RECLAMATION
Managing Water in the West

Draft Environmental Assessment Benson Canal Enclosure Project

PRO-EA-18-002

Upper Colorado Region
Provo Area Office
Provo, Utah

U.S. Department of the Interior
Bureau of Reclamation
Provo Area Office
Provo, Utah

July 2018

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The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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Provo Area Office
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Provo, Utah **July 2018**

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Chapter 1 Purpose and Need for Proposed Action

1.1 Introduction

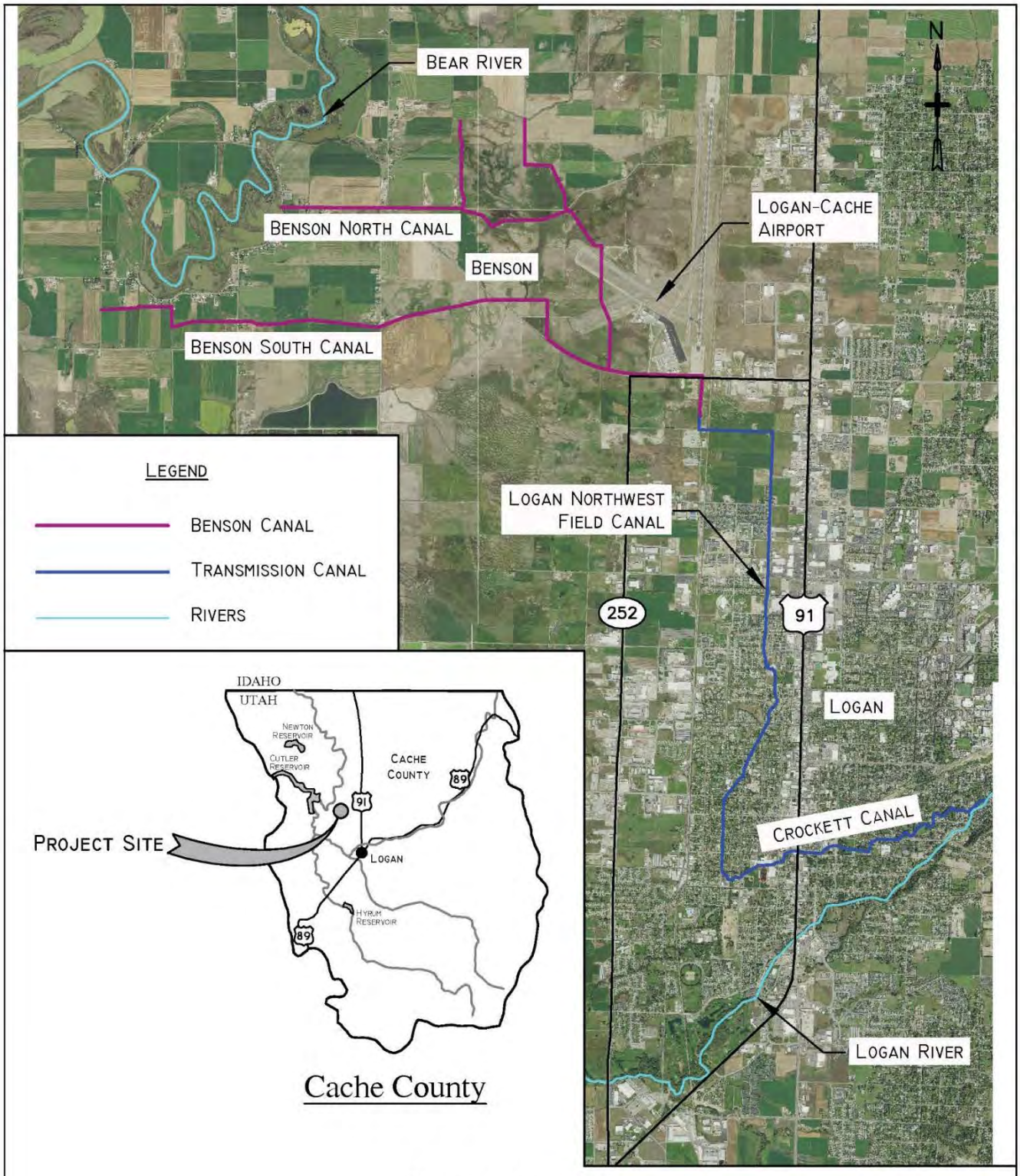
This Environmental Assessment (EA) was prepared to examine the potential environmental impacts of the Benson Canal Enclosure Project. This Action is proposed by the Benson Irrigation Company (BIC) in Cache County, Utah. If approved, 10.4 miles of open canal would be replaced with 11.5 miles of pressurized pipeline. A pond and centralized pumping station would be constructed to pressurize the entire pipeline.

This EA evaluates the potential effects of the Proposed Action to determine whether it would cause significant impacts to the human or natural environment, as defined by the National Environmental Policy Act (NEPA) of 1969. If the EA shows no significant impacts associated with implementation of the Proposed Action, then a Finding of No Significant Impact (FONSI) will be issued by the Bureau of Reclamation. Otherwise, an Environmental Impact Statement will be necessary prior to implementation of the Proposed Action.

1.2 Background

The BIC is a nonprofit irrigation company that was established in the mid-1800's to provide water to agricultural users near the town of Benson, Utah. There are approximately 65 shareholders irrigating 2,496 acres based on the BIC water rights and shares. The predominant crops for this area include alfalfa, winter wheat, spring wheat, corn (for silage), grass hay, and pastures. Water sources for irrigation include water diverted from the Logan River and supplemental water purchased from Logan City's wells. The BIC also has some water rights in wells, totaling 0.332 cubic feet per second (cfs), that do not significantly impact their water supply.

The BIC receives diverted water from the Logan River nearly 5 miles away at the Crockett Diversion as shown in Figure 1-1. The Crockett Diversion diverts water from the Logan River to a transmission canal system which conveys water to ten different canal companies, including the BIC. The Benson Canal starts at the end of the Logan Northwest Field Canal and flows almost a mile in the Benson Canal to where it splits into the Benson North and Benson South Canals. The combined length of the Benson Canal and the Benson North and South Canals is about 10.4 miles, as shown in Figure 1-2.



Project Area Map

FRANSON CIVIL ENGINEERS	DATE: May 11, 2018 SCALE: Not to Scale Loc Map.dwg P:\UT\Northern\Benson Canal Enclosure\3 - Design\Drawings LAYOUT: Location Maps	Benson Irrigation Company Benson Canal Enclosure	Figure 1-1 Location Map

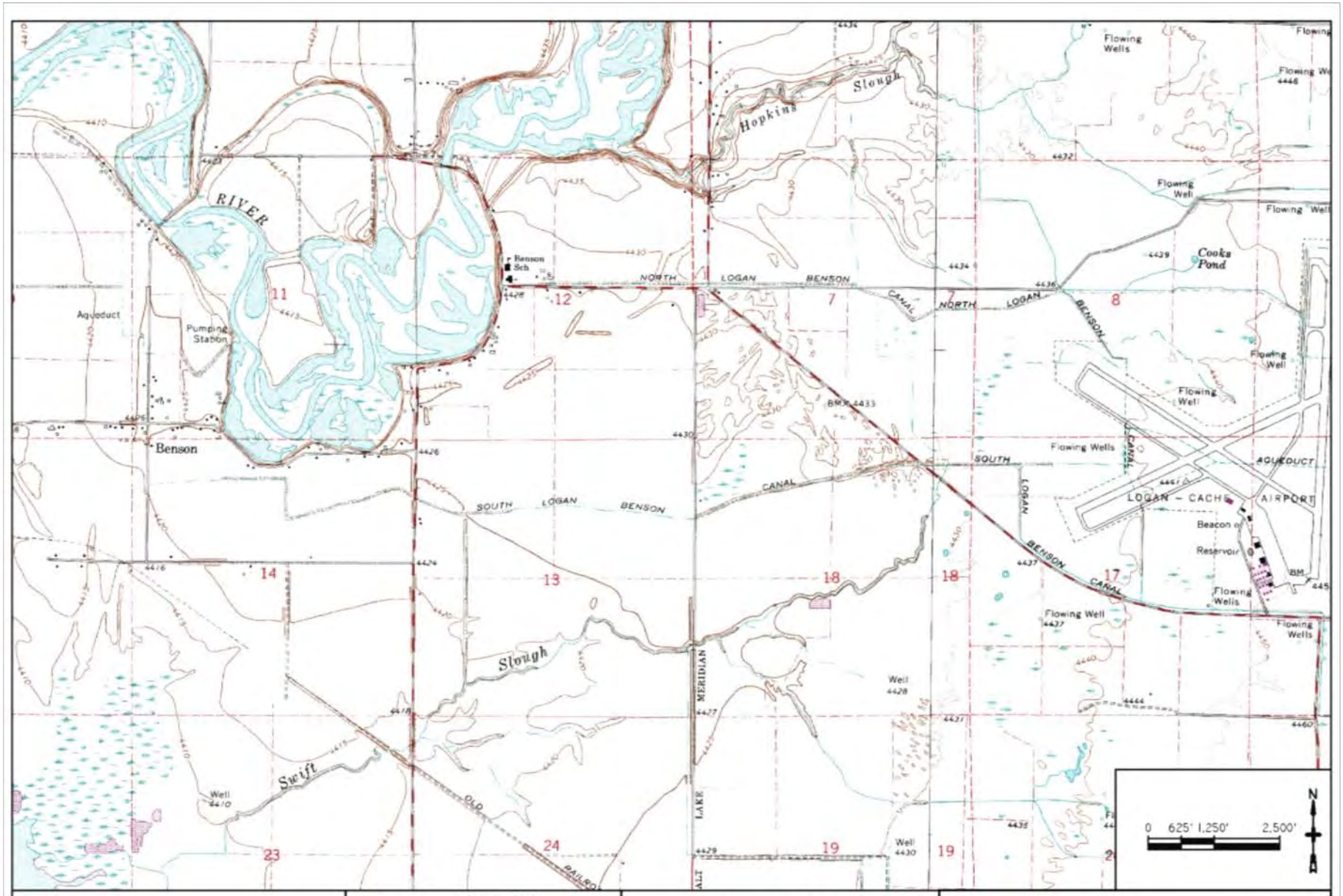


FIGURE 1-2 EXISTING SYSTEM	DATE: MAY 11, 2018 SCALE: Pipe Layout.dwg P:\UT\Northern\Benson Canal Enclosure\3 - Design\Drawings LAYOUT: USOS	BENSON IRRIGATION COMPANY BENSON CANAL ENCLOSURE

FRANSON CIVIL ENGINEERS

This conveyance facility is the only way the company receives its water from the Logan River. The Benson North and Benson South Canals are owned by the BIC and are a combination of earthen and concrete-lined canals. A Parshall flume, located at the start of the Benson Canal, records flows to track water usage.

On an average year, the irrigation company uses Logan River water from spring snowmelt runoff, which typically supplies for the water needs during the early months (April through July). In August through October, when river flows have decreased below 480 cfs and are being regulated by the Kimball Decree, neighboring canal companies help provide water through return flows, and the BIC purchases water from Logan City's wells to help mitigate shortages. The BIC purchases water from Logan City for $4 per acre-foot.

According to Water Commissioner Measurement records at the Parshall flume, the irrigation company has diverted on average 5,750 acre-feet of water annually to irrigate 2,496 acres. This water includes the Logan River diversions, Logan City well water, and return flows from the other canals. A recent study done by Utah State University showed seepage losses in the canal system were 37 percent (Molina 2008). In order to mitigate part of the shortages, the BIC is proposing to replace the existing open-channel system with a pressurized pipeline. On average, the conserved water will increase the amount of water reaching the farm fields by approximately 2,130 acre-feet each year.

Additionally, shareholders who sprinkle irrigate currently pump water out of the canals to provide adequate pressure to operate their sprinklers. To reduce individual pumping costs, the BIC is proposing to replace the individual pumping stations with a centralized pumping station to pressurize the whole canal system. This will provide the additional benefit of encouraging approximately 40 percent of the shareholders, most of those who are currently flood irrigating, to convert to higher efficiency sprinkle irrigation methods.

1.3 Purpose and Need for Proposed Action

The Project purpose includes:

- Conserving nearly 2,130 acre-feet of water annually.
- Reducing impact of periodic droughts.
- Conserving energy from reduction in pumping by individuals.
- Reducing the need to purchase additional water from Logan City wells.
- Reducing reliance on other canal companies.
- Improving water quality in the Middle Bear River and Cutler Reservoir that are listed as 303(d)-impaired water bodies by reducing phosphorus contributions in irrigation runoff containing excess fertilizer.

The Project need includes:

- Providing shareholders with a more reliable and sustainable system.
- Increasing sustainability of the farm industry in this area.
- Improving sustainability for a rural community.

1.4 Public Scoping and Involvement

A public meeting was held on March 8, 2018, at the Benson LDS Church Building to discuss the proposed project with the individual shareholders in an open question and answer format. Each shareholder met with a member of the team to ask questions, discuss their concerns, to identify where their property is located, how many shares they have currently, and whether they would rather have a flood irrigation turnout (i.e. furrow irrigation, border irrigation, or basin irrigation) or pressurized irrigation turnout (i.e. various sprinkler methods). Notices were sent to all 65 shareholders. Approximately 150 individuals were in attendance representing approximately 85 percent of the shareholders and a majority of the Benson agricultural and residential community.

A few of the key public meetings and 30-day comment period are listed below.

1. An annual shareholder meeting was held March 2, 2017, to discuss the proposed project.
2. A special shareholder meeting was held on March 8, 2018, to gather water use information and location from individual water users.
3. A 14-day public comment period is conducted to receive input/comments on the Draft EA from property owners within the canal right-of-way, interested public, and state and Federal agencies. The meeting minutes and summary of comments will be available in Appendix A of the Final EA.

1.5 Permits and Authorizations

Implementation of the Proposed Action may require a number of authorizations or permits from state and Federal agencies. The irrigation company would be responsible for obtaining all permits and authorizations required for the Project. Potential authorizations or permits may include those listed in Table 1-1.

Table 1-1
Permits and Authorizations

Agency/Department	Purpose
Utah Division of Water Quality, Cache County (MS4), and Logan City (MS4)	Utah Pollutant Discharge Elimination System (UPDES) Permit for construction activities would be required to help prevent erosion and ensure sediment controls are utilized to minimize construction impacts. The Project contractor would prepare the Storm Water Pollution Prevention Plan (SWPPP) and comply with all elements of the General Construction Permit.
State of Utah Department of Natural Resources, Division of Water Rights (DWRi)	Stream Alteration Permit under Section 404 of the Clean Water Act (CWA) and Utah statutory criteria of stream alteration described in the Utah Code. This would apply to proposed wetland impacts resulting from Project construction.
Utah State Historic Preservation Office (SHPO)	Consultation pursuant to Section 106 of the National Historic Preservation Act (NHPA), 16 USC 470 USC 470.

1.6 Scope of Analysis

The purpose of this EA is to determine whether or not Reclamation should authorize, provide funding, and enter into an agreement with the BIC for the enclosure of the Benson Canals to develop a more secure and reliable irrigation water supply. That determination includes consideration of whether there would be significant environmental impacts. Aside from the permits/authorizations identified in Table 1-1, the proposed project must successfully complete the NEPA process, which is anticipated to result in an EA with an accompanying FONSI. Analysis in the EA includes temporary impacts from construction activities and permanent impacts resulting from enclosing the canals.

