



# ALPINE AQUEDUCT REACH 1



REPLACEMENT &  
RESILIENCY PROJECT

FINDING OF NO  
SIGNIFICANT IMPACTS  
AND  
FINAL ENVIRONMENTAL  
ASSESSMENT





**United States Department of the Interior  
Central Utah Completion Act Office**

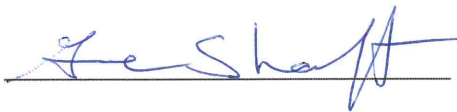
**Central Utah Water Conservancy District**

**Finding of No Significant Impact**

**Alpine Aqueduct Reach 1 Replacement & Resiliency Project**

**November 2022**

Recommended by:

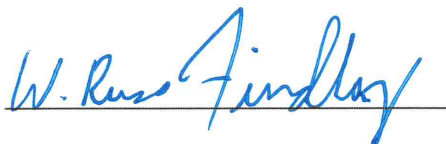


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# **FINDING OF NO SIGNIFICANT IMPACT**

## **Alpine Aqueduct Reach 1 Replacement & Resiliency Project**

In accordance with Section 102(2)(c) of the National Environmental Policy Act (NEPA), as amended, the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and the U.S. Department of the Interior regulations for implementation of NEPA (43 CFR Part 46), the U.S. Department of the Interior Central Utah Project Completion Act Office (Interior) and the Central Utah Water Conservancy District (District), find that the Preferred Alternative analyzed in the Final Environmental Assessment (Final EA) for the Alpine Aqueduct Reach 1 Replacement & Resiliency Project (Project) would not significantly affect the quality of the natural or human environment. Therefore, an Environmental Impact Statement is not required for the proposed Project.

### **Project Area**

The project is located in northeast Orem, west of Provo Canyon, within the Bonneville Unit of the Central Utah Project. The federally owned and District operated Alpine Aqueduct conveys water from the 10 MG Olmsted Reservoir to approximately half of Utah's population along the Wasatch Front through its three reaches: Reach 1, which connects to the Don A. Christiansen Regional Water Treatment Plant (DACRWTP) and into the Jordan Aqueduct near the DACRWTP; Reach 2, which delivers treated water from the DACRWTP to Orem and Provo; and Reach 3, which delivers untreated water to water treatment plants in Salt Lake County and to cities for use in their secondary pressurized irrigation systems in northern Utah County. This project involves Reach 1 (AA-1). The project study area is shown in Figure 1-4 of the Final EA.

### **Alternatives**

#### **No Action Alternative**

The No Action Alternative has been developed in accordance with CEQ guidelines to provide a comparison with the Preferred Alternative. Under the No Action Alternative, the AA-1 pipeline would remain in place. The pipeline would continue to require extensive ongoing maintenance and repair to remain operational and its location poses a high failure hazard because of landslide movement and the potential for a seismic event.

#### **Preferred Alternative**

The Preferred Alternative refers to the alternative that would best accomplish the Project's purpose and need (43 CFR §46.420(d)). The Preferred Alternative would utilize the existing Alpine Tunnel and construct a new 1,100-foot-long tunnel running southward from the Alpine Tunnel outlet at the west end. From the end of the new tunnel there would be 750 feet of open cut construction for the pipeline to the intersection near 1060 North/1560 East in Orem. The realigned AA-1 pipeline would run west under 1060 North, turn north onto 1360 East, and continue through the former Cascade Golf Course toward Orem City's storage tanks before terminating at the DACRWTP.

The following are alternate variations on how to reach the Preferred Alternative's alignment northeast of 1060 North.

#### **Variation A**

Variation A would construct the new AA-1 pipeline beginning at the Alpine Tunnel outlet portal to an area east of 1060 North using open cut construction. The new AA-1 pipeline would be constructed along a steep slope which would require it to be rock bolted to the hillside to anchor the new pipe in place. The pipe would also be encased in reinforced concrete to protect and secure it.



## Variation B

Variation B would include boring a new tunnel that would intersect the existing Alpine Tunnel near its midpoint and terminate at an area east of 1060 North. The pipeline would be installed within the tunnel. The lower portion of the Alpine Tunnel would be abandoned.

## Variation C

Variation C would include boring a new tunnel beginning near the inlet to the Alpine Tunnel directly west of the 10 million-gallon (MG) Olmsted Reservoir to an area east of 1060 North. The existing Alpine Tunnel would be abandoned.

The Preferred Alternative and its variations are shown in Figure 2-2 in the Final EA.

## Need for the Proposed Action

The need for the Project is to increase the physical integrity, functionality, and long-term viability of the AA-1 pipeline, which is the transmission line for a critical water supply.

## Purpose for the Proposed Action

The purposes of the Project are:

1. Continue to provide Bonneville Unit's M&I System water to Orem, Provo, and northern Utah and Salt Lake Counties along the Wasatch Front by maintaining continual service during seismic and non-seismic events.
2. Prevent catastrophic damage to adjacent residential areas and the environment due to pipe failure.
3. Increase the reliability and resiliency of the AA-1 pipeline.
4. Increase seismic design performance to provide for continued operation of the DACRWTP. In addition, the AA-1 pipeline provides a critical water supply to the JWTP and POMWTP located in the Salt Lake Valley.
5. Reduce operation, maintenance, and repair (OM&R) costs associated with AA-1 pipeline.

## Findings

The finding of no significant impact (FONSI) is based on the analysis presented in the Final EA and the summary of impacts in Table 1.

*Table 1. Summary of Impacts.*

Resource	Cumulative Impact (Yes/No)	Rationale
Air Quality	No	Temporary impacts
Climate Change	No	Temporary impacts
Cultural Resources	No	No impacts
Geological Hazards	No	Unavoidable crossing of WFZ
Groundwater and Subsurface Water	No	No impacts
Indian Trust Assets	No	No impacts
Public Health and Safety	No	Temporary impacts
Socioeconomics	No	No impacts
Soils	No	Temporary impacts

Resource	Cumulative Impact (Yes/No)	Rationale
Threatened and Endangered Species	No	No impacts
Transportation and Utilities	No	Temporary impacts
Vegetation and Invasive Species	No	Temporary impacts
Visual Resources	No	Temporary impacts
Wildlife	No	Temporary impacts

The effects determinations for threatened, endangered, and candidate species in regard to the Preferred Alternative are summarized in Table 2.

*Table 2. Threatened, Endangered, and Candidate Species Determination.*

Species	Status	Occurrence in the Study Area	Determination
Yellow-billed cuckoo ( <i>Coccyzus americanus</i> )	Threatened	Although there is suitable habitat within 0.5 miles of the study area, there are no documented occurrences of yellow-billed cuckoo within 2 miles.	No effect
June sucker ( <i>Chasmistes liorus</i> )	Threatened	There is no potential for the June sucker species to occur in the study area.	No effect
Canada lynx ( <i>Lynx canadensis</i> )	Threatened	No suitable habitat and no documented occurrences within or near the study area have been recorded. Therefore, this species is not found in or near the study area.	No effect
Monarch Butterfly ( <i>Danaus plexippus</i> )	Candidate	A milkweed obligate species. There are many species of milkweed that grow in a variety of habitat types, including those found in the study area. It is possible this species could occur in and near the study area.	No effect

The Preferred Alternative does not violate federal, state, or local laws or requirements imposed for the protection of the environment. The Interior and the District have analyzed the public comments, alternatives, and environmental effects in detail and find that the Preferred Alternative meets the purpose and need described in the Final EA with no significant impacts to the natural or human environment.

## Decision

Interior and the District have decided to implement the Preferred Alternative as described in the Final EA. The JLAs evaluated the Preferred Alternative which included an approximately 1,100-foot-long tunnel beginning at the existing Alpine Tunnel outlet portal on the eastern part of the Alpine Aqueduct Reach 1 alignment. Also, three variations of the pipelines proposed alignment in the eastern part of the Project were evaluated - two longer tunnels and one open cut option along the steep hillside (See Figure 2-4 in the Final EA). Additional geotechnical investigations will be conducted as part of the design and will be used to verify the feasibility of constructing the new 1,100-foot-long tunnel as part of the Preferred Alternative.

If it is determined through the geotechnical investigation that the 1,100-foot-long tunnel alignment is not feasible, the other alignments that were analyzed would be further investigated. It has been determined through the EA process that there would be no significant environmental impacts from any one of the variations.

## **Environmental Commitments**

Proactive measures would be implemented to avoid or prevent adverse impacts that could otherwise result from project measures. In addition to Best Management Practices (BMPs), the following mitigation commitments for air quality, climate change, cultural resources, geological hazards, groundwater and subsurface water, hazardous wastes, invasive species, noise and vibration, soils and vegetation, transportation and utilities and wildlife, would be part of the construction contract.

### **Air Quality**

BMPs would be employed during construction to mitigate for temporary impacts on air quality due to construction related activities. The BMPs may include:

- The application of dust suppressants and watering to control fugitive dust.
- Minimizing the extent of disturbed surfaces.
- Restricting earthwork activities during times of high wind.
- Establishing appropriate construction zone areas and stabilizing exits to reduce soil track-out onto the adjacent roadways.
- Slower speed limits on access roads to limit the amount of dust.
- If sediment is tracked off-site onto adjacent roadways, the sediment would be collected by sweeping and/or shoveling and disposed of in a stable location.
- Material stockpiles would be wetted to prevent wind-blown emissions.
- Vegetative cover would be established on bare ground as soon as possible after grading to reduce wind-blown dust.
- Use of properly operating well-maintained construction equipment.

### **Climate Change**

BMPs would be employed during construction to mitigate for temporary impacts on climate change due to construction-related activities. The BMPs may include requirement of appropriate emission-control devices on all construction equipment.

### **Cultural Resources**

Construction activities could have the potential to discover previous, unknown, cultural resources or Native American artifacts. In the event of a discovery, construction activity would be suspended, a treatment plan developed immediately, and coordination with State Historic Preservation Office (SHPO).

### **Geological Hazards**

Design considerations for crossing the WFZ must be accommodated by movement in the pipeline, or the surrounding ground as opposed to resisting the movement through force. Some methods include increasing pipe wall thickness, using welded steel pipe, pipe yielding, pipe stacking (zig-zag configuration across the fault so that the pipe can expand and contract during an earthquake), designing around pipe strain limits, and providing movable and yielding backfill around the pipeline. Recommendations also include a soil/pipe structural analysis to identify and confirm reasonable design and mitigation approaches (Jacobs 2020).



## **Groundwater and Subsurface Water**

The JLAs would investigate the presence of subsurface water that may exist along the Preferred Alternative alignment – specifically along 1060 North and 1360 East. If it is determined that corrective measures are needed so that the Project does not increase subsurface flows, the JLAs would incorporate corrective measures as part of the Project and coordinate authorizations and necessary permits with Orem City.

## **Hazardous Wastes**

BMPs would be employed during construction to mitigate for hazardous wastes due to construction-related activities. The BMPs may include:

- All hazardous waste materials, including wastes, petroleum products, and solid wastes, would be handled, stored, and disposed of in conformance with federal and state regulations to prevent soil, groundwater, or surface water contamination.
- The Utah Division of Environmental Response and Remediation (DERR) would be contacted immediately if any contaminated soil or hazardous material is discovered during construction, including petroleum hydrocarbons or other previously unidentified hazardous materials or contaminated soils. The appropriate characterization and handling of the material would be conducted in accordance with DERR guidance.
- Absorbent pads or sheets would be readily available onsite. If onsite maintenance of construction equipment is required, absorbent pads would be placed under likely leak or spill sources. Mitigation for incidental spills or leaks of hydraulic fluid or diesel fuel from construction equipment would be implemented, including cleaning up the spill immediately, removing contaminated soil from the site, and properly disposing of it in conformance with federal and state regulations.

## **Invasive Species**

BMPs would be employed during construction to mitigate for invasive species due to construction-related activities. The BMPs may include:

- Weed removal or reseeding after construction would be applied as required by landowners.
- BMPs would be utilized during construction and the District's Integrated Pest Management Plan would be implemented after construction for ongoing monitoring and treatment of invasive species.

## **Noise and Vibration**

BMPs would be employed during construction to mitigate for noise and vibration due to construction-related activities. The BMPs may include:

- The JLAs would comply with applicable federal, state, and local laws, orders, and regulations concerning the prevention, control, and abatement of excessive noise and vibration.
- The contractor may be required to monitor for vibration when construction activities are within city streets and near residential dwellings.
- Prior to construction activities, the existing condition of foundations, basements, and other structural features along the Preferred Alternative alignment would be documented via photos and video methods and may include exterior and interior of the structures. Any damage to adjacent properties that are a result of the pipeline construction would be mitigated by the selected contractor.

## **Public Safety and Health**

BMPs would be implemented to minimize the potential for risk and safety concerns during construction in the residential streets. The BMPs may include:

- At all times, construction fencing would be around the perimeter of construction zones to warn and keep out non-construction persons.
- Cover all open trenches with heavy metal plates outside of construction times.
- Use of orange construction signs warning of risk.
- A public information plan would be prepared and distributed, including project schedule, status, utility disruptions, and contact information.
- Construction traffic would maintain minimum driving speeds within residential neighborhoods.

## **Soils and Vegetation**

The following BMPs would be implemented to minimize the potential for soil erosion, particularly in areas with steep slopes within all alignments:

- Erosion-control measures would be installed as necessary immediately during and after construction to control and minimize erosion and runoff; including but not limited to silt fencing, straw bales, application of gravel or riprap, and minimization of disturbed vegetated areas.
- Topsoil and excavated soil would be salvaged and stockpiled adjacent to trenching activities and used to fill in the open trenches as soon as possible upon completion of pipe installation.
- Where compatible with land use, disturbed areas would be reseeded to stabilize soils and reduce erosion with native vegetation.
- A Stormwater Pollution Prevention Plan (SWPPP) would be prepared in compliance with Section 402 of the Clean Water Act (CWA); which would describe measures to minimize erosion and soils from leaving the Project site during construction activities.
- The Preferred Alternative and alignment variations would avoid the landslide complex. The Preferred Alternative would be designed to current seismic standards for the 975-year event. More information regarding the design techniques used for crossing seismic zones is found in Section 2.5.1 in Chapter 2.
- If vegetation is removed during the migratory bird breeding season (April 1 – July 15), a qualified biologist would conduct nesting surveys within the construction footprint and within 100-foot buffer zone, no more than 7-days prior to ground disturbing activities, to verify that no migratory birds are nesting in the vegetation to be removed. The surveys would be conducted in consultation with USFWS.
- Disturbed areas would be reseeded with native vegetation including appropriate seed mix species for the Monarch butterfly (where applicable), and the District's Integrated Pest Management Plan would be implemented after construction for ongoing monitoring and treatment of invasive species.
- Additional geotechnical testing would be performed in conjunction with the Project's design phase.

## **Threatened and Endangered Species**

The natural areas that are disturbed by construction would be reseeded with a native seed mix that benefits the Monarch butterfly. The USFWS would be consulted to determine the appropriate species to include in the seed mix to provide floral resources throughout the breeding and migration season for Monarch butterfly.

## **Transportation and Utilities**

BMPs would be required by the contractor during construction to mitigate for expected transportation impacts including:

- Where possible, the use of residential urban streets for construction haul routes would be minimized.
- Traffic control plans would be developed in coordination with Orem City and Utah Department of Transportation (UDOT) to minimize impacts to the public.
- A public information plan would be prepared and distributed, including project schedule, status, utility disruptions, and contact information.
- Advance notice for road closures, detours, and delays would be provided.
- Access to residences would be maintained as possible. Although vehicle access to driveways would be restricted for likely several weeks, walk-in and emergency access would be provided.
- Detailed inventory of utilities and utility providers would be prepared to minimize disruption in utility service.

## **Wildlife**

The following mitigations would be implemented to minimize disturbance to migratory birds and raptors caused by construction:

- All vegetation in the construction area would be cleared and grubbed outside the nesting season for most migratory birds (April 1 – July 15).
- Construction activities, including storing equipment and parking vehicles, would not take place within 0.5 miles of any red-tailed hawk nests or during the seasonal buffer for the nesting season (March 15 – August 15).
- A survey would be conducted for peregrine falcon nests to verify whether or not they are nesting and if so, construction activities would not occur during the seasonal buffer (April 1 – August 31).
- If construction activities cannot comply with these mitigation recommendations, the USFWS would be consulted to determine other methods for minimizing impacts.

## **Public Comment and Review**

The Joint Lead Agencies released the Draft EA on Monday, August 1, 2022, for public and agency review. The public and agency review period ended Friday, September 9, 2022. Activities used to notify the public and agencies of the release of the Draft EA consisted of:

- Letters mailed to Orem residents located near the study area.
- Legal notices in local newspapers
- Four email updates to stakeholder database were sent during the comment period.
- Updated the project website with a copy of the Draft EA along with a means to provide comments.
- Social media posts were published on Orem City's page and the District's pages during the comment period.
- Presentation at the Orem City Council meeting on August 23, 2022.



## **Public Meetings**

An in person public scoping meeting was held on Tuesday, November 30, 2021 at the District's office to present overall project information, answer questions, and gather public input. Twenty-four people attended the meeting in addition to the project team.

Another public meeting was held on August 30, 2022 at the District's office to present the Draft EA, answer questions, and gather public input. Seven households attended the meeting in addition to the project team.

## **Comments Received**

Eleven comments were received during the scoping period which are found and responded to in Table 4-2 in the Final EA. A total of five comments were received on the Draft EA and are found and responded to in Table 4-3 in the Final EA. Comments were received from local residents.

The comments received were carefully considered and reviewed together with the information contained in the Draft EA in determining whether to issue a FONSI.

## **Tribal Consultation**

Interior sent letters requesting consultation for the Project on potential properties of religions or cultural importance to Native American Tribal Governments and Bureau of Indian Affairs Agency Offices on November 15, 2021. The Hopi Cultural Preservation Office and the Navajo Nation responded. The Hopi Tribe requests that if the cultural resource survey identifies prehistoric sites that may be adversely affected by the Project, to consult with them. No prehistoric sites were identified. The Navajo Nation responded that the project could continue without further coordination with them. Additionally, if any Native American human remains or funerary objects are discovered during construction, to immediately stop construction and report the findings.

The Native American Tribes were notified of the release on the Draft EA, the public information meeting date and time, and the comment period. No responses were received.

More information on public and agency public involvement process is found in Section 4.1 of the Final EA.

The Final EA and FONSI are available on the internet at [www.doi.gov/cupcao](http://www.doi.gov/cupcao) and [www.cuwcd.com/alpineaqueduct.html](http://www.cuwcd.com/alpineaqueduct.html). Copies of the Final EA and FONSI are available on request by contacting:

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# **Alpine Aqueduct Reach 1 Replacement & Resiliency Project**

## **FINAL ENVIRONMENTAL ASSESSMENT**



**November 2022**

**Joint Lead Agencies:**

U.S. Department of the Interior, Central Utah Project Completion Act Office  
Central Utah Water Conservancy District

**Cooperating Agencies:**

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# 1 Introduction

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The Central Utah Water Conservancy District (District) and the U.S. Department of the Interior, Central Utah Project Completion Act Office (Interior) are evaluating alternatives to increase the resiliency and reliability of the Alpine Aqueduct Reach 1 (AA-1). The District and Interior, as Joint Lead Agencies (JLAs), have initiated an Environmental Assessment (EA) to analyze and disclose the potential impacts of the proposed Alpine Aqueduct Reach 1 Replacement and Resiliency Project (Project) located in northeast Orem west of Provo Canyon.

The District is a political subdivision of the state created in response to the 1956 Colorado River Storage Act. It manages the Bonneville Unit of the Central Utah Project (CUP) and its network of water facilities, in addition to District-owned water facilities. Under the terms of the Central Utah Project Completion Act (CUPCA) Section 205(b) and a 1993 compliance agreement between the District and the Secretary of the Interior (Secretary), the District is considered a federal agency “for purposes of compliance with all Federal fish, wildlife, recreation, and environmental laws with respect to the use of such funds, and to comply with [CUPCA]” (District 2016).

Interior is a federal entity that oversees completion of the Bonneville Unit of the CUP and administers the CUPCA program including funding, legal compliance, and environmental work. The Interior CUPCA office reports directly to the Secretary through the Assistant Secretary for Water and Science.

## 1.1 National Environmental Policy Act

This Final 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), the Council on Environmental Quality (CEQ), and Department of the Interior Regulations Implementing NEPA (40 Code of Federal Regulations [CFR] §1500-1508 and 43 CFR §46.300, respectively). If the EA shows no significant impacts associated with implementation of the proposed Project, then a Finding of No Significant Impact (FONSI) will be issued by the JLAs. During the EA process, if it is determined that there may be significant impacts, preparation of an Environmental Impact Statement (EIS) would be necessary prior to implementation of the Proposed Action. The JLAs will use this EA to satisfy disclosure requirements and as a means for public participation as part of NEPA, Section 106 of the National Historic Preservation Act (NHPA), Section 7 of the Endangered Species Act (ESA), and Public Involvement as required by the CUPCA (Public Law 102-575 CUPCA).



## 1.2 Cooperating Agencies

The JLAs invited the U.S. Bureau of Reclamation (Reclamation) and the Utah Reclamation Mitigation and Conservation Commission (Mitigation Commission) to serve as Cooperating Agencies, and they are participating in the preparation and review of the NEPA process.

As defined by the CEQ 40 CFR §1501.8, a Cooperating Agency actively participates in the NEPA process, provides information for preparing environmental analyses for which the Cooperating Agency has jurisdiction by law or special expertise, and is part of the project's interdisciplinary team.

## 1.3 Proposed Action

The Proposed Action would make the following improvements to the AA-1 pipeline:

- Realign the AA-1 pipeline to avoid an existing landslide complex.
- Perform design and construction across the Wasatch Fault Zone (WFZ) to ensure the AA-1 pipeline can withstand a 975-year seismic event.

For this proposed Project, the Proposed Action is also the Preferred Alternative.

### 1.3.1 Detailed Description of the Preferred Alternative

The realignment of the AA-1 pipeline would cross the WFZ, which is unavoidable but would completely avoid the landslide complex that it currently traverses. A summary is provided below. Further details and a map of the Preferred Alternative are provided in Chapter 2.

#### Preferred Alternative

The Preferred Alternative refers to the alternative that would best accomplish the Project's purpose and need (43 CFR §46.420(d)). The Preferred Alternative would include utilizing the existing Alpine Tunnel and constructing a new 1,100-foot-long tunnel running southward from the Alpine Tunnel outlet at the west end. From the end of the new tunnel there would be 750 feet of open cut construction for the pipeline to the intersection near 1060 North/1560 East in Orem. The realigned AA-1 pipeline would run west under 1060 North, turn north onto 1360 East, and continue through the former Cascade Golf Course toward Orem City's storage tanks before terminating at the Don A. Christiansen Regional Water Treatment Plant (DACRWTP).

The following are alternate variations on how to reach the Preferred Alternative's alignment northeast of 1060 North.

#### Variation A

Variation A would construct the new AA-1 pipeline beginning at the Alpine Tunnel outlet portal to an area east of 1060 North using open cut construction. The new AA-1 pipeline would be constructed along a steep slope which would require it to be rock bolted to the hillside to anchor the new pipe in place. The pipe would also be encased in reinforced concrete to protect and secure it.



### **Variation B**

Variation B would include boring a new tunnel that would intersect the existing Alpine Tunnel near its midpoint and terminate at an area east of 1060 North. The pipeline would be installed within the tunnel. The lower portion of the Alpine Tunnel would be abandoned.

### **Variation C**

Variation C would include boring a new tunnel beginning near the inlet to the Alpine Tunnel directly west of the 10 million-gallon (MG) Olmsted Reservoir to an area east of 1060 North. The existing Alpine Tunnel would be abandoned.

### **1.3.2 Fault Crossings**

Design and construction across faults would include heavy or thicker wall welded steel pipe which is considered a flexible pipe and welded steel pipe joints which allows the pipe to deflect and bend thereby providing the elongation necessary during a seismic event. Additionally, the trench zone around the pipe would be backfilled with movable or crushable materials to help accommodate movement during a seismic event. Also, the pipe would be constructed in a zig-zag pattern across the fault which allows the pipe to bend and yield during a seismic event. During preliminary and final design, geotechnical subsurface investigations may be needed for the final design details.

## **1.4 Background**

### **1.4.1 Central Utah Project**

The CUP is the largest and most complex water resource development project in the state of Utah. The CUP is a United States federal water project authorized for construction under the Colorado River Storage Project Act of April 11, 1956 (Public Law 84-485, 70 Statute 105). Constructed by Reclamation and the District. The CUP is located in the central, east central, and northeast parts of Utah. The CUP makes use of a portion of Utah's share of the Colorado River yield, as set out in the Colorado River Compact of 1922. Water developed by the CUP is used for municipal, industrial, and agricultural supplies; hydroelectric power generation; fish and wildlife; and recreation needs. The CUP also improves flood control capability and helps to control water quality. The CUP was originally divided into six units to facilitate planning and construction: Vernal, Bonneville, Jensen, Upalco, Uinta, and Ute Indian. The Upalco, Uinta, and Ute Indian units were subsequently deauthorized. The Vernal and Jensen units are completed.

The Bonneville Unit is the largest unit of the CUP. The Bonneville Unit collects and diverts water within the Uinta Basin (part of the Colorado River Basin) to the Bonneville and Uinta basins, providing water for Salt Lake, Utah, Wasatch, Juab, and Duchesne Counties and portions of Summit County, Utah. The Bonneville Unit contains a vast network of reservoirs, aqueducts, tunnels, canals, pipelines, pumping plants, and other conveyance facilities that develop water for irrigation, municipal, and industrial use; instream flows; and hydropower production. The





Bonneville Unit is comprised of six systems: Starvation Collection System, Strawberry Aqueduct & Collection System, Municipal and Industrial System (M&I System), Diamond Fork System, Utah Lake Drainage Basin Water Delivery System (ULS), and Wasatch County Water Efficiency/Daniel Replacement Project (WCWEP/DRP) (Figure 1-1). Much of the Bonneville Unit is completed, and the remaining features of the ULS are currently under construction.

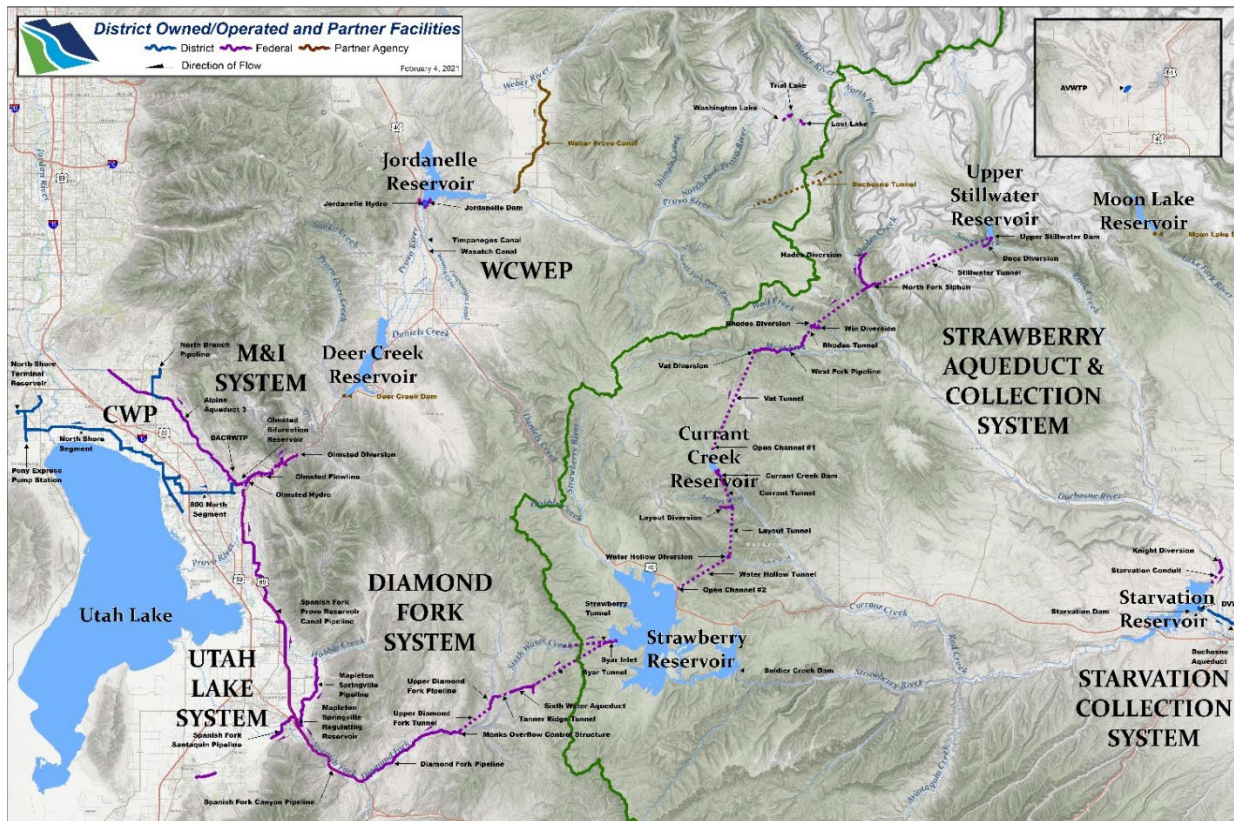


Figure 1-1. Bonneville Unit Map of the CUP and District-Owned Facilities.

The M&I System conveys water through the Jordanelle Reservoir and delivers over 90,000 acre-feet of water to northern Utah and Salt Lake Counties. The M&I System transmission network consists of the Olmsted Diversion and Flowline, the Alpine Aqueduct, and Jordan Aqueduct systems. District and non-District facilities are listed in Tables 1-1 and 1-2 and shown in Figure 1-2.



Table 1-1. District Regional Water Delivery Facilities.

Facility	Description
Alpine Aqueduct	The federally owned and District operated Alpine Aqueduct conveys water from the 10 MG Olmsted Reservoir to approximately half of Utah's population along the Wasatch Front through its three reaches: Reach 1, which connects to the DACRWTP and into the Jordan Aqueduct near the DACRWTP; Reach 2, which delivers treated water from the DACRWTP to Orem and Provo; and Reach 3, which delivers untreated water to water treatment plants in Salt Lake County and to cities for use in their secondary pressurized irrigation systems in northern Utah County.
Central Water Project – 800 North Aqueduct (CWP)	The District owns and operates the non-federal Central Water Project (CWP) that develops and delivers Municipal & Industrial (M&I) water to northwest Utah County and to Jordan Valley Water Conservancy District. The 800 North Aqueduct is part of the CWP that delivers treated water from the DACRWTP.
Don A. Christiansen Regional Water Treatment Plant	The non-federal and District owned and operated DACRWTP is a 100-million-gallons-per-day (MGD) water treatment plant located above the Orem cemetery in the foothills of Mount Timpanogos. It delivers treated water to Orem, Provo, and other District customers. It is owned and operated by the District.
Olmsted Diversion and Flowline	The federal Olmsted Flowline carries water from the Provo River Olmsted Diversion to the 10 MG Olmsted Reservoir. Water for the Olmsted Hydroelectric Plant flows from the 10 MG reservoir through an 84-inch pipeline and is then returned to the Provo River through the historic tailrace. The Olmsted Flowline also supplies water to the Alpine Aqueduct at the 10 MG reservoir.
ULS, Spanish Fork Canyon and Provo Reservoir Canal Pipeline	The federal Spanish Fork Provo Reservoir Canal Pipeline (SFPRCP) is a 60-inch, 19-mile-long welded steel pipe that conveys water from Spanish Fork Canyon pipeline to Utah and Salt Lake Counties. The SFPRCP connects to AA-1 (through the Olmsted hydroelectric powerplant and the 10 MG Olmsted Reservoir) and to the Provo River Aqueduct (PRA).





Table 1-2. Non-District Regional Water Facilities.

Facility	Description
Alta Springs Pipeline	The non-federal Alta Springs Pipeline delivers Orem City M&I water from springs located about 3 miles up Provo Canyon to storage tanks near the DACRWTP. It is a steel pipeline that ranges from 16 to 30 inches in diameter. It is owned and operated by Orem City.
Jordan Aqueduct	The federal Jordan Aqueduct is a 38-mile-long pipeline beginning near the DACRWTP and terminating near 2100 South/Bangerter Highway in West Valley City. It is a major conveyance facility to the western and southern Salt Lake Valley areas delivering water from the Provo River to the 180 MGD Jordan Valley Water Treatment Plant (JVWTP) and the 70 MGD Point of the Mountain Water Treatment Plant (POMWTP). It was constructed as part of the M&I System of the CUP and is operated by Jordan Valley Water Conservancy District (JVWCD).
Provo River Aqueduct (PRA)	The non-federal PRA, previously known as the Murdock Canal or the Provo Reservoir Canal, is a 21-mile-long pipeline that originates from the Murdock Diversion at the mouth of Provo Canyon to the Point of the Mountain. The open portion of the PRA was enclosed in 2012 with a 126-inch welded steel pipe and delivers water from the Provo River to Utah and Salt Lake Counties and to the Jordan Valley and Point of the Mountain Water Treatment Plants. In 2012, the Provo River Water Users Association (PRWUA) and Reclamation constructed a parallel pipe to the existing PRA Olmsted Siphon Pipeline located at the mouth of Provo Canyon that is 4,200 feet of 84-inch welded steel pipe (known as the Parallel Pipe). The existing Olmsted Siphon is a 96-inch diameter reinforced concrete pipeline constructed in the late 1940's and includes non-seismic designed gasketed pipe joints. The Parallel Pipe is approximately 1-mile long and constructed parallel to the Olmsted Siphon at the mouth of Provo Canyon to the crest of the hill on 800 North in Orem. The Parallel Pipe provides the PRA additional capacity and some system reliability and resiliency.
Salt Lake Aqueduct (SLA)	The non-federal SLA is a 69-inch diameter, 42-mile-long pipeline beginning at the base of Deer Creek Dam. It is a major conveyance facility for eastern Salt Lake Valley delivering water from Deer Creek Reservoir to the 113 MGD Little Cottonwood Water Treatment Plant. The SLA can also supply water to the DACRWTP on a space-available basis, and it can be supplied with water through the AA-1 pipeline (requires pumping). It is operated by Metropolitan Water District of Salt Lake and Sandy (MWDSLS).

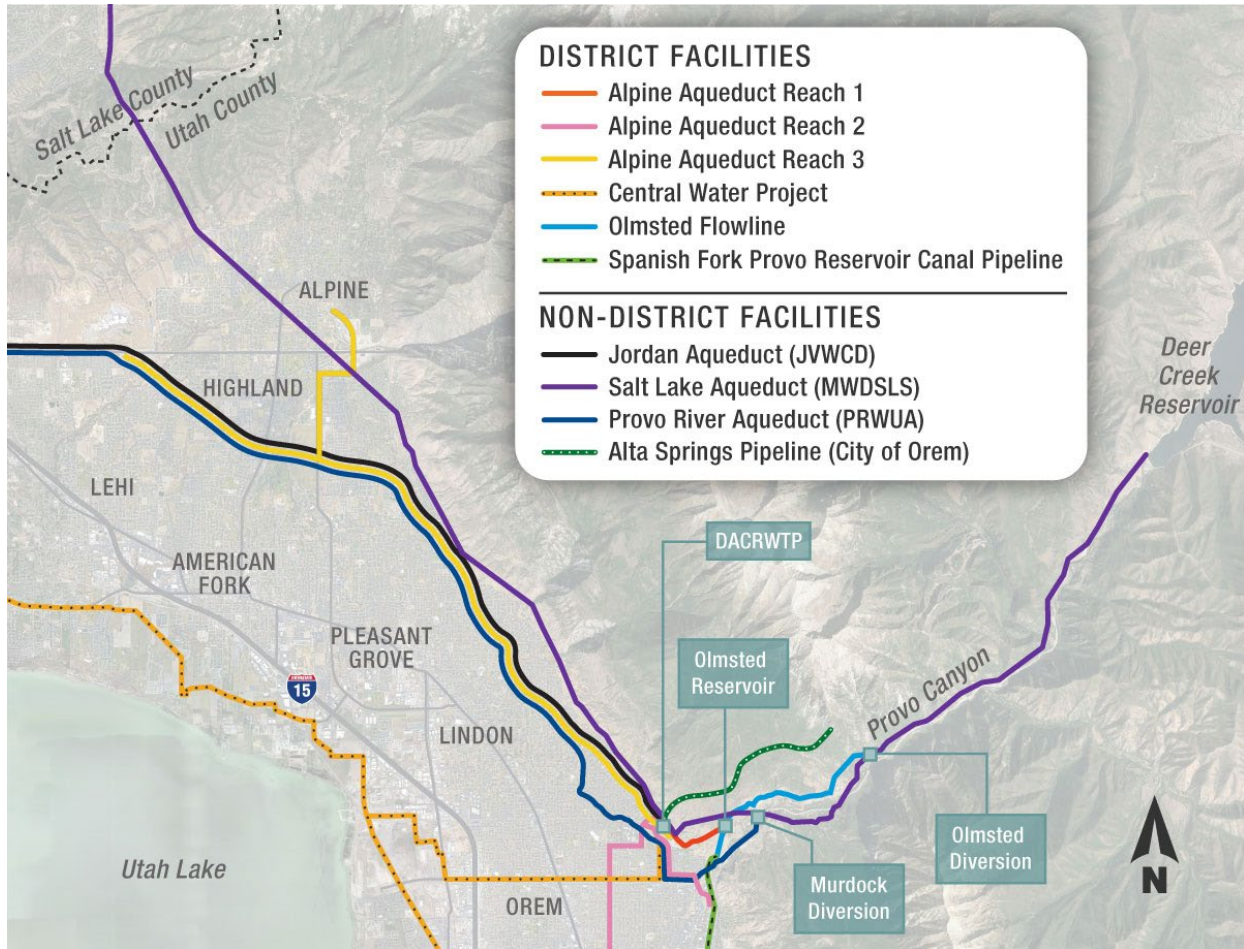


Figure 1-2. Map of Regional Water Delivery Facilities along the Wasatch Front.

### 1.4.2 Alpine Aqueduct

Constructed by Reclamation in 1978-80 and put into operation in 1982, the Alpine Aqueduct is part of the M&I System's regional water delivery system. The 13.2-mile-long pipeline begins at the 10 MG Olmsted Reservoir in Provo Canyon, traverses the foothills of Orem City, and terminates in northern Utah County. The aqueduct consists of three reaches: Reach 1 (proposed Project reach); Reach 2, which delivers treated water from the DACRWTP to Orem and Provo; and Reach 3, which delivers untreated water to water treatment plants in Salt Lake County and to cities in northern Utah County for use in their secondary pressurized irrigation systems. In addition, AA-1 provides water to the Jordan Aqueducts which are a primary water supply for the JVWTP and POMWTP located in south Salt Lake County. The Alpine Aqueduct supplies a major portion of the water for Utah and Salt Lake Counties along the Wasatch Front, as it delivers M&I water to approximately half of Utah's population (Figure 1-3).

