization.</p>	<p>As DOE has seen from the prior breaching of dams at the RFS, both upland and wetland vegetation would be established in the former pond footprint dependent on hydrologic conditions at specific locations. The establishment of vegetation (upland or wetland) to reduce erosion and sedimentation is well documented in the scientific literature.</p> <p>Additionally, refer to Response 28.</p> <p>The remedy is designed to prevent surface soil from becoming sediment; wetlands were not proposed to stabilize sediments. The wetlands enhance habitat, and erosion would not occur because of design, i.e., flat areas, with no slope. Section 4.3.4.2 discusses the existing wetlands that have established around the perimeters of the existing ponds.</p>

No.	Comment	DOE Response
80	<p>It is certain that wildfire will occur, indeed, one occurred in 2006. Wildfire removes plant material, should a large enough precipitation event occur while the soil is exposed, sediment will be moved downstream. Given the gravity of the pollutants, and the possible effects to public health, it seems prudent to keep the dams intact and the sediments in place.</p>	<p>Section 6.4.1 describes the mitigation measures that would be used to minimize erosion both throughout and after the breaching of the dams. Because these measures would be used on a consistent basis, it is not necessary to add additional mitigation measures following a wildfire event. The URL address to the Erosion Control Plan for the Rocky Flats Property Central Operable Unit has been added as a reference in Section 8.0.</p> <p>Additionally refer to Common Concern Statement Response 5.</p> <p>It should be noted that the April 2006 wildfire that occurred in the NE corner of the Buffer Zone largely burned areas east of the terminal ponds in Walnut Creek. Therefore the terminal ponds did not function in the fashion the commentor suggests.</p>
81	<p>Once the dams are breached, water flowing off site can no longer be contained. In the event a water quality standard is violated, there is no way to capture the water. It will flow through the communities of Westminster, Broomfield, Thornton, and down to the South Platte River. Both Walnut and Big Dry Creek provide many important recreational opportunities to the citizens of these communities. Big Dry Creek supports a Primary Recreation use designation which is defined by the CDPHE as “recreational activities where the ingestion of small quantities of water is likely to occur. Such activities include but are not limited to swimming, rafting, kayaking, tubing, windsurfing, water-skiing, and frequent water play by children.” While Northglenn does not border Walnut or Big Dry Creeks, we support protecting citizens from potential health risks.</p>	<p>Refer to Common Concern Statement Response 4.</p>
82	<p>The dams serve as a last line of defense to protect human health and the environment.</p>	<p>Refer to Common Concern Statement Responses 1 and 4.</p>

No.	Comment	DOE Response
83	<p>The Site is moving from surface water to groundwater. There are multiple contaminate plumes of carcinogenic volatile organic compounds (“VOC”). VOC’s delivered to surface water have more time to volatilize if retained in ponds.</p>	<p>This comment appears to refer to the fundamental hydrologic processes at Rocky Flats, wherein contaminated groundwater discharges to surface water. DOE does not rely on the process described by the commentor to reduce concentrations of VOCs in water. Instead, treatment systems are in place to intercept and treat contaminated groundwater that would otherwise discharge to surface water. These systems are repeatedly confirmed to be effective through the collection of analytical data and operational information and undergo maintenance as needed to ensure their continued effectiveness. Potential system improvements are also evaluated and, if warranted, are installed. However, it is true that not all of the VOC-contaminated groundwater plumes at Rocky Flats are routed through a treatment system; to confirm that contaminated groundwater from these plumes does not discharge to surface water, monitoring wells are positioned along the flowpaths between these plumes and surface water. These wells are monitored in accordance with RFLMA and indicate surface water quality is not adversely impacted by the plumes; if the analytical data suggested otherwise, the RFLMA process would drive evaluation of the cause(s) and appropriate response(s) to the potential impact.</p>
84	<p>Water quality at the Indiana Street Points of Compliance show more variability post closure than preclosure. This is an indication that the hydrology has not stabilized.</p>	<p>Refer to Response 17 and Common Concern Statement Response 1. Additionally, a table showing the POC data has been included in the Final EA (Table 4–17).</p>
85	<p>Two of the four purposes for the proposed dam modification can be linked to cost savings. While no estimate of savings was given in the EA, the DOE have an estimate of \$24 million savings over a 75 year period at the EA public meeting; at the same meeting, an estimate of \$130,000 savings from dam maintenance and operation was expressed. As this seems a primary reason for wanting to breach the dams, a detailed report of the cost savings is appropriate. Northglenn requests that the DOE develop a detailed budget for operation and maintenance of the remaining dams, monitoring costs by general objective, and administrative costs associated with the substitute supply-augmentation plan. Furthermore, Northglenn requests that these costs be evaluated against the costs to the environment and human health if contamination migrates off site. If a detailed budget is nor forthcoming, Northglenn requests that any potential economic benefit, as identified by DOE, be removed from consideration for this EA.</p>	<p>Refer to Common Concern Statement Response 6 and 8.</p>

No.	Comment	DOE Response
86	The post closure data record does not include sufficient wet/dry cycles for assessing hydrologic conditions at the site. Wet/dry cycles test the function and effectiveness of remedy.	Refer to Common Concern Statement Response 1.
87	The inability to fully evaluate the effectiveness of the remedy due to ongoing construction activities, recent operational changes, and future plans for phased modifications at landfills and groundwater treatment systems.	Refer to Common Concern Statement Response 2.
88	Not enough technical data was provided in the EA to support the proposed action of breaching the remaining dams.	40 CFR 1508.9(a) directs an EA to “briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or finding of no significant impact. To avoid undue length, the EA may incorporate by reference background data to support its concise discussion of the proposal and relevant issues.” Extensive data are referred to in the EA but not repeated in the document. Please refer to Section 8.0 (References) for further information.
89	Lack of a Contingency Plan to ensure the health and safety of downstream communities should a water quality standard be exceeded. If a Contingency Plan is developed, it should model the fate and transport of contaminants in the flow through condition to the South Platt River, a drinking water source.	Refer to Common Concern Statement Response 4.
90	The EA does not address contamination for the proposed action; however, the proposed action will lead to additional risks not identified within the EA. These risks have not been evaluated or considered. This is an egregious oversight and is sufficient reason to determine that a Finding of No Significant Impact (FONSI) is not supported and an EIS should be considered or the process halted.	Refer to the Common Concern Statement 8.
<b>James Campbell, MD, MS, Arvada, CO</b>		
91	After learning more about the proposed changes, I do remain concerned that breaching the dams constitutes a relatively irreversible loss of potential containment for contaminated surface water leaving the site. In short, I submit that the dams should be maintained and not breached.	Refer to Common Concern Statements 1 and 4.

No.	Comment	DOE Response
93	<p>While the present system of periodic release of batched pond water is no guarantee that surface water will be confirmed as meeting specification before leaving the site (e.g. the recent emergency release at the B5 Pond in Spring of 2010), it is true that the current ability to retain water in the ponds does represent an important line of defense against the vast majority of unforeseen releases of contaminated surface water in the future. The current site, even post-remediation, still represents an enormously complex and dynamic system of ongoing cleanup tasks (e.g. volatile organic compound (VOC) degradation) and monitoring of contaminants (e.g. surveillance of radionuclide levels in surface water effluent). Given the great deal of work done to clean up the site and continually monitor it, we may hope with some degree of confidence that there will not be unexpected contaminant releases from the site in the future, but it would be untenable to project that the dynamic migrations of ground and surface water through this intricately and highly contaminated site will never change in unpredicted ways. It is important for any public review to recall that the Rocky Flats cleanup agreement achieved higher standards for surface soil remediation by allowing for retention of many original Rocky Flats structures underground.</p>	<p>Refer to the Common Concern Statement 8.</p>
94	<p>Additionally, while there is diligent attention currently focused on the current system for remediation and monitoring of underground VOC plumes, this too can be a tricky business, prone to unanticipated events over the coming years and decades.</p>	<p>General groundwater characteristics (such as flow directions) are assessed annually, and new technologies (including for groundwater treatment) are examined at least every 5 years as a part of the CERCLA Periodic Review. These efforts, together with the near-daily site visits and collection of analytical data on groundwater and surface water quality, help to provide leading indicators of changing conditions. When and if they arise and warrant a response, unanticipated events and conditions would be addressed via the RFLMA process.</p>

No.	Comment	DOE Response
95	<p>In reference to the Citizen’s Advisory Board “Our Legacy Report to the Community” As “Water Quality will be a significant measure of the site’s cleanup. Historically, water quality problems have occurred at Rocky Flats during periods of increased precipitation and run-off. Although surface water quality as it leaves the site has always remained below regulatory limits, there have been some instances, as late as 2005, where onsite water quality has exceeded state standards for plutonium, uranium, and americium. This water is collected in onsite ponds and tested before it is released to streams that travel offsite... The board advises that site neighbors and other interested community members pay particular attention to the surface water monitoring program for the foreseeable future.”</p> <p>This expert recommendation represents the culmination of 13 years of dedicated service by the men and women of the Citizen’s advisory board and constitutes a warning for all parties interested in the future of Rocky Flats to maintain the highest reasonable standards for monitoring the site’s surface water quality as a means of monitoring the fitness of the entire site in the coming post-cleanup decades. Breaching the dams diminishes our ability to characterize and control effluent releases of surface water from the site and consequently should be viewed with great caution and avoided. While maintaining the current system of retention ponds at the site is not without difficulty and expense, it does constitute a better and safer alternative than free unregulated flow of surface water off the site via breached dams.</p>	<p>Refer to Common Concern Statement Responses 1, 4, and 5.</p> <p>Additionally, the Citizen’s Advisory Board report does not issue a warning for all parties interested in the future of Rocky Flats to maintain the highest reasonable standards for monitoring the site’s surface water quality. Rather, the recommendations included the explicit statement to the public for future questions to be asked as “are water quality standards being met?” (page 17 of Our Legacy report to the Community URL: <a href="http://www.rockyflatsssc.org/legacy_report.html">http://www.rockyflatsssc.org/legacy_report.html</a>). The Citizen’s Advisory Board report also stated “Given the amount of secrecy that surrounded Rocky Flats in its first 40 years of operation, the openness of the cleanup years was an astounding reversal.”</p>
<b>Josh Nims, President Woman Creek Reservoir Authority (May 28, 2010 – also incorporating February 11, 2010 letter)</b>		
96	<p>The Authority strongly prefers a “No Action” decision, the “alternative of breaching the five dams and the resulting flow of water and sediments from the existing ponds is simply unacceptable to the Authority. Under this alternative there would be a permanent loss of any DOE control of water in the watersheds. Simply walking away from any long term stewardship obligations associated with the 5 ponds is inappropriate at this time and cannot constitute a viable “alternative”, nor can it be justified in the name of alleged water quality, riparian or wetland improvements.</p> <p>NOTE: this statement was in the Feb. 11, and May 28 letters, which have been consolidated for this table.</p>	<p>Comment noted.</p>



No.	Comment	DOE Response
97	<p>The A, B and C series ponds were constructed, in part, to allow contaminated sediments to settle out of the water column before the surface water was discharged offsite. These ponds currently serve as a last measure of on-site protection for the downstream communities. DOE has not provided any documentation in the EA to address sediment mobility concerns. The potential costs associated with cleanup of mobile sediment should be factored into any cost saving determination advanced by DOE.</p> <p>NOTE: this statement was in the Feb. 11, and May 28 letters, which have been consolidated for this table.</p>	Refer to Response 21 and Common Concern Statement Response 5.
98	<p>There are still a number of ongoing DOE remedial efforts at the Site that still do not conform to the requirements of the RFLMA as of this date (February 11), including but not limited to, ongoing groundwater treatment and landfill cover activities. In light of these activities and in light of the fact that regulatory closure occurred less than four years ago, there is not nearly enough of a record of wet and dry year cycles to reach any meaningful conclusions on the long terms flow regime of both the Woman and Walnut Creek watersheds that could possibly justify breaching existing dams. Frankly, the current effort to breach the dams appears to be motivated more by a desire to reduce DOE dam liability and operational costs, rather than any supportable environmental benefit.</p> <p>Note: This statement was in the February 11 letter only.</p>	Refer to Common Concern Statement Responses 1 and 2.
99	<p>The Authority wants specific assurances from DOE and the relevant regulators that a “breach” or any other “alternative” considered in this process does not include or constitute a relaxation, movement, change or re-visitation of DOE’s ongoing obligations for operation and monitoring of the Indiana Street Point of Compliance in the future. DOE most continue to monitor water quality at the Indiana Street Point of Compliance indefinitely. Any attempts to relax or move the point of compliance would constitute a major change to the RFLMA and would be inconsistent with DOE’s existing agreements with the Authority. The Authority wants written assurances that any such activity is not contemplated under the current proposal.</p> <p>NOTE: this statement was in the Feb. 11, and May 28 letters, which have been consolidated for this table.</p>	Refer to Common Concern Statement Response 3.

No.	Comment	DOE Response
100	<p>Pond C-2 is the only remaining on-site detention facility in the Woman Creek basin. It contains sediments from the days when DOE actively conducted nuclear activities at the Site and, to this day, still collects runoff from a portion of the industrial zone via the South Interceptor Ditch. At a minimum, continued maintenance of Pond C-2 is critical to the protection of Woman Creek flows. As such, an alternative should be analyzed that at least maintains a viable dam and appropriate water quality testing at Pond C-2. The water quality testing that currently occurs at Pond C-2 prior to any release would presumably be eliminated if the dam is breached. This water quality testing is critical to the interests of the Authority and serves as an additional assurance that the water released to Woman Creek is of an acceptable quality. NOTE: this statement was in the Feb. 11, and May 28 letters, which have been consolidated for this table.</p>	<p>This comment essentially recommends the No Action alternative, which is evaluated in the EA. Also, refer to Common Concern Statement Response 7.</p> <p>Monitoring of flow from the SID that would become part of the flow-through of the breached C-2 would continue at POE SW027; outflows would continue to be measured at RFLMA POC(s).</p>
101	<p>DOE failed to consider the Authority’s suggested alternative in the EA. The Authority suggested that DOE should consider a breach of Pond C-2 in 10, 25, or 50 years as separate alternatives. This would allow a meaningful analysis of flow regime in Woman Creek during both extended wet and dry year cycles. Moreover, before any breach under these types of approaches is authorized, it would be essential for a full suite of independent testing of the sediments in Pond C-2 to occur that demonstrates that the sediments released by a breach of the dam do not negatively impact Woman Creek and the related environment and ecology. An extended delay of any breach event coupled with the sediment testing should be considered as an alternative to simply breaching the dams in the next year as proposed by DOE. These alternatives need to be fully analyzed in the EA, not simply ignored and justified as a no action alternative. These were not a “no action” alternatives, but rather specific alternatives for dam breaching at different times to allow for additional data collection. NOTE: this statement was in the Feb. 11, and May 28 letters, which have been consolidated for this table.</p>	<p>Refer to Responses 3, 25, 100 and Common Concern Statement Responses 1, 4, and 7.</p>

No.	Comment	DOE Response
102	<p>The current DOE effort to breach the dams appears to be motivated more by a desire to reduce DOE dam liabilities and operational costs, rather than any supportable environmental benefit. In public meetings, DOE has stated that breaching the dams will save “\$24 million over a 75 year period”. Nothing in the EA provides any support for these figures. DOE must provide a detailed breakdown of support for these figures, including, but not limited to, an appropriate estimate of costs and liability if contaminated water and/or sediments leaves federally controlled property. It is inappropriate for DOE to rely on cost savings as a rationale for dam breaching under the EA without including the cost saving data in the EA itself. At a minimum, the EA needs to be supplemented with detailed cost saving information as to each of the terminal ponds and circulated for additional comment.</p>	<p>Refer to Common Concern Statement Response 6.</p>
103	<p>At a public meeting, DOE rationalized, in part, the alternative of dam breaching by pointing to ongoing evaporation concerns. Those concerns, however, will be addressed by the currently pending plan for augmentation filed by DOE in Colorado Water Court – Water Division No. 1. In Case No. 08CW002, DOE has already taken steps to address the current level of evaporation from the terminal ponds. Upon issuance of a decree in Water Court, those concerns will be addressed on a permanent basis. During the pendency of that case, on information and belief, DOE has obtained a valid Substitute Supply Plan to address evaporative losses until such time as a final decree issues in Water Court. In short, DOE is already addressing evaporative loss issues.</p>	<p>While retention of water and evaporative loss of water may be recognized by the Water Court in the mentioned proceeding, this is not DOE’s Proposed Action. The water court documents provide for evaporative loss water to be made up so downstream rights holders get the water they are entitled to, but Broomfield has to give up some of their water to do this, because the water that evaporates at the RFS is no longer available to be used.</p> <p>If no reportable evaporation occurs at the RFS, both DOE and Broomfield would not have the need to spend resources on accounting and reporting.</p>
104	<p>DOE has suggested that different timing of dam breaching occur to allow for additional collection of data. DOE has failed to explain why Pond C-2 is treated differently than the other terminal ponds. The Authority prefers a no action alternative. To the extent that DOE goes forward with dam breaching, however, it would be appropriate to operate all the terminal in a flow through approach to collect more data. Under this approach, the outlet works for Pond C-2 would be opened so as to operate as a flow through system. Testing would be maintained at both the outlet and at the Indiana Street Point of Compliance. To the extent a relevant standard is exceeded at either point of compliance, the outlet could be shut to retain any remaining contaminated water on site until such time as DOE can adequately address the exceedance. This allows DOE to maintain some level of ability to retain contaminated water on-site.</p>	<p>Refer to Common Concern Statement Response 7.</p>

No.	Comment	DOE Response
105	DOE argues that any such contamination is unlikely, but this approach allows for some level of protection to downstream entities if DOE's assurances of no exceedances proves inaccurate. It also allows DOE to obtain additional data on the flow regime on Woman Creek in both extended wet and dry year cycles to justify additional action in the future. To the extent DOE's assurances are accurate and no future exceedances occur, the DOE will have minimized evaporation issues associated with a flow through pond and furthered its stated goal of wetlands and riparian improvements, yet maintained the ability to retain water on-site if necessary in the future. To the extent DOE claims a lack of cost reduction related to dam monitoring and repairs associated with the approach, it must provided (sic) a detailed cost analysis specific to costs associated with operating and maintain Pond C-2.	Refer to Responses 3 and 25 and Common Concern Statement Responses 1, 4, 6, and 7.
106	DOE has claimed that it will operate some of the terminal ponds in a flow through manner to obtain additional necessary data prior to final breach. The Authority believes this need for additional data, in and of itself, precludes DOE's ability to issue a Finding of No Significant Impact in this instance. It is inappropriate to make a determination of no significant impact when all of the data required to support the decision are not, as yet, collected.	Refer to Common Concern Statement Responses 1 and 7.
107	If Pond C-2 is breached. DOE must be required to maintain long term monitoring of Woman Creek flows at the Indiana Street Point of Compliance in Perpetuity and sediment testing prior to any such breach. As indicated above, the Authority strongly prefers a "No Action" determination. In the worst case scenario, however, a breach upon demonstration that the released sediments pose no undue risks coupled with a perpetual monitoring requirement at the Indiana Street Point of Compliance would be better than a simple breach alternative.	Refer to Common Concern Statement Responses 1, 3, and 7.
<b>Ed Lanyon, Water Resources Administrator, Thornton, CO</b>		
108	Thornton strongly supports the "No Action" alternative for reasons identified below.	Comment noted.
109	Impact to and protection of human health and the environment were not fully considered in the EA. At the public meeting held on May 18, 2010, DOE staff stated that a contingency plan has not been developed or even considered should residual contamination move off the Rocky Flats site and into the downstream communities.	Refer to Common Concern Statement Response 4.

No.	Comment	DOE Response
110	It is unknown if sufficient time has passed since regulatory closure in 2006 to adequately evaluate the effectiveness of the mitigation that has been put in place. At a minimum, Thornton requests that the DOE provide information on how it has evaluated the effectiveness of the mitigation.	Refer to Common Concern Statement Response 1.
111	Breaching of the dams will remove facilities that help to prevent residual contamination from moving off the site.	Refer to Common Concern Statement Response 5.
112	Thornton requests that the DOE allow more time to pass to evaluate the remedy before taking action so soon after regulatory closure. Unnecessary and hasty actions at this point could have serious consequences for the downstream communities should the assumptions made by the DOE prove to be incorrect.	Refer to Common Concern Statement Response 1.
113	<p>The Draft EA states that a reduction/elimination of depletions would reduce or eliminate the following: 1) costs incurred by Broomfield; 2) depletion reporting costs; and 3) costs to water rights holders responsible for downstream augmentation.</p> <ul style="list-style-type: none"> <li>• Unless all depletions are going to be eliminated and water won't be impounded on the site, and reporting will not be required by the State Engineer, then reporting costs aren't going to be reduced. It doesn't matter if an entity is reporting 100AF or 1AF, there will still be reporting requirements to perform</li> <li>• Water impounded on the site to maintain wetlands will cause depletions.</li> <li>• How are costs to water rights holders responsible for downstream augmentation going to be reduced or eliminated? This statement is not clear and is not consistent with Colorado water law or water rights administration.</li> </ul>	<p>Refer to Response 103 and Common Concern Statement Response 6.</p> <p>DOE believes that breaching the dams would essentially eliminate depletion issues. The resulting stream configuration would promote wetlands formation, but the amount of evaporative loss would be very small in relation to the current water retention regime. DOE believes that the monitoring and subsequent reporting of depletion amounts after dam breach would also range from minimal to none required.</p> <p>Cost to water rights holders responsible for augmentation would be reduced or eliminated because water is no longer retained for which augmentation would be required.</p> <p>The EA is not intended to constitute a DOE legal opinion regarding this issue but rather reflects what DOE believes would be the practical outcome of the Proposed Action.</p>
114	<p>The Draft EA states that the dams are no longer needed and breaching would reduce costs (and by association taxpayer's costs).</p> <ul style="list-style-type: none"> <li>• What are the estimated cost savings? There isn't an amount discussed in the EA. If cost savings is one of them major reasons for breaching the dams then the estimated savings should be stated.</li> </ul>	Refer to Common Concern Statement Response 3

No.	Comment	DOE Response
115	<p>The Draft EA states that breaching of the dams will preclude any injury to calling senior water rights holders.</p> <ul style="list-style-type: none"> <li>• This is not a true statement since there is an augmentation plan in place that augments depletions associated with these reservoirs. That is the function of an augmentation plan, to ensure other water rights are not injured.</li> </ul>	<p>See response to comment 113. DOE considers that this constitutes a practical and not a legal determination.</p>
116	<p>The Draft EA states that breaching the dams would not change DOE obligations to monitor surface water and meet standards as required by RFLMA.</p> <ul style="list-style-type: none"> <li>• What are the DOE's plans if there is an exceedence of the standards?</li> </ul>	<p>Refer to Common Concern Statement Responses 1 and 4.</p>
117	<p>The Draft EA discusses floodplains across the eastern portion of the Rocky Flats site.</p> <ul style="list-style-type: none"> <li>• Why weren't the floodplains related to the entire site addressed and studied? If they would have been studied, could that reveal an increased risk of residual contamination being exposed and conveyed through the breached dams and onto the downstream communities?</li> <li>• Were out-of-basin inflows from canals considered in the assessment? If out-of-basin inflows were not considered, could they increase the risk of residual contamination being exposed and conveyed through the breached dams and onto the downstream communities? DOE stated at a public meeting that they get flows onto the site from the irrigations canals.</li> </ul>	<p>Section 4.3.4.3 explains that floodplains are generally delineated by the Federal Emergency Management Agency (FEMA). Within the RFS, no floodplains are delineated by FEMA because the extent of FEMA mapping does not extend into the current RFS boundaries. Because FEMA has not mapped the RFS, DOE used the information available to them through the references listed in Section 4.3.4.3 to assess potential impacts. Section 1502.22 of CEQ regulations for implementing NEPA provides for the disclosure of unavailable information in a NEPA document, provided that the unavailable information is identified. Based on the additional information available from other reports cited in Section 4.3.4.3, DOE believes that the agency's evaluation of impacts is based upon research methods generally accepted in the scientific community. For the purposes of this section, "reasonably foreseeable" includes impacts that may have catastrophic consequences, even if their probability of occurrence is low, and the analysis of the impacts is supported by credible scientific evidence.</p> <p>All of the ditches and diversions were taken into account in the EA assessment of impacts upstream of the dams. Refer to Appendix F modeling data.</p>

No.	Comment	DOE Response
118	<p>The Draft EA states that even with maintenance, the dams still might need to be breached in the future.</p> <ul style="list-style-type: none"> <li>• Appropriate and continued maintenance of the dams could make them last for decades.</li> </ul>	<p>Refer to Common Concern Statement Response 6.</p> <p>In addition to maintenance costs, as stated in Section 5.2.5.2 “failure of an earthen dam would result in the downstream transport and deposition of large quantities of soil from the embankment structure. The remaining dams at the RFS are more than 30 years old. While the expected lifespan of these earthen dams is not known, continued aging, regardless of rigorous maintenance, could necessitate the breach of these structures in the interest of dam safety.”</p>
<b>J. Brent McFall, City Manager, Westminster, CO</b>		
119	<p>The City of Westminster advocates the “No Action” EA alternative and provides supporting evidence herein to refute assertions in the EA that minimize or dismiss the significance of potential impacts to identified resources. In addition, the City identifies in its comments additional resource impacts that were omitted from evaluation in the EA.</p>	<p>Comment noted.</p>
120	<p>Westminster contends the EA Proposed Action violates the Institutional Controls for the Central Operating Unit (COU) as detailed in RFLMA Attachment 2, Table 4, February 2007. Use Restriction Control #2 states: “Excavation, drilling and other intrusive activities below a depth of three feet are prohibited, except for remedy-related purposes and routine or emergency maintenance of existing utility easements, in accordance with pre-approved procedures.” Based on the purpose of the EA stated above, excavation for breaching the dams under this EA would be in violation of Institutional Control #2. The Use Restrictions are legally enforceable requirements placed upon the property owner under the Environmental Covenant granted to CDPHE by DOE and filed with Jefferson County in 2006.</p> <p>The CDPHE granted approval of Contact Record 2010-02 titled Approval of Excavation Greater Than 3 Feet Below Grade to Breach Dams A-3, A-4, B-5, C-2 and the Present Landfill Dam on April 15, 2010. The CR details plans for the Surface Water EA that was not released for public comment until April 30, 2010. The Rocky Flats Operations Guide, Appendix F, Rocky Flats Site Soil Disturbance Evaluation Procedure assumes excavation below the three foot depth only requires compliance with a soil erosion control protocol. The requirement for an erosion control plan, while applicable to this project, is not the regulatory compliance document required to perform excavation at depths below three feet for non-remedy related purposes.</p> <p>The EA and CR 2010-02 fail to recognize that the Proposed Action violated</p>	<p>Refer to Common Concern Statement Response 3.</p> <p>The RFLMA party consultation was necessary prior to the release of the Draft EA, because as the commenter points out, the dam breach work would otherwise be assumed to be in violation of the institutional control. Also, refer to response 34.</p> <p>The Contact Record is the result of the RFLMA party consultative process and reflects the implementation of the institutional control requirements to meet the stated objective and rationale, as contemplated by the CAD/ROD. The CAD/ROD provides the following:</p> <p>“In addition to the specific rationales set forth in the text for the various use restrictions, imposing the institutional controls discussed in the text also results in achieving compliance with the CDPHE risk management policy of ensuring that residual risks to the site user are at or below <math>1 \times 10^{-6}</math>. ... DOE shall notify EPA and CDPHE 45 days in advance of any proposed land use changes that are inconsistent with the objectives of these institutional controls or the selected remedy/corrective action. DOE shall not modify or terminate institutional controls, implementation actions or modify land use without approval by EPA and CDPHE. DOE</p>

No.	Comment	DOE Response
	<p>Institutional Control #2 because the Proposed Action is not remedy-related. The CAD/ROD states and the Rocky Flats Site Operations Guide – Appendix F reiterates the objective and rationale for prohibiting non-remedy related activities in the COU as stated for Institutional Control #2:</p> <ul style="list-style-type: none"> <li>• <i>Objective; prevent unacceptable exposure to residual subsurface contamination. Rationale; contaminated structures, such as building basements, exist in certain areas of the Central OU, and the CRA did not evaluate the risks posed by exposure to this residual contamination. Thus, this restriction eliminates the possibility of unacceptable exposures. Additional, it prevents damage to subsurface engineered components of the remedy.</i></li> </ul> <p>The CAD/ROD states “these controls will extend throughout the Central OU” and “will run with the Property in perpetuity and be binding on DOE and all parties having any right, title or interest in the Property”. Westminster contends that the excavation activities proposed in CR 2010-02, for consideration based on results of the EA, violate Institutional Control #2.</p>	<p>shall seek prior concurrence before any anticipated action that may disrupt the effectiveness of these institutional controls or any action that may alter or negate the need for institutional controls." CAD/ROD, Section 17, p.71.</p> <p>Thus, the Contact Record provides this notification and documents that the excavation for the dam breach would be in compliance with the CAD/ROD requirements regarding institutional controls.</p>
121	<p>The City of Westminster is located directly east of the RFS adjacent to Indiana Street along the eastern boundary of the federal property. Surface water flows in Woman Creek leaving the RFS bypass the City’s drinking water supply in Standley Lake by means of the facilities constructed and operated under the Standley Lake Protection Project; however, Walnut Creek flows that bypass Great Western Reservoir flow through portions of the City to Big Dry Creek and provide an existing primary contact recreation use to City residents that could result in incidental ingestion of water.</p>	<p>Comment noted. An explanation of the flow regime has been added to Section 1.1 in the Final EA to further clarify. Additionally, refer to Response 25.</p>
122	<p>Walnut and Woman Creeks, including those segments on the COU and the POU are classified by the Colorado Water Quality Control Commission as Aquatic Life Warm Water 2, which means these waters are not capable of sustaining a wide variety of warm water biota, including sensitive species, due to physical habitat, water flows or levels, or uncorrectable water quality conditions that result in substantial impairment of the abundance and diversity of species. Breaching all remaining dams in a selective attempt at riparian habitat improvement on the COU will not ensure sustainable habitat improvement in the drainages downstream of the existing ponds. The numerous references to water quantity limitation provided by DOE</p>	<p>Comment noted. The riparian habitat improvements and enhancements DOE is referring to are related to the vegetation communities behind the dams and along the streams downstream of the ponds, not the aquatic communities in the streams.</p>



No.	Comment	DOE Response
	<p>throughout the EA and RFS annual reports support this conclusion. The success in establishing new habitat in downstream drainages if the dams are breached is optimistic, especially due to the water quantity limitations. It is certain that dam breaching will eliminate 95 percent (14 acres) of open water habitat for 45 species of waterfowl. The gains in riparian habitat and the species they support would be minimal relative to the loss of open water habitat.</p>	
123	<p>The details provided for breaching the dams in the EA are inconsistent with the details included in CR 2010-02. In addition, DOE’s explanation of the proposed dam configuration and operations presented at the public meeting on May 18, 2010 presented other conflicting details, such as the free board levels that would remain above the Pond C-2 sediments following the dam breach. Consistence of the message would simplify the efforts to understand and respond to the impacts; DOE must address any inconsistencies between the two documents.</p>	<p>The comment is noted but does not provide details regarding perceived inconsistencies.</p> <p>The purpose of the Contact Record is discussed in comment Response 120, and DOE does not believe there is any inconsistency.</p>
124	<p>The EA describes the channel inlets at the dam breach sites “...will be located to provide positive drainage from the area upstream of each channel inlet. This would ensure a consistent flow of water and prevent ponding. The area upstream of each channel would be designed to preserve and enhance wetlands and habitat to the extent possible, while still providing positive flow.” The EA does not specify any criteria for assessing the habitat enhancements, yet quantifies the acres of existing habitat to be eliminated in the areas upstream of each channel. The priority for the dam breach focuses on positive flow of surface water off the COU – at the expense of any open pond habitat.</p>	<p>As stated in Section 5.2.4.1, the acres of habitat to be eliminated is based on expected drawdown of the pond water derived from the preliminary engineering estimates. Setting criteria for assessing the habitat enhancements would be a requirement of the USACE, which has stated that the activities would most likely be permitted under a Nationwide Permit #27, as stated in Section 6.4.2. Section 6.4.2 includes general and activity-specific conditions to control and mitigate the water quality impacts of the work, including post-construction erosion controls and revegetation and requires notification of USACE of the intent to perform work in accordance with the permit prior to commencing the work.</p>
125	<p>The soil in the breach channel below a depth of three feet (as detailed in CR 20010-02[sic]) will be used to fill “former spillways and roads to be reclaimed.” There is no reference to characterization of the excavated soils or specific identification of the designated areas to be filled with excavated soils Westminster contends this activity is in violation of Institutional Control #2.</p>	<p>The Contact Record provides information and reference to the characterization results.</p> <p>The removed material (which, although is below a depth of 3 feet from the current surface, would be from the soils in the dam structure) is consistent with the surface soils within the COU, and thus is acceptable for use within the COU for revegetation purposes.</p>

No.	Comment	DOE Response
126	The EA states that the dams are no longer needed for the original purpose. According to historical documents, the original purpose for the majority of the ponds was the containment of wastewater flows including some flows which were contaminated with radionuclides and other analytes of concern. In effect, the ponds serve as the last line of defense for the downstream communities by preventing contaminated sediment migration of the COU.	Refer to Common Concern Statement Response 4 and 5.
127	DOE revealed at the public meeting held on May 18, 2010, the cost savings resulting from implementing the Proposed Action for operation, maintenance and dam safety compliance would be \$24 million over a 75 year period. The detailed assessment of how DOE derived the cost saving estimate is not available for review.	Refer to Common Concern Statement Response 6.
128	The attendees at the public meeting on May 18, 2010 were also led to believe the dams are in jeopardy of failing – especially B-5. Summaries of the recent dam inspections reported by DOE lists satisfactory condition ratings and recommended a safe storage level of “full.” Clearly, dam safety has not been jeopardized. Emergency releases as detailed in the Rocky Flats Site Operations Guide are utilized, as necessary, to ensure dam safety.	Comment noted. Also refer to Response 118.
129	The EA states that breaching Pond C-2 and PLF dams will have little to no effect on improvement to downstream habitat. Cost savings, rather than habitat improvement, appears to be the driver for breaching the Pond C-2 and PLF dams.	Section 1.2 describes the purpose and need for the Proposed Action. All issues described in this section are the purposes, and no single one is the determinant factor for the decision document from DOE.
130	The EA states that “water discharged from the terminal pond dams meets applicable RFLMA surface water quality standards, which are based on the CWQCC CCR, Regulation No. 31..., and on the site specific standards in the CWQCC Regulations No. 38...” It should be noted, however, that while the RFLMA surface water standards are <u>based</u> on the referenced regulations, they are not <u>applied</u> in the same manner. The mechanism for calculating compliance with RFLMA standards is relatively unique in the state for assessing compliance with surface water standards applicable for individual stream segments. The manner in which CWQCC Regulation No. 38 is applied for segment 4a within the RFS and how it is applied outside the boundary of federal lands are not the same. Protection of surface water was a basis for making soil and groundwater response action decisions during the cleanup period so that surface water on site and leaving the site would be of sufficient quality to support all uses. Table ES-1 in the EA, Resource-Specific	Refer to Response 25 and Common Concern Statement Responses 1 and 4.

No.	Comment	DOE Response
	Consequences, states "individual sample results downstream are expected to show increased variability." The EA does not indicate how the variability will be monitored. Increase variability in sample results based on the Proposed Action could result in exceedance of the applicable stream standards in the downstream watersheds when the WQCC Regulation No. 38 standards are applied to streams off federal lands.	
131	In some instances, the statistical assessment software DOE uses for data interpretation requires more individual data points than are collected under the current sampling frequencies and site conditions. Oftentimes, contaminant plume migration trending cannot be assessed as evidenced in CR 2010-05. The uranium data in the groundwater wells downstream of the Old Landfill (OLF), while significantly higher than the wells upgradient of the OLF, cannot be trended due to the limited data collected. These limitations on interpretation and applicability of the data collected to predict impacts on the downstream site locations, both on federal lands, and off, concern the downstream communities regarding the protectiveness of the remedy to ensure surface water is of sufficient quality to protect all uses.	Refer to Common Concern Statement Responses 2 and 5.
132	It should also be noted that surface water standards have been exceeded on the COU at the POEs upstream of the ponds and in the PLF pond.	Refer to Response 18.
133	Westminster is concerned by the following section included in the EA: "Parallel to the completion of this EA, DOE has proposed that the RFLMA be modified to change some of the current RFLMA monitoring points, including Point of Compliance (POCs) downstream of the dams. The proposed RFLMA modification is subject to CDPHE and EPA approval. The RFLMA modification is not considered a part of this EA but is a part of the remedy for the RFS. The modification has not been approved as of the date of this Draft EA, but if the approval has been received by the Final EA, this document will be updated to reflect the change. If the RFLMA is modified to change the location of the POCs downstream of the dams, ground disturbance would occur with the closure of the current POCs and development of new monitoring points." The public does not have access to the proposed RFLMA modification document referenced. The EA should not be amended following the public comment period to incorporate significant changes, such as monitoring point locations, if the public is not permitted to provide comments. DOE must disclose the specifics of all actions relevant to this EA for evaluation of the resource impacts to downstream communities.	<p>Refer to Response 10 and 25 and Common Concern Statement Response 3.</p> <p>The Final EA will clarify that DOE's proposal was still at an informal stage and specific details were still being considered by DOE, CDPHE, and EPA (the RFLMA Parties) under the RFLMA consultative process (see RFLMA paragraph 11). However, the RFLMA Parties have communicated to stakeholders in the Draft EA (as well as at the Rocky Flats Stewardship Council public meetings) their intent to issue a formal RFLMA proposed modification document for public review and comment.</p> <p>The proposed POC modification is different than the EA. While the breaching of the dams for Ponds A-4, B-5 and C-2 (part of the Proposed Action) triggers evaluation of relocating the RFLMA surface water points of compliance downstream of these ponds pursuant to the CAD/ROD and RFLMA, DOE may propose changes to RFLMA</p>

No.	Comment	DOE Response
		<p>monitoring points at any time, whether or not the dams are breached. The Proposed Action is not dependent on any proposed modifications to RFLMA monitoring points, now or in the future.</p> <p>DOE is the decision-making agency regarding the NEPA evaluation of the Proposed Action and to make a determination whether a FONSI should be approved or whether an EIS is required. DOE is responsible to confer with the other RFLMA parties to reach agreement to the extent possible regarding a proposed course of action to implement RFLMA in accordance with the RFLMA consultative process. CDPHE and EPA are the approving agencies of any final modification to RFLMA monitoring points in accordance with the CAD/ROD and RFLMA. The EA states that water monitoring in accordance with RFLMA will be conducted for as long as RFLMA requires.</p>
134	<p>The EA categorizes groundwater under the "Resources Considered but not Present or Impacted by the Proposed Action" section. The EA dismisses the impact to groundwater at all five proposed dam breach locations. Westminster insists that groundwater could be impacted if the dams are breached. Changing the hydrologic configuration at the RFS for surface water flow may increase the migration of groundwater plumes, some of which are direct contiguous links to surface water. It has been noted that groundwater seeps to the surface more in dry years. Seeps have been identified in the drainages where the Proposed Action is identified. The EA states that if the POCs are relocated downstream of the ponds, groundwater will be considered in deciding where the POCs should be located. Westminster contends that there is a potential for groundwater to be impacted by the Proposed Action.</p>	<p>Refer to Common Concern Statement Response 2.</p>

No.	Comment	DOE Response
135	The EA discusses the need for an EPA-issued stormwater permit to be applied during the construction activities. The potential impact to surface water due to construction activities could be significant. In the event the Proposed Action proceeds, Westminster requests EPA consider adding a water quality monitoring requirement to the stormwater permit in addition to the best management practices to ensure protection of human health and the environment during construction activities.	<p>Comment noted.</p> <p>As stated in Section 6.5, for federal facilities in Colorado, the stormwater permitting is regulated by EPA. A construction general permit for stormwater discharge is provided by EPA regulations in 40 CFR 122. All requirements under the stormwater permit as directed by EPA would be followed.</p> <p>Based on experience with past construction activities, DOE believes its erosion control and storm water management actions would appropriately comply with the stormwater permit conditions. All RFLMA-required monitoring would continue during construction (and after, for as long as RFLMA requires).</p>
136	Westminster has identified additional resources that could be impacted by the Proposed Action, which were not addressed in the EA: The EA fails to address the impact of the Proposed Action on the downstream communities in the event any part of the remedy releases contaminated water or sediments that would have been captured in the ponds, but as a result of the Proposed Action, will be released downstream and off federal land. A contingency plan for containment of contamination on the COU is critical.	Refer to Common Concern Statement Response 4 and 5.
137	The EA fails to consider the impacts of fires on the COU, how the impacts would be monitored and the physical barriers required to contain any contamination on site.	Refer to Response 80.
138	The proposed relocation of the boundary POCs should be fully evaluated as part of this EA.	Refer to Common Concern Statement Response 3.
139	DOE is currently performing non-RFLMA sampling (CR 2010- 03) to assess sediment transport in the A and B series ponds. If more data is required to ensure the Proposed Action is protective of surface water before those dams are breached, then DOE is acknowledging there is the potential for downstream impacts. The present action should be assessed as a cumulative impact in the EA.	DOE is performing the sampling project for the reasons stated in the Contact Record 2010-03 because DOE believes that the information will be useful for comparison to pre-closure data and data that may be collected in the future from time to time. The EA is based on the post-closure sampling data available during preparation of the EA.
140	DOE has received approval from CDPHE to perform targeted soil sampling at the OLF (CR 2010-01) in order to meet CDPHE requirements for ending post-closure landfill care - which usually is required for 30 years, but may be extended or shortened. The impacts of ending OLF monitoring in the foreseeable future should be addressed as a cumulative impact in this EA.	Refer to Common Concern Statement Response 2 and Response 41. The OLF is within the Woman Creek basin, not the SID basin. C-2 is at the end of the SID and does not receive flows from Woman Creek. Breaching C2 would not change the OLF's relationship with Woman Creek.

No.	Comment	DOE Response
141	Westminster respectfully requests a written response to each of our concerns individually.	Comment noted. Please refer to responses above.
142	In closing, Westminster does not support a Finding of No Significant Impact (FONSI) for this EA and advocates the "No Action" alternative. At less than five years post-closure, remediation activities continue at the Rocky Flats Site and the uncertainties of all impacts associated with those activities do not justify the risk to the downstream communities. DOE - Legacy Management is obligated to comply with the CAD/ROD and RFLMA requirements for Institutional Controls on the COU to ensure protection of public health and the environment.	Comment noted. Also, refer to Common Concern Statement Response 1.
<b>Alan King, Director of Public Works, City and County of Broomfield, CO</b>		
143	We would like to remind DOE-LM of their responsibility to ensure all activities performed at the site must remain protective of human health and the environment following completion of cleanup, disposal, or stabilization in perpetuity.	Comment noted.
144	The on-site ponds serve as our last measure of defense. Based on current regulatory requirements, DOE-LM must measure water quality before it leaves the site and the ponds provide a mechanism to control and contain water that does not meet surface water standards. DOE-LM may also need the ponds to store and treat water onsite since ponds A-3 and A-4 were used for this purpose in the past to ensure off-site surface water quality is protected. With residual contamination remaining on-site, Broomfield wants to make certain that DOE-LM will continue to maintain the site in a safe configuration that protects human health and the environment for the life of the remaining contaminants. Broomfield has very thoughtfully and thoroughly reviewed this crucial document and prepared both general and specific concerns associated with the EA.	Refer to Common Concern Statement Responses 1, 4 and 5.

No.	Comment	DOE Response
145	Broomfield strongly believes that DOE-LM must adopt the "No Action" alternative and provides strong support herein for our assertion that the EA improperly minimizes or dismisses the significance of potential impacts to environmental resources. The mere fact that the proposed action has the potential to introduce contaminants into downstream ecosystems, and such impacts have not been mentioned, assessed, or quantified, should automatically preclude DOE-LM from adopting a Finding of No Significant Impact (FONSI). Our justification for the "No Action" alternative is primarily based on the following key concerns.	Comment noted.
146	DOE-LM Has Failed to Follow the Proper National Environmental Policy Act (NEPA) Process. It is clear from the actions that have already been taken that the preferred EA alternative was pre-determined. The CDPHE granted approval of Contact Record (CR) 2010-02 titled Approval of Excavation Greater Than 3 Feet Below Grade to Breach Dams A-3, A-4, B-5, C-2 and the Present Landfill Dam on April 15, 2010. The Surface Water EA was not released for public comment until April 30, 2010; therefore, CR 2010-02 presumed selection of the preferred proposed action by DOE-LM prior to allowing the public to participate in the NEPA process to evaluate and determine the action that best protects public health and the environment. Broomfield is also aware that DOE-LM has already provided CDPHE with a draft contact record addressing modifications to the regulatory Points-of-Compliance (POCs).	Refer to Response 34 and Common Concern Statement Response 3.
147	If DOE-LM is concerned about costs, please clarify why funds have been utilized for a proposed action that has yet to be determined in accordance with the NEPA process.	Refer to Common Concern Statement Response 6. Additionally, costs incurred to date have been in connection with the preliminary design of the dams and NEPA-related activities of assessing existing conditions, which would be necessary to evaluate the environmental impacts related to the Proposed Action.
148	Implementation of the Chosen Alternative Would Violate Otherwise Applicable Institutional Controls. The Rocky Flats Legacy Management Agreement (RFLMA) includes seven Institutional Controls that restrict certain uses within the Central Operable Unit (COU). Use restriction Control #2 of the RFLMA explicitly states: "Excavation, drilling and other intrusive activities below a depth of three feet are prohibited, except for remedy-related purposes and routine or emergency maintenance of exiting utility easements, in accordance with pre-approved procedures.	Refer to Common Concern Statement Response 3 and Response 120.