Chapter 2 Alternatives

2.1 Introduction

This chapter describes the features of the No Action and Proposed Action Alternatives. It includes a description of each alternative considered and presents the alternatives in comparative form, defining the differences between each alternative.

2.2 No Action

Under the No Action Alternative, the Benson Canal system would not be converted to pressurized pipelines. The system would continue to lose water through seepage and evaporation. This negative impact on shareholders, the town of Benson, and the local economy would continue. Nutrient rich irrigation tailwater would continue to discharge into Swift Slough, Hopkins's Slough, and Cutler Reservoir. Figure 1-2 shows the current conveyance system.

2.3 Proposed Action

The Proposed Action is the preferred alternative. The Proposed Action would replace the existing canals in the system with pressurized pipelines and construct a pond and centralized pumping station as shown in Figure 2-1. Approximately 10.4 miles of open canals would be replaced with 11.5 miles of pressurized pipelines. About half of the existing canals would remain open to convey stormwater. It is anticipated that nearly 2,130 acre-feet of water would be conserved annually.

2.3.1 Canal Enclosure

Polyvinyl chloride (PVC) pipe, which is commonly used for irrigation systems, would be used for enclosing the canals. The pipe sizes would vary from 6 to 27-inches-in-diameter. The system would be a large loop with a combined capacity of 25 cfs.

The pipelines would be designed not to exceed the industry accepted standard of a water velocity of 5 feet per second (NRCS Utah FOTG 2018). A hydraulic model has been prepared based on the determined design flows at each shareholder's delivery point to evaluate potential surges and to verify sizing and pressure requirements. Air valves, control valves, drains, fittings, and relief valves would be installed at appropriate locations to ensure the proper operation of the pipelines.

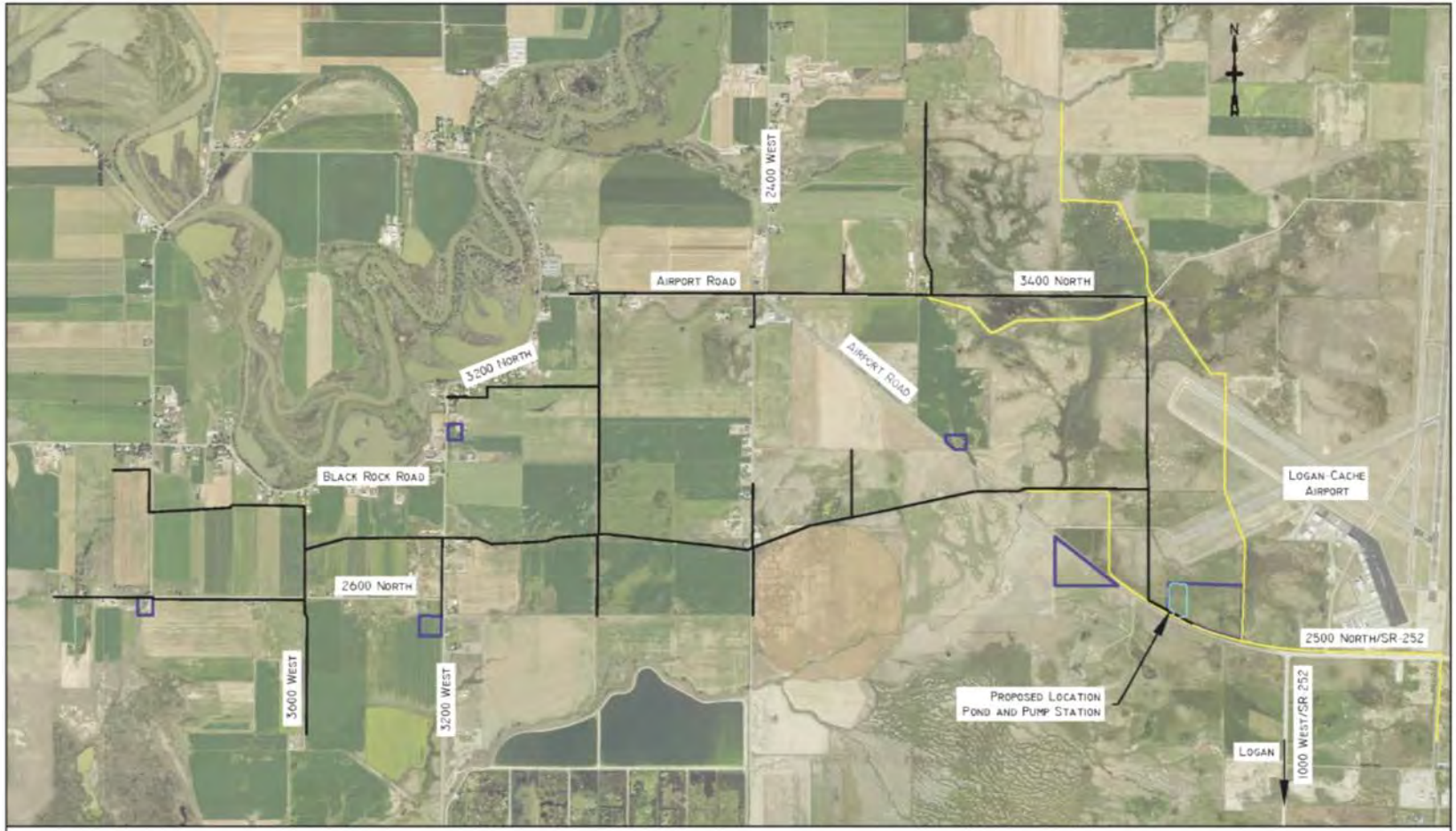


FIGURE 2-1 PROPOSED SYSTEM	DATE: JULY 5, 2018 SCALE: Pipe Layout.dwg P:\UT\Northern\Benson Canal Enclosure\0 Design\Drawings LAYOUT: Project Map	BENSON IRRIGATION COMPANY BENSON CANAL ENCLOSURE	FRANSON CIVIL ENGINEERS

2.3.2 Centralized Pond and Pumping Station

Constructing a centralized pumping station would eliminate the need for individual users to pump water from canals, thus conserving energy. In addition, it would provide an incentive for those currently flood-irrigating to convert to more efficient methods of irrigation.

2.3.3 Turnouts

Approximately 80 turnouts would be installed along the pipeline to deliver water. The amount of water available to the turnouts would be regulated by the pressure generated by the pump station located on the pond. This would allow the system to balance diurnal demand variation while receiving a nearly steady supply of water from the Crockett Canal system upstream.

2.3.4 Rights-of-Way

The land on which construction would occur is either private property, of which easements are being obtained, public lands with existing rights-of-way, or within the canal alignment right-of-way.

2.3.5 Road Crossings

All road crossings would be subterranean and would take advantage of using existing culverts to minimize traffic disruption. Airport road (2500 North), 2400 West, and 3200 West will be crossed through the existing culverts where those culverts provide a suitable amount of cover.

Other crossings will require the road to be open cut. In these situations, roads may be temporarily shut down, so the roadway could be cut and the pipeline installed. Road closures would result in detours to manage traffic. At night, the trenches will be backfilled and compacted to allow traffic to pass safely. Special traffic control devices and plans would be in accordance with the most current edition of the Utah Manual of Uniform Traffic Control Devices (UMUTCD). Following construction, disturbed roads would be repaired to an equivalent or better than pre-construction condition. All major roads would remain open, with necessary lane closures, to minimize construction-related effects on traffic patterns.

Driveway crossings provide access over the canals for individual landowners and consist of existing culverts. Most crossings would remain intact throughout construction of the Project.

2.3.6 Saved Water

An estimated 2,130 acre-feet of water would be conserved by implementing this Project, which would decrease shortages and improve water management. With good construction practices, the losses due to seepage and evaporation would be near zero. This saved water does not constitute a new source of water under Utah water law.

The Project would benefit all water users on the system. The conserved water from the Project allows water to be available longer into the irrigation season, thereby allowing users to reduce soil moisture deficiencies, providing approximately 10 inches of additional water on the fields over the entire year, thus increasing yields.

2.3.7 Construction Schedule and Canal Operation During Construction

The Project consists of constructing 11.5 miles of pipeline. It is anticipated that the work would begin during the fall 2018 and that all construction could be completed by the fall 2019.

Access to the farmlands and agricultural areas would be maintained during construction. The BIC's board members would work with the affected property owners to address their concerns, to the extent practicable.

It is anticipated that the pipe used would be PVC, which has an industry accepted life expectancy of 50 years. Corrosion resistant fittings would be used to increase life expectancy of all fittings and appurtenances. All non-PVC fittings will be wrapped with polyethylene (8 mils thick) to prevent direct contact of any non-galvanized parts from the soil.

2.3.8 Project Construction Procedures

2.3.8.1 Construction Sequence

Construction would likely occur in the following sequence:

- Clear, grade and excavate in pipeline construction corridor.
- Install pipeline bedding materials.
- Haul pipeline to construction sites.
- Place pipeline and connect.
- Backfill around pipeline and regrade surface.
- Grade pond and install pump station.
- Clean up and restore areas disturbed by construction.
- Install plants in the construction corridor and other disturbed areas for soil stabilization.

2.3.8.2 Clear, Grade, and Excavate in Pipeline Construction Corridor

The pipeline alignment, including canal locations where pipeline will be placed, would be excavated and graded to provide a base for installation of the pipeline. All excess material would be disposed of within easements of the pipeline right-of-way. Much of the excavated material could be used for backfilling and any excess material would be disposed of in ways that blend with adjacent lands. Bedding material would be hauled to the Project site and placed in the bottom of the pipeline trench. Stored fill material will not be placed in wet areas or areas identified as wetlands.

2.3.8.3 Pipeline Installation

The pipe manufacturer would transport the materials to the work site by flatbed truck and/or specially outfitted loaders. Using construction equipment, contractors would place the pipeline in the prepared alignment adjacent to the trench locations. The trench would then be excavated, and the pipe bedded. The backfill material would be placed at correct compaction levels around the pipeline using material available along the alignment or imported from local commercial sources. Air valves, control valves, drains, fittings, and relief valves would be installed at appropriate locations to ensure the proper operation of the pipeline. Excess spoil in work areas would be blended with existing contours to maintain pre-construction drainage patterns. All construction debris would be removed by the contractor soon after completed construction.

2.3.8.4 Road Crossings

It is anticipated that pipeline installation at road crossings would be completed with minimal disturbance to existing structures. Notices will be posted at each home and business along the alignment and agricultural property owners will be notified at least 48 hours prior to any crossings. Additionally, notifications will be sent to the emergency services and a public notice distributed on the local radio stations. The road will be closed the morning of the crossing in compliance with the Utah Manual of Uniform Traffic Control Devices.

The road will be sawcut and excavation across the road will then be completed. The pipe will then be installed using all imported material in accordance with the Cache County and Logan City Engineering Standards and Specifications. Backfilled material would be compacted to appropriately match pre-construction road surface elevations. Compacting this material would prevent the road surface from subsiding under repeated traffic loads. Temporary gravel surfaces would be installed during construction. The final asphalt would be placed and compacted by the completion of the Project. Existing roadside grass swales would be restored and maintained to protect existing drainage patterns and stormwater management of Cache County and Logan City. Road crossings would be restored to a condition better than or equal to existing conditions as documented by video footage and photographs.

2.3.8.5 Pond and Pump Station

The pond and pump station were sited to avoid any culturally sensitive sites, wetlands, and other environmental resources. The pond, including the pump station and diversion structure, would be excavated and graded to facilitate the remaining construction sequence. Excess material would be disposed of within the construction corridor. The remaining material would be delivered to the Logan City/Cache County Landfill to be used as cap material during landfill closure. Fill will not be allowed in wet areas or areas identified as wetlands. The bottom foot of the pond will always have water. The sides of the pond will be lined with either a clay or impermeable membrane to prevent seepage, if determined necessary by the geotechnical engineer.

2.3.8.6 Quality Control Procedures

The contractor would ensure quality control of construction through visual inspection and in accordance to standard specifications provided by the Natural Resources Conservation Service and detailed in the National Engineering Handbook. Additional system testing such as leak testing using air or water (in accordance with the National Engineering Handbook, pump startup and testing, monitoring pressure gauges and flow meters, and verification of flows and pressures at each turnout will ensure the system operates as required. The startup testing will take place once water is turned into the system.

2.3.8.7 Construction Staging Areas

Six separate equipment and material storage and staging areas (39.7 acres) in the Project area were evaluated. Aside from areas specifically identified for staging, the pipeline alignment would also function as a staging area for the construction crews as they construct the pipeline by preparing the alignment, laying the pipeline, backfilling, finishing grading, and restoration.

2.3.8.8 Operation and Maintenance

Operation of the BIC's system after the Project would remain essentially unchanged, and maintenance would be reduced significantly. Agricultural operation would occur primarily from April 15 to October 15. Irrigation turnouts and the pipelines would be designed to drain every fall to prevent freezing. In the spring, each turnout would be inspected for leaks or other needed repairs when the system is turned on.

Maintenance to the pond including annual inspection of the outlet works and pump station will occur every spring early enough to allow for repairs and maintenance. Where the pond berms are less than 2 feet and the water surface is at least 1 foot below the existing top of canal in a 100 year (1 percent chance) storm event, maintenance inspections will occur annually focusing primarily on bank stability and the control of rodents. Additionally, the pond will be maintained to control moss and to prevent overloading the screen on the pump station.

The existing open canals that are being abandoned and would still carry storm water are currently maintained jointly with Cache County, Logan City, and unincorporated Benson. This current maintenance would continue unchanged.

Standard Operating Procedures (SOPs) during construction and Operation and Maintenance (O&M) of the Project in accordance with an O&M Manual and manufacturer recommendations after construction would be followed to avoid or minimize adverse impacts on people and natural resources. Chapter 3 presents the impact analysis for resources after SOPs have been successfully implemented.

2.4 Alternatives Considered and Eliminated from Further Study

The following alternatives were evaluated but eliminated because they did not meet the purpose or need for the Project.

2.4.1 Membrane Lining

This alternative would include lining the canals in their current locations. This would require the full reconstruction of the ditches and laterals, approximately 10.4 miles of total channel length.

This would result in the same conditions that currently exist regarding the BIC's desire to increase water conservation; the system would still experience substantial water loss from the canals via evaporation. Additionally, this alternative would not conserve energy or improve water quality in the Bear River or Cutler Reservoir.

2.4.2 Gravity Pipeline

This alternative would require the installation of 12.7 miles of pipeline starting at the Benson Flume. A gravity pipeline would only generate a maximum of 11 pounds per square inch (psi) at the lowest point in the system because the region within the BIC service area exhibits little topographic relief. The 11 psi would not be enough to allow for any on-farm water conservation through the implementation of sprinklers and would still require those who do sprinkle to pump their water.

This alternative does not meet the purpose and need for the Project because:

- it would not conserve energy.
- the individual existing sprinkler systems would still require separate water pumps for each shareholder.
- it would not improve water quality in the Bear River and Cutler Reservoir because it will not encourage the conversion from flood irrigation to more efficient methods. Therefore, nutrient rich agricultural runoff would continue to flow into the Bear River and Cutler Reservoir.