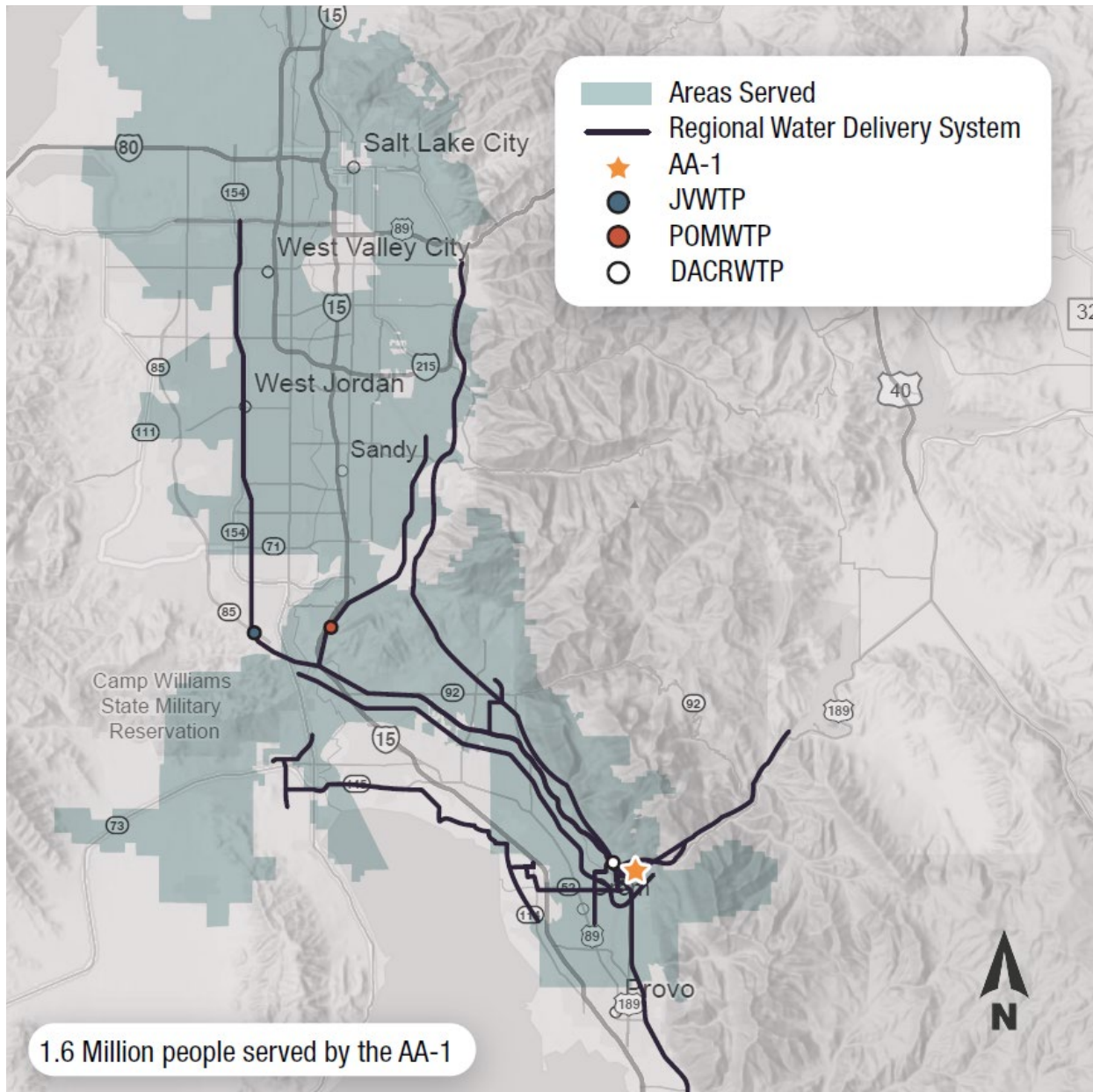


Figure 1-3. Alpine Aqueduct Service Area.

### 1.4.3 Alpine Aqueduct Reach 1

The AA-1 pipeline is a welded steel pipeline, measuring 90 inches in diameter, approximately 1.1 miles in length and can deliver up to 450 cubic feet per second (cfs) of water. It is comprised of an 1,830-foot-long tunnel called the Alpine Tunnel and a 400-foot above-ground section. The remainder of the AA-1 pipeline is buried and connects to the DACRWTP and downstream of the Jordan and Alpine Aqueduct systems. The existing AA-1 pipeline alignment and the Project's study area is shown in Figure 1-4.





Figure 1-4. AA-1 Alignment and Project Study Area.

## 1.5 Geologic Hazards

The regional water delivery pipelines discussed above in Tables 1-1 and 1-2 cross the WFZ and an active landslide (Figure 1-4). Given their location within a highly geologically active area, they are subject to a variety of geologic hazards such as fault displacements, landslide movements, steeply incised canyons, and unstable bedrock conditions. The AA-1 pipeline's location in relation to historical landslides and potential seismic events place it at high risk of catastrophic failure due to the unpredictable ground movement and displacement that will cause the pipeline to rupture.

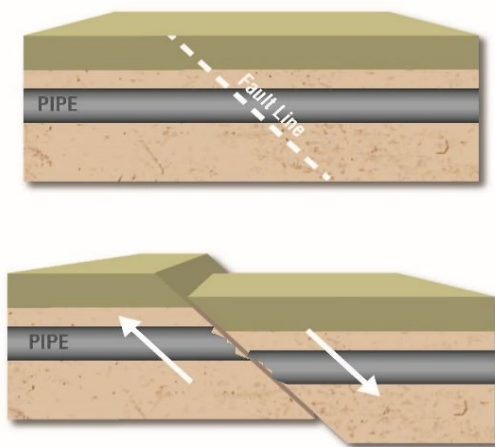
### 1.5.1 Wasatch Fault

The 230-mile-long WFZ is the largest seismic fault in northern Utah. It is the most likely fault in the area to produce a moderate- to large-magnitude earthquake. Research from the Utah Chapter of the Earthquake Engineering Institute indicates that the Wasatch Fault has a 43% chance of experiencing a magnitude 6.75 or greater earthquake in the next 50 years. Often referred to as "The Big One," experts predict that an earthquake of this magnitude would be one of the deadliest disasters in U.S. history with a projected death toll of 2,500 individuals.



Additionally, hundreds of thousands of Utahns would be left without shelter and critical services such as water, sewer, electricity, and natural gas, and transportation could be disrupted for a huge portion of the population. Current estimates predict that 330,000 homes would be left without water for a minimum of three months following a major seismic event. The Utah Seismic Safety Commission (USSC) recently ranked improvements to major aqueducts along the Wasatch Front as the number one priority in preparing for “The Big One” (USSC 2021).

The Provo Segment of the WFZ has produced five surface rupturing events over the last 7,000 years, causing substantial vertical displacements along the fault. Vertical displacement estimates for a future design seismic event range from 8 to 17 feet along the Provo Segment. Displacement of this magnitude would damage pipelines, tunnels, and aqueducts that cross the fault (Figure 1-5).



*Figure 1-5. Illustration of Vertical Displacement.*

### **1.5.2 Landslide Complex**

The foothills above Orem at the mouth of Provo Canyon are made up of ancient deposits including a large landslide complex (see Figure 1-4 above). Geologic mapping shows that the AA-1 pipeline crosses through a large landslide, which consists of unstable fractured limestone and shale, and multiple smaller slides within Lake Bonneville deposits. As part of the Alpine Aqueduct Reach 1 Resiliency Assessment Project (*Resiliency Assessment*, Jacobs 2020), mapping by several different organizations including the Utah Geological Survey (UGS) and Lettis Consultants International (LCI) shows the large landslide to be approximately 5,000 feet long and 1,800 feet wide. Due to the presence of weak bedding planes and sheer surfaces, the landslide can be activated by a variety of triggers, including high moisture content and seismic activity. In the last 40 years, the AA-1 pipeline has ruptured five times due to landslide movement and hillside slumping (Figure 1-6 and Figure 1-7). A 900-foot section of the pipeline that had experienced previous ruptures was replaced during the winter of 2001-2002. In the spring of 2017, a 300-foot-wide segment of the slide’s southwestern toe upgradient of the AA-1





pipeline became active and pushed up and over the pipeline, causing deformation and strain to the steel pipeline. Emergency mitigation measures required the construction of a large earthen berm to buttress the landslide and reduce further deformation of the pipe. Inclonometers (instruments used to detect if a landslide is moving) installed in 2017 indicate that the landslide continues to move and puts stress on the existing AA-1 pipeline, resulting in damage, deformity, and corrosion of the pipe in several locations.



*Figure 1-6. Pipeline Failures in the Last 40 Years.*



Figure 1-7. 2000 Landslide that Caused AA-1 Failure.

## 1.6 Reliability and Resiliency

In 2018, the District initiated the *Resiliency Assessment* (Jacobs 2020) to evaluate the AA-1 pipeline's vulnerability, risk, and consequences of failure; determine its existing resiliency; and develop reasonable options to decrease consequences of failure and to identify potential steps to increase reliability of the pipeline for District customers.

Though the AA-1 pipeline continues to provide District customers with water, the *Resiliency Assessment* (Jacobs 2020) found that the existing pipeline does not meet current industry standard performance objectives and has a high risk of failure. In accordance with ALA<sup>1</sup> *Seismic Guidelines for Water Pipelines* (ALA 2005), major transmission pipelines such as the AA-1 should have a minimum performance reliability objective following an earthquake due to the critical water supply they provide to the community. The JLAs determined that the AA-1 pipeline is a Class III critical water supply pipeline in accordance with the ALA criteria, based on the population it serves, and its importance to the area's economy. After a seismic event, the AA-1 pipeline would be temporarily shut down for inspection and repair but should have a minimum performance reliability of remaining in service following a 975-year seismic event.

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<sup>1</sup> The American Lifelines Alliance is a public-private partnership project that is funded by the Federal Emergency Management Agency (FEMA). The ALA is managed by the National Institute of Building Sciences, and its goal is to reduce the risks to essential utility and transportation systems (lifelines) from hazards including seismic damage.





Failure would result in significant economic impact to the community and a substantial hazard to human life and property.

The *Resiliency Assessment* (Jacobs 2020) developed replacement options based on weighted non-cost evaluation criteria deemed to be most critical to provide safe, reliable operations of the AA-1 pipeline (Table 1-3). Replacement and rehabilitation options were ranked according to these criteria and are discussed more fully in the *Resiliency Assessment* (Jacobs 2020).

*Table 1-3. Criteria Considered in Resiliency Assessment.*

Criteria	Items Considered	Weight
Reliability	<ul style="list-style-type: none"> <li>• Non-Seismic Events.</li> <li>• Seismic Events.</li> <li>• Consequences of Failure/Flooding Risk.</li> <li>• Potential for Interconnection.</li> </ul>	40%
Repairability	<ul style="list-style-type: none"> <li>• Accessibility.</li> <li>• Repair Materials and Methods.</li> <li>• Time to Repair.</li> </ul>	20%
Operations and Maintenance	<ul style="list-style-type: none"> <li>• Access.</li> <li>• Maintenance.</li> <li>• Security.</li> </ul>	20%
Environmental	<ul style="list-style-type: none"> <li>• Wetlands/Rivers/Groundwater.</li> <li>• Species/Land Disruption.</li> <li>• Community Impacts.</li> <li>• Visual/Safety.</li> </ul>	10%
Implementation/Constructability	<ul style="list-style-type: none"> <li>• Construction Risk.</li> <li>• Property/Right-of-Way.</li> <li>• Schedule.</li> </ul>	10%

All replacement and rehabilitation alignments and options considered would cross the WFZ. They were carefully planned to minimize the number of required crossings traversing identified fault strands and to orient the crossings as close to perpendicular as possible to the faults to allow the application of seismic design principles. Furthermore, some options cross over the fault strands in addition to being located within the landslide complex.

The preliminary analyses yielded four potential pipeline alignments that scored notably higher than the other alignment options evaluated as part of the *Resiliency Assessment* (Jacobs 2020). These four alignments were carried forward for further development. Based on evaluation criteria, the final analyses determined the highest-ranking alignment as Option 3B and is a subset of Option 3 that was identified during the preliminary analyses. Option 3B was used to develop the Preferred Alternative alignment. The Final EA evaluates the Preferred Alternative, Variations A, B, and C, and the No Action Alternative.



## 1.7 Purpose and Need

The need for the Project is to increase the physical integrity, functionality, and long-term viability of the AA-1 pipeline, which is the transmission line for a critical water supply. The purposes of the Project are:

1. Continue to provide Bonneville Unit's M&I System water to Orem, Provo, and northern Utah and Salt Lake Counties along the Wasatch Front by maintaining continual service during seismic and non-seismic events.
2. Prevent catastrophic damage to adjacent residential areas and the environment due to pipe failure.
3. Increase the reliability and resiliency of the AA-1 pipeline.
4. Increase seismic design performance to provide for continued operation of the DACRWTP. In addition, the AA-1 pipeline provides a critical water supply to the JWTP and POMWTP located in the Salt Lake Valley.
5. Reduce operation, maintenance, and repair (OM&R) costs associated with AA-1 pipeline.

### 1.7.1 Description of Purposes

The following provide more detailed descriptions of each purpose.

1. *Continue to provide Bonneville Unit's M&I System water to Orem, Provo, and northern Utah and Salt Lake Counties along the Wasatch Front by maintaining continual service during seismic and non-seismic events.*

The M&I System of the Bonneville Unit delivers water to more than half of Utah's population. If a geohazard were to cause damage to the AA-1 pipeline that required a shutdown of the facility, the impacts would be significant and widely felt. In addition, two other significant water transmission facilities cross this same landslide complex: the SLA, originally constructed by Reclamation and operated by Metropolitan Water District of Salt Lake and Sandy, and the Alta Springs Pipeline, constructed and owned by Orem City.

The AA-1 pipeline's construction and alignment through an active landslide do not meet current industry design standards which have become more stringent since its construction. Continuous landslide movement is weakening the pipe structure, increasing non-seismic damage, and decreasing its structural integrity. The Project would design the AA-1 pipeline to remain operable following a 975-year seismic event, according to American Lifelines Alliance (ALA) guidelines for a Class III pipeline. See Section 1.6 for detailed discussion on reliability and resiliency.

Because of the landslide's proximity to the fault and the potential for significant ground deformation through the landslide complex during a seismic or non-seismic event, the pipeline located within the landslide has a high likelihood of failure, which diminishes its ability to provide reliable and continual service. Relocating, designing, and constructing the AA-1



pipeline to current seismic standards increases the overall resiliency of the pipeline allowing it to continue to provide water to the people of Utah, even in the wake of a geologic event.

*2. Prevent catastrophic damage to adjacent residential areas and the environment due to pipe failure.*

A portion of the AA-1 pipeline is situated directly above a residential neighborhood. Pipeline failure due to a geologic event may result in substantial flooding of downhill properties and place the lives of those below in significant danger. Additionally, flooding from the pipeline would exacerbate landslide conditions. Flows from the broken pipeline would notably increase saturation and weight of the soils, further loosening the sediments and increasing downhill debris flows. Relocating the AA-1 pipeline away from the existing landslide and constructing it to the 975-year seismic event reduces the potential for catastrophic damage to the residential area and the environment.

*3. Increase the reliability and resiliency of the AA-1 pipeline.*

There have been five ruptures of AA-1, all caused by movement of the landslide complex, over the last 40 years that have necessitated significant repairs. As a key artery for the M&I System, the AA-1 pipeline supplies raw water to treatment facilities that, combined, deliver water to over 1.6 million people. During a moderate earthquake, the AA-1 pipeline in its current location is anticipated to fail and would be unable to provide critical water supply; damage could take six months or more to repair as materials would need to be custom manufactured (USSC 2021).

*4. Increase seismic design performance to provide for continued operation of the DACRWTP.*

The District recently upgraded DACRWTP, which provides drinking water to Orem, Provo, and CWP customers in northwest Utah County, to increase its resiliency and continuous operation following a 975-year seismic event and avoid catastrophic failure following a 2,475-year seismic event. The AA-1 also supplies water to the Jordan Aqueduct which supplies water to JVVWTP and POMWTP for service to their customers in Salt Lake County. The Project would upgrade the AA-1 pipeline to industry seismic standards to maintain operability of the DACRWTP following a seismic event.

*5. Reduce OM&R costs associated with the AA-1 pipeline.*

In its current location, the AA-1 pipeline is relatively accessible for OM&R activities. However, due to the continual danger of damage due to the landslide, the pipeline currently requires weekly exterior inspections; more frequent in-depth inspections that require the pipeline to be taken offline, drained, and walked through; and, as well as routine monitoring of inclinometers and piezometers. The District maintains a small stockpile of various diameter welded steel pipe and repair materials for minor repairs. However, in the event of a moderate seismic event, the AA-1 pipeline would likely require extensive repairs and necessitate the procurement and installation of new pipe materials. The pipeline would likely be inoperable for months.



## 1.8 Permits, Contracts, and Authorizations

Prior to ground disturbance for construction, the contractor would be required to obtain a Utah Pollution Discharge Elimination System Permit and follow a stormwater pollution prevention plan.

The Project would require federal easements from private landowners and Orem City for the proposed pipeline alignment, access points, and construction right-of-way not located in the public road right-of-way or existing easements. Construction time could be shortened in residential neighborhoods if temporary easements are granted for construction in landowner's park strips mainly along 1060 North and 1360 East (see Figures 3-1 and 3-2 in Chapter 3 for more information). Other permits and authorizations for the project would include Orem City road cut and construction permits; and other county, state, and jurisdictional agency permits typical of this type of construction.

The JLAs would coordinate authorizations and necessary permits with Orem City if it is determined that corrective measures are needed, such as a French drain system, to capture subsurface flow along the Preferred Alternative alignment.

## 1.9 Statutes, Regulations, and Other Related Documents

### 1.9.1 Statutes and Regulations

The Project would comply with all federal, state, and local regulations.

### 1.9.2 Related Environmental Documents

The Preferred Alternative has taken into consideration related environmental documents, including:

- Environmental Statement, Municipal and Industrial System, Bonneville Unit, Central Utah Project (1979).
- Supplement to the Final Environmental Study, Municipal and Industrial System, Bonneville Unit, Central Utah Project (1987).
- Provo Reservoir Canal Enclosure Environmental Assessment and Finding of No Significant Impact (2003).
- 2004 Supplement to the 1988 Definite Plan Report for the Bonneville Unit (supplement to the Bonneville Unit 1964 Definite Plan Report).
- Utah Lake Drainage Basin Water Delivery System Final Environmental Impact Statement (2004) and Record of Decision (2005).
- Realignment of a Portion of the Utah Lake Drainage Basin Water Delivery System Final Environmental Assessment (2010).
- Parallel Pipeline Project Final Environmental Assessment and Finding of No Significant Impact (2011).



## 2 Alternatives

### 2.1 Introduction

The National Environmental Policy Act (NEPA) requires federal agencies to evaluate a reasonable range of alternatives for a proposed action when it involves unresolved conflicts concerning alternative uses of available resources. The range of alternatives must meet the project need while addressing environmental effects or conflicts. Reasonable alternatives are defined by the Council on Environmental Quality's (CEQ's) regulations implementing NEPA as those that are technically and economically feasible. NEPA also requires that a No Action Alternative be evaluated as a baseline for comparing the other analyzed alternatives.

Alternatives were developed and evaluated to address issues or concerns raised during internal and public scoping, as described in this Chapter. If an alternative is suggested that does not meet the project need, does not provide benefits over an alternative already being considered, or is not economically or technically feasible, a detailed analysis of that alternative is not required. However, a rationale for eliminating the alternative from detailed analysis must be provided.

### 2.2 Screening Criteria

Project Screening Criteria were developed by the JLAs to evaluate alternatives for replacing the Alpine Aqueduct Reach 1 (AA-1) pipeline (Table 2-1). Screening Criteria were developed based on the Project's need: to provide physical integrity, functionality, and long-term viability of the AA-1 pipeline. Preliminary alternatives that would not meet the Screening Criteria or would incur unacceptable impacts to environmental resources were removed from further consideration or evaluation. The Preferred Alternative and Variations A, B, and C meet the Project Screening Criteria and were developed and evaluated in detail.

*Table 2-1. Project Screening Criteria.*

Project Screening Criteria	Description
Physical Integrity	Does not require additional maintenance beyond routine maintenance.  Does not pose a risk to human life and property in the event of a landslide.
Functionality	Provides continual service to Central Utah Water Conservancy District (District) customers during a 975-year seismic event and non-seismic geologic events.
Long-Term Viability	Provides reliable pipeline to meet long term water commitments. Long design life of the pipeline.



## 2.3 Alternatives Considered but Eliminated From Further Discussion

As requested during the public scoping, the JLAs developed two alternatives including the Existing Alpine Aqueduct Reach 1 Alignment Alternative and the 800 North Alternative. These alternatives were evaluated, and it was determined that they did not meet the Project's need identified in Section 1.7.

### 2.3.1 Existing Alpine Aqueduct Reach 1 Alignment Alternative

Several comments received during scoping requested that an alternative be evaluated along the existing AA-1 alignment and right-of-way using stronger and more flexible pipe material that could potentially withstand landslide movement. As part of the Alpine Aqueduct Reach 1 Resiliency Assessment Project (*Resiliency Assessment*), the JLAs developed and evaluated options that would utilize all or a portion of the existing AA-1 right-of-way. These options generally ranked low for reliability as the pipeline is expected to experience continued ruptures and failures if it remains in its existing alignment crossing the landslide complex. This is primarily due to the number of failures the pipeline has already experienced during its relatively short lifespan, the up to 10 feet of ground displacement the landslide is expected to experience during the 975-year seismic event, and the statistical certainty that the landslide will continue to move during non-seismic events. Further, it should be recognized that landslide movement is expected to continue along the existing pipeline alignment compared to fault displacement that occurs at localized areas where mitigation measures can be implemented.

The JLAs have concluded that the AA-1 pipeline is at high risk of failure due to previously experienced and ongoing landslide movement. Regardless of the pipe material from which it may be constructed, excessive sudden movement of the landslide or slow and steady incremental movement would eventually overstress and rupture the AA-1 pipeline, potentially resulting in downhill flooding. Additionally, this potential rupture would require the AA-1 pipeline to be taken out of service for repair over an extended period and would inhibit the delivery of water.

Movement of the landslide since the construction of the AA-1 pipeline is primarily due to creep and soil moisture conditions that increase the instability of the landslide. The landslide is also anticipated to move due to seismic shaking resulting from a low- to moderate-sized earthquake (less than the 475-year seismic event). During the 975-year seismic event, the landslide is projected to move up to 10 feet. Any alternative through the landslide would require frequent and above-normal maintenance because of this landslide's documented continual gradual movement. This landslide complex contains many other smaller landslides nested within the larger slide that have historically caused ruptures and continue to stress the existing pipe.

In addition to the landslide concern, danger to the existing AA-1 alignment and any variation of the alignment through the landslide is compounded by having to cross the Wasatch Fault. During the 975-year seismic event, fault displacement is anticipated to range from 8 to 17





vertical feet coupled with 3 to 6 feet of horizontal displacement. Experts anticipate a fault displacement of this magnitude would trigger movement of the landslide resulting in the shearing or rupture of the pipeline, rendering it unusable until it could be repaired. This could result in flooding downhill of the AA-1 pipeline, depending on the location and severity of the rupture. The AA-1 pipeline would most likely be out of service for an extended period while enough length of pipe could be acquired, and the pipeline reconstructed. Constructing a replacement pipeline through the landslide to withstand a 475-year to 975-year seismic event is not feasible.

For these reasons, any alignment that would utilize the existing AA-1 right-of-way or other alignment variations through the landslide complex was removed from consideration as it would not provide a long-term, reliable, and resilient solution as identified as part of the Project need.

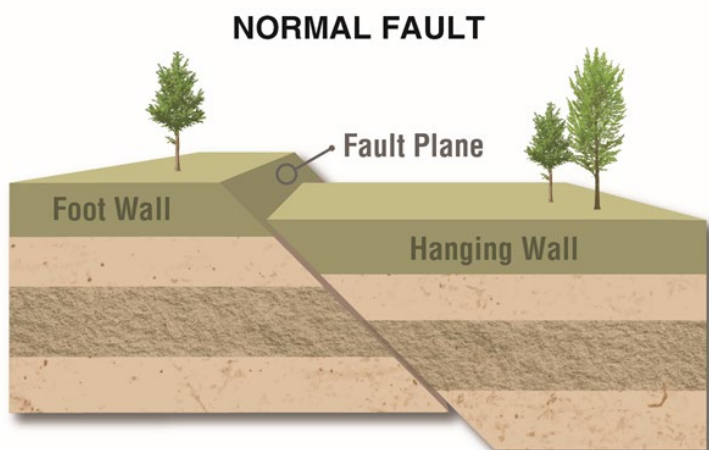
### **2.3.2 800 North Alternative**

Several comments received during the scoping period recommended that the JLAs evaluate an alternative on 800 North as part of the alignment for the proposed pipeline. The 800 North Alternative recommended during scoping would extend southward from the Alpine Tunnel outlet and would be constructed within the 1560 East roadway to 800 North and then loop back up to the Don A. Christiansen Regional Water Treatment Plant (DACRWTP).

This alternative would avoid the landslide complex but would still cross the eastern and central strands of the Wasatch Fault. In addition, this alternative would parallel the eastern strand of the Wasatch Fault along 1560 East on the hanging wall side of the “normal” fault (Figure 2-1) that is expected to drop during a seismic event. If the rock mass above a fault moves down, the fault is termed normal. Having a significant amount of the pipeline parallel to the fault greatly increases the chances of rupture during a seismic event and its anticipated fault displacement.

As discussed in the *Resiliency Assessment* (Jacobs 2020), a 975-year seismic event is anticipated to have a vertical displacement of 8 to 17 feet and a horizontal displacement of 3 to 6 feet. This displacement is anticipated to occur across the eastern and central strands of the Wasatch Fault. The more stable footwall of the Wasatch Fault is represented by the exposed limestone and weather shale layers located on the east side of the eastern strand of the fault. The location of the eastern strand of the fault is well documented by fault trenches excavated during geological investigations for the Utah Lake Drainage Basin Water Delivery System (ULS) pipeline.





*Figure 2-1. Hanging Wall and Foot Wall of a Normal Fault.*

Constructing the AA-1 pipeline within 800 North would place three large regional water delivery pipelines parallel to each other: the 84-inch welded steel pipe and 96-inch reinforced concrete pipe segments of the Provo River Aqueduct (PRA) and the proposed realigned AA-1 pipeline. In this location, the original PRA, 96-inch Olmsted Siphon, was constructed in the 1940s with non-seismic resistant concrete pipe and gasketed joints. In 2010-2012 the concrete segment was paralleled with a more seismic-resilient, 84-inch-diameter welded steel pipeline to increase the PRA's capacity. However, the reduced seismic resilience of the 1940s concrete pipe presents a potential risk to any utilities constructed parallel and in the same corridor as this section of pipe. A 975-year earthquake is anticipated to have a vertical displacement of 8 to 17 feet and a horizontal displacement of 3 to 6 feet. Displacements of this magnitude would most likely pull apart and rupture the concrete, gasketed PRA pipeline, which could wash out any other pipelines and utilities in this corridor. In this event, water deliveries from three regional pipelines (both PRA pipelines and the AA-1) would be out of service for an extended period.

For these reasons, the 800 North Alternative was removed from consideration as it would not satisfy the Project Screening Criteria and therefore would not meet the Project need.

## **2.4 No Action Alternative**

### **2.4.1 Alternative Description**

The No Action Alternative has been developed in accordance with CEQ guidelines to provide a comparison with the Preferred Alternative. Under the No Action Alternative, the AA-1 pipeline would remain in place. The pipeline would continue to require extensive ongoing maintenance and repair to remain operational and its location poses a high failure hazard because of landslide movement and the potential for a seismic event.



### 2.4.2 Screening Criteria Compliance

The No Action Alternative does not satisfy the need-based Project Screening Criteria as described in Table 2-1.

- *Physical Integrity* – The current pipeline alignment crosses through a known landslide and has ruptured by the slide five times since its construction. Additionally, the AA-1 pipeline poses a risk to human life and property located downhill, as landslide movement or a moderate seismic event could cause pipeline failure.
- *Functionality* – The AA-1 pipeline does not meet the ALA industry standard performance objectives for high-priority pipelines (see Chapter 1). According to the ALA, the AA-1 pipeline should have a minimum performance reliability objective of remaining in service following a 975-year seismic event. The AA-1 pipeline is at risk of failure due to even a moderate seismic event. The extensive repairs needed in the case of pipeline failure after a seismic event would likely take months.
- *Long-term Viability* – The AA-1 pipeline has limited long-term viability due to the constant strain and pressure from the landslide which will most likely result in future failures to the pipeline.

The No Action Alternative fails to meet the Project need. It has been studied in detail in accordance with CEQ guidelines throughout this EA.

## 2.5 Preferred Alternative

The Preferred Alternative would realign the AA-1 pipeline to completely avoid the landslide complex it currently traverses and be designed and constructed to withstand and remain operational following a 975-year seismic event. It has the lowest flooding risk due to fewer potential break points and is the most reliable alignment evaluated as stated in the *Resiliency Assessment* (Jacobs 2020).

Proposed improvements include a tunneled section, buried pipeline (located within undeveloped land, within residential streets, and through a section of the former Cascade Golf Course), and across two unavoidable fault lines. The Preferred Alternative includes a preferred alignment and three alignment variations, which are optional alignments between the Olmsted 10 MG Reservoir and east of the landslide complex to the 1060 North/1560 East intersection as shown in Figure 2-2. The Preferred Alternative and the alignment variations would use the Alpine Tunnel or a new tunnel alignment that would meet up with the Preferred Alternative.

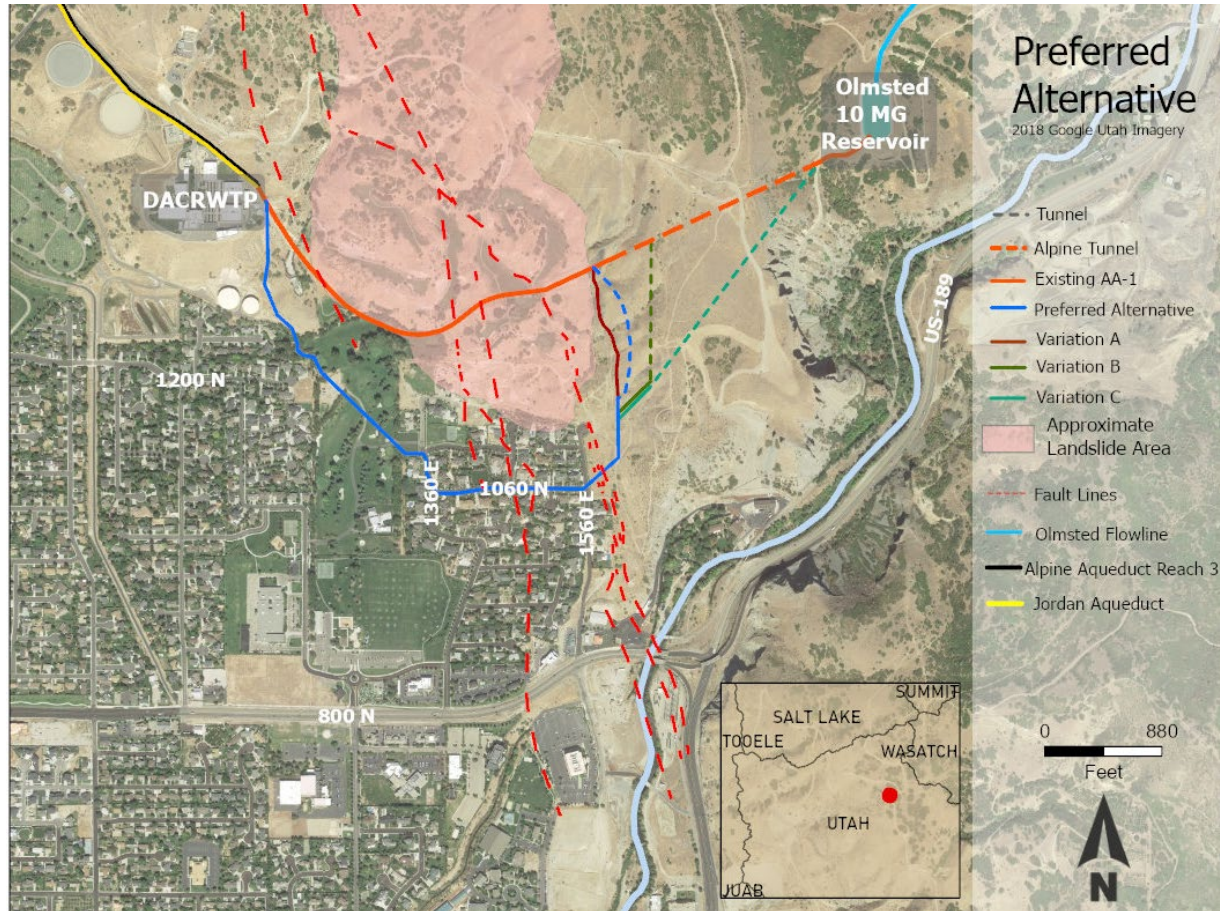


Figure 2-2. Preferred Alternative and Other Alignment Variations.

### 2.5.1 Design Considerations

One of the primary risks of failure is at the fault crossings during a major seismic event. The pipeline design and construction would incorporate the expected fault displacements to avoid failure. During construction and prior to operations, the new AA-1 pipeline would be hydro tested to make sure that there are no leaks.

The design would address any constructability risks associated with tunneling, including additional bore holes and geotechnical investigations along the tunnel alignment to develop a geotechnical baseline to help establish ground conditions. To reduce the tunneling risks, all proposed tunnel alignments would be sited east of the steeply interbedded weak shale layers to reduce risk of damage and tunneling risks, thereby reducing the likelihood of repair.

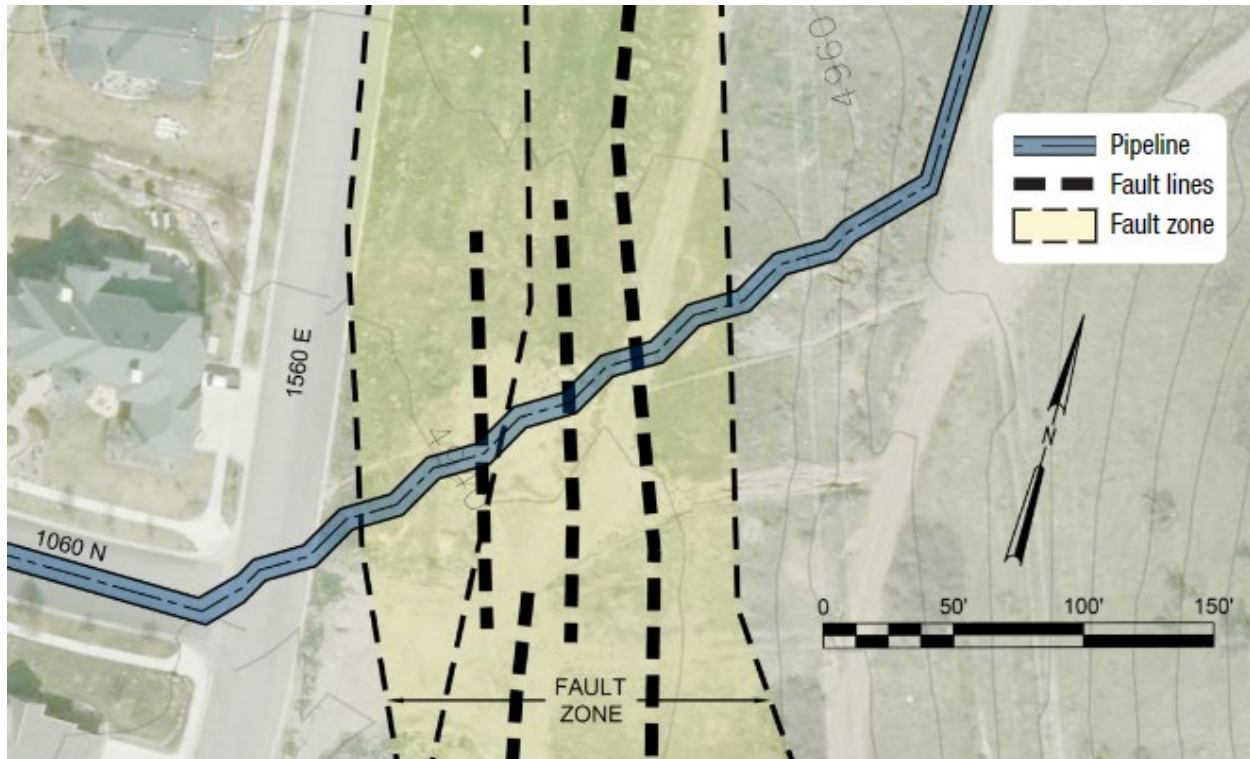
### Fault Crossings

The alignment would include several unavoidable crossings of fault lines, which is true for any possible alignment. Design and construction efforts include heavy wall, welded steel pipe with movable pipe joints providing flexibility. Where the pipeline crosses the fault lines, it would be designed to cross at approximate perpendicular angles to minimize the length of the pipe at risk. Additionally, the pipe would be constructed at horizontal offsets to create a “stacked” or





zig-zag pattern across the fault that would allow the pipe to expand, contract, and accommodate fault displacement during a seismic event. Figure 2-3 shows how this would be done. The trench zone around the pipe would be backfilled with movable or crushable material to help accommodate ground movement and would be no more than 3 feet of fill on top of the pipe allowing it to move vertically without failing during a seismic event. Strain gauge sensors would be installed on the outside of the pipeline at the fault lines to monitor for any changes to the pipe's alignment indicating movement. During design, geotechnical subsurface investigations may be needed for the final design details.



*Figure 2-3. Stacked Pipe Design for Fault Crossings.*

### **Subsurface Water**

Several comments received during the scoping process and on the Draft EA stated that the residential neighborhood has experienced problems with subsurface water. The JLAs will investigate for subsurface water along the Preferred Alternative alignment – specifically along 1060 North and 1360 East. If subsurface water is identified under these roads, the JLAs would design and construct corrective measures, such as a French drain system along the pipeline alignment, to capture the subsurface flows and convey the water away from the neighborhood. These measures would be designed so that the Project would not increase any subsurface drainage problems within the neighborhood.



### **Constructability within Residential Neighborhoods**

The pipeline would be constructed within the roadway's easement which is from curb to curb owned by Orem City. Construction equipment would be at both ends of the open trench for access and pipe installation. Access to home's driveways could be restricted for several weeks during construction. Although vehicle access to driveways would be restricted, walk-in and emergency access would be provided. In an effort to minimize disruption times, a schedule would be followed by the contractor to maintain construction progress. Coordination and cooperation between the contractor, construction workers, and the public would be necessary to ensure a smooth construction process for all involved parties.

An option for speeding up construction is to obtain temporary construction easements from homeowners on one side of 1060 North and 1360 East for construction access in their park strips which would widen the construction zone thereby allowing construction equipment to be on the sides of the trench. Park strips would be reconstructed as near as possible to preconstruction conditions.

### **2.5.2 Preferred Alternative Alignment**

The Preferred Alternative's alignment would utilize the existing Alpine Tunnel and bore a new 156-inch diameter tunnel, approximately 1,100-foot-long, southward from the Alpine Tunnel outlet. A 108-inch welded steel pipeline would be installed in the new tunnel and would continue southward from the new tunnel's outlet to a location east of the 1060 North/1560 East intersection. From there, the pipeline would go west under 1060 North, turn north onto 1360 East, and continue through the former Cascade Golf Course toward Orem City's storage tanks before terminating at the DACRWTP. The Preferred Alternative would be buried. Visible elements would include blowoff structures connected to the Orem City storm drain system, access manways, air vents, inlet and outlet portals for the new tunnel, and access to the strain gauge sensors.

### **2.5.3 Preferred Alternative Variation Alignments**

As part of the *Resiliency Assessment* (Jacobs 2020), other alignments were evaluated of where to construct the pipeline between the 10 MG Olmsted Reservoir to a location southeast of the landslide complex. There are three alignment variations that could be used instead of the Preferred Alternative's alignment for connection to the Preferred Alternative at a location east of the 1060 North/1560 East intersection as shown in Figure 2-4.

#### **Variation A**

Variation A's alignment would begin at the existing Alpine Tunnel outlet portal (where the above-ground section of AA-1 begins). This variation would utilize the entire Alpine Tunnel. Connecting at the Alpine Tunnel's outlet, an approximately 1,750 foot 108-inch diameter welded steel pipeline would be constructed along the foothills northeast of the Canyon Cove Estates neighborhood to a location east of the 1060 North/1560 East intersection. Segments of this reach would be along steep hillsides and would include considerable earthwork consisting



of open cut construction to reach stable soils suitable for construction. Rock bolts and reinforced concrete encasement would be used to anchor the pipeline into the hillside and texturized to blend in with the existing landscape. Variation A would intersect with the alignment of the Preferred Alternative as shown in Figure 2-4.

### Variation B

Variation B's alignment would include boring a new tunnel, approximately 1,450 feet long, that would intersect the existing Alpine Tunnel and terminate at an area east of the 1060 North/1560 East intersection. The new tunnel would be 156 inches in diameter with a 108-inch diameter welded steel pipeline constructed within it. A 200-foot vertical shaft would be required above where the tunnel intersects the existing Alpine Tunnel to remove the boring equipment and to provide a connection to the existing tunnel. From the outlet of the new tunnel, the 108-inch pipeline would continue along the Preferred Alternative's alignment. The segment of the existing Alpine Tunnel downstream of the intersection with the new tunnel would be abandoned.