No.	Comment	DOE Response
	<p>The proposed dam breaching activity, which is supposedly justified by the EA, would be in violation of these Institutional Controls. These use restrictions are legally enforceable requirements placed upon the property owner under the Environmental Covenant granted to CDPHE by DOE and filed with Jefferson County, Colorado in 2006. The restrictions in Attachment 2, Table 4 of the RFLMA were established to ensure such site activities would not compromise the integrity or function of the remedy or result in uncontrolled releases of, or exposure to, subsurface contamination that remains at the site. The EA and the CR 2010-02 fail to recognize that the proposed action violates the Institutional Controls identified within the RFLMA. In addition, the CAD/ROD and the Rocky Flats Site Operations Guide - Appendix F are clear in the objective and rationale for prohibiting non-remedy related activities in the COU as stated for Institutional Control #2: Objective: prevent unacceptable exposure to residual subsurface contamination. Rationale: Contaminated structures, such as building basements, exist in certain areas of the Central OU, and the CRA did not evaluate the risk posed by exposure to this residual contamination. Thus, this restriction eliminates the possibility of unacceptable exposure. Additionally, it prevents damage to subsurface engineered components of the remedy. The CADROD for the Rocky Flats site states: "These controls will extend throughout the Central OU" and "Will run with the Property in perpetuity and be binding on DOE and all parties having any right, title or interest in the Property." (Emphasis added.) Broomfield submits that the three-year period that has elapsed since regulatory closure clearly does not equate to "perpetuity."</p> <p>Comment: Please provide the rationale as to why DOE-LM would have the authority to violate the RFLMA and the intent of the CAD/ROD and the Proposed Plan.</p>	
149	<p>Breaching the Present Landfill (PL) Pond Dam is Contrary to the Requirements Established Pursuant to the Resource Conservation and Recovery Act (RCRA) Plan. The PL was closed in accordance with 6 CCR 1007-3 3 265.12(a) (3) as a Subtitle-C Resource Conservation and Recovery Act (RCRA) landfill. Section 2.5.5 of the Present Landfill Monitoring and Maintenance Plan and Post-Closure Plan, U.S. Department of Energy Rocky Flats Site, March 2008, states: The East Landfill Pond will remain and</p>	<p>Refer to Common Concern Statement Responses 1 and 4 and comment Response 130.</p> <p>Section 2.5.5 of the Present Landfill Monitoring and Maintenance Plan and Post-Closure Plan (M&amp;M Plan) provides a factual site physical description. If DOE issues a FONSI, and the surface water configuration is changed under the Proposed Action, the site physical description</p>



No.	Comment	DOE Response
	<p>receive treated water from the PLFTS and surface water from the east face and surrounding hillsides, as well as precipitation falling directly into the Pond. The decision framework for this sampling is found in RFLMA Attachment 2, Figure 1 1.</p> <p>The Present Landfill pond was remediated and the contaminated soils were placed within the Present Landfill. The pond does serve as a settling pond based on the material that was removed during remediation of the pond. In addition, the pond receives and contains water that exceeds the RFLMA standard at the Present Landfill Treatment Unit. Vinyl chloride, selenium, silver and other analytes have exceeded the surface water RFLMA standards as recently as this past year.</p> <p>Comment: Please provide the exception to the regulation that would allow DOE-LM to intentionally discharge water that does not meet surface water standards to waters of the state.</p>	<p>would be modified. The PLF Pond (or the East Landfill Pond as the commentor stated) is not required by the CAD/ROD, because it is not a component of the final closure of the PLF. See M&amp;M Plan Section 1.0.</p> <p>However, DOE notes that M&amp;M Plan Section 2.5.5 also refers to the description of monitoring of the pond as discussed in M&amp;M Plan Section 5. Section 5.1 references RFLMA Attachment 2, Table 2, “Water Monitoring Locations and Sampling Criteria” as the requirements for the monitoring location.</p> <p>As discussed in the EA, DOE is proposing changes to RFLMA monitoring locations, and the proposed modification addresses the replacement for the pond sampling current location.</p> <p>The PLF treatment system monitoring results have intermittently exceeded the RFLMA standards, which triggers more frequent sampling to determine if the exceedance persists and thus may trigger RFLMA consultation to determine if the exceedance condition may require mitigating action. Exceedances have been only slightly above the RFLMA standard (triggering additional sampling) but have not triggered consultation or mitigating action because of the short duration. It should be noted that the RFLMA standards are based on the lowest standard promulgated by the Colorado Water Quality Control Commission but are implemented to trigger investigation and/or mitigation actions under RFLMA in a more conservative way than provided for by the WQCC standards.</p> <p>For example, the RFLMA standard for vinyl chloride (VC) is based on the lowest laboratory Practical Quantification Limit for VC of 0.2 µg/L, which is below the upper limit of the WQCC promulgated standard, which is 0.02-2 µg/L (2 µg/L is the Maximum Contaminant Level [MCL] for drinking water). VC exceedances of the RFLMA standard have been well below the MCL.</p> <p>DOE does not intentionally discharge water that does not meet surface water standards. The PLF treatment system is designed and functioning</p>

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		in accordance with the final closure requirements for the PLF. Whether the remedy is being implemented as required is routinely evaluated by the RFLMA regulatory agencies.
150	<p>The proposed action would allow water to freely flow from the pond and there would be no control in place to prevent negative impacts to such a valuable resource. Waste in the landfill was not removed and contamination remains in place. Benzene and vinyl chloride were the primary contaminants detected above the established standards during the remedial investigation.</p> <p>Comment: Provide the process to ensure the RFLMA is enforced to meet surface water standards prior to release.</p>	Refer to Common Concern Statement Responses 1, 2, 3, and 4.
151	<p>The treatment unit for the PL serves as a point source and the effluent must meet surface water standards prior to discharge.</p> <p>Comment: Please provide the associated contingency plan to contain the leachate if it exceeds the RFLMA surface water standard. Include the notification process, schedule to contain water, monitoring methodology, and notification process to downstream communities.</p>	<p>Refer to Common Concern Statement Responses 1 and 4.</p> <p>The "Final Interim Measure/Interim Remedial Action for IHSS 114 and RCRA Closure for the Present Landfill" (IM/IRA), August 2004, describes the regulatory status of the Present Landfill Treatment System (PLFTS) discharge. CDPHE approved the PLFTS as a waste water treatment unit (WWTU), and the discharge is regulated under the National Pollution Discharge Elimination System (NPDES) requirements. As such, under CDPHE's hazardous waste regulations, the discharge is not a solid waste and therefore not a hazardous waste at the point of discharge. The requirement for a NPDES permit for the PLFTS is waived in accordance with CERCLA permit waiver provisions for on-site actions, and the PLFTS is subject to CERCLA applicable or relevant and appropriate requirements (ARARs) identified in the CAD/ROD. The IM/IRA and identified NPDES ARARs were adopted in the CAD/ROD.</p>
152	<p>Broomfield understands that the dams are not required to maintain adequate protection of human health and the environment under the final CADROD; however they do serve as sediment ponds to collect contaminants. The ponds were identified as Individual Hazardous Substance Sites (IHSS) during site closure and some of the ponds had extensive remediation to remove materials above action levels and/or surface water standards. The scope of the previous 2004 EA related to breaching the dams in North and South Walnut Creek upstream of ponds A-3, A-4, and B-5 was limited only to those ponds listed because the downstream communities were adamant in their insistence that the terminal dams were not to be breached until adequate data were available</p>	<p>Refer to Common Concern Statement Response 4 and 8.</p> <p>The EA modeling report was for water volumes only and not contaminants.</p>

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	<p>to evaluate sediment and contamination migration post-closure. The downstream communities want to have a baseline developed on post-closure conditions after the site has fully stabilized and associated trending during wet and dry precipitation years has been completed. The current 2010 EA states it evaluated the direct, indirect, and cumulative impacts of breaching all remaining dams. We contend the EA did not properly assess environmental impacts directly, indirectly, or cumulatively related to impacts to offsite watersheds and potential risk to downstream communities.</p> <p>Comment: Please provide the modeling and evaluation that was performed to determine impacts to downstream watersheds if surface water leaves the site that does not meet the regulatory standards.</p>	
153	<p>The 2010 EA did not evaluate sediment migration after an uncontrolled fire. Fires can substantially increase runoff in watersheds. The US Forest Service's Rocky Mountain Research Station has studied the impact of fires on watersheds in General Technical Report RMRS-GTR-63, "Evaluating the Effectiveness of Post fire Rehabilitation Treatments", September 2000. The report states that severe fire can increase surface runoff by 70 percent and increase erosion by three orders of magnitude (Page 5). A single grassland similar to Rocky Flats was studied, as most of the fires studied were in forests. The increase in water yield ranged from 12 percent to 1421 percent, with the one incidence of grassland fire increasing water yield by 1150 percent. If drought conditions are combined with severe fires, the vegetation may not recover for many years.</p> <p>Comment: Please provide more information about the evaluation DOE-LM performed to address wildfires to ensure there are not direct, indirect, and cumulative impacts to human health and the environment related to the certainty of increased runoff from an uncontrolled fire. Please identify the Contingency Plan that would be implemented to prevent major erosion and release of sediment off-site.</p>	<p>Refer to Response 80.</p> <p>Section 6.4.1 describes the mitigation measures that would be used to minimize erosion both throughout and after the breaching of the dams. Because these measures would be employed on a consistent basis, it is not necessary to add additional mitigation measures following a wildfire event. The URL address to the Erosion Control Plan for the Rocky Flats Property Central Operable Unit has been added as a reference in Section 8.0.</p> <p>Additionally refer to Common Concern Statement Response 4.</p>
154	<p>The absence of a Contingency Plan to limit/control actinide migration from soil erosion, especially following a major storm event or fire, has not been provided for us to review so we could evaluate the proposed action. DOE-LM has not provided us with a response or identification of a process as to how DOE-LM would maintain regulatory compliance for surface water, identify</p>	<p>Refer to Common Concern Statement Responses 1 and 4.</p>

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	<p>the details of the sampling methodology for water flowing freely versus the current protocols; or how the agency would contain or treat water that did not meet the RFLMA standards. Broomfield wants to protect our communities and watersheds in the event of an exceedance.</p> <p>Comment: We request that DOE-LM provide us with the details of their Contingency Plans for the events identified in these comments.</p>	
155	<p>Broomfield questions the evaluation performed to address impacts from groundwater. The site has not stabilized and DOE-LM acknowledges this fact in its own documents. The EA improperly dismissed the impact to groundwater at all five proposed dam breach locations. The EA improperly evaluates such a key component of the proposed action as a mere concern. More emphasis is placed on ecological systems than on hydrology at the site. This approach is improper, particularly for a site that is still undergoing treatment and has not fully stabilized.</p> <p>The site has not been subject to a full 5-year Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) review since regulatory closure occurred. There is no sufficient baseline data available to identify trends and evaluate the effectiveness of the existing remedies. DOE-LM has several ongoing activities that have the potential for affecting or negatively impacting surface water quality such as modifications to groundwater treatment units, evaluation of the subsidence in the Original Landfill cover, and additional sampling regimes at the Present Landfill. In addition, insufficient time has lapsed since closure to be able to observe the hydrological or topographical impacts to the surface water quality resulting from sequential wet and dry periods. Changing the surface water flow may increase the migration of groundwater plumes, some of which are direct contiguous links to surface water on the Rocky Flats site. It is well-known that seeps south of the B-series ponds have had elevated VOC concentrations.</p> <p>Comment: How will monitoring of groundwater seeps downstream of the proposed dams be evaluated?</p>	<p>Refer to Common Concern Statement Responses 1 and 2. Additionally, the dams would be breached, not removed, and the portion of the structures that influence groundwater hydrology would remain.</p> <p>Any groundwater seeps below the dams would flow into the creeks and would therefore be included in the POC monitoring,</p>

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156	<p>Pertinent contaminants in groundwater within the drainages are monitored upstream of the ponds that are proposed for breaching and most of the constituent concentrations at the relevant Points of Evaluation (POEs) are above the RFLMA standards that apply at the POCs.</p> <p>Comment: Please provide additional information to address how groundwater and seeps downstream of the breached ponds will be monitored to ensure water quality leaving the site is maintained.</p>	Refer to Common Concern Statement Response 2.
157	<p>In light of the fact that water quality is such a key component of the remediation at Rocky Flats, it is disappointing to see that groundwater was evaluated in one short paragraph of the EA. Other resources such as socioeconomic considerations, cultural resources, and transportation were given more thorough reviews than groundwater.</p> <p>Comment: Please provide the analysis that the agency performed to validate the EA's rationale pertaining to its determination that there would be minimal impact to groundwater. Please identify the direct impacts, indirect impacts, and cumulative impacts and the modeling associated with the EA's statement. Was this analysis validated and if so, by whom? Did the evaluation consider drought years, wet years, floods, and fires?</p>	Refer to Common Concern Statement Response 2.
158	<p>Section 5.1 of Attachment 2 to RFLMA states: "If the terminal ponds are removed, new monitoring and compliance points will be designated and will consider groundwater in alluvium." In order to make an informed decision on the proposed action and provide suitable comments on the EA, we need additional information to evaluate impacts to groundwater and other environmental media.</p> <p>Comment: Please provide the details concerning how the groundwater alluvium was evaluated and how those results will be considered as part of the Points-of-Compliance. What will the sampling methodology be for the groundwater alluvium?</p>	Refer to Common Concern Statement Response 2.

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159	<p>All government agencies and members of the interested public agree that protection of surface water is one of the primary objectives for remedial actions at the site. Due to the life expectancy of the remaining contaminants at the site, Section 2.1 of Attachment 2 to RFLMA states: Protection of surface water was a basis for making soil and groundwater response action decisions during the cleanup period so that surface water on-site and leaving the site would be of sufficient quality to support all uses. The proposed dam breaches will likely increase the risk that water on-site will leave the federal site boundary and not meet the RFLMA regulatory standards. Breaching the dams would clearly increase the potential for uncontrolled releases of contaminated surface water off-site that would negatively impact downstream watersheds and expose downstream communities to additional risks. Broomfield submits once again that the proposed action is not authorized per the RFLMA. Without the holding ponds, DOE-LM will intentionally be removing the only control in place to ensure surface water on-site and leaving the site would be of sufficient quality to support all uses.</p> <p>Comment: To ensure that the RFLMA is adhered to, please provide DOE-LM's rationale for the assumption that the Draft EA sufficiently evaluates all water quality impacts for the proposed action in order to make a Finding of No Significant Impact (FONSI) and does not warrant an Environmental Impact Statement (EIS).</p>	<p>Refer to Common Concern Statement Responses 1, 2, 3, and 4.</p>
160	<p>The existing ponds serve as an early warning that the remedy is functioning as designed. The final Environmental Assessment Comment Response and Finding of "No Significant Impact," dated October 2004, states the following: Ponds A-4 and B-5 would be maintained for two reasons. First, these ponds improve water quality by holding the water long enough for suspended solids to settle out. Since these terminal ponds are the largest ponds in their respective drainages, and thereby provide the longest residence times, they provide the most improvement in water quality of any ponds in the existing pond network. The second reason for maintaining the terminal ponds is for flood control. Removing all of the dams and the stormwater protection these ponds provide would change the hydrology of the basin and potentially expose downstream development to increased risk from flood hazards. However, the importance of this second reason for maintaining the terminal ponds may be partially diminished as future runoff volumes from the Site</p>	<p>Refer to Common Concern Statement Response 1 concerning water quality.</p> <p>Additionally, the 2004 EA stated in the "as discussed below" (as cited in the quote from the commentator):</p> <p>"Although the dams at Ponds A-4 and B-5 would remain unchanged and continue to operate in the same manner as they are currently, the volume of water routed through these ponds would be reduced in the future."</p> <p>The decrease is further discussed in the 2004 EA concerning stormwater runoff volumes diminished as buildings and pavement are eliminated. Based on the reasons stated in the 2004 EA, the possible flood control measures needed to maintain the hydrology at the RFS are no longer applicable, because the inflow into the dams and surface water runoff</p>

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	<p>decrease, as discussed below. (Emphasis added.)  The 2004 EA for the Pond Reconfiguration clearly identifies the need to maintain the terminal ponds to improve water quality. Broomfield also submits that the ponds serve an essential purpose to ensure that the water in the ponds meets RFLMA water quality standards prior to release off-site.</p> <p>Comment: What changes have occurred since 2004 to conclude that the remaining dams no longer provide a water quality benefit? Please provide the documentation that supports this conclusion.</p>	<p>from paved areas is no longer applicable.</p> <p>Additionally, upstream data (and POC data) show that the remedy is functioning acceptably. The remedy was designed not to need the ponds.</p>
161	<p>Table 4- 16 of the draft EA provides a summary of analytical results at POEs and Performance Monitoring locations. The average of the data is for October 2005 through 2009. Data when averaged especially over four years can provide us with the average concentration, but we would like to see the highest concentration for each location to determine if compliance would have been met at any single point in time.</p> <p>Comment: Please provide in table format, the supporting data for each location and include the highest concentration and the lowest.</p>	<p>Refer to Response 88. Data are provided on the RFS LM web page, and the URL address is available in Section 8.0 of the EA.</p>
162	<p>The draft EA provided some insight to the peak flow rates in the events of major storm events but leaves several critical questions unanswered.</p> <p>Comment: Has sediment transport been modeled with the associated storm events? Did Wright Water Engineers, Inc. determine the peak flow in the event of a wildfire with no vegetation as part of the report attached to the EA as Appendix D? What would the erosion rates be and would channeling contribute to sediment transport?</p>	<p>Refer to Common Concern Statement Response 5 and Response 153.</p>
163	<p>The draft EA identifies dam safety as an issue which supports DOE-LM's decision to remove the dams. In Table ES-1 Surface Water Quality, the draft EA states for Surface Water Quality under No Action: However, failure of a dam during a flood event would result in higher flood flows downstream and transport and deposition of large quantities of soil from the embankment structure. The remaining dams at the RFS are more than 30 years old. We understand that the dams are more than 30 years old. Nevertheless, there are several dams in Colorado that are much older than three decades. Continued operations and maintenance would ensure the safety of the dams. From previous inspections, it appears there were no issues with the dams.</p>	<p>Refer to Response 118.</p>

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	<p>Comment: Please provide information that supports what appears to be DOE-LM's determination that the dams are failing or are suffering from other conditions that would help us make a determination concerning the safety of the dams.</p>	
164	<p>The following statement is included in Table ES-1 for Surface Water Quality under Proposed Action: "Individual sample results....."</p> <p>The downstream communities are very concerned about this statement. The Proposed Action is expected to have increased variability yet such changes can result in water quality that exceeds Colorado Water Quality Control Commission (WCCC) Regulation No. 38 that are applicable the downstream watersheds below federally controlled lands.</p> <p>Comment: Please clarify which sampling results are expected to have increased variability and provide information as to the magnitude, frequency, and basis for calculation that was used to make this conclusion. How will the variability be monitored? How many data points will be collected and under what site conditions? Please provide the information on the application of surface water standards via summary statistics.</p>	<p>Refer to Common Concern Statement Responses 1 and 8.</p> <p>Table ES-1 is a summary of impacts and is not intended to supply detailed data. Please refer to Section 5.2.5.1 for complete detailed information.</p> <p>The ponds are operated in batch mode, and a discharge can include water 'collected' over several months. This water arrived in the ponds with varying levels of constituents due to hydrology and natural processes: uranium associated with groundwater gets diluted by runoff, periods of runoff can result in higher levels of constituents that are associated with solids transport. The resulting batch discharge is essentially an 'average' of this variability. So, if the ponds are removed, the downstream POCs (automated samplers) would be collecting samples with higher variability over the extended flow period not just during a 2-week batch discharge. But, the 'average' water quality is expected to be essentially the same.</p>
165	<p>DOE-LM Attempts to Justify the Proposed Alternative based on Unsupported Assumptions that Breaching; the Dams will Enhance Habitat and Various Ecological Systems.</p> <p>The agency has not adequately evaluated the hypothesis that the chosen alternative will enhance or improve habitat and various ecological systems as compared to the current system. DOE-LM has failed to properly support its conclusion that negative impacts are occurring with the present pond system. The draft EA does not properly assess alleged long-term habitat enhancements. The alleged benefits are theoretically based on the concept of what "available water allows." Numerous references by DOE-LM to water quantity limitations throughout the draft EA and DOE-LM annual reports theoretically support this conclusion.</p> <p>DOE-LM's decision to breach all the remaining dams is based on an unsupported theory that the breaches will improve riparian habitat within the COU. The proposed action will not ensure sustainable habitat improvement in the drainages downstream of the existing ponds. It is optimistic at best to</p>	<p>See Response 122 and Section 5.2.3.2 in the EA.</p>



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	<p>suggest that breaching the dams will establish new and better habitat in downstream drainages. Water quantity limitations, alone, bring this conclusion into question. Moreover, the draft EA clearly states that the dam breaching will eliminate 95 percent (14 acres) of open water habitat for 45 species of waterfowl. Broomfield submits that the theoretical gains in riparian habitat and the species they support would be minimal relative to the proven and admitted loss of open water habitat that will result from the dams being breached.</p> <p>Comment: Please provide an analysis of, and the justification for, elimination of 95% of one type of habitat (i.e., open-water habitat) as the proper trade-off for the theoretical potential gain for riparian habitat, particularly in light of the fact that the project site is located in a part of Colorado that is mainly a prairie grassland ecosystem.</p>	
166	<p>The objective of the Proposed Action is to "preserve and enhance wetlands and habitat to the extent practicable." However, the draft EA does not offer any objective criteria for measuring success of the proposed action, nor does the draft EA identify the expected timelines for reaping the theoretical environmental rewards of the proposed action.</p> <p>Comment: Please provide the evaluations that DOE-LM prepared to determine the enhancements to, and the viability of, the wetlands. Please provide the data to document the negative impacts the current system has on habitat.</p>	See Response 124.
167	<p>Since the ponds are more than 30 years old, Broomfield submits that substantial alterations to the associated ecological systems have already occurred.</p> <p>Comment: Please identify how human activities impact the ecosystems and the alterations that such activities have created at the site for the past 30 years.</p>	<p>Section 1.1 provides background on the RFS activities. Section 4.3 describes the current conditions in relation to present operations, and Section 5.0 provides expected impacts from the Proposed Action, as well as a cumulative impact summary.</p> <p>The purpose of this EA is to assess impacts that would be associated with the breaching of the remaining dams. For information concerning the activities for the past 30 years, and associated ecosystem impacts, please refer to Section 8.0 for reference documents.</p>

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168	<p>Establishing the suggested riparian habitat will certainly take many years, during which time the potential for uncontrolled contaminant migration flow off site remains.</p> <p>Comment: If contaminants flow offsite, what is the impact to the offsite habitat? Have offsite impacts to habitats been evaluated?</p>	<p>Refer to Common Concern Statement Responses 1 and 5.</p>
169	<p>DOE-LM has Not Adequately Evaluated the Impacts to Threatened and Endangered Plant and Wildlife Species. The draft EA states that the multi-strata habitat could change the multi-strata riparian woodland/shrubland habitats in Walnut Creek to a single story herbaceous habitat, which would limit the amount of quality habitat for the Preble's Meadow Jumping Mouse (PMJM). In fact, continued long-term reduction in creek flows below the dams in Walnut Creek will likely reduce the amount of existing wetland along this reach of creek, which would in turn, reduce available habitat.</p> <p>Comment: Please provide us with the agency's assessment of the change in downstream habitat from the original habitat in 1979 as compared to today's habitat.</p>	<p>Section 6.3 addresses the U.S. Fish and Wildlife requirements concerning the PMJM. DOE would evaluate the impacts to the Preble's mouse during consultation with the USFWS on the amendment to the PBA.</p> <p>The purpose of the EA is to assess impacts that would be associated with the breaching of the remaining dams. One of the purposes, as stated in Section 1.2, is to return the RFS surface water flow configuration to the <b>approximate</b> conditions existing prior to construction of the dams (emphasis added). For habitat information concerning pre-dam construction, please refer to Section 8.0 for reference documents.</p>
170	<p>In addition, because Broomfield augments water for downstream asset holders, Broomfield does not agree with the agency's suggestion that the lower South Platte River species would continue to be impacted by the retention of water upstream of the dams in the No Action Alternative.</p> <p>Comment: Please provide a proper assessment of the reduction in wetlands based on the current configuration of wetlands at the site.</p>	<p>Refer to Response 124.</p>
171	<p>DOE-LM has Failed to Explain the Inconsistencies which have Surfaced in the Draft EA, the Contact Record (CR), and the May 18, 2010 Public Meeting.</p> <p>Broomfield is also concerned about the inconsistencies that have surfaced in terms of the details provided in and related to two of the critical documents related to the agency's proposed choice of alternatives (i.e., the draft EA and the CR), as well as the DOE-LM's attempt to explain the proposed dam breaching activities and related operations presented at the public meeting on May 18, 2010. It is impossible to adequately comment on the proposed action</p>	<p>Refer to Common Concern Statement Responses 1, 3, and 7.</p>

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	<p>when DOE-LM has changed the concept, rationale, and protocols for the breaching of the dams throughout the process.</p> <p>Comment: Why is it necessary to collect several years of additional information and data related to habitat development and ecological changes related to the proposed flow-through condition that will be created at the terminal dams in the A and B series, but not at the terminal dam in the C series? How can the draft EA properly state that there will be enhanced habitat and ecological conditions that will result from the dam breaches, while simultaneously stating at the May 18, 2010 public meeting that several additional years of information and data compilation will need to be gathered at two of the three terminal dams to determine the exact habitat and ecological conditions which will result from the flow-through conditions?</p>	
172	<p>As justification for breaching the dams for the Present Landfill and Pond C-2 dam in 2011, the draft EA conclusively states, with virtually no explanation or assessment, that there will be minimal change to the habitat for No Name Gulch and Woman Creek. Without an adequate assessment of this conclusion, it is impossible for Broomfield or any other interested party to understand the need to proceed with the proposed action or the urgency to breach the C-2 dam. DOE-LM, without explanation, is treating two of the terminal dams in the A and B series differently than the C-2 dam. At the May 18, 2010 public meeting DOE-LM either could not, or simply would not, explain or justify its decision to place the C-2 dam breaching on a different schedule than the breaching for the A-4 and B-5 dams. All three of the terminal ponds are used as the downstream users' last opportunity to determine the quality of water to be released offsite. C-2 receives the run-off water from the 903 Pad, Inner Lip area, Americium area, 881 hillside and the 400 area. All these areas have residual contamination and C-2 captures the surface runoff for this large area. In addition, several trenches remain in the area north of C-2. Elevated readings for uranium have been recorded in this pond, and DOE-LM acknowledges that it is not 100% natural uranium. Although it is not discussed in the draft EA, the agency has determined that it is necessary to collect several years of additional information related to habitat and ecological system changes by creating a flow-through condition at two of the terminal dams. Broomfield submits that, before DOE-LM breaches any of the terminal dams, the same data and information should be collected</p>	Refer to Common Concern Statement Responses 1 and 7.

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	<p>over the same period of years for the C-2 terminal dam. There is no justification to treat the C-2 dam any differently than the A-4 and B-5 dams. Once that information is collected for the habitat above and below all three dams, and several years from now, the agency should then assess the need, if any, to suggest breaching of the terminal dams and make that assessment available to the public for review and comment.</p> <p>Comment: Why is DOE-LM treating the terminal dams associated with the A- and B- series ponds differently than dam for Pond C-2? Please provide the methods of evaluation and basis for success of the proposed flow-through operations.</p>	
173	<p>The EA Fails to Disclose or Quantify the Fiscal Benefit of the Proposed Action</p> <p>It appears the key motive for DOE-LM's proposal is alleged cost savings. As a downstream community, Broomfield reminds DOE-LM that they are responsible for the long-term stewardship of the site for the life of the contaminants left on-site and which, if improperly managed, may move off-site.</p> <p>Comment: Please clarify how DOE-LM determined cost savings associated with the proposed action. Provide a comparison of costs against the potential cost for corrective actions to address a release of offsite contamination. Has a cost benefit analysis been prepared to make a comparison between the actual cost and increased risk? Please provide the following financial information: - Annual cost to inspect the dams; Annual cost to draft reports associated with the ponds; - Annual cost to perform O&amp;M activities for the ponds; = Annual cost for sampling to ensure compliance; The estimated construction costs to breach the dams; The cost saving that would be made if the proposed action is implemented; and A comparison of these dam-related costs to the overall costs of the remedy to date, and as compared to expected future costs for the entire remedy.</p>	Refer to Common Concern Statement Response 6.

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174	<p>DOE-LM has Not Identified the Assessments that Need to be Made Related to Sediment/Soil Removal.</p> <p>Broomfield does not agree sediment from a settling pond should be removed and placed on the site surface without prior characterization. The ponds were clearly identified as IHSSs due to their nature to capture sediment potentially containing radionuclides, heavy metals or other analytes.</p> <p>Comment: When dredging the sediments and soil from the ponds and dams, will any sampling be performed to determine if there are any contaminants in the sediments?</p>	Refer to Response 125 and Common Concern Statement Response 5.
175	<p>In conclusion, Broomfield reiterates that it is too soon to breach the dams. More time is needed for the site to stabilize to develop a proper baseline and then compile data for trending and analysis. DOE-LM has not been able to provide the public with a Contingency Plan to protect downstream communities, and we do not have the details of the proposed relocation of the points-of-compliance. In addition, all three terminal dams should continue to serve as the last line of defense to prevent the movement of contaminated water and/or sediments off-site.</p>	Comment noted.
176	<p>We would also like to remind DOE-LM that monitoring at A-4, B-5 and C-2 is not a 'feel good' thing as stated at the public meeting on May 18, 2010. These sampling locations are regulatory obligations explicitly identified within the RFLMA. The terminal ponds are currently points-of-compliance and, at one time, the sampling methodology for these terminal ponds was for a 30-day running average.</p>	<p>Comment noted.</p> <p>Predischarge monitoring is not a CAD/ROD requirement but was added to RFLMA Attachment 2 as a component of operational monitoring based on agreement by the RFLMA Parties. The CAD/ROD and RFLMA POCs are located downstream of the dam locations.</p>

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177	<p>Broomfield and other downstream communities worked in good faith with DOE-LM to develop and identify the sampling locations and protocols for the site post-closure. Broomfield expects DOE-LM to uphold its obligation to ensure protection of human health and the environment by ensuring it has an effective long-term monitoring and maintenance program. We look forward to your response to our comments and a future meeting to address your disposition to the comments. We ask that DOE-LM disseminate our comments individually to address each specific concern to reflect due diligence on their part to address our concerns and comments to protect one of our greatest assets, surface water. Finally, we are hopeful that Broomfield and the general public will have an opportunity to review and comment on the additional information requested in this letter before DOE-LM takes any formal action on the Draft EA.</p>	<p>Comment noted.</p>
<p><b>John L. Watson, Special Counsel to the City and County of Broomfield, CO, Berenbaum Weinshienk, PC</b></p>		
178	<p>Broomfield strongly supports the “No Action” alternative identified in the Draft EA. We question the rationale for breaching terminal dams A-4, B-5, and C-2. The Draft EA does not provide sufficient analysis, data, or information for eliminating these features which serve as the last line of defense to ensure that contaminants which remain on the Rocky Flats site in soil, sediments, ground water and surface water are not released off-site into surrounding communities.</p>	<p>Comment noted.</p>
179	<p>Moreover, the agency acknowledges that it needs to gather several years of data and information related to ecological systems and habitat formation and restoration in the context of the “flow-through” configuration which the agency has proposed for terminal dams A-4 and B-5. Broomfield submits that the agency has not adequately justified its intent to breach terminal dam C-2 without gathering this same type of data and information for the habitat and ecological systems which exist in that portion of the site.</p>	<p>Refer to Common Concern Statement Responses 1 and 7.</p>

No.	Comment	DOE Response
180	<p>Timing of the dam breach activities:</p> <ul style="list-style-type: none"> <li>• At the May 18, 2010 public meeting, the DOE staff explained that, although it would breach terminal dam C-2 relatively quickly, i.e., in 2011, the agency intended to breach terminal dams A-4 and B-5 several years later, i.e., sometime in the years 2015-2018. The timing differential was referenced in the draft EA, but the reasoning for this time differential was not addressed in the draft EA.</li> <li>• Although it was not mentioned in the draft EA, the agency staff also stated at the May 18, 2010 public meeting that they intend to create a “flow-through” condition in the intervening years at terminal dams A-4 and B-5</li> <li>• At the May 18, 2010 meeting, in response to the question of “why,” the agency staff stated that they wanted to collect several years of additional data and information in the interim related to changes to habitat and the ecological systems that would occur after the agency created a flow-through condition for both terminal dams A-4 and B-5.</li> <li>• Having learned for the first time at the May 18, 2010 public meeting about this “flow-through” condition concept and the need for the agency to collect additional habitat formation and other ecological system data and information for two of the terminal dams, Broomfield asked why the agency was treating terminal dam C-2 differently than terminal dams A-4 and B-5.</li> </ul> <p>Please explain in detail:</p> <ul style="list-style-type: none"> <li>○ The methods and protocols for establishing the “flow-through” condition at terminal dams A-4 and B-5;</li> </ul>	<p>Refer to Common Concern Statement Response 7.</p> <p>Maintaining flow-through conditions at the dams is discussed in Section 2.1.1 and in the Project Description Section 3.1. For clarity, the flow-through configuration proposal has been reinforced in the wording throughout the document.</p> <p>Refer to Common Concern Statement Responses 1 and 7.</p> <p>Refer to response above on the flow-through configuration. Additionally, refer to Common Concern Statement Response 7.</p> <p>Section 3.1 describes the Proposed Action.</p> <p>Refer to Common Concern Statement Response 7.</p>

No.	Comment	DOE Response
	<ul style="list-style-type: none"> <li>○ Why this same “flow-through” condition could not be established at terminal dam C-2;</li> <li>○ What data and information the agency intends to collect related to habitat formation and ecological systems for terminal dams A-4 and B-5 in the intervening years between now and 2015-2018; and</li> <li>○ Why the agency has determined that it is not necessary to collect the same types of data and information related to habitat formation and ecological systems before it fully breaches terminal dam C-2.</li> </ul>	<p>There is no regulatory requirement to collect additional habitat or ecological information at the ponds/dams prior to any proposed breaching. A baseline of ecological information is available for RFS in previous annual reports that date back to the early 1990s.</p>
181	<p><u>Downstream Habitat.</u> The Draft EA provides a partial justification for the breaching proposal and states: “Long-term continuation of batch releases from the ponds, predominantly during the non-growing season, could alter the structure and composition of the downstream habitat.” <i>See</i> page xii, Walnut Creek “No Action Summary;” <i>see also</i> page 5-4, section 5.2.2.2; and page 5-15, Table 5-2.</p> <ul style="list-style-type: none"> <li>• In light of the fact that the terminal dams have been in operation for several decades, i.e., in excess of 30 years, it is clear that the structure and composition of the downstream habitat has already been altered over those several decades.</li> <li>• The public learned for the first time at the May 18, 2010 public meeting that the DOE intends to create a “flow-through” condition at terminal dams A-4 and B-5, but not at terminal dam C-2. The purpose of this flow-through condition is to collect additional data and information related to ecological systems and habitat restoration and formation before breaching terminal dams A-4 and B-5.</li> <li>• The agency also mentioned in the Draft EA that the batch and release events occur during the “non-growing” season for vegetation. <i>See</i> page 5-3, section 5.2.1.2.</li> </ul>	<p>Section 5.2 states that the potential impacts have been assessed according to the degree in which impacts may occur in magnitude in relation to the overall environment and associated resources. Some impacts are assessed based on professional judgment. Each section states if information is not available or uncertain.</p> <p>40 CFR Section 1502.15 directs the environmental assessment to “succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration. The descriptions shall be no longer than is necessary to understand the effects of the alternatives. .... Verbose descriptions of the affected environment are themselves no measure of the adequacy ....”</p> <p>The prior conditions at the RFS have been extensively described in numerous documents referenced throughout the EA. Refer to Section 8.0 for a list of the referenced documents.</p> <p>Refer to Response 180 and Common Concern Statement Response 7. The purpose of the flow-through conditions, prior to breaching, are not as the commentor has suggested to “collect additional data and information related to ecological systems and habitat restoration and formation...” but rather to evaluate how the upstream breached ponds are affecting water quality.</p> <p>Comment noted.</p>



No.	Comment	DOE Response
	<ul style="list-style-type: none"> <li>Broomfield MAY be amenable to operating all three terminal dams with a flow-through configuration, provided that the agency develops and implements an acceptable contingency plan in the event of high flow (or any other) conditions which could otherwise result in releases offsite which are not in conformance with applicable standards. If such an acceptable contingency plan is prepared and submitted to Broomfield and other members of the public for comment, it MAY be acceptable to allow “flow-through” at all three terminal dams so that releases occur throughout the year, including the “growing seasons.</li> </ul>	<p>Refer to Common Concern Statement Responses 1, 4, and 7. Additionally, as described in the Executive Summary, and Sections 3.1.7, 4.3.5.1, and 4.3.5.3, according to the RFLMA operational monitoring and the Operations and Maintenance Plan for the Rocky Flats Surface Water Control Projects....., the operation of ponds A-4, B-5, and C-2 is to retain water until approximately 40 to 50 percent of capacity is reached, at which point discharge planning is initiated. This discharge is planned at capacity limits at directed in these referenced documents and is not driven by seasonal needs.</p>
	<ul style="list-style-type: none"> <li>This will ensure that (a) data and information related to ecological systems and habitat restoration and formation can be collected for all three dams rather than just two, and that (b) the dams can continue to serve their exceptionally valuable function as a final line of defense against problematic off-site releases.</li> <li>In the meantime, Broomfield submits that it makes more sense to maintain the status quo via the “No Action” alternative.</li> </ul>	<p>There is no regulatory requirement to collect additional habitat or ecological information at the ponds/dams prior to any proposed breaching. A baseline of ecological information is available for RFS in previous annual reports that date back to the early 1990s.</p>
182	<p><b>Riparian habitat and wetlands. See discussion in the Draft EA related to “Purpose and Need,” at page 1-5, which states in part, “Returning flows to approximate pre-retention conditions would provide ecological benefits by improving riparian habitat and reestablishing wetland formation.”</b></p> <ul style="list-style-type: none"> <li>Extensive wetland and riparian habitat has developed as a result of dam placement over the last several decades (<i>see</i> Figures 4-1 through 4-5; <i>see also</i> page 4-9, Table 4-4 showing total wetland acreage of 18.155 acres).</li> <li>Has the agency assessed and estimated (and if so what is your best estimate of) the total acreage of wetlands which will develop over time as a result of the dam breach as compared to the total wetland</li> </ul>	<p>Comment noted.</p> <p>Section 5.2.4.1 provides quantifiable data concerning the total acreage of wetlands that would be expected to be created in former open water habitat areas.</p>

No.	Comment	DOE Response
	<p>and riparian habitat acreage which will be lost as a result of the dam breach?</p> <ul style="list-style-type: none"> <li>• What is the net acreage increase or decrease for wetlands?</li> <li>• Is it a wash? In other words, is there essentially no net increase or decrease?</li> <li>• What is the basis for your response to questions (3) and (4), immediately above?</li> <li>• Is the agency's need to properly answer these questions at least in part the reason the agency wishes to collect additional data and information related to ecological systems and habitat restoration and formation related to terminal dams A-4 and B-5?</li> </ul>	<p>Section 5.2.4.1 provides quantifiable data concerning the total acreage of wetlands that would be impacted.</p> <p>Section 5.2.4.1 provides the net increase/decrease acreage of emergent wetlands expected.</p> <p>The basis of the information presented in the EA is from the RFS GIS data and professional judgment.</p> <p>Refer to Common Concern Statement Responses 1 and 7 and response to bullet 2 in Response 181.</p>
183	<p><b>Water quality standards. See discussion in the Draft EA related to "Purpose and Need," at page 1-5, which states in part, "Water discharged from the terminal pond dams meets applicable RFLMA surface water quality standards."</b></p> <ul style="list-style-type: none"> <li>• The water quality monitoring program results which support the above statement are premised on 12-month averages.</li> <li>• The DOE staff stated at the May 18, 2010 public meeting that the individual data points for each monitoring event, each location, and each constituent are provided in the quarterly reports provided on the agency's website.</li> <li>• We have not had the time to review the data related to these individual monitoring events, but one expects that there will be substantial variation over time showing that in relation to several data points (location, date, media, constituents analyzed), there will be several exceedances of the applicable water quality standards at</li> </ul>	<p>Comment noted.</p> <p>Comment noted.</p> <p>As stated in Sections 4.3.5.3 and 5.2.5.1, over 7,400 individual grab samples have been taken. Refer to Section 8.0 for references for Annual Reports. These reports provide individual sample results and are incorporated into the EA by reference.</p> <p>A single data point does not make an exceedance of a Standard.</p>

No.	Comment	DOE Response
	<p>individual monitoring stations and at different dates over the 12-month averaging period.</p> <ul style="list-style-type: none"> <li>• Is this true?</li> <li>• What are the trends, if any, with regard to these exceedances?</li> <li>• How does the water quality vary over time?</li> </ul>	<p>Compliance is demonstrated using some method: 85<sup>th</sup> percentile, 50<sup>th</sup> percentile, 30-day average, 12-month average, etc. Additionally, refer to Response 164.</p>
184	<p><b><u>Sediments.</u></b> <i>See discussion in the Draft EA related to “Issues and Concerns,” at page 2-1, section 2.1.1, Internal Scoping which states in part, “The team identified the following issues to be addressed in the EA: . . . Surface water quality monitoring, including <u>downstream sediment</u> (the team noted that surface water quality is a key known concern for neighboring communities).” (Emphasis added.)</i></p> <p><i>See also the agency’s statement at page 5-1 of the Draft EA, “[T]he dams are not a part of the final CAD/ROD remedy for RFS and are not <u>designed or operated as sedimentation basins.</u>” (Emphasis added.)</i></p> <ul style="list-style-type: none"> <li>• Although the dams (both terminal dams and non-terminal dams) are not “designed or operated as sedimentation basins,” they function as such, i.e., they have collected sediment behind the dams for decades.</li> <li>• The agency mentions at page “x” of the Draft EA in the “No Action” discussion that, “Data would continue to be collected on water quality <u>and sediment.</u>” (Emphasis added.)</li> <li>• What is the current protocol for testing sediments – both upstream and downstream of the dams?</li> <li>• What are the levels of contaminants which have been found in both upstream and downstream sediments?</li> </ul>	<p>Refer to Common Concern Statement Response 5.</p> <p>Refer to Response 3.</p> <p>Refer to Common Concern Statement Response 1. Sediments that are transported in surface water are sampled inherently within the water samples collected. Water samples are not filtered prior to analysis, and analytical results reflect constituent concentrations for both the water and any suspended solids.</p>

No.	Comment	DOE Response
	<ul style="list-style-type: none"> <li>• We assume that contaminated sediments (wherever they are found, above or below the dams) which are above a certain threshold will be removed to an appropriate area and isolated from the environment or disposed off-site.</li> <li>• What criteria have been developed to determine whether and when to remove sediments upstream or downstream of the dams in the context of the breaching activities?</li> <li>• Why did the agency limit its assessment of sediments to “downstream sediments?” <i>See</i> “Issues and Concerns,” at page 2-1, section 2.1.1, Internal Scoping of the Draft EA.</li> <li>• Did the agency consider the fact that the breaching activities will cause what are now “contained and captured sediments” which lie above the dams to be released downstream of the dams and perhaps off-site, particularly during peak surface water flows?</li> </ul>	<p>Refer to Common Concern Statement Response 1. See response to prior bullet.</p> <p>Refer to Common Concern Statement Response 5.</p>

No.	Comment	DOE Response
185	<p><b>Floodplains and Peak Flood Flows.</b> The agency’s floodplain analysis in the Draft EA which begins at page 4-10 confirms that substantial peak flows will occur at the site in the event of 50-year or 100-year flood events.</p> <p>The water quality analysis beginning at page 4-24 of the Draft EA confirms Total Uranium exceedances at POE GS-10 (16.9 ug/L averaged over 68 sampling events versus a standard of 16.8 ug/L) and, more particularly Performance location GS-13 (26.4 ug/L averaged over 76 sampling events versus a standard of 16.8 ug/L).</p> <ul style="list-style-type: none"> <li>• Broomfield submits that it makes more sense to maintain the terminal dams at ponds A-4, B-5 and C-2 indefinitely to avoid substantial sediment movement downstream of the dams if and when such flood events occur?</li> <li>• The agency states at pages 5-18 and 5-19 of the Draft EA that the “breach of the C-2 dam would be engineered to accommodate” the possibility that the Woman Creek Diversion Dam would fail, and thus the C-2 dam breach would be “designed to accommodate the entire Woman Creek flood flow.”</li> <li>• What are the characteristics of the sediments which would flow downstream in the event of the failure of the Woman Creek Diversion Dam?</li> <li>• Given the fact that there is a possibility that the new C-2 dam configuration resulting from the “C-2 dam breach” might not “accommodate the entire Woman Creek flood flow,” Broomfield submits that it makes more sense to maintain the status quo via the “No Action” alternative for all three terminal dams, including C-2.</li> <li>• As stated above in the section related to <u>Downstream Habitat</u>, Broomfield MAY be amenable to operating all three terminal dams with a flow-through configuration, provided that the agency develops</li> </ul>	<p>Refer to Common Concern Statement Response 5 for all of the bullet points in this comment. Additionally, the dams are classified by the State of Colorado as Low or No Public Hazard, which means that even if they were to fail, flood volumes are not a downstream risk.</p>

No.	Comment	DOE Response
	<p>and implements an acceptable contingency plan in the event of high flow (or any other) conditions which could otherwise result in releases offsite which are not in conformance with applicable standards. If such an acceptable contingency plan is prepared and submitted to Broomfield and other members of the public for comment, it MAY be acceptable to allow “flow-through” at all three terminal dams so that releases occur throughout the year, including the “growing seasons.</p> <ul style="list-style-type: none"> <li>• This will ensure that (a) data and information related to ecological systems and habitat restoration and formation can be collected for all three dams rather than just two, and that (b) the dams can continue to serve their exceptionally valuable function as a final line of defense against problematic off-site releases.</li> <li>• The agency’s flood flow modeling predicts that flood flows will occur over time. Broomfield submits that the agency should maintain all three terminal dams to capture the modeled and predicted flood flows.</li> <li>• Again, Broomfield submits that it makes more sense to maintain the status quo via the “No Action” alternative for all three terminal dams, including C-2.</li> </ul>	
186	<p>In sum, subject to further communications among the interested parties and agencies particularly with regard to contingency plans, and to allow the continued use of the terminal dams as the last line of defense against unacceptable off-site releases, Broomfield submits that it is better to maintain the status quo via the “No Action” alternative. It is important to continue to capture water flows and test the water before releases occur.</p>	<p>Comment noted.</p>

In addition to the written comments received on the Draft EA, the following provides a transcript of statements that were written on a flip chart during the information public meeting at the Broomfield City and County Building on May 18, 2010. The meeting was an informal format, and these comments were written on flip charts for the audience review. Many comments were answered during this meeting, and this is noted in the following transcript.