2.5 Comparison of Alternatives

The suitability of the No Action and Proposed Action Alternatives were compared based on five objectives identified for the Project. The objectives are to improve water management through:

- Increasing water conservation;
- Reducing dependency on well water (from private and Logan City wells) and return flows (from other canal companies);

- Reducing nutrient loads into Cutler Reservoir;
- Conserving energy; and
- Improving economic sustainability of the community.

As shown in Table 2-1, the No Action Alternative did not meet any of the Project's objectives while the Proposed Action met all six objectives.

Table 2-1
Comparison of Alternatives

Project Objective	Does the No Action Meet the Objective	Does the Proposed Action Meet the Objective
Conserve water	No	Yes
Reduce dependency on well water and return flows	No	Yes
Reduce nutrient loads into Cutler Reservoir	No	Yes
Conserve energy	No	Yes
Improve economic sustainability of the community	No	Yes

2.6 Minimization Measures Incorporated into the Proposed Action

The minimization measures, along with other measures listed under each resource in Chapter 3 and Chapter 4 have been incorporated into the Proposed Action to reduce the potential adverse effects.

- The proposed Project construction area would be located in areas previously disturbed, agricultural farmland, existing roads, ditch rights-of-way, and staging areas adjacent to the Project area. Due to this setting, areas in a more natural state would be avoided.
- Staging and stockpiling areas would be located where they would minimize new disturbance of area soils and vegetation. These areas have been cleared in advance with the land owners and Reclamation.
- Ground disturbance would be minimized to the extent practicable.
- The BIC would be responsible during construction to ensure the contractor provides for safety measures, as well as implementing standard Reclamation Best Management Practices (BMP) to avoid or minimize the negative effects of increased noise and dust, and, air and water pollution. This would be done in compliance with the Utah Construction General Permit and the Clean Water Act.

- Only certified weed-free hay or straw, or paper mulch if needed, would be used as an erosion control mulch or moisture stabilizing mulch to prevent the spread of invasive weed seed, to control erosion, and to minimize dust after construction.
- The Project would be constructed mostly in the winter so that temporarily disturbed ground would be ready for revegetation in the spring when water is available.
- Segregated topsoil and cleared vegetation would be returned as part of final grading. Existing vegetation would be mixed with the topsoil to provide a mulch and reintroduce the seedbank, which would facilitate soil stabilization.
- Construction vehicles and equipment would be inspected and cleaned prior to entry into the Project area to ensure that they are free of weed seed.
- Disturbed sites would be monitored for invasive plant species from windblown seeds or dormant seeds exposed during construction and invasive species will be selectively removed either mechanically or chemically as appropriate and safe for the environment.
- The BMP would be required for erosion control, sediment control, and regular stormwater management under the UPDES permit until 70 percent of the disturbed areas are 100 percent revegetated or fully stabilized.

Chapter 3 Affected Environment and Environmental Consequences

3.1 Introduction

This chapter describes the environment that could be affected by the Proposed Action. These impacts are discussed under the following resource issues: geology and soils resources; visual resources; cultural resources; paleontological resources; wilderness and wild and scenic rivers; hydrology; water quality; system operations; health, safety, air quality, and noise; prime and unique farmlands; flood plains; wetlands, riparian, noxious weeds and existing vegetation; fish and wildlife resources; threatened, endangered, and sensitive species; recreation; socioeconomics; access and transportation; water rights; Indian Trust Assets; environmental justice; and cumulative effects. The present condition or characteristics of each resource are discussed first, followed by a discussion of the predicted impacts caused by the Proposed Action. The environmental effects are summarized in Section 3.7.

Implementing minimization measures would ensure impacts are either avoided or minimized to the greatest extent practicable. Chapter 3 presents the impact analysis for resources after minimization measures and BMP have been successfully implemented.

3.2 Resources Considered and Eliminated from Further Analysis

The following resources were considered but eliminated from further analysis because they did not occur in the Project area or because their effect is so minor (negligible) that it was discounted.

Table 3-1
Resources Eliminated from Further Analysis

Resource	Rationale for Elimination from Further Analysis
Paleontological Resources	Consultation with the State Paleontologist states there are no paleontological localities recorded within the Project area and would have a low probability to be a paleontological sensitive area.
Wilderness Areas and Wild and Scenic Rivers	There are no designated Wilderness Areas or Wild and Scenic Rivers within the Project area; therefore, Wilderness Areas and Wild and Scenic Rivers would not be affected by implementing the No Action or Proposed Action Alternatives.
Hydrology	The BIC irrigation system is part of an off-stream canal system. The amount of water diverted from the Logan River through the Crockett Diversion will not change as a result of the Proposed Action.
Prime and Unique Farmland	Prime Farmland, but no Unique Farmland, exists within the Project area. However, there would be no conversion of farmland to non-agricultural use, as defined by the Farmland Protection Policy Act (USC 4201-4209), by implementing the No Action or Proposed Action Alternatives.
Recreation	The BIC's irrigation ditches do not provide sources of recreation; therefore, there would be no impact to recreation from the Proposed Action.

3.3 Affected Environment and Environmental Consequences

This chapter describes the affected environment (baseline conditions) and environmental consequences (impacts as a result of the Proposed Action) on the quality of the human environment that could be impacted by construction and operation of the Proposed Action, as described in Chapter 2. The human environment is defined in this study as all of the environmental resources, including social and economic conditions occurring in the impact area of influence.

3.3.1 Geology and Soils Resources

The Project area is geologically the product of eons of sedimentary deposition from Lake Bonneville. In Cache Valley, the high water mark of Lake Bonneville was at approximately, elevation 5,090 feet, 16,000 to 14,500 years ago. Approximately, 14,500 years ago, a breach at Red Rock Pass in Idaho drained the

lake from the Bonneville Shoreline to the Provo Shoreline (elevation 4,740 feet) where it remained fairly consistent until about 13,500 years ago. Significant changes in climate leading to reduced precipitation and increased evaporation started lowering the water elevations. Between 13,500 and 11,000 years ago, Lake Bonneville dropped to levels below Cache Valley, exposing the Project area to climatic factors including the effects of precipitation and wind. As a result of the water elevation fluctuations, the Project area consists of predominantly silts and clay deposited 50 to 100-feet-deep by Lake Bonneville over 12,000 years ago. The primary geological features in the project area, including Hopkins Slough and Swift Slough, are the products of significant erosion that occurred over the last 14,500 years resulting from natural climatic factors prior to settlement in the late 1800s.

The Project area is dominated by fine sandy loam and silty clay loam which are considered moderately well- to poorly-drained soils. Along the proposed pipeline alignment, the soils are predominately made up of approximately 28 percent Salt Lake silty clay (Se), 20 percent Lewiston fine sandy loam (Ln and Lo), 16 percent Quinney silt loam (Qu), 14 percent Payson silt loam (Pn), and 11 percent Jordan silty clay loam (Jo) (Web Soil Survey 2018). These soils are affected by salt and alkali due to the high water table. The Jordan, Payson, and Salt Lake Series are characterized by slow permeability and slight hazard of erosion and are more suitable for range, meadow pasture, or hay. The Lewiston and Quinney Series are characterized by moderate permeability and are suitable for alfalfa, corn, and other irrigated crops.

The BIC currently has 65 shareholders irrigating 2,496 acres. The predominant crops for this area include alfalfa, winter wheat, spring wheat, corn (for silage), grass hay, and pastures. Corn and most of the alfalfa are sprinkler irrigated by pumping water from the canals.

3.3.1.1 No Action

The No Action Alternative would have no effect on geology and soils as delivery and application of irrigation water would remain as is.

3.3.1.2 Proposed Action

The Proposed Action Alternative would have temporary surface soil impacts during construction with the exception of the pond. The pond area would disturb approximately 4.6 acres of total area. Construction erosion and sediment controls and BMP would reduce these impacts. As a requirement of the UPDES permit for construction activities, a SWPPP would be developed and adhered to by the construction contractor.

3.3.2 Visual Resources

The natural and constructed features contribute to the visual resources within the Project area, including: mountain views, agricultural fields, a backdrop of Cutler Reservoir, Cutler Marsh, and vegetation along the ditches. Viewers, including local residents, workers, and recreationists, have a perception of the existing

physical characteristics. This section assesses the extent to which the Project would change the perceived visual character and quality of the environment where the Project is located.

3.3.2.1 No Action

The No Action Alternative would have no effect on visual resources.

3.3.2.2 Proposed Action

Under the Proposed Action Alternative, it is anticipated that there would be no permanent changes to the existing visual conditions. There would be some temporary disturbance that is to be revegetated and will have matching visual aspects after the site stabilization takes place as part of the SWPPP requirements. Some of the abandoned ditches and canals would remain open for stormwater collection.

Additionally, there would be no permanent construction impacts from constructing a pipeline to the overall visual character for the close-range to mid-range or even long-range viewers. Any visual impairment due to construction would be temporary. All ground disturbance related to construction of the pipeline would be regraded and revegetated.

3.3.3 Cultural Resources

Cultural resources are defined as physical or other expressions of human activity or occupation that are over 50 years in age. Such resources include culturally significant landscapes, prehistoric and historic archaeological sites as well as isolated artifacts or features, traditional cultural properties, Native American and other sacred places, and artifacts and documents of cultural and historic significance.

Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), mandates that Reclamation consider the potential effects of a proposed Federal undertaking on historic properties. Historic properties are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for, inclusion in the National Register of Historic Places (NRHP). Potential effects of the described alternatives on historic properties are the primary focus of this analysis.

The affected environment for cultural resources is identified as the area of potential effects (APE), in compliance with the regulations found in Section 106 of the NHPA (36 CFR 800.16). The APE is defined as the geographic area within which Federal actions may directly or indirectly cause alterations in the character or use of historic properties. The APE for this Proposed Action includes the area that could be physically affected by any of the proposed project alternatives (the maximum limit of disturbance).

A Class I literature review and a Class III cultural resource inventory were completed for the APE, as defined in the action alternative and analyzed for the

Proposed Action, by Bighorn Archaeological Consultants (Bighorn). In accordance with 36 CFR 800.4, any sites identified within the APE were evaluated for significance in terms of NRHP eligibility. The significance criteria applied to evaluate cultural resources are defined in 36 CFR 60.4 as follows:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, association, and

1. that are associated with events that have made a significant contribution to the broad patterns of our history; or
2. that are associated with the lives of persons significant in our past; or
3. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
4. that have yielded, or may be likely to yield, information important in prehistory or history.

A cultural resource inventory was completed by Bighorn in October 2017 and May 2018. Bighorn identified two cultural resource sites (42CA143 and 42CA144) within a 1-mile buffer of the project area. Site 42CA143 was determined to be within the APE and eligible for inclusion on the NRHP.

Site 42CA143, or the historic Benson Canal, was initially recommended eligible by the Utah Department of Transportation in 2008. The original site form asserted that although the canal was modified through general maintenance, upgrades, and other changes, the canal appears to follow the original alignment and usage, thereby retaining sufficient cultural significance. Bighorn concurred with the previous recommendation under Criterion A and Reclamation determined that Site 42CA143 was eligible for inclusion on the NRHP.

No other sites were identified within the APE. Thus, the subject of this analysis for cultural resources, is the project effect on the historic Benson Canal.

3.3.3.1 No Action

The No Action Alternative would have no effect on the historic Benson Canal. A continuation of existing management and land use practices would occur, which would include on-going maintenance and repair of existing facilities. There would be no changes to the current conditions.

3.3.3.2 Proposed Action

The proposed project would abandon and fill portions of the historic canal causing an alteration to the characteristics of the Benson Canal which make it eligible for the NRHP and will, therefore, have an adverse effect on the historic property according to 36 CFR 800.16(i).

Pursuant to 36 CFR 800.5, the criteria of adverse effect were applied to the site. An adverse effect is defined as an effect that could diminish the integrity of a historic property's location, design, setting, materials, workmanship, feeling, or association. The proposed action will diminish the integrity of the site and will constitute an adverse effect to the historic property.

In compliance with 36 CFR 800.4(dX2) and 36 CFR 800.11(e), a copy of the cultural resource inventory report and a determination of historic properties affected have been submitted to the SHPO, the Advisory Council on Historic Preservation (ACHP), and tribes which may attach religious or cultural significance to historic properties possibly affected by the proposed action for consultation.

Pursuant to 36 CFR 800.6(c), a Memorandum of Agreement (MOA) will be developed to resolve the adverse effects to the Benson Canal. The MOA must be executed prior to project implementation.

Under the Proposed Action Alternative, construction activities have the potential to discover previous, unknown, cultural resources and Native American artifacts. In the event of a discovery, construction activity in the vicinity would be suspended. A treatment plan would be developed, and coordination with Utah SHPO would occur immediately.

3.3.4 Water Quality

The CWA, as amended (1972), dictates water quality requirements. Also, streams, reservoirs, and canals in Utah are classified according to its beneficial uses. The required standards for water quality parameters are determined by the classifications used according to the Standards of Quality for Waters of the State, Environmental Quality (R317-2-13), Utah Administrative Code (UAC). All irrigation canals and ditches statewide (except as otherwise designated) including the Benson Canals are classified as:

- Class 2B -- Protected for infrequent primary contact recreation. Also, protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.
- Class 3E -- Severely habitat-limited waters. Narrative standards (R317-2-7.2 UAC) will be applied to protect these waters for aquatic wildlife.
- Class 4 -- Protected for agricultural uses including irrigation of crops and stock watering.

Irrigation return flows may discharge into the Bear River and Cutler Reservoir which are adjacent to the BIC service area. The Bear River and/or Cutler Reservoir are classified as:

- Class 2B -- Protected for infrequent primary contact recreation. Also, protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.
- Class 3A -- Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.
- Class 3B -- Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.
- Class 3D -- Protected for waterfowl, shore birds and other water-oriented wildlife not included in Classes 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain.
- Class 4 -- Protected for agricultural uses including irrigation of crops and stock watering.

The Bear River and Cutler Reservoir are 303(d)-listed water bodies of the CWA, indicating that it is an impaired body of water for water quality standards, particularly total phosphorus and dissolved oxygen. The Middle Bear River and Cutler Reservoir Total Maximum Daily Load (TMDL) was completed and approved in February 2010 (Gaddis 2010). The TMDL identified runoff from agricultural lands and pastures as watershed nonpoint sources. The TMDL identified the goal to reduce direct inflow of phosphorus into Cutler Reservoir from agricultural lands and pastures by 3,096 kilograms of total phosphorus per year. The BIC is a substantial part of this irrigated land.

3.3.4.1 No Action

Under the No Action Alternative, there would be no changes to the current conditions or additional effects to water quality. Any herbicides, nutrients, and sediments would continue to remain in the water in the same ratios as current conditions. Phosphorus loads from agricultural runoff and pasture lands would continue at the same levels. Since no construction would occur, there would be no new construction-related water quality impacts.

3.3.4.2 Proposed Action

Under the Proposed Action Alternative, water quality impacts during construction would be minimal, as there is no water in the canal during the non-irrigation season. Piping the canal would improve water quality in the system as water would be conveyed in a closed pipe preventing contact with soil, which would eliminate bank erosion. It would also substantially reduce agricultural and urban runoff that is associated with the current flood irrigation practice. There are no foreseen long-term negative impacts to water quality resulting from the Proposed Action.

Portions of the existing canals will remain open after construction is complete to convey stormwater through the Swift and Hopkins Sloughs to the Bear River.