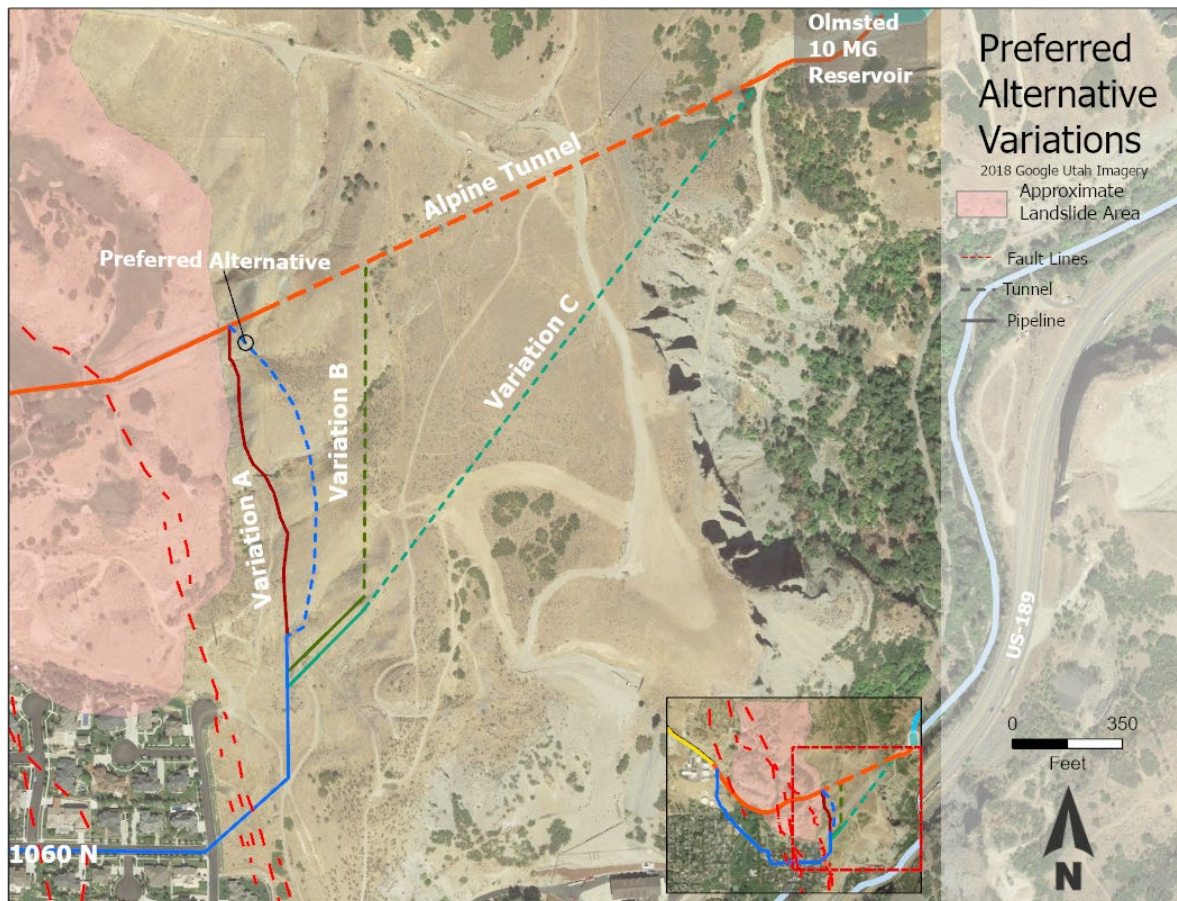


Figure 2-4. Detail View of Alignment Variations.





## Variation C

Variation C's alignment would include boring a new tunnel beginning near the inlet to the Alpine Tunnel directly west of the 10 MG Olmsted Reservoir to an area east of the 1060 North/1560 East intersection. The new 2,450-foot-long tunnel would be 156 inches in diameter with a 108-inch diameter welded steel pipeline constructed within it. From the outlet of the new tunnel, the 108-inch pipeline would continue along the Preferred Alternative. The existing Alpine Tunnel would be abandoned.

### 2.5.4 Screening Criteria Compliance

The Preferred Alternative satisfies the need-based Project Screening Criteria as described in Table 2-1.

- *Physical Integrity* - The Preferred Alternative would provide the physical integrity of the AA-1 pipeline by moving the pipeline to an alignment that completely avoids the known landslide complex and minimizes crossings of the Wasatch Fault Zone (WFZ). Additionally, the pipeline would be designed and constructed to increase its ability to withstand seismic movement.
- *Functionality* - The Preferred Alternative would increase the functionality of the AA-1 pipeline by making improvements that would enable the pipeline to stay in service following the 975-year seismic event.
- *Long-term Viability* - The Preferred Alternative would improve the long-term viability of the pipeline by moving it away from the constant landslide hazard and building the pipeline to current seismic design standards with improved resilient materials.

## 2.6 Summary and Comparison of Alternatives

Table 2-2 is a summary and comparison of the resources of concern and associated impacts of the Preferred and No Action Alternatives addressed in Chapter 3.

*Table 2-2. Summary and Comparison of Alternatives.*

Resource of Concern	Preferred Alternative	No Action Alternative
Air Quality	<ul style="list-style-type: none"> <li>• Temporary and localized impacts to air quality during construction that would be minimized through implementation of Best Management Practices (BMPs).</li> <li>• No long-term effects.</li> </ul>	<ul style="list-style-type: none"> <li>• Temporary and localized impacts to air quality during repair work that would be minimized through implementation of BMPs.</li> </ul>
Climate Change	<ul style="list-style-type: none"> <li>• Would cause a temporary increase in emissions during construction but overall would result in a decrease of emissions corresponding to a decreased need for a high frequency of pipeline inspection and maintenance.</li> </ul>	<ul style="list-style-type: none"> <li>• Would require a high frequency of maintenance and inspection that would continually release greenhouse gas emissions.</li> </ul>
Cultural Resources	<ul style="list-style-type: none"> <li>• No effect.</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Preferred Alternative.</li> </ul>



Resource of Concern	Preferred Alternative	No Action Alternative
Geological Hazards	<ul style="list-style-type: none"> <li>Would result in decreased crossing of geologic hazards.</li> </ul>	<ul style="list-style-type: none"> <li>Risks from known soil and geologic hazards.</li> </ul>
Groundwater and Subsurface Water	<ul style="list-style-type: none"> <li>No effect. No change in the amount of water that infiltrates into the ground. No change in the flow of groundwater.</li> <li>The JLAs would investigate the presence of subsurface water under 1060 N and 1360 E. If present, the JLAs would determine the best corrective measure, such as a French drain system, to not increase the effects of the subsurface water by the Project in the neighborhood.</li> </ul>	<ul style="list-style-type: none"> <li>No effect. No change in the amount of water that infiltrates into the ground. No change in the flow of groundwater.</li> </ul>
Indian Trust Assets	<ul style="list-style-type: none"> <li>No effect.</li> </ul>	<ul style="list-style-type: none"> <li>Same as Preferred Alternative.</li> </ul>
Public Health and Safety	<ul style="list-style-type: none"> <li>Reduced risk to public safety from existing pipeline failure.</li> <li>Temporary noise impacts during construction to adjacent residents and businesses.</li> <li>Potential vibration impacts to nearby homes.</li> </ul>	<ul style="list-style-type: none"> <li>Temporary noise impacts during maintenance activities to nearby residents and businesses.</li> </ul>
Socioeconomics	<ul style="list-style-type: none"> <li>No permanent effect.</li> <li>During the construction period there would be temporary benefits to the local economy (employment, spending on goods, services, and materials).</li> </ul>	<ul style="list-style-type: none"> <li>No permanent effect.</li> </ul>
Soils	<ul style="list-style-type: none"> <li>Would result in soil disturbance, but to a lesser degree than the No Action Alternative.</li> </ul>	<ul style="list-style-type: none"> <li>Would result in soil disturbance caused by potential pipeline rupture in the event of a geologic hazard and/or pipeline repair.</li> </ul>
Threatened and Endangered Species	No effect to Yellow-billed cuckoo, June sucker, Canada lynx, and Monarch butterfly.	<ul style="list-style-type: none"> <li>Same as Preferred Alternative.</li> </ul>
Transportation and Utilities	<ul style="list-style-type: none"> <li>Temporary impacts to businesses and local residents as a result of construction traffic.</li> <li>No long-term effects.</li> </ul>	<ul style="list-style-type: none"> <li>Temporary impacts during maintenance activities to adjacent residents and businesses.</li> <li>Temporary impacts if failure causes soil erosion that enters neighborhood streets.</li> <li>No long-term effects.</li> </ul>





Resource of Concern	Preferred Alternative	No Action Alternative
Vegetation and Invasive Species	<ul style="list-style-type: none"> <li>Construction activities could allow for the establishment or spread of invasive species and noxious weeds; however, BMPs would be utilized during construction and the District's Integrated Pest Management Plan would be implemented after construction for ongoing monitoring and treatment of invasive species.</li> <li>Vegetation removal.</li> </ul>	<ul style="list-style-type: none"> <li>Construction activities during maintenance and repair of the current alignment could allow for the establishment or spread of invasive species and noxious weeds; however, BMPs would be utilized during construction and the District's Integrated Pest Management Plan would be implemented after construction for ongoing monitoring and treatment of invasive species.</li> <li>Vegetation removal.</li> </ul>
Visual Resources	<ul style="list-style-type: none"> <li>Temporary to permanent impacts to visual resources during construction depending on alignment.</li> <li>Removal of 400-foot visible pipeline section.</li> </ul>	<ul style="list-style-type: none"> <li>No change or effect.</li> </ul>
Wildlife	<ul style="list-style-type: none"> <li>No effect to state sensitive species.</li> <li>Would not permanently impact suitable habitat for mule deer and elk.</li> <li>Minimal to non-existent permanent impacts to nesting, feeding, roosting, and hiding cover habitat for migratory birds, including raptors.</li> <li>No impacts to aquatic habitat in the Olmsted Hydroelectric Plant tailrace, Provo Bench Canal, or Provo River.</li> <li>Temporary impacts to wildlife and their habitats because of higher than usual noise levels, proximity of construction equipment, and other construction-related activities during construction.</li> <li>Lower impacts to habitat due to reduced ground disturbance.</li> </ul>	<ul style="list-style-type: none"> <li>No effect to state sensitive species.</li> <li>Would not permanently impact suitable habitat for mule deer and elk.</li> <li>Minimal to non-existent permanent impacts to nesting, feeding, roosting, and hiding cover habitat for migratory birds, including raptors.</li> <li>No permanent impacts to aquatic habitat in the Olmsted Hydroelectric Plant tailrace, Provo Bench Canal, or Provo River.</li> <li>Temporary impacts to wildlife and their habitats as a result of higher than usual noise levels, proximity of construction equipment, and other construction-related activities during pipeline maintenance and repair.</li> </ul>



## 3 Affected Environment and Environmental Consequences

### 3.1 Introduction

The purpose of this chapter is to describe the existing conditions of the human and natural environments within the Alpine Aqueduct Reach 1 Replacement and Resiliency Project's (Project) study area and evaluate the potential beneficial or adverse effects of implementing the Preferred Alternative, including alignment variations (Variations A, B, and C), or the No Action Alternative. Identified resources of concern are presented in this chapter. Each resource section presents the issues for analysis and characterizes both the affected environment and environmental effects. The environmental consequences are discussed including the impact (effect) indicators used that are "changes to the human environment from the proposed action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives, including those effects that occur at the same time and place as the proposed action or alternatives and may include effects that are later in time or farther removed in distance from the proposed action or alternatives" (40 Code of Federal Regulations [CFR] §1508.1(g)). Finally, construction impacts and mitigation measures are described.

#### 3.1.1 Affected Environment

The affected environment or the existing conditions were identified and described based on field investigations; scientific studies; previous related reports; coordination with federal, state, and local agencies; and literature and data file searches.

#### 3.1.2 Resource Concerns

Resources of concern, identified by agency and public scoping and Joint Lead Agencies' (JLAs) staff with specific knowledge of resources considered in this Final Environmental Assessment (EA) are shown in Table 3-1.

*Table 3-1. Resources of Concern.*

Resources of Concern
Air Quality
Climate Change
Cultural Resources
Geological Hazards
Groundwater and Subsurface Water
Indian Trust Assets
Public Health and Safety
Socioeconomics
Soils
Threatened and Endangered Species



### Resources of Concern

Transportation and Utilities

Vegetation and Invasive Species

Visual Resources

Wildlife

### Resources Not Addressed in the Final EA

Resources not addressed in this Final EA include those that are not present in the study area or the Preferred Alternative would have no effect or impact on these resources. The resources considered for inclusion but eliminated from further analysis are listed in Table 3-2.

*Table 3-2. Resources Eliminated from Consideration.*

Resource	Reason for Exclusion
Agricultural Resources	There would be no agricultural resources effected by the Project.
Energy	There would be no effect on the energy production of the nearby Olmsted Hydroelectric Plant or any other facilities.
Environmental Justice	The Project would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations.
Floodplains	There would be no change to the base flood elevations of the Provo River and would not impact the Provo River floodplain. Additionally, there are no Federal Emergency Management Agency (FEMA)-mapped floodplains within the study area.
Hazardous Waste	Construction of the Preferred Alternative is not expected to create hazardous materials, result in any hazardous waste impacts, or add contaminated soils within the study area.
Land Use Plans and Policies	There would be no change to existing or proposed land use plans. The Preferred Alternative would require easements from private landowners and Orem City for the pipeline alignment, access points, and construction right-of-way not located in the public road right-of-way or existing easement. Construction time could be shortened in residential neighborhoods if easements are granted for construction in landowner's park strips, which would be restored after construction.
Prime, Unique, and Statewide Important Farmland	The Farmland Protection Policy Act (FPPA) defines prime farmland as farmland that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for other uses. A Unique Farmland is land other than Prime Farmland that is used for production of specific high-value food and fiber crops; it has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops. Farmland already in urban development includes lands identified as "urbanized area" on the Census Bureau Map. There are no Prime, Unique, or Statewide Important Farmland within the Project study area.
Recreation	There would be no impacts to recreational resources. Access points in the construction area may be limited during construction, but the trails used by outdoor enthusiasts would still be available.
Water Resources	The Project would not involve new or a change in use of water resources.





Resource	Reason for Exclusion
Water Quality	The Project would not impact water quality in receiving waters.
Waters of the U.S. (WOTUS)	The Project would not impact any Waters of the U.S.
Wetlands	No wetland areas were delineated in the study area and therefore none would be impacted by the Project.
Wild and Scenic Rivers	The Provo River, within the study area, is not protected under the Wild and Scenic Rivers Act of 1968, as amended, and there is no known proposal to protect this portion of the Provo River under the act. The river would not be impacted by the Project.
Wilderness	The Project would not disturb lands that are protected now or proposed for protection under the Wilderness Act of 1964, nor would the project introduce any additional lands for consideration as wilderness.

### 3.1.3 Environmental Consequences

The National Environmental Policy Act (NEPA) requires consideration of the potential direct, indirect, and cumulative impacts that each alternative would have on the affected environment and provide measures to avoid, minimize, or mitigate these potential impacts. The terminology used to describe impacts is included in Table 3-3.

*Table 3-3. Environmental Consequences.*

Effect Type	Description
Direct	Impacts caused by an action and occurring at the same time and place (40 CFR §1508.8).
Indirect	Impacts caused by an action that are later in time or farther removed in distance but are still reasonably foreseeable (40 CFR §1508.8). Indirect effects are generally less quantifiable but can be reasonably predicted to occur.
Cumulative	Impacts on the environmental that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person is undertaking such other action (40 CFR §1508.7).

These environmental consequences can have either a temporary or permanent impact and short- or long-term impact, as described in Table 3-4.

*Table 3-4. Project Impact Descriptions.*

Impacts	Description
Temporary	Not lasting, and the affected resource would return or be restored to its pre-project state.
Permanent	Lasting, and the affected resource would not return to its previous state within one's lifetime.
Short-Term	Impacts that last during the duration of construction and shortly after (duration of impact is approximately 2 years).
Long-Term	Impacts that last for an extended duration of time (beyond year 2 up to the evaluated life of the Project (75-100 years)).



Resources benefitting from mitigation measures and Best Management Practices (BMPs) are defined in Section 3.17 and not identified in each resource section. The Preferred Alternative contains a preferred alignment and three alignment variations - Variations A, B, and C. The environmental consequences' sections evaluate the Preferred Alternative and Variation A, B, and C. The No Action Alternative discussions assume that there would be no construction activities. If the Alpine Aqueduct Reach 1 (AA-1) pipeline ruptures due to landslide or fault movement, Operations, Maintenance and Replacement (OM&R) activities would be needed, in which case the impacts would be similar to those of the Preferred Alternative related construction activities.

## 3.2 Air Quality

The Clean Air Act Amendments (CAAA) of 1990 established the National Ambient Air Quality Standards (NAAQS) for airborne pollutants. The six criteria pollutants addressed in the NAAQS are carbon monoxide (CO), particulate matter (PM), ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), lead (Pb), and sulfur dioxide (SO<sub>2</sub>). Particulate matter is broken into two categories: particulate matter with a diameter of 10 micrometers or less (PM<sub>10</sub>) and particulate matter with a diameter of 2.5 micrometers or less (PM<sub>2.5</sub>). The CAAA requires that air quality conditions within all areas of a state be designated with respect to the NAAQS as attainment, maintenance, nonattainment, or unclassifiable. Areas that do not exceed the NAAQS are designated as attainment, while areas that exceed the standards are designated as nonattainment. A maintenance area is an area previously designated as a nonattainment area where a state or local government has developed a plan to reduce the criteria pollutant concentrations to levels below NAAQS standards.

### 3.2.1 Affected Environment

According to the Utah Division of Air Quality (UDAQ), the study area falls within an area that has been designated as nonattainment for PM<sub>10</sub> and PM<sub>2.5</sub>. Additionally, a small portion of the study area is located in an area of Utah County that has been designated a maintenance area for CO.

### 3.2.2 Environmental Consequences

#### Preferred Alternative and Variations A, B, or C

##### *PM<sub>10</sub> and PM<sub>2.5</sub>*

Temporary and localized impacts to air quality as a result of fugitive dust emissions and other construction-related pollutants could occur during implementation of the Preferred Alternative and Variations A, B, or C. Fugitive dust can be released and become airborne during construction activities including land clearing, ground excavation, cut-and-fill, road cutting, construction trucks carrying uncovered loads, mud tracked onto paved roads in the construction zone, and by winds blowing through the construction site. All other pollutants, PM<sub>2.5</sub> and greenhouse gases are generated from heavy-duty diesel construction equipment.



Earthwork phases emit the greatest amount of dust and emissions. Implementation of BMPs, including periodic watering of borrow and spoil material, and access roads, would prevent large amounts of dust from being emitted. There would be no long-term adverse impacts to air quality from operation of the pipeline.

### **CO**

Emissions of CO would be generated from construction equipment and vehicle exhaust during construction activities. The Preferred Alternative or Variations A, B, or C would have no long-term adverse impacts on air quality.

### **No Action Alternative**

Under the No Action Alternative, the Central Utah Water Conservancy District (District) would continue to provide OM&R to the existing AA-1 pipeline, as it regularly receives damage from movement of the landslide complex, resulting in temporary and localized impacts to air quality.

## **3.3 Climate Change**

The earth's climate is changing, as evidenced by rising temperatures, shifting snow and rainfall patterns, and more extreme climate events like heavy rainstorms and record high temperatures. Climate change is in part caused by greenhouse gases which trap heat in the atmosphere. Burning fossil fuels (coal, natural gas, and oil), solid waste, trees, and other biological materials release carbon dioxide (CO<sub>2</sub>) into the atmosphere. Emissions of CO<sub>2</sub> make up the largest component, 79%, of greenhouse gas emissions.

Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance established an integrated strategy towards sustainability in the federal government and made the reduction of greenhouse gas emissions a priority for agencies.

### **3.3.1 Affected Environment**

Weather patterns are changing over time, including warmer temperatures, more severe storms, and increased drought. The study area and the areas supplied by the regional water delivery system are being affected by these changes.

### **3.3.2 Environmental Consequences**

#### **Preferred Alternative and Variations A, B, or C**

Additional CO<sub>2</sub> emissions would be emitted during the construction of the Preferred Alternative or Variations A, B, or C. These would be temporary and localized impacts. Implementation of BMPs may be required for construction equipment. Emissions from construction activities are usually local and temporary and last only for the duration of the construction period. There would be no long-term, indirect impacts from the implementation of the Preferred Alternative and Variations A, B, or C.





### **No Action Alternative**

Under the No Action Alternative, the District would continue to provide OM&R to the AA-1 pipeline, which regularly sustains damage from the movement of the landslide, resulting in temporary and localized emissions. There would be no long-term impacts to climate change.

## **3.4 Cultural Resources**

Historic properties include archaeological resources (both prehistoric and historic), architectural resources (buildings and structures), and traditional cultural properties. The Advisory Council on Historic Preservation (ACHP) defines a historic property 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).”

The National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations (36 CFR §800) establish the national policy and procedures regarding historic properties. Section 106 of the NHPA requires consideration of the effects of federal projects and policies on historic properties. Utah Administrative Code (UAC) §9-8-401 et seq. was passed to provide protection of “all antiquities, historic and prehistoric ruins, and historic sites, buildings, and objects which, when neglected, desecrated, destroyed or diminished in aesthetic value, result in an irreplaceable loss to the people of this state.”

The Section 106 review process requires historic properties to be evaluated for eligibility and listing on the NRHP based upon whether “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, and association,” and meet one or more of the following criteria:

- A. Associated with events that have made a significant contribution to the broad patterns of our history.
- B. Associated with the lives of persons significant in our past.
- C. Embody distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction.
- D. Yielded, or may likely yield, information important in prehistory or history.

### **3.4.1 Affected Environment**

A Class I literature review and a Class III cultural resource inventory were completed within the Area of Potential Effects (APE) in April 2022. The inventory resulted in no newly recorded sites and documentation of two previously recorded sites within the APE, indicated in Table 3-5. In accordance with 36 CFR §800.4, any sites identified within the APE were evaluated for significance in terms of the above NRHP eligibility criteria. Both sites were previously determined eligible for listing on the NRHP. No changes to these sites were observed that would require revision of the previous determination. No historic-period structures were observed within the APE.





Table 3-5. Cultural Resources Within the Study Area.

ID	Description	NRHP Eligibility
42UT1134	Salt Lake Aqueduct	Eligible
42UT1758	Olmsted Hydroelectric Plant	Eligible

Site 42UT1134 was previously documented by Baseline Data in 2000, Earth Touch in 2007, and Sagebrush Consultants in 2011 (Allison 2000; Billat and Billat 2007; Pagano 2011). Other recorded segments have been previously determined eligible for the NRHP under Criterion A, due to its association with broad patterns of water manipulation and control in Utah Valley in the early to mid-20th century in 2001. This segment, though mostly a subsurface feature, retains integrity of location, design, setting, materials, and association, and it is recommended that the site remain eligible for the NRHP.

Site 42UT1758 has been previously determined eligible for the NRHP as one of the earliest hydroelectric sites in Utah. The power generation building is listed on the NRHP and has provided an important power source to the Tintic mining district as well as local municipalities and was one of the earliest training facilities for electrical engineers in the United States. The plant was closely associated with Lucian Nunn, an important early developer of hydroelectric power. The buildings on the site, as well as the contributing archaeological features, are excellent and rare examples of the style of early hydroelectric plants. It is also possible that additional information regarding the daily lives of early students and employees at the site could be recovered through excavation.

### 3.4.2 Environmental Consequences

#### Preferred Alternative and Variations A or B

The Preferred Alternative nor Variations A or B would avoid impacting the cultural resources listed in Table 3-5 and would completely avoid impacts to 42UT1134, the Salt Lake Aqueduct. Improvements and realignment of the AA-1 pipeline would remain south of the Salt Lake Aqueduct's alignment and not interrupt its service. The Preferred Alternative nor Variations A or B would completely avoid impacts to 42UT1758, the Olmsted Hydroelectric Plant site. It was determined that the overall Section 106 effect of the AA-1 realignment on historic properties is No Historic Properties Affected. The Utah State Historic Preservation Office (SHPO) concurred with that determination on May 16, 2022. There would be no direct or indirect impacts on cultural resources.

#### Variation C

Variation C would completely avoid impacts to 42UT1134, the Salt Lake Aqueduct. Although an access road to Site 42UT1758 traverses the hillside from the west to the east, it would not be impacted by construction activities associated with the boring of the pipeline under Variation C, and no historic properties would be affected. There would be no direct or indirect impacts on cultural resources.



### **No Action Alternative**

The District would continue ongoing OM&R of existing facilities as needed. The No Action Alternative would have no direct or indirect impacts on cultural resources.

## **3.5 Geological Hazards**

A geological hazard is an adverse geologic condition that can cause widespread damage or loss of property and life. The *Resiliency Assessment* (Jacobs 2020) provides an in-depth discussion on geotechnical investigations completed to identify geologic hazards.

### **3.5.1 Affected Environment**

#### **Geologic Setting of the Study Area**

Located at the base of the Wasatch Mountains' western slope, the study area is in a highly geologically active area, which is subject to a variety of geological hazards such as landslides, steeply incised canyons, and unstable bedrock conditions. The area is characterized by young alluvial and river terrace deposits of the Provo River, underlain by the Manning Canyon Shale and the Great Blue Limestone of Mississippian/Pennsylvanian age. The natural slopes are composed of alluvial terrace deposits at a relatively steep slope, containing sub-angular to rounded cobbles and boulders which could loosen and roll down the slope in a seismic event (Golder 2013).

#### **Wasatch Fault Zone**

The study area is located within the 230-mile-long Wasatch Fault Zone (WFZ), with several suspected active fault lines extending through the study area. In general, an "active" fault is defined as one that shows evidence of movement within the last 10,000 to 11,000 years, or within the Holocene Epoch. The Provo Segment of the WFZ has produced five surface-rupturing events over the last 7,000 years, causing substantial displacements along the fault. Estimates for a future seismic event range from 8 to 17 feet of displacement, which would damage critical infrastructure including the AA-1 pipeline. Any project improvements would require crossing the eastern and central strands of the WFZ.

#### **Landslide Complex**

In addition to the WFZ, geologic mapping by the United States Geological Survey (USGS), Utah Geological Survey (UGS), and Lettis Consultants International (LCI) shows the presence of a landslide complex in the foothills above Orem City that is approximately 5,000 feet long and 1,800 feet wide. The complex consists of unstable fractured limestone and shale, and multiple smaller slides within Lake Bonneville deposits. This area has experienced multiple landslides, requiring repairs to the AA-1 pipeline in 1985, 1986, 1988 (2 failures), 2000, and most recently 2017. This landslide complex area is considered a geological hazard to be avoided as infrastructure crossing over or through would likely not survive the 975-year seismic event because of significant ground deformation (landslide slippage). Triggers known to activate a landslide include high moisture content and seismic activity.



Due to the landslide and its potential to move and damage the AA-1 pipeline, the District installed inclinometers and piezometers through the landslide complex. The inclinometers, installed between 50 – 150 in depth, measure the amount of landslide movement occurring. A piezometer measures the underground water pressure in the aquifer.

### **3.5.2 Environmental Consequences**

#### **Preferred Alternative and Variations A, B, or C**

The Preferred Alternative would provide a more reliable and resilient pipeline by avoiding the landslide complex. While it would cross the WFZ in several locations, the design and construction would include seismic mitigations as described in Section 2.5.1. The Preferred Alternative and Variations A, B, and C are all located outside the landslide complex. The Preferred Alternative alignment crosses the WFZ, as shown in Figure 2-2. Variations A, B, and C represent only a partial change in alignment to the Preferred Alternative and are outside of the WFZ. As the WFZ is unavoidable, any alignment chosen would need to cross the WFZ. There would be direct and temporary impacts with the implementation of the Preferred Alternative.

#### **No Action Alternative**

The District would continue ongoing OM&R of existing facilities as needed. In the event of landslide or fault movement, the AA-1 pipeline is anticipated to withstand a very limited amount of ground displacement before rupturing, causing damage to the pipeline and surrounding area. Direct impacts could include the loss of water conveyance in the pipeline while repairs are made and erosion and flooding in surrounding areas due to uncontrolled release of flows.

## **3.6 Groundwater and Subsurface Water**

According to the U.S. Geological Survey, Utah Valley is bounded by the Wasatch Range, West Mountain, and the northern extension of Long Ridge. The valley is divided into two groundwater basins, northern and southern, which are separated by Provo Bay in northern Utah Valley. Groundwater in Utah Valley occurs in unconsolidated basin-fill deposits under both water-table and artesian conditions, but most wells discharge from artesian aquifers. The principal groundwater recharge area for the basin-fill deposits is in the eastern part of the valley, along the base of the Wasatch Range (USGS 2018).

According to *Hydrology of Northern Utah Valley, Utah County, Utah 1975-2005*, measured groundwater levels have declined an average of 22 feet from 1981 to 2004. Recharge areas along the mountain front is focused over areas where streams and creeks enter the valley. With persistent drought conditions, groundwater levels will likely continue to decline.

Groundwater conditions and quantities can vary considerably depending on the season, climate conditions, withdrawals, and proximity to the river. Groundwater may occur in permeable gravel zones, and/or locally perch on top of bedrock surfaces. (Golder 2013).



### **3.6.1 Affected Environment**

There is limited data on the presence of groundwater and the piezometric surface along the Preferred Alternative's alignment. Boreholes were drilled in connection with the investigation presented in the Resiliency Assessment (Jacobs 2020), which did not show any significant volumes of groundwater. Regular measurements of standing water within each borehole prior to and after drilling operations reported "dry holes," suggesting low, or no, groundwater. In addition, a geotechnical investigation conducted as part of the development of the Canyon Cove Estates neighborhood did not encounter groundwater.

Only a few wells are within the study area, of which well logs indicate that water depth at the time of drilling ranged between 140 and 219 feet below the surface (55-13419 and 55-12639). USGS Well Station 401853111401501, located south of the study area, ranged from a high of 294 feet below the surface in 1985 to a low of 346 in 2004.

Orem City has two spring sources located in Provo Canyon, Alta Springs, which is 3 miles northeast from the mouth of the canyon, and Canyon Springs, which is located near Mount Timpanogos Park. There are no other documented springs near the study area.

Several comments received during the scoping process and on the Draft EA stated that the residential neighborhood has experienced problems with subsurface water. Soils in the area may experience subsurface flows with no natural outlet for the water resulting in saturated soils from the accumulated infiltration of water. This can occur when there are obstructions to percolation of water through soil such as shallow bedrock, depositional clay layers, and other similar causes. It is possible that there are remaining subsurface drainage systems from the orchards that historically were farmed in the study area.

### **3.6.2 Environmental Consequences**

#### **Preferred Alternative and Variations A, B, or C**

The Preferred Alternative nor Variations A, B, or C would change the surface water that infiltrates into the ground and would have no impact to the groundwater supply, quality, or quantity. From the few well logs in the study area, recorded groundwater levels are well below the depth that would be impacted by construction of the Project. Additionally, there are no recorded springs along the alignments. There would be no direct or indirect impacts to groundwater.

At this time, it is unclear whether or not the residential neighborhood is experiencing surface and/or subsurface water drainage issues. A large diameter pipe may impede or alter the subsurface drainage flow resulting in subsurface water to surface in a different location or change direction. The JLAs would investigate for subsurface water along the Preferred Alternative alignment in the residential area – specifically along 1060 North and 1360 East. If subsurface drainage problems are identified under these roads, the JLAs would determine the best corrective measure, such as a French drain system, as part of the Project to safely convey water away from the neighborhood. These measures would be designed to not increase the



effects of the subsurface water by the Project in the neighborhood. If necessary, the JLAs would coordinate authorizations and necessary permits with Orem City.

### **No Action Alternative**

The No Action Alternative would have no direct or indirect impacts to groundwater, as there would be no change to the amount of water that infiltrates into the ground.

## **3.7 Indian Trust Assets**

Indian Trust Assets (ITA) are legal interests in property held in trust by the United States for Indian tribes or individuals. The U.S. Department of the Interior, Central Utah Project Completion Act Office's (Interior) policy is to recognize and fulfill its legal obligations to identify, protect, and preserve 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). All impacts to ITAs, even those considered nonsignificant, must be discussed in NEPA compliance documents and appropriate compensation or mitigation must be implemented.

Trust assets may include agricultural lands, minerals, hunting and fishing rights, traditional gathering grounds, and water rights. Impacts to ITAs are evaluated by assessing how the action affects the use and quality of ITAs. Any action that adversely affects the use, value, quality, or enjoyment of an ITA is considered to have an adverse impact to the resources.

### **3.7.1 Affected Environment - Indian Trust Asset Status**

The Interior CUPCA office sent letters requesting consultation for the Project on potential properties of religions or cultural importance to Native American Tribal Governments and Bureau of Indian Affairs Agency Offices on November 15, 2021. The Hopi Cultural Preservation Office and the Navajo Nation responded. The Hopi Tribe requests that if the cultural resource survey identifies prehistoric sites that may be adversely affected by the Project, to consult with them. The Navajo Nation responded that the project could continue without further coordination with them. Additionally, if any Native American human remains or funerary objects are discovered, construction would be stopped immediately, and the findings would be reported.

### **3.7.2 Environmental Consequences**

#### **Preferred Alternative and Variations A, B, or C**

Implementation of the Preferred Alternative nor Variations A, B, or C would have no foreseeable negative impacts on ITAs. There would be no direct or indirect impacts to ITAs.

#### **No Action Alternative**

The No Action Alternative would have no direct or indirect impacts to ITAs.



## 3.8 Public Health and Safety

### 3.8.1 Affected Environment

During construction, there would be temporary effects to public health and safety with respect to local residents, public, and construction workers. With deep open trenches in the residential streets, maintaining and limiting working areas for construction workers would be challenging. Ensuring safety would require coordination and cooperation between the involved parties.

There would be no long-term effects to public health and safety during regular operation. An Emergency Action Plan (EAP) would be developed providing procedures to be followed in the event of a rupture. Although a seismic event is much less likely to cause a rupture in the new pipeline, should a problem arise, the EAP would be followed. Possible procedures may include closing the slide gates at the 10 MG Olmsted Reservoir as fast as possible but at a systematically controlled rate so as to not damage other facilities connected to AA-1 (e.g., DACRWTP, Alpine Aqueduct Reach 3, Olmsted Flowline). The EAP would also notify those affected by the AA-1 pipeline's rupture and subsequent shut down. Repairing the new AA-1 pipeline could occur relatively quickly because of the shallow bury depth and repair materials that the District would have on hand.

### 3.8.2 Environmental Consequences

#### Preferred Alternative and Variations A, B, or C

Based on the existing failure hazards of the AA-1 pipeline, the Project would have an overall beneficial long-term impact on public health and safety due to the reliability of the water supply. Although the Preferred Alternative would place the pipeline adjacent to multiple houses, the pipeline's design, alignment, and construction would be such that it is less likely to rupture and cause flooding to residential areas. In the event of pipeline damage, the quantity of water would be consistent with the existing pipeline's capacity and would follow the natural drainage path, first along curb and gutter and then any flows exceeding the roadway's capacity would follow the natural topography of the ground.

During construction, there would be temporary impacts to local residents, including the potential risk and safety concerns related to the proximity of a deep open trench and operating equipment located within the neighborhood. Residents and children would be unable to recreate near construction zones. The active construction areas would be fenced and secured at all times. All open trenches would be covered with heavy metal plates.

Overall, there would be indirect and long-term beneficial impacts to public health and safety from the implementation of the Preferred Alternative and Variations A, B, or C.

#### No Action Alternative

Under the No Action Alternative, there would be no beneficial or negative direct or indirect impacts to public health and safety unless there was a rupture to the AA-1 pipeline. As a result





of a landslide or earthquake, a rupture of the AA-1 pipeline would result in health and safety impacts adjacent to the break, likely resulting in large volumes of water flowing from the break and erosion of soils. Additionally, a break could result in loss of water supply to the 1.6 million water users. Construction crews would be required on short notice to perform emergency maintenance. In the event of a pipeline rupture, there could be direct impacts to local residents depending on the location of the rupture but could include large amounts of water and soil erosion which could impact public health and safety.

## **3.9 Socioeconomics**

### **3.9.1 Affected Environment**

The 13.2 mile-long Alpine Aqueduct pipeline is an integral facility of the Bonneville Unit M&I System's vast network of water facilities. It delivers water for irrigation, municipal, and industrial uses to approximately 1.6 million people in northern Utah and Salt Lake Counties, which is half of Utah's population. The water is essential for the population's livelihoods including domestic and productive needs. Failure of the AA-1 pipeline would result in significant economic impact to the communities that would no longer have this water source. Other critical infrastructure and services rely on water, including power, medical care, and fire response. Without water, interdependent systems and infrastructure would remain offline. Impacts would extend to the rest of Utah, which is reliant on food, fuel, and other supplies sourced in the Wasatch Front. If communities are without water for months, businesses would collapse, and families would relocate (USSC, 2021). Another impact due to failure of the AA-1 pipeline could be water damage to downstream properties and hazards to human life.

### **3.9.2 Environmental Consequences**

#### **Preferred Alternative and Variations A, B, or C**

Indirect, long-term benefits of the Preferred Alternative and Variations A, B, or C to socioeconomics include meeting existing contractual obligations and providing safe and efficient operation of the AA-1 pipeline. The new AA-1 pipeline section would be connected to the existing AA-1 pipeline during the winter when water users are not dependent on that water supply. There would be temporary beneficial impacts from the employment of construction crews and spending on goods, services, and materials during the construction phase, which would benefit local businesses and the county from collected taxes.

#### **No Action Alternative**

Under the No Action Alternative, there would be no beneficial or negative direct or indirect impacts while the AA-1 pipeline is functioning properly. The District would continue ongoing OM&R of existing facilities as needed. In the event of a pipeline rupture, there could be a significant direct economic impact to the 1.6 million water users that rely on the water and a substantial hazard to human life and property.





## 3.10 Soils

### 3.10.1 Affected Environment

A portion of the AA-1 pipeline was constructed between two drainages consisting primarily of colluvium and Manning Canyon Shale spoil from the tunnel's excavation that was used to construct the embankment. The remainder of the AA-1 pipeline was constructed in a trench installation through the underlying native materials. It appears from investigations that the embankment was constructed of colluvium materials, fragmented shale, and limestone, which appear to be landslide materials consisting of silty to clayey gravel with sand and cobbles. Although the soils from the tunnel's excavation were placed directly atop the natural soil deposits and compacted when placed, many of the shale fragments have degraded into clay (URS 2001). Soil units and man-made fills and grading are described below.

#### Soil Units

Manning Canyon Shale is prone to slumping, landslides, and related instability and is known to cause problems. Field studies conducted prior to the AA-1 construction indicated the predominant near-surface soil types to be brown silty and clayey gravel with sand and limestone cobbles, with some limestone and shale blocks greater than 10 feet in diameter. Reclamation broadly classified these soils as generally with "slopewash" or landslide deposits. Additionally, silts and clays underlain by highly weathered Manning Canyon Shale was observed above the Alpine Tunnel outlet. Alpine Aqueduct reaches 2 and 3 were installed in native materials, which do not have these issues and are outside the landslide area. (URS 2001)

Specific surficial soil deposits consist of several distinct units including the following:

- Quaternary Lake Bonneville lacustrine gravel and sand (Qlb): consist of beds of sand, gravel, silt, and some clay deposited during the Bonneville phase of the Lake Bonneville cycle. Deposits range from clast supported pebble and cobble gravel with sand and silt matrix, to laminated sand with minor pebbly gravel and silt, to massive silt with sand. Sand and gravel are typically subrounded to well-rounded.
- Quaternary stream alluvium (Qsa): consist of pebble and cobble gravel with sand and silt matrix, occasional sand lenses, poorly to moderately sorted, and subangular to rounded clasts. Typically found at the mouths of drainages.
- Quaternary alluvial fan (Qaf): consist of intermixed sand, silt, and gravel. Typically, angular to subrounded, with occasional rounded clasts derived from Bonneville Lake cycle sediments. Typically found at the mouths of drainages.
- Quaternary colluvium (Qc): consist of well-graded silt, sand, and gravel. Clasts are angular and derived from various upslope bedrock units.