**Summary of oral questions and comments at the  
May 18, 2010 informational public meeting  
on the Rocky Flats Surface Water Configuration EA**

Key: Q = questions  
C = comments  
A = answers or responses where applicable

- 1) Q – What are the water levels in A-4, B-5 in flow-through condition, how high are the dams?  
A – Water levels not below 10 percent of capacity, A-4 approximately 5 feet, B-5 approximately 10 feet above water level.
- 2) Q – In flow-through condition you can stop the flow if monitoring results show elevated contaminants. Would you (DOE) consider closing the A-4, B-5 valves if turbidity gets too high? What are the annual amounts of evaporative losses?  
A – Yes – variable, less than 100 acre-feet.
- 3) Q – Elaborate on costs, \$24 million over 75 years, how much did DOE spend last year (on dam maintenance)?  
A – Approximately \$135,000 on operation and maintenance only.
- 4) Q – What evaluation was used in the EA concerning sediments?  
A – The evaluations were developed during closure.
- 5) C – Woman Creek Basin, unresolved – issues with seepage at Original Landfill remedy (cap) that didn't work – continued monitoring required, upstream wells with elevated uranium levels – seems premature (to breach C-2) – still working to control seeps, landfill not resolved – concerned about filling in SID.
- 6) Q – Why are you treating Terminal Dam C-2 differently (than A-4, B5)? – does groundwater enter C-2 – can't stop water or sediments from C-2.  
A - C-2 is not part of Woman Creek, so not a terminal dam –some groundwater from other ditches and Woman Creek does seep into C-2.
- 7) C – Issue with human health and environment - wants to see several CERCLA review cycles go by before breaching terminal dams - takes too long to establish wetlands and sediments can move if there is a flood (from written statement that will be submitted).
- 8) C – Should slowly reduce levels – no way to control the water – no contingency plan (from written statement that will be submitted).

- 9) C – 2004 EA did not consider breaching the PLF pond, A-3, A-4, B-5, C-2. Did not review all cumulative impacts – not consider off-site contaminant migration or include a contingency plan in this EA.
- 10) Q – To CDPHE: How will you stop contaminants from leaving the site if you breach the dams and change the POCs?  
A – Explained RFLMA process: evaluate, consultation, actions plans, source evaluation, potential corrective action.
- 11) C – Contact Record approving excavation premature, presumption that dams will be breached, why make the effort to put together the CR if you haven't already made the decision to breach the dams.  
A – Explained that addressing the IC at this time is part of the evaluation of the proposed action.
- 12) Q – How can you resolve issuing a FONSI if you are going to operate A-4, B-5 in flow-through to evaluate ecological impacts to drainage?
- 13) Q – Why not operate the three terminal dams in flow-through state to get additional data on impacts?
- 14) C – (The EA should) explain monitoring targets, analytes – questions on how DOE monitors at the site and location of data.
- 15) Q – Is there anything to prevent monitoring POCs on USFWS property?  
A – No
- 16) Q – Who approved going forward with this EA - how much has it cost - does it take a court challenge to challenge a FONSI?  
C – This action is premature for a number of reasons – Pu loading on site from 69 fires, 903 pad (one other event mentioned but not captured).  
There still is contamination on east side of site, which is not stabilized. The City and County of Broomfield has been insulted enough over the last 60 years. This project is 90 –100 years premature. This is not safe for people. Our reservoir had 10–20 pCi/l.
- 17) Q – No information in Draft EA on what condition dams are in, what you are required to do to maintain the dams. Would DOE release the state engineer inspection reports?  
A – Scott Surovchak will check to see if that information is releasable to the public.
- 18) Q – If you notch the dams will you be able to hold the water from flowing downstream if contaminants are found?  
A – No.

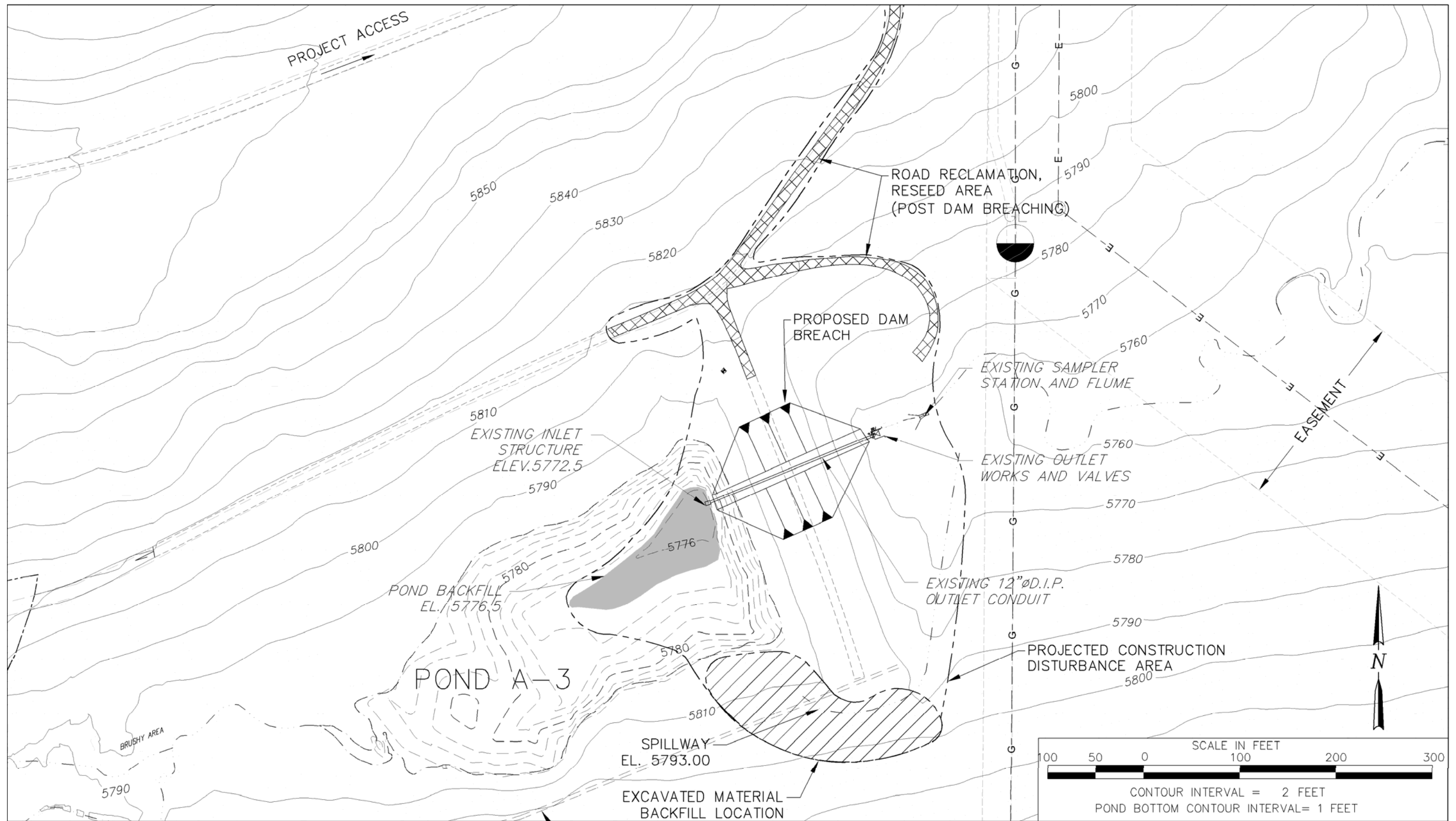


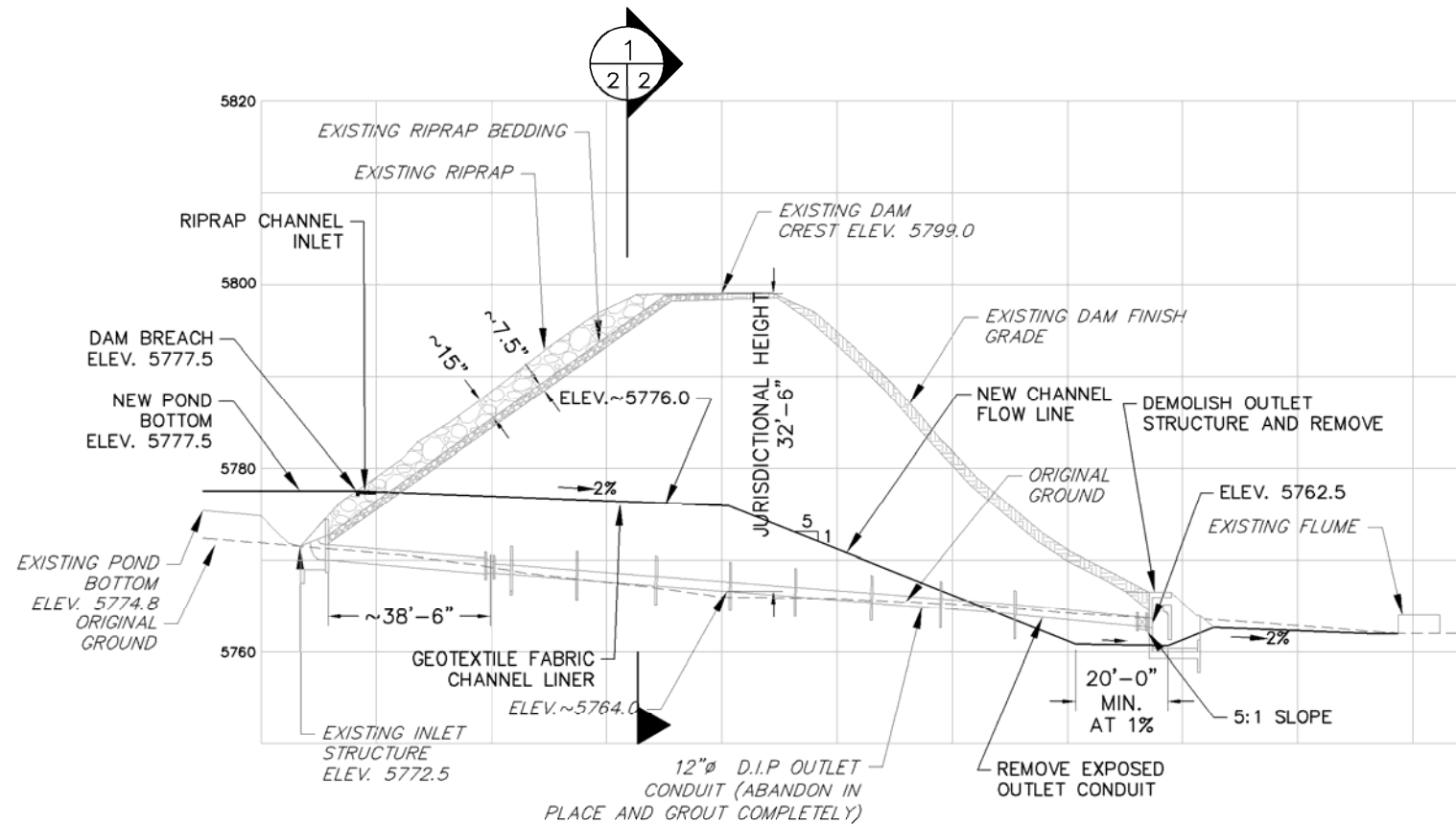
- 19) C – Need greater discussion on:
- a. cost reduction analysis/comparison to cost of project/remedy.
  - b. clarify why you are treating C-2 differently from the other terminal dams – should operate all three in flow-through for another five years and study – then come back to community with EA.
  - c. sedimentation – dams not designed or operated as settling ponds, but might act as settlement basins.
- 20) C – You say dam releases during non-growing season alter downstream habitats, is it feasible to conduct more frequent batch releases during the year to aid habitat?
- 21) Q – Water quality standards?  
A – Water released meets RFLMA standards
- 22) Q – Will data continue to be collected on water and sediments? Suggest implementing sediment sampling regimen or explain why not needed.
- 23) C – If an exceedance occurs, then you will evaluate – not an acceptable response.
- 24) C – Much too soon to move forward. There is no information on an extensive fire or heavy precipitation event. Need more analysis of site conditions and configuration. Once the dams are breached we will have no final line of protection. Not enough information in EA to make informed decision. Not convinced remedy remains protective with dams breached.
- 25) C – Remedy not established, still making adjustments on treatment systems – when can we get the information we’ve asked for – will there be a second round of review and comments on EA.
- 26) C – Are you studying the upstream breaches and how the wetlands are establishing – the impact of the changes has not been evaluated, only have subjective qualitative statements – can’t quantify or determine what the ecological impacts will be.

## **Appendix B**

### **Engineering Drawings—Dam Specific**

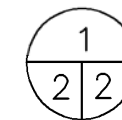
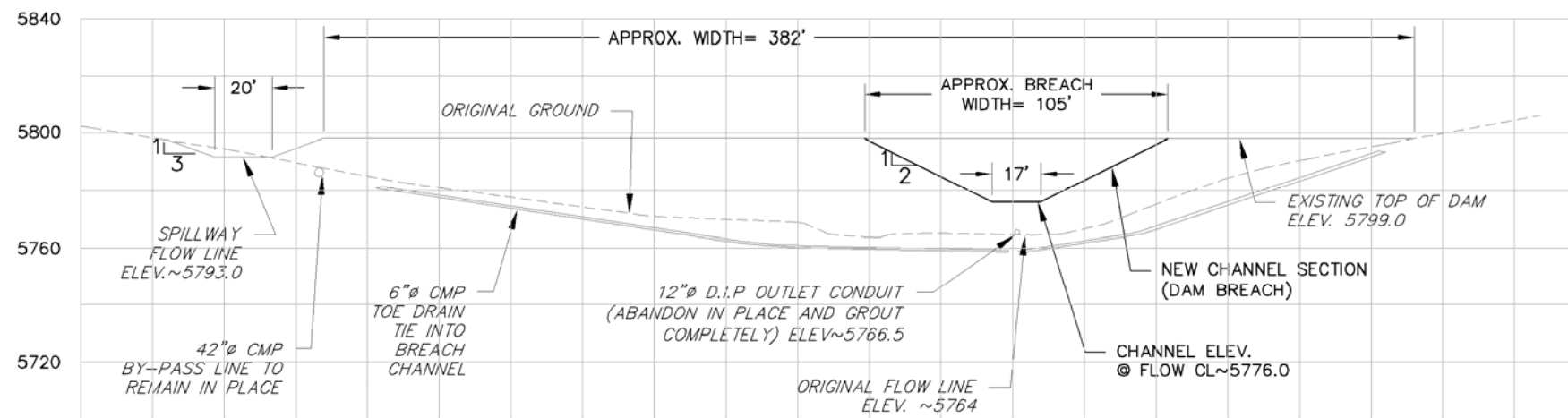
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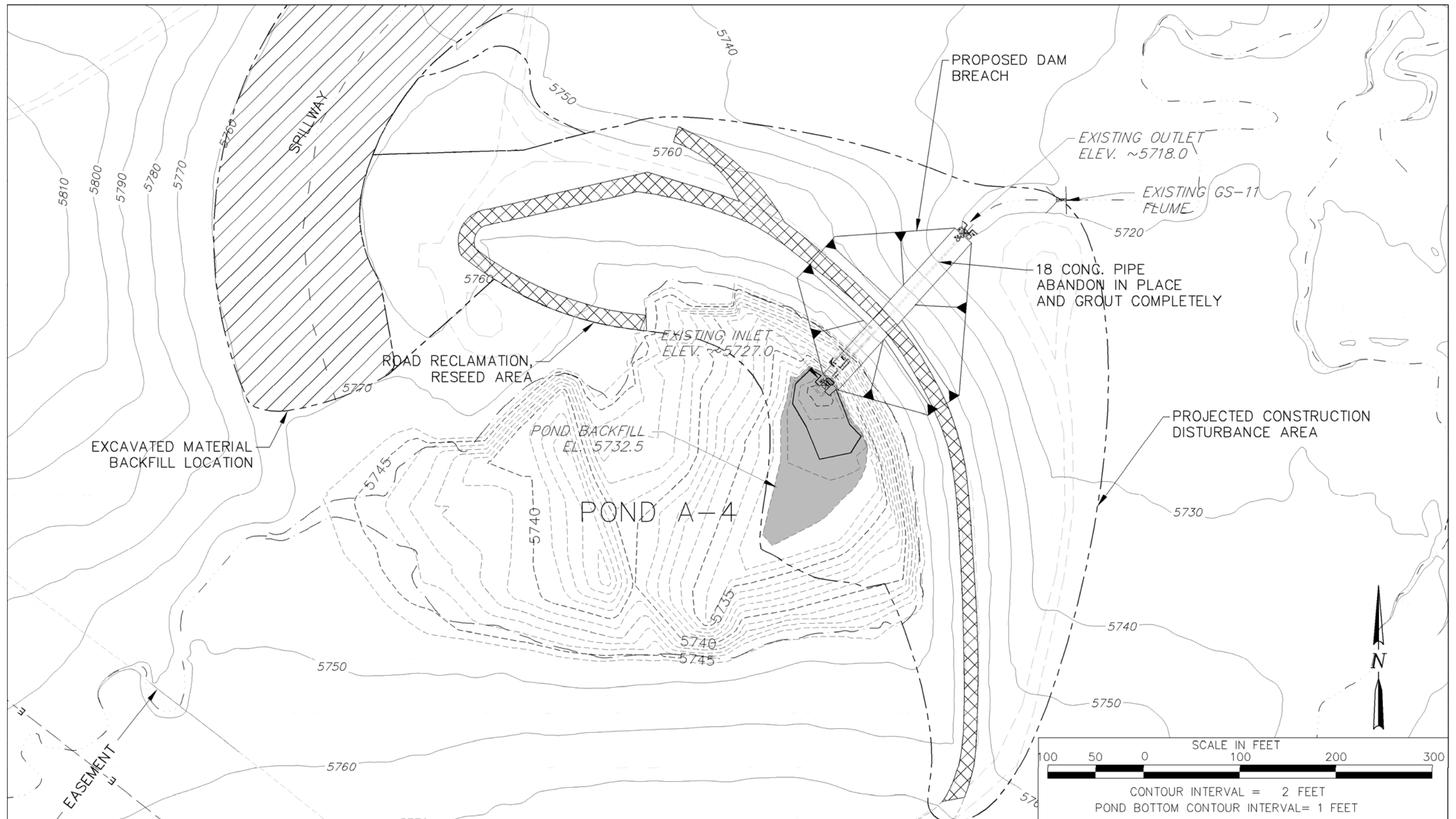
**DAM A-3 BREACH:  
CHANNEL PROFILE THROUGH DAM SECTION**

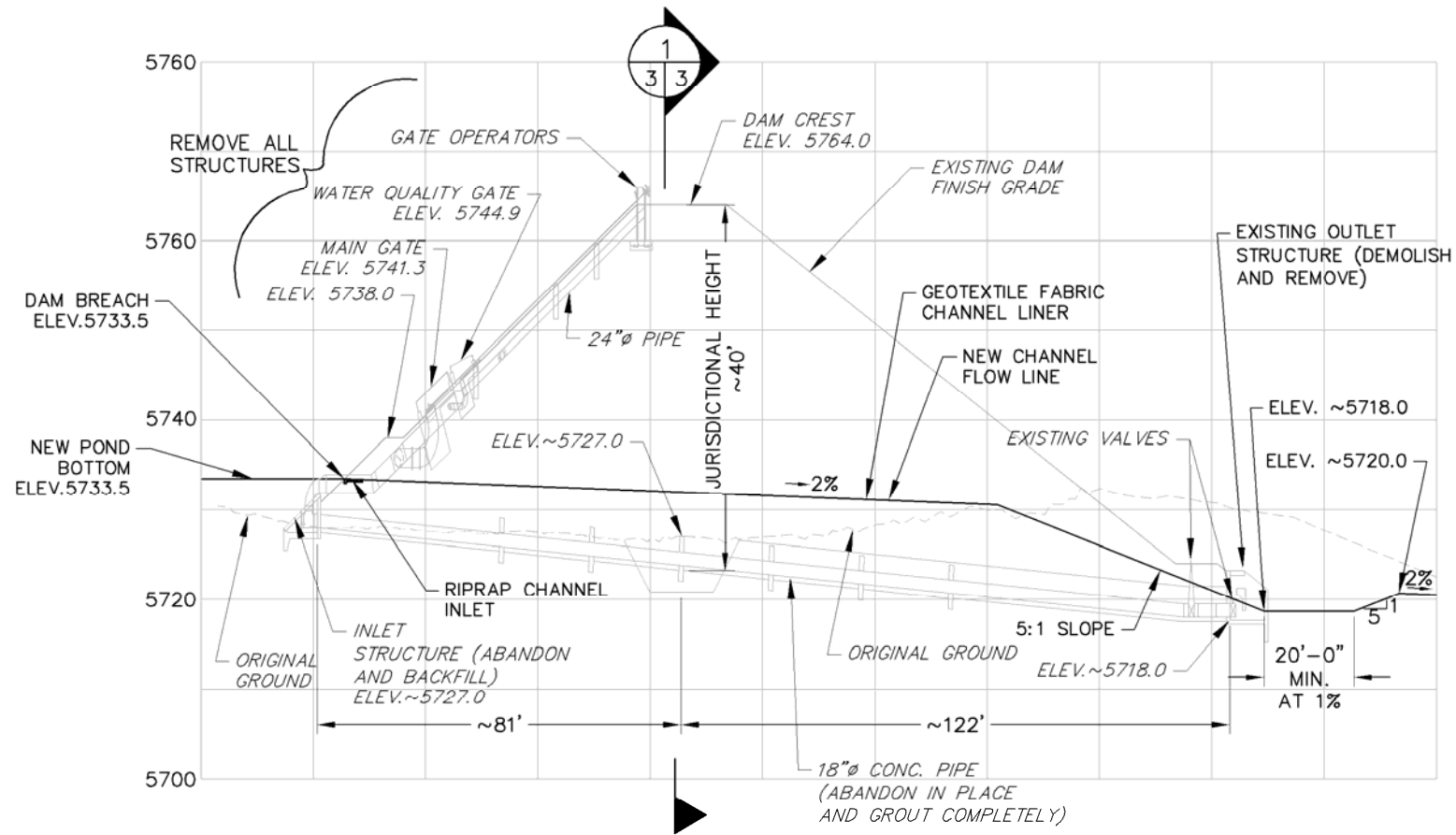
SCALE: HORIZONTAL 1" = 40'  
VERTICAL 1" = 20'



**DAM A-3 BREACH:  
SECTION THROUGH DAM PROFILE (LOOKING DOWNSTREAM)**

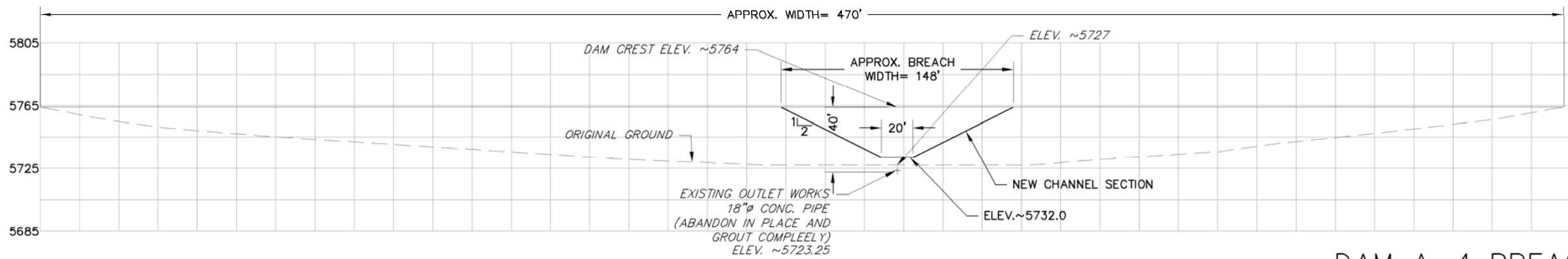
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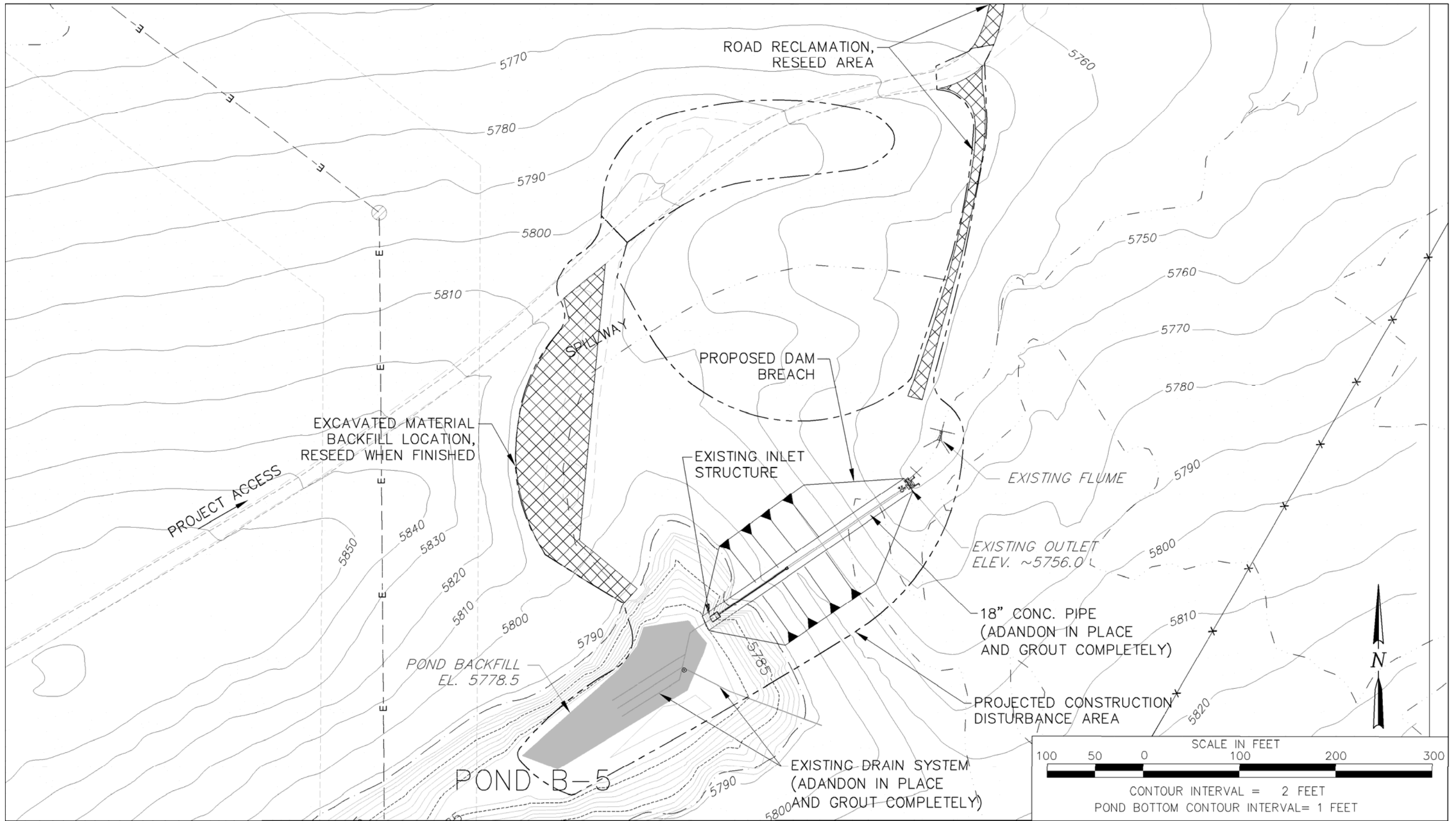
**DAM A-4 BREACH:  
CHANNEL PROFILE THROUGH DAM SECTION**

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VERTICAL 1" = 20'

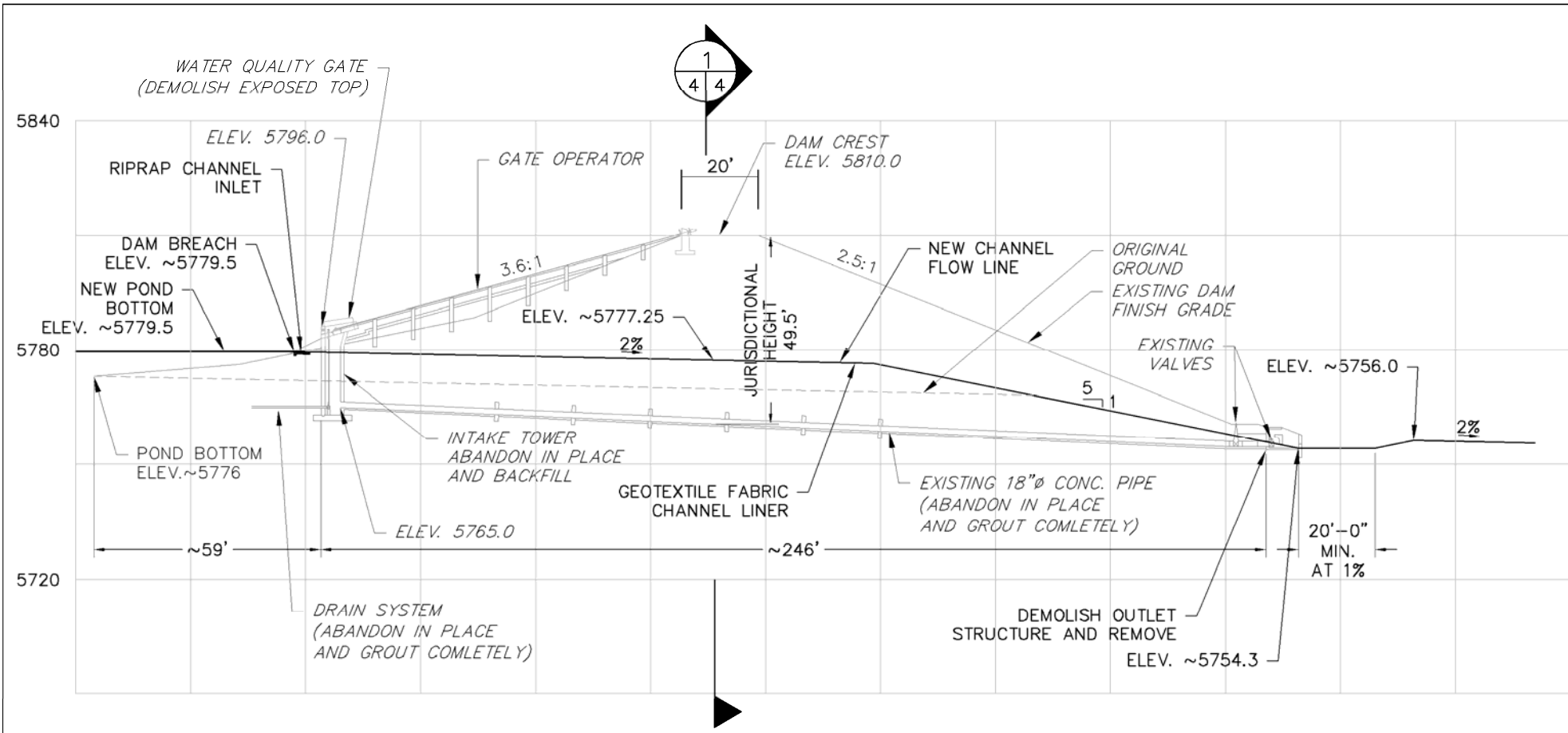


**DAM A-4 BREACH:  
SECTION THROUGH DAM PROFILE (LOOKING DOWNSTREAM)**

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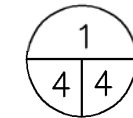
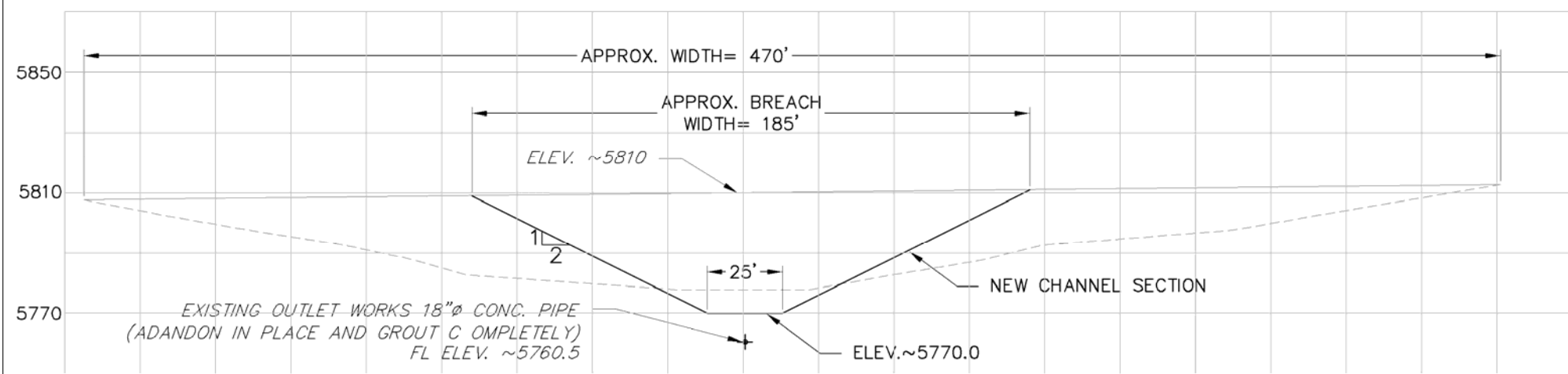






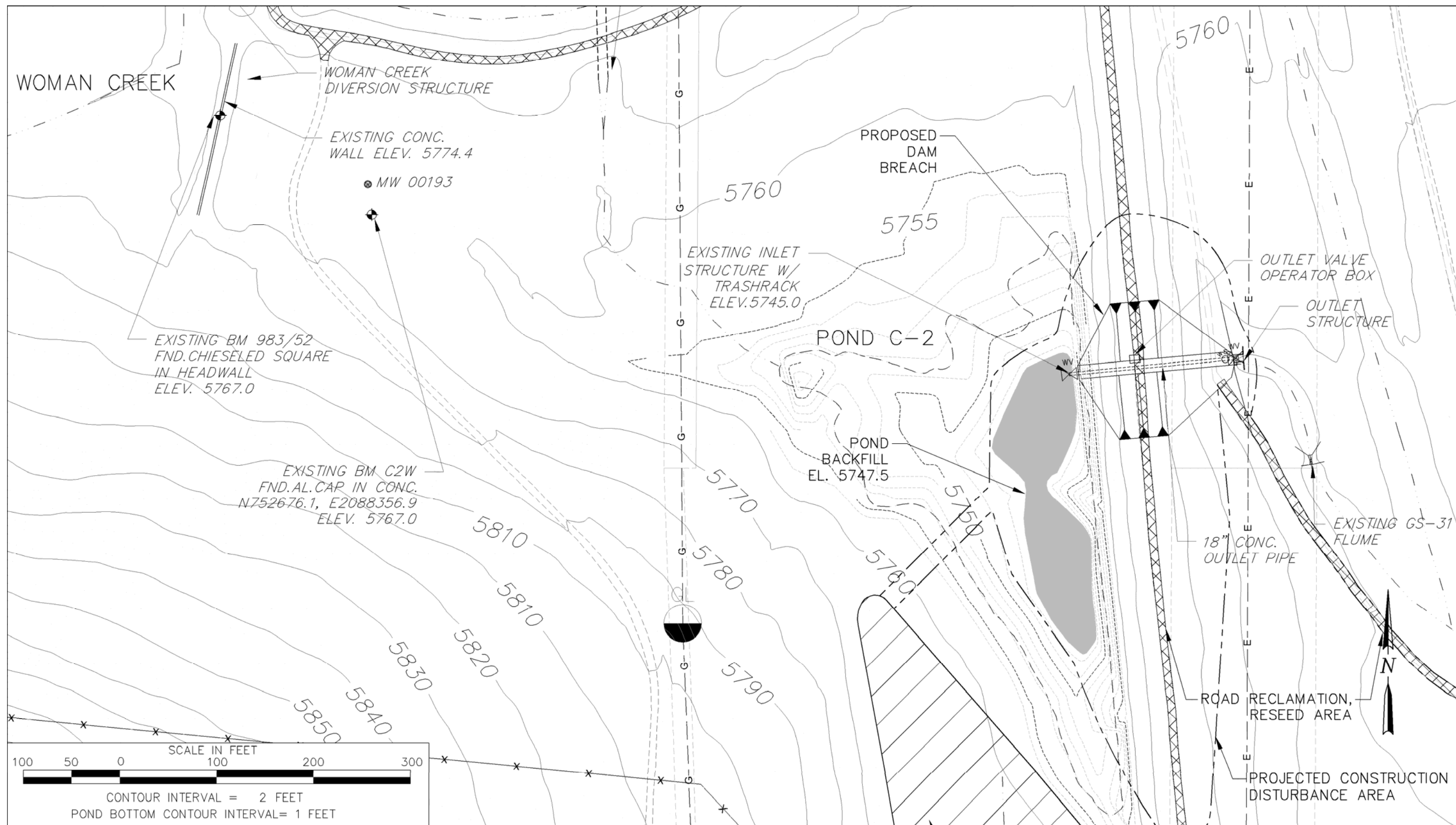
**DAM B-5 BREACH:  
 CHANNEL PROFILE THROUGH DAM SECTION**

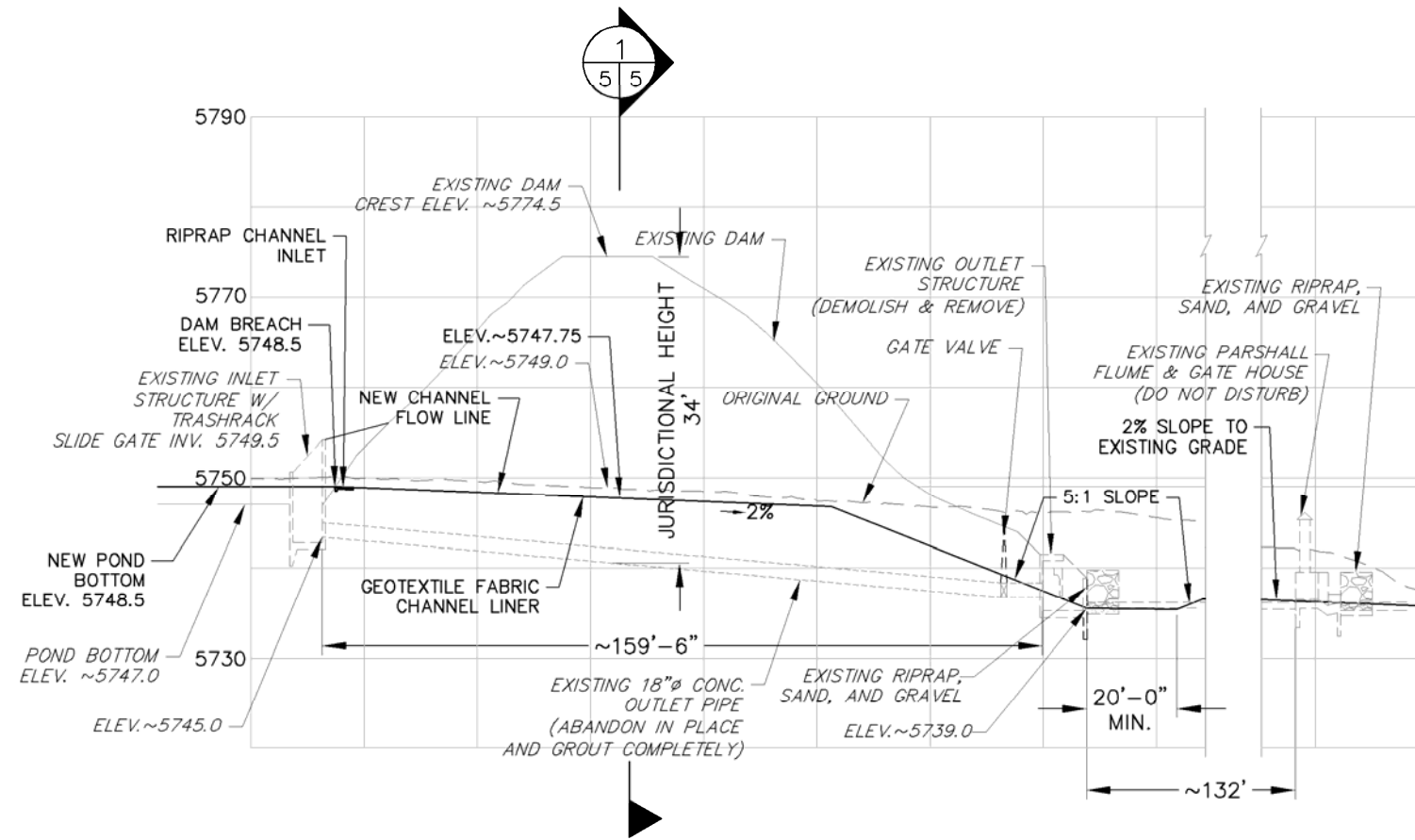
SCALE: HORIZONTAL 1" = 40'  
 VERTICAL 1" = 20'



**DAM B-5 BREACH:  
 SECTION THROUGH DAM PROFILE (LOOKING DOWNSTREAM)**

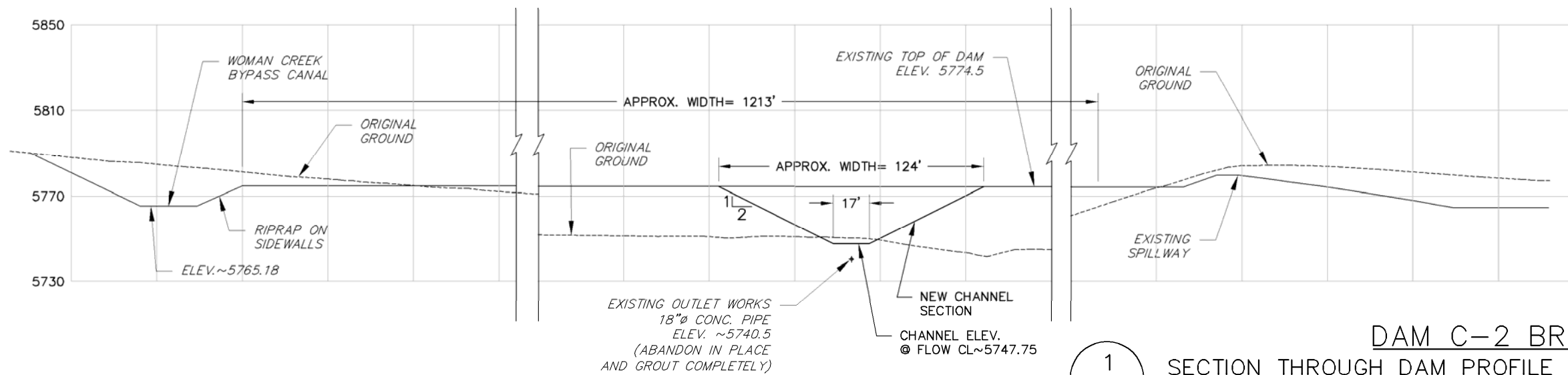
SCALE: 1" = 50'