This will be a continuation of current practice and, therefore, would not have any new effect on the water quality in the Bear River.

There is a potential temporary increase in turbidity due to sediment entering the sloughs during construction, creating direct and indirect effects on the water quality. The contractor would prepare a SWPPP, obtain a Notice of Intent, and comply with the State of Utah General Construction Permit. Erosion control measures would be comprehensively addressed in the SWPPP. The Project would require disturbed land to be graded to provide proper drainage, to blend with the natural contours, and to be revegetated with native plants.

Piping the irrigation system would encourage land owners to convert existing lands from flood irrigation to pressurized sprinkler systems. This change will eliminate runoff from existing flood irrigation practices during the summer months, encourage the regrading of lands to contain water, significantly reduce the loading of phosphorus into Cutler Reservoir, and help meet TMDL goals.

3.3.5 System Operations

The BIC receives water from the Logan River through the Crockett Avenue Distribution System and the Logan Northwest Field Canal. Water is called for from April 15 to October 15 and delivered to the Benson Flume that is the start of the Benson Canal.

The Benson, Benson North, and Benson South Canals are solely controlled by the BIC for the purpose of meeting shareholder irrigation needs. Major components of the system include the flume out of the Logan Northwest Field Canal, head gates or irrigation turnouts, check structures, and culverts.

3.3.5.1 No Action

The No Action Alternative would have no effect on system operations as the BIC system would continue to operate under its current conditions.

3.3.5.2 Proposed Action

The Proposed Action Alternative would have no effect on the current operation of the Crockett Diversion out of the Logan River or the operation of the Logan Northwest Field Canal.

Also, the BIC system would have minimal losses and conserve, on average, 2,130 acre-feet of water annually. By piping the canals, the required maintenance along the ditch would be reduced because of the minimal flows it would need to handle and the reduced amount of debris from entering the system.

The numerous existing pump stations, trash and debris screens associated with the pump stations, would all be consolidated to a single pump station location, allowing for the use of higher efficiency pumps and more efficient screening of the water to remove trash and debris. The check structures and culverts would be eliminated from the irrigation system, thus reducing both operations and

maintenance time and costs. Therefore, the Proposed Action would have a beneficial impact on the system operations.

3.3.6 Health, Safety, Air Quality, and Noise

The Project is in a rural area which is adjacent to the suburban community of Logan, Utah. Current operations of BIC have no effect on the general public health in the Project area. Safety can be a concern as water is conveyed through a system of open ditches. Noise in the area is typical for a rural, agricultural community.

The Clean Air Act requires EPA to set National Ambient Air Quality Standards (NAAQS) for six airborne pollutants: carbon monoxide, particulate matter, ozone, nitrogen dioxide, lead, and sulfur dioxide (EPA 2018). Air Quality conditions within the state are designated with respect to the NAAQS attainment. Benson is located within an attainment area for all six pollutants except particulate matter with a diameter of 2.5 micrometers or less ($PM_{2.5}$). Benson is in a $PM_{2.5}$ nonattainment area (UDEQ Areas Designations 2018).

3.3.6.1 No Action

The No Action Alternative would have no effect on health, safety, air quality, or noise. Current public safety risks of open ditches/canals that could result in accidental drowning would continue.

3.3.6.2 Proposed Action

The Proposed Action Alternative may have minor short-term effects during construction. Noise levels within the Project area would temporarily increase during pipeline construction due to heavy equipment and truck traffic. If county and state roads are used for access during construction, risk of traffic accidents may increase slightly. Also, fugitive dust has the potential to increase during pipeline construction; however, dust suppressant measures will be used to help minimize the increased short-term impacts.

The irrigation system would operate as a low-pressure pipeline. Pipeline pressure would range from 50 to 60 psi based on the local ground elevation. Every pipe has a pressure class rating with a built-in factor of safety. The appropriate pipe class would be selected depending on the calculated pressures. Pipe fittings would meet the same pressure requirements as the pipe. Many pipelines are pressurized, including culinary water lines, and do not pose a threat to public safety. Therefore, there would be no long-term effects on health, safety, air quality, or noise.

3.3.7 Flood Plains and Flood Control

Federal Emergency Management Agency (FEMA) flood zone maps were reviewed to determine if the Project area lies within an area of potential risk. Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM), which reflect the severity or type of flooding that could occur.

The Project area is adjacent to the Bear River and areas defined as Zone A (FEMA Flood Map Service Center). Zone A are "areas with a 1 percent annual chance of flooding and a 26 percent chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones" (Definitions of FEMA Flood Zone Designations). Most of the area the system would be installed in is Zone X. Zone X is defined as "the area determined to be outside of the 500-year flood" (Definitions of FEMA Flood Zone Designations) (See Appendix B).

The Benson North and South Canals have served inadvertently as a flood control facility, collecting stormwater and irrigation runoff. The water collected in the canals is delivered through the Hopkins and Swift Sloughs to the Bear River.

3.3.7.1 No Action

Under the No Action Alternative, there would be no changes to current conditions.

3.3.7.2 Proposed Action

Under the Proposed Action Alternative, the flood plain areas would remain the same. There would be no impact to flood plains. The existing land surface at the pond is at elevation 4,441 feet and the maximum elevation of the pond in the 100-year storm event (1 percent chance) is at elevation 4,440 feet. Under this condition, the flood plain is not affected.

Under the Proposed Action Alternative, portions of the Benson North and South Canals will remain open to collect stormwater. This will allow stormwater to continue to drain through the Hopkins and Swift Sloughs to the Bear River.

3.3.8 Wetlands, Riparian, Noxious Weeds, and Existing Vegetation

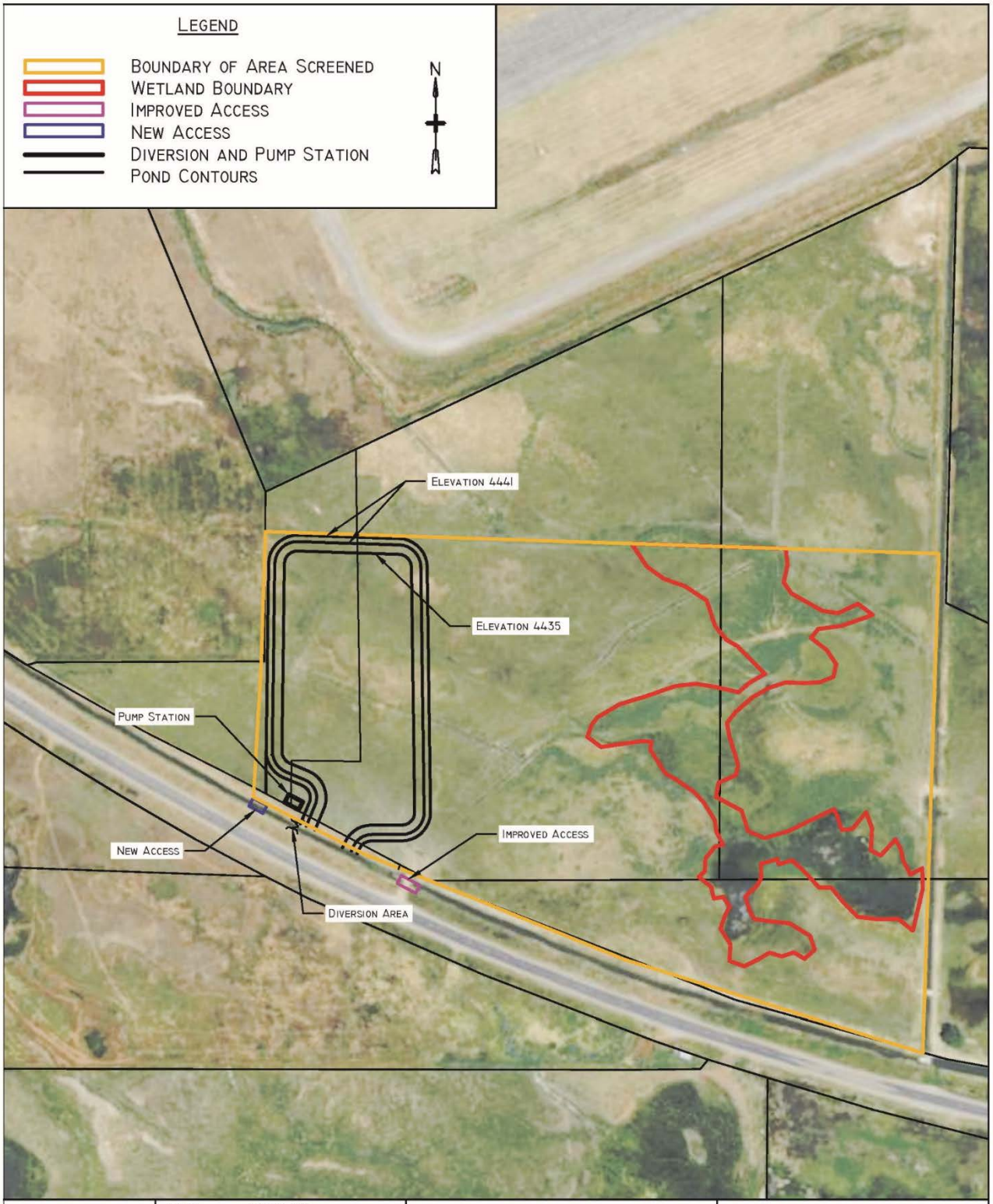
3.3.8.1 Wetlands and Riparian

The CWA (Section 404), as amended in 1977 and 1987, requires wetlands to be protected. In a memorandum of understanding between the Army Corps of Engineers and the Environmental Protection Agency, a "no-net loss" policy was implemented requiring the Army Corps of Engineers to select the least impactful alternative on wetlands. In compliance with this objective, the National Wetlands Inventory (NWI) Mapper was used to identify wetland area within the Project area. According to the NWI, some freshwater emergent wetland is present along various sections of the pipeline alignment. A wetland delineation was conducted on May 11, 2018, to identify all wetland boundaries with the proposed project limits (Appendix C).

One wetland area was identified near the pipeline construction and two wetland areas in the staging locations, as shown in the report. Wetland No. 1, as designated in the report, is located on a property identified as a staging area. The property is large enough that the wetlands will be avoided. Wetland No. 2 is on

the same property identified as a staging area and the location of the pond, as shown in Figure 3-1.

To minimize impacts to the wetlands and any other potential critical habitat, the pond disturbance will be kept to a minimum of 300 feet from the nearest wetland boundary. Wetland No. 3 would also be avoided since pipeline construction would occur within the road right-of-way. As a result, under the Proposed Action, there would be no impacts to wetlands.



FRANSON CIVIL ENGINEERS

DATE: JULY 5, 2018
SCALE: 1" 250'
Final Pond Design-Property Purchase.dwg
P:\UT\Northern\Benson Canal Enclosure\3 - Design\Drawings

BENSON IRRIGATION COMPANY
BENSON CANAL ENCLOSURE

FIGURE 3-1
POND LAYOUT

3.3.8.2 Noxious Weeds

Noxious, or invasive, weeds are plants designated by a Federal, State, or County government as injurious to public health, agriculture, recreation, wildlife, or property. The following weeds are officially designated and published as noxious for the State of Utah under the Utah Noxious Weed Act (R68-9). Cache County's highest priority weeds are listed in bold:

- Bermudagrass (*Cynodon dactylon*)
- Black henbane (*Hyoscyamus niger*)
- **Canada thistle** (*Cirsium arvense*)
- Diffuse knapweed (*Centaurea diffusa*)
- **Dyers woad** (*Isatis tinctori*)
- Field bindweed (*Convolvulus arvensis*)
- **Hoary cress** (*Cardaria drabe*)
- Houndstongue (*Cynoglossum officinale*)
- Johnsongrass (*Sorghum halepense*)
- **Leafy spurge** (*Euphorbia esula*)
- **Medusahead** (*Taeniatherum caput-medusae*)
- Musk thistle (*Carduus mutans*)
- Oxeye Daisy (*Chrysanthemum leucanthemum*)
- **Perennial pepperweed** (*Lepidium latifolium*)
- Perennial sorghum (*Sorghum halepense*, *S. almum*)
- **Poison Hemlock** (*Conium maculatum*)
- Purple loosestrife (*Lythrum salicaria*)
- Quackgrass (*Agropyron repens*)
- Russian knapweed (*Centaurea repens*)
- Salt Cedar (*Onopordum acanthium*)
- Scotch thistle (*O. acanthium*)
- Spotted knapweed (*Centaurea maculosa*)
- Squarrose knapweed (*Centaurea squarrosa*)
- St. Johnswort (*Hypericum perforatum*)
- **Yellow starthistle** (*Centaurea solstitialis*)
- Yellow toadflax (*Linaria vulgaris*)

Additional noxious weeds declared by Cache County:

- **Goatsrue** (*Galega officinalis*)
- **Puncturevine** (*Tribulus terrestris*)

The Cache County Resource Assessment (NRCS 2011) indicates that the noxious weeds within the Project area include mainly Goatsrue and some Scotch Thistle. Other noxious weeds near the Project area include Broad-leaved Peppergrass, Dyer's Woad, Hoary Cress, Musk Thistle, and Poison Hemlock.

In 2016, Cache County adopted a weed control policy to organize, supervise, and coordinate a noxious weed control plan for Cache County including chemical and biological control practices (Cache County 2016).

3.3.8.3 Existing Vegetation

Limited vegetation exists along the canal alignments due to regular maintenance and portions of the canal being concrete lined. There are approximately a dozen Russian olive trees (listed on the state invasive species list) along the existing alignments and several ornamental trees associated with residential properties.

3.3.8.4 No Action

The No Action Alternative would have no effect on wetlands, riparian, noxious weeds, or vegetation. A continuation of existing management and land use practices would occur and would include ongoing maintenance and repair of existing facilities. There would be no change to the current conditions.

3.3.8.5 Proposed Action

Following all observations and analysis, it is concluded that under the Proposed Action Alternative, no impacts to the delineated wetland areas are anticipated to occur during pipeline or pond construction. The wetland areas will be delineated with marker fences and stormwater BMP installed around the perimeter to protect the wetlands. A 50-foot vegetated buffer and either a silt fence, straw waddle, or isolation berm will be installed around the perimeter of the delineated wetlands near the staging areas to provide double BMP per UPDES requirements. Since no wetlands are being impacted, a stream alteration permit will not be required.

There is a lack of desirable riparian vegetation along the canals. There are approximately a dozen Russian olive trees along the canal and ditch reaches proposed to be abandoned that would not capture sufficient stormwater, agricultural runoff, or other supplemental water sources to allow such vegetation to persist. Since the Russian olive trees are considered a Class 4 prohibited invasive noxious weed by the Utah Department of Agriculture, they will be removed during construction. All other construction activities would occur in areas that have been previously disturbed by the development of existing facilities and farming practices.

Soil disturbance would create a suitable condition for some noxious weed species recruitment. However, during construction, soil disturbance would be temporary and minimal, which should also minimize the potential for weed recruitment. Also, with removal of all canal water, the habitat for some noxious weed species (e.g Dyers woad and goatsrue) would be altered, reducing their persistence. However, since a canal represents an existing disturbed area, other noxious weed species may recruit in this new habitat type.