#### Manmade Fills and Grading

There are nine general areas where substantial amounts of fill were placed upslope of the AA-1 pipeline, most of which were for the former Cascade Golf Course. These areas were spread



using a crawler tractor-type excavator with no compaction control. The fill material appears to be principally native material cut during mass grading from adjacent ridges and hillsides, with the remaining portion being imported.

The area closest to the Don A. Christiansen Regional Water Treatment Plan (DACRWTP) has fill along the AA-1 pipeline of up to 10 to 20 feet. Other fill depths moving east along the alignment range from 5 to 10 feet. Localized fill placed along drainages and erosion channels are estimated to range from 10 to 20 feet thick.

### **3.10.2 Environmental Consequences**

#### **Preferred Alternative and Variations B or C**

The Preferred Alternative and Variations B or C would result in soil disturbance and vegetation removal associated with construction activities. Exposure to soils include vegetation removal, mixing of soil gradations, loss of topsoil productivity, soil compaction, and increased susceptibility to erosion. The Preferred Alternative's alignment would have less potential for slope and seismic instability when compared with the No Action Alternative which crosses the landslide complex. BMPs would be implemented as described in Section 3.17 and additional geotechnical testing would be performed in conjunction with the Project's design phase. Areas disturbed would be restored and stabilized through re-establishment of vegetation and would diminish over time as reclamation is achieved. The Preferred Alternative and Variations B or C would have direct and temporary impacts to areas disturbed during construction.

#### **Variation A**

Variation A would have direct, indirect, and permanent impacts related to the construction of the pipeline including open cutting and rock bolting to the hillside. Although disturbed areas would be restored and stabilized through re-establishment of vegetation, there would be permanent changes to soils and vegetation on the hillside potentially leading to increased erosion. BMPs would be implemented as described in Section 3.17. Areas disturbed would be restored and stabilized through re-establishment of vegetation.

#### **No Action Alternative**

The No Action Alternative would have no direct or indirect impact to soils while the pipeline is functioning properly. In the event of a rupture, the District would perform OM&R activities to remediate pipeline issues. The associated disturbance to soils would be direct, temporary, and localized to the immediate work area to complete the necessary repairs. There are no long-term or permanent impacts expected for soils.

## **3.11 Threatened and Endangered Species**

### **3.11.1 Endangered Species Act**

Section 7 of the Endangered Species Act (ESA) of 1973 (7 United States Code [USC] §136, 16 USC §1531 et seq.), as amended, requires federal agencies to consult with the U.S. Fish and



Wildlife Service (USFWS) if listed species or designated Critical Habitat may be affected by the Preferred Alternative. If adverse impacts would occur as a result of the Preferred Alternative, the ESA requires federal agencies to evaluate the likely effects and ensure that it neither jeopardizes the continued existence of federally listed ESA species nor results in the destruction or adverse modification of designated Critical Habitat.

### 3.11.2 Affected Environment

Table 3-6 lists the federally listed ESA species that are known to occur within Utah County, Utah, and are considered in this analysis. No designated critical habitat for federally listed ESA species occurs within a half mile of the study area.

Table 3-6. ESA Species List.

Species	Status	Occurrence in the Study Area
Yellow-billed cuckoo ( <i>Coccyzus americanus</i> )	Threatened	Found in mixed native and non-native riparian woodlands. Patches vary in size and shape but must be $\geq 12$ -acres and 100-meters wide or more in at least one location. Quality habitat is structurally diverse with a multi-layered overstory and dense understory. Although there is suitable habitat, consisting of multi-layered riparian vegetation, for yellow-billed cuckoo within 0.5 miles of the study area, no documented occurrences of yellow-billed cuckoo within 2 miles. However, due to the presence of suitable habitat, it is possible this species could occur in and near the study area.
June sucker ( <i>Chasmistes liorus</i> )	Threatened	Endemic to Utah Lake and the Provo River. Designated critical habitat for the June sucker is in the lower 4.9 miles of the Provo River, measured from its confluence with Utah Lake. The Tanner Race diversion falls within the critical habitat and is approximately 4.5 miles from the study area. There are four diversions between the study area and Tanner Race diversion. These diversions are not passable by June sucker. Therefore, this species is not found in or near the study area.
Canada lynx ( <i>Lynx canadensis</i> )	Threatened	Found in moist, montane, boreal forests with an abundance of snowshoe hare. No suitable habitat and no documented occurrences within or near the study area have been recorded. Therefore, this species is not found in or near the study area.
Monarch butterfly ( <i>Danaus plexippus</i> )	Candidate	A milkweed obligate species. There are many species of milkweed that grow in a variety of habitat types, including those found in the study area. It is possible this species could occur in and near the study area.

Source: USFWS's Information for Planning and Consultation (IPaC), accessed on February 16, 2022.



### 3.11.3 Environmental Consequences

#### Preferred Alternative and Variations A, B, or C

##### *Yellow-billed cuckoo*

Suitable habitat for yellow-billed cuckoo occurs about 740 feet to the east of the study area. No suitable habitat would be removed during construction or otherwise directly impacted by Project activities. A noise screening analysis determined that noise from equipment used during project construction would not exceed the ambient noise level of the adjacent US-189. There would be no direct or indirect impacts from the implementation of the Preferred Alternative nor Variations A, B, or C.

##### *Monarch butterfly*

There is potentially suitable habitat for monarch butterfly in the study area due to the diverse habitat types in which milkweed can occur. However, because monarch butterfly is a candidate species, no conservation actions are currently required.

Disturbed areas resulting from construction will be reseeded, where applicable, with a seed mix that includes vegetation suitable for monarch butterfly habitat.

#### No Action Alternative

Under the No Action Alternative, there would be no direct or indirect impacts to listed species or critical habitat.

## 3.12 Transportation and Utilities

### 3.12.1 Affected Environment

The affected environment for the transportation and utility impacts includes roads that would be used by construction crews to access the project site in Orem from 800 North to either 1400 East or 1560 East and for pipeline construction in the 1060 North and 1360 East roadways. The remainder of the Preferred Alternative's alignment is in undeveloped areas and the former Cascade Golf Course. The Preferred Alternative would cross under several large above ground powerlines located east of the neighborhood. From the *Resiliency Assessment* (Jacobs 2020), existing utilities in the 1060 North and 1360 East roadways include fiber optic, gas, power, 8-inch waterline, and an 8-inch sewer line, and 1360 East also has a 24-inch storm drain line and storm drain inlets.

### 3.12.2 Environmental Consequences

#### Preferred Alternative and Variations A, B, or C

The Preferred Alternative and Variations A, B, or C would have direct and temporary impacts to traffic due to construction including traffic increase with construction traffic moving equipment, materials, and workers to the construction site, detours, delays, and residential access restrictions, all of which could increase the risk of accidents. Vehicular access to properties may be restricted during construction with alternate routes identified. The contractors would be



required to address traffic concerns with notification prior to impacts to local residents and flagging if necessary. Children would be unable to recreate near construction zones during construction. There would be no long-term adverse impacts to transportation or utilities.

Construction in the residential streets would require the existing sewer to be lowered or the installation of a parallel sewer line. The District has routinely relocated sewers and smaller utilities as part of other pipeline projects without issues or significant challenges. Figures 3-1 and 3-2 show a typical cross-section in 1060 North and 1360 East (Jacobs 2020). There would be a direct and temporary impact (completed within 6-8 hours) to the sewer utility when the relocated sewer pipeline would be connected to the existing sewer pipeline. Relocation of other utilities, if necessary, would be determined during the final design.

### No Action Alternative

Under the No Action Alternative, there would be no direct or indirect impacts to transportation and utilities. In the event of a rupture of the AA-1 pipeline, access to the pipeline would be from 800 North to either 1400 East or 1560 East and from the DACRWTP. Impacts to traffic would be minimal and temporary.

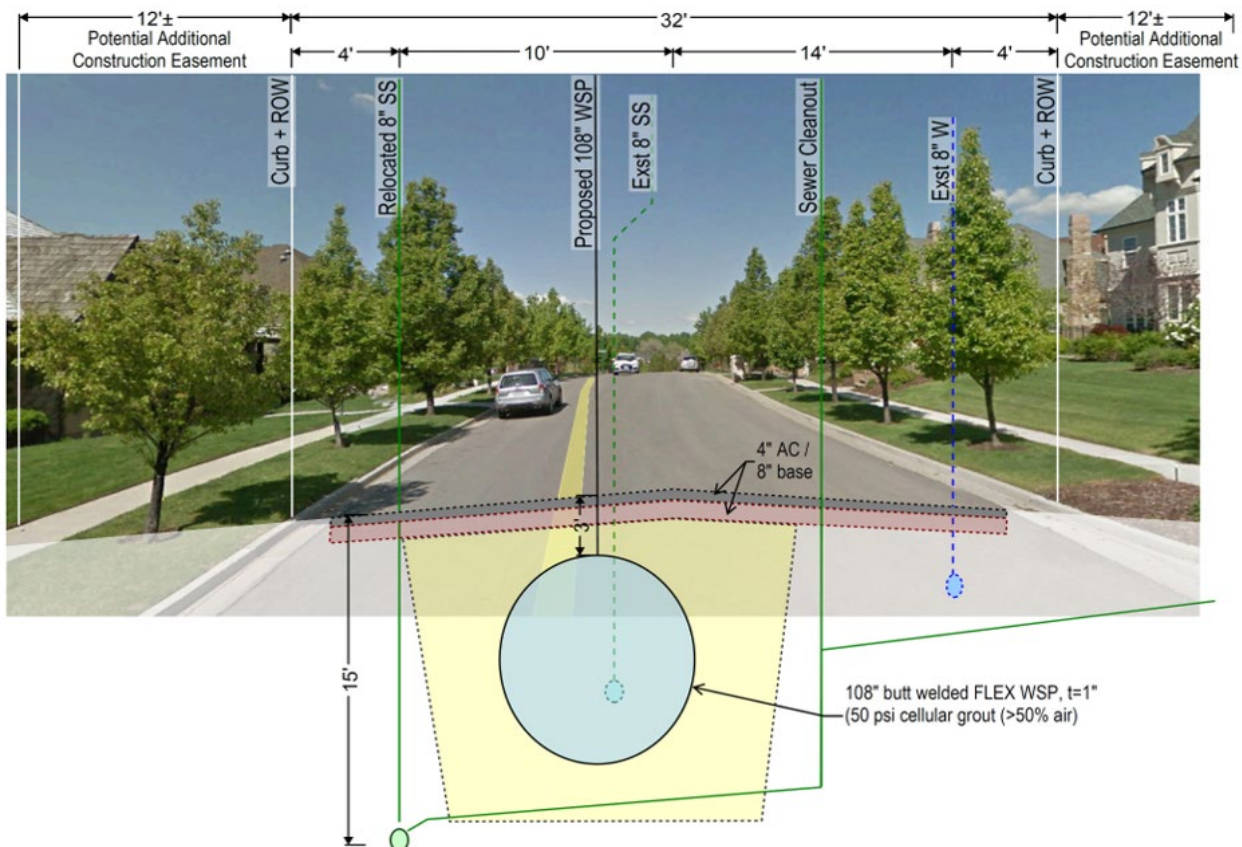


Figure 3-1. Cross-Section View of 1060 North.



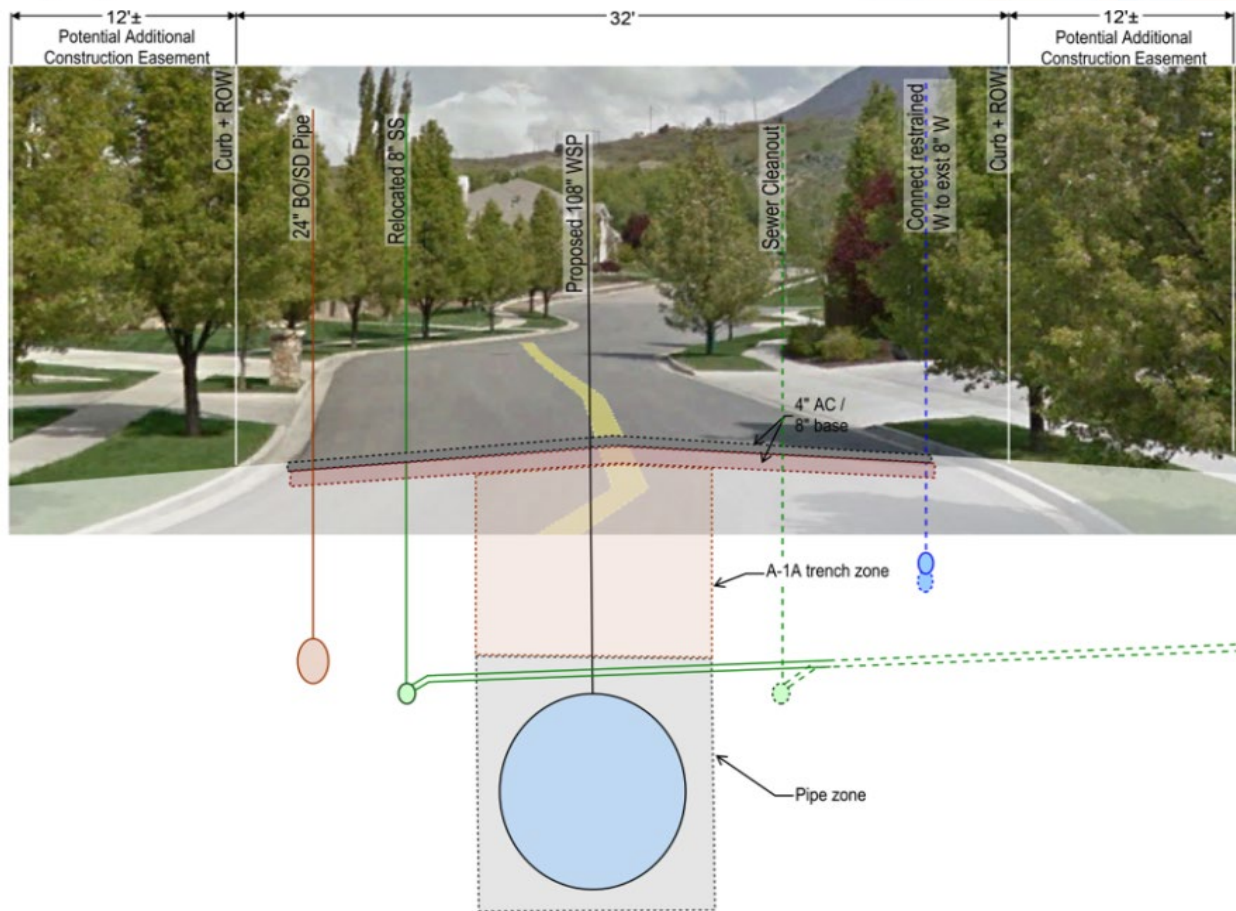


Figure 3-2. Cross-Section View of 1360 East.

### 3.13 Vegetation and Invasive Species

Invasive species are non-native species that spread at the expense of native vegetation and are considered harmful to plants, animals, or the environment. Prevention and early treatment are the most cost-effective BMPs. Vegetation in the study area has declined due to drought conditions and land use practices.

#### 3.13.1 Affected Environment

##### Vegetation

The habitat in the study area can be classified as northern mountain brush complex using Woody Plants of Utah (Van Buren et al. 2011). This vegetative community occurs in the foothills of mountain ranges and is dominated by shrubs such as Gambel oak (*Quercus gambelii*), bigtooth maple (*Acer grandidentatum*), box elder (*Acer negundo*), curl-leaf mountain mahogany (*Cercocarpus ledifolius*), alderleaf mountain mahogany (*Cercocarpus montanus*), and sagebrush (*Artemisia spp.*).

Due to the 2020 Range Fire, which burned approximately 3,500 acres at the mouth of Provo



Canyon, very few trees and shrubs are present in the study area. Instead, the study area is dominated by various species of native and non-native grasses and forbs such as intermediate wheatgrass (*Thinopyrum intermedium*), crested wheatgrass (*Agropyron cristatum*), bulbous bluegrass (*Poa bulbosa*), and cheat grass (*Bromus tectorum*) (see Figure 1).

In addition to the grassland habitats available in the study area, suitable habitat for migratory birds occurs in small patches of oakbrush (*Quercus gambelii*), sagebrush (*Artemisia tridentata*), and Utah juniper (*Juniperus osteosperma*) as well as along the large limestone cliffs at the mouth of Provo Canyon.

### **Invasive Species**

During an onsite survey, invasive species and noxious weeds were identified including hoary cress (*Lepidium draba*) a Class 3 Containment Noxious Weed, and Dalmatian Toadflax (*Linaria dalmatica*) a Class 2 Control Noxious Weed. Other invasive species identified in the study area include cheatgrass (*Bromus tectorum*), Jim Hill Mustard (*Sisymbrium altyissimum*), storksbill (*Erodium cicutarium*), and bulbous bluegrass (*Poa bulbosa*). Invasive species were observed throughout the study area but were most abundant in disturbed areas.

## **3.13.2 Environmental Consequences**

### **Preferred Alternative and Variations A, B, or C**

The Preferred Alternative would include construction activities that would disturb the vegetation. The ground disturbance would be direct and temporary, and there could be an increase in the spread of invasive or noxious weeds. The risk of spreading weeds during construction would be temporary but would reduce as reclamation was completed and disturbed surfaces were re-established with desirable vegetation. However, BMPs would be utilized during construction and the District's Integrated Pest Management Plan would be implemented after construction for ongoing monitoring and treatment of invasive species. There would be no long-term or permanent risk of spreading invasive species because of construction.

### **No Action Alternative**

Under the No Action Alternative, there would be no direct or indirect impacts to vegetation or invasive species. However, if OM&R activities are required, impacts would be consistent with construction activities and BMPs and the District's Integrated Pest Management Plan would be implemented during and after OM&R activities.

## **3.14 Visual Resources**

This section describes the existing visual resources and assesses the extent to which the Project would change the perceived visual character and quality of the environment where the Project is located. The analysis addresses changes to the existing landscape characteristics that would result from construction, operation, or maintenance of either alternative or variations.



### **3.14.1 Affected Environment**

Visual or scenic resources within the study area are the natural and built features of the landscape that contribute to the public's experience and appreciation of the environment. For the study area, these include historical structures and site features and established vegetation and landscapes. Visual resources or scenic impacts are generally defined in terms of a project's physical characteristics and potential visibility and the extent to which the Project's presence would change the perceived visual character and quality of the environment in which it would be located. For this study, the primary viewer groups of the study area include those adjacent to the study area (residents and recreationists) and those traveling near the study area (motorists on adjacent roadways).

### **3.14.2 Environmental Consequences**

#### **Preferred Alternative**

During construction of the Preferred Alternative, construction activities and equipment used for tunneling, excavating, pipe placement, and material hauling would be visible along the proposed alignment. After installation, project facilities would have minimal visual impact. The completed pipeline would be underground with access points at ground level via manhole covers. Visible elements may include blowoff structures connected to the Orem City storm drain system at the intersection of 1060 North and 1360 East, manways, tunnel inlet and outlet portals, air vents, access points to the strain gauges, which create minor long-term visual impacts in the landscape. Disturbed areas would be reclaimed and restored to preconstruction conditions upon construction completion. The visible portion of the existing AA-1 pipeline, approximately a 400-foot section, would be removed and no longer visible. If easements for use of the park strips were obtained, the removal of mature trees and the replacement with new trees would be a visual impact along the residential streets. There would be a direct and temporary impacts with the implementation of the Preferred Alternative.

#### **Variation A**

Construction of Variation A would require considerable earthwork disturbance to reach the elevation for the new pipeline, stable soils, and to create a 'shelf' suitable for the approximately 1,750 feet of open cut construction from the Alpine Tunnel outlet along the steep hillsides. Located northeast of the Canyon Cove Estates neighborhood, the construction activities as well as the completed pipeline would be visible from locations west of the Project (see Figure 3-3). Rock bolts and reinforced concrete encasement would be used to anchor the pipeline into the hillside including a texturized concrete overlay intended for blending with the existing landscape. There would be direct, indirect, and permanent impacts to visual resources from the pipeline being anchored to the hillside. After construction, the disturbed areas (not the concrete encasement) would be restored to a natural landscape. This would be visible during construction and until adequate time has passed to reclaim the site. There would be direct and temporary impacts with the implementation of this variation alignment.



Figure 3-3. Visual Impact from Variation A's Alignment.

### Variation B

Variation B would include boring a new tunnel, approximately 1,450 feet long, that would intersect the existing Alpine Tunnel and terminate at an area east of the 1060 North/1560 East intersection. The construction for the 156-inch diameter tunnel would require drilling a vertical shaft about 200 feet above the existing Alpine Tunnel near the intersection point of the new tunnel to remove the boring equipment and to connect the Variation B tunnel with the existing Alpine Tunnel. After construction, the area would be restored to a natural hillside landscape. This would be visible during construction and until adequate time has passed to reclaim the site. There would be a direct and temporary impacts with the implementation of this variation alignment.

### Variation C

Construction activities would involve boring through the hillside for construction of a 156-inch-diameter tunnel. Construction areas would be reconstructed and reclaimed to ensure a natural hillside landscape after construction. There would be a direct and temporary impacts with the implementation of this variation alignment. After construction, disturbed areas would be restored to their natural landscape. This would be visible during construction and until adequate time has passed to reclaim the site. There would be a direct and temporary impacts with the implementation of this variation alignment.

### No Action Alternative

The No Action Alternative would not have direct or indirect impacts to the existing visual resources.





## 3.15 Wildlife

### 3.15.1 General Wildlife

The study area is located adjacent to the Timpanogos Wildlife Management Area (WMA). The Timpanogos WMA consists of rolling hills and steep foothills containing sagebrush, native grasses, and Gamble oak brush habitat. This land provides winter habitat for chukar, cottontail rabbit, mourning dove, mule deer, elk, and Rocky Mountain bighorn sheep.

### 3.15.2 Conservation Agreement Species

A conservation agreement (CA) is a voluntary agreement that provides incentives for non-federal landowners to conserve candidate and other unlisted species that are likely to become candidates for listing in the future. Under Title 43, Section 24.6 of the Code of Federal Regulations and Title 23 Chapter 22.1 of the Utah Code, the Utah Division of Wildlife Resources (UDWR) may enter into cooperative agreements for purposes of wildlife conservation. All parties involved in these agreements have statutory responsibilities that cannot be delegated, particularly with respect to the management and conservation of wildlife, its habitat and the management, development, and allocation of water resources.

### 3.15.3 Greater Sage Grouse

Greater sage-grouse (*Centrocercus urophasianus*) is given special conservation considerations through a conservation partnership involving multiple federal agencies and western states, including the State of Utah. Although greater sage-grouse is not protected under a formal CA, it is afforded special protections and potential impacts to the species resulting from state or federal actions must be considered.

### 3.15.4 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) established protection for migratory birds and their parts (including eggs, nests, and feathers) from hunting, capture, or sale. Executive Order 13186, signed on January 10, 2001, directs federal agencies to take actions to further implement the MBTA. Specifically, the Order directs agencies, whose direct activities will likely result in the take of migratory birds, to develop and implement a Memorandum of Understanding (MOU) with USFWS that promotes the conservation of bird populations.

### 3.15.5 Bald Eagle Protection Act of 1940

This law provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act.





### 3.15.6 Affected Environment

#### General Wildlife

The study area is in the foothills near the Timpanogos WMA but does not include mountainous or heavily forested areas. Due to the study area's proximity to roads, buildings, and the human environment, some of the area within and adjacent to the study area are highly disturbed and would not be considered ideal wildlife habitat. The less disturbed areas within the study area likely provide adequate foraging, cover, and breeding habitat for small mammals, game birds, songbirds, and ungulates.

#### Conservation Agreement Species

Table 3-7. Animal Species of Concern.

Animal Species	½ mile radius	2-mile radius	Last Observation Year
Columbia Spotted Frog ( <i>Rana luteiventris</i> )	Y	N	1965
Least Chub ( <i>Lotichthys phlegethontis</i> )	Y	N	1931

Source: Utah Natural Heritage Program Online Species Search Report, March 16, 2022.

#### Greater Sage-grouse

Occupied lek data and the boundaries of established Sage-grouse Management Areas (SGMAs) were reviewed to determine the likelihood of greater sage-grouse occurring in the study area. The study area is more than 23 miles from the closest known lek and is not located in an SGMA. There is no suitable habitat for greater sage-grouse in the study. Given these conditions, greater sage-grouse does not occur in the study area.

#### Eagles and Migratory Birds

The Utah Natural Heritage Program (UNHP) data revealed two peregrine falcon nesting sites 0.5 to 2 miles outside of the study area. The data indicated that the sites were last recorded in 2006. No peregrine falcon nesting sites were observed during surveys conducted in 2015 or May 2022. In addition, the May 6, 2022 onsite survey indicated the presence of red-tail hawks and their nest in the rocky bluffs located near the study area. Nesting has potentially occurred for several years at this location. Within the study area, several potential migratory bird nests were noted during the onsite survey.

### 3.15.7 Environmental Consequences

#### Preferred Alternative and Variations A, B, or C

##### General Wildlife

The Preferred Alternative nor Variations A, B, or C would have no long-term negative effects to wildlife. No construction would occur within the Timpanogos WMA, and effects to wildlife would be isolated and unlikely to contribute to declines in local population levels. Wildlife in the area is likely familiar with human disturbance due to the number of biking and walking trails in the area and would be able to use adjacent lands during the temporary construction window.



Additionally, wildlife disturbance would be localized, temporary, and minimal due to the linear and fast-moving nature of the construction activities. Revegetation in the spring and early summer at the project's elevation and location would likely occur rapidly, which would minimize the disruption of habitat use by wildlife.

#### ***Conservation Agreement Species***

No species protected under a CA occur in the study area. Therefore, there would be no direct or indirect impacts to CA species from the Preferred Alternative or variations.

#### ***Greater Sage-grouse***

Greater sage-grouse do not occur in the study area. Therefore, there would be no direct or indirect impacts to the species from the Preferred Alternative or variations.

#### ***Eagles and Migratory Birds***

Potential impacts to migratory birds would be avoided through implementation of the BMPs and mitigation measures identified in Section 3.17.13. Neither the Preferred Alternative nor any of the variations would result in take to migratory birds. Eagles do not occur in the study area. Therefore, neither the Preferred Alternative nor any of the variations would result in take to eagles.

#### **No Action Alternative**

The No Action Alternative would have no direct or indirect impacts to CA species, greater sage-grouse, migratory birds, eagles, or other wildlife species. The District would continue ongoing OM&R of existing facilities as needed. In the event of a pipeline rupture, there could be minor direct temporary impacts to wildlife during OM&R activities.

### **3.16 Cumulative Impacts**

Cumulative impacts are the impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR §1508.7). Cumulative impact analysis is focused on the sustainability of the environmental resource in light of all the forces acting upon it and can result from individually minor but collectively significant actions taking place over time.

The cumulative impact analysis focuses on environmental resources that would have direct or indirect impacts, or which may be affected by a connected action. However, it must first have a direct or indirect effect on the resource concern or be connected to the associated action to have a cumulative effect.

#### **3.16.1 Cumulative Impacts Analysis**

All resources of concern analyzed would not be subject to cumulative impacts because there are neither direct nor indirect impacts, or the resources would not be subject to cumulative impacts because they by nature do not result in cumulative impacts. Table 3-8 identifies the resources and whether the Preferred Alternative would have a cumulative impact.



Table 3-8. Cumulative Impacts.

Resource	Cumulative Impact (Yes/No)	Rationale
Air Quality	No	Temporary impacts
Climate Change	No	Temporary impacts
Cultural Resources	No	No impacts
Geological Hazards	No	Unavoidable crossing of WFZ
Groundwater and Subsurface Water	No	No impacts
Indian Trust Assets	No	No impacts
Public Health and Safety	No	Temporary impacts
Socioeconomics	No	No impacts
Soils	No	Temporary impacts
Threatened and Endangered Species	No	No impacts
Transportation and Utilities	No	Temporary impacts
Vegetation and Invasive Species	No	Temporary impacts
Visual Resources	No	Temporary impacts
Wildlife	No	Temporary impacts

## 3.17 Mitigation Commitments

Proactive measures would be implemented to avoid or prevent adverse impacts that could otherwise result from project measures. In addition to BMPs, the following mitigation commitments for air quality, climate change, cultural resources, geological hazards, hazardous wastes, invasive species, noise and vibration, soils and vegetation, transportation and utilities and wildlife, would be part of the construction contract.

### 3.17.1 Air Quality

BMPs would be employed during construction to mitigate for temporary impacts on air quality due to construction related activities. The BMPs may include:

- The application of dust suppressants and watering to control fugitive dust.
- Minimizing the extent of disturbed surfaces.
- Restricting earthwork activities during times of high wind.
- Establishing appropriate construction zone areas and stabilizing exits to reduce soil track-out onto the adjacent roadways.
- Slower speed limits on access roads to limit the amount of dust.
- If sediment is tracked off-site onto adjacent roadways, the sediment would be collected by sweeping and/or shoveling and disposed of in a stable location.
- Material stockpiles would be wetted to prevent wind-blown emissions.
- Vegetative cover would be established on bare ground as soon as possible after grading to reduce wind-blown dust.
- Use of properly operating well-maintained construction equipment.



### **3.17.2 Climate Change**

BMPs would be employed during construction to mitigate for temporary impacts on climate change due to construction-related activities. The BMPs may include requirement of appropriate emission-control devices on all construction equipment.

### **3.17.3 Cultural Resources**

Construction activities could have the potential to discover previous, unknown, cultural resources or Native American artifacts. In the event of a discovery, construction activity would be suspended, a treatment plan developed immediately, and coordination with SHPO.

### **3.17.4 Geological Hazards**

Design considerations for crossing the WFZ must be accommodated by movement in the pipeline, or the surrounding ground as opposed to resisting the movement through force. Some methods include increasing pipe wall thickness, using welded steel pipe, pipe yielding, pipe stacking (zig-zag configuration across the fault so that the pipe can expand and contract during an earthquake), designing around pipe strain limits, and providing movable and yielding backfill around the pipeline. Recommendations also include a soil/pipe structural analysis to identify and confirm reasonable design and mitigation approaches (Jacobs 2020).

### **3.17.5 Groundwater and Subsurface Water**

The JLAs would investigate the presence of subsurface water that may exist along the Preferred Alternative alignment – specifically along 1060 North and 1360 East. If it is determined that corrective measures are needed so that the Project does not increase subsurface flows, the JLAs would incorporate corrective measures as part of the Project and coordinate authorizations and necessary permits with Orem City.

### **3.17.6 Hazardous Wastes**

BMPs would be employed during construction to mitigate for hazardous wastes due to construction-related activities. The BMPs may include:

- All hazardous waste materials, including wastes, petroleum products, and solid wastes, would be handled, stored, and disposed of in conformance with federal and state regulations to prevent soil, groundwater, or surface water contamination.
- The Utah Division of Environmental Response and Remediation (DERR) would be contacted immediately if any contaminated soil or hazardous material is discovered during construction, including petroleum hydrocarbons or other previously unidentified hazardous materials or contaminated soils. The appropriate characterization and handling of the material would be conducted in accordance with DERR guidance.
- Absorbent pads or sheets would be readily available onsite. If onsite maintenance of construction equipment is required, absorbent pads would be placed under likely leak or spill sources. Mitigation for incidental spills or leaks of hydraulic fluid or diesel fuel from construction equipment would be implemented, including cleaning up the spill



immediately, removing contaminated soil from the site, and properly disposing of it in conformance with federal and state regulations.

### **3.17.7 Invasive Species**

BMPs would be employed during construction to mitigate for invasive species due to construction-related activities. The BMPs may include:

- Weed removal or reseeding after construction would be applied as required by landowners.
- BMPs would be utilized during construction and the District's Integrated Pest Management Plan would be implemented after construction for ongoing monitoring and treatment of invasive species.

### **3.17.8 Noise and Vibration**

BMPs would be employed during construction to mitigate for noise and vibration due to construction-related activities. The BMPs may include:

- The JLAs would comply with applicable federal, state, and local laws, orders, and regulations concerning the prevention, control, and abatement of excessive noise and vibration.
- The contractor may be required to monitor for vibration when construction activities are within city streets and near residential dwellings.
- Prior to construction activities, the existing condition of foundations, basements, and other structural features along the Preferred Alternative alignment would be documented via photos and video methods and may include exterior and interior of the structures. Any damage to adjacent properties that are a result of the pipeline construction would be mitigated by the selected contractor.

### **3.17.9 Public Safety and Health**

BMPs would be implemented to minimize the potential for risk and safety concerns during construction in the residential streets. The BMPs may include:

- At all times, construction fencing would be around the perimeter of construction zones to warn and keep out non-construction persons.
- Cover all open trenches with heavy metal plates outside of construction times.
- Use of orange construction signs warning of risk.
- A public information plan would be prepared and distributed, including project schedule, status, utility disruptions, and contact information.
- Construction traffic would maintain minimum driving speeds within residential neighborhoods.





### **3.17.10 Soils and Vegetation**

The following BMPs would be implemented to minimize the potential for soil erosion, particularly in areas with steep slopes within all alignments:

- Erosion-control measures would be installed as necessary immediately during and after construction to control and minimize erosion and runoff; including but not limited to silt fencing, straw bales, application of gravel or riprap, and minimization of disturbed vegetated areas.
- Topsoil and excavated soil would be salvaged and stockpiled adjacent to trenching activities and used to fill in the open trenches as soon as possible upon completion of pipe installation.
- Where compatible with land use, disturbed areas would be reseeded to stabilize soils and reduce erosion with native vegetation.
- A Stormwater Pollution Prevention Plan (SWPPP) would be prepared in compliance with Section 402 of the Clean Water Act (CWA); which would describe measures to minimize erosion and soils from leaving the Project site during construction activities.
- The Preferred Alternative and alignment variations would avoid the landslide complex. The Preferred Alternative would be designed to current seismic standards for the 975-year event. More information regarding the design techniques used for crossing seismic zones is found in Section 2.5.1 in Chapter 2.
- If vegetation is removed during the migratory bird breeding season (April 1 – July 15), a qualified biologist would conduct nesting surveys within the construction footprint and within 100-foot buffer zone, no more than 7-days prior to ground disturbing activities, to verify that no migratory birds are nesting in the vegetation to be removed. The surveys would be conducted in consultation with USFWS.
- Disturbed areas would be reseeded with native vegetation including appropriate seed mix species for the monarch butterfly, and the District's Integrated Pest Management Plan would be implemented after construction for ongoing monitoring and treatment of invasive species.
- Additional geotechnical testing would be performed in conjunction with the Project's design phase.

### **3.17.11 Threatened and Endangered Species**

The natural areas that are disturbed by construction would be reseeded with a native seed mix that benefits the Monarch butterfly. The USFWS would be consulted to determine the appropriate species to include in the seed mix to provide floral resources throughout the breeding and migration season for Monarch butterfly.



### **3.17.12 Transportation and Utilities**

BMPs would be required by the contractor during construction to mitigate for expected transportation impacts including:

- Where possible, the use of residential urban streets for construction haul routes would be minimized.
- Traffic control plans would be developed in coordination with Orem City and Utah Department of Transportation (UDOT) to minimize impacts to the public.
- A public information plan would be prepared and distributed, including project schedule, status, utility disruptions, and contact information.
- Advance notice for road closures, detours, and delays would be provided.
- Access to residences would be maintained as possible. Although vehicle access to driveways would be restricted for likely several weeks, walk-in and emergency access would be provided.
- Detailed inventory of utilities and utility providers would be prepared to minimize disruption in utility service.

### **3.17.13 Wildlife**

The following mitigations would be implemented to minimize disturbance to migratory birds and raptors caused by construction:

- All vegetation in the construction area would be cleared and grubbed outside the nesting season for most migratory birds (April 1 – July 15).
- Construction activities, including storing equipment and parking vehicles, would not take place within 0.5 miles of any red-tailed hawk nests or during the seasonal buffer for the nesting season (March 15 – August 15).
- A survey would be conducted for peregrine falcon nests to verify whether or not they are nesting and if so, construction activities would not occur during the seasonal buffer (April 1 – August 31).
- If construction activities cannot comply with these mitigation recommendations, the USFWS would be consulted to determine other methods for minimizing impacts.



## 4 Consultation and Coordination

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Chapter 4 describes the early and ongoing coordination activities and summarizes key issues and pertinent information received through coordination with the public and various agencies.

### 4.1 Public and Agency Scoping Process

As part of the National Environmental Policy Act (NEPA) process, the Section 106 process of the National Historic Preservation Act (NHPA) of 1966 and requirements found in Central Utah Project Completion Act (CUPCA) legislation, the Joint Lead Agencies (JLAs) initiated a public scoping process to inform the public and agencies about the Environmental Assessment (EA), the purpose and need (as defined by NEPA), and the proposed Alpine Aqueduct Reach 1 Replacement and Resiliency Project (Project) and to gather input regarding issues to be analyzed in the EA.

Scoping was conducted in accordance with the Central Utah Water Conservancy District's (District) 2016 *Handbook for the National Environmental Policy Act* and NEPA regulations in 40 Code of Federal Regulations [CFR] §1501.9. Both outline an early and open process to determine the scope of issues for analysis to be addressed and for identifying the significant issues related to a proposed action.

The purpose of scoping is to obtain information that will focus the NEPA analysis on the potentially significant environmental issues and de-emphasize insignificant issues. Scoping engages the general public and other entities that may have an interest in the project with the goal of soliciting input on the issues, impacts, and potential alternatives to be addressed in the NEPA document.

#### 4.1.1 Scoping Process

The public scoping process was initiated in October of 2021 using a variety of methods to advertise the beginning of the NEPA process. A Public Meeting was held on November 30, 2021. The actions for the public meeting included the following:

- Letters mailed to Orem residents located near the study area.
- Letters mailed to federal, state, and local agencies and interested parties, Native American Tribal Governments, and Bureau of Indian Affairs.
- An announcement posted on the District's website with project information, including the *Resiliency Assessment* (Jacobs 2020), the Scoping Document, the Public Meeting presentation materials, and instructions on how to provide feedback.
- Legal notices with pertinent information were advertised in the *Daily Herald*, *Salt Lake Tribune*, and *Deseret News* two weeks prior to the meeting.
- Social media posts were published on Orem City's page and the District's pages during the scoping process.



All the previous forms of notification included Project information:

- Listing the project proponents (the Joint Lead Agencies).
- Stating that a NEPA document will be prepared.
- Including the Project purpose and need.
- Soliciting comments as part of scoping.
- Announcing the Public Meeting.
- Publishing contact information, including telephone numbers and email and website addresses.

The formal comment period began on November 15, 2021 and ended on December 20, 2021. Interested parties were offered a variety of ways to submit comments.

#### 4.1.2 Scoping and Coordination Meetings

In addition to the Public Meeting, Table 4-1 lists other meetings held to discuss comments and concerns with agencies, stakeholders, and the public as part of the coordination process for this EA. A summary of the discussion points for each meeting are included. In addition to the meetings listed, internal study team meetings were held throughout the development of this EA.

*Table 4-1. Scoping and Coordination Meetings.*

Date/Meeting Type	Attendees	Discussion Items
Oct. 8, 2021 Orem City Coordination Meeting	District Horrocks Engineers Orem City	<ul style="list-style-type: none"> <li>• Study overview and NEPA process.</li> <li>• Stakeholder outreach.</li> <li>• Ongoing coordination.</li> </ul>
Oct. 26, 2021 Orem City Council Work Session	District Orem City	<ul style="list-style-type: none"> <li>• Study overview.</li> <li>• Environmental schedule.</li> <li>• Public Meeting.</li> <li>• Ongoing coordination.</li> </ul>
Nov. 2021 Canyon Cove Neighborhood	District Canyon Cove Neighborhood Representative	<ul style="list-style-type: none"> <li>• Study overview.</li> <li>• Environmental schedule.</li> <li>• Next Steps.</li> </ul>
Nov. 2021 Utah County Commission	District Bill Lee, Utah County Commissioner	<ul style="list-style-type: none"> <li>• Study overview.</li> <li>• Environmental schedule.</li> <li>• Next Steps.</li> </ul>
Nov. 2021 Utah Senate	District Senator Mike Kennedy	<ul style="list-style-type: none"> <li>• Study overview.</li> <li>• Environmental schedule.</li> <li>• Next Steps.</li> </ul>

#### 4.1.3 Public Scoping Meeting

The JLAs held an in person Public Scoping Meeting to present overall project information, answer questions, and gather public input. It was held on Tuesday, November 30, 2021, from 5:30 – 7:30 p.m. at the District's Building 2 (1426 East 750 North, Building 2, Orem, UT 84097). Twenty-four people signed in at the Public Meeting.