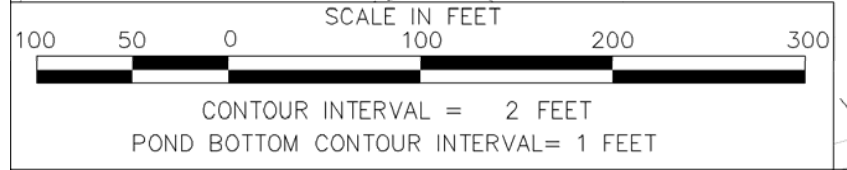
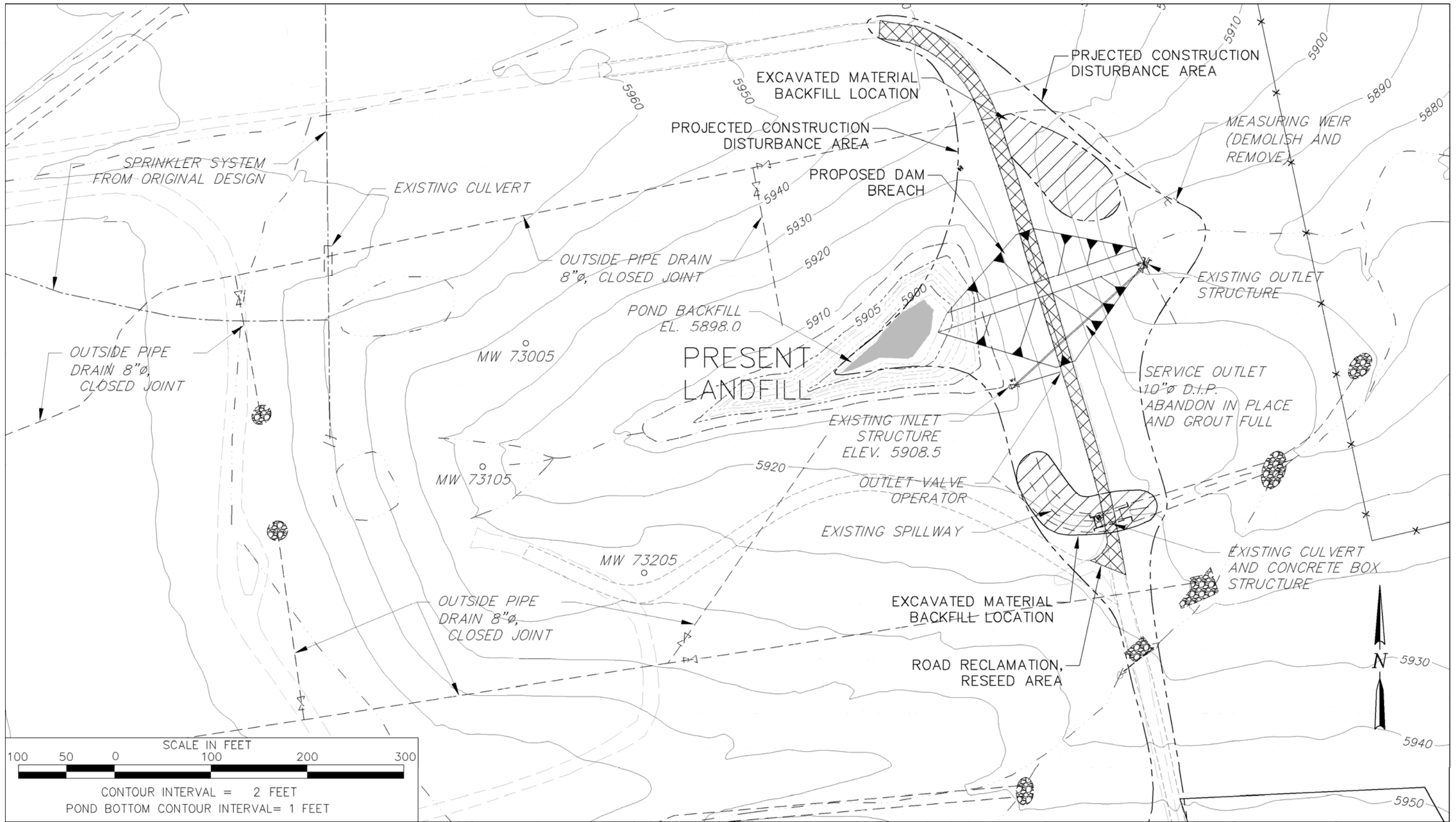
**DAM C-2 BREACH:  
CHANNEL PROFILE THROUGH DAM SECTION**

SCALE: HORIZONTAL 1" = 40'  
VERTICAL 1" = 20'



**DAM C-2 BREACH:  
SECTION THROUGH DAM PROFILE (LOOKING DOWNSTREAM)**

SCALE: 1" = 60'

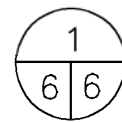
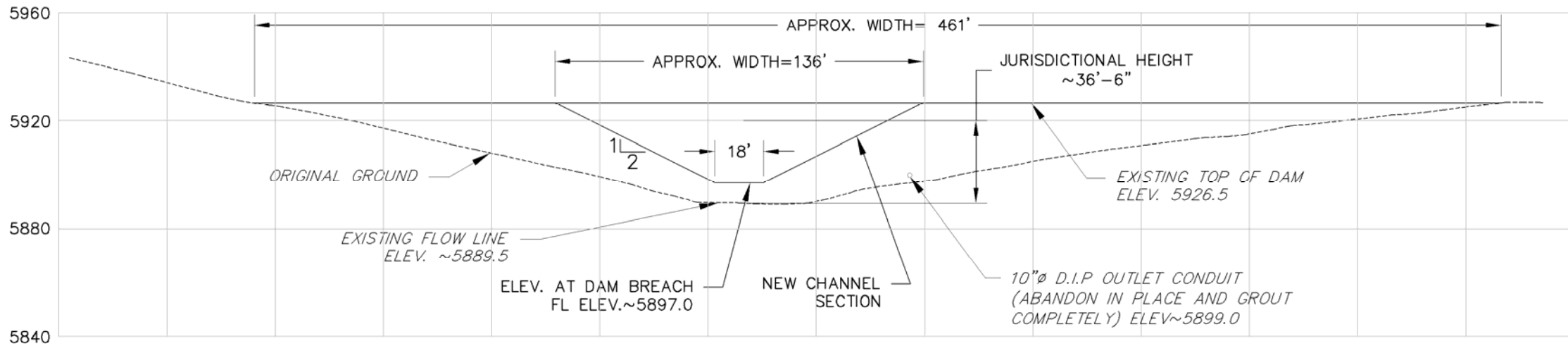
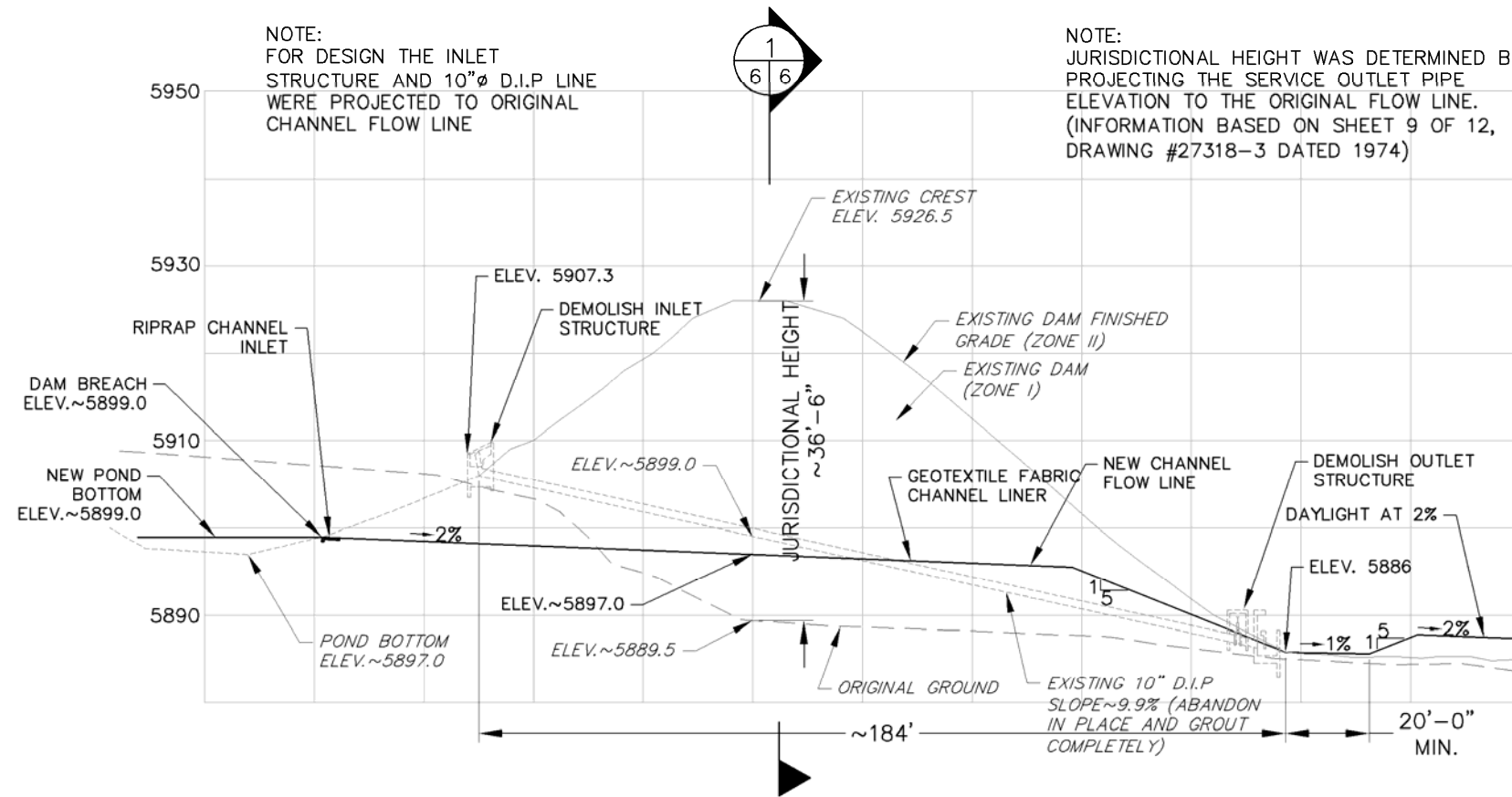


NOTE:  
FOR DESIGN THE INLET  
STRUCTURE AND 10"Ø D.I.P LINE  
WERE PROJECTED TO ORIGINAL  
CHANNEL FLOW LINE

NOTE:  
JURISDICTIONAL HEIGHT WAS DETERMINED BY  
PROJECTING THE SERVICE OUTLET PIPE  
ELEVATION TO THE ORIGINAL FLOW LINE.  
(INFORMATION BASED ON SHEET 9 OF 12,  
DRAWING #27318-3 DATED 1974)

**PRESENT LANDFILL DAM BREACH:  
CHANNEL PROFILE THROUGH DAM SECTION**

SCALE: HORIZONTAL 1" = 40'  
VERTICAL 1" = 20'



**PRESENT LANDFILL DAM BREACH:  
SECTION THROUGH DAM PROFILE (LOOKING DOWNSTREAM)**

SCALE: 1" = 50'

## **Appendix C**

**RFLMA Regulatory Contact Record 2010-02  
and  
RFLMA Regulatory Contact Record 2010-04**

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# ROCKY FLATS SITE REGULATORY CONTACT RECORD

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**Purpose:** Approval of Excavation Greater Than 3 Feet Below Grade to Breach Dams A-3, A-4, B-5, C-2 and the Present Landfill Dam.

**Contact Record Approval Date:** April 15, 2010

**Site Contact(s)/Affiliation(s):** Scott Surovchak, U.S. Department of Energy (DOE); Linda Kaiser, S.M. Stoller; John Boylan, S.M. Stoller; George Squibb, S.M. Stoller; Rick DiSalvo, S.M. Stoller

**Regulatory Contact(s)/Affiliation(s):** Carl Spreng, Colorado Department of Public Health and Environment (CDPHE)

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**Introduction:** Breaching of Dams A-1 and A-2 (located in North Walnut Creek) and Dams B-1, B-2, B-3, and B-4 (located in South Walnut Creek) was completed in 2009. This action was the preferred alternative in the DOE October 2004 *Pond and Land Reconfiguration Environmental Assessment, Comment Response and Finding of No Significant Impact* (DOE/EA-1492). The dam breach work included soil excavation more than 3 feet below the surface and removal of sentinel well TH046992 at Dam B-3 that required approval under the Rocky Flats Legacy Management Agreement (RFLMA), because these actions are otherwise prohibited by certain RFLMA institutional controls (ICs). The approval for the soil excavation and removal of the monitoring well location is documented in Contact Records 2008-02 and 2008-09.

The five remaining Rocky Flats Site dams, Dams A-3 and A-4 (in North Walnut Creek), Dam B-5 (in South Walnut Creek), Dam C-2 (at the end of the South Interceptor Ditch north of Woman Creek), and the Present Landfill (PLF) Dam (in No Name Gulch) retain surface water in retention ponds that are not necessary to site operations. DOE proposes to breach these remaining dams. This action would reduce or eliminate the out-of-priority retention of surface water and return the Rocky Flats surface water flow approximately to the original conditions. Returning flows to a more natural condition will provide ecological benefits by improving riparian habitat and promoting wetlands. In addition, this will reduce or eliminate the inspection and reporting costs associated with meeting dam safety requirements, operating and maintaining the dams, and determining out-of-priority storage and evaporative depletions.

DOE is preparing the *Rocky Flats Surface Water Configuration Environmental Assessment* (EA) to evaluate impacts related to breaching the remaining dams. DOE intends to release the draft EA for public review and comment in spring 2010 and issue the final EA in summer 2010. Figures 1 and 2 show the locations of the remaining ponds and dams and the approximate footprints of the construction areas where excavations would occur based on the preliminary design being prepared for the EA. Final design and construction work will be performed after DOE issues the final EA.

A portion of each dam embankment will be removed to form a channel in the dam and create a flow-through configuration. The designs for the previous dam breach construction included stop log structures in the notch to retain a shallow pool level upstream of the stop logs. The shallow pool level



can be adjusted by adjusting the height of the stop logs (by removing or adding stop logs) in the structure. The preliminary design for the breach of the remaining dams does not include stop log structures; channel invert and grading elevations are designed to result in no retained water. The final design will be informed by the hydrological modeling being conducted as part of the EA.

The proposed excavation work will exceed the 3-foot depth limit prohibited by ICs (RFLMA, Attachment 2, Table 4, Control 2) and thus requires pre-approved procedures. On January 18, 2010, DOE and CDPHE staff consulted regarding the soil excavation.

The objective of IC 2 regarding excavations with a depth that exceeds 3 feet is to maintain the current depth to subsurface contamination or contaminated structures. This IC also results in achieving compliance with the CDPHE risk management policy of ensuring that residual risks to the site user are at or below  $1 \times 10^{-6}$  excess lifetime cancer risk. As discussed below, the proposed work achieves the risk management policy goal.

The excavated soils will be used as fill in accordance with the engineering design to raise the level of a portion of the pond bottoms, partially fill the spillways adjacent to each dam, and reclaim disturbed areas. It is not anticipated that any imported fill will be needed for these purposes. Some excavated soils from within the notched area could also be used to provide materials for reclaiming roads adjacent to the dams and for revegetation and minor recontouring in the Central Operable Unit (COU) to maintain and improve erosion control.

Erosion controls for the excavation, construction, and fill activities will be employed in accordance with the *Erosion Control Plan for Rocky Flats Property Central Operable Unit*, DOE-LM/1497-2007, July 2007.

CDPHE has requested that the following information be included in Contact Records for soil excavation related to IC 2 that will not return soil to the preexisting grade:

*1. Provide information about any remaining subsurface structures in the vicinity so that the minimum cover assumption will not be violated (or state that there are none if that is the case).*

There are no subsurface building or tunnel structures near the dams. However, outlet works, pipes, valves, drop structures, spillways, and miscellaneous components are integral to the dam structures. Unneeded surface components or structures will be removed to appropriate depth below the finished grade, and openings in pipes, manholes, and drop structures that are not removed will be stabilized in accordance with the engineering design to meet the Colorado State Engineer's requirements for the breached dam structures. Process knowledge (i.e., familiarity based on past experience at the site) regarding the characteristics for each removed item will be confirmed by visual inspection. If process knowledge cannot be confirmed by visual inspection, additional characterization will be performed to determine proper disposal. It is expected that removed items will be disposed of off site as solid waste or recycled, as appropriate. However, routine radiological field screening of these waste items will also be performed to determine if off-site disposal under DOE directives and policy as radioactive waste is required. Items removed for disposal will be staged in a manner to prevent run-on and runoff of precipitation and surface water pending off-site disposal.

2. Provide information about any former Individual Hazardous Substance Sites or Potential Areas of Concern (IHSSs/PACs) or other known soil or groundwater contamination in the vicinity (or state that there is no known contamination).

The dams are associated with the following former IHSSs/PACs:

IHSS 142.3 - Pond A-3

IHSS 142.4 - Pond A-4

IHSS 142.9 - Pond B-5

IHSS 142.11- Pond C-2

IHSS 114 - PLF Pond

More detailed information on these IHSSs/PACs and the disposition of these areas is available in the *RCRA Facility Investigation—Remedial Investigation/Corrective Measures Study—Feasibility Study Report for the Rocky Flats Environmental Technology Site (RI/FS)*, Appendix B, “FY2005 Final Historical Release Report.”

A Rocky Flats Cleanup Agreement (RFCA) accelerated action resulted in removal of sediment from the PLF Pond as part of the PLF closure in 2005. The removed sediment was placed in the PLF prior to construction of the PLF closure cover. Confirmation sampling after the sediment removal demonstrated that the objectives of the removal were met, and the remaining residual contamination levels were well below the RFCA wildlife refuge worker soil action levels. This accelerated action and the confirmation sampling results are documented in the September 2005 *Final Closeout Report for IHSS Group 000-5 Present landfill (IHSS-114)*.

Characterization results for the investigation of ponds A-3, A-4, B-5, and C-2 are presented in the October 2005 *Data Summary Report for IHSS Group NE-1 (DSR)*.

Based on the DSR characterization information for the ponds in question, all surface and subsurface constituent concentrations or activities were less than the RFCA wildlife refuge worker soil action levels, and no RFCA accelerated action was required.

As part of the RI/FS, Exposure Units (EUs) were evaluated and documented in the RI/FS Appendix A, “Comprehensive Risk Assessment” (CRA). Ponds A-3, A-4, and B-5 are located in the Upper Walnut Drainage EU. Pond C-2 is located in the Lower Woman Drainage EU. The PLF pond is located in the No Name Gulch Drainage EU.

The results of the CRA for the Upper Walnut Drainage EU are in Volume 7 of Appendix A. Benzo(a)pyrene was identified as the only contaminant of concern (COC) for surface soil/surface sediment in this EU. No COCs were identified for subsurface soil. Benzo(a)pyrene was not directly associated with any Rocky Flats Site historical source areas but could be associated with vehicle traffic, paving, or pavement degradation prior to closure. The calculated risk to the wildlife refuge worker for the surface and subsurface exposure scenario for benzo(a)pyrene in the CRA is  $1 \times 10^{-6}$ .

The results of the CRA for the No Name Gulch Drainage EU are in Volume 6 of Appendix A. Vanadium was identified as the only COC for surface soil in this EU. The noncancer hazard index (HI)

estimate is less than 1, indicating that adverse noncancer health effects are unlikely for the wildlife refuge worker exposure scenario.

The results of the CRA for the Lower Woman Drainage EU are in Volume 11 of Appendix A. No COCs were identified for this EU. Thus, risks are expected to be similar to those associated with background conditions.

3. *Resurvey any new surface established in subsurface soil, unless sufficient existing data is available to characterize the surface (or state that the excavated soil will be replaced and the original contours restored).*

When completed, the new surface elevations will be consistent with the final design drawings for the regrading work for the dams and the new POCs. Final elevations will be surveyed, and the resulting data will be used to update the COU topographic maps.

**Closeout of the Contact Record:** This Contact Record will be closed out when the as-built drawings are completed for the construction work, and the COU topographic maps have been updated with the final elevations.

**Resolution:** Carl Spreng, CDPHE, approved the soil excavation for the proposed dam breach work.

**Contact Record Prepared by:** Rick DiSalvo

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**Distribution:**

Carl Spreng, CDPHE  
Scott Surovchak, DOE  
Linda Kaiser, Stoller  
Rocky Flats Contact Record File

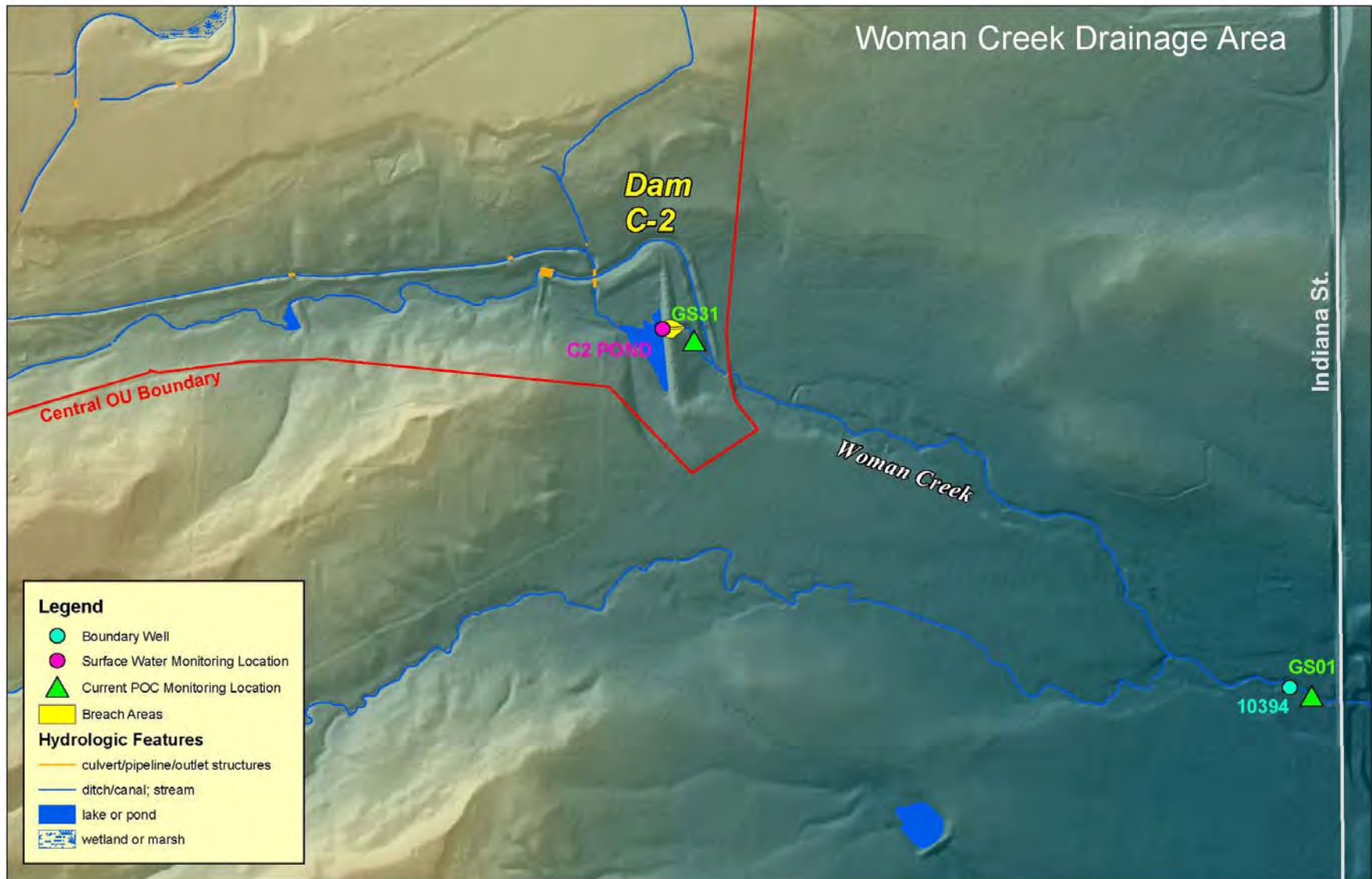


Figure 1. Monitoring and Dam Breach Locations—Woman Creek Drainage Area

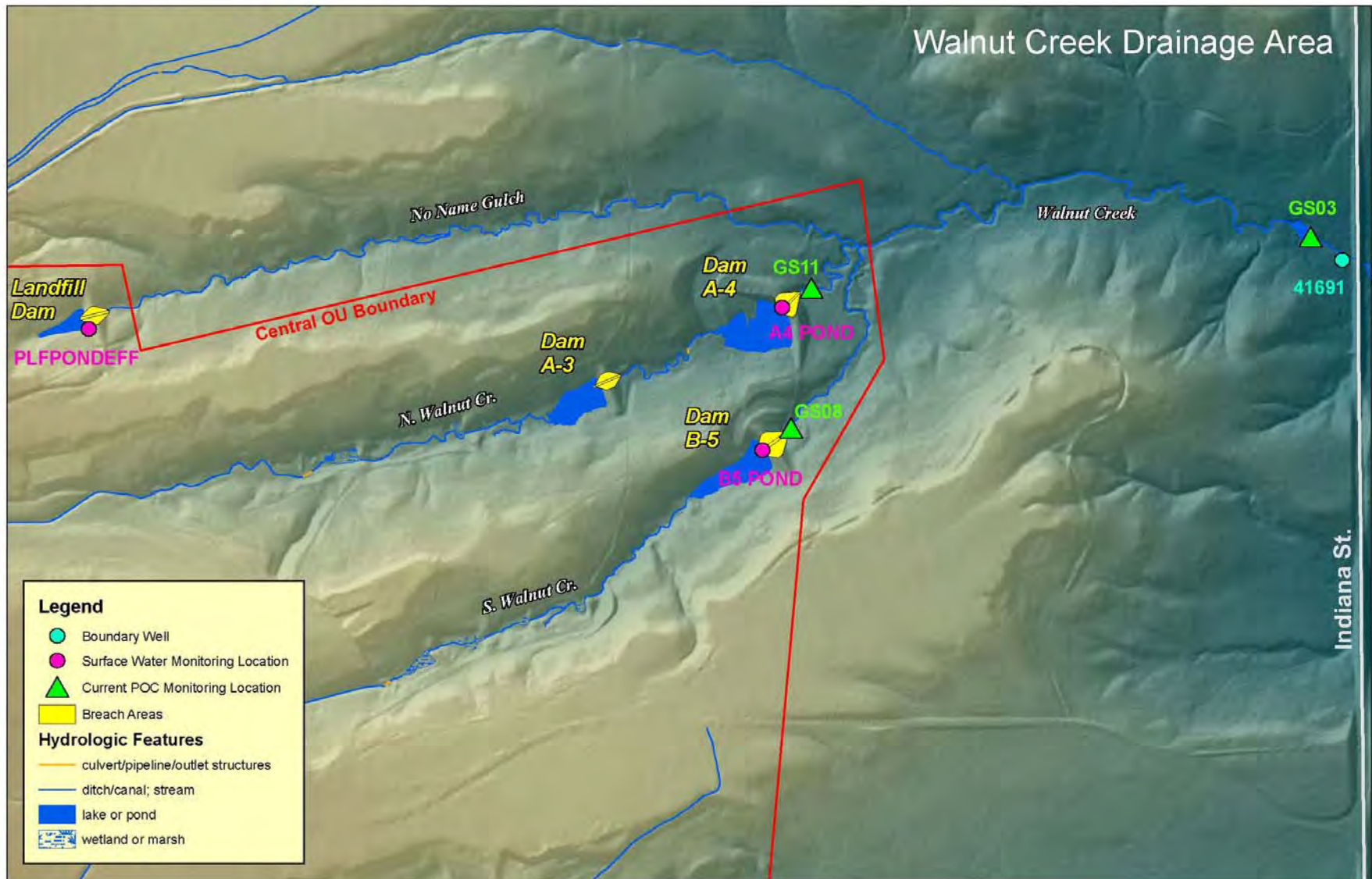


Figure 2. Monitoring and Dam Breach Location—Walnut Creek Drainage Area

# STATE OF COLORADO

Bill Ritter, Jr., Governor  
Martha E. Rudolph, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

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Colorado Department  
of Public Health  
and Environment

October 15, 2010

Scott Surovehak  
LM Site Manager  
U.S. Department of Energy  
11025 Dover Street, Suite 1000  
Westminster, CO 80021-5573

RE: RFLMA Contact Record 2010-02

Dear Mr. Surovehak:

The Colorado Department of Public Health and Environment approved RFLMA Contact Record 2010-02 on April 15, 2010. In the interim the surrounding communities have raised concerns, including the potential violation of Institutional Control #2, as documented in the CAD/ROD and the Environmental Covenant. In addition, the schedule for implementing actions that would require this approval is years in the future. In light of these considerations, our approval of Contact Record 2010-02 is withdrawn.

This withdrawal of approval will allow for further consideration of concerns raised by the communities and possibly clarification of Institutional Control #2 before potential reconsideration of the contact record.

Please let me know if you have any questions regarding this retraction of our previous approval.

Sincerely,

Carl Spreng  
RFLMA Project Coordinator

cc: Rick DiSalvo, Stoller  
Vera Moritz, EPA  
Walter Avramenko, CDPHE  
Dan Miller, AGO

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# ROCKY FLATS SITE REGULATORY CONTACT RECORD

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**Purpose:** Rocky Flats Legacy Management Agreement Attachment 2: Modification to Revise Monitoring Points

**Contact Record Approval Date:** July 15, 2010

**Site Contact(s)/Affiliation(s):** Scott Surovchak, U.S. Department of Energy (DOE); Linda Kaiser, S.M. Stoller; John Boylan, S.M. Stoller; George Squibb, S.M. Stoller; Rick DiSalvo, S.M. Stoller

**Regulatory Contact(s)/Affiliation(s):** Carl Spreng, Colorado Department of Public Health and Environment (CDPHE)

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**Introduction:** This Contact Record documents the Rocky Flats Legacy Management Agreement (RFLMA) parties' consultation regarding proposed changes to RFLMA required monitoring points. The RFLMA monitoring points are incorporated in RFLMA Attachment 2, *Legacy Management Requirements*, and DOE proposes to eliminate certain monitoring points and establish new monitoring points as discussed in the Contact Record.

This Contact Record does not constitute approval of the proposed changes to RFLMA monitoring points discussed herein. The proposed changes to RFLMA Attachment 2 are subject to regulatory approval under RFLMA paragraph 65. The parties agreed that in accordance with RFLMA paragraph 66, the proposed changes to monitoring points will be subject to public review and comment, as discussed below.

The proposed changes are prompted for two main reasons. First, the U.S. Environmental Protection Agency (EPA), with CDPHE concurrence, deleted the Peripheral Operable Unit (POU) from the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priority List (NPL) on May 25, 2007, and no further response action is required for the POU. DOE subsequently transferred jurisdiction and control of most of the land in the POU to the U.S. Fish and Wildlife Service for the establishment of the Rocky Flats National Wildlife Refuge. Thus, monitoring and compliance points in the POU are no longer on the NPL site.

Second, RFLMA anticipates moving the surface water points of compliance (POCs) if the terminal ponds are breached or other changes to site configuration force their relocation. DOE is preparing the *Rocky Flats Surface Water Configuration Environmental Assessment (EA)* to evaluate environmental impacts related to breaching the remaining dams. DOE released a draft EA for public review and comment from April 26, 2010, through June 1, 2010. RFLMA Contact Record 2010-02 also provides information related to the proposed dam breach work.

The remaining dams are Dams A-3 and A-4 (located in North Walnut Creek), Dam B-5 (located in South Walnut Creek), Dam C-2 (located at the end of the South Interceptor Ditch north of Woman Creek), and the Present Landfill (PLF) Dam (located in No Name Gulch) that retain surface water in retention ponds that are not necessary to site operations and are not a requirement of the remedy. RFLMA Attachment 2 provides that if the terminal ponds (Ponds A-4, B-4, and C-2) dams are breached, new monitoring and compliance points will be established.



In addition, DOE has historically operated the terminal ponds in a batch and release mode. Though not required by the remedy, RFLMA Attachment 2, section 5.4, “Operational Monitoring,” requires DOE to sample and evaluate terminal pond water quality prior to batch release (unless an emergency release is warranted). In the EA, DOE evaluates operating the terminal ponds in flow-through mode for the next several years prior to actually breaching the dams.

Thus, as required by RFLMA, the proposed changes to monitoring points address where new monitoring and compliance points will be located considering DOE’s proposed action to breach the terminal ponds. Also, the proposed changes to monitoring locations include elimination of pre-discharge sampling in the terminal ponds.

Figures 1 and 2 in this Contact Record also show the current required monitoring locations, the monitoring locations that DOE proposes to eliminate, and DOE’s proposed new monitoring locations. The relevant monitoring locations are listed in Table 1 as well. Figures 1 and 2 also show the locations of the remaining ponds and dams and the approximate footprints of the construction areas for the proposed dam breach based on the preliminary design used in preparing the EA.

In addition to the main reasons for the proposed monitoring locations discussed above, the following items are also pertinent to the proposed changes:

- The proposed locations maintain the ability to evaluate the quality of surface water leaving the site in order to determine whether the remedy remains adequately protective of human health and the environment.
- The decision frameworks in the RFLMA Attachment 2 monitoring point evaluation flowcharts will be followed for reporting and consultation to implement response actions as appropriate when specified compliance values are exceeded.
- Compliance values are based on the surface water standards in RFLMA Attachment 2, Table 1.
- Boundary wells, which are located in the POU where no further response action is required, are remote from groundwater sources of contamination and are not used for POC monitoring.
- Having fewer routine sampling locations increases efficiency and reduces the need to enter the Refuge for monitoring and maintenance work.
- The monitoring locations within the Refuge are also in the possible route of the proposed Jefferson Parkway (see, [www.jppha.org](http://www.jppha.org)), so changes to locations need to be considered to accommodate the proposed Parkway routing.
- The Colorado Water Quality Control Commission moved the eastern end of Big Dry Creek Segment 5 (which includes Walnut Creek) to the eastern Central Operable Unit boundary as part of the 2009 triennial review of the Classifications and Numeric Standards for South Platte River Basin—Regulation 38 (5 CCR 1002-38), and the proposed Walnut Creek monitoring location will remain in Segment 5.

On January 18, March 29, and April 27, 2010, DOE and CDPHE staff consulted regarding DOE’s proposed changes to monitoring points. DOE and CDPHE have also continued to discuss the proposed changes during the public review and comment period for the draft EA.

The RFLMA parties agreed that the proposed RFLMA Attachment 2 modification will be released for a 30-day public review and comment period. The parties also agreed that a public information meeting regarding the proposed modification will also be scheduled to occur during the public comment period.

The RFLMA parties also agreed that the dates upon which the specific changes to monitoring locations become effective would be included in any approval decision by CDPHE and EPA regarding DOE's proposed modification.

**Discussion:** Some of the monitoring locations subject to the proposed modification are identified in the Corrective Action Decision/Record of Decision (CAD/ROD) and are incorporated into RFLMA Attachment 2. Other monitoring locations are only identified in RFLMA Attachment 2. The proposed monitoring point changes will therefore require EPA and CDPHE approval.

The following excerpts are relevant to the proposed monitoring point changes:

Pursuant to the CAD/ROD Section 17, "Selected Remedy/Corrective Action for the Central OU":

[Points of Compliance (POCs)] ... are currently established in Walnut and Woman Creeks at Indiana Street and at the outfalls of the terminal ponds (Ponds A-4, B-5, and C-2). POCs will remain at these points unless changes in site configuration (such as removal of the terminal ponds or the construction of a new highway along Indiana Street) force their relocation.

While the example of the removal of the terminal ponds is used to illustrate a change in site configuration, the deletion of the POU from the NPL site and determination that no further response action is required in the POU is also a site configuration change.

RFLMA Attachment 2, Section 5.1, "Monitoring Surface Water," provides the following direction:

Compliance with the surface-water standards in Table 1 will be measured at the Points of Compliance (POCs) downstream of the terminal ponds in Woman and Walnut Creeks. If the terminal ponds are removed, new monitoring and compliance points will be designated and will consider groundwater in alluvium.

In addition to the changes to monitoring locations, the installation of flumes at the proposed new monitoring locations will involve excavations deeper than 3 feet below the surface, which is prohibited by RFLMA institutional controls (ICs) unless approved by CDPHE. This Contact Record provides information requested by CDPHE for approval of excavations deeper than 3 feet below the surface.

Table 1. RFLMA Monitoring Locations Proposed for Changes

ID	Location	Identified in CAD/ROD	Required by RFLMA	Proposed Change
GS01	Surface water Point of Compliance (POC)—Woman Creek at Indiana St.	Yes	Yes	Remove—not part of NPL site. POC is upstream in Woman Creek at the Central Operable Unit (COU) boundary. GS01 is in the Northwest Parkway proposed route.
GS03	Surface water POC—Walnut Creek at Indiana St.	Yes	Yes	Remove—not part of NPL site. POC is upstream in Woman Creek at COU boundary. GS03 is in the Northwest Parkway proposed route.
GS08	Surface water POC—South Walnut Creek at outfall of Pond B-5	Yes	Yes	Replace with new POC near COU boundary at confluence of North and South Walnut Creeks. Compliance value remains based on 12-month rolling average, but DOE will use 30-day rolling average to trigger consultation with CDPHE on whether mitigating actions are required.
GS11	Surface water POC—North Walnut Creek at outfall of Pond A-4	Yes	Yes	Replace with new POC near COU boundary at confluence of North and South Walnut Creeks. Compliance value remains based on 12-month rolling average, but DOE will use 30-day rolling average to trigger consultation with CDPHE on whether mitigating actions are required.
GS31	Surface water POC—At outfall of Pond C-2 upstream of Woman Creek	Yes	Yes	Replace with new POC in Woman Creek near COU boundary. Compliance value remains based on 12-month rolling average, but DOE will use 30-day rolling average to trigger consultation with CDPHE on whether mitigating actions are required.
PLFPONDEFF	Surface water grab sample location to determine water quality downstream of Present Landfill Treatment System if treatment system effluent exceeds RFLMA standards	No	Yes	A new sampling point ID will be assigned. Grab sample location will be in No Name Gulch near the proposed PLF dam notch after notching. This is the approximate downstream location of the current PLFPONDEFF location.
Pond A-4	Operational monitoring surface water grab sample location for pre-discharge sampling	No	Yes	Remove—operational monitoring not needed; pre-discharge sampling no longer relevant once surface water flow-through condition is restored.
Pond B-5	Operational monitoring surface water grab sample location for pre-discharge sampling	No	Yes	Remove—operational monitoring not needed; pre-discharge sampling no longer relevant once surface water flow-through condition is restored.
Pond C-2	Operational monitoring surface water grab sample location for pre-discharge sampling	No	Yes	Remove—operational monitoring not needed; pre-discharge sampling no longer relevant once surface water flow-through condition is restored.

ID	Location	Identified in CAD/ROD	Required by RFLMA	Proposed Change
Well 10394	Operational monitoring Boundary well near POC GS01	No	Yes	Abandon—not part of NPL site. Area of Concern wells inside COU meet groundwater point of compliance regulatory standard. Well is in the Northwest Parkway proposed route.
Well 41691	Operational monitoring Boundary well near POC GS03	No	Yes	Abandon—not part of NPL site. Area of Concern wells inside COU meet groundwater POC regulatory standard. Well is in the Northwest Parkway proposed route.

DOE intends to install monitoring equipment at the proposed new POC locations to have these locations operational before work begins on the surface water configuration project. Current monitoring locations will be sampled as required by RFLMA until the time monitoring at current locations is to be discontinued in accordance with any approved RFLMA Attachment 2 modifications.

**Proposed RFLMA Attachment 2 Modifications:** The following information provides more detail for the proposed changes outlined in Table 1.

*Surface Water POCs*—As outlined above, adjusting the location of the POCs to the edge of the COU is a consequence of deleting the POU from the NPL, establishing the Wildlife Refuge, and moving the boundary of the DOE-managed property. State and federal guidance for POCs (for groundwater, but the concepts and principles are the same for surface water) require locating them at or as close as possible to the "waste management area" boundary. CERCLA requires that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate federal and state requirements, standards, criteria, and limitations, which are collectively referred to as ARARs. ARARs are in the Rocky Flats CAD/ROD, Table 21, and include the Colorado Water Quality Control Commission (WQCC) statewide basic standards in Regulation No. 31 (5 CCR 1002-31), site-specific standards in WQCC Regulation No. 38 (5 CCR 1002-38), and groundwater standards in Regulation No. 41 (5 CCR 1002-41).

The Area of Concern (AOC) wells satisfy the ARAR in Regulation No. 41 for groundwater POCs. However, surface water POCs are not identified in Regulation No. 31 or No. 38, or in the Rocky Flats CAD/ROD ARARs, but are established in accordance with the remedial action, implemented under RFLMA. Under CERCLA guidance, compliance with surface water ARARs is measured at an appropriate point considering groundwater impacts to surface water within the NPL site boundary.

RFLMA Attachment 2 Section 5.1 states that new POCs will consider groundwater in alluvium. The draft EA describes that the proposed dam breach design is to notch, rather than completely remove the dams. The remaining structures will continue to effectively capture alluvial groundwater and direct it towards the surface water flowing through the notches so that it will be measured at the POCs. The proposed new POCs, like the current POCs, are downgradient of the AOC wells. They are also proposed to be located downstream of the notches proposed to breach the dams. Thus, the proposed new POCs are positioned to evaluate contaminated groundwater in the alluvium reaching the stream. No change to Section 5.1 is warranted and none is proposed.

*Boundary Wells*—Because the boundary wells are located outside the COU, DOE proposes to abandon them. RFLMA Attachment 2 Section 5.4.1 and the evaluation criteria for boundary well sampling results presented in Figure 7 are proposed to be deleted; Figure 7 will be revised to only address AOC wells and SW018 sampling results evaluation criteria. RFLMA Attachment 2 Section 5.4.1 explains that the boundary wells are used to demonstrate that contaminants are not migrating off site in groundwater. However, contaminated groundwater migrates by discharging to surface water. The AOC wells, which are downgradient of contaminant plumes, adjacent to surface water features, together with the proposed surface water POCs downgradient of the AOC wells provide adequate monitoring information to determine if contamination in groundwater is migrating off site. The AOC wells inside the COU are much closer than the boundary wells to source areas, and the AOC wells therefore allow earlier detection of contaminant migration.

*Pre-discharge Sampling for Terminal Ponds*—The procedure and terminology in RFLMA Attachment 2 Section 5.4.2 refers to terminal pond pre-discharge sampling and providing notification to allow CDPHE and EPA to collect split or duplicate samples. While the pre-discharge sampling would be obviated by breaching the dams, the RFLMA Attachment 2 Section 5.4.2 text will be revised to provide for CDPHE and EPA to collect split or duplicate samples at the POCs. RFLMA Attachment 2 Figure 13, which contains the evaluation criteria for pre-discharge pond sampling results, is proposed to be deleted.

*Determining Exceedances at POCs* —In accordance with Note 1 of Figure 5 in RFLMA Attachment 2, plutonium, americium, and uranium concentrations in samples taken at GS01 and GS03 (and nitrate, when required at GS03) are measured by calculating the 30-day rolling average of the flow-paced sampling (and grab sampling for nitrate) results. For samples taken at GS08, GS11, and GS31 (and nitrate at GS08 and GS11) plutonium, americium, and uranium concentrations are measured by calculating the 12-month rolling average of the flow-paced sampling (and grab sampling for nitrate) results. For the proposed new POCs, the 30-day and 12-month averages will still be calculated and an exceedance of applicable remedy performance standards by either of these calculated values will constitute a reportable condition under RFLMA Attachment 2, Section 6.0. Exceedance of the 30-day rolling averages would trigger timely implementation of the RFLMA party consultation process in accordance with RFLMA paragraph 11 to determine the actions or direction to be taken. The 12-month rolling averages will be used to determine compliance with the remedy performance standards for surface water (RFLMA Attachment 2, Table 1). The criteria for determining exceedances in Figure 5 are proposed to be revised accordingly.