To control the spread of any noxious weeds, the following procedures would be included in the construction specifications. Earth-moving construction equipment would be cleaned with a high-pressure water blasting method prior to use on the

Project. Any existing noxious weeds would be treated with commercially available herbicides at least 10 days before starting earthwork operations to control the identified weed species. The disturbed area would be regraded with the segregated topsoil to potentially take advantage of an existing native seed bank.

3.3.9 Fish and Wildlife Resources

3.3.9.1 Fish

The Benson North and South Canals are earth or concrete-lined irrigation ditches that carry irrigation water from the Logan Northwest Field Canal to agricultural land in the BIC service area. They are used primarily during the irrigation season and are dry for several months of the year except during some storm events when portions of the canals convey stormwater to the Hopkins and Swift Sloughs. Since the canals have no continuous water source from a stream, and, the canal system periodically is dry, there are no fish present.

3.3.9.2 Small Mammals

Small mammals are inherently part of rural and agricultural areas. It is presumed that several species are present throughout the Project area, where suitable habitat persists.

3.3.9.3 Birds

Raptors, waterfowl, and upland game bird species may be found year-round in and near the Project area including red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), turkey vulture (*Cathartes aura*), Canada goose (*Branta canadensis*), mallard (*Anas platryrhynchos*), and mourning dove (*Zenaida macroura*). Seasonally, a variety of migratory songbirds may also pass through the project vicinity.

3.3.9.4 Big Game

Though the Project area is primarily cultivated agricultural land adjacent to a suburban environment, mule deer are adaptable to agricultural environments and could be present.

3.3.9.5 No Action

The No Action Alternative represents a continuation of existing management and land use practices. There would be no new impacts to wildlife within the Project area.

3.3.9.6 Proposed Action

Under the Proposed Action Alternative, there would be no major long-term negative effects to wildlife. Construction activities would occur in or adjacent to areas that were previously disturbed by agricultural development, homes, and roadways. Construction would be in the late fall through early spring. Wildlife disturbance would be localized, temporary and minimal due to the lineal and fast-moving nature of the construction activities. Revegetation at that elevation and

location, in spring and early summer would likely occur fairly rapidly, which would minimize the disruption of habitat use by wildlife.

Seasonal migrations of wildlife may be affected by Project construction. This would be temporary, and wildlife would be able to use adjacent lands during this time. Temporary effects would be minimized by restricting construction activities to avoid sensitive breeding or nesting seasons.

The BIC would ensure compliance with the Migratory Bird Treaty Act and the U.S. Fish and Wildlife Service (USFWS) Utah Raptor Guidelines. If nests of migratory birds were located during the construction process, a Reclamation biologist would be consulted, and an appropriate buffer would be put in place. Any birds still in the Project area during construction would be able to use similar roost sites or other habitats in the immediate vicinity. The removal of large trees is not anticipated to be necessary for this Project.

Effects to fish, small mammals, reptiles, and big game would be minimal. If the species were present during construction, minor disturbance may occur. However, most of the area has already been disturbed and is continually treated during typical agriculture-related maintenance activities. Additionally, the Proposed Action would remove the open canal as a free water source. This would cause any wildlife habituated to the canal water to utilize the many proximal wetland areas and artificially created water sources. See mapping in Appendix C for more details.

Overall, the direct and indirect effects to wildlife resources would be minimal. In addition, the long and short-term impacts to the habitat, water sources, and behavior would be minor.

3.3.10 Threatened, Endangered, and Sensitive Species

Federal agencies are required under the Endangered Species Act (ESA) of 1973, 16 USC 1531, to ensure that any action federally authorized, funded, or carried out, does not jeopardize the continued existence of threatened or endangered species, or modify their critical habitat.

The USFWS's online listed species occurrence database, known as Information for Planning and Consultation (IPaC), was accessed on November 29, 2017, to identify listed species potentially occurring in the Project area. Three threatened species were identified as potentially being affected by the Proposed Action. Table 3-2 lists the species along with habitat requirements and potential impact determination.

Table 3-2
ESA Listed Species Potentially Found in Project Area*

Species (common and scientific name)	Status	Habitat Description	Suitable Habitat in Project Area	Project Impact Determination
Birds				
Yellow-billed cuckoo *(Coccyzus americanus)*	Threatened	Riparian areas with dense willows combined with mature cottonwoods. Also known to use wooded parks, cemeteries, tree islands, Great Basin Shrub-steppe, and high elevation willow thickets	No. Project area is outside proposed critical habitat.	**No effect**
Flowering Plants				
Ute ladies'-tresses *(Spiranthes diluvialis)*	Threatened	Undisturbed riparian areas and wetland habitats; only in moist to very wet meadows near springs, lakes, relict meanders, and perennial streams	No. Potential suitable habitat in the Project vicinity will be avoided.	No hydrologic connection to a known population; **No effect**
Mammals				
Canada lynx *(Lynx canadensis)*	Threatened	Isolated spruce, fir, and lodgepole pine forests, typically in areas with high prey populations, especially snowshoe hare	No. Project area is outside final critical habitat.	**No effect**

*U.S. Fish and Wildlife Service (2017, November 29).

Reclamation did conduct site assessments to survey for occupied and potentially suitable habitat for Ute ladies'-tresses (ULT) on August 4, 2017, May 31, 2018, and June 15, 2018. No occupied habitat was identified during the August 2017 survey; however, potentially suitable habitat was identified along the canal east of the bifurcation of the Benson North and South Canals. Due to the identification of the potentially suitable habitat, the locations of the diversion structure and inlet pond for the Proposed Action were modified. They are now sited at least 300 feet away from potentially suitable habitat. Due to this adjustment to Project design, the Proposed Action would have no effect on ULT.

3.3.10.1 State Sensitive Species

The State Sensitive Species List contains species that are considered "Wildlife Species of Concern," which means there are threats to their populations. These species are identified for conservation actions that would preclude the need for their listing under the ESA. There is no statutory protection from the Federal or State government.

The following species were identified in an information request from the Utah Department of Natural Resources, Utah Natural Heritage Program. The results are from a database managed by the Utah Division of Wildlife Resources (UDWR), which was accessed on November 27, 2017.

There are recent records of occurrence within a ½-mile radius of the Project area for bobolink (*Dolichonyx oryzivorus*) and short-eared owl (*Asio flammeus*), and historical records of occurrence for Great Plains toad (*Bufo cognatus*).

In addition, within a 2-mile radius, there are recent records of occurrence for least chub, and historical occurrence records for burrowing owl (*Athene cunicularia*) and long-billed curlew (*Numenius americanus*).

Agricultural fields (e.g. hay fields and pasture) provide suitable habitat for the bobolink. This migratory songbird spends about 6 months each year migrating to South America and back. Breeding season in Utah begins early to mid-May when males return to breeding grounds (UDWR species page accessed June 28, 2018). Due to its migratory nature and its breeding season, if bobolink utilize habitat in the project area, it is anticipated that they would not be present during the scheduled construction period (i.e. fall to late winter).

Due to the proposed construction schedule, relevant habitat requirements for the short-eared owl includes only the breeding season. This owl is a ground-nester, but breeding is limited in northern Utah, occurring primarily in the northwest region (UDWR species page accessed June 28, 2018). The Proposed Action is in northeast Utah, so potential involvement with this species would be unlikely.

Burrowing owls, like the bobolink, are migratory. They utilize mammal burrows for nesting and cover in habitats that are generally open, lacking trees. They are also capable of excavating their own burrow in suitable soil. Although they are known to occupy agricultural fields, especially pasture, the Project area lacks existing burrows, primarily due to the high groundwater table. This condition also prevents the owl from excavating burrow(s).

The proposed Project area provides potentially suitable nesting habitat for the long-billed curlew (UDWR species page accessed June 28, 2018). However, this species, like the bobolink and burrowing owl, should not be present during construction based on its breeding and migration periods.

The Great Plains toad does have a potential to occur in the Project area as they utilize agricultural fields as well as arid, natural habitats. Low wet areas (i.e. standing water) and wetlands, such as those documented on site, provide suitable breeding habitat. It also burrows underground when inactive (UDWR species page accessed June 28, 2018). Based on habitat requirements alone, this species would potentially be involved with the Proposed Project. However, this species has become increasingly rare in Utah, to the extent that there have been no

occurrence records in more than 15 years (Utah Wildlife Action Plan Joint Team, 2015). Furthermore, the most recent records are from localities approximately 200 miles south of the project vicinity. Therefore, it is extremely unlikely that this species would be affected by the Proposed Project.

3.3.10.2 No Action

Under the No Action Alternative, there would be no direct or indirect effects to threatened, endangered, and sensitive species or critical habitat because there would be no construction-related activities.

3.3.10.3 Proposed Action

Under the Proposed Action Alternative, there would be no effect to Federally listed species during or after construction because neither the species nor suitable habitat is present along the pipeline alignment.

Of the five state sensitive species identified as potentially occurring, four are not anticipated to be present during construction due to a lack of suitable habitat or the timing of migration and breeding periods relative to the construction period. However, the Great Plains toad may occur in the Project area and construction activity would potentially have a direct or indirect effect on individuals.

3.3.11 Socioeconomics

The population of Benson was 1,485 in the 2010 census; it had increased from 1,451 in 2000 (United States Census Bureau). The estimated median adjusted gross income (MAGI) in 2016 was $47,541, which is 7 percent higher than the state's MAGI of $44,268. Benson exhibits limited overall racial diversity, with 95 percent of residents classified as white in 2010 and the next largest race being Hispanic at 4 percent.

3.3.11.1 No Action

Under the No Action Alternative, there would be no changes to the socioeconomics of the community.

3.3.11.2 Proposed Action

Under the Proposed Action Alternative, there would be an increase in crop production for the BIC shareholders due to increased water supplies. It would help stabilize the economics and sustainability of the farming and ranching community by providing improved irrigation efficiency and improved crop production. Based on an average expected increase of 25 percent in crop yield for alfalfa with an estimated value of $80 per ton, it is expected that the BIC shareholders could increase annual revenues by $200,000.

There would also be a temporary increase in jobs since most of the construction will take place in the fall and during the winter. Thus, allowing the selected construction contractor to avoid typical winter employment layoffs experienced in Cache Valley. Costs borne by the BIC for operation and maintenance would be reduced.

There would be no changes to the land uses, thereby creating no effect to the socioeconomics of the community.

3.3.12 Access and Transportation

The Project area, situated directly northwest of Logan, Utah and adjacent to the Logan Cache Airport, can be accessed via State Road (SR) 252 from the south or east. From SR 252, the Project site can be accessed via Airport Road and other rural roadways.

During construction, most of the vehicle trips would be for transporting construction materials. The contractor would be transporting heavy construction equipment at the beginning and end of the Project.

In accordance with the UMUTCD, traffic control plans will be prepared and implemented to provide alternative routes with detours throughout the project area. Additionally, where detours are not reasonable, a minimum a single passage lane will be required with flaggers or other appropriate method directing traffic, in accordance with the UMUTCD.

3.3.12.1 No Action

The No Action Alternative would have no impact on access and transportation.

3.3.12.2 Proposed Action

The Proposed Action Alternative would have minor short-term effects during construction. Where the pipeline crosses existing roadways the roads would be temporarily shut down so that they can be cut, and the pipeline installed. During each roadway closure, detours would be provided which could cause short-term delays. The road would be repaired following pipeline construction. There would be no long-term effects on access and transportation.

3.3.13 Water Rights

The BIC's primary water right for 16 cfs from the Logan River is diverted at the Crockett Diversion and delivered through the Logan Northwest Field Canal. The BIC also holds several smaller rights that add up to an additional 0.332 cfs. Combined with the Logan River right, these rights allow BIC to irrigate 2,496.20 acres.

3.3.13.1 No Action

The No Action Alternative would have no effect on water rights.

3.3.13.2 Proposed Action

Under the Proposed Action Alternative, there would be no changes to the allowed beneficial uses or place of use for the BIC water rights. There would also not be any changes to the existing points of diversion. The Proposed Action, however, would allow the BIC to maximize the amount of water applied to crops as evaporative and seepage related losses incurred by conveying water via the Benson North and South Canals would be eliminated.

3.4 Indian Trust Assets

Indian Trust Assets are legal interests in property held in trust by the United States for Federally recognized Indian Tribes or Indian individuals. The Department of the Interior's policy is to recognize and fulfill its legal obligations to identify, protect, and conserve the trust resources of Federally recognized Indian tribes and tribal members, and to consult with tribes on a government-to-government basis whenever plans or actions affect tribal trust resources, trust assets, or tribal safety (see Departmental Manual, 512 DM 2). Assets can be real property, physical assets, or intangible property rights, such as lands, minerals, hunting and fishing rights, and water rights.

The United States has an Indian trust responsibility to protect and maintain rights reserved by or granted to such tribes or individuals by treaties, statutes, and executive orders. These rights are sometimes further interpreted through court decisions and regulations. This trust responsibility requires that all Federal agencies take all actions reasonably necessary to protect trust assets. Reclamation carries out its activities in a manner which protects these assets and avoids adverse impacts to the extent practicable. When impacts cannot be avoided, Reclamation would provide appropriate mitigation or compensation. Implementation of the No Action or Proposed Action would have no foreseeable negative impacts on Indian Trust Assets.

3.5 Environmental Justice

Executive Order 12898, established Environmental Justice as a Federal agency priority to ensure that minority and low-income groups are not disproportionately affected by Federal actions. Implementation of the Proposed Action would not disproportionately (unequally) affect any low-income or minority communities within the Project area as it would not involve major facility construction, population relocation, health hazards, hazardous waste, property takings, or substantial economic impacts. This action would therefore have no adverse human health or environmental effects on minority and low-income populations.

3.6 Cumulative Effects

In addition to project-specific impacts, Reclamation analyzed the potential for significant cumulative impacts to resources affected by the Project and by other past, present, and reasonably foreseeable activities within the watershed. According to the Council on Environmental Quality's regulations for implementing NEPA (50 CFR §1508.7), a “cumulative impact” is an impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place

over a period of time. It focuses on whether the Proposed Action, considered together with any known or reasonably foreseeable actions by Reclamation, other Federal or state agencies, or some other entity combined to cause an effect. There is no defined area for potential cumulative effects.

Cumulative effects for this Project may include maintenance and repair activities on the new system including the pipeline, turnouts, pond, and appurtenances. These new structures would be installed on existing disturbed areas. Also, existing grazing and agricultural practices would be expected to continue indefinitely. It is not anticipated that any of these activities would increase the potential for prospective land development as the Proposed Action will not result in increased production that would result in expansion of current agricultural practices into new areas not currently serviced by the BIC.

Consequently, all effects are considered temporary in nature, and would be expected to end shortly after construction completion. Therefore, based on resource specialists' review of the Proposed Action, Reclamation has determined that this action would not have a significant adverse cumulative effect on any resources.

3.7 Summary of Environmental Effects

Table 3-3 summarizes environmental effects under the No Action and the Proposed Action Alternatives.