#### **4.1.4 Input Received During the Scoping Period**

The study team received a total of 11 comments throughout the scoping period. The commenters addressed topics such as suggested pipeline alignments, resiliency measures, construction timeline and process, pipeline materials, accessibility to homes during construction, the right-of-way process, maintenance disruptions, and safety. Comments and responses can be found in Table 4-2.





Table 4-2. Public Comments and Responses.

Number	Comments	Responses
1	<p>I have the following questions/concerns:</p> <p>1A. I haven't been able to find a map of the fault lines that run through our neighborhood that matches the one you gave me. Would you mind giving me the source of the map?</p> <p>1B. The proposed route for the new pipeline avoids the landslide but still crosses a number of fault lines on the map you provided. In the information you provided, it states that fault displacement may range from 8-17 feet. If we have an event, I'm not sure having a pipeline run through our neighborhood is any better than having one above it. In my opinion, it would be best to avoid having the pipeline cross any of the fault lines. Could the pipeline be brought down the road that leads to Mama Chus/ gas station then go up 800 North? I know there is a pipeline already there but could a second one be installed that parallels the other one? Would that allow the pipeline to avoid the fault lines?</p> <p>Also, I have heard several concerns from the neighbors. They are listed as follows:</p> <p>1C. Limited access to their homes during construction.</p> <p>1D. Traffic flow through the neighborhood during construction.</p> <p>1E. Easements that may be granted to the CUWCD to access private property to install and maintain the pipeline.</p> <p>1F. Risk of flooding if we have an earthquake.</p>	<p>1A. Current mapping of the faults is based on work completed by Jacobs/LCI as part of the AA-1 Resiliency Assessment Project Final Project Report (Resiliency Assessment). Section 3 and the references included in Section 11 of the Resiliency Assessment describe the geological characteristics of the site and present the current mapping of faults and other geological features.</p> <p>1B. Unfortunately, crossing of the Wasatch Fault is not avoidable with any of the alignment variations as the Wasatch Fault extends north and south along the Wasatch Front and the pipeline is required to cross from east to west from the 10 MG Olmsted Reservoir to the DACRWTP. For pipelines that must cross fault lines, the best practice for design is to cross normal fault lines near perpendicular (60 degrees to 90 degrees) where possible and avoid alignments that are parallel to fault lines. This reduces potential damage to the pipeline to one crossing location rather than multiple ruptures along the length of the pipeline that parallels the fault. The realigned AA-1 pipeline would be designed and constructed to include specific measures to withstand and prevent rupture during a 975-year seismic event.</p> <p>An alignment down 1560 East south toward Mama Chus Restaurant would put a significant length of the AA-1 pipeline running parallel to the Wasatch Fault (between the eastern and central strand) on the hanging wall side of the fault which is expected to experience the greatest amount of displacement during a seismic event (see Figure 2-1). This is not considered to be as resilient of a design alternative compared to the Preferred Alternative on 1060 North which would cross the fault lines near perpendicular. Additionally, a pipeline in 800 North would be parallel to the 126-inch diameter Provo River Aqueduct and the older 1940's 96-inch diameter reinforced concrete Provo River Olmsted Siphon Pipeline. All three pipelines would cross the central strand of the Wasatch Fault in the same location. Since these pipelines are considered critical life-line facilities for water supply, placing these three pipelines in close proximity to one another greatly decreases the resiliency of each pipeline during a seismic event, as the failure of one pipeline could result in failure of another.</p> <p>1C and 1D. See Section 3.17 for a full list of construction mitigations and commitments. During construction, vehicle access along the residential streets would be restricted during working hours and for extended periods of time depending on construction activities taking place. At all times emergency vehicle access to residential homes would be maintained. The contractor would be required to temporarily fence the work area to keep non-project related persons out of the construction site. As part of construction, the JLAs would implement construction scheduling and sequencing requirements to reduce disruption to the neighborhood.</p> <p>1E. The Preferred Alternative and variations would require easements from landowners and Orem City for the pipeline alignment, access points, and construction right-of-way not located in the public road right-of-way or existing easement. Construction time could be shortened in residential neighborhoods if easements are granted for construction in landowner's park strips, which would be restored after construction.</p> <p>1F. Leaving the Alpine Aqueduct Reach 1 in its current location has a greater chance of rupturing due to landslide activity and movement caused by an earthquake. The existing Alpine Aqueduct Reach 1 was designed and constructed in the late 1970s and early 1980s without fully understanding the risk of the landslide complex that the current pipeline traverses. Since the construction of AA-1, an increased understanding of the landslide risk has been gained. In addition, seismic design and construction standard practices have been improved to provide a more resilient pipeline design to accommodate the anticipated earthquake along the Wasatch Fault. The realigned AA-1 pipeline would be designed and constructed to specific measures to withstand a 975-year seismic event. A main consideration of realigning AA-1 is to avoid the active landslide and the issues associated with it. This risk of flooding due to a break caused by both landslide and fault displacement of the AA-1 would be much less by installing the pipeline around the landslide rather than leaving the existing pipeline in its current location.</p>





Number	Comments	Responses
2	<p>Reed R. Murray, Program Director Attention: W. Russ Findlay Department of the Interior, Office of the Secretary CUPCA Office 302 East Lakeview Parkway Provo, Utah 84606 Re: Alpine Aqueduct Reach I Replacement and Resiliency Project Environmental Assessment</p> <p>Dear Mr. Murray,</p> <p>Thank you for your correspondence, regarding the Department of the Interior, Central Utah Project Completion Act Office and the Central Utah Water Conservancy District evaluating a replacement alternative and resiliency measures for the Alpine Aqueduct Reach I (AA-I) near the mouth of Provo Canyon Environmental Assessment. The Hopi Cultural Preservation Office appreciates the Central Utah Project Completion Act Office's solicitation of our input and your efforts to address our concerns.</p> <p>The Hopi Tribe claims cultural affiliation to earlier identifiable cultural groups in Utah, including the Fremont cultural group. The Hopi Cultural Preservation Office supports the identification and avoidance of our ancestral sites and Traditional Cultural Properties, and we consider the archaeological sites of our ancestors to be "footprints" and Traditional Cultural Properties.</p> <p>The Hopi Cultural Preservation Office requests consultation on any proposal with the potential to adversely affect prehistoric cultural resources in Utah. If the cultural resource survey of the area of potential affect identifies prehistoric sites that may be adversely affected by project activities, please provide us with copies of the survey report, draft environmental assessment and any proposed treatment plans for review and comment.</p> <p>In addition, we recommend that if any cultural features or deposits are encountered during project activities, these activities must be discontinued in the immediate area of the remains, and the State Historic Preservation Office must be consulted to evaluate their nature and significance. If any Native American human remains or funerary objects are discovered during construction, they must be immediately reported as required by law. Thank you again for your consideration. Respectfully, Stewart B. Koyiyumptewa, Program Manager/THPO</p>	<p>The JLAs conducted a cultural resources investigation within the study area. No prehistoric cultural resources were identified. In addition, if any cultural features or deposits are encountered during construction, the JLAs would immediately cease activities in the area and consult with SHPO.</p>
3	<p>Chris,</p> <p>Thank you for the information. Three other questions for tonight.</p> <p>3A. Why wasn't option 15 given more consideration? Cost?</p> <p>3B. Is there any information on how the water would flow through the neighborhood if there were a rupture in the existing system and the current option under consideration?</p> <p>3C. If the aqueduct were to rupture and flood homes in the neighborhood, would the CUWCD help with any of the costs to repair damage due to the flooding?</p> <p>Thanks, August</p>	<p>3A. Option 15 in the Resiliency Assessment (Around the Landslide from Olmsted Reservoir, through Provo Canyon, 800 North, and paralleling the Provo River Aqueduct) was given detailed analysis and consideration. Although this option completely avoids the landslide, it crosses the eastern and central strands of the Wasatch Fault. Also, Option 15 would parallel the Provo River Aqueduct and the Provo River Olmsted Siphon Pipeline which are other major water delivery pipelines for north Utah and Salt Lake counties (see Response 1B above). Locating these major water supply pipelines within the same corridor reduces the overall resiliency of water supply for the Wasatch Front especially considering these pipes cross the Wasatch Fault in the same pipeline corridor. If one pipeline failed in this location, it could damage and/or remove the other pipelines from service, which could result in disrupting water service to approximately half of the Utah residents along the Wasatch Front.</p> <p>Additionally, Option 15 is substantially longer than other alignments considered, therefore increasing project costs and introducing additional constructability challenges associated with crossing of the Provo River and construction in the heavy traffic and utility congested 800 North roadway and along the Provo River Parkway trail.</p> <p>3B. How the water would flow through the neighborhood upon a break or rupture largely depends upon where the break occurred and the surrounding topography. The previous breaks occurred at or near the above ground section of AA-1 near the Alpine Tunnel outlet portal. In this case, water flowed down through a natural ravine below the AA-1 pipeline and to 1560 East. However, since the proposed pipeline would be located in the public road right-of-way, it is anticipated in the event of a rupture, the flows would follow the natural drainage path of the roadway along curb and gutter and then into the storm drain. For flows that exceed the capacity of the roadway drainage, overland flow is likely and would follow the natural topography of the ground. Outside of the roadway, and where practical, drainage berms would be considered during preliminary and final design to help mitigate any potential overland flow.</p> <p>3C. The District has a duty to use reasonable care in the engineering, design, and construction of the Alpine Aqueduct Reach 1 Relocation and Resiliency Project, and to continue to exercise that duty of reasonable care in the on-going operation, maintenance, repair, and replacement of this facility. The District could be held liable if the District is negligent in the performance of its duties and its negligence is determined to be the cause of any damages to person or property.</p> <p>As a governmental entity, the liability of the District would be subject to the provisions of the Governmental Immunity Act, Section 63G-6a-101, including its caps on liability. The District has liability insurance that would be responsible in the event the District were determined to have been negligent, and that negligence resulted in damages. The District could not be held liable for injuries caused by the negligence of others.</p>





Number	Comments	Responses
4	This is the ideal pump location. Extend the green line to the headworks for the plant. This is likely more feasible than going north from the pump site, running the aqueduct above ground and into the headworks. Noting the projections from AIG Climate models for 2070, any routing of the distribution system would be negatively impacted from erosion caused by the projected increase in precipitation.	Thank you for your comment. The pump stations were removed from consideration as part of this Environmental Assessment. The installation of the new AA-1 pipeline may temporarily impact erosion during construction. The new pipeline would be buried or tunneled and designed to withstand the projected increase in erosion caused by increased precipitation.
5	Please try to schedule construction through the neighborhood - 1060 North/1360 East in spring/summer/fall - not during winter months when snow would further inconvenience residents having to park away from homes and make plowing of the streets difficult.	Please see Section 3.17 for a detailed list of construction mitigations and commitments. As part of construction, the JLAs would implement construction scheduling and sequencing requirements to reduce disruption to the neighborhood. A typical construction season in Utah extends from the springtime, through summer, and into fall. At this time, the construction schedule has not been set for the proposed reconstruction and realignment of AA-1.
6	I am writing to request access daily to my house on [Redacted] when you are doing the construction of the new pipeline. Please write it into the contractor's contract. Thank you, [Redacted]	See Section 3.17 for a complete list of construction mitigations and commitments. Walking and emergency access to homes would be provided. During construction, vehicle access along the residential streets in areas where active construction is taking place would be restricted during working hours and for extended periods of time depending on construction activities taking place. At all times, emergency vehicle access to residential homes would be provided. As part of construction, the JLAs would implement construction scheduling and sequencing requirements to reduce disruption to the neighborhood. Based on the location of your home on 1110 North, it would be anticipated that you would have continual access from either Ashby Place or 1360 East.
7	Please make daily access during the hours of 7 am thru 6 pm to the neighborhood and homes. Some are medical professional and need immediate access in and out of the neighborhood. Some homes have home businesses and have daily freight deliveries which need access as well. Please limit the working "closed" area to 200 feet or less at any one time. Keep the neighborhood clear of debris and dangers for children and mischievous teens.	As part of construction, the District would implement construction scheduling and sequencing requirements to reduce disruption to the neighborhood. See Section 3.17 for a complete list of construction mitigations and commitments. During construction, vehicle access along the residential streets in areas where active construction is taking place may be restricted during working hours and for extended periods of time depending on construction activities taking place. At all times, emergency vehicle access to residential homes would be provided. The JLAs and selected contractor would coordinate and communicate construction activities with the city, neighborhood, affected residents, and others that may be impacted during construction.





Number	Comments	Responses
8	<p>I would like to thank you for holding the public meeting on November 30, 2021 regarding the Alpine Aqueduct Reach 1 Replacement and Resiliency Project. Many of the questions and concerns that I had with the project were addressed at the meeting; however, a few remain. At the meeting, I was told by Adam, Dave and Chris that I would receive follow-up on my remaining concerns. They are as follows:</p> <p>8A. It is my understanding that the majority of structural issues with the current pipeline have occurred in the area of the pipeline that is now above ground located north of the cul-de-sac on 1560 East. The natural flow of water from this area of pipeline is down 1560 East and if there were a problem with the pipeline, water from it would flow down the road avoiding the majority of homes in the Canyon Cove Estates neighborhood. If there is an issue with the pipeline west of the exposed area, I'm not sure how it being underground would affect the flow of the water but, any surface water should flow downhill and a good portion of that water would probably run through the Pedersen's property avoiding most of the homes in our neighborhood. Moving the pipeline would disrupt the natural flow of water and increase the risk of water damage to homes in our neighborhood.</p> <p>8B. It is my understanding that CUWCD is going to use materials to construct the new pipeline and the immediate area around the pipeline that will mitigate the likelihood of the aqueduct rupturing or being displaced or compressed in a seismic event. I was shown an example of the material that may be used at the meeting and told about various other materials that may be used. I would like to know what materials will be used and that they have been tested to withstand the potential 8-17 feet of vertical displacement and other damage that may occur in a seismic event. I've looked at companies that make pipelines in Japan that are engineered to withstand earthquakes, material such as Geofoam, etc. and if you read the small print I am not sure they are made to withstand the amount of displacement that is described in the report generated for the CUWCD by Jacobs.</p> <p>8C. At the meeting, we were told that it takes 30-60 minutes to stop the water upstream after a leak is detected. Is there current technology that would allow CUWCD to determine a leak sooner than the technology currently in place and that would decrease the time window of turning the water off upstream?</p> <p>8D. In proposal #3, the new aqueduct would turn uphill onto 1360 East. If there were a leak, I assume the pipeline would lose pressure and the water headed uphill to the treatment facility would lose its forward momentum and reverse direction and run downhill. Is there a way to gate the pipeline to minimize the amount of water that would run downhill if a leak were to occur?</p> <p>8E. Last, I know in other areas such as golf courses next to neighborhoods that liability is determined by what was built first. For example, if the golf course was built prior to the homes, the golf course does not have any liability for a window in a home being broken by a golf ball. If the homes were there first, then the golf course is liable for the damage. With this proposed aqueduct route through our neighborhood, would CUWCD have any financial responsible for water damage to homes from a failed pipeline? Dave told me he would ask CUWCD's legal department this question and get back with me.</p> <p>Sincerely, [Redacted]</p>	<p>8A. Historical failures of the AA-1 pipeline at the location where it is currently above ground occurred prior to 2002 when the pipeline was still located below ground. These failures have occurred because of landslide movement. The 2017 landslide movement along the pipeline, which occurred to the west of previous failures, has raised concern for the entire length of AA-1's resiliency and reliability due to the ongoing landslide issues. Construction of a new pipeline would not change the drainage patterns of the existing site as the new pipeline would be buried below ground and the surface drainage features would remain unchanged. In the event that a shallow groundwater layer was encountered during construction, its flow path would naturally follow the pipeline due to the soils.</p> <p>8B. It is proposed that the replacement AA-1 pipeline be constructed of welded steel with restrained welded pipe joints and designed to current seismic standards to withstand a 975-year seismic event. Welded steel is considered a flexible and ductile material capable of handling displacement and movement during a seismic event. Other measures may include:</p> <ul style="list-style-type: none"> <li>• Use of movable and lightweight backfill material around the pipeline to reduce pipeline stresses during a seismic event.</li> <li>• Use of minimal fill material on top of the pipeline which would allow the pipe to lift out of the ground during a seismic event (see Section 4.1.2.2 in the <i>Resiliency Assessment</i>, Jacobs 2020); and avoid rupture due to external soil loads imposed on the pipeline.</li> <li>• Stack the pipe or using a zig zag alignment to accommodate the elongation of the pipeline (see Section 4.1.2.3 in the <i>Resiliency Assessment</i>, Jacobs 2020) and provide the ability to accommodate fault displacement.</li> </ul> <p>Other measures as outlined in section 4.1.2 in the Resiliency Assessment may be utilized. Chapter 2 of the Environmental Assessment provides more design information.</p> <p>8C. Currently, the time to close the valve at the 10 MG Olmsted Reservoir is dictated by operations and safety protocols. Rapidly closing a valve on a large diameter pipeline causes an unsafe environment and can cause major damage to the pipeline, its appurtenances, and adjoining systems. The JLAs are committed to designing and constructing the safest and most reliable pipeline for the AA-1 project. In the event of an emergency, the District would close the valve as fast as possible without endangering employees, the public, or damaging the pipeline.</p> <p>8D. Adding a valve at this location would require a large concrete valve box to be located in the street or within private property. The comment suggests that if the break occurred between this new valve and the DACRWTP, it could be shut to reduce water leaving the pipe and damaging homes in the area. However, valving for large diameter pipelines cannot be closed rapidly (see discussion about valve shut times on large diameter pipelines above in Response 8C).</p> <p>8E. See Response 3C.</p>





Number	Comments	Responses
9	<p>Central Utah Water Conservancy District c/o Alpine Aqueduct Reach 1 Project 1426 East 750 North, Suite 400 Orem, UT 84097-54742</p> <p>On behalf of the [Redacted], we appreciate the opportunity to comment on the proposed Alpine Aqueduct Reach 1 Replacement and Resiliency Project. My wife and I attended the November 30, 2021 Open House and we have considered the explanations we received at that time and we have studied the materials you provided.</p> <p>In summary, we are very concerned about the proposal to route a new aqueduct along 1060 North. Our primary concern is that this proposal exposes our home – and all other homes in our neighborhood that are downhill from the proposed route – to greater long-term risk of water problems than the risk we currently have. In addition, we have the normal concerns about construction and maintenance disruptions in the neighborhood.</p> <p><b>Risk Exposure</b></p> <p>We moved into our home in the spring of 2011. With the first spring rains, we discovered that our window wells would rapidly fill with water. We (and our extended family when we were out of town) were constantly on-call to drop submersible pumps into the window wells whenever it rained.</p> <p>9A. In speaking with neighbors, we discovered that they also had ground water problems, and many had installed drainage systems to mitigate the problem. After fighting the problem for a few years, we ultimately installed drainage systems in each of the three window wells that had the problem. Those holes for those systems were deep, well below the house footings. Much to our relief, this seemed to solve the problem. However, after several months, the same problem began appearing in other window wells that had never had the problem. We ultimately applied the same solution, and we have not had a problem in any of our window wells since.</p> <p>What we suspect is that there are groundwater flows under our neighborhood. When those flows are disrupted – as will most certainly be the case if the aqueduct is installed along 1060 North – the water will move to the next route of least resistance, and we will see new groundwater problems in neighborhood homes. Further, if there is ever a leak in the new aqueduct, the leaked water will find its way into our underground water flows, and potentially be exposed as water problems in neighborhood houses.</p> <p>As you likely know, the resolution of a groundwater problem in a house is not a trivial expense. So, the question is – will the Central Utah Water Conservancy District indemnify our neighborhood against any new groundwater problems our houses encounter during or after construction of the new 1060 North aqueduct? At the Open House when we expressed concern about potential flooding and groundwater problems, the response was to minimize the concern. We heard responses like: 1. “The pipe used for the new aqueduct will be very thick and won’t have many leaks.” Our reaction – if that’s the case, replace the existing aqueduct with that kind of pipe or better – or put that kind of pipe along 800 North.</p> <p>9B. “If there is an earthquake that breaks the new aqueduct, water flooding will be the least of our problems.” Our reaction – the same logic applies to the existing aqueduct. We should not minimize the ongoing concern by simply referencing an extreme catastrophe.</p> <p>9C. “Your neighborhood already has water problems, just think of the heavy rainstorm several years ago that flooded homes in your neighborhood.” Our reaction – that was a heavy rainstorm over a broad area that affected a few houses. It was not a concentrated break in a 7 or 8-foot pipe that is full of water. Imagine the pressure and resulting blast of water and erosion that will surely inundate houses that are only a few yards from such a break.</p> <p><b>9D. Construction and Maintenance Problems</b></p> <p>All the problems associated with a major construction project in a compact neighborhood with many children are too many to mention. However, in addition to the disruption and inconvenience for months, we are extremely concerned about the danger such a project presents for children. This is a neighborhood that is busy with children in the streets and yards – and that is one of the desirable things about our neighborhood. Heavy machinery, large pipes, deep holes, re-routed traffic, etc. all seem like a recipe for serious accident.</p> <p>9E. The same is true as maintenance will surely be required over time, and that maintenance may bring heavy equipment, excavation and industrial materials into the neighborhood. All of these create the same risk to children as the original construction.</p> <p><b>Summary</b></p> <p>All in all – it seems that installing a major pipeline in a hillside neighborhood that already has groundwater and soil stability problems has great potential for more extreme problems. It seems to move the problem from one point in our neighborhood to another – but much closer to many more houses.</p> <p>There are groundwater issues in our neighborhood, and people have adapted to and resolved most of those problems. A new pipeline along 1060 North potentially disrupts those solutions and opens the door to more concentrated water problems in houses that are right next to the pipeline. The risks to children that are created by heavy construction, excavation, and pipeline maintenance in a neighborhood full of children cannot be minimized. Given the nature of our neighborhood, these risks alone may necessitate moving the plan to an alternative route.</p> <p>9F. We believe there must be other solutions to the aqueduct issues that currently exist – and suggest those alternatives take priority.</p> <p>Sincerely, [Redacted]</p>	<p>9A. Refer to Section 3.6 in Chapter 3 for more information on groundwater and subsurface water. In researching groundwater for the analysis, the recorded groundwater depths either from water rights well logs or from studies indicate that the groundwater levels in the study area are more than 140 feet below the surface and could be deeper in today’s drought conditions. There are no recorded springs other than Orem City’s two springs located in Provo Canyon which are well outside the study area. The pipeline installation would include bedding and filling materials for the support and structural stability of the pipeline. These soil types are coarse-grained soils which are porous and conducive for conveying any water in the ground. In the event that a shallow groundwater layer was encountered during construction, its flow path would naturally follow the pipeline due to the soils.</p> <p>The depth of the trench for the realigned AA-1 pipeline through the neighborhood is anticipated to be about 12 feet. A geotechnical report that was required for the development of the eastern portion of the subdivision was reviewed as part of this project. To determine the geotechnical characteristics for this area, 11 test pits were dug that ranged between 8-12 feet in depth. No groundwater was found at any of these test pits. More detailed geotechnical investigations would be conducted during the design phase of the proposed Project.</p> <p>9B. See response 8B. To summarize what was discussed during the open house, the pipeline would be constructed of welded steel with watertight (zero leakage) welded joints and designed to withstand a 975-year seismic event. The potential for leakage is if the pipeline ruptures following a seismic event greater than the 975-year event. The realigned AA-1 pipeline would be designed and constructed away from the landslide (cause and location of previous breaks) and would not be placed into service until pressure testing the pipeline and confirmation that the pipeline has zero leakage.</p> <p>9C. Locating the pipeline away from the existing landslide increases the overall resiliency of the system and greatly reduces the chances of pipeline rupture, leakage, and flooding.</p> <p>9D. See section 3.17 in Chapter 3. The contractor would be required to temporarily fence the work area to keep non-project related persons out of the construction site. The JLAs are committed to maintaining a safe construction zone for all those that either live nearby or are part of the construction process.</p> <p>9E. Ongoing and routine maintenance is part of any buried utility. It is anticipated that the majority of the maintenance activities would not be intrusive (e.g., above ground visual inspections, inspections inside the pipeline) and would not require ground disturbing activities. However, should the need to uncover the pipeline through the neighborhood arise, those impacts would be temporary in nature. Coordination and communication with the city and nearby residents would take place.</p> <p>9F. The JLAs conducted an extensive evaluation of 15 different options as part of the <i>Resiliency Assessment</i>. The JLAs have determined that the Preferred Alternative (and its variations) meet the Project purpose and need as defined in Chapter 1.</p>





Number	Comments	Responses
10	<p>1452 E 920 N Orem To whom it may concern, My name is [Redacted] and I live at [Redacted] which is next to the new proposed path for the new aqueduct. I do have a few questions? 10A. Have you found that there is a drop in home values because people prefer not to live next to the aqueduct? 10B. Are you planning to compensate homeowners for the loss in value of their homes because people prefer not to live next to this aqueduct? 10C. If there is ever a break in the aqueduct that causes damage to homes nearby is there an insurance policy in place to compensate homeowners? 10D. Is there an earthquake policy in place that covers damage to homes in the event of an earthquake? 10E. What is the timeframe to complete the new aqueduct? 10F. When will the new route be decided? Thanks for your time. I look forward to hearing back from you. Can you please reply that you received these questions?</p>	<p>10A. In other areas of Utah County where large diameter water pipelines have been constructed through existing neighborhoods, there has not been a drop in home values. The value of homes continues to increase in today's housing market. The pipeline would be buried and not visible and unless a seismic event occurs causing ground movement and exposure of the pipeline, there would be no issues as a result of a pipeline being under the streets. As part of the Bonneville Unit of the CUP, the JLAs have constructed over 128 miles of pipelines. One example is the Spanish Fork-Provo Reservoir Canal Pipeline (SFPRC) which is part of the ULS. The SFPRC delivers water from Strawberry Reservoir to Salt Lake County (though a connection to AA-1). This pipeline extends for about 30 miles beginning at the mouth of Spanish Fork Canyon to the mouth of Provo Canyon. It is a buried 60-inch welded steel pipeline which was constructed through residential areas including the cities of Mapleton, Springville, Provo, before terminating in Orem with a connection to AA-1. The home values along the alignment of this pipeline have not dropped in value since construction. 10B. See Response 10A above. After construction, there would be no long-term impact to homeowners. 10C. See Response 3C above. 10D. Please contact your homeowners insurance company to determine what policies could be obtained. 10E. Design of the AA-1 project is anticipated to start in late fall of 2022 and would last for approximately one year. Construction is estimated to begin in the spring of 2024 and be completed by the fall of 2026. Construction in the neighborhoods would take approximately 6 to 9 months, with full construction of the pipeline schedule being closer to 2 years. 10F. Currently, the JLAs are in the NEPA phase of the project and are producing this EA. It is anticipated that the new route would have approval for construction upon completion of this EA and subsequent decision document. The EA is anticipated to be completed in the fall of 2022.</p>
11	<p>My concerns about the proposed rerouting of the Alpine Aqueduct are as follows: 11A. Moving it into our neighborhood increases the risk to life and property in the event of an earthquake. It does not reduce the number of fault lines crossed but put the risk directly among people and their homes. I understand that the intent is to avoid the landslide area but putting it through the neighborhood also makes it far less accessible for repairs, which seems like a paramount concern if the primary goal is to keep water flowing to the million + users. Surely there will be some repairs required either way. 11B. It also seems like the damage would be much more likely to be catastrophic in an earthquake as opposed to the damage and maintenance required in the slow-moving slide area. As a result, the risk to us and our homes would be compounded - from earthquake damage and then significant flood damage as well. 11C. At the open house, much was made of how much more flexible the new pipe would be - we were shown a sharply bent piece of metal. But surely replacing the current pipe in its current location with more flexible material would make it much more resilient to movement of the landslide as well. Wouldn't the likely maintenance be reduced in that case as well? I would like the team to consider the potential for reducing maintenance costs in the current location. 11D. I'd also like the team to consider and share the cost comparison between the expected maintenance at the current location, the costs if the existing pipe were upgraded in the current location, and the costs of building the pipe in alternate, much longer route plus its maintaining it there. I was surprised that a cost comparison did not figure more prominently in the criteria defined in the materials I was sent. I expect that costs are rapidly rising with the recent building boom in Utah and the inflation around the country. 11E. In addition, I'd like the study team to consider putting in a gate in the pipe at the east side of the slide area so that the flow of water could more easily be stopped if repairs were needed. It seems like that would mitigate flood damage and facilitate repair and continued water flow more quickly than if the aqueduct has to be accessed under our roads and the water flow stopped well above us in the canyon. 11F. Also, at the open house, we were told that the study team had drilled extensively in the slide area to determine that tunneling to put the aqueduct below ground there was not feasible. But when I asked whether they had drilled under our neighborhood to test the stability of that soil, I was told they had not. I would very much like to see the results of such testing. 11G. We had a sewer line leak about 14 years ago. It was dug up and repaired - about 12 feet down at the street in front of our home. The area in the road and our gutter almost immediately settled and created a dip in the road and the curb where water collects and mosquitos breed in the summer. Many of our neighbors have experienced significant settling of their homes as well - one of them has had to shore up their foundation at significant cost. So, I'm concerned about whether the construction would exacerbate all of that and whether it is really suitable for putting such a large pipe in. 11H. Finally, I'm concerned about the damage construction may cause to our homes. The digging and heavy equipment 30 feet from my front door and going 30+ feet down will surely cause significant vibration. So, I'm concerned about what that will do to the stability of our foundation and the whole structure. Thanks for your consideration. I am hopeful that you can find the best solution and I wish you luck with the project.</p>	<p>11A. The <i>Resiliency Assessment</i> (Jacobs 2021) extensively evaluated 15 Options and what would provide the best long-term reliability and resiliency for the AA-1 pipeline that provides critical water supply to over 1.6 million residents. Several options were evaluated that would utilize the existing AA-1 alignment and right-of-way. However, these alternatives would not avoid the landslide complex and would still be at risk of failure. The JLAs have determined that in order to provide the highest degree of resiliency and reliability, the pipeline should be moved outside of the landslide complex, which is located directly north of the residential area. Monitors in the landslide complex indicate that the area is constantly moving and continues to put more stress and strain on the existing AA-1 pipeline. As described in the EA and Resiliency Assessment, other alternatives were evaluated but eliminated. 11B and 11C. The realigned AA-1 pipeline would be designed and constructed to withstand the 975-year seismic event. The landslide is anticipated to move up to 10 feet during a 975-year seismic which would result in damage to the pipeline if it remained in that location. No upgrades or replacement within the alignment of the existing AA-1 pipeline would be able to withstand the amount of landslide movement that is anticipated during an earthquake. 11D. Reconstructing the pipeline in place would be a shorter route and require less capital investment than the Preferred Alternative. However, the Resiliency Assessment has shown that the Preferred Alternative would be 8 times more resilient than the existing alignment. Future costs of normal and extraordinary operation, maintenance, and replacement (OM&amp;R) of a pipeline in the existing alignment would exceed the costs OM&amp;R of the Preferred Alternative. Of a greater magnitude would be the cost of the interruption of water delivery to 1.6 million people due to the lower resiliency of the existing alignment which would make re-construction far too costly. 11E. See Responses 8C and 8D. 11F. During the Resiliency Assessment, the JLAs reviewed geotechnical reports. A geotechnical report was prepared prior to construction of the neighborhood per Orem City code. The subsurface materials appear to support the realignment of the AA-1 pipeline. 11G and 11H. See Section 3.17 in Chapter 3 for more information.</p>





#### 4.1.5 Comments to the Draft EA

Five comments were received on the Draft EA. The commenters addressed topics such as suggested pipeline alignments, access to existing trails, removal of trees, subsurface water, construction timeline and process, impacts related to construction, pipeline resiliency, and safety. Comments and responses can be found in Table 4-3.

Table 4-3. Comments on the Draft EA.

Number	Comments	Responses
1	Please route the new aqueduct from Olmstead reservoir up to the fire road, then through the hills above the landslide. The current proposal is through 6 fault lines and a neighborhood. Going through the hills above landslide will only cross two fault lines	<p>There are several reasons why an alignment along the fire road (Bonneville Shoreline Trail) was not considered. The landslide extends northward as shown in Figure 1-4 (this figure has been updated to show the landslide extending northward) and the suggested alignment does not avoid the landslide. We anticipate additional, unmapped Wasatch Fault lines to the north near the fire road. These faults were not mapped as part of the Project because an alignment option along the fire road is not reasonable and feasible. Therefore, the suggested alignment could be required to cross additional splays of the Wasatch Fault Zone.</p> <p>Also, the fire road is approximately 200 vertical feet higher than the Alpine Aqueduct Reach 1 pipeline. An alternative route from the 10 MG Olmsted Reservoir to fire road would require year-round pumping of the up to 450 CFS that flows in the Alpine Aqueduct Reach 1 pipeline.</p>
2	Hi there, I submitted a comment after the last public meeting. Are answers to questions posted somewhere? If not, could you tell me if a soil study like the ones that have been done in the slide area will or has been done on the soil under our street (1060 N) where the aqueduct will be installed? [redacted]	<p>Comments and responses from scoping are found in Table 4-2 of the Draft EA, also shown in Table 4-2.</p> <p>Additional geotechnical investigations would be conducted along the Preferred Alternative alignment to determine the soil composition.</p>
3	<p>(3A) 1. Please do not cut down the trees in our neighborhood along 1060 North. It will take a decade plus to have them grow back.</p> <p>(3B) 2. I run up the hill several times a week. Would it be possible to move the access through the fence to another position along the fence (maybe south edge of the homes) during construction so we can still access the trails?</p> <p>(3C) 3. Please check for underground water that originates under the pool located on the property at 1375 E 1160 N. Thank you! [redacted]</p>	<p>(3A) See Sections 1.8 and 3.14.2 in the Final EA.</p> <p>(3B) A new trail entry may require access across private property from 1560 East. The JLAs would coordinate with the selected contractor and the owner of the private property to determine the best location for an alternate trail access, if available. However, some of the trails may be closed during construction depending on contractor needs.</p> <p>(3C) During the design phase of the Project, additional studies and testing would be conducted to determine the level of groundwater and subsurface water along the Preferred Alternative alignment. These would include more detailed geotechnical investigations with test hole loggings that would show soil types and the elevation of groundwater along the Preferred Alternative alignment. If groundwater is encountered, the design and construction would accommodate groundwater movement so that there would be no change to the existing conditions.</p> <p>Also, the JLAs have instructed the design consultant to evaluate corrective options to subsurface drainage problems that have been mentioned by several residents that live in the neighborhood (see comment #5 below). Several options to help alleviate subsurface flows may include a French drain system that parallels the new pipeline within 1060 North and 1360 East and/or improvements to the storm water collection system. The French drain would be constructed within the trench zone and collect any subsurface water that may be encountered along the new pipeline and convey it away from the neighborhood by either discharging it into the existing storm drain that runs southward along 1360 East or improving the storm drain system. The JLAs would coordinate with Orem City for sizing and use of their storm drain for the collection of subsurface drainage that may be encountered by the new Alpine Aqueduct Reach 1 pipeline. Section 3.17.5 in the Final EA has been updated to include a mitigation commitment stating that the JLAs would conduct a subsurface water investigation and incorporate corrective measures as part of the Project.</p>
4	<p>Hi Chris,</p> <p>(4A) To follow up on our conversation at the public meeting, I would like to request that the construction schedule take into account the time that school starts and ends so that it doesn't disrupt the kids walking to and from school too much. We have lots of kids who walk on 1060 and lots of carpools going to the junior high and high school.</p> <p>(4B) Also, I'd like to second the request that the trees lining our street be preserved (or replaced with comparably mature trees). Thanks for your help and consideration. [redacted]</p>	<p>(4A) The JLAs and selected contractor would continue to coordinate and communicate construction activities with the city, neighborhood, affected residents, and others that may be impacted during construction.</p> <p>(4B) See response to comment 3A above.</p>





Number	Comments	Responses
5	<p>On December 17, 2021 I submitted comments and concerns regarding the proposed Alpine Aqueduct Reach 1 Replacement and Resiliency Project (Project). Subsequently, I have reviewed the August 2022 Draft Environmental Assessment (DEA) and continue to have the following specific concerns. These concerns do not mean I disagree with the need for some action to protect the pipeline.</p> <p>(5A) But they do mean that I am worried about the proposed Preferred Alternative: Construction Safety: A serious concern is that the Project will be built in a neighborhood of busy families and children. Although “the active construction areas would be fenced and secured at all times” and “open trenches would be covered with heavy metal plates” and “children would be unable to recreate near construction areas” – all those residents will be granted access to their homes. That limited access, along with heavy equipment in the area, will create circumstances in which it may be difficult to properly protect children in such an active neighborhood. Similar circumstances will be created every time the pipeline requires maintenance. To me, avoiding such a neighborhood would be the prudent course of action.</p> <p>(5B) Groundwater Problems: I recognize that the Joint Lead Agencies’ (JLA’s) groundwater studies show that groundwater levels are at least “140 feet below the surface.” However, neighborhood homeowner experiences show that in the past, groundwater has been found at the basement levels. I know of homeowners who live on or downhill from the proposed 1060 North route that have invested in groundwater mitigation systems, some at significant expense and effort. Because the JLA studies do not reveal the problems homeowners have actually experienced, it seems that the JLA studies may not have been adequate (location, depth, timing, season, rainfall, etc.). The net result is the DEA does not propose any mitigation because it does not acknowledge the problem. Therefore, I am very concerned that disruption or re-routing of the groundwater flows caused by the Project could negatively impact existing homeowner solutions to groundwater problems and result in expensive damage.</p> <p>(5C) Pipeline Break and Flooding: The DEA suggests that most of the pipeline leakage has occurred in the above ground segment of the existing pipeline, which is located in an area vulnerable to earth movement. We agree with the DEA that this problem needs to be resolved, as houses downstream will be vulnerable to flooding. With the 1060 North route, the DEA suggests that water resulting from pipeline damage or groundwater will “naturally follow the pipeline due to the [porous course-grained soils in which the pipeline is bedded and filled].” This response simply increases my concerns because theoretically, all water from a break or groundwater would run downhill – through the porous soils along the 1060 North pipeline to its low point at 1360 East, where it then turns north, and uphill. If the water runs to the low point junction of 1060 North and 1360 East, where might it ultimately go? I can only conclude that it could go into the basements of houses near that junction.</p> <p>(5D) Construction Damage: With regard to “public health and safety” the DEA states that there will be “potential vibration impacts to nearby homes.” I may have missed it, but I have not found where the DEA addresses how it will eliminate the potential damage that comes from construction vibration, it simply states the vibration will impact nearby homes. Obviously, if the vibration damages any house, it is a concern. Of the above, the greatest concern is ensuring that neighbors, especially children, will be safe during construction and subsequently during on-going maintenance. It seems there should be less risky alternatives than the Preferred Alternative, even if they cost more money. The other concerns deal with the economic impact of neighbors if there is damage or flooding as a result of constructing or operating the pipeline in a neighborhood area. If the LJAs move forward with the Preferred Alternative, and any of the above concerns become a reality, the questions ultimately become:</p> <p>(5E) (1) Who will compensate the families or homeowners for the problems created? And</p> <p>(2) What kind of hassle will those families or homeowners encounter in seeking reparations?</p> <p>Since it seems the DEA is committed to the Preferred Alternative; one purpose of this letter is to document that these concerns were raised before the Project was approved and when there was opportunity to mitigate the concerns before they occurred. In the end, I continue to hope for a less intrusive alternative that would do away with, or minimize, all the above concerns. Sincerely [redacted]</p>	<p>(5A) See Section 3.17. The selected contractor would be required to temporarily fence the work area to keep non-project related persons out of the construction site. The JLAs are committed to maintaining a safe construction zone for all those that either live nearby or are part of the construction process. Best Management Practices for construction safety in residential neighborhoods would be required and followed as outlined in the Final EA (Section 3.17). In addition, the JLAs have constructed a number of projects of large diameter water pipelines through similar neighborhoods without any accidents to pedestrians or children. Large diameter pipelines have been constructed through neighborhoods in Mapleton, Springville, Provo, Orem, Spanish Fork, Salem, Payson and other locations. Regarding maintenance on the new pipeline, the JLAs do not anticipate major maintenance activities with the new Alpine Aqueduct Reach 1.</p> <p>(5B) The JLAs have instructed the design consultant to evaluate corrective options if subsurface water is found during the investigations. Several options to help alleviate subsurface flows may include a French drain system that parallels the new pipeline within 1060 North and 1360 East and/or improvements to the storm water collection system. The French drain would be constructed within the trench zone and collect any subsurface water that may be encountered along the new pipeline and convey it away from the neighborhood by either discharging it into the existing storm drain that runs southward along 1360 East or improving the storm drain system. Section 3.17.5 in the Final EA has been updated to include a mitigation commitment stating that the JLAs will conduct a subsurface drainage investigation and corrective measures as part of the Project.</p> <p>(5C) See response to comment 5B above.</p> <p>A French drain system would collect subsurface water that may flow along a path of the new pipeline and would convey it away from the neighborhood by either discharging it into the existing storm drain that runs southward along 1360 East or improving the storm drain system.</p> <p>The new Alpine Aqueduct Reach 1 pipeline would be designed and constructed not to leak. The new pipeline would be constructed of a thicker steel wall pipe (7/8” to 1” thickness), mortar lined (inside the pipe), tape wrapped, and mortar coated on the outside. Each pipe length is hydraulically tested prior to construction. Pipe segments are constructed with a bell and spigot design and are connected in the field with a double weld (outside and inside) and each weld is tested to make sure it is leak proof. The new Alpine Aqueduct Reach 1 pipeline would be tested prior to being put into service to determine if any leaks exist.</p> <p>Once in service, the new Alpine Aqueduct Reach 1 pipeline will be regularly maintained. If a leak is detected, the pipeline would be dewatered, and all leaks would be repaired. The JLAs do not anticipate having any leaks to the new Alpine Aqueduct Reach 1 pipeline.</p> <p>(5D) See Section 3.17.8. In addition, the JLAs would commit to make available, through the selected contractor, the videoing and documentation of foundations, basements, and other structural features along the Preferred Alternative alignment prior to construction activities. Any damage to adjacent properties that are a result of the pipeline construction would be mitigated by the selected contractor.</p> <p>(5E) The District has a duty to use reasonable care in the engineering, design, and construction of the Alpine Aqueduct Reach 1 Relocation and Resiliency Project, and to continue to exercise that duty of reasonable care in the on-going operation, maintenance, repair, and replacement of this facility. The District could be held liable if the District is negligent in the performance of its duties and its negligence is determined to be the cause of any damages to person or property.</p> <p>As a governmental entity, the liability of the District would be subject to the provisions of the Governmental Immunity Act, Section 63G-6a-101, including its caps on liability. The District has liability insurance that would be responsible in the event the District were determined to have been negligent, and that negligence resulted in damages. The District could not be held liable for injuries caused by the negligence of others.</p>



## 4.2 Agency Consultation and Coordination

This section contains a record of correspondence between the study team and federal, state, local, and tribal agencies. All correspondence letters (both sent and received) are shown in Table 4-4.