*PLF Treatment System Evaluation*—The protocols in RFLMA Attachment 2 Figure 11, which contains the evaluation criteria for treatment system sampling results, include collecting a grab sample from the PLF Pond (designated PLFPONDEFF) if three consecutive monthly samples of PLF Treatment System effluent indicate an exceedance for a monitored analyte. Once the PLF Dam is notched, the pond will be eliminated and a new sampling location established just upstream of the notch in the dam, at approximately the same place as the current location.

The proposed modification to RFLMA Attachment 2 released for public review and comment will contain other changes made for internal consistency. For example, the map (RFLMA Attachment 2, Figure 1) and table of water monitoring locations (RFLMA Attachment 2, Table 2) will be revised to reflect the monitoring location changes.

**Excavation Work:** Excavation to install the flumes in the stream channels for the proposed new POC locations is discussed below, and CDPHE agreed that the flume installation in these locations could proceed. However, the effective date for these locations to become POCs will be included in any approval decision by CDPHE and EPA regarding DOE's proposed modification. As a practical matter, the planning and design work will take time to complete, but DOE intends to plan for this work during the upcoming construction season. However, these locations are not approved as the new POCs until RFLMA Attachment 2 modification designating them as POCs is approved.

The proposed excavation work will exceed the 3-foot depth limit established by ICs (RFLMA Attachment 2, Table 4, Control 2) and thus requires pre-approved procedures. The objective of IC 2 regarding excavations with a depth that exceeds 3 feet is to maintain the current depth to subsurface contamination or contaminated structures. This IC also results in achieving compliance with the CDPHE risk management policy of ensuring that residual risks to the site user are at or below  $1 \times 10^{-6}$  excess lifetime cancer risk. As discussed below, the proposed work achieves the risk management policy goal.

The flume construction will include excavation to install concrete footers for the flume. The soils removed for footer construction will be used for backfill, and any excess soil will be used in the construction area for recontouring and revegetation. Any excess soil could also be used for revegetation and minor recontouring in the COU to maintain and improve erosion controls.

The fill placement will be in conformance with the ICs, and the final elevations of areas receiving fill, after fill placement and reseeded, are expected to be above the existing elevations. Erosion controls for the excavation, construction, and fill activities will be employed in accordance with the *Erosion Control Plan for Rocky Flats Property Central Operable Unit*, DOE-LM/1497-2007, July 2007.

CDPHE has requested that the following information be included in Contact Records for soil excavation related to IC 2 that will not return soil to the preexisting grade:

*1. Provide information about any remaining subsurface structures in the vicinity so that the minimum cover assumption will not be violated (or state that there are none if that is the case).*

There are no subsurface building or tunnel structures near the flume locations. The soil surface will be returned to approximately pre-existing grades.

*2. Provide information about any former Individual Hazardous Substance Sites or Potential Areas of Concern (IHSSs/PACs) or other known soil or groundwater contamination in the vicinity (or state that there is no known contamination).*

The locations are not in any former IHSSs/PACs. The proposed new Walnut Creek POC is located in the Upper Walnut Drainage Exposure Unit (EU). The proposed new Woman Creek POC is located in the Lower Woman Drainage EU. The EUs were evaluated as part of the Remedial Investigation/Feasibility Study (RI/FS) and documented in the RI/FS Appendix A, "Comprehensive Risk Assessment" (CRA).

The results of the CRA for the Upper Walnut Drainage EU are in Volume 7 of Appendix A. Benzo(a)pyrene was identified as the only contaminant of concern (COC) for surface soil/surface sediment in this EU. No COCs were identified for subsurface soil. Benzo(a)pyrene was not directly associated with any Rocky Flats Site historical source areas but could be associated with traffic,

paving, or pavement degradation prior to closure. The calculated risk to the wildlife refuge worker for the surface and subsurface exposure scenario for benzo(a)pyrene in the CRA is  $1 \times 10^{-6}$ .

The results of the CRA for the Lower Woman Drainage EU are in Volume 11 of Appendix A. No COCs were identified for this EU. Thus, risks are expected to be similar to those associated with background conditions.

3. *Resurvey any new surface established in subsurface soil, unless sufficient existing data is available to characterize the surface (or state that the excavated soil will be replaced and the original contours restored).*

When completed, the new surface elevations are not expected to be significantly different from current elevations. The flume elevations will be consistent with the final design drawings for the new flumes. Final elevations will be surveyed, and the resulting data will be used to update the COU topographic maps.

**Closeout of the Contact Record:** This Contact Record will be closed out when the RFLMA modification is completed and the as-built drawings are completed for the flume construction work.

**Resolution:** Carl Spreng, CDPHE, approved the summary of the consultation provided by this Contact Record documenting the approach for the proposed modification of monitoring locations. The soil excavation for the new flumes may also be conducted as described in the Contact Record.

**Contact Record Prepared by:** Rick DiSalvo

---

**Distribution:**

Carl Spreng, CDPHE  
Scott Surovchak, DOE  
Linda Kaiser, Stoller  
Rocky Flats Contact Record File

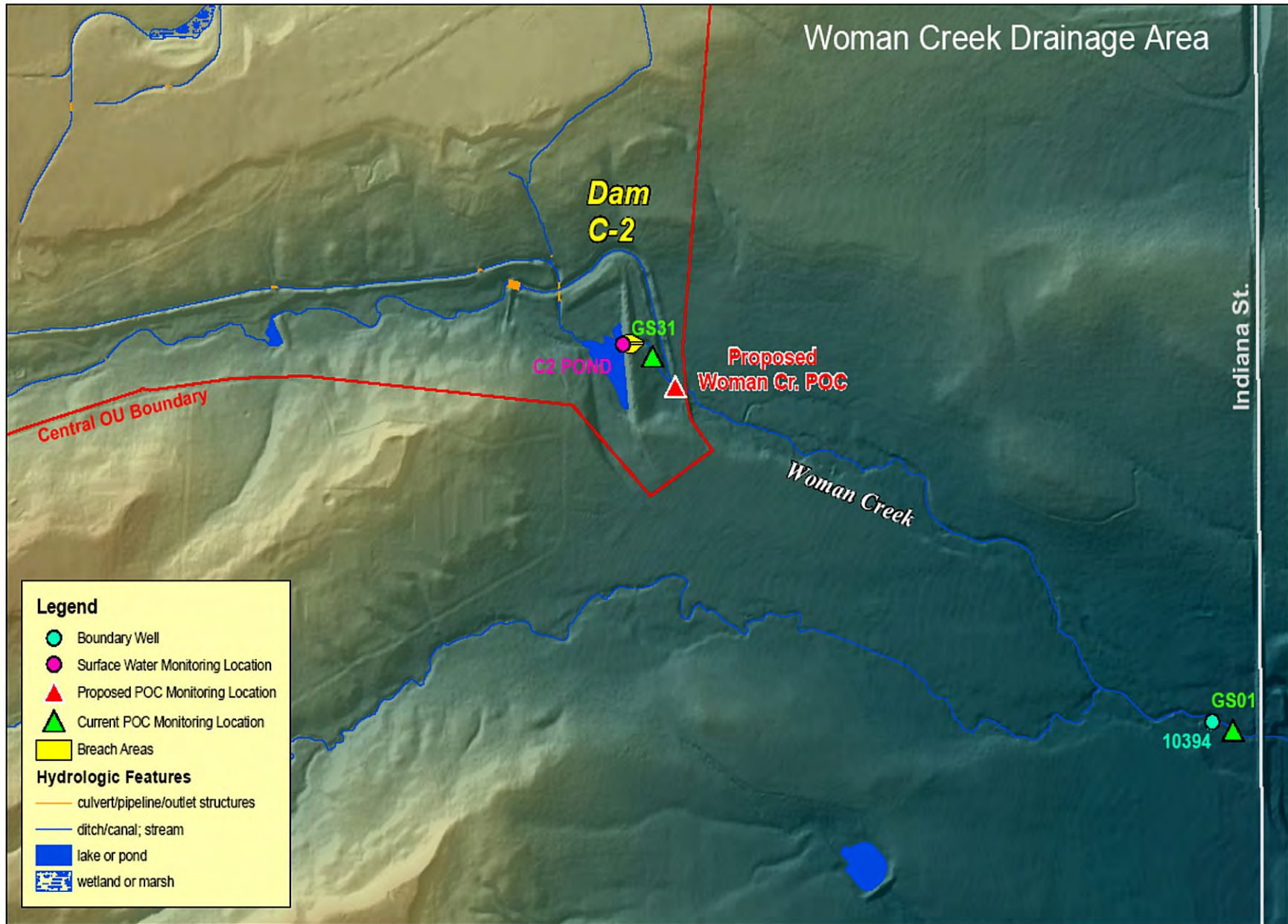


Figure 3. Monitoring and Dam Breach Locations—Woman Creek Drainage Area



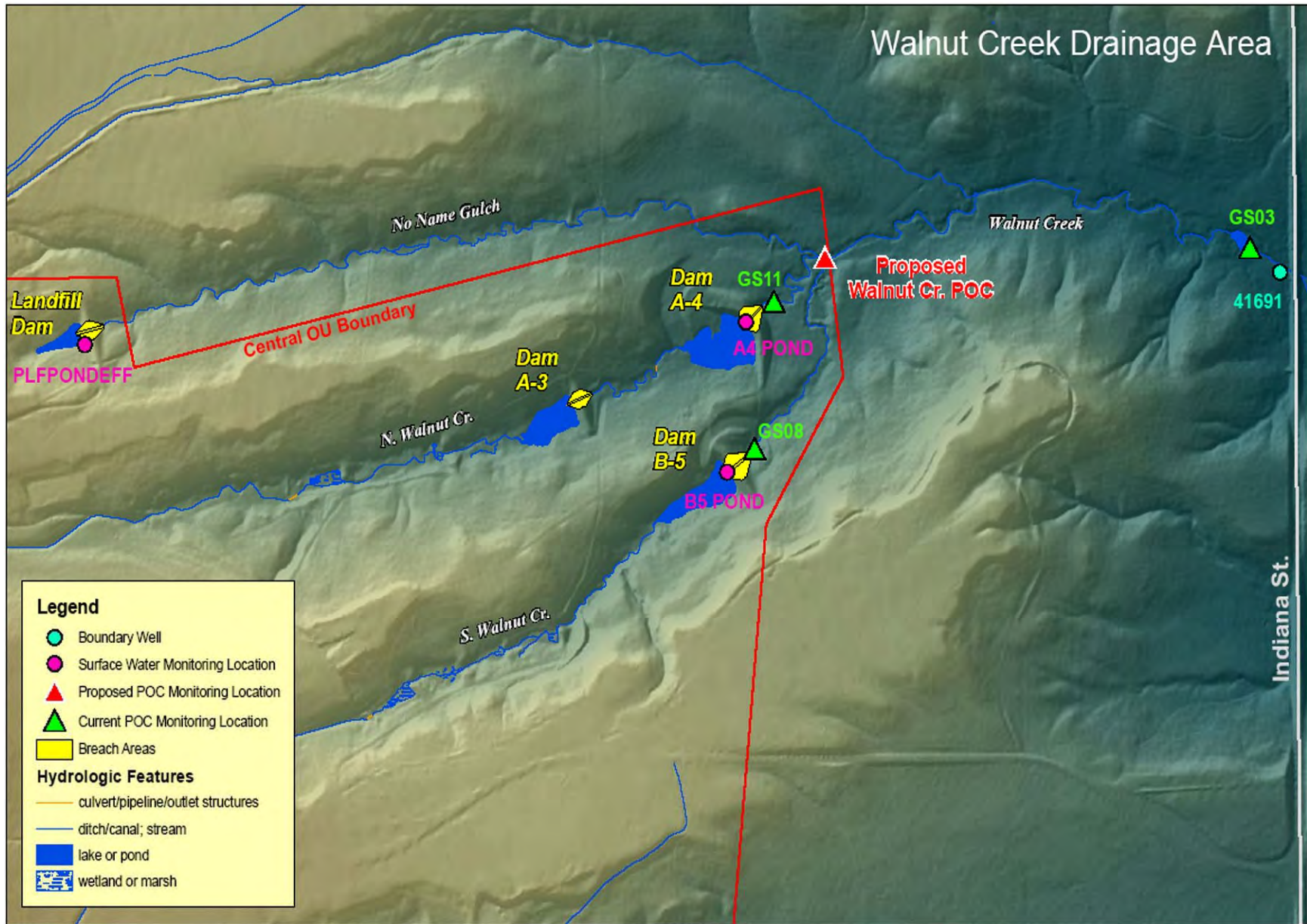


Figure 4. Monitoring and Dam Breach Location—Walnut Creek Drainage Area

## **Appendix D**

### **Agency Consultation and Coordination**

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STATE OF COLORADO

Bill Ritter, Jr., Governor  
DEPARTMENT OF NATURAL RESOURCES  
**DIVISION OF WILDLIFE**

AN EQUAL OPPORTUNITY EMPLOYER

Thomas E. Remington, Director  
6060 Broadway  
Denver, Colorado 80216  
Telephone: (303) 297-1192  
[wildlife.state.co.us](http://wildlife.state.co.us)



*For Wildlife-  
For People*

March 15, 2010

Scott Surovchak  
Office of Legacy Management  
Department of Energy  
11025 Dover St, Suite 1000  
Westminster CO 80021

Re: Threatened and Endangered Species Consultation  
Rocky Flats Surface Water Configuration Project Environmental Assessment

Dear Mr. Surovchak:

Thank you for the invitation to participate in the *Rocky Flats Surface Water Configuration Project Environmental Assessment*. The purpose of this Environmental Assessment (EA) is to evaluate impacts related to the breaching of dams and restoring the approximate stream configurations for creeks traversing the Rocky Flats site northwest of Denver, Colorado.

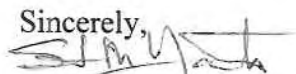
The Preble's Meadow Jumping Mouse (PMJM) is listed as threatened under the Endangered Species Act. Typically this mouse occurs in low undergrowths of grasses and forbs in open wet meadows and riparian corridors near forests or where tall shrubs and low trees provide adequate cover (USFWS 1997, Meaney and Clippinger 1995). The mouse occurs below 7,600 feet in elevation (USFWS 1997) and has been found to utilize upland areas more than 91m (300 feet) from a main drainage (Shenk and Sivert 1999).

Rock Creek, Woman Creek and Walnut Creek on the Rocky Flats property have been proposed as critical habitat for the Preble's Meadow Jumping Mouse by the U.S. Fish & Wildlife Service. From past environmental assessments of nearby Coal Creek, the PMJM has been known to occupy riparian habitat in this area of Colorado. Because these riparian corridors on Rocky Flats are the targets of the proposed stream configuration modifications, it is our recommendation that the Department of Energy consult with the U.S. Fish & Wildlife Service to learn of any concerns they may have and obtain any permits they may require for this project.

It is important to note that the Preble's mouse is a hibernating species, and hibernates from October through early May. (Whitaker 1963). Therefore, we recommend that no species surveys of a property be conducted during the hibernation period as that may result in false assumptions about the absence of the mouse. In addition, any development proposal resulting in different land conditions by varying seasons should be evaluated based upon the hibernation period being the time when the mouse is the most vulnerable to eradication.

Again, thanks for the opportunity to comment on the Rocky Flats Environmental Assessment, and please do not hesitate to contact Vicki Vargas-Madrid at 303 291-7275 or Liza Hunholz at 303 291-7122 if you have further questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Steve Yamashita", written over the word "Sincerely,".

Steve Yamashita  
NE Regional Manager

cc: L. Hunholz, K. Green, V. Vargas-Madrid

From: Haynes, Mark [Mark.Haynes@state.co.us]  
Sent: Wednesday, February 03, 2010 5:39 PM  
To: Darr, Bob  
Subject: Rocky Flats Environmental Assessment Review

Mr. Darr - I received a letter today from a Mr. Scott Surovchak concerning the Environmental Assessment(EA) for the Rocky Flats site and whether our agency would to be interested in reviewing the EA. The review of the EA is beyond my purview and therefore, I will respectfully decline being considered to be a reviewer. Nevertheless, any modifications to the dams at the Rocky Flats site will be required to be reviewed and accepted by this office. I will be more than happy to discuss the requirements of our office as they relate to breaching or modifying of the dams. Thank you

Mark R. Haynes, P.E.

Chief, Safety of Dams Program

Colorado Division of Water Resources

1313 Sherman Street, Rom 818

Denver, CO 80203

Office: (303) 866-3581 ext. 8276

Cell: (303) 204-6613

Home: (303) 973-7332

FAX: (303) 866-3589

e-mail: mark.haynes@state.co.us

From: Steve\_Berendzen@fws.gov  
Sent: Friday, April 02, 2010 8:19 AM  
To: Darr, Bob  
Cc: Bruce Hastings  
Subject: Re: Response to invitation to be a cooperating agency for RF dam breach EA

Bob: I'm out of the office this week, but hope to be at SC meeting Monday Can I get a copy of the EA then? We would like to be a cooperating agency Sent From My BlackBerry®

----- Original Message -----

From: "Darr, Bob" [Bob.Darr@lm.doe.gov]  
Sent: 04/01/2010 11:35 AM CST  
To: Steve Berendzen  
Subject: Response to invitation to be a cooperating agency for RF dam breach EA

Steve, I just want to verify whether you want to serve as a cooperating agency and review the draft EA. Please let me know by letter or email if you want to review as we are going to send the draft out next week with a short turn-around time for responses by April 16. If you want to review but won't be able to get the comments in by the 16th, we can still send out the draft and incorporate any comments you may have during the public comment period. Give me a call if you have any questions or we can talk on Monday if you go to the stewardship council meeting, I've attached a copy of the invitation letter for your convenience.

Thanks,  
Bob

Bob Darr  
SM Stoller Corporation  
DOE Legacy Management Support  
Phone 720-377-9672  
email bob.darr@lm.doe.gov



**DEPARTMENT OF THE ARMY**  
CORPS OF ENGINEERS, OMAHA DISTRICT  
DENVER REGULATORY OFFICE, 9307 SOUTH WADSWORTH BOULEVARD  
LITTLETON, COLORADO 80128-6901

February 9, 2010

Mr. Scott R. Surovchak  
LM Site Manager  
Department of Energy  
Office of Legacy Management  
11025 Dover St, Suite 1000  
Westminster, CO 80021

**RE: Rocky Flats Surface Water Configuration Project Environmental Assessment**

Dear Surovchak:

I am writing this letter in response to your correspondence of January 20, 2010, regarding the above referenced project. In your letter you requested that the U.S. Army Corps of Engineers (COE) participate as a Cooperating Agency during preparation of the subject EA.

As discussed in your February 8, 2010 conversation with Matt Montgomery, the COE will participate as a Commenting Agency to assist in preparation of this EA. Our involvement will include providing document review and input concerning potential impacts to waters of the United States subject to COE jurisdiction under Section 404 of the Clean Water Act. In addition, we will provide assistance in evaluating and assessing alternatives relative to the Section 404(b)(1) Guidelines.

Matt Montgomery will serve as the primary point of contact. Feel free to contact him with any questions you may have concerning Section 404 permitting. If you need to reach either of us by telephone, our number is 303-979-4120. Our e-mail addresses are [timothy.t.carey@usace.army.mil](mailto:timothy.t.carey@usace.army.mil) and [matthew.r.montgomery@usace.army.mil](mailto:matthew.r.montgomery@usace.army.mil).

Sincerely,

A handwritten signature in black ink, appearing to read "Timothy T. Carey", is written over a circular stamp or seal.

Timothy T. Carey  
Chief, Denver Regulatory Office



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Department of Energy  
Office of Legacy Management

March 10, 2010

Mr. Ed Nichols  
State Historic Preservation Officer  
Colorado History Museum  
1300 Broadway  
Denver, CO 80203

Subject: Request for Concurrence in U.S. Department of Energy's Determination of No Effect for its Proposed Dam Breach Project at the Rocky Flats Site (RFS), Jefferson County, Colorado

Dear Mr. Nichols:

The U.S. Department of Energy Office of Legacy Management (DOE) is proposing to breach the dams at five retention ponds at its RFS formerly known as the Rocky Flats Plant and the Rocky Flats Environmental Technology Site (RFETS) in Jefferson County, Colorado, located approximately 16 miles northwest of downtown Denver. The RFS is a former Cold War industrial complex at which plutonium triggers were manufactured. The former RFETS was cleaned up and closed in 2005, and DOE is responsible for its long-term surveillance and maintenance.

The cleanup and closure of the former RFETS was completed via a cleanup agreement under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and a Compliance Order on Consent under the Resource Conservation and Recovery Act (RCRA) and the Colorado Hazardous Waste Act (CHWA). The final response action for the former RFETS is specified in the final Corrective Action Decision/Record of Decision (CAD/ROD) issued on September 29, 2006.

Under the CAD/ROD, two Operable Units (OUs) were established within the boundaries of the former RFETS property: the Central OU (COU) and the Peripheral OU (POU). The COU consolidates areas that require additional remedial or corrective actions, while also considering the practicalities of future land management. The POU surrounds the COU and includes the remaining, generally unaffected, portions of the former RFETS property.

The POU surrounds the COU (see the attached figure) and the majority of the land was transferred to the U.S. Fish and Wildlife Service in 2007 for use as the Rocky Flats National Wildlife Refuge. The COU is shown as the DOE Site Boundary on the attached map, and is referred to as the RFS.

2597 B 3/4 Road, Grand Junction, CO 81503	<input type="checkbox"/>	99 Research Park Road, Morgantown, WV 26505
1000 Independence Ave., S.W., Washington, DC 20585	<input type="checkbox"/>	11025 Dover St., Suite 1000, Westminster, CO 80021
10995 Hamilton-Cleves Highway, Harrison, OH 45030	<input type="checkbox"/>	955 Mound Road, Miamisburg, OH 45342
232 Energy Way, N. Las Vegas, NV 89030	<input type="checkbox"/>	
REPLY TO: Westminster Office		

During operations at the former RFETS, numerous retention ponds were constructed using earthen dams for stormwater control and to allow DOE to monitor surface water quality. These dams are no longer required, and DOE would like to return surface water flows in the creeks to approximate original conditions. Breaching the retention pond dams would provide ecological benefits by improving riparian habitat and promoting wetland development and would also reduce DOE's inspection and reporting requirements associated with maintaining the dams. The ponds, shown on the enclosed map, are located in Sections 1, 2, 11, 12, and 13 of Township 2 South, Range 70 West, 6<sup>th</sup> Principal Meridian on the Louisville U.S.G.S Quadrangle.

DOE is proposing the following actions during 2011:

- Dewater Pond A-3, Pond C-2, and the Present Landfill Pond by opening the existing discharge valves and pumping residual water.
- Mobilize equipment and set up a staging area at each pond.
- Install a temporary coffer dam upstream of each of the dams to control surface water inflows.
- Notch the dams according to engineering specifications; build a drop structure downstream of each breach; use rip rap and erosion control fabric to armor the permanent notches and drop structures.
- Partially fill small areas immediately upstream of the notches.
- Reclaim disturbed areas with native seed and live plantings.

Each dam breach is expected to take approximately 10 weeks to complete. A similar sequence of events would occur in 2015-2018 when DOE proposes to breach Ponds A-4 and B-5. The total area of potential effect associated with the dam breaching project would be approximately 45 acres (as highlighted on the enclosed map).

Class III cultural resource inventories of the former RFETS were conducted in 1989 and 1991 and documented in the following reports:

- Burney, Michael S.; Steven F. Mehls, and Marcus P. Grant, 1989. *An Archaeological and Historical Survey of Selected Parcels within the Department of Energy, Rocky Flats Plant, Northern Jefferson County, Colorado*, prepared by Burney and Associates, Inc., Boulder, Colorado; prepared for U.S. Department of Energy Rocky Flats Plant.
- Dames and Moore, 1991. *Cultural Resources Class III Survey of the Department of Energy Rocky Flats Plant, Northern Jefferson and Boulder Counties, Colorado*, prepared for EG&G.

During these inventories, 35 cultural sites and 28 isolated finds were discovered or reevaluated. These sites are listed in the enclosed Tables 1 and 2, respectively. As shown on the attached map, of the 63 sites and finds, seven are located in the current RFS boundary, and none are within the areas of potential disturbance. All sites and isolated finds were determined to be ineligible for inclusion on the National Register of Historic Places.

An architectural inventory of the former industrial buildings was conducted in 1995 and documented in the following report:

- Science Applications International Corporation, 1995. *Final Draft, Cultural Resources Survey Report, Rocky Flats Environmental Technology Site*, prepared by SAIC, Santa Barbara, California and Golden, Colorado; prepared for U.S. Department of Energy.

Of the 123 Cold War buildings in the complex, 64 were identified as potentially eligible for inclusion in the National Register of Historic Places as contributors to a Rocky Flats Plant Historic District. These buildings were documented in a Historic American Engineering Record before they were decontaminated and demolished during cleanup of the former RFETS.

DOE, the Colorado State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation entered into a Programmatic Agreement Regarding Historic Properties at the former RFETS on July 17, 1997. DOE implemented its Cultural Resources Management Plan (CRMP) pursuant to the Programmatic Agreement. The Programmatic Agreement noted that the SHPO concurred that identification and evaluation of historic properties referenced in the CRMP were adequate and complete, with little likelihood that additional archeological resources would be discovered.

The dams were constructed before the cultural inventories discussed above were performed, and were part of the area previously inventoried. Since the 1989 and 1991 cultural resource inventories, the areas in and around the retention ponds have not been significantly disturbed and monitoring and maintenance activities were conducted in accordance with the Programmatic Agreement and CRMP requirements. For these reasons, DOE believes that the 1989 and 1991 cultural resource inventories, although not recent, remain applicable today.

Given the lack of cultural resources on the Site and that DOE's proposed activities would take place in drainage bottoms and on man-made dam impoundments, DOE has determined that its proposed work would have "no effect" on cultural resources. Please let us know if you concur with this determination.

A copy of this letter is being sent to the U.S. Fish and Wildlife Service to inform them of DOE's actions respecting this request for concurrence from SHPO.

If you have questions or comments about this determination, please contact me at (720) 377-9682. If you have specific questions about cultural resources, please contact Marilyn Kastens, Cultural Resource Coordinator, at (970) 248-6781.

Sincerely,



Scott R. Surovchak  
LM Site Manager

Mr. Ed Nichols

-4-

Enclosures (w/o map)

cc:

Steve Berendzen, USFWS

Sandra Beranich, Stoller

Linda Kaiser, Stoller

Marilyn Kastens, Stoller

rc-rocky.flats

Table 1. Cultural Resource Sites Recorded at the Rocky Flats Site, 1989 and 1991

Site Number	Site Type	T. 2 S., R. 70 W., Section	NRHP Eligibility Determination
5JF79	Eight stone features	15	Not eligible
5JF217	Various rock alignments	3	Not eligible
5JF474	Firebreak site	15	Not eligible
5JF483	Orchard	15	Not eligible
5JF484	Stone structure	13	Not eligible
5JF485	Lindsay Ranch	3	Not eligible
5JF512	Upper Church Ditch	1, 2, 3, 9, 10	Not eligible
5JF513	McKay Ditch	1, 2, 3, 9, 10	Not eligible
5JF514	Smart Ditch	13	Not eligible
5JF722	Stock pond	15	Not eligible
5JF723	Stock tank/spring	14	Not eligible
5JF724	Stock tank	14	Not eligible
5JF725	Stone piles	13	Not eligible
5JF726	Stock pond	14	Not eligible
5JF727	Stock pond	14	Not eligible
5JF728	Spring house	3	Not eligible
5JF729	Probable corral	3	Not eligible
5JF730	Stock tanks/feeder	3	Not eligible
5JF731	Historic foundation	10	Not eligible
5JF732	Stock pond/foundation	13	Not eligible
5JF733	Stock pond	13	Not eligible
5JF734	Mower Ditch	13	Not eligible
5JF735	Historic foundation	4	Not eligible
5JF736	Stock ponds (2)	9	Not eligible
5JF737	Stock ponds (2)	9	Not eligible
5JF738	Barbed wire fence	9	Not eligible
5JF739	Gravel pit	9	Not eligible
5JF740	Ditch	12	Not eligible
5JF741	Ditch	12	Not eligible
5JF742	Historic railroad grade	4, 9, 10	Not eligible
5JF743	Historic dump	15	Not eligible
5JF744	Corral area	15	Not eligible
5JF761	Stock pond	3	Not eligible
5JF762	Stock pond	3	Not eligible
5JF766	Ditch	13, 14	Not eligible

Table 2. Isolated Finds Recorded at the Rocky Flats Site, 1989 and 1991

Site Number	Site Type	T. 2 S., R. 70 W., Section	NRHP Eligibility Determination
5JF475	Rock cairn	9	Not eligible
5JF476	Rock cairn	9	Not eligible
5JF477	Chipped stone	10	Not eligible
5JF478	Rock cairn	3	Not eligible
5JF479	Rock cairn	3	Not eligible
5JF480	Horseshoe	3	Not eligible
5JF481	Barbwire	15	Not eligible
5JF482	Sandstone fragment	1	Not eligible
5JF486	Survey cairn	4	Not eligible
5JF745	Unifacially worked flake	13	Not eligible
5JF746	Cairn	13	Not eligible
5JF747	Porcelain sherd	13	Not eligible
5JF748	Horse-drawn rake	13	Not eligible
5JF749	Depression	13	Not eligible
5JF750	Square nails	15	Not eligible
5JF751	Barbed wire	15	Not eligible
5JF752	Barbed wire	15	Not eligible
5JF753	Hub cap	11	Not eligible
5JF754	Barbed wire	4	Not eligible
5JF755	Barbed wire	4	Not eligible
5JF756	Barbed wire	2	Not eligible
5JF757	Glass fragments	3	Not eligible
5JF758	Cairn	14	Not eligible
5JF759	Cairn	14	Not eligible
5JF760	Rock piles	3	Not eligible
5JF763	Barbed wire	15	Not eligible
5JF764	Cairn	15	Not eligible
5JF765	Barbed wire	15	Not eligible

March 24, 2010

Scott R. Surovchak  
LM Site Manager  
Department of Energy  
Office of Legacy Management  
11025 Dover St., Suite 1000  
Westminster, CO 80021

Re: Request for Concurrence in U.S. Department of Energy's Determination of No Effect for its Proposed Dam Breach Project at the Rocky Flats Site (RFS), Jefferson County, Colorado (CHS #56785)

Dear Mr. Surovchak,

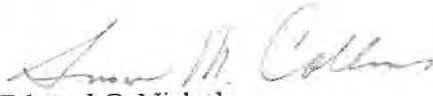
Thank you for your correspondence dated March 10, 2010 (received by our office on March 16, 2010) regarding the subject project.

Following our review of the documentation provided, we concur with your determination that a finding of **no historic properties affected** is appropriate for the proposed project.

Should unidentified archaeological resources be discovered in the course of the project, work must be interrupted until the resources have been evaluated in terms of the National Register of Historic Places eligibility criteria (36 CFR 60.4) in consultation with our office.

Thank you for the opportunity to comment. If we may be of further assistance, please contact Shina duVall, Section 106 Compliance Manager, at (303) 866-4674 or [shina.duvall@chs.state.co.us](mailto:shina.duvall@chs.state.co.us).

Sincerely,

  
Edward C. Nichols  
State Historic Preservation Officer  
ECN/SAD



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# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Ecological Services  
Colorado Field Office  
P.O. Box 25486, DFC (65412)  
Denver, Colorado 80225-0486

IN REPLY REFER TO:  
ES/CO: T&E/Species List  
TAILS: 65412-2010-SL-0261

FEB 26 2010

Scott Surovchak  
DOE, OLM  
11025 Dover Street, Suite 1000  
Westminster, Colorado 80021

Dear Mr. Surovchak:

Based on the authority conferred to the U.S. Fish and Wildlife Service (Service) by the Fish and Wildlife Act of 1956 (916 U.S.C. 742(a)-754); Fish and Wildlife Coordination Act (FWCA - 16 U.S.C. 661-667(e)); National Environmental Policy Act of 1969 (NEPA - 42 U.S.C. 4321-4347); Department of Transportation Act (49 U.S.C. 1653(f)), and; Endangered Species Act of 1973, as amended (ESA - 50 CFR §402.14), as well as multiple Executive Orders, policies and guidelines, and interrelated statutes to ensure the conservation and enhancement of fish and wildlife resources (e.g., Migratory Bird Treaty Act (MBTA - 16 U.S.C. 703), and Bald and Golden Eagle Protection Act (BGEPA - 16 U.S.C. 668)), the Service reviewed your February 2, 2010, request for information on the Service's trust resources in the vicinity of the proposed **Rocky Flats Surface Water Configuration Project, Jefferson County, Colorado**. With this project, you are proposing to reduce or eliminate the retention of surface water and to return the surface water flow configuration to the approximate original conditions by breaching several dams at the site. You will need to amend the existing Programmatic Biological Assessment for impacts to the Preble's meadow jumping mouse (*Zapus hudsonius preblei*) for these activities, and are requesting any additional information we may have on listed or proposed species or critical habitat.

## Threatened and Endangered Species

Following is a list of Federal endangered, threatened, proposed and candidate species for Jefferson County, which may be used as a basis for determining additional listed species potentially present in the project area. While other species could occur at or visit the project area, endangered or threatened species most likely to be affected include:

Birds:

- \*Piping Plover, (*Charadrius melodus*), Threatened
- \*Least Tern (*Sterna antillarum*), Endangered
- \*Whooping crane (*Grus americana*), Endangered

- Mammals: ▲Preble's meadow jumping mouse (*Zapus hudsonius preblei*), Threatened
- Fishes: \*Pallid sturgeon (*Scaphirhynchus albus*), Endangered
- Plants: Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*), Threatened  
Ute ladies'-tresses orchid (*Spiranthes diluvialis*), Threatened  
\*Western prairie fringed orchid (*Platanthera praeclara*), Threatened

\* Since 1978, the Service has consistently taken the position in its section 7 consultations that Federal agency actions resulting in existing or new water depletions to the Platte River system may affect these species as well as designated critical habitat for the whooping crane and piping plover in the central Platte River in Nebraska. Depletions include evaporative losses and/or consumptive use less return flows. Project elements that could be associated with depletions to the Platte River system include, but are not limited to, ponds (detention/water quality/recreation/irrigation storage), lakes (recreation/ irrigation storage/municipal storage/power generation), reservoirs (recreation/irrigation storage/municipal storage/power generation), pipelines, and water treatment facilities, dust control, and compaction.

▲ Critical Habitat for this species has been proposed in your project area.

The Service also is interested in the protection of species which are candidates for official listing as threatened or endangered (Federal Register, Vol. 61, No. 40, February 28, 1996). While these species presently have no legal protection under the Act, it is within the spirit of this Act to consider project impacts to potentially sensitive candidate species. It is the intention of the Service to protect these species before human-related activities adversely impact their habitat to a degree that they would need to be listed and, therefore, protected under the Act. Additionally, we wish to make you aware of the presence of Federal candidates should any be proposed or listed prior to the time that all Federal actions related to the project are completed. If any candidate species will be unavoidably impacted, appropriate mitigation should be proposed and discussed with this office.

The Service is not aware of any Candidate species in the project area at this time.

#### Migratory Birds

Under the MBTA construction activities in grassland, wetland, stream, and woodland habitats, and those that occur on bridges (e.g., which may affect swallow nests on bridge girders) that would otherwise result in the take of migratory birds, eggs, young, and/or active nests should be avoided. Although the provisions of MBTA are applicable year-round, most migratory bird nesting activity in eastern Colorado occurs during the period of April 1 to August 31. However, some migratory birds are known to nest outside of the aforementioned primary nesting season period. For example, raptors can be expected to nest in woodland habitats during February 1 through July 15. If the proposed construction project is planned to

occur during the primary nesting season or at any other time which may result in the take of nesting migratory birds, the Service recommends that the project proponent (or construction contractor) arrange to have a qualified biologist conduct a field survey of the affected habitats and structures to determine the absence or presence of nesting migratory birds. Surveys should be conducted during the nesting season. In some cases, such as on bridges or other similar structures, nesting can be prevented until construction is complete. It is further recommended that the results of field surveys for nesting birds, along with information regarding the qualifications of the biologist(s) performing the surveys, be thoroughly documented and that such documentation be maintained on file by the project proponent (and/or construction contractor) for potential review by the Service (if requested) until such time as construction on the proposed project has been completed. The Service's Colorado Field Office should be contacted immediately for further guidance if a field survey identifies the existence of one or more active bird nests that cannot be avoided by the planned construction activities. Adherence to these guidelines will help avoid the unnecessary take of migratory birds and the possible need for law enforcement action.

### Wetlands

FWCA provides the basic authority for the Service's involvement in evaluating impacts to fish and wildlife "whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified **for any purpose whatever**...by any department or agency of the United States, or by any public or private agency under Federal permit or license," including water crossings and wetland impacts, whether or not those wetlands are under the jurisdiction of the U.S. Army Corps of Engineers [16 U.S.C. 661(1), emphasis added]. It requires that fish and wildlife resources "receive equal consideration...to other project features...through the effectual and harmonious planning, development, maintenance, and coordination of wildlife conservation and rehabilitation," and requires Federal agencies to consult with the Service during the planning process to help "prevent the loss of or damage to such resources as well as providing for the development and improvement thereof" (16 U.S.C. 661 *et seq*). Full consideration is to be given to Service recommendations.

If the Service can be of further assistance, please contact Alison Deans Michael of my staff at 303 236-4758.

Sincerely,



Susan C. Linner  
Colorado Field Supervisor

pc: Rocky Flats (Jody Nelson)

Ref: Alison\H:\My Documents\Rocky Flats\Surface water config spplist.doc

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Tribal Contact List:

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Apache Tribe of Oklahoma  
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NAGPRA Representative  
Ute Mountain Ute Tribe  
P.O. Box 468  
Towoac, CO 81334



Letter from Scott Surovchak to Indian Tribes (see attached list of contacts)  
Please Send by CERTIFIED MAIL (Return Receipt)

Subject: Proposed Dam Breaching Project at U.S. Department of Energy's Rocky Flats Site in Jefferson County, Colorado

Dear \_\_\_\_\_:

The U.S. Department of Energy Office of Legacy Management (DOE) is proposing to breach the dams at five retention ponds at its Rocky Flats Site in Jefferson County, Colorado, located approximately 16 miles northwest of downtown Denver. The Rocky Flats Site is a former Cold War industrial complex at which plutonium triggers were manufactured. The site was cleaned up and closed in 2006, and DOE is responsible for its long-term surveillance and maintenance.

The cleanup and closure of Rocky Flats Site (RFS) was completed via a cleanup agreement under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and a Compliance Order on Consent under the Resource Conservation and Recovery Act (RCRA) and the Colorado Hazardous Waste Act (CHWA). The final response action for RFS is specified in the final Corrective Action Decision/Record of Decision (CAD/ROD) for Rocky Flats issued on September 29, 2006.

Under the CAD/ROD, two Operable Units (OUs) were established within the boundaries of the Rocky Flats property: the Central OU (COU) and the Peripheral OU (POU). The COU consolidates areas that require additional remedial or corrective actions, while also considering the practicalities of future land management. The POU surrounds the COU and includes the remaining, generally unaffected, portions of the Rocky Flats property.

The POU surrounds the COU (see the attached figure) and the majority of the land was transferred to the U.S. Fish and Wildlife Service in 2007 for use as the Rocky Flats National Wildlife Refuge. The COU is shown as the DOE Site Boundary on the attached map, and is referred to as the Rocky Flats Site (RFS).

During operations at the site, numerous retention ponds were constructed using earthen dams for storm water control and to allow DOE to monitor surface water quality. These dams are no longer required, and DOE would like to return surface water flows in the creeks to their approximate original condition. Breaching the retention pond dams would provide ecological benefits by improving riparian habitat and promoting wetland development and also would reduce DOE's inspection and reporting requirements associated with maintaining the dams. The ponds, shown on the enclosed map, are located in Sections 1, 2, 11, 12, and 13 of Township 2 South, Range 70 West, 6<sup>th</sup> Principal Meridian on the Louisville U.S.G.S Quadrangle.

DOE is proposing the following actions during 2011:

- Dewater Pond A-3, Pond C-2, and the Present Landfill Pond by opening the existing discharge valves and pumping residual water.
- Mobilize equipment and set up a staging area at each pond.

- Install a temporary coffer dam upstream of each of the dams to control surface water inflows.
- Notch the dams according to engineering specifications; build a drop structure downstream of each breach; use rip rap and erosion control fabric to armor the permanent notches and drop structures.
- Partially fill small areas immediately upstream of the notches.
- Reclaim disturbed areas with native seed and live plantings.

Each dam breach is expected to take approximately 10 weeks to complete. A similar sequence of events would occur in 2015-2018 when DOE proposes to breach Ponds A-4 and B-5. The total area of potential effect associated with the dam breaching project would be approximately 45 acres (as highlighted on the enclosed map).

Class III cultural resource inventories of the Rocky Flats Site were conducted in 1989 and 1991 and documented in the following reports:

- Burney, Michael S.; Steven F. Mehls, and Marcus P. Grant, 1989. *An Archaeological and Historical Survey of Selected Parcels within the Department of Energy, Rocky Flats Plant, Northern Jefferson County, Colorado*, prepared by Burney and Associates, Inc., Boulder, Colorado; prepared for U.S. Department of Energy Rocky Flats Plant.
- Dames and Moore, 1991. *Cultural Resources Class III Survey of the Department of Energy Rocky Flats Plant, Northern Jefferson and Boulder Counties, Colorado*, prepared for EG&G.

During these inventories, 35 cultural sites and 28 isolated finds were discovered or reevaluated. These sites are listed in the enclosed Tables 1 and 2, respectively. All sites and isolated finds were determined to be ineligible for inclusion on the National Register of Historic Places. None of the sites or isolated finds would be affected by DOE's proposed action.

We would like to know if you have specific concerns about DOE's proposed actions and if this area of northern Jefferson County contains features that may have religious or cultural significance to you. If you have questions or comments about the site, please contact me at (720) 377-9682. If you have specific questions about cultural resources, please contact Marilyn Kastens, Cultural Resource Coordinator, of my contractor staff at (970) 248-6781. I appreciate your consideration of this project's impacts to cultural resources that may be unknown to us.

Sincerely,

Scott Surovchak  
Rocky Flats Site Manager

Enclosures (3)

cc w/ enclosures:

Project File RFS 100.02 (Raynes)  
NEPA Administrative Record (Bowdidge)  
M. Kastens, Stoller  
L. Kaiser, Stoller

Table 1. Cultural Resource Sites Recorded at the Rocky Flats Site, 1989 and 1991

Site Number	Site Type	T. 2 S., R. 70 W., Section	NRHP Eligibility Determination
5JF79	Eight stone features	15	Not eligible
5JF217	Various rock alignments	3	Not eligible
5JF474	Firebreak site	15	Not eligible
5JF483	Orchard	15	Not eligible
5JF484	Stone structure	13	Not eligible
5JF485	Lindsay Ranch	3	Not eligible
5JF512	Upper Church Ditch	1, 2, 3, 9, 10	Not eligible
5JF513	McKay Ditch	1, 2, 3, 9, 10	Not eligible
5JF514	Smart Ditch	13	Not eligible
5JF722	Stock pond	15	Not eligible
5JF723	Stock tank/spring	14	Not eligible
5JF724	Stock tank	14	Not eligible
5JF725	Stone piles	13	Not eligible
5JF726	Stock pond	14	Not eligible
5JF727	Stock pond	14	Not eligible
5JF728	Spring house	3	Not eligible
5JF729	Probable corral	3	Not eligible
5JF730	Stock tanks/feeder	3	Not eligible
5JF731	Historic foundation	10	Not eligible
5JF732	Stock pond/foundation	13	Not eligible
5JF733	Stock pond	13	Not eligible
5JF734	Mower Ditch	13	Not eligible
5JF735	Historic foundation	4	Not eligible
5JF736	Stock ponds (2)	9	Not eligible
5JF737	Stock ponds (2)	9	Not eligible
5JF738	Barbed wire fence	9	Not eligible
5JF739	Gravel pit	9	Not eligible
5JF740	Ditch	12	Not eligible
5JF741	Ditch	12	Not eligible
5JF742	Historic railroad grade	4, 9, 10	Not eligible
5JF743	Historic dump	15	Not eligible
5JF744	Corral area	15	Not eligible
5JF761	Stock pond	3	Not eligible
5JF762	Stock pond	3	Not eligible
5JF766	Ditch	13, 14	Not eligible

Table 2. Isolated Finds Recorded at the Rocky Flats Site, 1989 and 1991

Site Number	Site Type	T. 2 S., R. 70 W., Section	NRHP Eligibility Determination
5JF475	Rock cairn	9	Not eligible
5JF476	Rock cairn	9	Not eligible
5JF477	Chipped stone	10	Not eligible
5JF478	Rock cairn	3	Not eligible
5JF479	Rock cairn	3	Not eligible
5JF480	Horseshoe	3	Not eligible
5JF481	Barbwire	15	Not eligible
5JF482	Sandstone fragment	1	Not eligible
5JF486	Survey cairn	4	Not eligible
5JF745	Unifacially worked flake	13	Not eligible
5JF746	Cairn	13	Not eligible
5JF747	Porcelain sherd	13	Not eligible
5JF748	Horse-drawn rake	13	Not eligible
5JF749	Depression	13	Not eligible
5JF750	Square nails	15	Not eligible
5JF751	Barbed wire	15	Not eligible
5JF752	Barbed wire	15	Not eligible
5JF753	Hub cap	11	Not eligible
5JF754	Barbed wire	4	Not eligible
5JF755	Barbed wire	4	Not eligible
5JF756	Barbed wire	2	Not eligible
5JF757	Glass fragments	3	Not eligible
5JF758	Cairn	14	Not eligible
5JF759	Cairn	14	Not eligible
5JF760	Rock piles	3	Not eligible
5JF763	Barbed wire	15	Not eligible
5JF764	Cairn	15	Not eligible
5JF765	Barbed wire	15	Not eligible

## **Appendix E**

### **Floodplain/Wetlands Assessment for the Surface Water Configuration Project at the Rocky Flats Site**

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# Technical Report

## E1.0 Introduction

The Rocky Flats Site (RFS) is owned by the United States and is located in northern Jefferson County, Colorado, approximately 16 miles northwest of Denver. The RFS was formerly used to process and manufacture nuclear weapons components, but cleanup and closure of Rocky Flats by the U.S. Department of Energy (DOE) was completed in 2005. The DOE Office of Legacy Management (LM) has jurisdiction and control of the Central Operable Unit (COU) at Rocky Flats.