Table 3-3
Summary of Environmental Effects

Project Resource	No Action	Proposed Action
Geology and Soils Resources	No Effect	Minor Temporary Effect
Visual Resource	No Effect	Minor Temporary Effect
Cultural Resources	No Effect	Adverse Effect to Site 42CA143
Water Quality	No Effect	Minor Temporary Effect
System Operations	No Effect	No Effect
Health, Safety, Air Quality, and Noise	No Effect	Minor Temporary Effect
Flood Plains and Flood Control	No Effect	No Effect
Wetland, Riparian, Noxious Weeds, and Existing Vegetation	No Effect	Minor Temporary Effect
Fish and Wildlife Resources	No Effect	Minor Temporary Effect
Threatened and Endangered Species, Sensitive Species	No Effect	No Effect
Socioeconomics	No Effect	No Effect
Access and Transportation	No Effect	Minor Temporary Effect
Water Rights	No Effect	No Effect
Indian Trust Assets	No Effect	No Effect
Environmental Justice	No Effect	No Effect
Cumulative Effects	No Effect	No Effect

Chapter 4 Environmental Commitments

Environmental Commitments, along with Minimization Measures in Section 2.6 have been developed to lessen the potential adverse effects of the Proposed Action.

4.1 Environmental Commitments

The following environmental commitments will be implemented as an integral part of the Proposed Action.

1. **Standard Reclamation Best Management Practices -** Standard Reclamation (BMP) will be applied during construction activities to minimize environmental effects and will be implemented by construction forces or included in construction specifications. Such practices or specifications include sections in the present EA on public safety, dust abatement, air pollution, noise abatement, water pollution abatement, waste material disposal, erosion control, archaeological and historical resources, vegetation, fish and wildlife and threatened and endangered species. Excavated material and construction debris may not be wasted in any stream or river channel in flowing waters. This includes material such as grease, oil, joint coating, or any other possible pollutant. Excess materials must be wasted at a Reclamation approved upland site well away from any channel. Construction materials, bedding material, excavation material, etc. may not be stockpiled in riparian, wetland, or water channel areas. Silt fencing will be appropriately installed and left in place until after revegetation becomes established, at which time the silt fence can then be carefully removed. Machinery must be fueled and properly cleaned of dirt, weeds, organisms, or any other possibly contaminating substances offsite prior to construction.

2. **Additional Analyses -** If the Proposed Action were to change significantly from that described in this EA because of additional or new information, or if other spoil, or work areas beyond those outlined in this analysis are required outside the defined Project construction area, additional environmental analyses may be necessary.

3. **Construction Restrictions** – Construction and staging activities would be confined to previously disturbed areas, to the extent practicable.

4. **Public Access** - Construction sites will be closed to public access. The BIC would coordinate with contractor's personnel, as necessary, to ensure public safety.

5. **UPDES Permit** - A UPDES Permit will be required from the State of Utah before any discharges of water, if such water is to be discharged as a point source into a regulated water body. Appropriate measures will be taken to ensure that construction related sediments will not enter the stream either during or after construction. Settlement ponds and intercepting ditches for capturing sediments will be constructed, and the sediment and other contents collected will be hauled off the site for appropriate disposal upon completion of the Project.

6. **Air Quality** – The BMP would be followed to mitigate for temporary impact on air quality due to construction related activities. These may include the application of dust suppressants and watering to control fugitive dust; minimizing the extent of disturbed surface; during times of high wind, restricting earthwork activities; and limiting the use of, and speeds on, unimproved road surfaces.

7. **Cultural Resources** – The Project will likely cause an adverse effect to Historic Properties, with a final determination pending SHPO review. If the Utah SHPO concurs with Reclamation's determination of adverse effect, a MOA will be developed and signed prior to implementation.

   In the case that any cultural resources other than the previously identified Benson Canal, either on the surface or subsurface, are discovered during construction, Reclamation's Provo Area Office archeologist shall be notified and construction in the area of the inadvertent discovery will cease until an assessment of the resource and recommendations for further work can be made by a professional archeologist.

8. **Human Remains** - Any person who knows or has reason to know that he/she has inadvertently discovered possible human remains on Federal land, he/she must provide immediate telephone notification of the discovery to Reclamation's Provo Area Office archaeologist. Work will stop until the proper authorities are able to assess the situation onsite. This action will promptly be followed by written confirmation to the responsible Federal agency official, with respect to Federal lands. The Utah SHPO and interested Native American Tribal representatives will be promptly notified. Consultation will begin immediately. This requirement is prescribed under the Native American Graves Protection and Repatriation Act (43 CFR Part 10); and the Archaeological Resources Protection Act of 1979 (16 USC 470).

9. **Historical Sites** - A MOA will be executed to mitigate the adverse effects to site 42CA143. Mitigation for the adverse effects, set forth in the stipulations of the MOA, must be completed before construction activities associated with the Proposed Action begin.

10. **Paleontological Resources** - Should vertebrate fossils be encountered by the proponent during ground disturbing actions, construction must be suspended until a qualified paleontologist can be contacted to assess the find.

11. **Wetland Resources** - The BIC would work with the State of Utah DWRi on the necessary stream alteration permits. It would be determined what measures need to be taken to avoid any and all wetlands where able. If a wetland area is relatively unavoidable, there would be consultation with the appropriate agencies so as to minimize surface and immediate subsurface integrity. A U.S. Army Corps of Engineers 404 permit would be obtained prior to the discharge of any dredged or fill material into waters of the United States including wetlands.

12. **Invasive Species** – Appropriate steps would be taken to prevent the spread of, and to otherwise control, undesirable plants and animals within areas affected by construction activities. Equipment used for the Project would be inspected for reproductive and vegetative parts, foreign soil, mud or other debris that may cause the spread of weeds, invasive species and other pests. Such material would be removed before moving vehicles and equipment. Upon the completion of work, decontamination would be performed within the work area before the vehicle and/or equipment are removed from the Project site.

    The BIC would make periodic inspections following vegetation of disturbed areas to locate and control populations of noxious weeds, if present. All seed used for restoration would be certified "noxious weed free" before use. If needed, the County Weed Control Department could be contacted to provide services to control the spread of noxious weeds.

13. **Vegetation** – Design and treatment activities would ensure that vegetation would be protected with no long term adverse effects. Staging areas would be in previously disturbed areas to the extent practicable.

14. **Wildlife Resources** – In the case that bald and/or golden eagles are observed within the Project area and vicinity, Reclamation's Provo Area Office wildlife biologist shall be notified and construction in the area shall cease until an assessment of eagle presence can be made by a professional wildlife biologist. The Bald and Golden Eagle Protection Act prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" eagles, including their parts, nests, or eggs. The Act defines

"take" as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. "Disturb" means: "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.

New guidance pertaining to the Migratory Bird Treaty Act (MBTA) was issued on December 22, 2017, by the U.S. Department of the Interior under Secretarial Order 3345. Furthermore, the USFWS issued guidance through an M-Opinion. That guidance states MBTA's prohibitions on take apply when the purpose of an action is to take migratory birds, their eggs, or their nests. Therefore, the take of birds, eggs or nests resulting from an action in which the purpose is to not take birds, eggs or nests, is not prohibited by the MBTA.

15. **Disturbed Areas** - All disturbed areas resulting from the Project will be smoothed, shaped, contoured, and rehabilitated to as near the pre-Project construction condition as practicable. After completion of the construction and restoration activities, disturbed areas will be seeded at appropriate times with weed-free, native seed mixes having a variety of appropriate species (especially woody species where feasible) to help hold the soil around structures, prevent excessive erosion, and to help maintain other riverine and riparian functions. The composition of seed mixes will be coordinated with wildlife habitat specialists and Reclamation biologists. Weed control on all disturbed areas will be required. Successful revegetation efforts must be monitored and reported to Reclamation, along with photos of the completed Project.

Chapter 5 Consultation and Coordination

5.1 Introduction

This chapter details other consultation and coordination between Reclamation and other Federal, state, and local Government Agencies, Native American Tribes, and the public during the preparation of this EA. Compliance with NEPA, is a Federal responsibility that involves the participation of all of these entities in the planning process. The NEPA requires full disclosure about major actions taken by Federal agencies and accompanying alternatives, impacts, and potential mitigation of impacts.

5.2 Public Involvement

Reclamation's public involvement process presents the public with opportunities to obtain information about a given project and allows all interested parties to participate in the project through written comments. The key objective is to create and maintain a well-informed, active public that assists decision-makers throughout the process, culminating in the implementation of an alternative.

A copy of the Draft EA will be sent to interested agencies and key stakeholders for review. Any comments received during the public comment period will be addresses and integrated into the EA as appropriate. Comments will be in the Project administrative record and available for public review.

5.3 Native American Consultation (Required)

Reclamation conducted Native American consultation throughout the public involvement process. Tribal consultation letters for the Draft EA were sent out to the Eastern Shoshone Tribe, the Northwestern Band of Shoshone Nation, and the Shoshone-Bannock Tribes of the Fort Hall Reservation of Idaho. In compliance with 36 CFR 800.4, Reclamation sent consultation letters with a determination of Adverse Effect to Historic Properties and a copy of the Class III Cultural Resource Inventory Report to the above tribes on July 11, 2018. This consultation was conducted in compliance with 36 CFR 800.2(c)(2) on a government-to-government basis. Through this effort, each tribe is given a reasonable opportunity to identify any concerns about historic properties; to advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance; to express their views on the

effects of the Proposed Action on such properties; and to participate in the mitigation of adverse effects. Reclamation has received no response from the consulted tribes to date.

5.4 Utah Geological Survey (Required)

The Utah Geological Survey was contacted on December 7, 2017. The assistant to the State Paleontologist reviewed the Project area and determined that there are no paleontological localities recorded and that the area has a low probability for paleontological resources.

5.5 Utah State Historic Preservation Office (Required)

A copy of the Class III Cultural Resource Inventory Report and a determination of historic properties affected for the Proposed Action were submitted to the SHPO on July 11, 2018. The SHPO concurred with Reclamation's determination of historic properties affected in a letter dated July 16, 2018.

5.6 U.S. Fish and Wildlife Service

The USFWS was contacted on November 29, 2017, and an IPaC report was obtained for the APE.

Chapter 6 Preparers

The following is a list of preparers who participated in the development of the EA. They include environmental summary preparers, Reclamation team members, and Federal, State and District members.

Table 6-1
Environmental Summary Preparers

Name	Title	Company
Ms. Lauren Ploeger	Senior Engineer, Writing, Editing	Franson Civil Engineers, Inc.
Mr. Lance Houser	Project Manager	Franson Civil Engineers, Inc.
Mr. Jon Baxter	Archeologist	Bighorn Archeological Consultants, LLC
Mr. Chris Jensen	Biologist, Wetlands	Canyon Environmental, LLC

Table 6-2
Reclamation Team Members

Name	Title	Resource
Jared Baxter	Fish and Wildlife Biologist, Reclamation Provo Area Office	Biological Resources
Rick Baxter	Water, Environmental, and Lands Division Manager, Reclamation Provo Area Office	Document Oversight
Peter Crookston	Environmental Group Chief, Reclamation Provo Area Office	NEPA Oversight
Thomas Davidowicz	Fish and Wildlife Biologist, Reclamation Provo Area Office	Biological Resources
Dale Hamilton	Resource Management Division Manager, Reclamation Provo Area Office	Health, Safety, Air Quality, and Noise
Jeff Hearty	Economist, Reclamation Provo Area Office	Socioeconomics

Name	Title	Resource
Linda Morrey	Secretary, Reclamation Provo Area Office	Writing, Editing
Rachel Musil	Civil Engineer, Reclamation Provo Area Office	Water Rights
Carley Smith	Archaeologist, Reclamation Provo Area Office	Cultural Resources, Paleontological Resources, Indian Trust Assets
Zachary Nelson	Archaeologist, Reclamation Provo Area Office	Cultural Resources, Paleontological Resources, Indian Trust Assets

Table 6-3
Federal, State or District Members

Name	Title	Company
Mr. Rick Reese	President	Benson Irrigation Company
Ms. Sarah Lindsey	Senior GIS Analysist	Utah Division of Wildlife Resources
Ms. Martha Hayden	Assistant State Paleontologist	Utah Geological Survey

Chapter 7 Acronyms and Abbreviations

Acronym/Abbreviations	Meaning
APE	Area of Potential Effect
BIA	Bureau of Indian Affairs
BIC	Benson Irrigation Company
BMP	Standard Reclamation Best Management Practices
CFR	Code of Federal Regulations
cfs	Cubic Feet Per Second
CWA	Clean Water Act
DEQ	State of Utah Department of Environmental Quality
DWR	State of Utah Division of Wildlife Resources
DWRi	State of Utah Division of Water Rights
EA	Environmental Assessment
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FOTG	Field Office Technical Guide
IPaC	Information for Planning and Consultation
MAGI	Mean Adjusted Gross Income
MBTA	Migratory Bird Treaty Act
MOA	Memorandum of Agreement
MS4	Municipal Separate Stormwater Sewer System
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O&M	Operation and Maintenance
PVC	Polyvinyl Chloride
Reclamation	U.S. Bureau of Reclamation
SHPO	Utah State Historic Preservation Office
SOP	Standard Operating Procedures
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
UAC	Utah Administrative Code
UMUTCD	Utah Manual of Uniform Traffic Control Devices
UPDES	Utah Pollutant Discharge Elimination System

Acronym/Abbreviations	Meaning
USFWS	U.S. Fish and Wildlife Service
USC	United States Code
ULT	Ute ladies'-tresses

Chapter 8 References

Baxter, Jon R. and Syanna T. Madsen, 2018. A Cultural Resource Inventory for the Proposed Benson Canal Piping Project in Benson, Cache County, Utah. Bighorn Archaeological Consultants, L.L.C. Orem, Utah.

Cache County Weed Control Policy 2016. https://www.cachecounty.org/assets/department/weed/PDFs/2016%20CACHE%20COUNTY%20WEED%20CONTROL%20POLICY.pdf

Federal Emergency Management Agency, Definitions of FEMA Flood Zone Designations. http://snmapmod.snco.us/fmm/document/fema-flood-zone-definitions.pdf

Federal Emergency Management Agency, Flood Map Service Center. Cache County Unincorporated Areas: Benson, Utah. https://msc.fema.gov/portal/search?AddressQuery=Benson%2C%20utah#searchresultsanchor

Gaddis, Erica, 2010. Middle Bear River and Cutler Reservoir Total Maximum Daily Load. SWCA Environmental Consultants. Salt Lake City, Utah.

Molina, Katerine N., "Seepage Evaluations in Cache Valley Irrigation Canals" (2008). *All Graduate Theses and Dissertations*. 424. https://digitalcommons.usu.edu/etd/424

Stewart, Williams. Lake Bonneville: Geology of Southern Cache Valley, United States Department of Interior, Geological Survey Professional Paper 257-C, United States Government Printing Office, Washington DC, 1962.

Utah Department of Environmental Quality, Interactive Map http://enviro.deq.utah.gov/

Utah Department of Environmental Quality, Area Designations: $PM_{2.5}$ State Implementation Plan Development, Utah Nonattainment Map, https://deq.utah.gov/legacy/pollutants/p/particulate-matter/pm25/areas.htm

Utah Geological and Mineral Survey, Map 73, Major Levels of Great Salt Lake and Lake Bonneville, May 1984 https://ugspub.nr.utah.gov/publications/maps/m-73.pdf

Utah Office of Administrative Rules, Utah Administrative Code: Rule R68-9. Utah Noxious Weed Act.

https://rules.utah.gov/publicat/code/r068/r068-009.htm

Utah Office of Administrative Rules, Utah Administrative Code: Rule R317-2-13. Classification of Waters of the State. https://rules.utah.gov/publicat/code/r317/r317-002.htm#T15

Utah Wildlife Action Plan Joint Team. 2015. Utah Wildlife Action Plan: A plan for managing native wildlife species and their habitats to help prevent listing under the Endangered Species Act. Publication Number 15-14. Utah Division of Wildlife Resources, Salt Lake City, Utah, USA.