Cooperating agencies, as defined in the Council of Environmental Quality (CEQ) Regulations 40 CFR §1501.8, participate in the preparation and review of the EA because of their jurisdiction by law or special expertise (e.g., Section 106 of the NHPA, Endangered Species Act, and Section 404 of the Clean Water Act [CWA]). Cooperating agency letters were sent by the JLAs to Orem City, U.S. Bureau of Reclamation (Reclamation), Utah Reclamation Mitigation and Conservation Commission (Mitigation Commission), and Utah County on November 11, 2021. Reclamation and the Mitigation Commission accepted the request.

Consultation letters were sent to Native American Tribal Governments that may have an interest in the proposed Project. These letters were sent by the U.S. Department of the Interior, Central Utah Project Completion Act Office (Interior) and included a copy of the scoping document.

*Table 4-4. List of Cooperating Agencies and Native American Tribal Governments Consultation Letters Sent.*

Date	To	From	Subject
Nov. 11, 2021	Orem City	Sarah Sutherland Environmental Programs Manager, District	Request to be a Cooperating Agency for the Alpine Aqueduct Reach 1 Replacement and Resiliency Project.
Nov. 11, 2021	Bureau of Reclamation	Sarah Sutherland Environmental Programs Manager, District	Request to be a Cooperating Agency for the Alpine Aqueduct Reach 1 Replacement and Resiliency Project.
Nov. 11, 2021	Utah Reclamation Mitigation and Conservation Commission	Sarah Sutherland Environmental Programs Manager, District	Request to be a Cooperating Agency for the Alpine Aqueduct Reach 1 Replacement and Resiliency Project.
Nov. 11, 2021	Utah County	Sarah Sutherland Environmental Programs Manager, District	Request to be a Cooperating Agency for the Alpine Aqueduct Reach 1 Replacement and Resiliency Project.





Date	To	From	Subject
Nov. 15, 2021	Candance Bear Chairwoman Skull Valley Band of Goshute Indians	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Shaun Chapoose Chairman Ute Tribe Business Committee	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Harold Cuthair Chairman Ute Mountain Ute Tribe	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Vernon Hill Chairman Shoshone Tribe of the Wind River Reservation of Wyoming	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Jonathan Nez Chairman Navajo Nation, Arizona, New Mexico, Utah Navajo Nation Tribal Council	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Timothy Nuvangyaoma Chairman Hopi Tribe of Arizona	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Val Panteah Governor Zuni Tribe of the Zuni Reservation, New Mexico	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Darren Parry Chairman Northwestern Band of Shoshoni Nation of Utah	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.





Date	To	From	Subject
Nov. 15, 2021	Antonio Pingree Acting Superintendent Uintah & Ouray Agency Bureau of Indian Affairs	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Ona Segundo Chairwoman Kaibab Band of Paiute Indians	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Vickie Simmons Chairman Moapa Band of Paiute Indians	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Pami Borchardt Slayton Chairwoman Paiute Indian Tribe	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Nathan Small Chairman Shoshone- Bannock Tribes	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Lee Spoonhunter Chairman Northern Arapaho Tribe	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Rupert Steele Chairman Confederated Tribes of the Goshute Reservation	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Randy Thompson Acting Superintendent Fort Hall Agency	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	James Williams Superintendent Southern Paiute Agency	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.



Date	To	From	Subject
Nov. 15, 2021	Mike Addy Superintendent Wind River Agency	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 15, 2021	Curtis Anderson Chairman Las Vegas Tribe of Paiute Indians	Reed Murray Program Director, Interior	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project Completion Act.
Nov. 23, 2021	Reed Murray Program Director, Interior	Richard M. Begay Navajo Nation Heritage and Historic Preservation Department	Alpine Aqueduct Reach 1 Replacement and Resiliency Project.
Nov. 29, 2021	Reed Murray Program Director, Interior	Stewart Koyiyumptewa Program Manager Hopi Tribe	Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental Assessment.
Jan. 24, 2022	Sarah Sutherland Environmental Programs Manager, District	Kent Kofford Area Manager, Reclamation	Request to be a Cooperating Agency for the Alpine Aqueduct Reach 1 Replacement and Resiliency Project.



## 5 List of References

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- American Lifelines Alliance (ALA), *Seismic Guidelines for Water Pipelines*, March 2005  
[https://www.americanlifelinesalliance.com/pdf/SeismicGuidelines\\_WaterPipelines\\_P1.pdf](https://www.americanlifelinesalliance.com/pdf/SeismicGuidelines_WaterPipelines_P1.pdf)
- Bowen Collins & Associated, Inc., *Orem City Water Master Plan*, March 2016  
[http://orem.org/wp-content/uploads/2017/05/Orem-City-Water-Master-Plan-3\\_18\\_reduced.pdf](http://orem.org/wp-content/uploads/2017/05/Orem-City-Water-Master-Plan-3_18_reduced.pdf)
- U.S. Department of the Interior (Interior), Departmental Manual, Part 512 Chapter 2, December 1995
- Jacobs Engineering Group Inc., Alpine Aqueduct Reach 1 Resiliency Assessment Project, October 2020
- Golder Associates Inc, *Summary of Geotechnical Data Spanish Fork Provo Reservoir Canal Pipeline - Orem Reach 1B and Areas to North*, June 2013
- Horrocks Engineers, Alpine Aqueduct Reach 1 Replacement and Resiliency Project. Utah Antiquities Project Number U22HX0280, May 2022
- URS Corporation, *Geotechnical Evaluations Alpine Aqueduct – Reach 1*, August 2001
- U.S. Department of the Interior, Central Utah Project Completion Act Office, Central Utah Water Conservancy District, Utah Reclamation Mitigation and Conservation Commission, *Utah Lake Drainage Basin Water Delivery System (ULS) Orem Reach 2 Realignment Environmental Assessment*, July 2015 <https://www.doi.gov/sites/doi.gov/files/uls-oremreach2-ea.pdf>
- U.S. Fish & Wildlife Service (USFWS), *IPaC resource list*, February 16, 2022
- U.S. Geological Survey (UGS), *Liquefaction Potential Map for a Part of Utah County, Utah*, August 1994
- U.S. Geological Survey (UGS), *Groundwater Conditions in Utah Spring of 2018*, Cooperative Investigations Report No. 59, 2018  
<https://waterrights.utah.gov/techinfo/wwwpub/GW2018.pdf>
- U.S. Geological Survey (UGS), *Hydrology of Northern Utah Valley, Utah County, Utah 1975-2005* <https://pubs.usgs.gov/sir/2008/5197/>
- U.S. Geological Survey (USGS), Well Station 401853111401501, April 2022,  
<https://groundwaterwatch.usgs.gov/AWLSites.asp?mt=g&S=401853111401501&ncd=aw>



Utah Division of Air Quality (UDAQ), *Utah Nonattainment Areas*, March 2022

Utah Natural Heritage Program (UNHP), Utah Division of Wildlife Resources (UDWR), GIS files obtained March 16, 2022

Utah Seismic Safety Commission (USSC), *Utah Seismic Safety Commission Recommendations*, November 2021

Van Buren, R., Cooper, J.G., Shultz, L.M., and Harper, K.T. 2011. *Woody Plants of Utah*. Utah State University Press. Logan, Utah.



## 6 List of Preparers

Name	Title	Agency/Firm
W. Russ Findlay	CUPCA Program Coordinator	CUPCA Office
Wes James	CUPCA Program Coordinator	CUPCA Office
Sarah Sutherland	Environmental Programs Manager	District
Jared Hansen	CUP Manager	District
Devin McKrola	Bonneville Unit O&M Manager	District
Rachel Musil	Water Rights Manager	District
Paul Pierpont	Provo Area Manager	District
Chris Elison	NEPA Projects Coordinator	District
Mike Whimpey	Chief Engineer	District
Stan Jorgensen	Principal	Horrocks Engineers
Gabriella Lawson	Environmental Specialist	Horrocks Engineers
Monique Robbins	Environmental Specialist	Horrocks Engineers
Chuck Easton	Cultural Resource Specialist	Horrocks Engineers
Heather LaFrance	Cultural Resource and Wetlands Specialist	Horrocks Engineers
Marley Madsen	Threatened and Endangered Species and Wildlife Specialist	Horrocks Engineers
Adam Murdock	Vice President, Global Director-Conveyance and Storage Solutions	Jacobs Engineering Group
Mitch Dabling	Conveyance Engineer Project Manager	Jacobs Engineering Group
John Chadwick	Project Engineer	Jacobs Engineering Group





## Abbreviations and Acronyms

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AA-1	Alpine Aqueduct Reach 1
ACHP	Advisory Council on Historic Preservation
ALA	American Lifelines Alliance
APE	Area of Potential Effects
BMPs	Best Management Practice
CA	Conservation Agreement
CAAA	Clean Air Act Amendments
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CUP	Central Utah Project
CUPCA	Central Utah Project Completion Act
CWA	Clean Water Act
CWP	Central Water Project
DACRWTP	Don A. Christiansen Regional Water Treatment Plan
DERR	Utah Division of Environmental Response and Remediation
District	Central Utah Water Conservancy District
EA	Environmental Assessment
EAP	Emergency Action Plan
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FPPA	Farmland Protection Policy Act
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
Interior	U.S. Department of the Interior, Central Utah Project Completion Act Office
IPaC	Information for Planning and Consultation
ITA	Indian Trust Asset
JLAs	Joint Lead Agencies
JVWTP	Jordan Valley Water Treatment Plant
JVWCD	Jordan Valley Water Conservancy District
LCI	Lettis Consultants International
M&I	Municipal and Industrial
M&I System	Municipal and Industrial System
MBTA	Migratory Bird Treaty Act



MG	million gallon
MGD	million gallons per day
Mitigation	
Commission	Utah Reclamation Mitigation and Conservation Commission
MOU	Memorandum of Understanding
MWDSLS	Metropolitan Water District of Salt Lake and Sandy
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO <sub>2</sub>	nitrogen dioxide
NRHP	National Register of Historic Places
O <sub>3</sub>	ozone
OM&R	operation maintenance & repair
Pb	lead
PM	particulate matter
PM <sub>2.5</sub>	particulate matter 2.5 micrometers
PM <sub>10</sub>	particulate matter 10 micrometers
POMWTP	Point of the Mountain Water Treatment Plant
PRA	Provo River Aqueduct
Project	Alpine Aqueduct Reach 1 Replacement and Resiliency Project
PRWUA	Provo River Water Users Association
Qaf	Quaternary alluvial fan
Qc	Quaternary colluvium
Qlb	Quaternary Lake Bonneville lacustrine gravel and sand
Qsa	Quaternary stream alluvium
Reclamation	Bureau of Reclamation
Resiliency	
Assessment	Alpine Aqueduct Reach 1 Resiliency Assessment Project
SGMAs	Sage-grouse Management Areas
Secretary	Secretary of the Interior
SFPRCP	Spanish Fork Provo Reservoir Canal Pipeline
SHPO	State Historic Preservation Office
SLA	Salt Lake Aqueduct
SO <sub>2</sub>	sulfur dioxide
SWPPP	Storm Water Pollution Prevention Plan
UAC	Utah Administrative Code
UDAQ	Utah Division of Air Quality
UDOT	Utah Department of Transportation
UDWR	Utah Division of Wildlife Resources
UGS	Utah Geological Survey



ULS	Utah Lake Drainage Basin Water Delivery System
UNHP	Utah Natural Heritage Program
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
USSC	Utah Seismic Safety Commission
WCWEP/DPR	Wasatch County Water Efficiency/Daniel Replacement Project
WFZ	Wasatch Fault Zone
WMA	Wildlife Management Area
WOTUS	Waters of the U.S.



## Appendix A: Consultation and Coordination

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## CENTRAL UTAH WATER CONSERVANCY DISTRICT

Al Mansell *Chair of the Board*  
Shelley Brennan *Vice Chair of the Board*  
Gene Shawcroft *General Manager / CEO*

G. Wayne Andersen  
JR Bird  
E James (Jim) Bradley  
Shelley Brennan  
Max Burdick  
Kirk L Christensen

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Edwin Boyd Sunderland  
Byron Woodland  
Boyd Workman

November 11, 2021

Re: Request to be a Cooperating Agency for the Alpine Aqueduct Reach 1 Replacement and Resiliency Project

Dear

The Central Utah Water Conservancy District (CUWCD) and the Department of the Interior-Central Utah Project Completion Act Office, as Joint Lead Agencies (JLAs), are preparing National Environmental Policy Act documentation, in accordance with 36 CFR 1500-1508, for the proposed Alpine Aqueduct Reach 1 Replacement and Resiliency Project. The JLAs are requesting that the U.S. Bureau of Reclamation – Provo Area Office be a cooperating agency for this project as defined in 40 Code of Federal Regulations 1501.8. Should your agency accept our invitation to be a cooperating agency, specific duties may involve:

- Participating in cooperating agency meetings;
- Providing comments on alternatives and issues to be analyzed in the EA;
- Providing input on resolution of issues associated with the proposed action; and
- Providing information as requested by the JLAs and assisting with analyses relevant to your agency's jurisdiction or area of special expertise.

Enclosed is a scoping document that outlines specifics about the Project. A segment of the Alpine Aqueduct Reach 1 (AA 1) is located within an active landslide in the foothills above Orem near the mouth of Provo Canyon. The landslide has caused operation and maintenance issues with AA 1. In addition, AA 1 crosses several splays of the Wasatch Fault. In the fall of 2020, CUWCD completed an analysis of options to address the geotechnical issues and concerns related with AA 1. The Proposed Action for the AA-1 Resiliency and Replacement Project would relocate the AA-1 pipeline to a location that would avoid the landslide complex and would construct segments of the pipeline that cross the WFZ in a manner that can better withstand potential seismic activity. The EA will also evaluate the construction of one or more pump stations to increase resiliency of the water delivery systems at the mouth of Provo Canyon. If you have any questions or concerns, please call me at (801) 226-7147 or send an email to [sarah@cuwcd.com](mailto:sarah@cuwcd.com).

Sincerely,

A handwritten signature in blue ink that reads "Sarah Sutherland".

Sarah Sutherland  
Environmental Programs Manager

ec: Reed Murray, CUPCA Office, Program Director





## United States Department of the Interior

BUREAU OF RECLAMATION  
Provo Area Office  
302 East Lakeview Parkway  
Provo, UT 84606



IN REPLY REFER TO:

PRO-637  
2.1.4.17

Ms. Sarah Sutherland  
Environmental Programs Manager  
Central Utah Water Conservancy District  
1426 East 750 North, Suite 400  
Orem, Utah 84097

Subject: Request to be a Cooperating Agency for the Alpine Aqueduct Reach 1 Replacement and Resiliency Project – Environmental Assessment, Utah

Dear Ms. Sutherland:

We received your letter dated November 11, 2021, regarding the Alpine Aqueduct Reach 1 Replacement and Resiliency Project (EA) concerning relocating the aqueduct to avoid a landslide complex. On behalf of the Central Utah Water Conservancy District (CUWCD) and the Department of the Interior, Central Utah Project Completion Act Office, as Joint Lead Agencies (JLAs), you requested the Bureau of Reclamation be a cooperating agency for the project as defined in 40 CFR 1501.6.

This letter is to inform you that we accept your request to be a cooperating agency on the EA. Mr. Wyatt Carter from our Environmental Group will be the team lead on your project. Please work directly with him to develop a Memorandum of Understanding outlining responsibilities under the National Environmental Policy Act for the respective agencies. Mr. Carter can be reached at (801) 379-1161 or by email at [wcarter@usbr.gov](mailto:wcarter@usbr.gov). For Text Telephone Relay Service access, call the Federal Relay System Text Telephone (TTY) number at (800) 877-8339.

Sincerely,

Acting For

Kent Kofford  
Area Manager

Digitally signed by  
RICK BAXTER  
Date: 2022.01.24  
14:30:16 -07'00'

INTERIOR REGION 7 • UPPER COLORADO BASIN

COLORADO, NEW MEXICO, UTAH, WYOMING

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# United States Department of the Interior

OFFICE OF THE SECRETARY  
Central Utah Project Completion Act Office  
302 East Lakeview Parkway  
Provo, Utah 84606

CA-1300  
2.1.4.17

Subject: Alpine Aqueduct Reach 1 Replacement and Resiliency Project Environmental

Assessment – Tribal Consultation – Section 202(a)(1) – Central Utah Project  
Completion Act

Dear

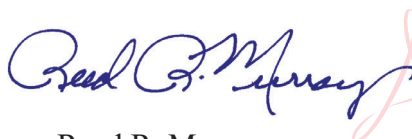
The Department of the Interior – Central Utah Project Completion Act Office (Interior) and the Central Utah Water Conservancy District (District) are evaluating a replacement alternative and resiliency measures for the Alpine Aqueduct Reach 1 (AA-1) near the mouth of Provo Canyon. The District and Interior, as Joint Lead Agencies (JLAs), have initiated an environmental assessment (EA), consistent with the National Environmental Policy Act (NEPA), to analyze and disclose the potential impacts of replacing the AA-1 on a different alignment. Currently, the JLAs are initiating agency and public involvement by conducting scoping activities and are requesting input on the realignment and replacement of the AA-1 pipeline and resiliency options.

The JLAs have determined that the pipeline is at risk of failure from both seismic and non-seismic events, which is unacceptable for a critical water supply. The Project would relocate the AA-1 pipeline to a location that would avoid a landslide complex and would construct segments of the pipeline that cross the Wasatch Fault Zone in a manner that can better withstand potential seismic activity.

We invite you to a public scoping meeting to discuss the proposed action on Tuesday, November 30, 2021, from 6:00-7:30 p.m. This meeting will be held at the Central Utah Water Conservancy District Offices located at 1426 East 750 North, Building 2, Orem, Utah 84097. Enclosed is a scoping packet regarding the proposed Project.

We appreciate your participation on this Project. Comments must be submitted by Monday, December 20, 2021, to Mr. W. Russ Findlay, 302 East Lakeview Parkway, Provo, Utah 84606-7317, or by email to [wfindlay@usbr.gov](mailto:wfindlay@usbr.gov). For Text Telephone Relay Service access, call the Federal Relay System Text Telephone (TTY) number at (800) 877-8339.

Sincerely,



Digitally signed by REED  
MURRAY

Date: 2021.11.15 15:54:07 -07'00'

Reed R. Murray  
Program Director

Enclosure

cc: [mholden@usbr.gov](mailto:mholden@usbr.gov)  
[gene@cuwcd.com](mailto:gene@cuwcd.com)  
(w/encl to each)

## Findlay, Walter (Russ)

---

**From:** Richard M. Begay <r.begay@navajo-nsn.gov>  
**Sent:** Tuesday, November 23, 2021 10:11 AM  
**To:** Findlay, Walter (Russ)  
**Cc:** Timothy Begay  
**Subject:** [EXTERNAL] RE: 20211123-Alpine Aqueduct Reach 1 Replacement and Resiliency Project Envir-1111131220211123-pdf

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Good morning Mr. Findlay

I am in receipt of the letter inviting the Navajo Nation to participate in the scoping activities for the Alpine Aqueduct Reach 2. The Navajo Nation has no concerns and will decline to participate in the scoping for this undertaking. Please proceed without further consultation with the Navajo Nation.

Richard M. Begay, THPO  
Navajo Nation Heritage and Historic Preservation Dep't  
Window Rock, AZ

---

**From:** Priscilla Chee <priscillachee@navajo-nsn.gov>  
**Sent:** Tuesday, November 23, 2021 9:20 AM  
**To:** Rudolph R. Shebala <rudyshbala@navajo-nsn.gov>; Richard M. Begay <r.begay@navajo-nsn.gov>; Elfrieda Woodman <elfreidawoodman@navajo-nsn.gov>  
**Cc:** Jonathan Nez <jonathannez@navajo-nsn.gov>; Myron Lizer <myronlizer@navajo-nsn.gov>; Paulson Chaco <paulsonchaco@navajo-nsn.gov>; James J. Davis, Jr <jjdavisjr@navajo-nsn.gov>; Davis Filfred <davisfilfred@navajo-nsn.gov>; Ettie Anderson <eanderson@navajo-nsn.gov>; Christopher T. Bahe <cbahe@navajo-nsn.gov>; Sharon Yazzie <sharonyazzie@navajo-nsn.gov>; Brenda Yazzie <brendayazzie@navajo-nsn.gov>  
**Subject:** 20211123-Alpine Aqueduct Reach 1 Replacement and Resiliency Project Envir-1111131220211123-pdf

Fwd: DNR



**Priscilla Chee**

*Sr. Office Specialist*

**THE NAVAJO NATION**

*Office of the President & Vice President*

P.O. Box 7440 | 100 Parkway | Window Rock, AZ 86515

Office: (928) 871-7000 | Facsimile: (928) 871-4025

E-mail: [priscillachee@navajo-nsn.gov](mailto:priscillachee@navajo-nsn.gov)



# SCOPING PACKET

## Alpine Aqueduct Reach 1 Replacement and Resiliency Project

### INTRODUCTION

The Central Utah Water Conservancy District (District) and the Department of the Interior – Central Utah Project Completion Act Office (Interior) are evaluating a replacement alternative and resiliency measures for the Alpine Aqueduct Reach 1 (AA-1) near the mouth of Provo Canyon. The District and Interior, as Joint Lead Agencies (JLAs), have initiated an environmental assessment (EA), consistent with the National Environmental Policy Act (NEPA), to analyze and disclose the potential impacts of replacing the AA-1 on a different alignment. Currently, the JLAs are initiating agency and public involvement by conducting scoping activities and are requesting input on the realignment and replacement of the AA-1 pipeline and resiliency options.

### Alpine Aqueduct

The Alpine Aqueduct was constructed as part of the Municipal and Industrial System of the Bonneville Unit of the Central Utah Project in 1979-80 by the Bureau of Reclamation. It is a 13.2-mile-long pipeline beginning at the 10-million-gallon (MG) Olmsted Reservoir in Provo Canyon and terminating in northern Utah County. It delivers untreated water to three water treatment plants (through a connection with the Jordan Aqueduct) as well as to secondary pressurized irrigation systems. The Alpine Aqueduct was constructed in reaches: AA-1 (proposed project reach); Reach 2, which delivers treated water from the Don A. Christiansen Regional Water Treatment Plant (DACRWTP) to Orem and Provo; and Reach 3, which delivers secondary irrigation water to northern Utah County.

### Alpine Aqueduct Reach 1 —

The AA-1 pipeline is part of the regional water delivery systems that traverse the mouth of Provo Canyon and is an integral part of the water delivery systems for Utah and Salt Lake Counties. It delivers municipal and industrial (M&I) water to approximately 1.6 million people in these counties.

The AA-1 pipeline is 90-inches in diameter and approximately 1.1 miles long. It is comprised of an 1,830-foot-long tunnel and a 400-foot section that is aboveground. The remainder of the AA-1 pipeline is buried and connects to the DACRWTP. The existing AA-1 pipeline is shown in Figure 3.



*Construction of the Alpine Aqueduct Reach 1*

### Regional Water Facilities

**DACRWTP** — The DACRWTP is a 100-million-gallon-per-day (MGD) water treatment plant located above the Orem cemetery in the foothills of Mount Timpanogos. It delivers treated water to Orem, Provo, and other District customers.

**JORDAN AQUEDUCT** — The Jordan Aqueduct is a 38-mile-long pipeline beginning near the DACRWTP and terminating near 2100 South/Bangerter Highway in West Valley City. It is a major conveyance facility to the western and southern Salt Lake Valley areas delivering water from the Provo River to the 180 MGD Jordan Valley Water Treatment Plant and the 70 MGD Point of the Mountain Water Treatment Plant.

**PROVO RIVER AQUEDUCT** — The Provo River Aqueduct (PRA), previously known as the Murdock Canal or the Provo Reservoir Canal, is a 21-mile-long pipeline from the mouth of Provo Canyon to the Point of the Mountain. It was enclosed in 2014 with a 126-inch welded steel pipe and delivers water from the Provo River to Utah and Salt Lake Counties and to the Jordan Valley and Point of the Mountain Water Treatment Plants.

**SALT LAKE AQUEDUCT** — The Salt Lake Aqueduct (SLA) is a 69-inch diameter, 42-mile-long pipeline beginning at the base of Deer Creek Dam. It is a major conveyance facility for eastern Salt Lake Valley delivering water from Deer Creek Reservoir to the 113 MGD Little Cottonwood Water Treatment Plant. The SLA can also supply water to the DACRWTP on a space-available basis.

**ALTA SPRINGS PIPELINE** — The Alta Springs Pipeline delivers Orem City M&I water from springs located about 3 miles up Provo Canyon to storage tanks near the DACRWTP. It is a steel pipeline that ranges from 30 to 16 inches in diameter.

**800 NORTH AQUEDUCT** — The District owns and operates the non-federal Central Water Project that develops and delivers M&I water to northwest Utah County and to a turnout for Jordan Valley Water Conservancy District. The 800 North Aqueduct is part of the Central Water Project delivering treated water from the DACRWTP.

**SPANISH FORK PROVO RESERVOIR CANAL PIPELINE** — The Spanish Fork Provo Reservoir Canal Pipeline (SFPRCP) is a 60-inch, 19-mile-long welded steel pipe that conveys Strawberry Reservoir water to Utah and Salt Lake Counties. The SFPRCP connects to AA-1 (through the Olmsted hydroelectric powerplant and the 10 MG Olmsted Reservoir) and to the PRA.

*Continue on page 2*



CENTRAL UTAH WATER  
CONSERVANCY DISTRICT



GEOLOGIC HAZARDS AT THE MOUTH OF PROVO CANYON

These water delivery pipelines, including AA-1, are located at the mouth of Provo Canyon and cross the Wasatch Fault Zone (WFZ). Other challenges include geologic hazards such as landslides, steeply incised canyons, and unstable bedrock conditions. The AA-1 pipeline is at risk of failure due to landslides and/or a seismic event.

Wasatch Fault

The WFZ is a 230-mile-long fault zone that is the largest seismic fault in northern Utah. It is the most likely fault in the area to produce a moderate- to large-magnitude earthquake. According to a recent study, there is an 18 percent probability that the WFZ will produce at least one magnitude 6.75 or greater earthquake in the next 50 years.

The Provo Segment of the WFZ (Figure 4) has produced five surface rupturing events over the last 7,000 years, with average vertical displacements ranging from 4.5 to 8.2 feet. Based on these values, vertical displacement estimates for a future design seismic event range from 11.4 to 15.7 feet along the Provo Segment. Displacement of this magnitude would damage pipelines, tunnels, and aqueducts that cross the fault (Figure 1). The AA-1 pipeline can only withstand a limited amount of landslide movement before rupturing and causing more damage to the surrounding area.

Figure 1

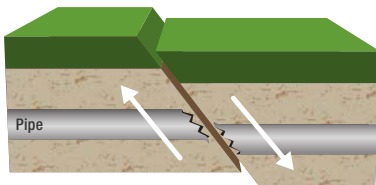
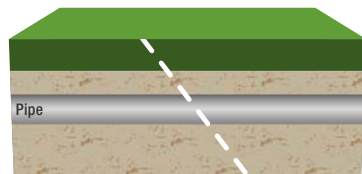


Figure 2

Landslide Complex

Another geologic hazard in the foothills above Orem at the mouth of Provo Canyon is a large landslide complex (Figure 4). It has been mapped by several different entities and is about 5,000 feet long and 1,800 feet wide. The AA-1 pipeline is at risk of failure from seismic shaking; non-seismic, moisture-induced landslide activity; and from localized landslides that exist within the larger landslide complex.

The landslide is promoted and activated by the presence of weak bedding planes and shear surfaces that enable its movement. In the last 20 years, the AA-1 pipeline has ruptured five times due to

landslide movement and hillside slumping. This landslide continues to put stress on the existing AA-1 pipeline and has damaged, deformed, and corroded the pipe in several locations.

AA-1 RESILIENCY ASSESSMENT

The District initiated the 2020 Alpine Aqueduct Reach 1 Resiliency Assessment Project (resiliency assessment) to evaluate options to improve the AA-1 pipeline and its resiliency. The objectives of the resiliency assessment were to evaluate its vulnerability, risk, and consequences of failure; determine its existing resiliency; and develop reasonable alternatives to decrease consequences of failure and increase reliability for District customers. A copy of the resiliency assessment is found on the AA-1 project website, <https://cuwcd.com/alpineaqueduct.html>.

Evaluations of Preliminary Alternatives

The resiliency assessment developed replacement options based on weighted non-cost evaluation criteria deemed to be most critical to provide safe, reliable operations of AA-1 (Figure 2). Replacement and rehabilitation options were ranked. The preliminary analyses yielded one potential pipeline alignment that scored significantly higher than the other options evaluated as part of the resiliency assessment. This alignment is referred to as option 3B in the resiliency assessment, but for purposes of this EA it will be referenced as the Proposed Action Alternative. The EA will evaluate the Proposed Action Alternative, No Action Alternative, and any reasonable alternatives proposed by the public or agencies.

PROPOSED ACTION

The Proposed Action for the AA-1 Replacement and Resiliency Project

would relocate the AA-1 pipeline to a location that would avoid the landslide complex and would construct segments of the pipeline that cross the WFZ in a manner that can better withstand potential seismic activity.

NEED FOR THE PROJECT

AA-1 is expected to provide reliable service year-round. Failure of AA-1 would

cause significant economic impact to the communities it supports and pose a substantial hazard to human life and property located below it. As discussed, the AA-1 pipeline crosses through and along a large landslide complex that has seen continued and recent localized slippage activity resulting in the rupture and failure of the

CRITERIA	ITEMS CONSIDERED	WEIGHT
Reliability	<ul style="list-style-type: none"><li>• Non-Seismic Events</li><li>• Seismic Events</li><li>• Consequences of Failure/Flooding Risk</li><li>• Potential for Interconnection</li></ul>	40%
Repairability	<ul style="list-style-type: none"><li>• Accessibility</li><li>• Repair Materials and Methods</li><li>• Time to Repair</li></ul>	20%
Operations and maintenance	<ul style="list-style-type: none"><li>• Access</li><li>• Maintenance</li><li>• Security</li></ul>	20%
Environment	<ul style="list-style-type: none"><li>• Wetlands/Rivers/Groundwater</li><li>• Species/ Land Disruption</li><li>• Community Impacts</li><li>• Visual/Safety</li></ul>	10%
Implementation/Constructability	<ul style="list-style-type: none"><li>• Construction Risk</li><li>• Property/Right-of-Way</li><li>• Schedule</li></ul>	10%



*Continued from Page 2*

pipeline multiple times since its construction.

Due to the critical nature of the AA-1 facility, the JLAs have determined that the pipeline is at risk of failure from both seismic and non-seismic events, which is unacceptable for a critical water supply. The vulnerability of the AA-1 pipeline greatly decreases the resiliency of the Wasatch Front water delivery facilities. Therefore, there is a need to evaluate the Proposed Action Alternative to increase AA-1's resiliency and reliability to provide water to Utah and Salt Lake Counties.

## PROPOSED ACTION ALTERNATIVE

The Proposed Action Alternative would consist of replacing and relocating the existing AA-1 pipeline outside of the landslide complex.

It would also be designed and constructed to minimize the effects of an earthquake. Since the WFZ extends north and south along the Wasatch Front, any alignment option would require crossing the WFZ. To help mitigate the WFZ crossing, current seismic pipeline design standards and practices for fault crossings would be followed and flexibility would be incorporated in the pipeline itself. These updated designs significantly decrease the potential for failure due to fault displacement and increase the resiliency of the facility. The Proposed Action Alternative is the highest-rated option evaluated in the resiliency assessment.

**The Proposed Action Alternative** would connect with the existing AA-1 pipeline at its tunnel outlet portal, continue south down the hillside, turn west onto 1060 North street in Orem, turn north onto 1360 East street, and continue through the former Cascade Golf Course to the DACRWTP. The proposed AA-1 pipeline would be 108-inch welded steel and the existing AA-1 pipeline would be abandoned. Three options for alternate pipeline alignments are also under consideration. These options will allow the study team to examine costs and benefits of different alignments:

**Option A** would construct a new tunnel with a 102-inch diameter steel pipe for the first 3,200 feet. The new tunnel would run from the existing AA-1 tunnel inlet portal near the 10 MG Olmsted Reservoir to an area east of the 1060 North/1560 East intersection. From there, a new 102-inch pipeline would continue along the alignment described above in the Proposed Action Alternative.

**Option B** would construct a new tunnel with a 108-inch diameter steel pipe for the first 1,400 feet. Most of the existing AA-1 tunnel



*Photo of a Landslide along AA-1 Pipeline*

would remain in use, but the remainder of the existing AA-1 pipeline would be abandoned. The proposed tunnel would connect into the existing AA-1 tunnel and would head south to an area east of the 1060 North/1560 East intersection. From there, a new 108-inch pipeline would continue along the alignment described above in the Proposed Action Alternative.

**Option C** is independent of the alignment options A or B. It would involve extending the 108-inch Proposed Action Alternative pipeline farther north on 1360 East and then west through the former Cascade Golf Course to the DACRWTP.

## Resiliency Measures

The resiliency assessment also evaluated measures to provide redundancy in the case of damage or rupture of the AA-1. Particularly, the resiliency assessment acknowledged the vulnerability of the major aqueducts located in Provo Canyon (e.g., Olmsted Flowline, SLA, and PRA) and considered reliability measures that could be implemented to improve the overall resiliency of the water delivery system. These measures include the interconnection between pipelines/aqueducts through the construction of proposed pump station(s), installation of valving, and the stockpiling of pipe and other appurtenances. The EA will evaluate the construction of one or more pump stations to increase resiliency of the water delivery systems at the mouth of Provo Canyon (Figure 4). Two pump station options are being considered as preliminary options:

**Cascade Pump Station** would be constructed adjacent to the 800 North park-n-ride lot and would pump water from the Provo Bench

*Continue on page 4*

*Continued from Page 3*

Canal into the PRA and/or to the realigned AA-1 pipeline through a newly proposed pipeline.

**Murdock Pump Stations** would consist of two pump stations — one located south of 800 North that would pump from the Provo Bench Canal into the PRA and the other near the Orem cemetery and would pump from the PRA to the DACRWTP and other water treatment plants located in the Salt Lake Valley.

The pump station options would not eliminate the need to replace AA-1. They are expected to operate even after a large seismic event. Either pump station option could potentially provide an opportunity for increased environmental benefit, depending on water contract holders' interest, by allowing water to continue down the Provo River below the Murdock Diversion instead of it being diverted above. If either option were constructed, water could then be diverted into the Provo Bench Canal and pumped into the PRA, AA-1, and/or the DACRWTP.

## No Action Alternative

The No Action Alternative scored low in the resiliency assessment but is a requirement to be considered in the EA for comparison purposes. The No Action Alternative would leave the existing AA-1 pipeline in place. For the Resiliency Measures, no new pump station(s) would be constructed. In addition, the No Action Alternative would require the ongoing maintenance and repair to the existing AA-1 pipeline that currently presents risks to the surrounding area.

## ENVIRONMENTAL RESOURCE CONCERNS

Resources identified as cause for concern include community impacts during construction, visual resources, and water quality. The Proposed Action Alternative crosses through a residential neighborhood that would experience temporary impacts during construction. The area would be restored as part of the construction process. Other resources will be evaluated as part of the EA.

## SCOPING INFORMATION

We invite the public to provide input on the AA-1 project, as well as concerns and suggestions regarding the Proposed Action Alternative and any additional alternatives not included. An open house will be held Tuesday, Nov. 30, 2021, from 6:00 p.m. to 7:30 p.m. where the public is encouraged to come, view exhibits, and talk with project representatives. The open house will be held at the District offices



*Photo of a Break in the AA-1 Pipeline*

located at 1426 East 750 North in Orem.

Comments can be submitted on the AA-1 project webpage using the interactive project map (<https://cuwcd.com/alpineaqueduct.html>) or by email ([info@alpineaqueduct.com](mailto:info@alpineaqueduct.com)). A dedicated project hotline will be maintained throughout the study period (385-376-4400). Please submit any comments by Monday, Dec. 20th. There will continue to be opportunities for the public to give input throughout the NEPA process over the next year. We value your ideas and look forward to your continued involvement in improving the resiliency and reliability of the Alpine Aqueduct.

## PUBLIC SCOPING MEETING

### OPEN HOUSE

#### WHEN:

Tuesday, Nov. 30, 2021, 6-7:30 p.m.

#### WHERE:

Central Utah Water Conservancy District Offices  
1426 East 750 North, Building 2, Orem, UT 84097

## WE WANT YOUR INPUT

Formal comment period will be open until Dec. 20, 2021.