Twelve dams were constructed on the RFS during operation of the facility. The dams were constructed for stormwater control and to retain surface water so it could be monitored and managed, if necessary, prior to release to downstream. The purpose of the Proposed Action is to reduce or eliminate the retention of surface water and return the RFS surface water flow configuration to the approximate conditions existing prior to construction of the dams. It is DOE policy to manage its land and facilities as valuable natural resources, and its stewardship is based on the principle of ecosystem management and sustainable development (DOE 1994). DOE is responsible for the long-term management of the water discharges at the RFS in an environmentally acceptable manner and in compliance with local, state, and federal regulations. To accomplish this long-term responsibility, the drainage system should require less active management and maintenance than the current system and should preserve existing wetlands and habitat as available water allows. Returning flows to approximate pre-retention conditions would provide ecological benefits by improving riparian habitat and promoting wetland formation. This would also reduce the Rocky Flats management efforts related to the continuous determination of evaporative depletions while also reducing the costs to water rights holders responsible for downstream augmentation replacements.

Seven dams at RFS were breached previously by constructing notches in the dam embankments. The Proposed Action would breach the remaining five dams and would be implemented in two timeframes, with the Present Landfill Dam (PLF) and A-3 breaching to occur in 2011, and breaching of dams A-4, B5, and C-2 would be completed between 2018 and 2020.

Figure E-1 shows the location of the affected dams at RFS. The dams proposed for breaching include the PLF Dam on No Name Gulch, dams A-3 and A-4 on North Walnut Creek, Dam B-5 on South Walnut Creek, and Dam C-2 upstream on the South Interceptor Ditch. Dams A-4, B-5, and the PLF are referred to as the terminal pond dams, because the water released from these dams flows off the site. Currently, these ponds are operated in batch-and-release mode and are discharged 0 to 2 times a year.

The dams are not required to maintain adequate protection of human health and the environment under the final Corrective Action Decision/Record of Decision (CAD/ROD) remedy. The activities proposed in this EA do not fall within the scope of CAD/ROD or Finding of No Significant Impact (FONSI) under the *Environmental Assessment Comment Response and Finding of No Significant Impact, Pond and Land Configuration* (DOE 2004). The 2004 EA addressed the possibility that all 12 dams could ultimately be breached, but breaching all of the dams was not originally anticipated when the 2004 EA was prepared, so they were not included as a connected action.



Executive Order 11988, *Floodplain Management* (1977), and Executive Order 11990, *Protection of Wetlands* (1977), requires that all federal agencies evaluate the potential impacts of actions within floodplains or wetlands and minimize adverse effects. This Floodplain and Wetland Assessment has been prepared in accordance with these executive orders as specified in Title 10 *Code of Federal Regulations* Part 1022. The Floodplain and Wetland Assessment will be included as an appendix to the *Rocky Flats Surface Water Configuration Environmental Assessment*.

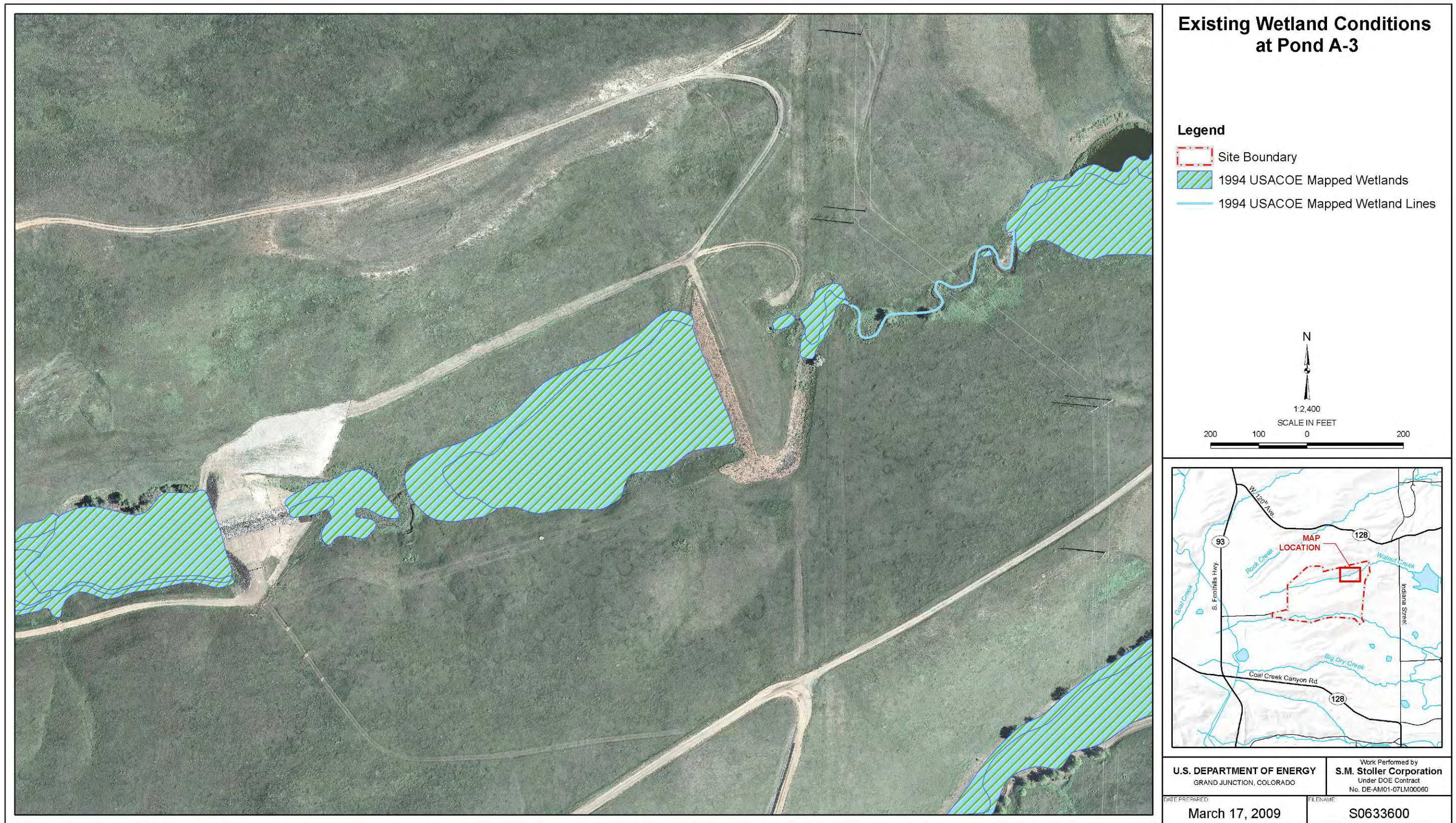
## **E1.1 Proposed Action**

The PLF Dam on No Name Gulch, Dams A-3 and A-4 on North Walnut Creek, Dam B-5 on South Walnut Creek, and Dam C-2 on the South Interceptor Ditch are being assessed for breaching. A “breach” or “channel” would be cut into each dam to reduce its jurisdictional height, thus creating a lower profile, and reestablish a natural flow through the pond. Construction is proposed to start in 2011 and be completed for Dams A-3, C-2 and the PLF by the end of fiscal year 2011. Construction for Dams A-4 and B-5 is proposed to be completed by 2018, with the partial design scheduled for completion by the end of fiscal year 2011.

The following sequence of events is similar to all five of dams.

- Dewater the ponds using existing discharge valves, and/or pumping as necessary several months prior to construction work.
- Mobilization: set up staging areas, erosion control, and stockpile areas.
- Install temporary coffer dam upstream for potential storm events (empty downstream of coffer dam and manage water upstream using pumps).
- Excavate soil from the breach area and stockpile in dam area.
- Breach the dam to engineering specifications; would have a drop structure downstream of the notch – approx. 5:1 slope; would use rip rap, erosion control fabric, etc.
- Regrade area upstream of channel to provide positive flow, minimize ponding, and promote establishment of quality habitat.
- Reclaim all disturbed areas.

This Technical Report assesses only the impacts that may occur as a result of the Proposed Action.



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Figure E-1. Rocky Flats Site

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## E1.2 Floodplain/Wetland Description

This section describes the existing vegetation communities, wetlands, and floodplains at the RFS and project areas.

### E1.2.1 Vegetation

The upland grassland areas around the ponds are generally classified as either mesic mixed grasslands or reclaimed grasslands (K-H 1997). Dominant species in the mesic mixed grassland include blue grama (*Bouteloua gracilis*), western wheat grass (*Agropyron smithii*), green needle grass (*Stipa viridula*), Kentucky bluegrass (*Poa pratensis*), and Japanese brome (*Bromus japonicus*). The reclaimed grasslands that were seeded after construction of the ponds are dominated by smooth brome (*Bromus inermis*), a non-native grass species. This would include the reclaimed grasslands at the A-3, A-4, B-5, and C-2 ponds. At the PLF pond, the reclaimed grassland is dominated by native species, which include western wheat grass, blue grama, side-oats grama (*Bouteloua curtipendula*), and switchgrass (*Panicum virgatum*).

### E1.2.2 Wetlands

The Walnut Creek and Woman Creek drainages are intermittent streams with perennial reaches, which have a narrow riparian corridor and limited wetlands. The wetland communities at RFS were delineated, characterized, and mapped by the U.S. Army Corps of Engineers (USACOE) in 1994 (USACOE 1994). Table E-1 summarizes the wetland communities found in the vicinity of each of the ponds. Figure E-2 shows the locations and types of existing wetlands in and around the study area ponds.

Table E-1. Existing Pond Area Wetland Summary Table

Location	Wetland Type	Total Acreage	Total Wetland Acreage
Pond A-3	Palustrine Emergent	0.896	4.187
	Palustrine Shrub	0.488	
	Open Water	2.802	
Pond A-4	Palustrine Emergent	1.547	4.480
	Palustrine Shrub	0.006	
	Open Water	2.927	
Pond B-5	Palustrine Emergent	0.592	3.036
	Open Water	2.445	
Pond C-2	Palustrine Emergent	1.562	5.543
	Palustrine Shrub	0.113	
	Open Water	3.868	
PLF Pond	Palustrine Emergent	0.801 (0.478)	0.909 (3.058)
	Open Water	2.257 (0.431)	
<b>Grand Total</b>		<b>20.304 (18.155)</b>	<b>18.155 (20.304)</b>

Acreage amounts are totals in area of each pond based on 1994 USACOE wetland mapping report. Linear wetland features acreages calculated as: (Length × 2 feet)/43,560 square feet/acre. PLF pond figures in parenthesis represent 2009 mitigation monitoring report values.

Small differences from the 1994 USACOE wetland delineation may currently exist at the A-3, A-4, B-5, and C-2 ponds due to changes in environmental conditions. Therefore the extent of the wetland mapping as delineated by USACOE may no longer be accurate.

The PLF pond and wetlands were disturbed as part of site closure activities, and wetland re-establishment is ongoing. Accordingly, the first set of values presented in Table E-1 for the PLF pond are based on what was previously delineated by the 1994 USACOE mapping. Values in parenthesis are based on the 2009 wetland mitigation monitoring report submitted to EPA.

Palustrine emergent wetlands are those dominated by herbaceous vegetation. Dominant species includes cattails (*Typha* spp.), arctic rush (*Juncus balticus*), sedges (*Carex* spp.), prairie cordgrass (*Spartina pectinata*), spikerushes (*Eleocharis* spp.), redtop (*Agrostis stolonifera*), and Canada thistle (*Cirsium arvense*). Palustrine shrublands are dominated by shrub species such as wild indigo (or leadplant) (*Amorpha fruticosa*) and coyote willow (*Salix exigua*) with an understory of herbaceous species. Open water habitats are areas that are permanently inundated, and no rooted emergent or woody plant species are present.

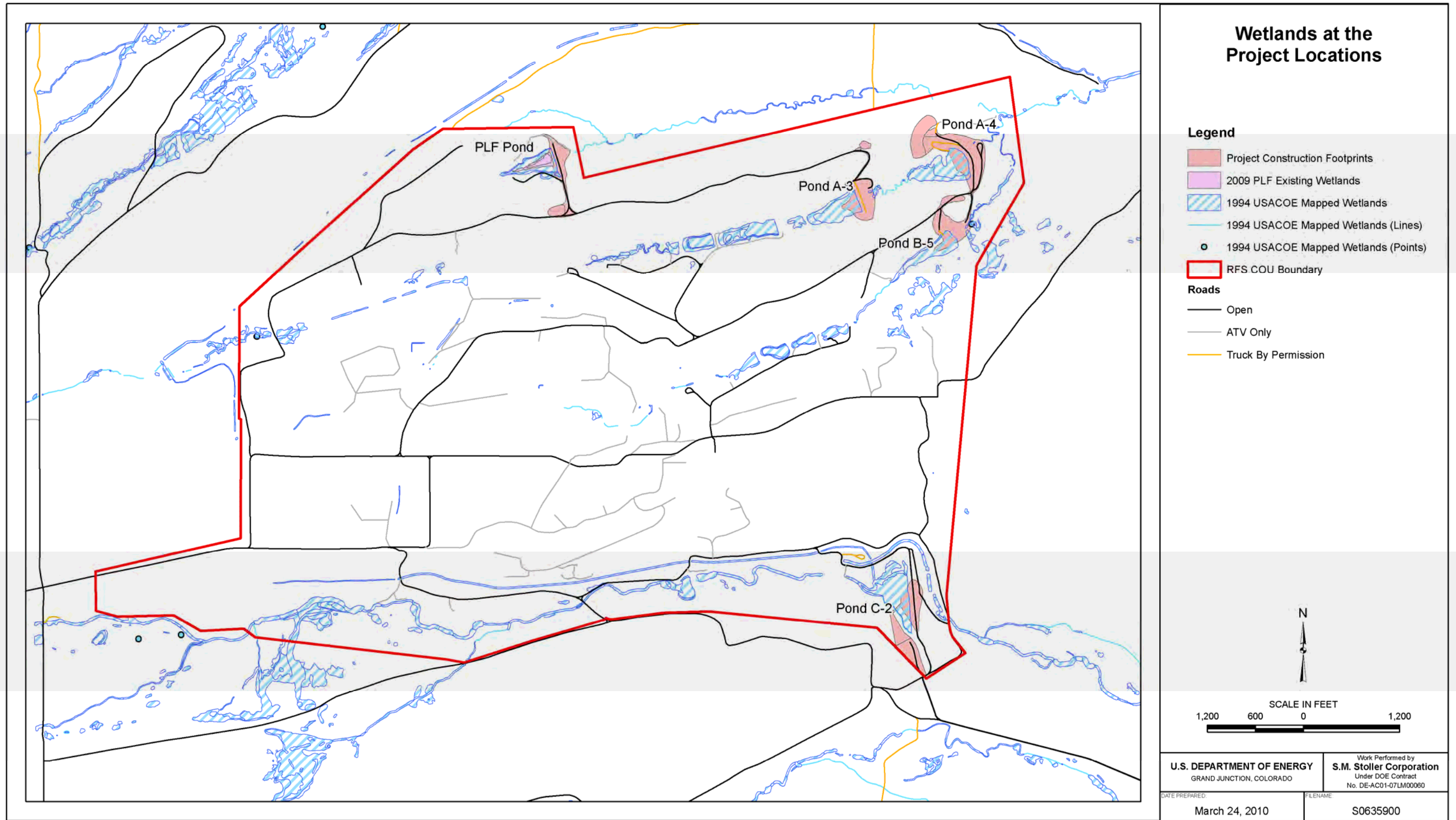
### **E1.2.3 Floodplains**

A floodplain is defined as “. . . lowlands adjoining inland and coastal waters and relatively flat areas and flood-prone areas of offshore islands including, at a minimum, that area inundated by a 1 percent or greater chance flood in any given year. The base floodplain is defined as the 100-year (1.0 percent) floodplain. The critical floodplain is defined as the 500-year (0.2 percent) floodplain. . .” (10 CFR 1022 *et seq.*). The Federal Emergency Management Agency (FEMA) defines a 100-year flood event as a flood that has a one percent chance of being equaled or exceeded in any given year, and a 500-year floodplain as having a 0.2 percent chance of being equaled or exceeded in any given year (FEMA 2007). Because no critical actions are proposed, the critical action floodplain (500-year floodplain) is not included in this assessment.

When maintained in a natural state, floodplains provide valuable services by moderating the extent of flooding, thereby (1) reducing the risk of downstream flood loss; (2) minimizing the impacts of floods on human safety, health, and welfare; and (3) providing support to wetlands, fish, and wildlife. For this assessment, the extent of the 100-year floodplains for RFS was derived from three sources:

- FEMA flood maps (FEMA 2010)
- *Rocky Flats Plant Drainage and Flood Control Master Plan* (EG&G 1992)
- *Determination of Peak Flow Rates and Floodplain Delineation for Dam Breaches at the Rocky Flats Site* (Wright Water Engineers [WWE] 2010)

Within the RFS, no floodplains are delineated by FEMA, because the extent of FEMA mapping does extend into the current RFS boundaries. However, FEMA flood maps indicate that the RFS property is located in two flood zone designations – Zone A and Zone X (FEMA 2010). Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. Zone A locations are within the 100-year floodplain. Zone X locations are those outside the 100-year floodplain where there is a 0.2 percent annual chance flood or areas of 1 percent annual chance flood with average depths of less than 1 foot or having drainage areas less than 1 square mile.



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Figure E-2. Wetlands at the Project Locations

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The *Rocky Flats Plant Drainage and Flood Control Master Plan* identified the 100-year floodplain at RFS based on the existing developed conditions in 1992 (EG&G 1992). Since the EG&G mapping, developed areas have been removed as part of the cleanup and closure activities at RFS, and reconfiguration activities have modified drainage basins at the site. Therefore the extent of the floodplains as delineated by this study may no longer be accurate.

In 2010, the *Determination of Peak Flow Rates and Floodplain Delineation for Dam Breaches at the Rocky Flats Site* (WWE 2010) delineated the current floodplains across the eastern portion of the RFS (Figure E-3). Based on this study, some of the proposed activities will be located in or adjacent to the 100-year floodplain. No high-hazard areas have been identified as part of this work, nor are high-hazard areas present at RFS.

### **E1.3 Floodplain/Wetland Impacts**

The Proposed Action would result in disturbance to approximately 26 acres of vegetation, wetlands, and floodplains around the dams. These direct impacts would result from clearing, earthmoving, stockpiling, construction, and staging area activities. These acres are estimates based on the preliminary engineering drawings for the Proposed Action and represent a worst-case scenario. The actual acres of disturbance may vary by dam site but would not exceed a total of 26 acres of disturbance to vegetation, wetlands and floodplains.

#### **Vegetation**

Direct impacts to the upland vegetation would be largely temporary, except where the breach spillway itself is located. After the original construction of the dams, the disturbed areas were seeded with predominantly non-native vegetation (smooth brome). Revegetation and weed-control efforts after project completion would replace the non-native vegetation with native vegetation, and create an indirect benefit by re-establishing native upland grasslands after the project.

Most noxious weeds in the project areas would be removed during construction activities, and reseeded with native species and ongoing weed control would be beneficial and necessary for establishment of native upland grasslands.

#### **Floodplains**

Portions of the project construction footprint at each pond are within the 100-year floodplain (Figure 3; 100-year, 24-hour event; WWE 2010). The total disturbance to the floodplain would be approximately 5.7 acres. Table E-2 presents the approximate floodplain impacts at each pond.



Table E-2. Floodplain Impacts at Each Pond

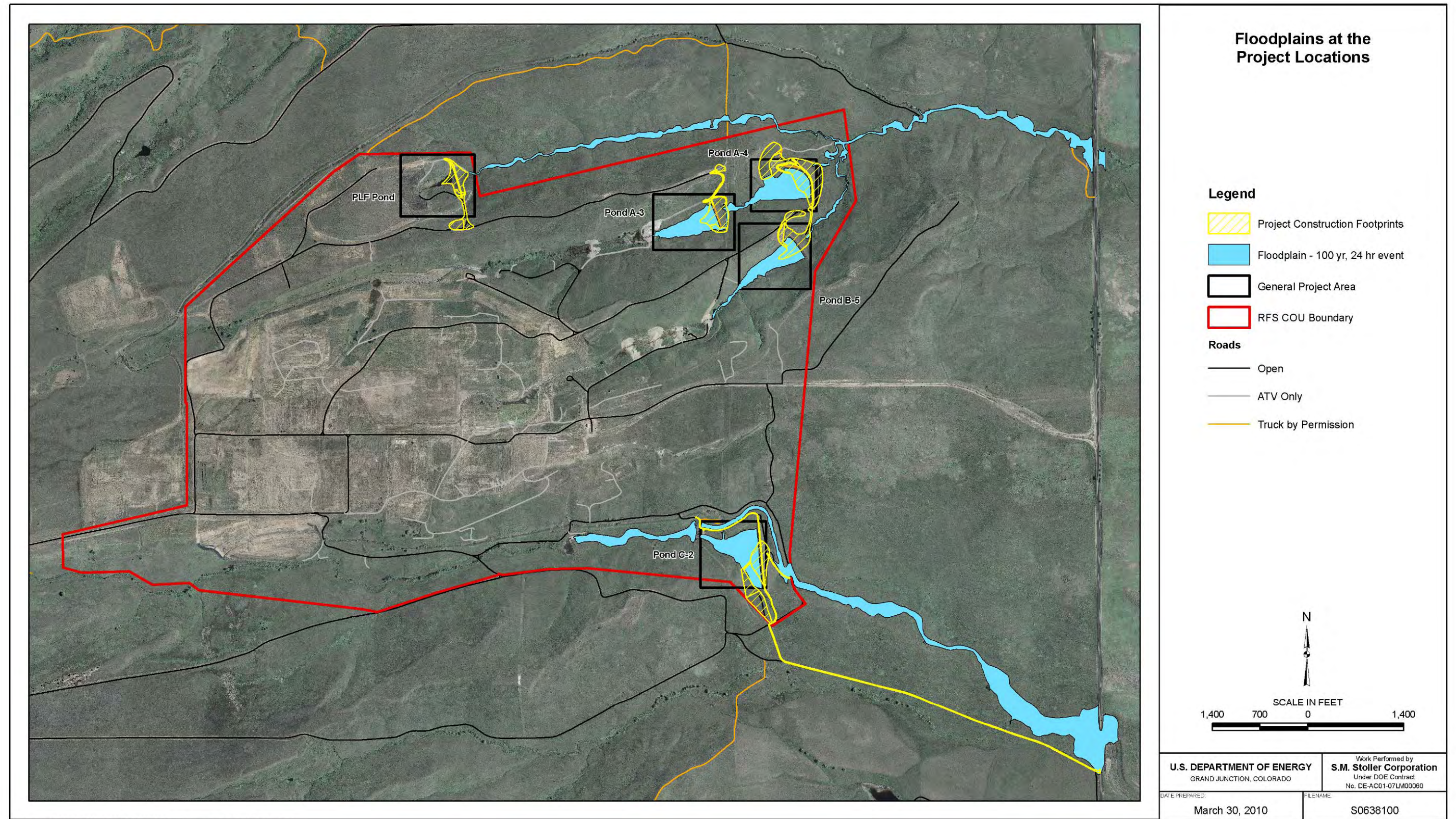
Location	Approximate Floodplain Acres Impacted by Project
PLF Pond	0.02
Pond A-3	1.41
Pond A-4	1.93
Pond B-5	1.20
Pond C-2	1.14
Total Acres	5.71

Direct impacts to floodplains would be minimal, temporary, and mostly limited to the construction footprints at each dam. Indirect impacts would alter the existing floodplains at each of the dams. Currently the floodplain at Pond A-3 goes around the dam through the spillway. Breaching of the dams would re-establish the historic floodplain and stream channel through the pond bottoms.

Minimal changes to floodplain capacity are expected relative to the overall capacity of the floodplain, because other than the breach in the dam, no changes are expected to the floodplain topography downstream of dam breaches. Indirect impacts to peak flows downstream of the breached dams are expected. Modeling results show that with the breached dams no longer able to attenuate peak flows and partially detain runoff volumes during flood events, larger flows and volumes are expected downstream compared to current conditions (WWE 2010). However, the potential flood conditions after implementation of the Proposed Action are not expected to be different from flood conditions prior to the original construction of the dams.

During implementation of the Proposed Action, there would be the potential for short-term erosion and sedimentation associated with construction disturbances and exposed areas in former pond bottoms. The dams are not a functional part of the remedy for Rocky Flats and are not designed or operated as sedimentation basins. Long-term erosion control at the site is addressed through ongoing activities such as soil stabilization, erosion control BMPs, and revegetation throughout the drainage basins. The *Erosion Control Plan for Rocky Flats Central Operable Unit* (DOE 2007) will be followed.

The Proposed Action is expected to have minimal direct impacts to storage and evaporative depletions during construction. Since the ponds will be drained prior to construction, small reductions in storage and evaporative depletions are expected. Indirect impacts from the Proposed Action are expected to eliminate evaporative depletions associated with the retention of out-of-priority water upstream of the Rocky Flats dams on Walnut Creek. The proposed action is designed to detain no water upstream of the remaining structures.



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Figure E-3. Floodplains at the Project Locations

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## Wetlands

Direct impacts to wetlands would be minimal, because the areas upstream of the dams are predominantly open water where the work in the ponds themselves would be done to create the breach. A small amount of downstream wetland impacts are anticipated where the toe of the breach spillway would be placed. Based on preliminary project designs, less than 0.5 acre of palustrine emergent/shrubland wetland and approximately 4 acres of open water habitat would be directly impacted by the Proposed Action activities. Most of this would be temporary disturbance.

Indirect impacts to the wetlands and open water habitat are expected as the stream channels are re-established upstream of the dams and the open water habitat is replaced with emergent/shrubland wetland types and upland habitat. Open water habitat would be largely eliminated at each pond with perhaps the exception of the water flowing in the stream channel. Additionally, some current palustrine emergent/shrubland wetland around the perimeter of the ponds may be permanently lost over time if hydrologic conditions are not sufficient to support them after project completion. A permanent benefit to offset these impacts, however, is that approximately 5 to 6 acres of palustrine emergent/shrubland wetland would be created in the former open water habitat areas, which would exceed the amount directly impacted during construction activities. The conversion of the open water habitat to palustrine emergent/shrubland wetland would increase the aquatic resources functions and services. Wetlands function to improve water quality through wetland filtering, enhance floodwater storage that can reduce flood risks, provide fish and wildlife habitat, and increase biological productivity. These functions are expected at varying levels in the wetlands created by the project. Removal of the dams would potentially benefit the Preble's meadow jumping mouse (*Zapus hudsonius preblei*; a federally listed threatened species at RFS) by increasing the amount of Preble's mouse habitat at RFS and increasing the connectivity of upstream and downstream habitat. This would reduce the fragmentation of Preble's mouse habitat that currently exists in the drainages.

### E1.4 Mitigation

The following potential adverse effects in the floodplains and wetlands were identified:

- The potential for erosion and sedimentation during and post-construction.
- Direct and indirect impacts to wetlands.
- Alteration of floodplain due to dam breaching.

The following mitigation measures were identified to avoid and reduce potential impacts:

- Erosion controls will be used to reduce the potential for erosion and sedimentation during and post-construction. The guidance in the *Erosion Control Plan for the Rocky Flats Property Central Operable Unit* (DOE 2007) will be followed,
- Temporarily disturbed areas would be reclaimed following project completion using native plant species,
- Revegetation would occur as soon as possible to establish vegetative cover and habitat for wildlife, while preventing the establishment of weeds,
- Noxious weeds would be controlled using appropriate weed control measures,

- Minimize construction footprints to minimize wetland and floodplain impacts, and
- Wetland impacts would be addressed through appropriate permits from the USACOE. Mitigation for wetland impacts would be conducted in-situ and follow the guidelines and permit requirements provided by the USACOE.

## **E2.0 References**

10 CFR 1022 *et seq.* 1997. Compliance With Floodplain and Wetland Environmental Review Requirements.

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USACOE (U.S. Army Corps of Engineers), 1994. *Rocky Flats Plant Wetlands Mapping and Resource Study*, prepared for the U.S. Department of Energy, Golden, Colorado, prepared by the U.S. Army Corps of Engineers, Omaha District, December.

WWE (Wright Water Engineers), 2010. *Determination of Peak Flow Rates and Floodplain Delineation for Dam Breaches at the Rocky Flats Site*, prepared for the U.S. Department of Energy, Westminster, Colorado, prepared by Wright Water Engineers, Denver, CO, March.

## **Appendix F**

### ***Determination of Peak Flow Rates and Floodplain Delineation for Dam Breaches at the Rocky Flats Site***

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**DETERMINATION OF PEAK FLOW RATES  
AND FLOODPLAIN DELINEATION  
FOR DAM BREACHES  
AT THE ROCKY FLATS SITE**

Prepared for:

**S.M. Stoller Corporation**

Prepared by:

**WRIGHT WATER ENGINEERS, INC.**  
Denver, Colorado

March 2010  
071-091.010



**DETERMINATION OF PEAK FLOW RATES AND  
FLOODPLAIN DELINEATION FOR DAM BREACHES  
AT THE ROCKY FLATS SITE**

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# DETERMINATION OF PEAK FLOW RATES AND FLOODPLAIN DELINEATION FOR DAM BREACHES AT THE ROCKY FLATS SITE

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## 1.0 INTRODUCTION

The study presented in this report was conducted by Wright Water Engineers, Inc. (WWE) to determine peak flow rates and delineate floodplains for a range of storm events at the U.S. Department of Energy (DOE) Rocky Flats Site located in Jefferson County, Colorado. The analysis will be used to support National Environmental Policy Act (NEPA) evaluation and design of planned breaches of Dams A-3, A-4, B-5, C-2 and the Present Landfill (PLF) Dam.

S.M Stoller Corporation (Stoller) is the Legacy Management Support Contractor for DOE at the RFS. This study was conducted for Stoller under Project No. LTS-111-0056-06-003.

DOE has previously completed breaches at seven of the twelve dams at the Rocky Flats Site. Five remaining dams are proposed to be breached in two groups as summarized in Table 1:

**Table 1. Future Dam Breach Projects at the Rocky Flats Site**

<b>Dam(s)</b>	<b>Schedule</b>
A-3, PLF, C-2	Design in 2010. Construction in 2011.
A-4, B-5	Preliminary design in 2011. Construction in 2015 - 2018.

The locations of the dams listed in Table 1 are shown on Figure 1.

## 2.0 SCOPE OF WORK

The scope of work addressed by this study involves analyzing stormwater runoff from the four storm events listed in Table 2.

**Table 2. Storm Events Analyzed for Peak Flow Analysis**

Storm Return Frequency	Duration	Depth
2-year	24-hour	2.2 inches
50-year	24-hour	4.4 inches
100-year	6-hour	3.8 inches
100-year	24-hour	5.0 inches

Notes:

- 1) Precipitation depths for the 24-hour storm events were derived from NOAA Atlas II, Volume III (Colorado) (NOAA .1973).
- 2) The precipitation depth for the 100-year, 6-hour event is the same that was used for the Drainage and Flood Control Master Plan for the Rocky Flats Plant (EG&G, 1992), which was derived from the Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual.

For the storm events listed above, three different dam breach scenarios were evaluated, as summarized in Table 3 and depicted graphically on Figure 2 (at back of report).

**Table 3. Dam Conditions Scenarios**

Scenario	Dam Breach Conditions	Initial Condition Assumptions
1 (Current Conditions)	Dams A-1, A-2, B-1, B-2, B-3, B-4 and C-1 are all breached. A-3, A-4, B-5, PLF, and C-2 are intact.	Existing breached dams have stop logs in place and are full. All other ponds have outlet works closed and are filled to maximum normal operating range (40% of capacity for A-3, A-4, B-5, and C-2; PLF is filled to 22%).
2	Dams A-1, A-2, B-1, B-2, B-3, B-4 and C-1 are all breached. Dams A-3, PLF, and C-2 are breached. Dams A-4 and B-5 are intact.	Existing breached dams have stop logs in place and are full. Ponds are empty in breached dams A-3, PLF and C-2. Ponds A-4 and B-5 are filled to 40% of capacity.

Determination of Peak Flow Rates and Floodplain Delineation  
For Dam Breaches at the Rocky Flats Site

Scenario	Dam Breach Conditions	Initial Condition Assumptions
3	<p>Dams A-1, A-2, B-1, B-2, B-3, B-4 and C-1 are all breached.</p> <p>Dams A-3, PLF and C-2 are breached.</p> <p>Dams A-4 and B-5 are breached.</p>	<p>Existing breached dams have stop logs in place and are full.</p> <p>Ponds are empty in breached dams A-3, PLF and C-2.</p> <p>Ponds are empty in breached dams A-4 and B-5.</p>

For the four storm events and three dam conditions scenarios described in Table 2 and Table 3, respectively, the following analyses are included in this report:

- Peak flow rate analyses - For each storm event and for each scenario, peak flow rates are calculated at the inlet and outlet of the ponds to be breached (A-3, A-4, B-5, C-2 and PLF). Twelve storm/dam conditions scenarios in total are evaluated.
- Floodplain analysis – For the 100-year, 6-hour event and the 100-year, 24-hour event, floodplain mapping was developed for each scenario. Floodplain mapping was developed for the following areas at the site:
  - A-Series Ponds – From Pond A-2 to the east edge of the Walnut Creek mapping area (east of Indiana Street at the Great Western Reservoir splitter box).
  - B-Series Ponds – From Pond B-4 to the east edge of the Walnut Creek mapping area.
  - PLF Pond – From the PLF pond to the confluence of No Name Gulch and Walnut Creek.
  - C-Series Ponds – From Pond C-1 to the east edge of the Woman Creek mapping area (east of Indiana Street at the junction of inflows to the Woman Creek Reservoir channel).

### 3.0 BACKGROUND

#### 3.1 Prior Studies

Two prior studies of flood hydrology conducted at RFS were referenced for this study: 1) the *Rocky Flats Plant Drainage and Flood Control Master Plan*, developed by WWE for EG&G in 1992 (EG&G 1992), herein referred to as the 1992 study, and 2) the *Determination of Peak Flow, Rocky Flats Environmental Technology Site Dams A-1, A-2, B-1, B-2, B-3, B-4 and C-1*, developed by WWE for Rocky Flats Closure Site Services in 2004 (RFCSS 2004), herein referred to as the 2004 study. These reports are summarized briefly below:

1992 Study - The flood hydrology of the Walnut Creek and Woman Creek drainage catchments, including the portion of the drainages within the RFS, was defined in the 1992 study. This modeling effort was reviewed and adopted by the Site, the Urban Drainage and Flood Control District (UDFCD) and the State of Colorado. The 1992 study included two land-use scenarios: 1) current development (i.e., with the fully developed industrial area at the site), and 2) potential future development. The study did not include a post-closure land-use scenario. Hydrographs for individual basins were calculated using the Colorado Urban Hydrograph Procedure (CUHP) program and routed using the UDSWM2-PC model developed by UDFCD. Flow elevations were determined using HEC-RAS to develop the floodplain delineation for the 100-year, 6-hour storm event. The UDSWM model routing diagram for the 1992 study is included in Appendix A.

2004 Study - The 2004 study was conducted to calculate the estimated peak runoff rates at ponds A-1, A-2, B-1, B-2, B-3, B-4 and C-1 in a post-closure (i.e., “undeveloped”) condition at RFS, and was based on the proposed land configuration of the RFS and the proposed geometry of the dam breaches for those ponds. The 2004 study was not based on the final “as-built” land configuration as it exists in 2010.

Results from the 2004 analysis were used to finalize the designs of the breaches for dams A-1, A-2, B-1, B-2, B-3, and B-4. Similar to the 1992 study, the 2004 study utilized versions of the CUHP and UDSWMM models to calculate peak flow rates and route flows. The 2004 report presents a table of the calibration results for the 2004 CUHP/UDSWMM models calibrated with the results from the 1992 study. The 2004 study did not include floodplain delineation. The UDSWMM model routing diagram for the 2004 study is included in Appendix A.

### 3.2 RFS Dam Breach Geometry

The geometry of the completed and proposed RFS dam breaches is summarized in Table 4.

**Table 4. Dam Breach Geometry**

Breach Status	Dam	Breach Inlet Elevation	Breach Outlet Elevation	Breach Width (ft)	Breach Side Slopes (H:V)	Stop Log Height (ft)
Completed Breaches	A-1	5823.0	5817.35	10	3:1	3
	A-2	5801.03	5791.85	15.7	3:1	3
	B-1	5878.1	5863.0	10	3:1	3
	B-2	5861.87	5849.2	14.5	3:1	3
	B-3	5846.97	5837.71	16	3:1	3
	B-4	5833.07	5814.93	20.4	3:1	3
	C-1	5813.4	5811.8	6	3:1	3.5
Proposed Breaches	A-3	5777.5	5762.5	17	2:1	N/A
	PLF	5899.0	5888.4	18	2:1	N/A
	C-2	5748.5	5739.0	17	2:1	N/A
	A-4	5733.5	5720.0	20	2:1	N/A
	B-5	5779.5	5756	25	2:1	N/A

Note: N/A indicates not applicable (the proposed breaches will not have stop logs).



### 3.3 Reference Information

The published standards and references that were used to guide the analysis described in this report include the following:

1. State of Colorado Department of Natural Resources, Division of Water Resources, Office of the State Engineer. *Rules and Regulations for Dam Safety and Dam Construction*. January 1, 2007.
2. EG&G Rocky Flats, *Rocky Flats Plant Drainage and Flood Control Master Plan*. Prepared for the Department of Energy, Rocky Flats Plant by Wright Water Engineers, Inc. April 1992.
3. NOAA, 1973. *Precipitation-Frequency Atlas of the Western United States. Volume III, Colorado*. U.S. Department of Commerce, National Oceanic and Atmospheric Administration.
4. Rocky Flats Closure Site Services. *Determination of Peak Flow, Rocky Flats Environmental Technology Site Dams A-1, A-2, B-1, B-2, B-3, B-4 and C-1*. Prepared for the RFCSS by Wright Water Engineers, Inc. December 2004.
5. UDFCD. *CUHP 2005 User Manual. Version 1.3.3*. Urban Drainage and Flood Control District. January 21, 2010.
6. EPA. *Stormwater Management Model User's Manual. Version 5.0*. U.S. Environmental Protection Agency. Revised July 2009.
7. S.M. Stoller. A-3, A-4, B-5, C-2, Present Landfill Dam Breaching – NEPA Evaluation. Drawing Sheets 1 – 6. February 12, 2010.
8. S.M. Stoller. A-1, A-2, B-1, B-2, B-3, and B-4 Dam Breaching - As-Constructed. Drawing Sheets 1 – 24. June 23, 2008.

## **4.0 ANALYSIS PROCEDURE**

Three computer models were used for the analyses presented in this report. These include two models for the hydrologic analysis:

- 1) CUHP 2005, Version 1.3.3.6, which was used to develop hydrographs for each individual catchment, and
- 2) EPA SWMM, Version 5.0, which was used to route the hydrographs developed in the CUHP. CUHP and SWMM were selected for the analysis to be consistent with the approach used for the 1992 and 2004 studies (see Section 3.1) and to use an approach accepted by UDFCD.

A third model, HEC-RAS Version 4.0, was used to calculate channel hydraulics to determine water surface elevations at various channel cross-sections for the floodplain delineation.

It is noted that the model versions used for this study differ from those used in the prior studies. Version 1.3.3.6 of CUHP was released in January 2010, and Version 5.0 of the EPA SWMM model is different than the UDSWMM model used in 2004. For the floodplain analysis, HEC-RAS is a newer version of the HEC-1 model used for floodplain delineation in the 1992 study. For this study, in addition to using the most current versions of CUHP, SWMM, and HEC-RAS, modifications were made to the sub-catchment boundaries to reflect the most current site topography, to incorporate the “as-built” condition of the completed dam breaches at Dams A-1, A-2, B-1, B-2, B-3, B-4, and C-1, and to reflect the preliminary design of the proposed breaches at Dams A-3, A-4, B-5, C-2 and the PLF Dam.

### **4.1 CUHP/SWMM Calibration**

In order to develop model results for this study that can be reasonably compared with results from the prior hydrologic modeling studies at RFS, the current CUHP model was calibrated to match the results of the CUHP version used in 2004. CUHP input files from 2004 were run in

the current CUHP 1.3.3.6 to generate hydrographs for the individual sub-catchments of the 2004 model. An EPA SWMM 5.0 model was developed to simulate the 2004 UDSWM model used for routing flows. Using the CUHP input files from 2004, output from the new version of the CUHP model for the 100-year, 6-hour storm event was routed into the SWMM model and results were compared with those from 2004. An iterative process was conducted where the CUHP Cp parameter was adjusted and the CUHP flows were routed through SWMM; this process was continued until the routed flows generated from the new CUHP and SWMM models provided a reasonable match with the results from the 2004 study. Results of the calibration for the Walnut Creek and Woman Creek basins are presented in Appendix B. CUHP input values for the Walnut Creek and Woman Creek models are included in Appendix C.

#### **4.2 Site Topography and Model Development**

Site topography based on 2006 aerial survey data, which has been subsequently updated to incorporate more recent localized modifications to the site topography (e.g., inclusion of dam breaches completed in 2009), was provided by Stoller. Using this updated topography, the following changes were made to the CUHP model:

1. CUHP sub-catchment delineations were re-delineated as needed. Where sub-catchments from the 1992 and 2004 studies were still appropriate, the basin remained the same in the CUHP model and the basin identifier was maintained. For sub-catchments that significantly changed from the 2004 study, a new basin designation was assigned by adding an “A”, “B”, “C”, etc. to the 2004 basin identifier (e.g., sub-catchment “WA6” in Walnut Creek was changed to “WA6A” after it was re-delineated). The new CUHP catchments are shown on Figure 3.
2. CUHP sub-catchment area, length, and length to centroid were recalculated for the newly defined sub-catchments.

3. Other CUHP model variables such as soil infiltration characteristics and surface retention characteristics were changed from the original modeling effort only for those sub-catchments where the original variables did not appear to be consistent with guidance specified by UDFCD.

A new SWMM model was developed to reflect the changes in the site topography and to incorporate the new routing created by the proposed dam breaches. A different SWMM model was created for each of the three scenarios described in Section 2.0. The new SWMM models incorporated the following elements:

1. SWMM element routing was developed using the prior studies as a basis, but with changes to channel lengths made to reflect the new basin delineations developed for the CUHP model.
2. Other channel geometry parameters, such as channel bottom width, side slopes, and roughness coefficients were, where appropriate, adopted from the parameter variables used in the prior studies.
3. The SWMM element numbering was carried over from the 2004 study where possible to facilitate comparison of results from prior studies. However, in cases where the SWMM elements were modified to reflect changes to the CUHP and SWMM models, the SWMM model elements were renumbered in the following manner:
  - a. New CUHP sub-catchments were assigned a prefix “7” in the Walnut Creek Basin and an “8” in the Woman Creek basin (e.g., former basin 31, assigned to catchment WA5 in the 2004 model, was designated as basin 731 and assigned to catchment WA5A in the current SWMM model).
  - b. New conveyance elements and design points were assigned a 500 series number in the Walnut Creek basin and a 600 series number in the Woman Creek basin. This

is why, for example, there are 400 and 500 series SWMM elements adjacent to one another in the North Walnut Creek basin.