U.S. Census Bureau, American Fact Finder. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

U.S. Department of Agriculture Natural Resources Conservation Service. Cache County Resource Assessment. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ut/technical/dma/nri/?cid=nrcs141p2_034107

U.S. Department of Agriculture Natural Resources Conservation Service Field Office Technical Guide. 2018. https://efotg.sc.egov.usda.gov/treemenuFS.aspx

U.S. Department of Agriculture Natural Resources Conservation Service Web Soil Survey https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

U.S. Department of Agriculture Soil Conservation Service and Forest Service in cooperation with Utah Agricultural Experiment Station, 1974. Soil Survey of Cache Valley Area, Utah Parts of Cache and Box Elder Counties.

U.S. Environmental Protection Agency. NAAQS Table. https://www.epa.gov/criteria-air-pollutants/naaqs-table

U.S. Fish and Wildlife Service, National Wetlands Inventory: Wetlands Mapper. https://www.fws.gov/wetlands/Data/Mapper.html

U.S. Fish and Wildlife Service, Endangered Species Act of 1973 (16 USC 1531-1544, 87 Stat.884). https://www.fws.gov/laws/lawsdigest/ESACT.HTML

Chapter 9 Appendices

Appendix A - Public Comments

Summary of 30-day Public Comment Period

Appendix B - FEMA Flood Map

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 12. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical **datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided by Cache County, Utah, Development Services - 2010.

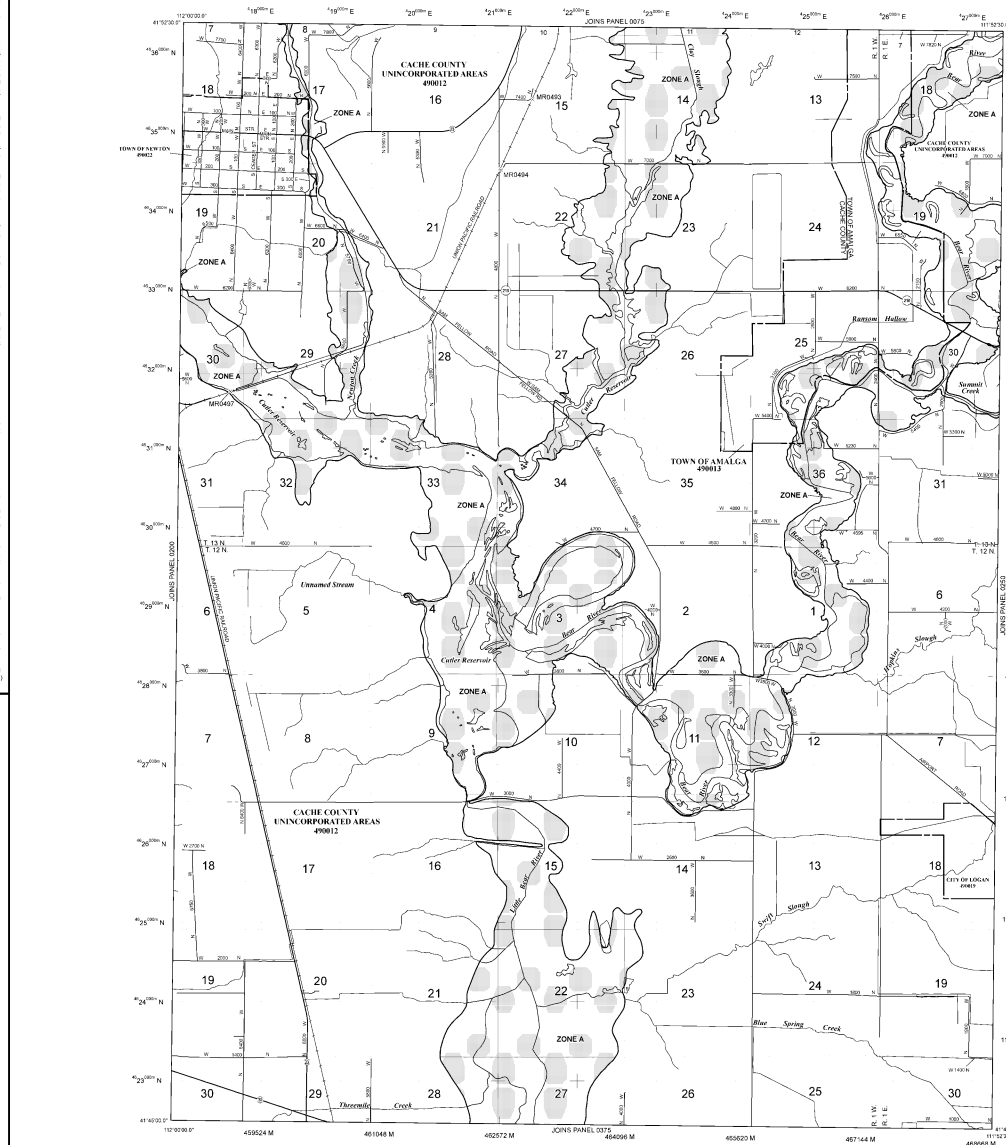
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call 1-**877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equalled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, A1-A30, V1-V30, VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A — No Base Flood Elevations determined.

ZONE AE — Base Flood Elevations determined.

ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachments so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4276000 N — 1000-meter Universal Transverse Mercator grid ticks, zone 12
- 6000000 M — 5000-foot grid ticks: Utah State Plane coordinate system, north zone (FIPSZONE 4301), Lambert Conformal Conic
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
May 24, 2011
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'
1000 0 2000 4000 FEET
600 0 600 1200 METERS

NFIP

PANEL 0225C

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CACHE COUNTY, UTAH AND INCORPORATED AREAS

PANEL 225 OF 800
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CACHE COUNTY	490012	0225	C
AMALGA, TOWN OF	490013	0225	C
LOGAN, CITY OF	490015	0225	C
NEWTON, TOWN OF	490022	0225	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
49005C0225C

EFFECTIVE DATE
MAY 24, 2011

Federal Emergency Management Agency

Appendix C - Wetland Delineation Report

Canyon Environmental, LLC

Canyon Environmental
2562 N 320 E
Provo, UT 84604
Phone: 801.602.6883
www.canyonenvironmental.com

June 6, 2018

Lauren Ploeger, P.E.
Senior Engineer
Franson Civil Engineers
1276 South 820 East, Suite 100, American Fork, Utah 84003
T: 801.756.0309 | F: 801.756.0481

Subject: Wetland Delineation for the Benson Canal System

Dear Ms. Ploeger:

Canyon Environmental has conducted a wetland evaluation and associated delineation for the Benson Canal Water Line Replacement Project. The identification, assessment, and delineation were conducted in order to comply with requirements set forth by State and Federal Regulations. This letter report represents the findings of the field study and wetlands evaluation.

Proposed Project

The proposed project comprises the placement of a buried pipeline to replace existing open-air irrigation canal and ditch segments that currently exists within and without the incorporated area of Benson in Cache Valley, to the east of the Bear River. The proposed pipeline project will remain within the existing canal and irrigation ditch rights-of-way and is primarily located on private parcels that are adjacent to existing county roads. Additional staging areas and proposed water storage pond areas were also identified and evaluated.

Habitat in the area can best be categorized as agricultural land within the Bear River drainage of Cache Valley. The proposed project area has been used for agricultural purposes from the 1850s to the present. Native habitat would have been predominantly comprised of sage brush steppe species. However, extensive anthropogenic changes and the introduction of feedstock grasses have significantly changed the landscape. Predominant grasses and ground cover consisted of crested wheat, alfa-alfa, and other feedstock grasses. Tree species were dominated by cottonwood and some Russian Olive, as well as a host of non-native species that were observed in private yards.

Existing man-made features in the project area and surrounding areas include, paved asphalt roadways, graded gravel roads, dirt two-track roads, residential homes, commercial buildings, floodgates within the irrigation canal, signage, livestock fencing, cattle guards, and overhead power and communications distribution lines.

Methods

The project area was initially evaluated through aerial photographs, GIS data layers and other information from the US Army Corps of Engineers. A physical evaluated of the project area was conducted via a pedestrian survey on May 11, 2018. The project areas and nearby adjoining areas were evaluated for the presence of potential wetlands. An approximate 150 foot corridor was assessed for proposed canal segments when possible. For areas that were located on private lands and permission could not be obtained, canal segments were observed from the nearest public right-of-way. A Trimble GPS unit was used to record data points and field notes were taken using the prescribed methods outlined for wetland identification and delineation in the US Army Corps of Engineers Manual.

Hydrology

Hydrology in Cache Valley is heavily influenced by the Bear River flowing into the valley from the north and the Logan River, which flows into the valley from the east. The two rivers converge in the valley, forming a large marshy area to the west and north of Benson, and then flow northeast into Cutler Reservoir and into the Great Salt Lake.

The capture of irrigation water commences on the east side of the valley and canal systems move water throughout the valley in a generally north and west direction. The project area and proposed improvement project is located at the terminus of the canal system, before the remaining water exits the canal system and flows back into the combined Logan and Bear River confluence area. Water seepage from the canal and associated irrigation ditches is the primary source of hydrology in the area, and accounts for the infill of low gradient locations across the project area. These areas of low gradient include roadside borrow pits and areas adjacent to the canal and existing distribution system.

Field Inventory

Based upon information obtained from the US Army Corps of Engineers and soil survey data (USDA), large portions of the proposed project were identified as containing wet meadows, as well as flowing water bodies that corroborated the with the existing canal system. Staging areas, proposed storage ponds, and the buried canal segments were evaluated for wetland characteristics.

The project area is in a highly transformed area that has been used for agricultural crops and livestock pastures for decades. Accordingly, ditch segments and borrow pits along existing roads contained wetland plants throughout the project area. Additionally, the earthen canal appears to have degraded in many places and seepage water from the canal system has transferred into adjacent areas of lower gradient throughout the irrigation system. These areas were not evaluated for the proposed project as their hydrology is linked to the canal system and the presences of these roadside wetlands are incidental to and dependent upon the canal system.

Three separate wetland areas were identified during the field assessment and are described below:

Wetland 1

The identified wetland is an emergent freshwater meadow (PEMB) comprising approximately 2.2 acres in size that is situated in a flat pasture to the south of the Airport Road. Dominant vegetation in the wet meadow included obligate species (OBL) and facultative species (FACW) such as arrowgrass (*Triglochin maritima L.*), Johnsongrass (*Sorghum halepense*), Bermuda grass (*Cynodon dactylon*) and other similar species.

The adjacent upland consisted of a livestock pasture with feedstock grasses. No trees were identified near the wet meadow. The upland transition was abrupt with no additional transitionary vegetation.

The primary source of water for the wetland appears to be subsurface flow and seepage from existing canal irrigation systems, and saturated soil conditions were observed within the identified wetland area. Standing water was not identified during the field inventory. The meadow slopes gently toward the north and west and terminates at the Airport Road boundary, where seasonal spring flooding appears to occur. Hydrology indicators comprising soil color changes were observed along the boundary of the wetland – which are indicative of seasonal fluctuations and the potential for standing water during the early spring season.

Soils in the wetland area are identified as Salt Lake Silty Clay, which is comprised of very poorly drained soils derived lacustrine deposits that is frequently inundated. Soils in the wet meadow exhibited hydric characteristics. Upland soils were dry silty loam. No hydric features were identified in the upland soils.

Wetland 2

The identified wetland is an emergent freshwater meadow (PEMB) comprising approximately 4 acres in size that is situated in a flat pasture to the south of the airport and to the north of Airport Road. The Benson Canal runs along the east side of the wetland area. Dominant vegetation in the wet meadow included obligate species (OBL) and facultative species (FACW) such as bulrush (Typha latifolia), sedges (Cyperaceae spp.), spikerush (Eleocharis spp.), shallow sedge (Carex lurida), arrowgrass (Triglochin maritima L.), Johnsongrass (Sorghum halepense), Bermuda grass (Cynodon dactylon) and other similar species.

The adjacent upland consisted of a livestock pasture with feedstock grasses. No trees were identified near the wet meadow. The upland transition was abrupt with no additional transitionary vegetation.

The primary source of water for the wetland appears to be subsurface flow and seepage from existing canal irrigation systems, and saturated soil conditions were observed within the identified wetland area. Standing water was identified during the field inventory. The meadow slopes gently toward the north and west. Hydrology indicators comprising soil color changes were observed along the boundary of the wetland – which is indicative of seasonal fluctuations and the potential for standing water during the early spring season – which was observed during the inventory.

Soils in the wetland area are identified as Salt Lake Silty Clay, which is comprised of very poorly drained soils derived lacustrine deposits that is frequently inundated. Soils in the wet meadow exhibited hydric characteristics. Upland soils were dry silty loam. No hydric features were identified in the upland soils.

Wetland 3

The identified wetland is a riverine emergent wetland located in a flooded area adjacent to an irrigation ditch. The wetland area is located on the south of 2600 North and the irrigation ditch flows south. The identified wetland area is approximately 0.018 acres in size. Dominant vegetation in the wet meadow included obligate species (OBL) and facultative species (FACW) such as bulrush (Typha latifolia), sedges (Cyperaceae spp.), spikerush (Eleocharis spp, arrowgrass (Triglochin maritima L.), and other similar species. Russian olive was also noted along the bank of the ditch. The wetland area is contained within a wide shallow area bordering the irrigation canal. Soil profiles were not collected due to land-owner considerations.

The Web Soil Survey identifies soils in the area as Jordan Silty Clay Loam, which is somewhat poorly drained soil associated with inundated and wetland areas. Soils in the wetland area appeared wet and moist. This wetland area is contained within the irrigation canal channel – which appears to have degraded and expanded over time to infill a larger area. The expansion of the canal channel appears to be associated with seasonal flooding and slow degradation of the bank over time. The channel is contained by an elevated pasture to the east and small elevated hill to the west, where a residence is situated.

Conclusions and Recommendations: The proposed project is located in the Middle Rocky Mountains Physiographic Province, which is characterized by rolling hills, plains, and alluvial floodplains. Specifically, the project is located within Cache Valley to the east of Logan, between the Bear River to the north and the Logan River to the south. Local hydrology is the result of years of irrigation practices that have resulted in the existing canal and ditch irrigation system. Habitat for the proposed project can best be described as livestock pastures and agricultural cropland.

A search of the Utah Natural Diversity Database and relevant information with the U.S. Fish and Wildlife did not identify any critical habitat for listed species in the project area or in the nearby vicinity. The identified wetlands are of good quality and are contained within existing functional livestock pastures.

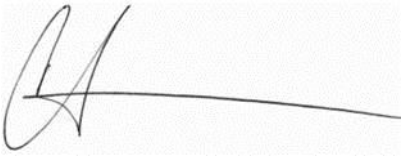
Hydrology and topography of the identified wetlands appeared to indicate that any surface flows likely flow in a generally westerly direction. Accordingly, steps should be taken to ensure that activities occurring during the development phase of the project have adequate engineering controls and measures to mitigate potential impacts to the nearby wetland areas. These measures could include:

- Silt fencing - to ensure that soil removal and excavation activities are not being deposited in the wetland areas.
- Dust control – to ensure that dispersed soils do not migrate to the nearby wetland areas.