### HOW TO COMMENT

- Attend the Public Scoping Meeting on [Nov. 30, 2021](#), to submit a formal verbal comment.
- Submit a comment on the interactive map at [cuwcd.com/alpineaqueduct.html](https://cuwcd.com/alpineaqueduct.html).
- Call the study hotline at [385-376-4400](tel:385-376-4400).
- Email the study team at [info@alpineaqueduct.com](mailto:info@alpineaqueduct.com).
- Pick up a physical comment form and a copy of the Scoping Document at the CUWCD's Orem office.
- Mail in a physical comment form to:  
[Central Utah Water Conservancy District](#)  
[c/o Alpine Aqueduct Reach 1 Project](#)  
[1426 East 750 North, Suite 400](#)  
[Orem, UT 84097-54742](#)

## DEFINITION OF ACRONYMS:

**AA-1** - Alpine Aqueduct Reach 1

**DACRWTP** - Don A. Christiansen  
Regional Water  
Treatment Plant

**EA** - Environmental Assessment

**JLA** - Joint Lead Agency

**M&I** - Municipal and Industrial

**MGD** - Million-gallon-per-day

**NEPA** - National Environmental  
Policy Act

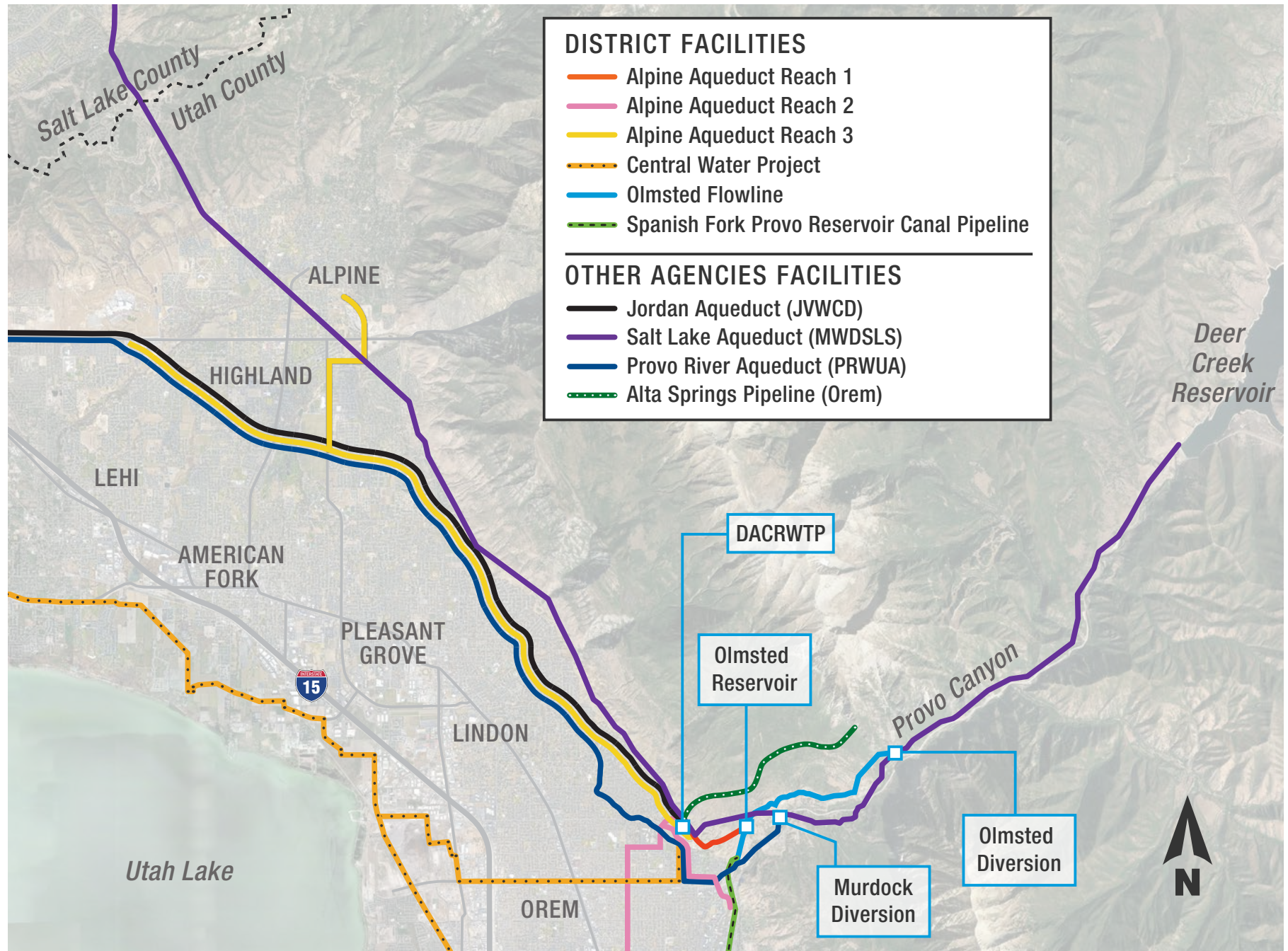
**PRA** - Provo River Aqueduct

**SLA** - Salt Lake Aqueduct

**WFZ** - Wasatch Fault Zone

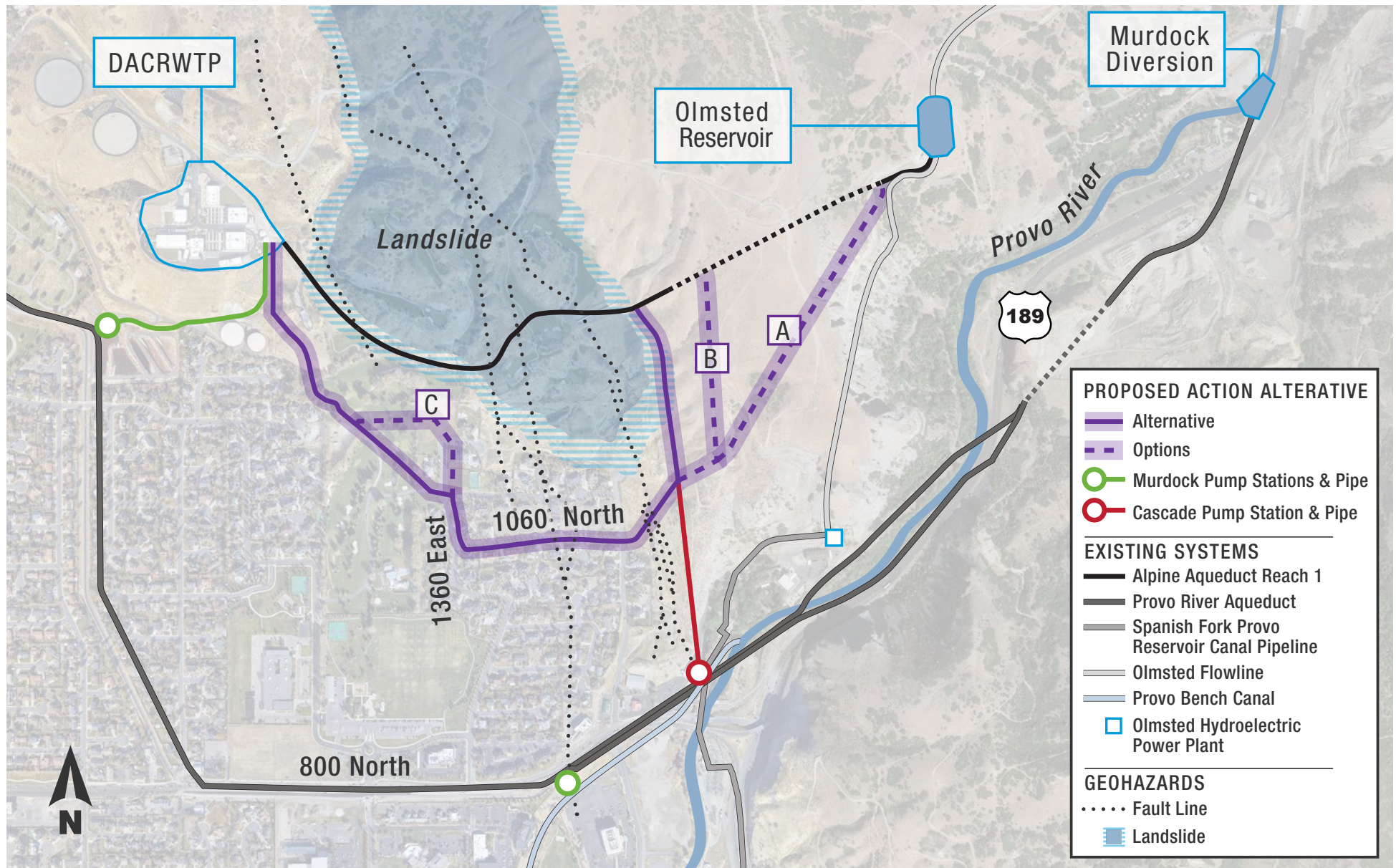


# Figure 3: Regional Water Facilities





# Figure 4: Proposed Action Alternative





**CENTRAL UTAH WATER**  
**CONSERVANCY DISTRICT**

**ALPINE AQUEDUCT REACH 1 EA**  
**PUBLIC MEETING SUMMARY**

PREPARED BY HORROCKS ENGINEERS  
JANUARY 2022

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Summary of Comments and Issues Raised .....	3

## List of Appendices

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Appendix B: Public Meeting Attendance .....	Error! Bookmark not defined.
Appendix C: Study Information.....	Error! Bookmark not defined.

## Study Overview

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The Central Utah Water Conservancy District (District) and the Department of the Interior – Central Utah Project Completion Act Office (Interior), as Joint Lead Agencies (JLAs), have initiated an Environmental Assessment (EA) to evaluate the replacement of a 1.4-mile segment of the Alpine Aqueduct at the mouth of Provo Canyon in Orem, Utah, and the potential addition of pump stations. The Alpine Aqueduct, through a connection with the Jordan Aqueduct, delivers water to approximately half of Utah's population, including Orem and Provo.

The EA study team is evaluating these improvements to protect this critical pipeline from geological hazards that are common along the Wasatch Front, such as landslides and earthquakes, and provide reliable service to Utahns well into the future. The study will comply with the National Environmental Policy Act (NEPA) requirements.

## NEPA Scoping Purpose and Goals

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NEPA regulations for scoping in 40 Code of Federal Regulations 1501.9 states, that agencies should use an early and open process to determine the scope of issues for analysis to be addressed and for identifying the significant issues related to a proposed action.

The purpose of scoping is to obtain information that will focus the NEPA analysis on the potentially significant environmental issues and de-emphasize insignificant issues. Scoping engages the general public and other entities that may have an interest in the project with the goal of soliciting input on the issues, impacts, and potential alternatives to be addressed in the NEPA document.

## Scoping Process

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Scoping was conducted in accordance with the District's 2016 *Handbook for the National Environmental Policy Act*, which specifies that "The District will provide an opportunity for scoping at the beginning of the NEPA process. Notifications will be made to the general public within the potential area of effect of the proposed action. Input to development of the EA will be solicited from the general public, interested parties, environmental groups, local, state and Federal agencies."

## Public Outreach

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A variety of methods were employed to advertise the beginning of the NEPA process and the Public Meeting, which took place on Nov. 30, 2021 (see Appendix A: Outreach).

- An invitation to the Public Meeting and the Scoping Document were mailed to approximately 300 Orem residents located near the project area and federal, state, and local agencies and interested parties including, U.S. Department of the Interior, U.S. Bureau of Reclamation, Utah Reclamation Mitigation and Conservation Commission, U.S. Forest Service, U.S. Fish and Wildlife Services, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Utah Geological Survey, Utah Division of Water Resources, Utah Division of Forestry, Fire & State Lands, Utah Division of Water Rights, Utah State Parks & Recreation, Utah Division of Wildlife Resources, Utah Department of Natural Resources, Governor's Office of Management & Budget, Utah Division of Water Quality, Utah Division of Drinking Water, Utah Division of State History & State Historic Preservation Office, Mountainland Association of Governments, Utah Department of Transportation, Utah Congressional Delegation, Provo City, Orem City, Alpine City, American Fork City, Highland City, Lehi City, Pleasant Grove City, Cedar Hills City, Saratoga Springs City, Lindon City, Vineyard City, Weber Basin Water Conservancy District, Jordan Valley Water Conservancy District, Metropolitan Water District of Salt Lake & Sandy, Provo River Water Users Association, Provo Bench Canal, North Union Irrigation Company, and PacifiCorp on Nov. 10, 2021.
- Interior sent a letter and the scoping document to Native American Tribal Governments and Bureau of Indian Affairs Agency Offices on Nov. 15, 2021, notifying them of the meeting, scoping comment period, and proposed project.
- The JLAs sent letters to agencies with jurisdiction by law or special expertise to notify them of the proposed action, the Public Meeting and inviting them to be a cooperating agency. The U.S. Bureau of Reclamation and Utah Reclamation Mitigation and Conservation Commission accepted the JLA's invitation to be cooperating agencies.
- The District website was made available to the public on Nov. 10, 2021 ([cuwcd.com/alpineaqueduct.html](http://cuwcd.com/alpineaqueduct.html)). The website contained an overview of the study, instructions on how to provide feedback, the Scoping Document, the Public Meeting presentation materials, and an interactive comment map on which the public could leave geospatial comments.
- The formal comment period began on Nov. 15, 2021. A legal notice was advertised in the *Daily Herald*, *Salt Lake Tribune* and *Deseret News* on Nov. 15, 2021. The legal notice contained an overview of the study, instructions on how to provide feedback, and details about the upcoming Public Meeting.
- The District worked with Orem City and other key stakeholders to publish social media posts about the NEPA study and the upcoming Public Meeting in November 2021.
- The District met with the following stakeholders:
  - Orem City Council and Mayor
  - Bill Lee, Utah County Commissioner
  - Senator Mike Kennedy
  - Canyon Cove neighborhood representative



## Opportunity for Public Comment

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Interested parties were offered a variety of ways to submit comments throughout the comment period (Nov. 15, 2021 – Dec. 20, 2021).

- Email: [info@alpineaqueduct.com](mailto:info@alpineaqueduct.com)
- Phone: 385-376-4400
- Website: [cuwcd.com/aplineaqueduct.html](http://cuwcd.com/aplineaqueduct.html)
- Mail: Central Utah Water Conservancy District c/o Alpine Aqueduct Reach 1 Project  
1426 East 750 North, Suite 400 Orem, UT 84097
- In-person: During the Public Meeting and at the District's main office

## Public Meeting

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The JLAs held an in-person Public Meeting to gather public input during the Scoping Phase of the Alpine Aqueduct Reach 1 (AA-1) EA. The Public Meeting was held on Tuesday, Nov. 30, 2021, from 5:30 – 7:30 p.m. at the District's Building 2 (1426 East 750 North, Building 2, Orem, UT 84097).

The meeting had 24 attendees. Of those attendees, 1 person left a written comment at the meeting. The meeting's presentation materials outlined the following items: study overview, regional facilities, project background, geotechnical investigations, evaluation criteria, project need, proposed action alternative, resiliency measures, how to provide comments, and schedule (see **Error! Reference source not found.** Study Information).

## Summary of Comments and Issues Raised

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The study team received a total of 11 comments throughout the comment period. The commenters addressed topics such as suggested pipeline alignments, resiliency measures, construction timeline and process, pipeline materials, accessibility to homes, the right-of-way process, maintenance disruptions, and safety.

The JLAs will consider the public scoping comments in developing the issues and alternatives and in shaping the impact analysis for the EA. A draft environmental document will be available for public comment in summer 2022.

#	COMMENT
1	<p>I have the following questions/concerns:</p> <ol style="list-style-type: none"> <li>1. I haven't been able to find a map of the fault lines that run through our neighborhood that matches the one you gave me. Would you mind giving me the source of the map?</li> <li>2. The proposed route for the new pipeline avoids the landslide but still crosses a number of fault lines on the map you provided. In the information you provided, it states that fault displacement may range from 8-17 feet. If we have an event, I'm not sure having a pipeline run through our neighborhood is any better than having one above it. In my opinion, it would be best to avoid having the pipeline cross any of the fault lines. Could the pipeline be brought down the road that leads to Mama Chus/ gas station then go up 800 North? I know there is a pipeline already there but could a second one be installed that parallels the other one? Would that allow the pipeline to avoid the fault lines?</li> </ol> <p>Also, I have heard several concerns from the neighbors. They are listed as follows:</p> <ol style="list-style-type: none"> <li>1. Limited access to their homes during construction.</li> <li>2. Traffic flow through the neighborhood during construction.</li> <li>3. Easements that may be granted to the CUWCD to access private property to install and maintain the pipeline.</li> <li>4. Risk of flooding if we have an earthquake.</li> </ol>
2	<p>Thank you for your correspondence, regarding the Department of the Interior, Central Utah Project Completion Act Office and the Central Utah Water Conservancy District evaluating a replacement alternative and resiliency measures for the Alpine Aqueduct Reach I (AA-I) near the mouth of Provo Canyon Environmental Assessment. The Hopi Cultural Preservation Office appreciates the Central Utah Project Completion Act Office's solicitation of our input and your efforts to address our concerns.</p> <p>The Hopi Tribe claims cultural affiliation to earlier identifiable cultural groups in Utah, including the Fremont cultural group. The Hopi Cultural Preservation Office supports the identification and avoidance of our ancestral sites and Traditional Cultural Properties, and we consider the archaeological sites of our ancestors to be "footprints" and Traditional Cultural Properties.</p> <p>The Hopi Cultural Preservation Office requests consultation on any proposal with the potential to adversely affect prehistoric cultural resources in Utah. If the cultural resource survey of the area of potential affect identifies prehistoric sites that may be adversely affected by project activities, please provide us with copies of the survey report, draft environmental assessment and any proposed treatment plans for review and comment.</p> <p>In addition, we recommend that if any cultural features or deposits are encountered during project activities, these activities must be discontinued in the immediate area of the remains, and the State Historic Preservation Office must be consulted to evaluate their nature and significance. If any Native American human remains or funerary objects are discovered during construction, they must be immediately reported as required by law. Thank you again for your consideration.</p>
3	<p>Thank you for the information. Three other questions for tonight.</p> <ol style="list-style-type: none"> <li>1. Why wasn't option 15 given more consideration? Cost?</li> <li>2. Is there any information on how the water would flow through the neighborhood if there were a rupture in the existing system and the current option under consideration?</li> <li>3. If the aqueduct were to rupture and flood homes in the neighborhood, would the CUWCD help with any of the costs to repair damage due to the flooding?</li> </ol>

#	COMMENT
4	This is the ideal pump location. Extend the green line to the headworks for the plant. This is likely more feasible than going north from the pump site, running the aqueduct above ground and into the headworks. Noting the projections from AIG Climate models for 2070, any routing of the distribution system would be negatively impacted from erosion caused by the projected increase in precipitation.
5	Please try to schedule construction through the neighborhood - 1060 North/1360 East in spring/summer/fall - not during winter months when snow would further inconvenience residents having to park away from homes and make plowing of the streets difficult.
6	I am writing to request access daily to my house on [REDACTED] when you are doing the construction of the new pipeline. Please write it into the contractor's contract.
7	Please make daily access during the hours of 7 am thru 6 pm to the neighborhood and homes. Some are medical professional and need immediate access in and out of the neighborhood. Some homes have home businesses and have daily freight deliveries which need access as well. Please limit the working "closed" area to 200 feet or less at any one time. Keep the neighborhood clear of debris and dangers for children and mischievous teens.
8	I would like to thank you for holding the public meeting on November 30, 2021, regarding the Alpine Aqueduct Reach 1 Replacement and Resiliency Project. Many of the questions and concerns that I had with the project were addressed at the meeting; however, a few remain. At the meeting, I was told by Adam, Dave and Chris that I would receive follow-up on my remaining concerns. They are as follows: 1. It is my understanding that the majority of structural issues with the current pipeline have occurred in the area of the pipeline that is now above ground located north of the cul-de-sac on 1560 East. The natural flow of water from this area of pipeline is down 1560 East and if there were a problem with the pipeline, water from it would flow down the road avoiding the majority of homes in the Canyon Cove Estates neighborhood. If there is an issue with the pipeline west of the exposed area, I'm not sure how it being underground would affect the flow of the water but, any surface water should flow downhill, and a good portion of that water would probably run through the Pedersen's property avoiding most of the homes in our neighborhood. Moving the pipeline would disrupt the natural flow of water and increase the risk of water damage to homes in our neighborhood. 2. It is my understanding that CUWCD is going to use materials to construct the new pipeline and the immediate area around the pipeline that will mitigate the likelihood of the aqueduct rupturing or being displaced or compressed in a seismic event. I was shown an example of the material that may be used at the meeting and talked about various other materials that may be used. I would like to know what materials will be used and that they have been tested to withstand the potential 8-17 feet of vertical displacement and other damage that may occur in a seismic event. I've looked at companies that make pipelines in Japan that are engineered to withstand earthquakes, material such as Geofoam, etc. and if you read the small print, I am not sure they are made to withstand the amount of displacement that is described in the report generated for the CUWCD by Jacobs. 3. At the meeting, we were told that it takes 30-60 minutes to stop the water upstream after a leak is detected. Is there current technology that would allow CUWCD to determine a leak sooner than the technology currently in place and that would decrease the time window of turning the water off upstream? 4. In proposal #3, the new aqueduct would turn uphill onto 1360 East. If there were a leak, I assume the pipeline would lose pressure and the water headed uphill to the treatment facility would lose its forward momentum and reverse direction and run downhill. Is there a way to gate the pipeline to minimize the amount of water that would run downhill if a leak were to occur? 5. Last, I know in other areas such as golf courses next to neighborhoods that liability is determined by what was built first. For example, if the golf course was built prior to the homes, the golf course does not have any liability for a window in a home being broken by a golf ball. If the homes were there first, then the golf course is liable for the damage. With this proposed aqueduct route through our neighborhood, would CUWCD have any financial responsibility for water damage to homes from a failed pipeline? Dave told me he would ask CUWCD's legal department this question and get back with me.

9	<p>On behalf of [REDACTED], we appreciate the opportunity to comment on the proposed Alpine Aqueduct Reach 1 Replacement and Resiliency Project. My wife and I attended the November 30, 2021, Open House and we have considered the explanations we received at that time, and we have studied the materials you provided.</p> <p>In summary, we are very concerned about the proposal to route a new aqueduct along 1060 North. Our primary concern is that this proposal exposes our home – and all other homes in our neighborhood that are downhill from the proposed route – to greater long-term risk of water problems than the risk we currently have. In addition, we have the normal concerns about construction and maintenance disruptions in the neighborhood. Risk Exposure</p> <p>We moved into our home in the spring of 2011. With the first spring rains, we discovered that our window wells would rapidly fill with water. We (and our extended family when we were out of town) were constantly on-call to drop submersible pumps into the window wells whenever it rained.</p> <p>In speaking with neighbors, we discovered that they also had ground water problems, and many had installed drainage systems to mitigate the problem. After fighting the problem for a few years, we ultimately installed drainage systems in each of the three window wells that had the problem. Those holes for those systems were deep, well below the house footings. Much to our relief, this seemed to solve the problem. However, after several months, the same problem began appearing in other window wells that had never had the problem. We ultimately applied the same solution, and we have not had a problem in any of our window wells since.</p> <p>What we suspect is that there are groundwater flows under our neighborhood. When those flows are disrupted – as will most certainly be the case if the aqueduct is installed along 1060 North – the water will move to the next route of least resistance, and we will see new groundwater problems in neighborhood homes. Further, if there is ever a leak in the new aqueduct, the leaked water will find its way into our underground water flows, and potentially be exposed as water problems in neighborhood houses.</p> <p>As you likely know, the resolution of a groundwater problem in a house is not a trivial expense. So, the question is – will the Central Utah Water Conservancy District indemnify our neighborhood against any new groundwater problems our houses encounter during or after construction of the new 1060 North aqueduct? At the Open House when we expressed concern about potential flooding and groundwater problems, the response was to minimize the concern. We heard responses like: 1. “The pipe used for the new aqueduct will be very thick and won’t have many leaks.” Our reaction – if that’s the case, replace the existing aqueduct with that kind of pipe or better – or put that kind of pipe along 800 North.</p> <p>2. “If there is an earthquake that breaks the new aqueduct, water flooding will be the least of our problems.” Our reaction – the same logic applies to the existing aqueduct. We should not minimize the ongoing concern by simply referencing an extreme catastrophe.</p> <p>3. “Your neighborhood already has water problems, just think of the heavy rainstorm several years ago that flooded homes in your neighborhood.” Our reaction – that was a heavy rainstorm over a broad area that affected a few houses. It was not a concentrated break in a 7 or 8-foot pipe that is full of water. Imagine the pressure and resulting blast of water and erosion that will surely inundate houses that are only a few yards from such a break. Construction and Maintenance Problems</p> <p>All the problems associated with a major construction project in a compact neighborhood with many children are too many to mention.</p> <p>However, in addition to the disruption and inconvenience for months, we are extremely concerned about the danger such a project presents for children. This is a neighborhood that is busy with children in the streets and yards – and that is one of the desirable things about our neighborhood. Heavy machinery, large pipes, deep holes, re-routed traffic, etc. all seem like a recipe for serious accident.</p> <p>The same is true as maintenance will surely be required over time, and that maintenance may bring heavy equipment, excavation, and industrial materials into the neighborhood. All of these create the same risk to children as the original construction. Summary</p> <p>All in all – it seems that installing a major pipeline in a hillside neighborhood that already has groundwater and soil stability problems has great potential for more extreme problems. It seems to move the problem from one point in our neighborhood to another – but much closer to many more</p>
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#	COMMENT
	<p>houses.</p> <p>There are groundwater issues in our neighborhood, and people have adapted to and resolved most of those problems. A new pipeline along 1060 North potentially disrupts those solutions and opens the door to more concentrated water problems in houses that are right next to the pipeline. The risks to children that are created by heavy construction, excavation, and pipeline maintenance in a neighborhood full of children cannot be minimized. Given the nature of our neighborhood, these risks alone may necessitate moving the plan to an alternative route.</p> <p>We believe there must be other solutions to the aqueduct issues that currently exist – and suggest those alternatives take priority.</p>
10	<p>To whom it may concern,</p> <p>My name is [REDACTED] and I live at [REDACTED] which is next to the new proposed path for the new aqueduct. I do have a few questions?</p> <ol style="list-style-type: none"> <li>1. Have you found that there is a drop in home values because people prefer not to live next to the aqueduct?</li> <li>2. Are you planning to compensate homeowners for the loss in value of their homes because people prefer not to live next to this aqueduct?</li> <li>3. If there is ever a break in the aqueduct that causes damage to homes nearby is there an insurance policy in place to compensate homeowners?</li> <li>4. Is there an earthquake policy in place that covers damage to homes in the event of an earthquake?</li> <li>5. What is the timeframe to complete the new aqueduct?</li> <li>6. When will the new route be decided?</li> </ol> <p>Thanks for your time. I look forward to hearing back from you. Can you please reply that you received these questions?</p>



#	COMMENT
11	<p>My concerns about the proposed rerouting of the Alpine Aqueduct are as follows:</p> <p>Moving it into our neighborhood increases the risk to life and property in the event of an earthquake. It does not reduce the number of fault lines crossed but put the risk directly among people and their homes. I understand that the intent is to avoid the landslide area but putting it through the neighborhood also makes it far less accessible for repairs, which seems like a paramount concern if the primary goal is to keep water flowing to the million + users. Surely there will be some repairs required either way.</p> <p>It also seems like the damage would be much more likely to be catastrophic in an earthquake as opposed to the damage and maintenance required in the slow-moving slide area. As a result, the risk to us and our homes would be compounded - from earthquake damage and then significant flood damage as well.</p> <p>At the open house, much was made of how much more flexible the new pipe would be - we were shown a sharply bent piece of metal. But surely replacing the current pipe in its current location with more flexible material would make it much more resilient to movement of the landslide as well. Wouldn't the likely maintenance be reduced in that case as well? I would like the team to consider the potential for reducing maintenance costs in the current location.</p> <p>I'd also like the team to consider and share the cost comparison between the expected maintenance at the current location, the costs if the existing pipe were upgraded in the current location, and the costs of building the pipe in alternate, much longer route plus its maintaining it there. I was surprised that a cost comparison did not figure more prominently in the criteria defined in the materials I was sent. I expect that costs are rapidly rising with the recent building boom in Utah and the inflation around the country.</p> <p>In addition, I'd like the study team to consider putting in a gate in the pipe at the east side of the slide area so that the flow of water could more easily be stopped if repairs were needed. It seems like that would mitigate flood damage and facilitate repair and continued water flow more quickly than if the aqueduct has to be accessed under our roads and the water flow stopped well above us in the canyon.</p> <p>Also, at the open house, we were told that the study team had drilled extensively in the slide area to determine that tunneling to put the aqueduct below ground there was not feasible. But when I asked whether they had drilled under our neighborhood to test the stability of that soil, I was told they had not. I would very much like to see the results of such testing.</p> <p>We had a sewer line leak about 14 years ago. It was dug up and repaired - about 12 feet down at the street in front of our home. The area in the road and our gutter almost immediately settled and created a dip in the road and the curb where water collects and mosquitos breed in the summer. Many of our neighbors have experienced significant settling of their homes as well - one of them has had to shore up their foundation at significant cost. So, I'm concerned about whether the construction would exacerbate all of that and whether it is really suitable for putting such a large pipe in.</p> <p>Finally, I'm concerned about the damage construction may cause to our homes. The digging and heavy equipment 30 feet from my front door and going 30+ feet down will surely cause significant vibration. So, I'm concerned about what that will do to the stability of our foundation and the whole structure. Thanks for your consideration. I am hopeful that you can find the best solution and I wish you luck with the project.</p>

## Appendix A: Outreach

# YOU'RE INVITED!

## PUBLIC SCOPING MEETING

The Central Utah Water Conservancy District (CUWCD) and the U.S. Department of the Interior are initiating a study to construct a new pump station and replace a 1.4-mile segment of the Alpine Aqueduct at the mouth of Provo Canyon in Orem. The Alpine Aqueduct, through a connection with the Jordan Aqueduct, delivers water to approximately half of Utah's population including Orem and Provo.

The study, in accordance with the National Environmental Policy Act (NEPA), is being conducted to protect this critical pipeline from geological hazards that are common along the Wasatch Front, such as landslides and earthquakes, and provide reliable service to the CUWCD's customers well into the future.




**PROPOSED ACTION ALTERNATIVE**

**WHEN:**  
Tuesday, Nov. 30, 2021  
6-7:30 p.m.

**WHERE:**  
Central Utah Water Conservancy District  
1426 East 750 North, Building 2, Orem, UT 84097

**NOTICE OF SPECIAL ACCOMMODATIONS DURING PUBLIC HEARINGS.** Any individual needing special accommodations (including auxiliary communicative aids and services) during this meeting should contact the study team five days in advance using the contact information below.

Hotline: 385-376-4400 | Email: [info@alpineaqueduct.com](mailto:info@alpineaqueduct.com) | Website: [cuwcd.com/alpineaqueduct.html](http://cuwcd.com/alpineaqueduct.html)



**CENTRAL UTAH WATER**  
CONSERVANCY DISTRICT

## WE WANT YOUR INPUT

FORMAL COMMENT PERIOD: Nov. 15, 2021 - Dec. 20, 2021

### How to Comment


- Attend the Public Scoping Meeting on Oct. 20, 2021, to submit a formal comment.
- Submit a comment on the interactive map at [cuwcd.com/alpineaqueduct.html](http://cuwcd.com/alpineaqueduct.html).
- Call the study hotline at 385-376-4400.
- Email the study team at [info@alpineaqueduct.com](mailto:info@alpineaqueduct.com).

- Pick up a physical comment form and copy of the Scoping Document at the CUWCD's Orem office.
- Mail in a physical comment form to:  
Central Utah Water Conservancy District  
c/o Alpine Aqueduct Reach 1 Project  
426 East 750 North, Suite 400  
Orem, UT 84097-5474

Alpine Aqueduct EA  
c/o Horrocks Engineers  
2162 West Grove Parkway, Suite 400  
Pleasant Grove, UT 84062



Sign up for study updates by emailing the team at [info@alpineaqueduct.com](mailto:info@alpineaqueduct.com).

Hotline: 385-376-4400 | Email: [info@alpineaqueduct.com](mailto:info@alpineaqueduct.com) | Website: [cuwcd.com/alpineaqueduct.html](http://cuwcd.com/alpineaqueduct.html)



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# Alpine Aqueduct Reach 1 Project

## Study Overview

The Central Utah Water Conservancy District (District) and the Department of the Interior – Central Utah Project Completion Act Office (Interior), as Joint Lead Agencies, have initiated an Environmental Assessment (EA) to evaluate the replacement of a 1.4-mile segment of the Alpine Aqueduct at the mouth of Provo Canyon in Orem and the potential addition of pump stations. The Alpine Aqueduct, through a connection with the Jordan Aqueduct, delivers water to approximately half of Utah's population including Orem and Provo.

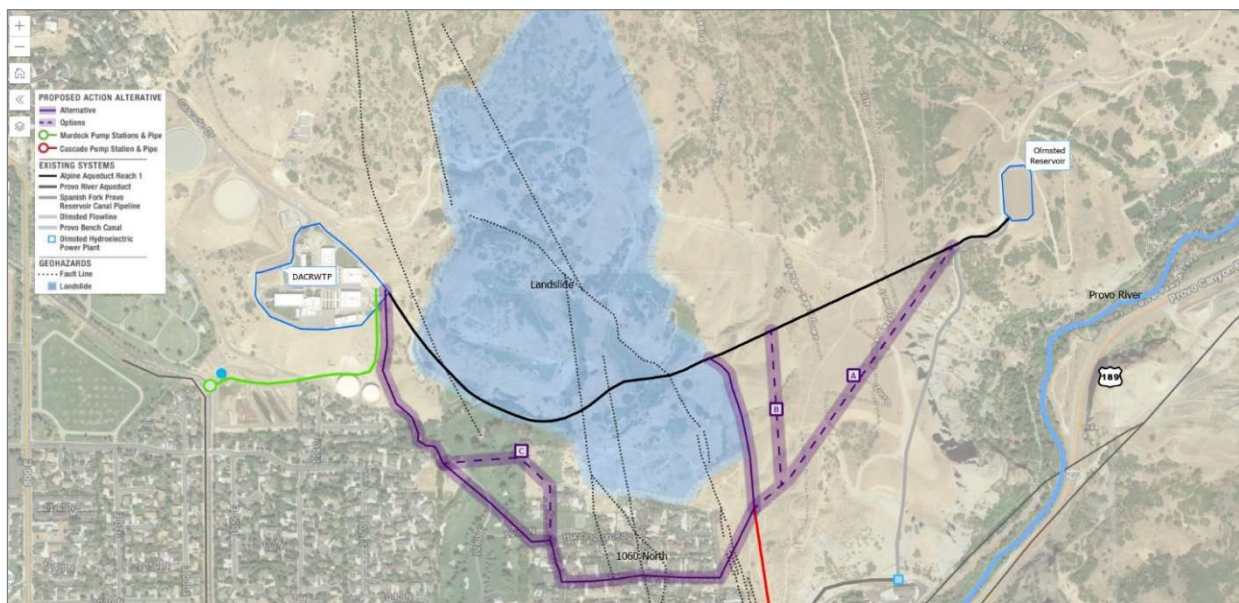
The EA is evaluating these improvements to protect this critical pipeline from geological hazards that are common along the Wasatch Front, such as landslides and earthquakes, and provide reliable service to Utahns well into the future.

## Public Meeting

The District hosted a Public Scoping Meeting for the Alpine Aqueduct Reach 1 on **Tuesday, Nov. 30, 2021, from 6:00 - 7:30 p.m.** The meeting was held at the District's Orem office at 1426 East 750 North, Building 2, Orem, UT 84097. To review the materials displayed at the meeting, click [here](#). The public is encouraged to review the [Scoping Document](#) and provide comments on the proposed action. For more information on the background of the associated study and the potential alignments and resiliency measures that were evaluated, please review the [Phase 1](#), and [Phase 2/Final Report](#) of the Alpine Aqueduct Reach 1 Resiliency Assessment.

## How Can I Provide a Comment?

- Submit a comment on the interactive map (see below).
- Call the study hotline at [385-376-4400](tel:385-376-4400).
- Email the study team at [info@alpineaqueduct.com](mailto:info@alpineaqueduct.com)
- Mail in a physical [Comment Form](#) to:



## **Alpine Aqueduct Environmental Assessment Notice of Public Meeting and Comment Period**

The Central Utah Water Conservancy District (District) and the Department of the Interior – Central Utah Project Completion Act Office (Interior), as Joint Lead Agencies, have initiated an Environmental Assessment (EA) to evaluate the replacement of a 1.4-mile segment of the Alpine Aqueduct at the mouth of Provo Canyon in Orem and the potential addition of pump stations. The study, in accordance with the National Environmental Policy Act (NEPA), is being conducted to evaluate these potential improvements to protect this critical pipeline from geological hazards, such as landslides and earthquakes. The District is initiating the first phase of the EA process (Scoping Phase).

The public is invited to attend a Scoping Meeting on Tuesday, Nov. 30, 2021, from 6-7:30 p.m. to learn more about this effort and provide input to the study team. The meeting will be held at the Central Utah Water Conservancy District (1426 East 750 North, Building 2 Orem, UT 84097). The Scoping Document will be available for review starting on Nov. 15, 2021, and can be accessed online at the study website ([cuwcd.com/alpineaqueduct.html](http://cuwcd.com/alpineaqueduct.html)) or in-person at the District's Orem office. Written comments can be submitted via email ([info@alpineaqueduct.com](mailto:info@alpineaqueduct.com)), mail, or the study website during the formal comment period between Nov. 15, 2021, and Dec. 20, 2021.

In compliance with the Americans with Disabilities Act (ADA), individuals needing special accommodations (including auxiliary communicative aids and services) or language translation services during this meeting should notify the project team five days in advance at the contact information provided above.





## Central Utah Water Conservancy District

November 17, 2021 · 🌐

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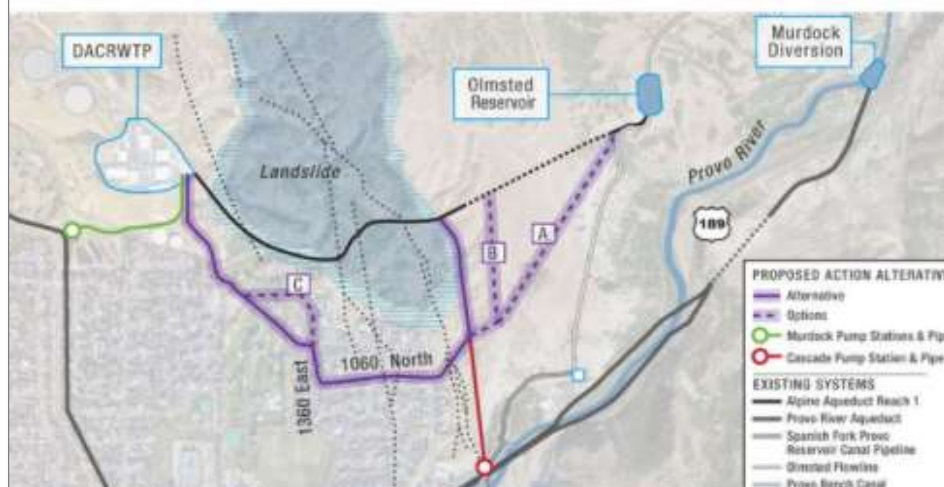
We have initiated an Environmental Assessment (EA) with the Department of the Interior – Central Utah Project Completion Act Office (Interior) as Joint Lead Agencies to evaluate the replacement of a 1.4-mile segment of the Alpine Aqueduct at the mouth of Provo Canyon in Orem and the potential addition of pump stations. The Alpine Aqueduct, through a connection with the Jordan Aqueduct, delivers water to approximately half of Utah's population, including Orem and Provo.

The study is being conducted to protect this critical pipeline from geological hazards that are common along the Wasatch Front, such as landslides and earthquakes, and provide reliable service to our customers well into the future.

Want to learn more? Join us at a Public Scoping Meeting on Tuesday, Nov. 30, 2021, from 6 to 7:30 p.m. to learn about the study and submit feedback. The meeting will be held at our Orem office at 1426 East 750 North, Building 2, Orem, UT 84097.

For information about the study and how to comment, visit [cuwcd.com/alpineaqueduct.html](http://cuwcd.com/alpineaqueduct.html), email [info@alpineaqueduct.com](mailto:info@alpineaqueduct.com) or call 385-376-4400. The study team is accepting comments from the public through Dec. 20, 2021.