The new SWMM elements are shown on Figure 3, along with the CUHP basin designations. The SWMM model routing is shown on Figure 4 (Note: Figure 4 reflects the SWMM routing for Scenario 3; SWMM routing for Scenarios 1 and 2 is the same as Scenario 3 except for the absence of breaches that are specific to each scenario).

### **4.3 Storm Events**

As described in Section 2.0, in accordance with the scope of work for the project, the model analysis for this study is conducted for the 100-year, 6-hour duration storm event and the 2-year, 50-year, and 100-year, 24-hour duration storm events. Prior hydrology studies at RFS included analyses of the 100-year, 6-hour event. Therefore, for this study, the 100-year, 6-hour event included the same precipitation depth (3.8 inches) and distribution, based on UDFCD methodology, as was used by past studies.

Since there were no 24-hour storm events analyzed in the prior RFS studies, storm event depths for the 24-hour storms in the current study were obtained from the NOAA Atlas II, Volume III (Colorado) (NOAA 1973). To facilitate comparisons between the 6-hour event and the 24-hour events, the UDFCD distribution for the 6-hour event was applied to the 24-hour storm depths (i.e., each time step for the 6-hour event was multiplied by 4 to create a 24-hour storm distribution, with values interpolated to generate 5-minute precipitation depths). These distributions were used in the CUHP model to generate peak hydrographs for each sub-catchment for each storm event analyzed; the CUHP output for each storm was then used as input for the SWMM models for each dam breach scenario.

### **4.4 Modeling Assumptions**

As presented in Table 3, the assumptions regarding the conditions of the ponds are as follows:

- The existing breached dams (A-1, A-2, B-1, B-2, B-3, B-4 and C-1) remain in their current form for all scenarios. The associated ponds are filled to the top of the stop log structures at the beginning of each scenario.
- Dams A-3 and C-2 are filled to 40 percent (their normal maximum operating condition) and the outlet works are closed at the beginning of Scenario 1. Similarly, the PLF dam is filled to 22 percent (the level of the outlet works) and the outlet works closed at the beginning of Scenario 1. In Scenarios 2 and 3, where these three dams are breached, their initial pond condition is empty.
- Dams A-4 and B-5 are filled to 40 percent (their normal maximum operating condition) at the beginning of Scenarios 1 and 2 and the outlet works are closed. In Scenario 3, where these two dams are breached, their initial pond condition is empty.

These assumptions were defined by Stoller as representative conditions to consider as a starting point for the modeled dam breach scenarios.

## 5.0 RESULTS

### 5.1 Peak Flow Rates

The peak flow rates at each of the dams proposed to be breached, for each of the storm events and for each of the different scenarios, are presented in Table 5 through Table 9.

**Table 5. Calculated Peak Flow Rates at Dam A-3**

<b>Scenario</b>	<b>Storm Event</b>	<b>Storm Event Depth (in)</b>	<b>A-3 Pond Peak Inflow (cfs)</b>	<b>A-3 Breach Peak Flow (cfs)</b>	<b>A-3 Spillway Peak Flow (cfs)</b>
<b>Scenario 1</b> <u>A-Series Ponds:</u> Breached: A-1 and A-2 Not Breached: A-3, and A-4	2-yr, 24-hr	2.2	3	N/A – not breached	0
	50-yr, 24-hr	4.4	257	N/A – not breached	26
	100-yr, 24-hr	5.0	366	N/A – not breached	92
	100-yr, 6-hr	3.8	527	N/A – not breached	158
<b>Scenario 2</b> <u>A-Series Ponds:</u> Breached: A-1 through A-3 Not Breached: A-4	2-yr, 24-hr	2.2	3	0	N/A
	50-yr, 24-hr	4.4	257	242	N/A
	100-yr, 24-hr	5.0	366	342	N/A
	100-yr, 6-hr	3.8	527	493	N/A
<b>Scenario 3</b> <u>A-Series Ponds:</u> Breached: A-1 through A-4 Not Breached: None	2-yr, 24-hr	2.2	3	0	N/A
	50-yr, 24-hr	4.4	257	242	N/A
	100-yr, 24-hr	5.0	366	342	N/A
	100-yr, 6-hr	3.8	527	493	N/A

Notes: For Pond A-3, the Scenario 2 peak flow values are the same as in Scenario 3 because the breach conditions of A-3 and the upstream A-Series ponds are the same in both Scenarios. N/A indicates not applicable.

Determination of Peak Flow Rates and Floodplain Delineation  
For Dam Breaches at the Rocky Flats Site

**Table 6. Calculated Peak Flow Rates at Dam A-4**

<b>Scenario</b>	<b>Storm Event</b>	<b>Storm Event Depth (in)</b>	<b>A-4 Pond Peak Inflow (cfs)</b>	<b>A-4 Breach Peak Flow (cfs)</b>	<b>A-4 Spillway Peak Flow (cfs)</b>
<b>Scenario 1</b> <u>A-Series Ponds:</u> Breached: A-1 and A-2 Not Breached: A-3, and A-4	2-yr, 24-hr	2.2	4	N/A – not breached	0
	50-yr, 24-hr	4.4	35	N/A – not breached	0
	100-yr, 24-hr	5.0	94	N/A – not breached	0
	100-yr, 6-hr	3.8	161	N/A – not breached	0
<b>Scenario 2</b> <u>A-Series Ponds:</u> Breached: A-1 through A-3 Not Breached: A-4	2-yr, 24-hr	2.2	4	N/A – not breached	0
	50-yr, 24-hr	4.4	255	N/A – not breached	0
	100-yr, 24-hr	5.0	363	N/A – not breached	0
	100-yr, 6-hr	3.8	525	N/A – not breached	0
<b>Scenario 3</b> <u>A-Series Ponds:</u> Breached: A-1 through A-4 Not Breached: None	2-yr, 24-hr	2.2	4	1	N/A
	50-yr, 24-hr	4.4	255	250	N/A
	100-yr, 24-hr	5.0	363	355	N/A
	100-yr, 6-hr	3.8	525	511	N/A

Note: N/A indicates not applicable.



Determination of Peak Flow Rates and Floodplain Delineation  
For Dam Breaches at the Rocky Flats Site

**Table 7. Calculated Peak Flow Rates at Dam B-5**

<b>Scenario</b>	<b>Storm Event</b>	<b>Storm Event Depth (in)</b>	<b>B-5 Pond Peak Inflow (cfs)</b>	<b>B-5 Breach Peak Flow (cfs)</b>	<b>B-5 Spillway Peak Flow (cfs)</b>
<b>Scenario 1</b>  <u>B-Series Ponds:</u> Breached: B-1 through B-4 Not Breached: B-5	2-yr, 24-hr	2.2	3	N/A – not breached	0
	50-yr, 24-hr	4.4	153	N/A – not breached	0
	100-yr, 24-hr	5.0	224	N/A – not breached	0
	100-yr, 6-hr	3.8	373	N/A – not breached	0
<b>Scenario 2</b>  <u>B-Series Ponds:</u> Breached: B-1 through B-4 Not Breached: B-5	2-yr, 24-hr	2.2	3	N/A – not breached	0
	50-yr, 24-hr	4.4	153	N/A – not breached	0
	100-yr, 24-hr	5.0	224	N/A – not breached	0
	100-yr, 6-hr	3.8	373	N/A – not breached	0
<b>Scenario 3</b>  <u>B-Series Ponds:</u> Breached: B-1 through B-5 Not Breached: None	2-yr, 24-hr	2.2	3	0	N/A
	50-yr, 24-hr	4.4	153	151	N/A
	100-yr, 24-hr	5.0	224	220	N/A
	100-yr, 6-hr	3.8	373	360	N/A

Note: N/A indicates not applicable.

Determination of Peak Flow Rates and Floodplain Delineation  
For Dam Breaches at the Rocky Flats Site

**Table 8. Calculated Peak Flow Rates at PLF Dam**

<b>Scenario</b>	<b>Storm Event</b>	<b>Storm Event Depth (in)</b>	<b>PLF Dam Peak Inflow (cfs)</b>	<b>PLF Dam Breach Peak Flow (cfs)</b>	<b>PLF Dam Spillway Peak Flow (cfs)</b>
<b>Scenario 1</b>  <u>PLF Pond Drainage:</u> Breached: None Not Breached: PLF Pond Dam	2-yr, 24-hr	2.2	1	N/A – not breached	0
	50-yr, 24-hr	4.4	15	N/A – not breached	0
	100-yr, 24-hr	5.0	19	N/A – not breached	0
	100-yr, 6-hr	3.8	26	N/A – not breached	0
<b>Scenario 2</b>  <u>PLF Pond Drainage:</u> Breached: PLF Pond Dam Not Breached: None	2-yr, 24-hr	2.2	1	0	N/A
	50-yr, 24-hr	4.4	15	15	N/A
	100-yr, 24-hr	5.0	19	19	N/A
	100-yr, 6-hr	3.8	26	26	N/A
<b>Scenario 3</b>  <u>PLF Pond Drainage:</u> Breached: PLF Pond Dam Not Breached: None	2-yr, 24-hr	2.2	1	0	N/A
	50-yr, 24-hr	4.4	15	15	N/A
	100-yr, 24-hr	5.0	19	19	N/A
	100-yr, 6-hr	3.8	26	26	N/A

Notes: For the PLF Dam, the Scenario 2 peak flow values are the same as in Scenario 3 because the breach conditions of the PLF Dam and the upstream conditions are the same in both Scenarios. N/A indicates not applicable.

Determination of Peak Flow Rates and Floodplain Delineation  
For Dam Breaches at the Rocky Flats Site

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**Table 9. Calculated Peak Flow Rates at Dam C-2**

<b>Scenario</b>	<b>Storm Event</b>	<b>Storm Event Depth (in)</b>	<b>Dam C-2 Inflow (cfs)</b>	<b>Dam C-2 Breach Peak Flow (cfs)</b>	<b>Dam C-2 Spillway Peak Flow (cfs)</b>
<b>Scenario 1</b> <u>Woman Creek Drainage:</u> Breached: C-1 Not Breached: C-2	2-yr, 24-hr	2.2	6	N/A – not breached	0
	50-yr, 24-hr	4.4	146	N/A – not breached	0
	100-yr, 24-hr	5.0	190	N/A – not breached	0
	100-yr, 6-hr	3.8	277	N/A – not breached	0
<b>Scenario 2</b> <u>Woman Creek Drainage:</u> Breached: C-1 and C-2 Not Breached: None	2-yr, 24-hr	2.2	6	4	N/A
	50-yr, 24-hr	4.4	146	141	N/A
	100-yr, 24-hr	5.0	190	184	N/A
	100-yr, 6-hr	3.8	277	266	N/A
<b>Scenario 3</b> <u>Woman Creek Drainage:</u> Breached: C-1 and C-2 Not Breached: None	2-yr, 24-hr	2.2	6	4	N/A
	50-yr, 24-hr	4.4	146	141	N/A
	100-yr, 24-hr	5.0	190	184	N/A
	100-yr, 6-hr	3.8	277	266	N/A

Note: For the C-2 Dam, the Scenario 2 peak flow values are the same as in Scenario 3 because the breach conditions of the C-2 Dam and C-1 upstream are the same in both Scenarios. N/A indicates not applicable.

**Table 10. Calculated Peak Flow Rates at Walnut and Woman Creeks at Indiana Street**

<b>Scenario</b>	<b>Storm Event</b>	<b>Storm Event Depth (in)</b>	<b>Walnut Creek and Indiana Street Peak Flow (cfs)</b>	<b>Woman Creek and Indiana Street Peak Flow (cfs)</b>
Scenario 1	2-yr, 24-hr	2.2	3	30
	50-yr, 24-hr	4.4	446	605
	100-yr, 24-hr	5.0	627	961
	100-yr, 6-hr	3.8	905	1443
Scenario 2	2-yr, 24-hr	2.2	3	30
	50-yr, 24-hr	4.4	454	644
	100-yr, 24-hr	5.0	636	1019
	100-yr, 6-hr	3.8	918	1533
Scenario 3	2-yr, 24-hr	2.2	3	30
	50-yr, 24-hr	4.4	758	644
	100-yr, 24-hr	5.0	1034	1019
	100-yr, 6-hr	3.8	1530	1533

(Note: Results are for flow estimates on the east side of Indiana Street at the study boundaries. Results for Scenarios 2 and 3 for Woman Creek are the same because the pond breach conditions in the Woman Creek basin are the same for each of those scenarios)

A listing of peak flow rates at all SWMM model nodes, for all scenarios, is provided in Appendix D.

## 5.2 Floodplain Delineation

The floodplain delineation mapping is organized as listed in Table 11.

**Table 11. Floodplain Mapping**

Drainage Basin	Storm Event	Scenario	Figure Number
Walnut Creek	100-Year, 6-Hour	1	5a
		2	5b
		3	5c
	100-Year, 24-Hour	1	5d
		2	5e
		3	5f
Woman Creek	100-Year, 6-Hour	1	6a
		2	6b
	100-Year, 24-Hour	1	6c
		2	6d

Model output from HEC-RAS, with water surface elevations at cross-sections throughout the study area, is provided in Appendix E.

Key findings of the peak flow analysis and floodplain delineation for the different scenarios analyzed are summarized below:

Walnut Creek Basin:

- The spillway for the A-3 dam has flow in Scenario 1 (current conditions scenario) during the 50-year, 24-hour storm (26 cfs), the 100-year, 24-hour storm (92 cfs) and the 100-year, 6-hour storm (158 cfs). In Scenarios 2 and 3, the A-3 dam is breached and hence the spillway does not flow in either of those scenarios for any of the storms analyzed.

- The spillway for the A-4 dam does not flow in any of the scenario/storm event combinations analyzed.
- The spillway for the B-5 dam does not flow in any of the scenario/storm event combinations analyzed.
- The roadway at Walnut Creek and Indiana Street is overtopped by flow from Walnut Creek in one scenario analyzed. During the 100-year, 6-hour storm event, in Scenario 3, Walnut Creek overtops Indiana Street. The maximum estimated depth of flow over the Indiana Street crown is approximately 1.2 feet for that storm event/dam breach scenario.
- The floodplain extent upstream of the dams at Ponds A-3, A-4, B-5 and the PLF Pond is largest in Scenario 1 because the dams are intact and the pool elevations are raised. However, downstream from these ponds, the floodplain extent is widest in Scenario 3, because all the dams have been breached and the peak flows are higher. At Walnut Creek and Indiana Street, where the floodplain broadens because of the constriction as flows pass through the 12-foot diameter corrugated metal pipe (CMP) under the road, the floodplain cross-section width for the 100-year 6-hour storm is approximately 690 feet in Scenario 1 versus 850 feet in Scenario 3.

Woman Creek Basin:

- The spillway for the C-2 dam does not flow in any of the scenario/storm event combinations analyzed.
- The roadway at Woman Creek and Indiana Street is overtopped by flow from Woman Creek during three storm events: 1) 100-year, 6-hour event, 2) 100-year, 24-hour event, and 2) 50-year, 24-hour event. For each of these events, Indiana Street is overtopped by Woman Creek for both Scenario 1 (dam C-2 not breached) and Scenario 2 (dam C-2 breached). For the events analyzed where Woman Creek overtops Indiana Street, the

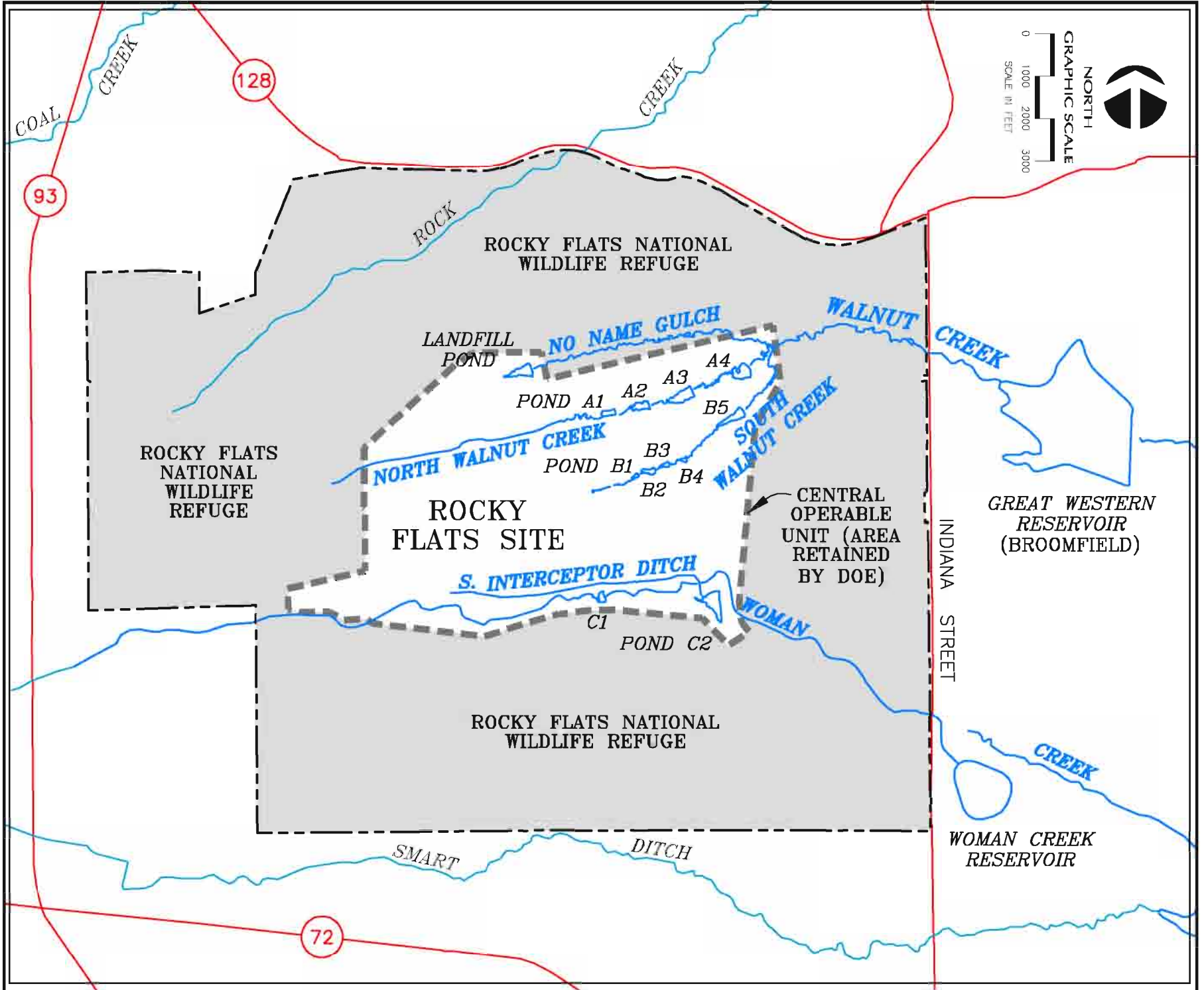
maximum estimated depth of flow over the roadway crown ranges from approximately 0.7 feet for the 50-year, 24-hour event (for Scenario 1) up to approximately 2.0 feet for the 100-year, 6-hour event (for Scenario 2). (Note: The boundaries of the Woman Creek flow over Indiana Street are approximate based on the available survey data in that area. Also note that Scenario 2 is the same as Scenario 3 in the Woman Creek basin because dam C-2 is breached in both scenarios). The flow conveyance structures underneath Indiana Street at Woman Creek include: 1) an elliptical CMP, 44 inches tall by 72 inches wide, located on the main Woman Creek channel, 2) a 3-foot diameter CMP, located approximately 340 feet north of the main Woman Creek channel, and 3) a 12-foot diameter CMP with vertical concrete sidewalls and gravel bottom, located north of and adjacent to the 3-foot CMP.

- The floodplain extent upstream from the dam at Pond C-2 is largest in Scenario 1 because the dam is intact and the C-2 pool elevation is raised from the inflow from the South Interceptor Ditch (note that this area is not within the main Woman Creek channel, which is routed around Pond C-2). Downstream from Pond C-2, the Woman Creek floodplain extent is only slightly larger in Scenario 2, because the dam has been breached and the peak flows are higher. The flow from Woman Creek which is routed around C-2 in both scenarios represents the majority of the flow downstream from Pond C-2. Consequently, the effect of the C-2 dam breach is relatively minor in terms of floodplain extent; in both scenarios, the total cross-section width of the Woman Creek floodplain at Indiana Street, from the north side of the north channel to the south side of the main channel, is approximately 1100 feet.

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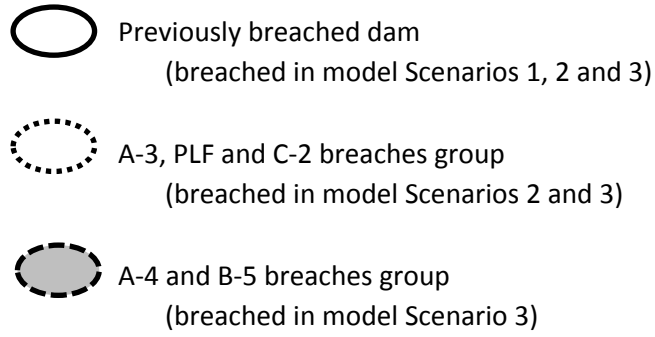
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**FIGURE 1**  
**ROCKY FLATS SITE MAP**

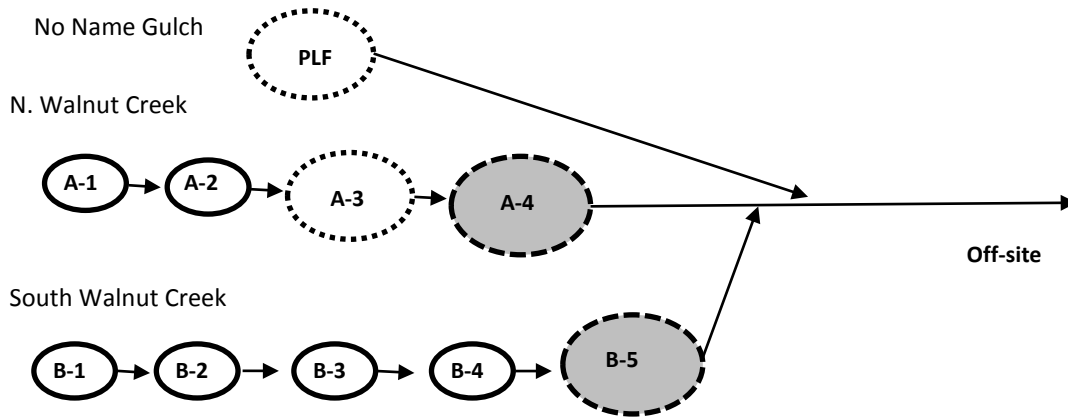




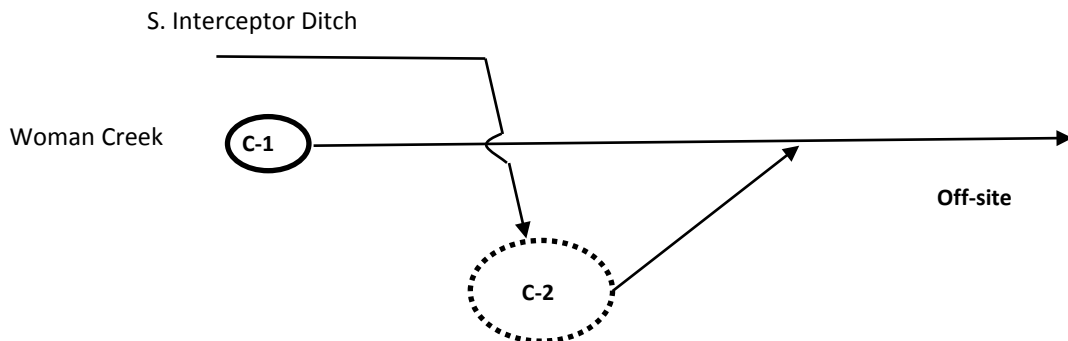
**Figure 2. Schematic Diagram of Dam Breach Scenarios – Walnut and Woman Creek Basins**



**Walnut Creek Basin**

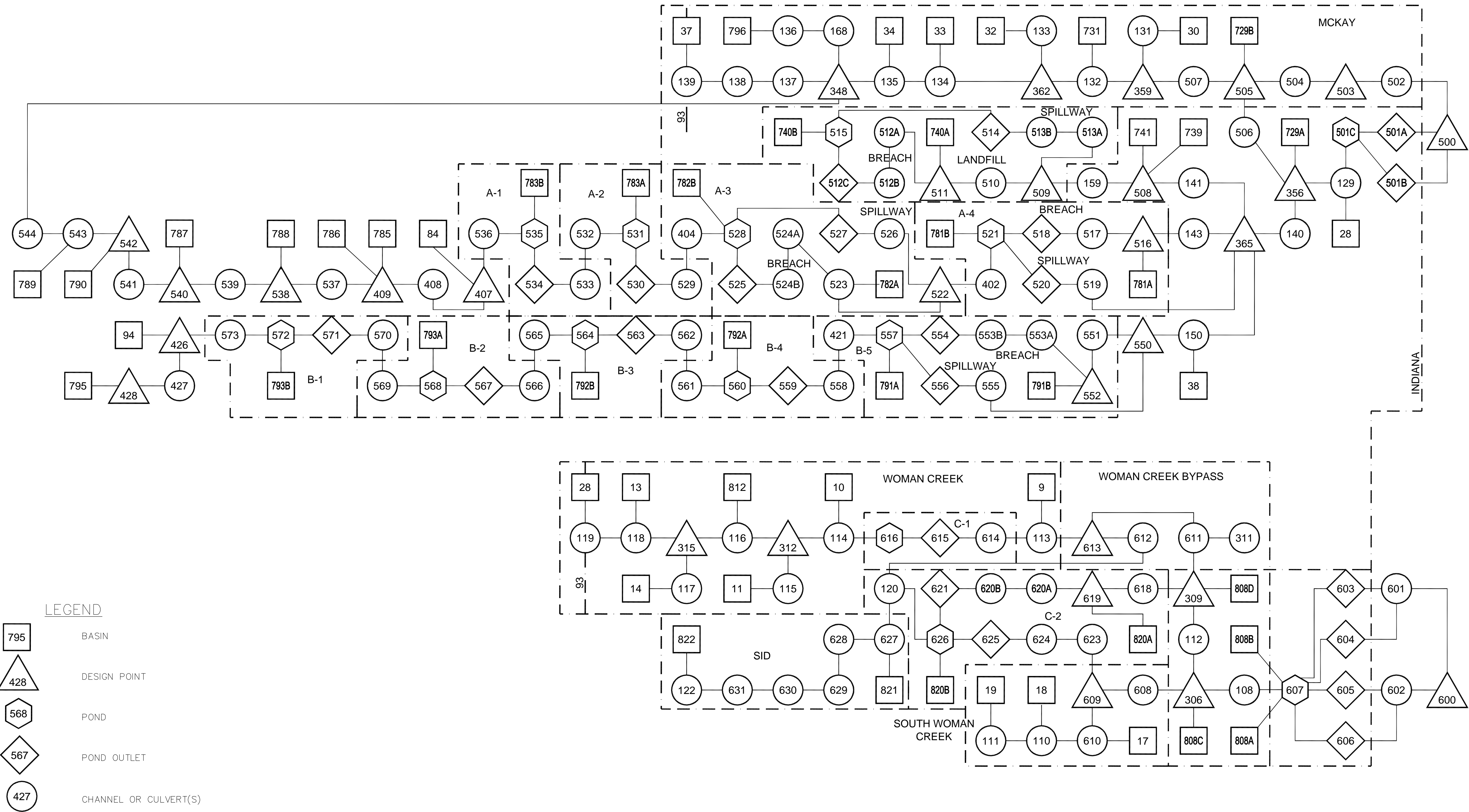


**Woman Creek Basin**





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**LEGEND**

- 795 BASIN
- 428 DESIGN POINT
- 568 POND
- 567 POND OUTLET
- 427 CHANNEL OR CULVERT(S)

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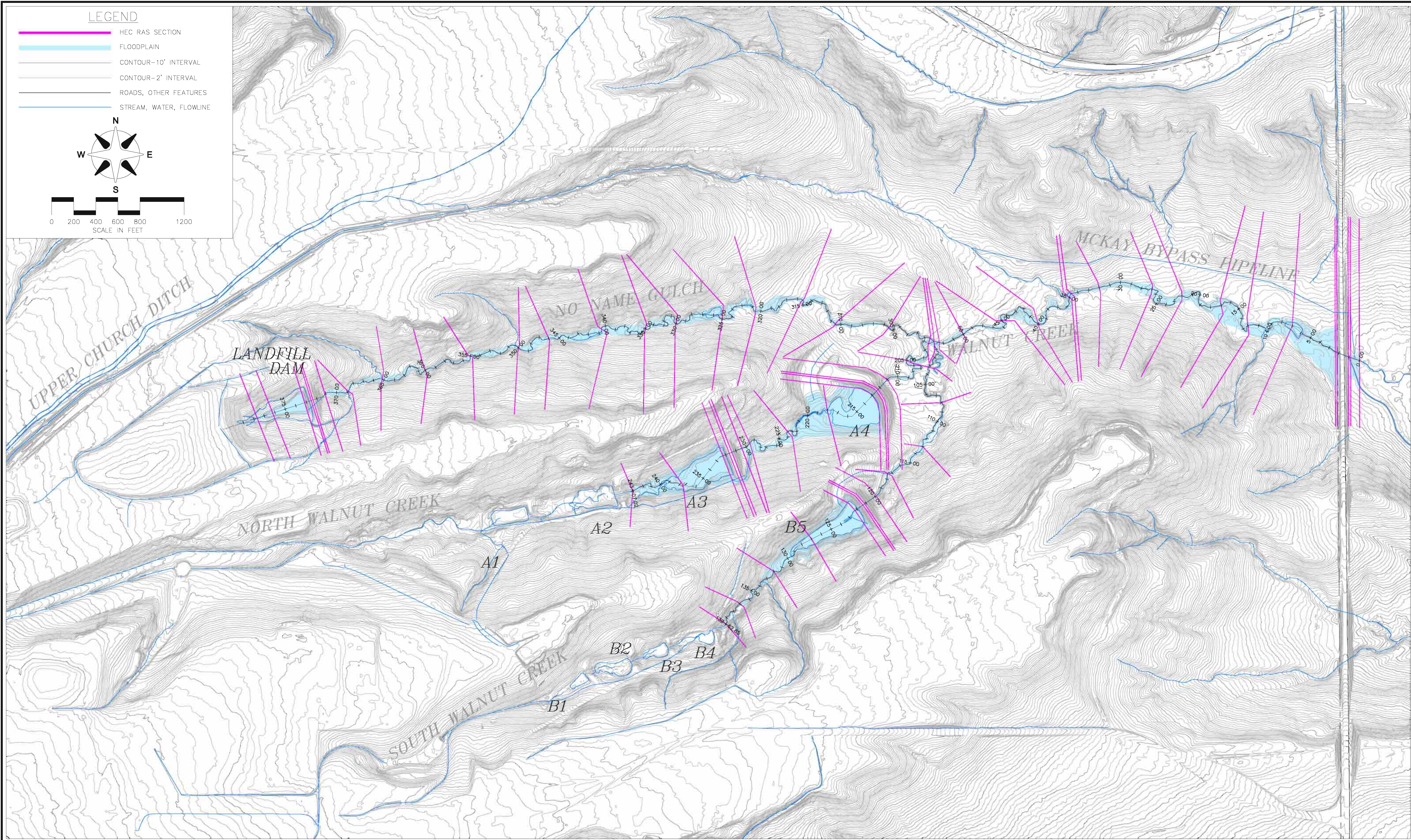
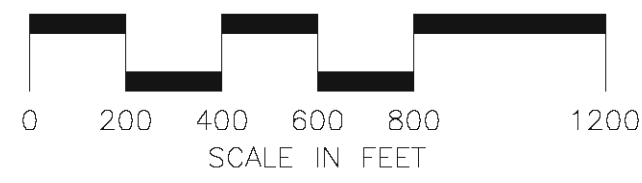
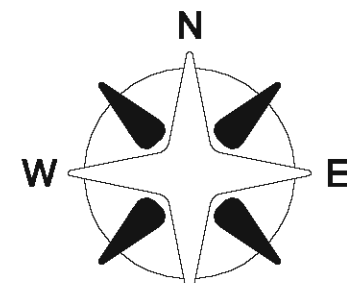
**DETERMINATION OF PEAK FLOW RATES AND FLOODPLAIN DELINEATION FOR DAM BREACHES AT THE ROCKY FLATS SITE**

**SWMM MODEL ROUTING DIAGRAM**

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SHEET NO.	4

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- HEC RAS SECTION
- FLOODPLAIN
- CONTOUR-10' INTERVAL
- CONTOUR-2' INTERVAL
- ROADS, OTHER FEATURES
- STREAM, WATER, FLOWLINE



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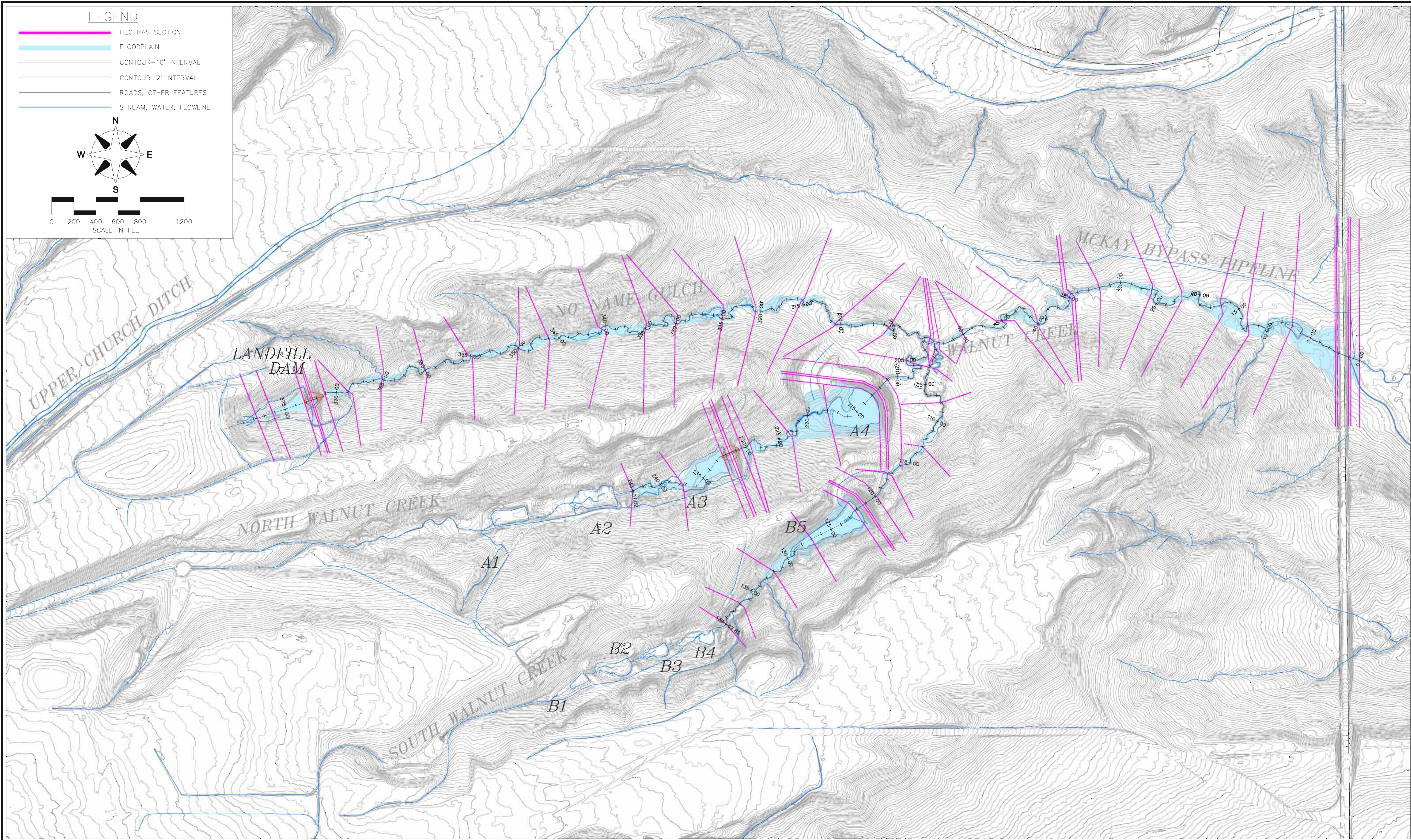
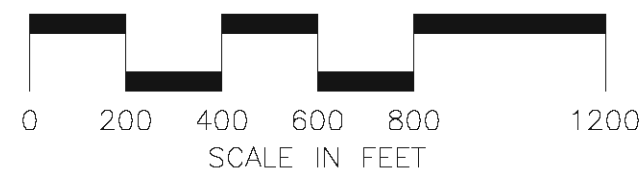
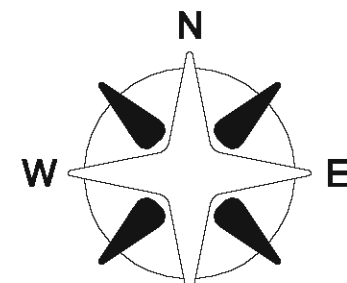
*DETERMINATION OF PEAK FLOW RATES AND FLOODPLAIN DELINEATION FOR DAM BREACHES AT THE ROCKY FLATS SITE*

**FLOODPLAIN DELINEATION  
 WALNUT CREEK, SCENARIO 1  
 100-YEAR, 6 HOUR STORM EVENT**

JOB NO. 071-091.010  
 REVISION NO. 0  
 SHEET NO. 5a

LEGEND

- HEC RAS SECTION
- FLOODPLAIN
- CONTOUR-10' INTERVAL
- CONTOUR-2' INTERVAL
- ROADS, OTHER FEATURES
- STREAM, WATER, FLOWLINE



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**DETERMINATION OF PEAK FLOW RATES AND FLOODPLAIN DELINEATION FOR DAM BREACHES AT THE ROCKY FLATS SITE**

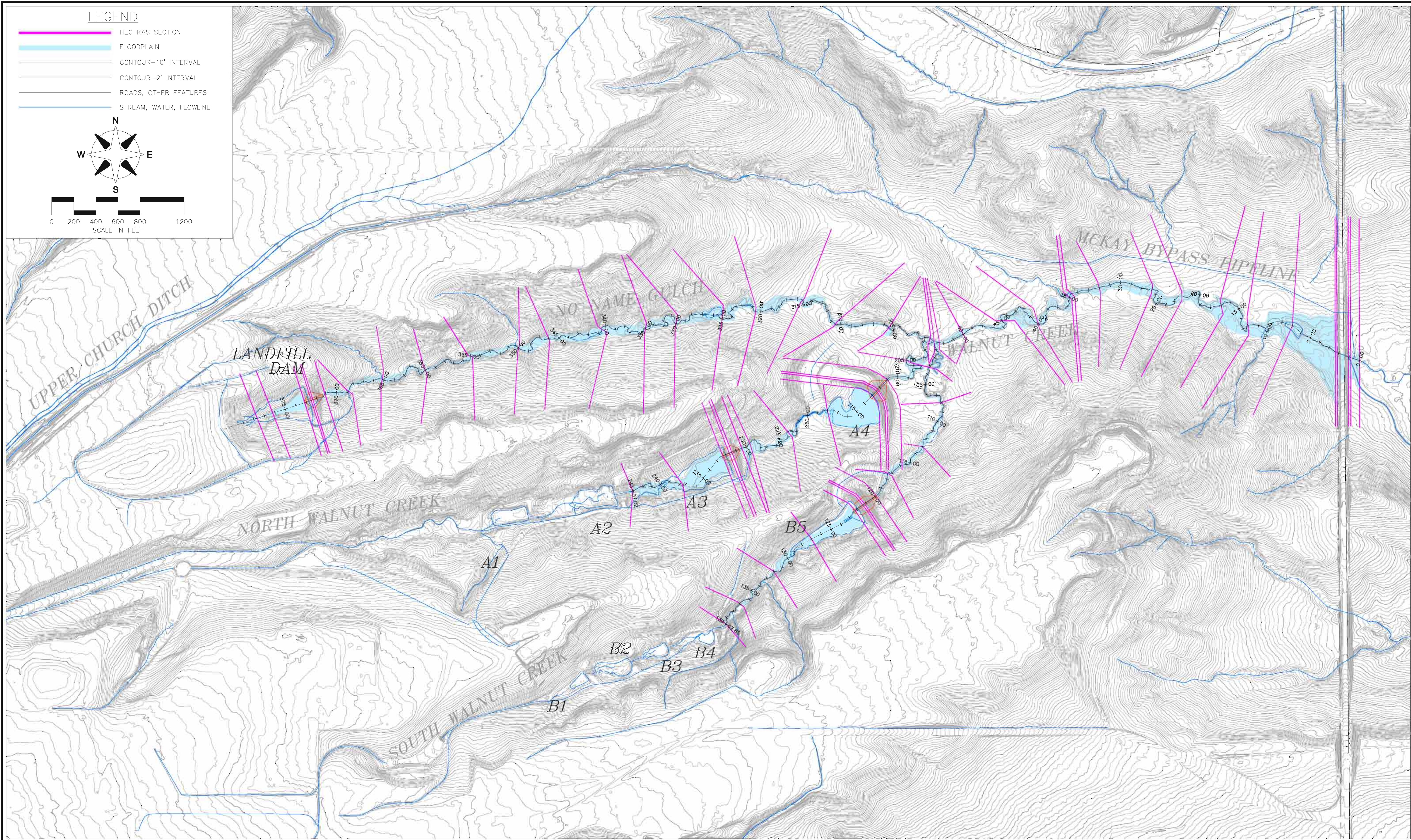
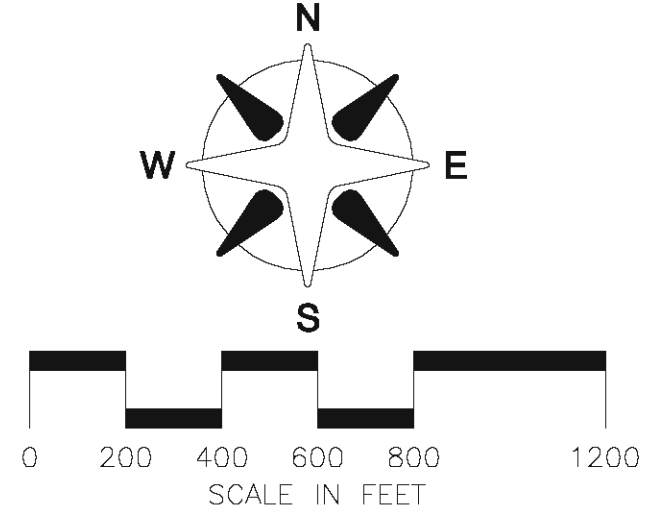
**FLOODPLAIN DELINEATION WALNUT CREEK, SCENARIO 2**

**100-YEAR, 6 HOUR STORM EVENT**

JOB NO. 071-091.010  
 REVISION NO. 0  
 SHEET NO. 5b

LEGEND

- HEC RAS SECTION
- FLOODPLAIN
- CONTOUR-10' INTERVAL
- CONTOUR-2' INTERVAL
- ROADS, OTHER FEATURES
- STREAM, WATER, FLOWLINE



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**DETERMINATION OF PEAK FLOW RATES AND FLOODPLAIN DELINEATION FOR DAM BREACHES AT THE ROCKY FLATS SITE**