- Clear identification of access limitations and project boundaries – to ensure that personnel and equipment do not inadvertently impact wetland areas.
- Other actions as determined through project design and consultation with agencies.

In our professional opinion, two locations qualify as emergent wet meadow wetlands and one location qualifies as a riverine emergent wetland pursuant to guidance from the Army Corps of Engineers' 1987 Manual and 2008 Arid West Regional Supplement. Accordingly, project considerations should include adequate measures to ensure the impacts to the identified wetlands are avoided and/or mitigated appropriately.

Sincerely,



Chris Jensen
Canyon Environmental

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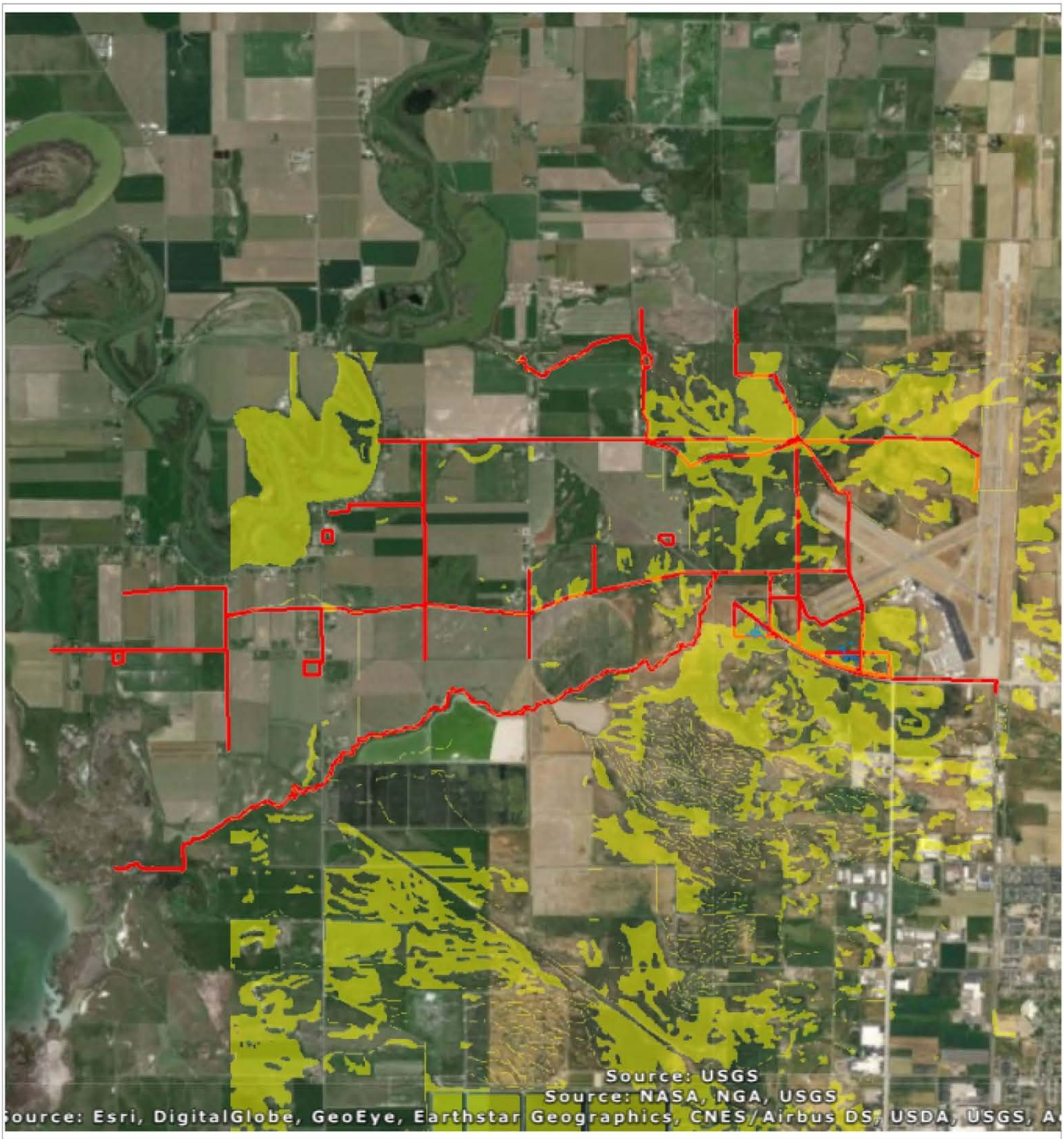
APPENDIX A
(Project Maps)



Aerial Image

Benson Canal Replacement

Cache County, UT

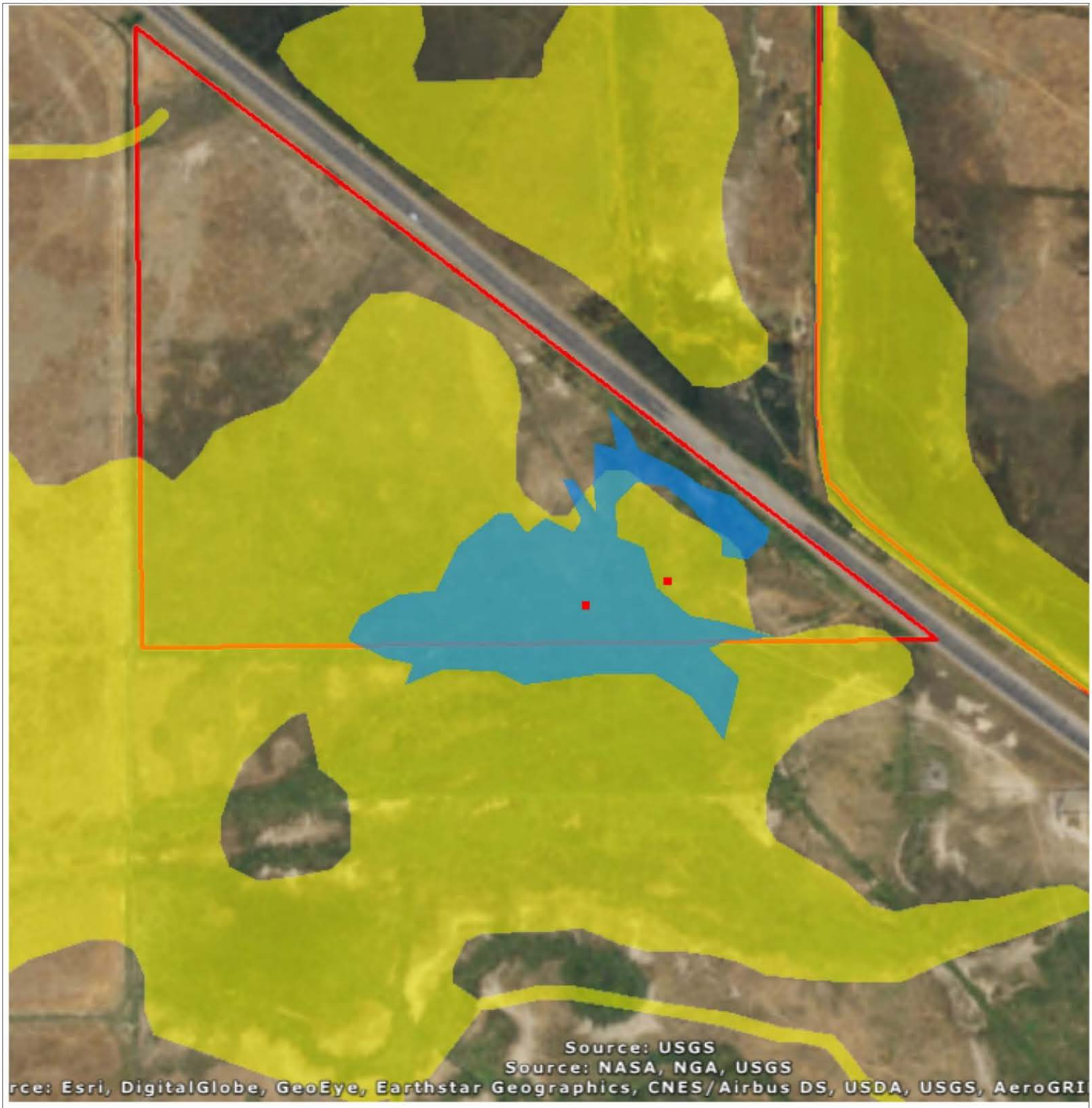
Canyon Environmental, LLC

Project Area

Wetland

National Wetlands

Project Area



Aerial Image

Benson Canal Replacement

Cache County, UT

Canyon Environmental, LLC

Project Area
Wetland
Soil Profile
National Wetlands

Wetland 1

Aerial Image

Benson Canal Replacement

Cache County, UT

Canyon Environmental, LLC

Project Area
Wetland
Soil Profile
National Wetlands

Wetland 2

Aerial Image

Benson Canal Replacement

Cache County, UT

Canyon Environmental, LLC

Project Area
Wetland
Soil Profile
National Wetlands

Wetland 3

Soil Map—Cache Valley Area, Parts of Cache and Box Elder Counties, Utah

Map Scale: 1:1,540 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cache Valley Area, Parts of Cache and Box Elder Counties, Utah
Survey Area Data: Version 10, Sep 6, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

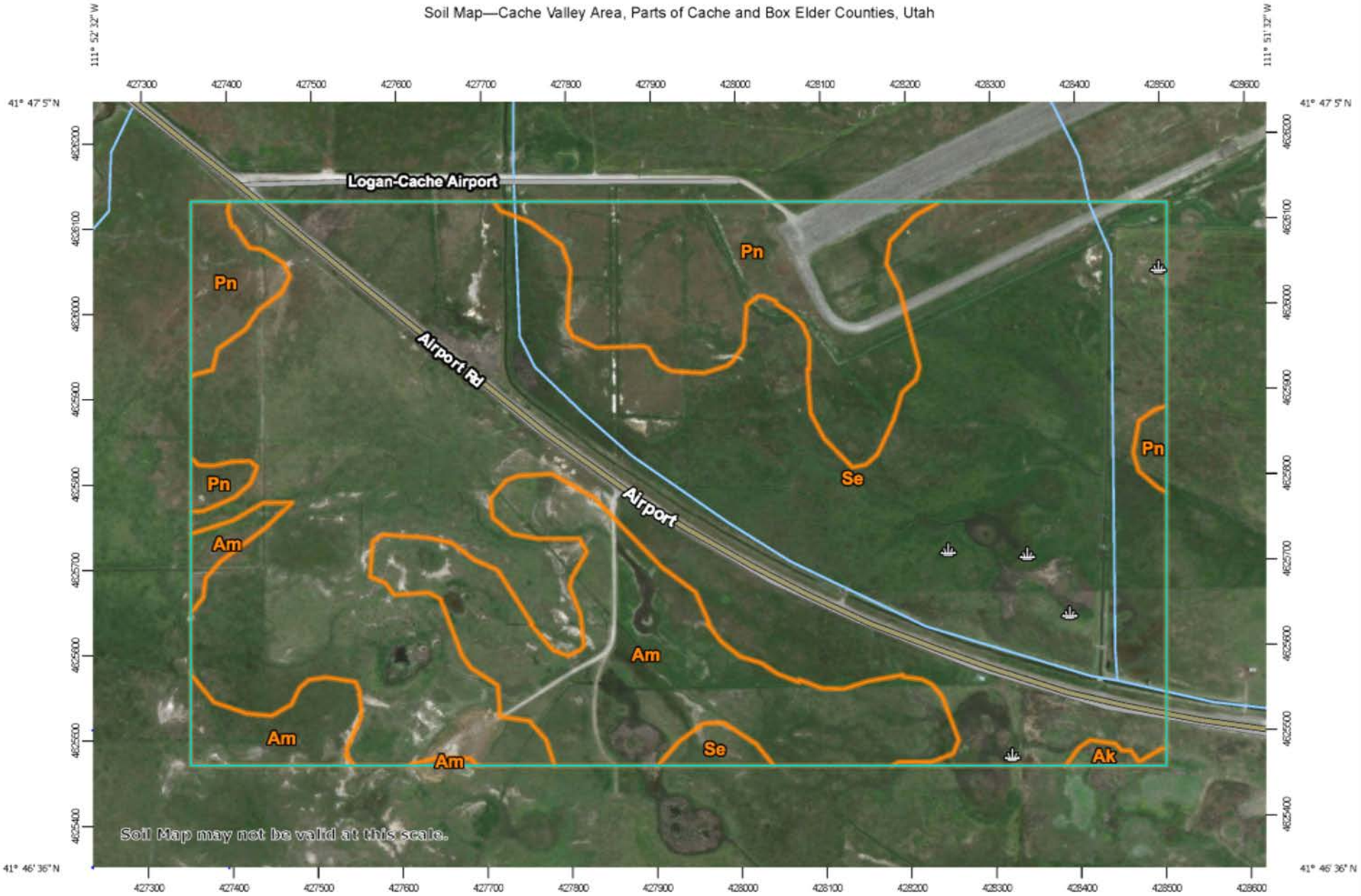
Date(s) aerial images were photographed: May 22, 2005—Nov 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Jo	JORDAN SILTY CLAY LOAM	7.2	59.3%
Ln	LEWISTON FINE SANDY LOAM	1.9	15.5%
Lo	LEWISTON FINE SANDY LOAM, STRONGLY ALKALI	3.1	25.3%
Totals for Area of Interest		**12.1**	**100.0%**

Soil Map—Cache Valley Area, Parts of Cache and Box Elder Counties, Utah



Map Scale: 1:6,320 if printed on A landscape (11" x 8.5") sheet.

Meters: 0 50 100 200 300

Feet: 0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
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- Gravelly Spot
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- Rock Outcrop
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- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

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Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cache Valley Area, Parts of Cache and Box Elder Counties, Utah
Survey Area Data: Version 10, Sep 6, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 22, 2005—Nov 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ak	AIRPORT SILTY CLAY LOAM	0.6	0.3%
Am	AIRPORT-SALT LAKE COMPLEX	29.3	15.5%
Pn	PAYSON SILT LOAM	25.3	13.4%
Se	SALT LAKE SILTY CLAY	133.6	70.8%
Totals for Area of Interest		**188.7**	**100.0%**

APPENDIX B
(Site Photos)

SITE: Benson Canal Replacement	
Photograph 1 View of canal channel near the Airport Road. View looking southwest.	
Photograph 2 View of wetland 1 looking west.	

SITE: Benson Canal Replacement	
Photograph 3 Hydric soil conditions – Wetland 1.	
Photograph 4 Upland soil conditions – Wetland 1	

SITE: Benson Canal Replacement	
Photograph 6 View of project area looking east and seasonal flooding due to spring conditions.	
Photograph 7 Overview of wetland 2 looking west.	

SITE: **Benson Canal Replacement**	
Photograph 8 Wetland 2 hydric soils.	
Photograph 9 Wetland 3 looking south. (This wetland is not within the project area, but is adjacent to the proposed pipeline corridor.)	

SITE: Benson Canal Replacement	
Photograph 10 Spring flooding conditions of the canal near the airport. Looking north.	
Photograph 11 View of canal segment looking north.	

SITE: Benson Canal Replacement	
Photograph 12 Irrigation system segment that will be converted to pipe.	
Photograph 13 View of the Bear River – located near the western edge of the proposed project area.