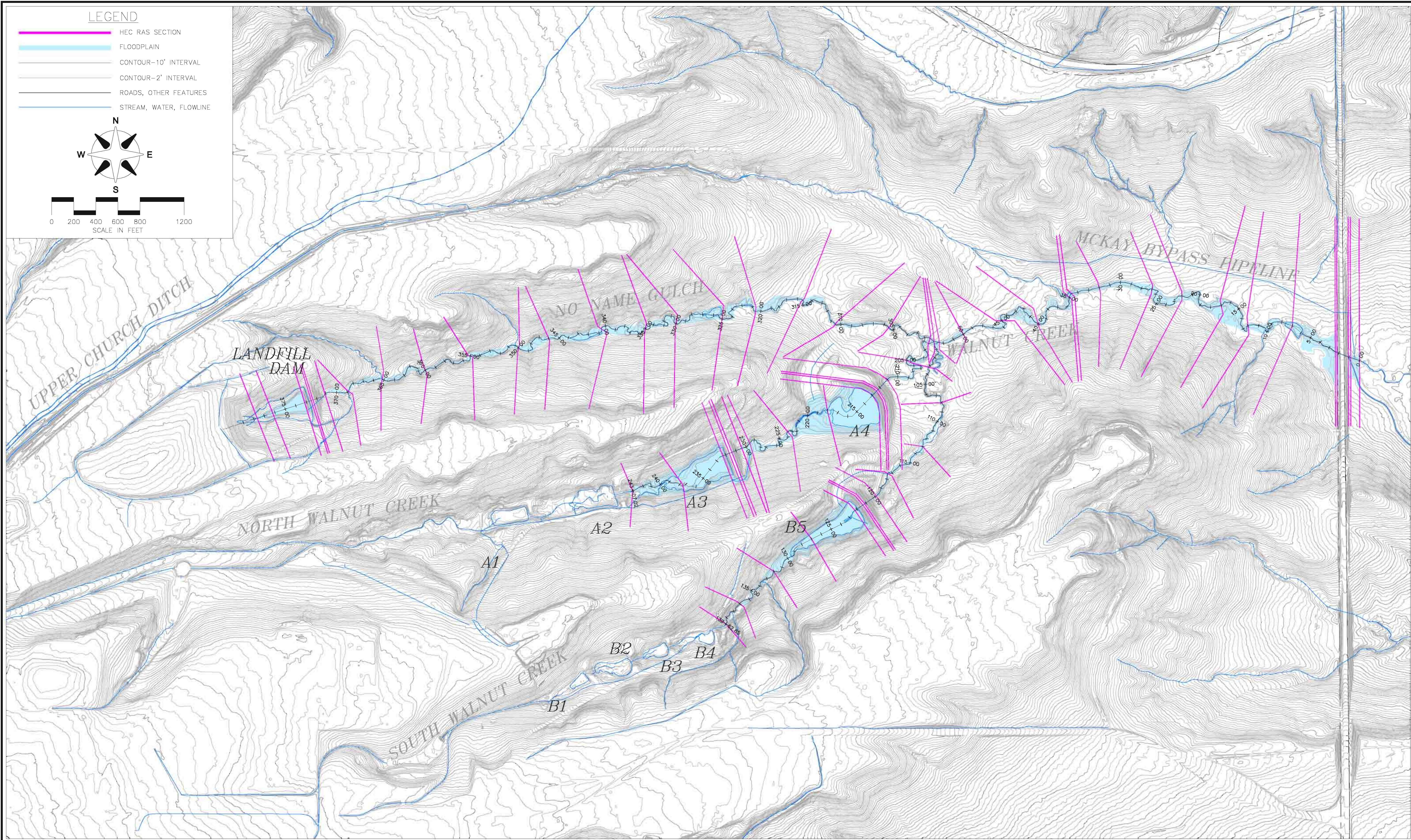
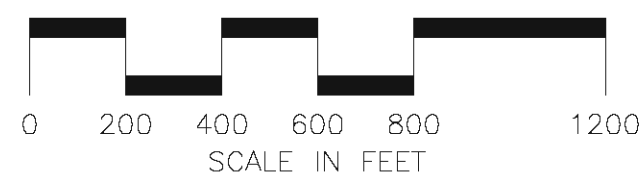
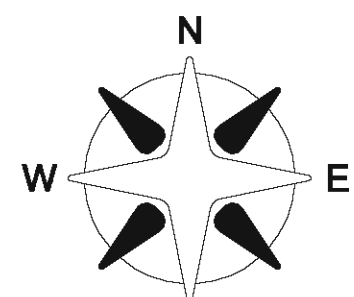
**FLOODPLAIN DELINEATION WALNUT CREEK, SCENARIO 3**

**100-YEAR, 6 HOUR STORM EVENT**

JOB NO. 071-091.010  
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LEGEND

- HEC RAS SECTION
- FLOODPLAIN
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- CONTOUR-2' INTERVAL
- ROADS, OTHER FEATURES
- STREAM, WATER, FLOWLINE



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**DETERMINATION OF PEAK FLOW RATES AND FLOODPLAIN DELINEATION FOR DAM BREACHES AT THE ROCKY FLATS SITE**

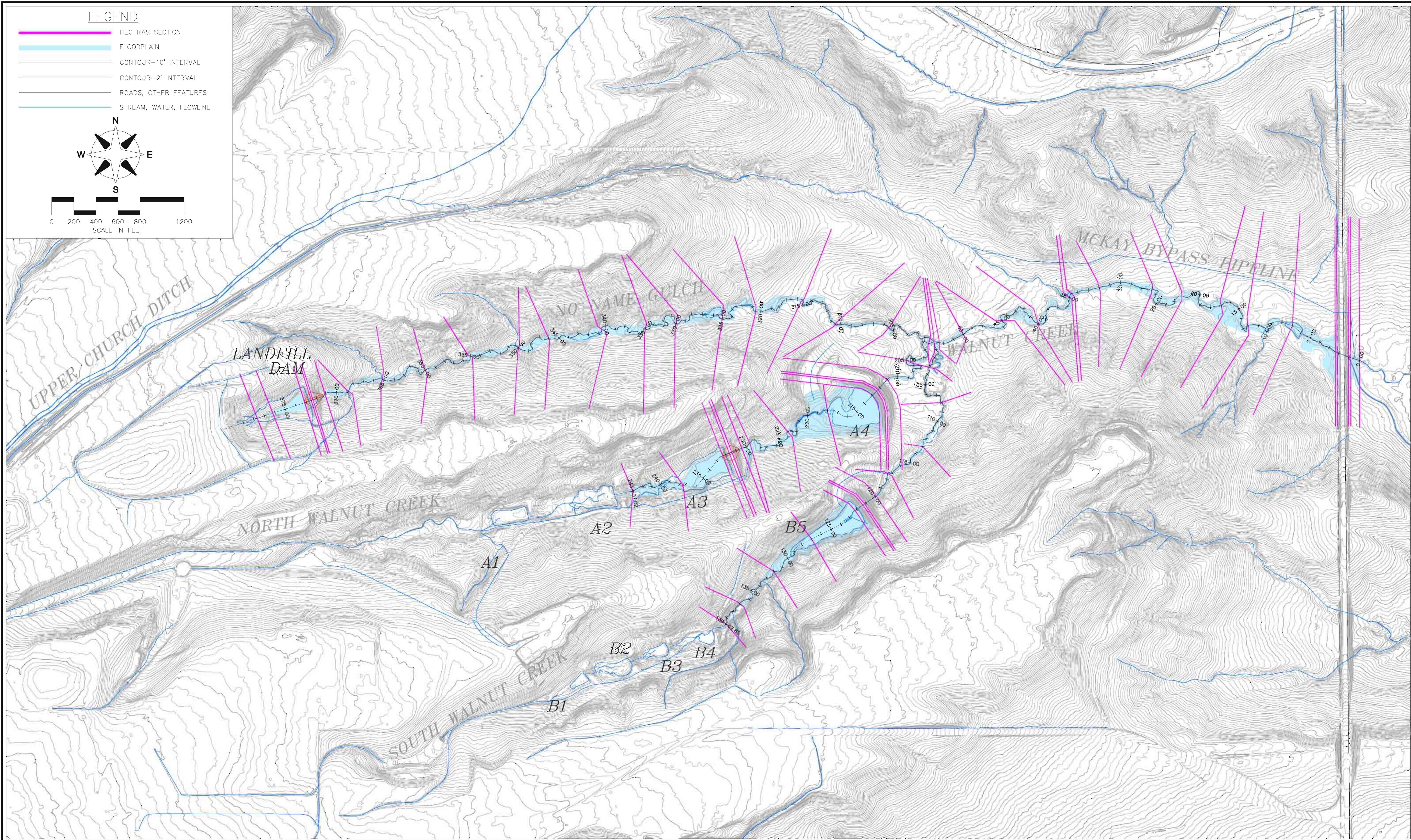
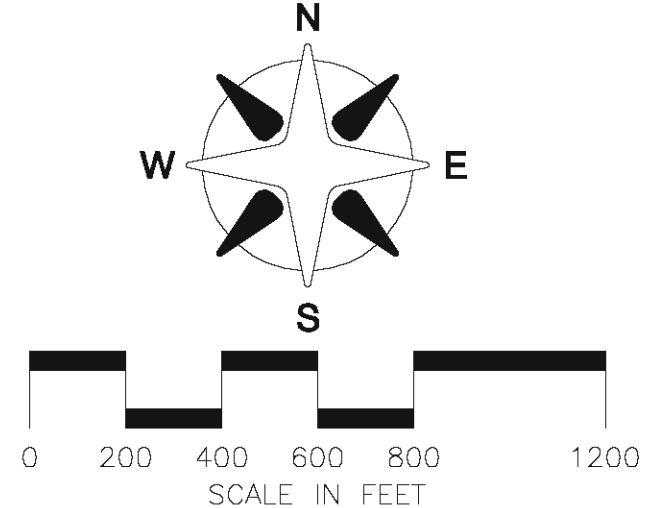
**FLOODPLAIN DELINEATION WALNUT CREEK, SCENARIO 1**

**100-YEAR, 24 HOUR STORM EVENT**

JOB NO. 071-091.010  
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 SHEET NO. 5d

LEGEND

- HEC RAS SECTION
- FLOODPLAIN
- CONTOUR-10' INTERVAL
- CONTOUR-2' INTERVAL
- ROADS, OTHER FEATURES
- STREAM, WATER, FLOWLINE



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**DETERMINATION OF PEAK FLOW RATES AND FLOODPLAIN DELINEATION FOR DAM BREACHES AT THE ROCKY FLATS SITE**

**FLOODPLAIN DELINEATION WALNUT CREEK, SCENARIO 2**

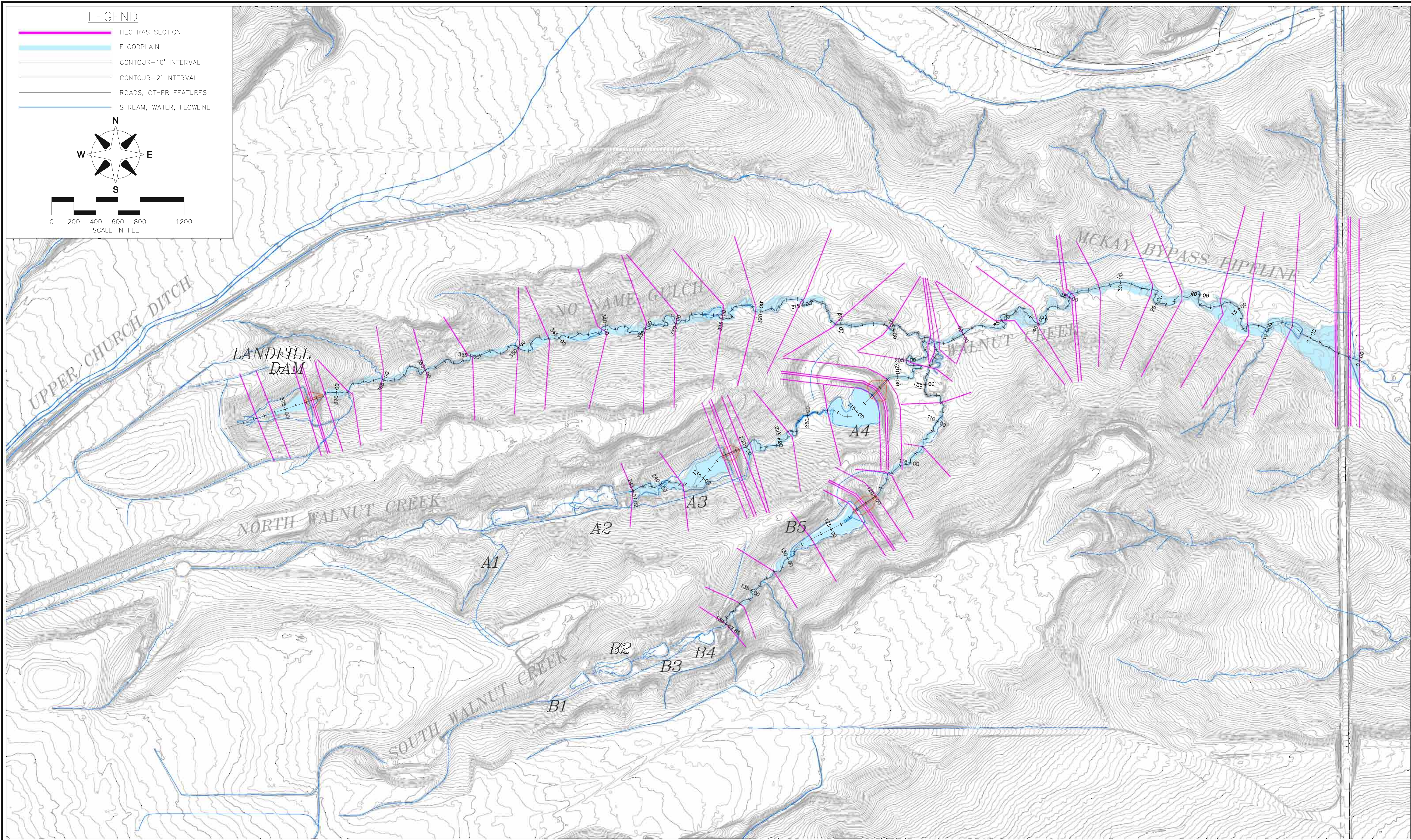
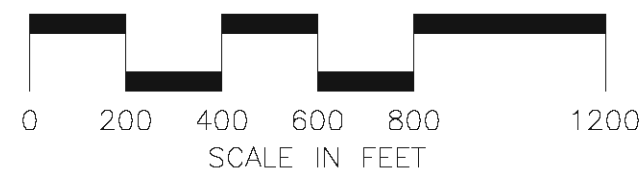
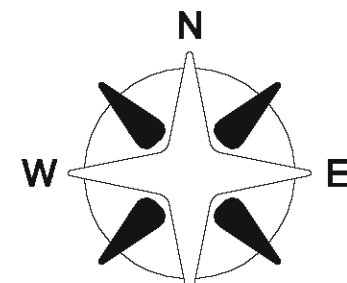
**100-YEAR, 24 HOUR STORM EVENT**

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 SHEET NO. 5e



LEGEND

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- FLOODPLAIN
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- CONTOUR-2' INTERVAL
- ROADS, OTHER FEATURES
- STREAM, WATER, FLOWLINE



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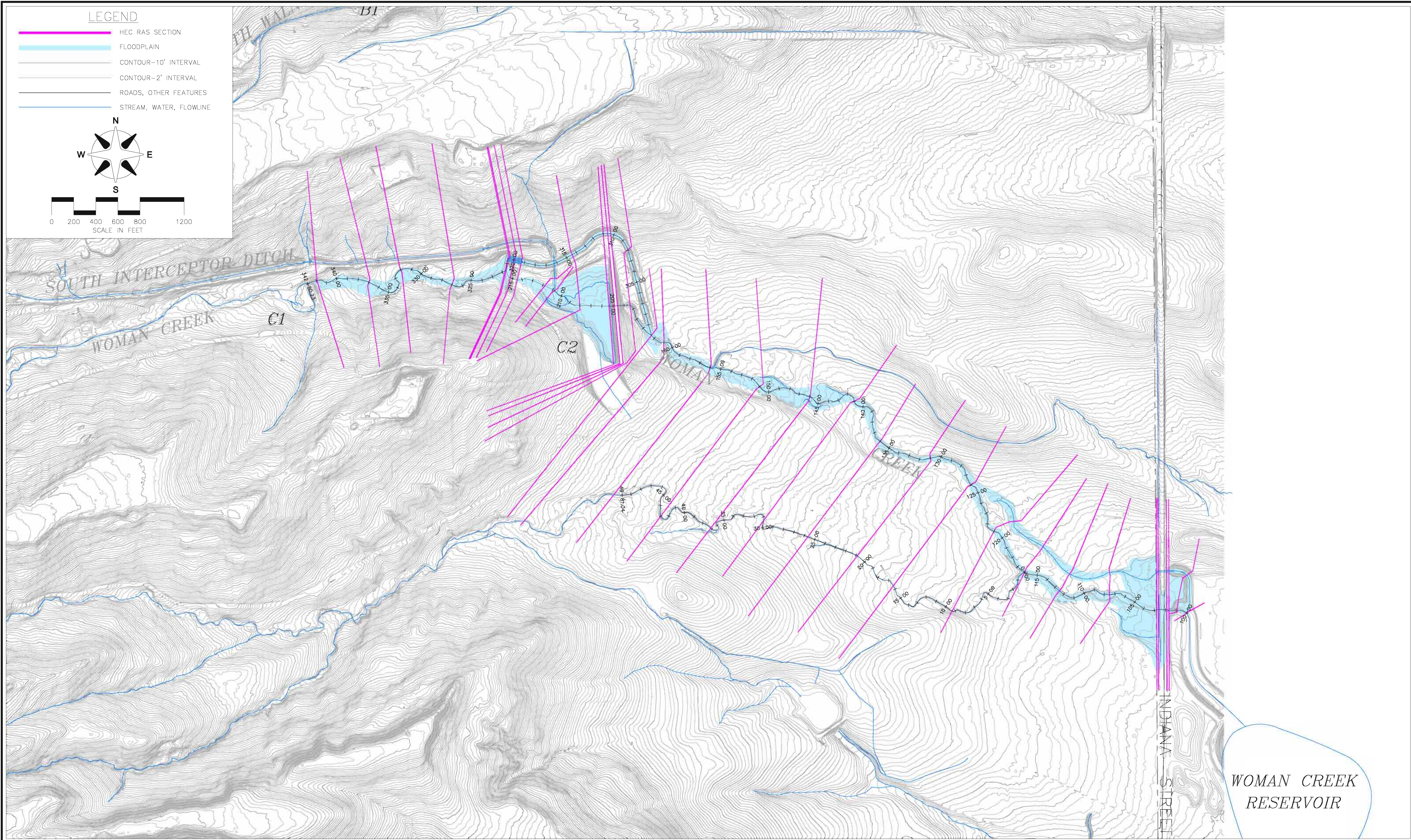
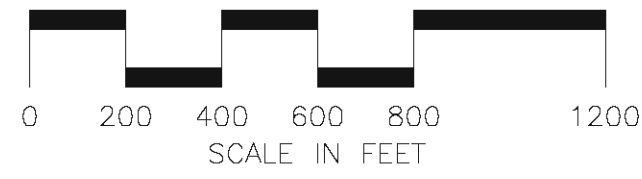
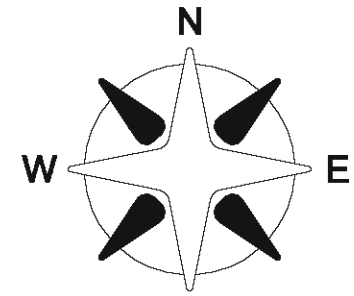
*DETERMINATION OF PEAK FLOW RATES AND FLOODPLAIN DELINEATION FOR DAM BREACHES AT THE ROCKY FLATS SITE*

**FLOODPLAIN DELINEATION  
 WALNUT CREEK, SCENARIO 3  
 100-YEAR, 24 HOUR STORM EVENT**

JOB NO. 071-091.010  
 REVISION NO. 0  
 SHEET NO. 5f

LEGEND

- HEC RAS SECTION
- FLOODPLAIN
- CONTOUR-10' INTERVAL
- CONTOUR-2' INTERVAL
- ROADS, OTHER FEATURES
- STREAM, WATER, FLOWLINE



Plot Date/Time: 04/01/2010, 10:27:53 AM; 2: \PROJECT\FILES\07\071-091\01\CAD-GIS\CAD\HYDROLOGY\2010.DWG FIG 6A

**WWE** WRIGHT WATER ENGINEERS, INC.  
 2490 W. 26TH AVE. SUITE 100A  
 DENVER, CO 80211  
 (303)480-1700 FAX(303)480-1020

REVISIONS				COMMENTS
NO.	BY	DATE	DESCRIPTION	
1	DKW	03/31/10	DESIGN	
2	DKW	03/31/10	DETAIL	
3	IBP	03/31/10	CHECK	
4			APPROVAL	
				SCALE 1"=400'
				FILE RF Hydrology 2010.dwg

	DATE
DESIGN	DKW 03/31/10
DETAIL	DKW 03/31/10
CHECK	IBP 03/31/10
APPROVAL	
SCALE	1"=400'
FILE	RF Hydrology 2010.dwg

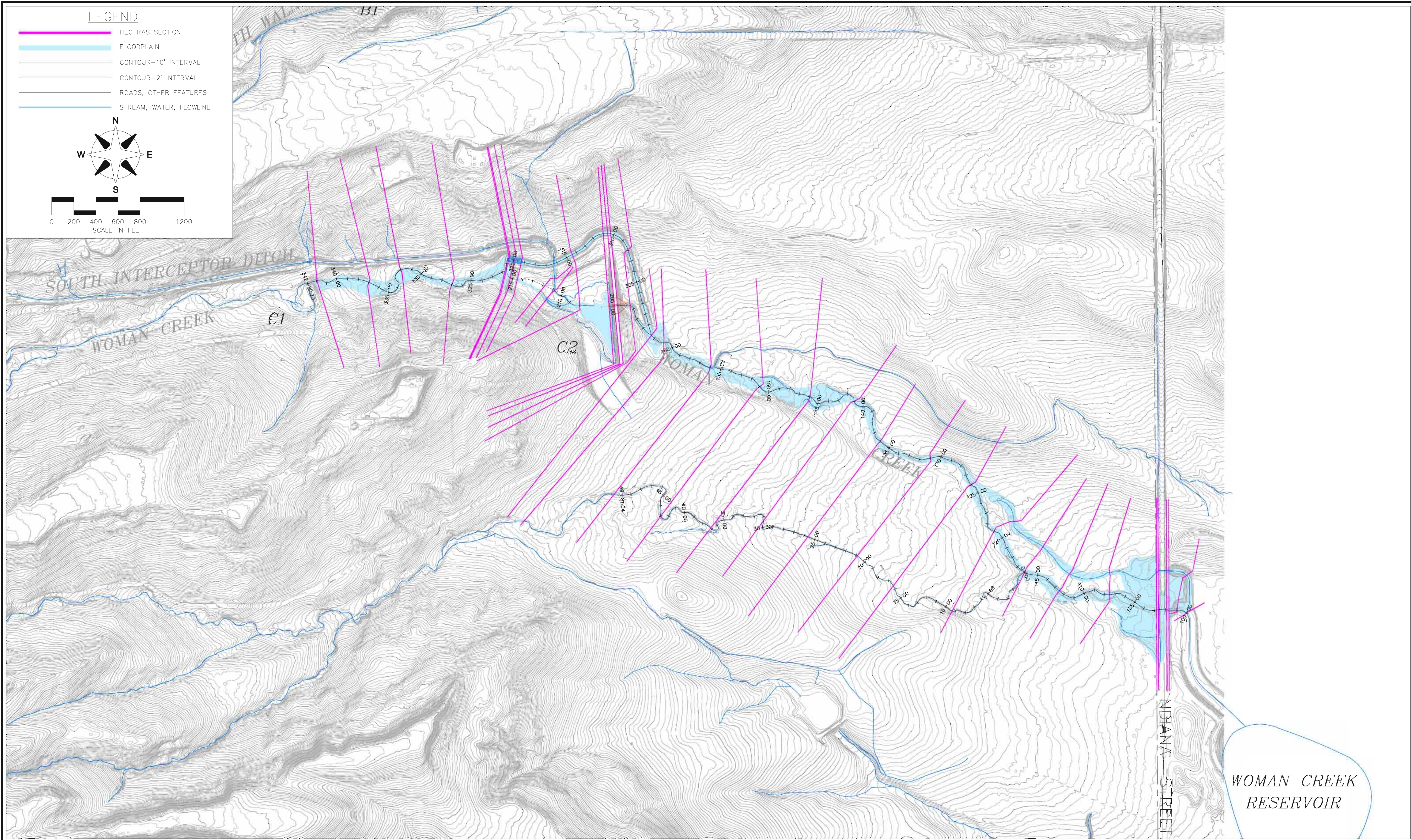
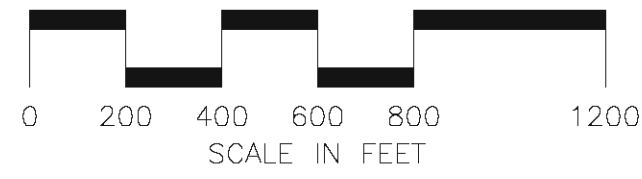
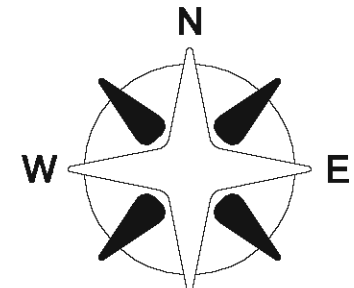
**DETERMINATION OF PEAK FLOW RATES AND FLOODPLAIN DELINEATION FOR DAM BREACHES AT THE ROCKY FLATS SITE**

**FLOODPLAIN DELINEATION WOMAN CREEK, SCENARIO 1 100-YEAR, 6 HOUR STORM EVENT**

JOB NO.	071-091.010
REVISION NO.	0
SHEET NO.	6a

LEGEND

- HEC RAS SECTION
- FLOODPLAIN
- CONTOUR-10' INTERVAL
- CONTOUR-2' INTERVAL
- ROADS, OTHER FEATURES
- STREAM, WATER, FLOWLINE



Plot Date/Time: 04/01/2010, 10:29:14 AM; Z:\PROJECT FILES\07-091\071-091\GIS\CAD\HYDROLOGY\DATA\10\RF\_HYDROLOGY\_2010.DWG-FIG 6B

**WWE** WRIGHT WATER ENGINEERS, INC.  
 2490 W. 26TH AVE. SUITE 100A  
 DENVER, CO 80211  
 (303)480-1700 FAX(303)480-1020

REVISIONS				COMMENTS
NO.	BY	DATE	DESCRIPTION	
1	DKW	03/31/10	DESIGN	
2	DKW	03/31/10	DETAIL	
3	IBP	03/31/10	CHECK	
4			APPROVAL	
				SCALE 1"=400'
				FILE RF Hydrology 2010.dwg

	DATE
DESIGN	DKW 03/31/10
DETAIL	DKW 03/31/10
CHECK	IBP 03/31/10
APPROVAL	
SCALE	1"=400'
FILE	RF Hydrology 2010.dwg

**DETERMINATION OF PEAK FLOW RATES AND FLOODPLAIN DELINEATION FOR DAM BREACHES AT THE ROCKY FLATS SITE**

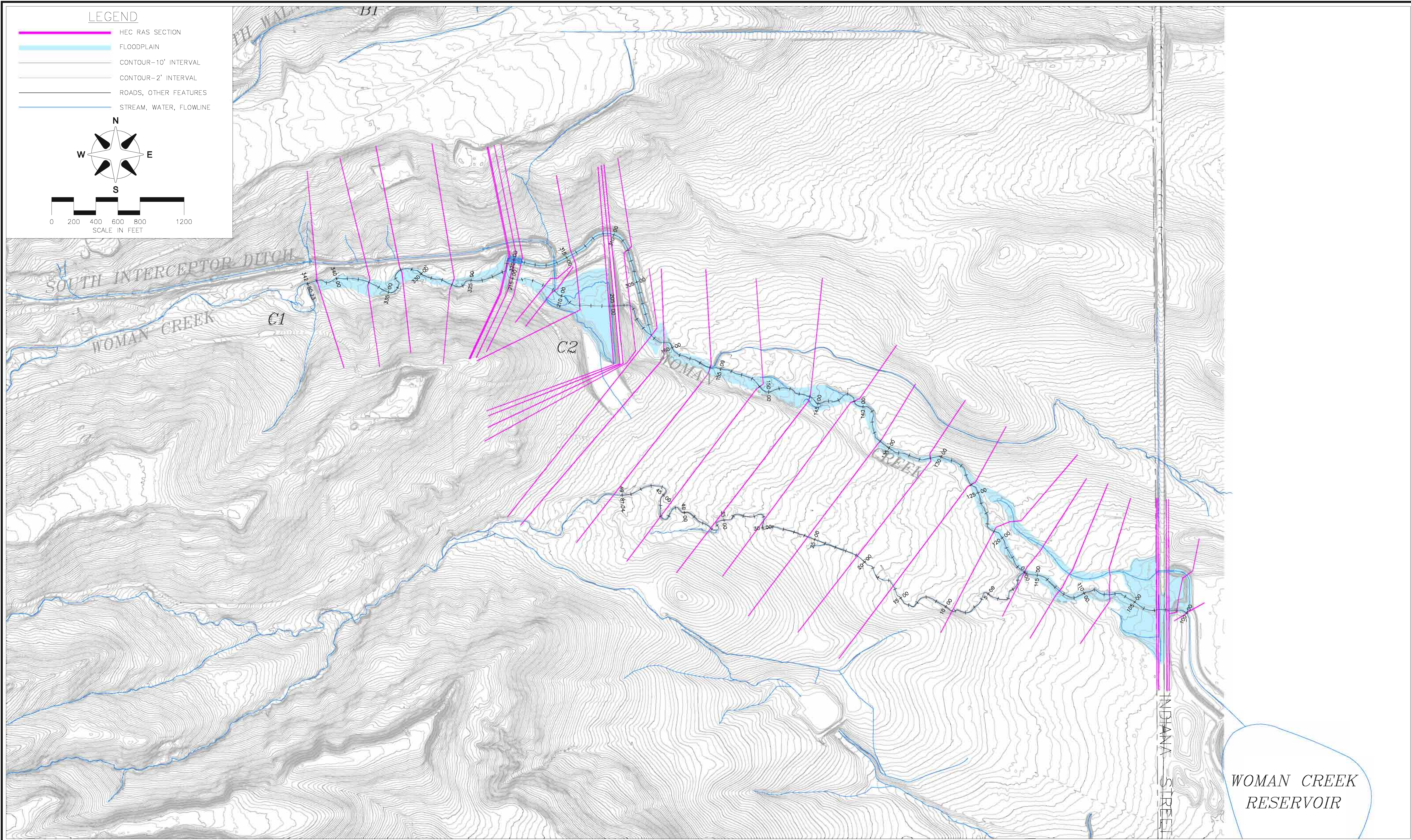
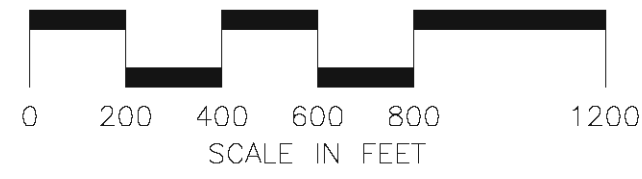
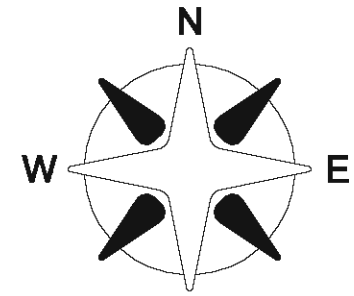
**FLOODPLAIN DELINEATION WOMAN CREEK, SCENARIO 2**

**100-YEAR, 6 HOUR STORM EVENT**

JOB NO.	071-091.010
REVISION NO.	0
SHEET NO.	6b

LEGEND

- HEC RAS SECTION
- FLOODPLAIN
- CONTOUR-10' INTERVAL
- CONTOUR-2' INTERVAL
- ROADS, OTHER FEATURES
- STREAM, WATER, FLOWLINE



Plot Date/Time: 04/01/2010, 10:30:35 AM; 2: \PROJECT\FILES\07\071-091\01\CAD\HYDROLOGY\DATA\10\RF\_HYDROLOGY\_2010.DWG FIG 6C

**WWE** WRIGHT WATER ENGINEERS, INC.  
 2490 W. 26TH AVE. SUITE 100A  
 DENVER, CO 80211  
 (303)480-1700 FAX(303)480-1020

REVISIONS				COMMENTS
NO.	BY	DATE	DESCRIPTION	
1	DKW	03/31/10	DESIGN	
2	DKW	03/31/10	DETAIL	
3	IBP	03/31/10	CHECK	
4			APPROVAL	
				SCALE 1"=400'
				FILE RF_Hydrology_2010.dwg

DATE	
DESIGN	DKW 03/31/10
DETAIL	DKW 03/31/10
CHECK	IBP 03/31/10
APPROVAL	
SCALE	1"=400'
FILE	RF_Hydrology_2010.dwg

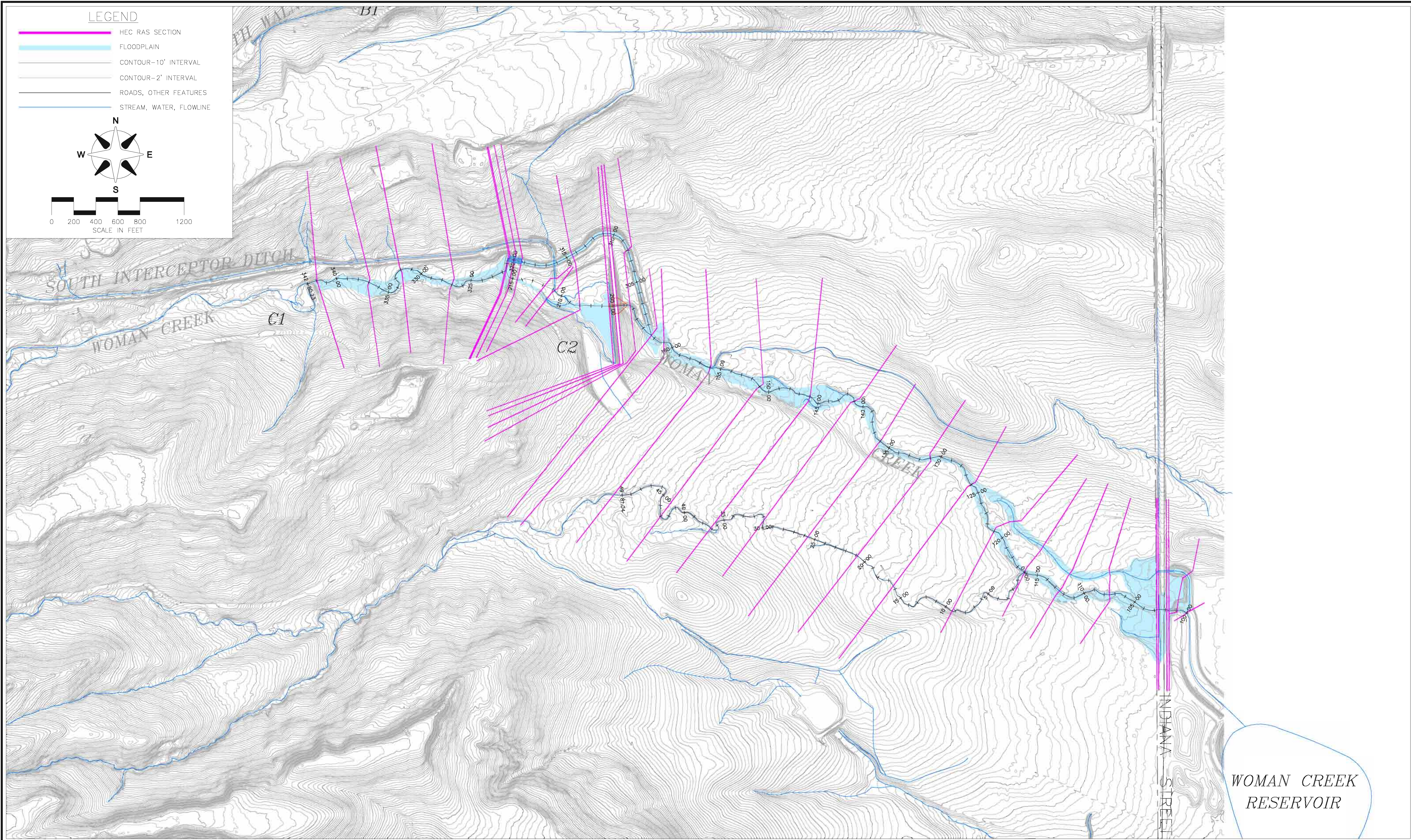
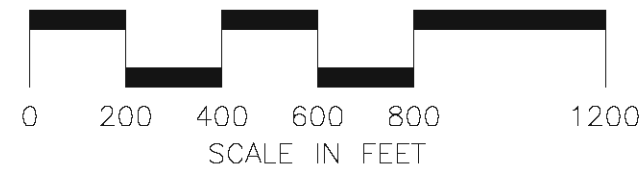
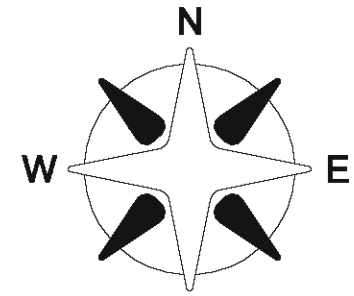
**DETERMINATION OF PEAK FLOW RATES AND FLOODPLAIN DELINEATION FOR DAM BREACHES AT THE ROCKY FLATS SITE**

**FLOODPLAIN DELINEATION WOMAN CREEK, SCENARIO 1 100-YEAR, 24 HOUR STORM EVENT**

JOB NO. 071-091.010  
 REVISION NO. 0  
 SHEET NO. 6C

LEGEND

- HEC RAS SECTION
- FLOODPLAIN
- CONTOUR-10' INTERVAL
- CONTOUR-2' INTERVAL
- ROADS, OTHER FEATURES
- STREAM, WATER, FLOWLINE



Plot Date/Time: 04/01/2010, 10:31:56 AM; Z:\PROJECT FILES\07-091\071-091\GIS\CAD\HYDROLOGY\DATA\10\RF\_HYDROLOGY\_2010.DWG-FIG 6D

**WWE** WRIGHT WATER ENGINEERS, INC.  
 2490 W. 26TH AVE. SUITE 100A  
 DENVER, CO 80211  
 (303)480-1700 FAX(303)480-1020

REVISIONS				COMMENTS
NO.	BY	DATE	DESCRIPTION	
1	DKW	03/31/10	DESIGN	
2	DKW	03/31/10	DETAIL	
3	IBP	03/31/10	CHECK	
4			APPROVAL	
				SCALE 1"=400'
				FILE RF Hydrology 2010.dwg

	DATE
DESIGN	DKW 03/31/10
DETAIL	DKW 03/31/10
CHECK	IBP 03/31/10
APPROVAL	
SCALE	1"=400'
FILE	RF Hydrology 2010.dwg

**DETERMINATION OF PEAK FLOW RATES AND FLOODPLAIN DELINEATION FOR DAM BREACHES AT THE ROCKY FLATS SITE**

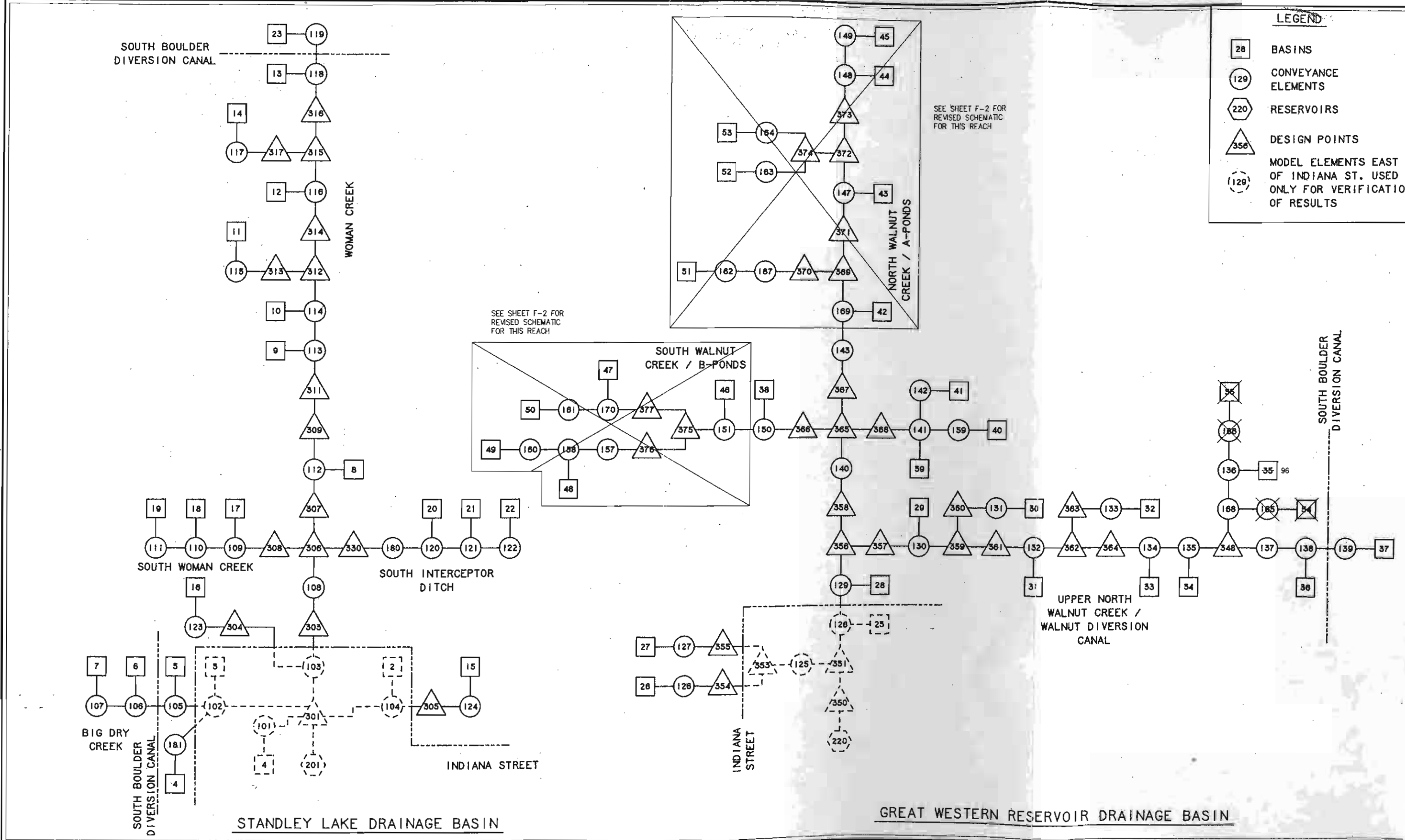
**FLOODPLAIN DELINEATION WOMAN CREEK, SCENARIO 2**

**100-YEAR, 24 HOUR STORM EVENT**

JOB NO. 071-091.010  
 REVISION NO. 0  
 SHEET NO. 6d

**LEGEND**

- 28 BASINS
- 129 CONVEYANCE ELEMENTS
- 220 RESERVOIRS
- 356 DESIGN POINTS
- 129 MODEL ELEMENTS EAST OF INDIANA ST. USED ONLY FOR VERIFICATION OF RESULTS



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 2490 W. 26TH AVE. SUITE 100A  
 DENVER, CO 80211  
 (303)480-1700 FAX(303)480-1020

REVISIONS			DESCRIPTION	COMMENTS
NO.	BY	DATE		

DATE	
DESIGN	12/17/04
DETAIL	12/17/04
CHECK	12/17/04
APPROVAL	
SCALE	1"=1" S.
FILE	RF-Drainage Plan.dwg

**ROCKY FLATS  
DAM BREACH**

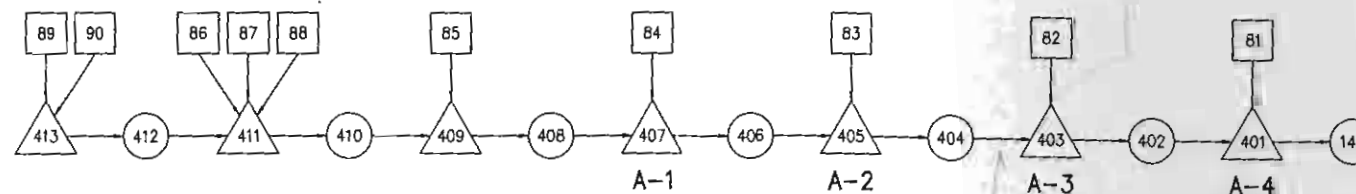
**ORIGINAL  
UDSWMM MODEL SCHEMATIC  
WITH REVISED AREAS MARKED**

JOB NO. 901-004.000  
REVISION NO.    
SHEET NO. **F-1**

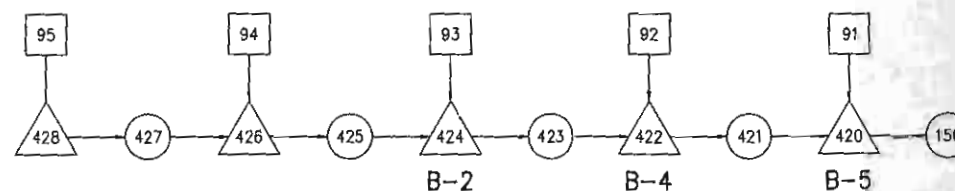
LEGEND

- 81 BASINS
- 143 CONVEYANCE ELEMENTS
- 401 DESIGN POINTS

NORTH WALNUT /  
A - PONDS



SOUTH WALNUT /  
B - PONDS



**WWE** WRIGHT WATER ENGINEERS, INC.  
2490 W. 26TH AVE. SUITE 100A  
DENVER, CO 80211  
(303)480-1700 FAX(303)480-1020

REVISIONS			DESCRIPTION	COMMENTS
NO.	BY	DATE		

		DATE
DESIGN	RP	12/17/04
DETAIL	NJM	12/17/04
CHECK	POW	12/17/04
APPROVAL		
SCALE	N.T.S.	
FILE	RF-Drainage Plan.dwg	

**ROCKY FLATS  
DAM BREACH**

**REVISED PORTIONS OF  
UDSWMM MODEL SCHEMATIC**

JOB NO.  
901-004.890

REVISION NO.  
-

SHEET NO.  
**F-2**

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