## Proposed Action Alternative







## City of Orem Government

November 18, 2021 · 🌐

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The Central Utah Water Conservancy District and the Department of the Interior – Central Utah Project Completion Act Office have initiated an environmental study to evaluate the replacement of a 1.4-mile segment of the Alpine Aqueduct at the mouth of Provo Canyon in Orem and the potential addition of pump stations.

The Alpine Aqueduct, through a connection with the Jordan Aqueduct, delivers water to approximately half of Utah's population, including Orem and Provo.

The study is being conducted to protect this critical pipeline from geological hazards that are common along the Wasatch Front, such as landslides and earthquakes, and provide reliable service to Utahns well into the future.

Want to learn more? Attend the team's Public Scoping Meeting on Tuesday, Nov. 30, 2021, from 6 to 7:30 p.m. to learn about the study and submit feedback. The meeting will be held at the District's Orem office at 1426 East 750 North, Building 2, Orem, UT 84097.

For information about the study and how to comment, visit [cuwcd.com/alpineaqueduct.html](http://cuwcd.com/alpineaqueduct.html), email [info@alpineaqueduct.com](mailto:info@alpineaqueduct.com) or call 385-376-4400. The study team is accepting comments from the public through Dec. 20, 2021.

## Proposed Action Alternative

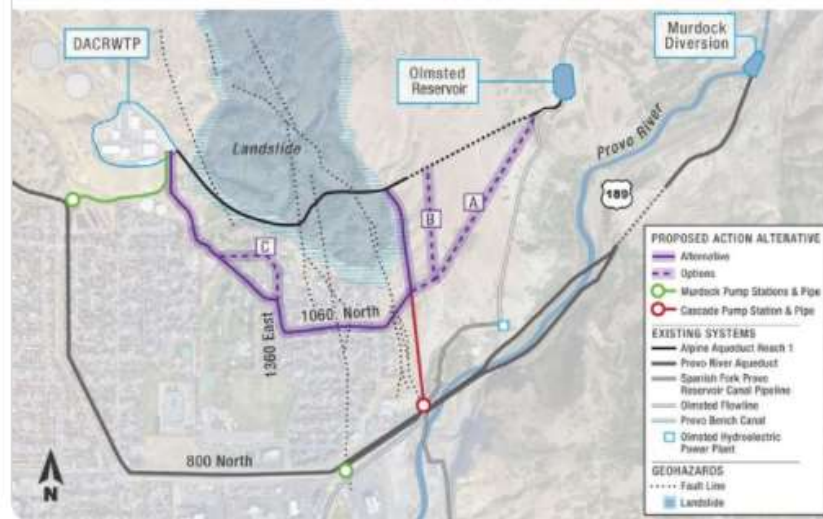




CUWCD @CUWCDUpdates · Nov 29, 2021

The Alpine Aqueduct environmental study team wants your feedback! Join us for a Public Scoping Meeting tomorrow, Nov. 30, from 6-7:30 p.m. to learn more about the study and provide input. Visit [cuwcd.com/alpineaqueduct...](https://cuwcd.com/alpineaqueduct...) for more information.

### Proposed Action Alternative

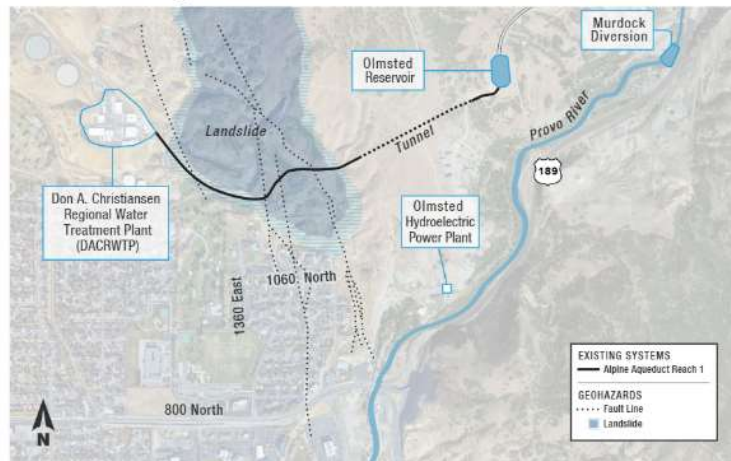


## Appendix B: Study Information

### ALPINE AQUEDUCT REACH 1 (AA-1) ENVIRONMENTAL ASSESSMENT



Current AA-1 Alignment



### AA-1

The AA-1 pipeline is part of the regional water delivery systems that traverse the mouth of Provo Canyon and is an integral part of the water delivery systems for Utah and Salt Lake counties. The Alpine Aqueduct, through a connection with the Jordan Aqueduct, delivers water to approximately half of Utah's population including Orem and Provo.

#### AA-1 Pipeline:

- 90 inches in diameter
- Approximately 1.4 miles in length
- 1,830-foot-long tunnel
- 5,280-foot below ground section
- 400-foot above ground section
- Connects to the Don A. Christiansen Regional Water Treatment Plant (DACRWTP) and Jordan Aqueduct

Current AA-1 Alignment





## REGIONAL FACILITIES

**Jordan Aqueduct** — The Jordan Aqueduct is a 38-mile-long pipeline between the DACRWTP and 2100 South/Bangerter Highway in West Valley. It is a major conveyance facility for the western and southern Salt Lake Valley areas, delivering water from the Provo River to the Jordan Valley Water Treatment Plant and Point of the Mountain Water Treatment Plant.

**Salt Lake Aqueduct** — The Salt Lake Aqueduct (SLA) is a 69-inch diameter, 42-mile-long pipeline beginning at the base of Deer Creek Dam. It is a major conveyance facility for the eastern Salt Lake Valley, delivering water from Deer Creek Reservoir to the Little Cottonwood Water Treatment Plant. The SLA can also supply water to the DACRWTP on a space-available basis.

**Provo River Aqueduct** — The Provo River Aqueduct (PRA), previously known as the Murdock Canal or the Provo Reservoir Canal, is a 21-mile-long pipeline from the mouth of Provo Canyon to the Point of the Mountain. It was enclosed in 2014 with a 126-inch diameter welded steel pipe and delivers water from the Provo River to Utah and Salt Lake counties and to the Jordan Valley and Point of the Mountain water treatment plants.

**Alta Springs Pipeline** — The Alta Springs Pipeline delivers Orem Municipal and Industrial (M&I) water from springs located about 3 miles up the Provo Canyon to storage tanks near the DACRWTP. It is a steel pipeline that ranges from 16 to 30 inches in diameter.

Regional Facilities Map



## BACKGROUND

In 2020, the District completed the AA-1 Resiliency Assessment to evaluate options to improve the AA-1 pipeline and its resiliency.

### Resiliency Assessment Objectives:

- Assess risk
- Calculate consequences of failure
- Determine existing resiliency
- Develop reasonable alternatives to decrease consequences of failure
- Evaluate vulnerability
- Increase reliability for the District's customers

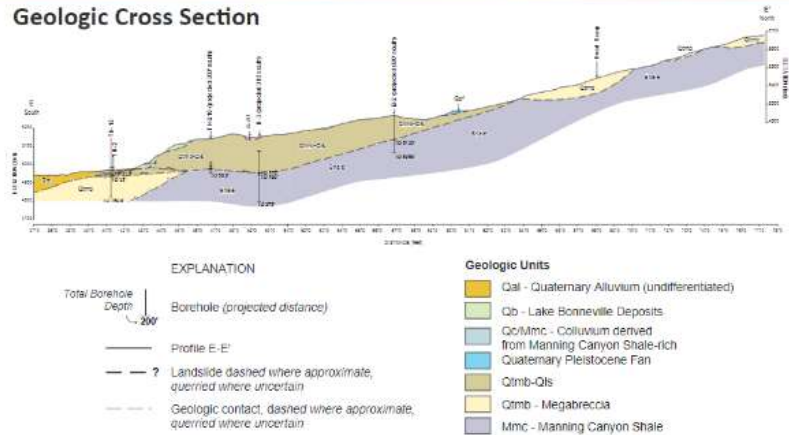
Resiliency Assessment Alignment Options



## GEOTECHNICAL INVESTIGATIONS

As part of the AA-1 Resiliency Assessment, geotechnical investigations were conducted to determine the stability of the landslide area and better map the three fault traces of the Wasatch Fault Zone (WFZ) that cross the AA-1 pipeline alignment. The findings show that the possibility of a landslide occurring presents an ongoing risk to the pipeline, and the pipeline is subject to movement due to high soil moisture or seismic events. Additionally, the WFZ crossing poses potential AA-1 pipeline ruptures, and replacement alternatives should mitigate this risk.

**Geologic Cross Section**



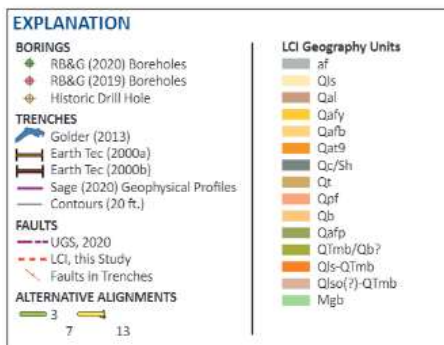
**Northern - Service Road Exposure**



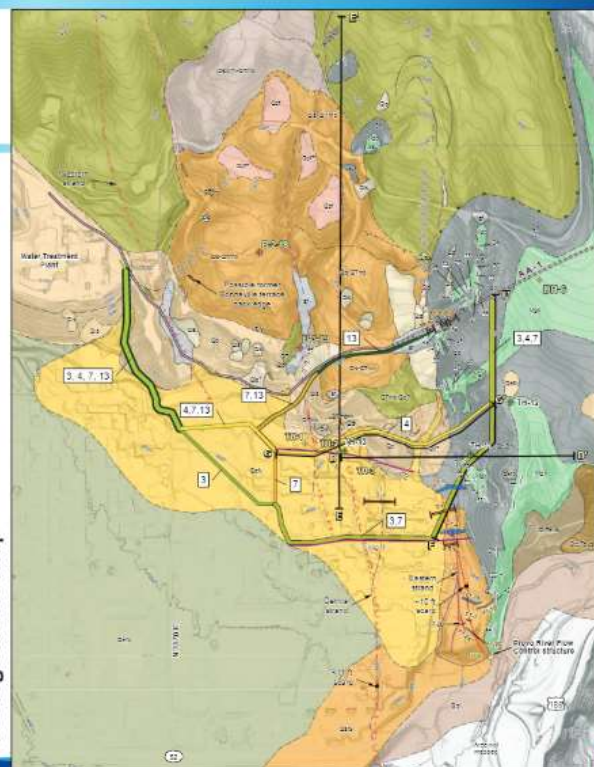
**Southern - Abandoned Quarry**



## GEOTECHNICAL INVESTIGATIONS



**Geological Site Map**





## EVALUATION CRITERIA

The Resiliency Assessment team developed replacement options based on weighted, non-cost evaluation criteria deemed to be most critical to provide safe, reliable operations of the AA-1 pipeline, and these replacement options were ranked. The analyses yielded one potential pipeline alignment that scored higher than the other options evaluated. This alignment is the Proposed Action Alternative.

CRITERIA	ITEMS CONSIDERED	WEIGHT
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Non-Seismic Events</li> <li>• Seismic Events</li> <li>• Consequences of Failure/Flooding Risk</li> <li>• Potential for Interconnection</li> </ul>	<b>40%</b>
<b>Repairability</b>	<ul style="list-style-type: none"> <li>• Accessibility</li> <li>• Repair Materials and Methods</li> <li>• Time to Repair</li> </ul>	<b>20%</b>
<b>Operations and Maintenance</b>	<ul style="list-style-type: none"> <li>• Access</li> <li>• Maintenance</li> <li>• Security</li> </ul>	<b>20%</b>
<b>Environmental Impacts</b>	<ul style="list-style-type: none"> <li>• Wetlands/Rivers/Groundwater</li> <li>• Species/Land Disruption</li> <li>• Community Impacts</li> <li>• Visual/Safety</li> </ul>	<b>10%</b>
<b>Implementation and Constructibility</b>	<ul style="list-style-type: none"> <li>• Construction Risk</li> <li>• Property/Right-of-Way Acquisition</li> <li>• Schedule</li> </ul>	<b>10%</b>

## PROJECT NEED

The AA-1 pipeline is expected to provide reliable service year-round. Failure of The AA-1 pipeline would cause significant economic impacts to the communities it supports and pose a substantial hazard to human life and property located below it. The AA-1 pipeline crosses through and runs along a large landslide complex that has experienced continued and recent localized slippage activity resulting in the rupture and failure of the pipeline multiple times since its construction.

The AA-1 pipeline continues to be at risk of failure from both seismic and non-seismic events, which is unacceptable for a critical water supply. The vulnerability of the AA-1 pipeline greatly decreases the resiliency of the Wasatch Front water delivery facilities. Therefore, there is a need to evaluate the Proposed Action Alternative to increase the AA-1 pipeline's resiliency and reliability to continue to provide water to Utah and Salt Lake counties.

A portion of AA-1 pipeline had to be removed after the 2000 landslide.



A landslide in 2000 caused pipe failure of the AA-1 pipeline.



A landslide occurred in 2017 that damaged the AA-1 pipeline.



A damaged pipe joint after the 2000 landslide.

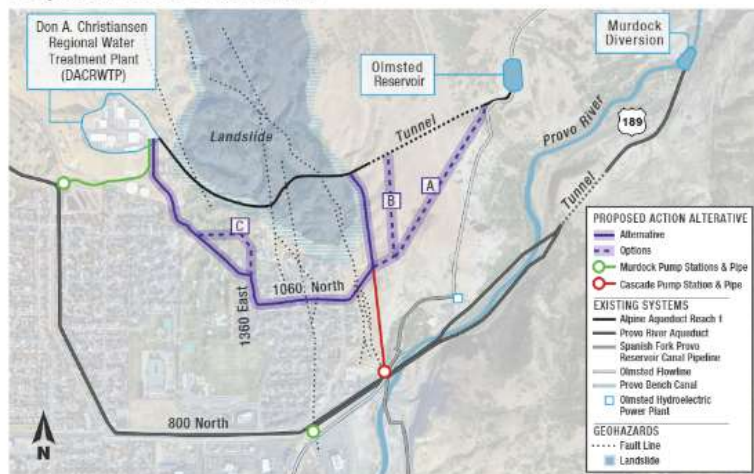


## PROPOSED ACTION ALTERNATIVE

The **Proposed Action Alternative** would connect with the existing AA-1 pipeline at its tunnel outlet portal, continue south down the hillside, turn west onto 1060 North in Orem, turn north onto 1360 East, and continue through the former Cascade Golf Course to the DACRWTP. The proposed AA-1 pipeline would be 108-inch diameter welded steel. Three options for alternate pipeline alignments are also under consideration.

**No Action Alternative** would leave the existing AA-1 pipeline in place and would require ongoing maintenance and repair to the pipeline which currently presents risks to the surrounding area and the regional water delivery system.

Proposed Action Alternative

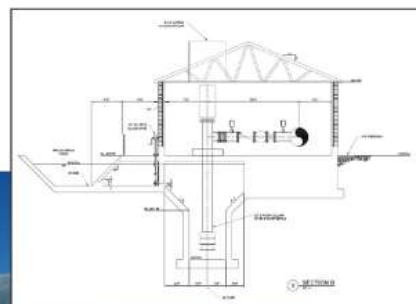


## RESILIENCY MEASURES

The AA-1 Resiliency Assessment team considered reliability measures that could be implemented to improve the overall resiliency of the water delivery systems. The measures include the interconnection between pipelines and aqueducts through the construction of proposed pump station(s), installation of valving and stockpiling of pipe. Two pump station options are being considered:

**Cascade Pump Station** would be located near the 800 North park-and-ride lot and would pump from the Provo Bench Canal into the PRA and/or to the realigned AA-1 pipeline to the DACRWTP.

**Murdock Pump Stations** would consist of two pump stations: one located south of 800 North that would pump from the Provo Bench Canal into the PRA and the other located near the Orem Cemetery that would pump from the PRA to the DACRWTP.





## HOW TO PROVIDE COMMENTS

*The comment period is open until Dec. 20, 2021*



**Hotline:** 385-376-4400



**Email:** [info@alpineaqueduct.com](mailto:info@alpineaqueduct.com)



**Website:** [cuwcd.com/alpineaqueduct.html](http://cuwcd.com/alpineaqueduct.html)



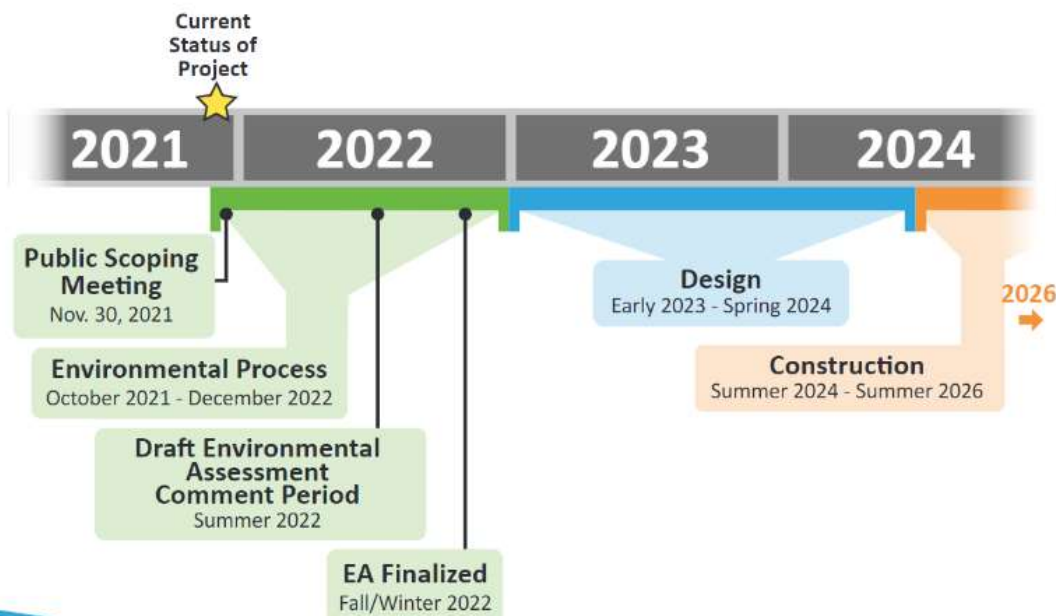
**Mail in a physical comment form to:**

Central Utah Water Conservancy District  
c/o Alpine Aqueduct Reach 1 Project  
1426 East 750 North, Suite 400  
Orem, UT 84097

## How can I provide useful feedback?

- Comments should be clear, concise and relevant to the issues at hand and the actions being considered.
- Feedback should be solution-oriented and provide specific examples of concerns and ideas.
- Comments provided to the study team will be reviewed and evaluated as part of the EA process.
- Please remember that commenting is not a form of "voting." The outcome of the EA will be based on technically sound and objective analyses, not on how many people like or dislike what is being studied.

## SCHEDULE



## Appendix C: Comments & Responses

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### Comment & Response 1

#### Comment

I have the following questions/concerns:

1A. I haven't been able to find a map of the fault lines that run through our neighborhood that matches the one you gave me. Would you mind giving me the source of the map?

1B. The proposed route for the new pipeline avoids the landslide but still crosses a number of fault lines on the map you provided. In the information you provided, it states that fault displacement may range from 8-17 feet. If we have an event, I'm not sure having a pipeline run through our neighborhood is any better than having one above it. In my opinion, it would be best to avoid having the pipeline cross any of the fault lines. Could the pipeline be brought down the road that leads to Mama Chus/ gas station then go up 800 North? I know there is a pipeline already there but could a second one be installed that parallels the other one? Would that allow the pipeline to avoid the fault lines?

Also, I have heard several concerns from the neighbors. They are listed as follows:

1C. Limited access to their homes during construction.

1D. Traffic flow through the neighborhood during construction.

1E. Easements that may be granted to the CUWCD to access private property to install and maintain the pipeline.

1F. Risk of flooding if we have an earthquake.

#### Response

1A. Current mapping of the faults is based on work completed by Jacobs/LCI as part of the AA-1 Resiliency Assessment Project. Section 3 and the references included in Section 11 of the *AA-1 Resiliency Assessment Project Final Project Report (Resiliency Assessment)* describe the geological characteristics of the site and present the current mapping of faults and other geological features.

1B. Unfortunately, crossing of the Wasatch Fault is not avoidable with any of the alignment options as it extends southward. For pipelines that must cross fault lines, the best practice for design is to cross normal fault lines near perpendicular (60 degrees to 90 degrees) where possible and avoid alignments that are parallel to fault lines. This minimizes potential damage to the pipeline at point locations rather than across the whole pipeline. The realigned AA-1 pipeline would be designed and constructed to include specific measures to withstand and not rupture during a 975-year seismic event.

An alignment down 1560 East toward Mama Chus would put a significant length of the Alpine Aqueduct pipe running parallel to the Wasatch Fault (between the eastern and central strand) and thus is not considered to be as resilient of a design alternative compared to the alignment on 1060 North which would cross the fault lines near perpendicular. Additionally, a pipeline in 800 North would be parallel to the 126-inch diameter Provo River Aqueduct and both pipelines would cross the central strand of the Wasatch Fault in the same location. Since both the Provo River Aqueduct and the Alpine Aqueduct are considered critical life-line facilities for water supply, placing these two pipelines in close proximity to one another greatly decreases the resiliency of each pipeline during a seismic event, as the failure of one pipeline could result in failure of the other.

1C and 1D. See Section 3.17 for a full list of construction mitigations and commitments. During construction, vehicle access along the residential streets would be restricted during working hours and for extended periods of time depending on construction activities taking place. At all times emergency vehicle access to residential homes would be maintained. The contractor would be required to temporarily fence the work area to keep non-project related persons out of the construction site. As part of construction, the JLAs would implement construction scheduling and sequencing requirements to reduce disruption to the neighborhood.

1E. The Preferred Alignment and Design Options would only require easements from one private property owner and Orem City.

1F. The realigned AA-1 pipeline would be designed and constructed to include specific measures to withstand and not rupture during a 975-year seismic event. A main consideration of realigning AA-1 is to avoid the active landslide and the issues associated with it. This risk of flooding due to a break of the AA-1 would be much less than leaving the existing pipeline in its current location.

## Comment & Response 2

### Comment

Reed R. Murray, Program Director Attention: W. Russ Findlay  
Department of the Interior, Office of the Secretary Central Utah Project Completion Act Office  
302 East Lakeview Parkway Provo, Utah 84606

Re: Alpine Aqueduct Reach I Replacement and Resiliency Project Environmental Assessment

Dear Mr. Murray,

Thank you for your correspondence, regarding the Department of the Interior, Central Utah Project Completion Act Office and the Central Utah Water Conservancy District evaluating a replacement alternative and resiliency measures for the Alpine Aqueduct Reach I (AA-I) near the mouth of Provo Canyon Environmental Assessment. The Hopi Cultural Preservation Office appreciates the Central Utah Project Completion Act Office's solicitation of our input and your efforts to address our concerns.



The Hopi Tribe claims cultural affiliation to earlier identifiable cultural groups in Utah, including the Fremont cultural group. The Hopi Cultural Preservation Office supports the identification and avoidance of our ancestral sites and Traditional Cultural Properties, and we consider the archaeological sites of our ancestors to be "footprints" and Traditional Cultural Properties.

The Hopi Cultural Preservation Office requests consultation on any proposal with the potential to adversely affect prehistoric cultural resources in Utah. If the cultural resource survey of the area of potential affect identifies prehistoric sites that may be adversely affected by project activities, please provide us with copies of the survey report, draft environmental assessment and any proposed treatment plans for review and comment.

In addition, we recommend that if any cultural features or deposits are encountered during project activities, these activities must be discontinued in the immediate area of the remains, and the State Historic Preservation Office must be consulted to evaluate their nature and significance. If any Native American human remains or funerary objects are discovered during construction they must be immediately reported as required by law. Thank you again for your consideration. Respectfully, Stewart B. Koyiyumptewa, Program Manager/THPO

#### Response

The JLAs conducted a cultural resources investigation within the study area. No prehistoric cultural resources were identified. In addition, if any cultural features or deposits are encountered during construction, the JLAs would immediately cease activities in the area and consult with SHPO.

## Comment & Response 3

#### Comment

Chris,

Thank you for the information. Three other questions for tonight.

3A. Why wasn't option 15 given more consideration? Cost?

3B. Is there any information on how the water would flow through the neighborhood if there were a rupture in the existing system and the current option under consideration?

3C. If the aqueduct were to rupture and flood homes in the neighborhood, would the CUWCD help with any of the costs to repair damage due to the flooding?

Thanks,

#### Response

3A. Option 15 in the *Resiliency Assessment* (Around the Landslide from Olmsted Reservoir, through Provo Canyon, 800 North, and paralleling the Provo River Aqueduct) was given detailed analysis and consideration in the *Resiliency Assessment*. Although this option completely avoids the landslide, it crosses the eastern and central strands of the Wasatch Fault through narrow corridors and alongside other major pipelines or water delivery

infrastructure (see Response 1B above). This would restrict the ability to design the pipeline to meet seismic requirements. Additionally, this alignment is substantially longer than other alignments considered therefore increasing project costs.

3B. How the water flows through the neighborhood depends mostly upon where the pipeline break is located and the surrounding topography. The previous breaks occurred at or near the above ground section of AA-1. In this case, water flowed down through a natural ravine below the AA-1 pipeline and to 1560 East.

3C. Part of the Project's purpose and need is to realign, design, and construct the AA-1 pipeline to avoid property damages and loss of service due to landslide movement and/or seismic events. In the case of flooding damages, the Districts liability insurance would be responsible to pay for damages as long as the District is negligent.

## Comment & Response 4

### Comment

This is the ideal pump location. Extend the green line to the headworks for the plant. This is likely more feasible than going north from the pump site, running the aqueduct above ground and into the headworks.

Noting the projections from AIG Climate models for 2070, any routing of the distribution system would be negatively impacted from erosion caused by the projected increase in precipitation.

### Response

Thank you for your insightful comment. The pump stations were removed from consideration in this Environmental Assessment. The current AA-1 pipeline would be decommissioned and would remain in place save for the approximately 400-foot above ground section located east of the landslide. The installation of the new AA-1 pipeline may temporarily impact erosion during construction. The new pipeline would be buried or tunneled and designed to withstand the projected increase in erosion caused by increased precipitation.

## Comment & Response 5

### Comment

Please try to schedule construction through the neighborhood - 1060 North/1360 East in spring/summer/fall - not during winter months when snow would further inconvenience residents having to park away from homes and make plowing of the streets difficult.

### Response

Please see Section 3.17 for a detailed list of construction mitigations and commitments. As part of construction, the JLAs would implement construction scheduling and sequencing requirements to reduce disruption to the neighborhood.

## Comment & Response 6

### Comment

I am writing to request access daily to my house on [Redacted] when you are doing the construction of the new pipeline. Please write it into the contractor's contract.

Thank you,  
[Redacted]

### Response

See Section 3.17 for a complete list of construction mitigations and commitments. Walking and emergency access to homes would be provided at all times. During construction, vehicle access along the residential streets would be restricted during working hours and for extended periods of time depending on construction activities taking place. At all times, emergency vehicle access to residential homes would be provided. The contractor would be required to temporarily fence the work area to keep non-project related persons out of the construction site. As part of construction, the JLAs would implement construction scheduling and sequencing requirements to reduce disruption to the neighborhood. Based on the location of your home on 1110 North, it would be anticipated that you would have continual access from either Ashby Place or 1360 East.

## Comment & Response 7

Please make daily access during the hours of 7 am thru 6 pm to the neighborhood and homes. Some are medical professional and need immediate access in and out of the neighborhood. Some homes have home businesses and have daily freight deliveries which need access as well. Please limit the working "closed" area to 200 feet or less at any one time. Keep the neighborhood clear of debris and dangers for children and mischievous teens.

### Response

During construction, vehicle access along the residential streets may be restricted during working hours and for extended periods of time depending on construction activities taking place. At all times, emergency vehicle access to residential homes would be provided. The JLAs and selected contractor would coordinate construction activities with the city, neighborhood, and others that may be impacted during construction.

The contractor would be required to temporarily fence the work area to keep non-project related persons out of the construction site. As part of construction, the District would implement construction scheduling and sequencing requirements to reduce disruption to the neighborhood. See Section 3.17 for a complete list of construction mitigations and commitments.

## Comment & Response 8

### Comment

I would like to thank you for holding the public meeting on November 30, 2021 regarding the Alpine Aqueduct Reach 1 Replacement and Resiliency Project. Many of the questions and concerns that I had with the project were addressed at the meeting; however, a few remain. At the meeting, I was told by Adam, Dave and Chris that I would receive follow-up on my remaining concerns. They are as follows:

8A. It is my understanding that the majority of structural issues with the current pipeline have occurred in the area of the pipeline that is now above ground located north of the cul-de-sac on 1560 East. The natural flow of water from this area of pipeline is down 1560 East and if there were a problem with the pipeline, water from it would flow down the road avoiding the majority of homes in the Canyon Cove Estates neighborhood. If there is an issue with the pipeline west of the exposed area, I'm not sure how it being underground would affect the flow of the water but, any surface water should flow downhill and a good portion of that water would probably run through the Pedersen's property avoiding most of the homes in our neighborhood. Moving the pipeline would disrupt the natural flow of water and increase the risk of water damage to homes in our neighborhood.

8B. It is my understanding that CUWCD is going to use materials to construct the new pipeline and the immediate area around the pipeline that will mitigate the likelihood of the aqueduct rupturing or being displaced or compressed in a seismic event. I was shown an example of the material that may be used at the meeting and told about various other materials that may be used. I would like to know what materials will be used and that they have been tested to withstand the potential 8-17 feet of vertical displacement and other damage that may occur in a seismic event. I've looked at companies that make pipelines in Japan that are engineered to withstand earthquakes, material such as Geofoam, etc. and if you read the small print I am not sure they are made to withstand the amount of displacement that is described in the report generated for the CUWCD by Jacobs.

8C. At the meeting, we were told that it takes 30-60 minutes to stop the water upstream after a leak is detected. Is there current technology that would allow CUWCD to determine a leak sooner than the technology currently in place and that would decrease the time window of turning the water off upstream?

8D. In proposal #3, the new aqueduct would turn uphill onto 1360 East. If there were a leak, I assume the pipeline would lose pressure and the water headed uphill to the treatment facility would lose its forward momentum and reverse direction and run downhill. Is there a way to gate the pipeline to minimize the amount of water that would run downhill if a leak were to occur?

8E. Last, I know in other areas such as golf courses next to neighborhoods that liability is determined by what was built first. For example, if the golf course was built prior to the homes, the golf course does not have any liability for a window in a home being broken by a golf ball. If

the homes were there first, then the golf course is liable for the damage. With this proposed aqueduct route through our neighborhood, would CUWCD have any financial responsible for water damage to homes from a failed pipeline? Dave told me he would ask CUWCD's legal department this question and get back with me.

Sincerely,  
[Redacted]

#### Response

8A. Historical failures of the AA-1 pipeline at the location where the pipeline is currently above ground occurred prior to 2002 when the pipeline was still located below ground. These failures have occurred because of landslide movement. Construction of a new pipeline would not change the drainage patterns of the existing site. Moving the pipeline from its current alignment to 1060 North would increase the reliability of the pipeline and substantially decrease the likelihood of failure from landslide movement. As part of the Bonneville Unit of the CUP, the JLAs have constructed over 128 miles of pipelines. One example is the Spanish Fork-Provo Reservoir Canal Pipeline (SFPRC) which is part of the ULS. The SFPRC delivers water from Strawberry Reservoir to Salt Lake County (though a connection to AA-1). This pipeline extends for about 30 miles beginning at the mouth of Spanish Fork Canyon to the mouth of Provo Canyon. It is a buried 60-inch welded steel pipeline which was constructed through residential areas including the cities of Mapleton, Springville, Provo, before terminating in Orem with a connection to AA-1.

8B. It is proposed that the replacement AA-1 pipeline be constructed of welded steel with restrained, double welded pipe joints, and designed to current seismic standards to withstand a 975-year seismic event. Welded steel is considered a flexible and ductile material capable of handling displacement and movement during a seismic event. Additionally, movable backfill material around the pipeline would be installed to help reduce pipeline stresses during a seismic event. Chapter 2 of the Environmental Assessment provides more design information.

8C. Currently, the time to close the valve at the 10 MG Olmsted Reservoir is dictated by operations and safety protocols. Rapidly closing a valve on a large diameter pipeline causes an unsafe environment and can cause major damage to the pipeline system. The JLAs are committed to designing and constructing the safest and most reliable pipeline for the AA-1 project. In the event of an emergency, the District would close the valve as fast as possible without endangering employees, the public, or damaging the pipeline.

8D. Adding a valve at this location would require a large concrete valve box to be located in the street or within private property. The comment suggests that if the break occurred between this new valve and the DACRWTP, it could be shut to reduce water leaving the pipe and damaging homes in the area. However, valving for large diameter pipelines cannot be closed rapidly (see discussion about valve shut times on large diameter pipelines above in Response 8C).



8E. See Response 3C.

## Comment & Response 9

### Comment

Central Utah Water Conservancy District  
c/o Alpine Aqueduct Reach 1 Project

1426 East 750 North, Suite 400  
Orem, UT 84097-54742

On behalf of the [Redacted], we appreciate the opportunity to comment on the proposed Alpine Aqueduct Reach 1 Replacement and Resiliency Project. My wife and I attended the November 30, 2021 Open House and we have considered the explanations we received at that time and we have studied the materials you provided.

In summary, we are very concerned about the proposal to route a new aqueduct along 1060 North. Our primary concern is that this proposal exposes our home – and all other homes in our neighborhood that are downhill from the proposed route – to greater long-term risk of water problems than the risk we currently have. In addition, we have the normal concerns about construction and maintenance disruptions in the neighborhood.

### Risk Exposure

We moved into our home in the spring of 2011. With the first spring rains, we discovered that our window wells would rapidly fill with water. We (and our extended family when we were out of town) were constantly on-call to drop submersible pumps into the window wells whenever it rained.

9A. In speaking with neighbors, we discovered that they also had ground water problems, and many had installed drainage systems to mitigate the problem. After fighting the problem for a few years, we ultimately installed drainage systems in each of the three window wells that had the problem. Those holes for those systems were deep, well below the house footings. Much to our relief, this seemed to solve the problem. However, after several months, the same problem began appearing in other window wells that had never had the problem. We ultimately applied the same solution, and we have not had a problem in any of our window wells since.

What we suspect is that there are groundwater flows under our neighborhood. When those flows are disrupted – as will most certainly be the case if the aqueduct is installed along 1060 North – the water will move to the next route of least resistance, and we will see new groundwater problems in neighborhood homes. Further, if there is ever a leak in the new

aqueduct, the leaked water will find its way into our underground water flows, and potentially be exposed as water problems in neighborhood houses.

As you likely know, the resolution of a groundwater problem in a house is not a trivial expense. So, the question is – will the Central Utah Water Conservancy District indemnify our neighborhood against any new groundwater problems our houses encounter during or after construction of the new 1060 North aqueduct? At the Open House when we expressed concern about potential flooding and groundwater problems, the response was to minimize the concern. We heard responses like: 1. “The pipe used for the new aqueduct will be very thick and won’t have many leaks.” Our reaction – if that’s the case, replace the existing aqueduct with that kind of pipe or better – or put that kind of pipe along 800 North.

9B. “If there is an earthquake that breaks the new aqueduct, water flooding will be the least of our problems.” Our reaction – the same logic applies to the existing aqueduct. We should not minimize the ongoing concern by simply referencing an extreme catastrophe.

9C. “Your neighborhood already has water problems, just think of the heavy rainstorm several years ago that flooded homes in your neighborhood.” Our reaction – that was a heavy rainstorm over a broad area that affected a few houses. It was not a concentrated break in a 7 or 8-foot pipe that is full of water. Imagine the pressure and resulting blast of water and erosion that will surely inundate houses that are only a few yards from such a break.

#### 9D. Construction and Maintenance Problems

All the problems associated with a major construction project in a compact neighborhood with many children are too many to mention.

However, in addition to the disruption and inconvenience for months, we are extremely concerned about the danger such a project presents for children. This is a neighborhood that is busy with children in the streets and yards – and that is one of the desirable things about our neighborhood. Heavy machinery, large pipes, deep holes, re-routed traffic, etc. all seem like a recipe for serious accident.

9E. The same is true as maintenance will surely be required over time, and that maintenance may bring heavy equipment, excavation and industrial materials into the neighborhood. All of these create the same risk to children as the original construction.

#### Summary

All in all – it seems that installing a major pipeline in a hillside neighborhood that already has groundwater and soil stability problems has great potential for more extreme problems. It seems to move the problem from one point in our neighborhood to another – but much closer to many more houses.

There are groundwater issues in our neighborhood, and people have adapted to and resolved most of those problems. A new pipeline along 1060 North potentially disrupts those solutions and opens the door to more concentrated water problems in houses that are right next to the pipeline. The risks to children that are created by heavy construction, excavation, and pipeline maintenance in a neighborhood full of children cannot be minimized. Given the nature of our neighborhood, these risks alone may necessitate moving the plan to an alternative route.

9F. We believe there must be other solutions to the aqueduct issues that currently exist – and suggest those alternatives take priority.

Sincerely, [Redacted]

#### Response

9A. Refer to Section 3.6 in Chapter 3 for more information on groundwater. In researching groundwater for the analysis, the recorded groundwater depths either from water rights well logs or from studies indicate that the groundwater levels in the study area are more than 140 feet deep and could be deeper in today's drought climate. There are no recorded springs other than Orem City's two springs located in Provo Canyon which are well outside the study area. The pipeline installation would include bedding and filling materials for the support and structural stability of the pipeline. These soil types are coarse-grained soils which are porous and conducive for conveying any water in the ground. In the event that a shallow groundwater layer was encountered during construction, its flow path would naturally follow the pipeline due to the soils.

The depth of the realigned AA-1 pipeline through the neighborhood is anticipated to be about 15 feet. A geotechnical report that was required for the development of the eastern portion of the subdivision was reviewed as part of this project. To determine the geotechnical characteristics for this area, 11 test pits were dug that ranged between 8-12 feet in depth. No groundwater was found at any of these test pits. More detailed geotechnical investigations would be conducted during the design phase of the proposed Project.

9B. To summarize what was discussed during the open house, the pipeline would be constructed of welded steel with double welded joints and to withstand a 975-year seismic event. The potential for leakage is if the pipeline ruptures following a seismic event greater than the 975-year event). The realigned AA-1 pipeline would be designed and constructed away from the landslide (cause and location of previous breaks) and to not leak.

9C. The Preferred Alternative would have temporary, short-term impacts to storm water runoff during construction. Construction related storm water impacts are mitigated and addressed through the requirement of the selected contractor to complete and abide by a Storm Water Pollution Prevention Plan (see Section 3.17 in Chapter 3 for more information). However, the realigned AA-1 pipeline would have no long-term impacts to the storm water patterns and flows in the area.

9D. See section 3.17 in Chapter 3. The contractor would be required to temporarily fence the work area to keep non-project related persons out of the construction site. As parents educate their children on the purpose and importance of staying out of construction zones, the resident's safety can be maintained during the construction period

9E. Ongoing and routine maintenance is part of any buried utility. It is anticipated that the majority of the maintenance activities would not be intrusive (e.g., above ground visual inspections, inspections inside the pipeline) and would not require ground disturbing activities. However, should the need to uncover the pipeline through the neighborhood arise, those impacts would be temporary in nature.

9F. The JLAs conducted an extensive evaluation of 15 different options as part of the *Resiliency Assessment*. The JLAs have determined that the Preferred Alternative (and its design options) meet the Project purpose and need as defined in Chapter 1.

## Comment & Response 10

### Comment

1452 E 920 N Orem

To whom it may concern,

My name is [Redacted] and I live at [Redacted] which is next to the new proposed path for the new aqueduct. I do have a few questions?

10A. Have you found that there is a drop in home values because people prefer not to live next to the aqueduct?

10B. Are you planning to compensate homeowners for the loss in value of their homes because people prefer not to live next to this aqueduct?

10C. If there is ever a break in the aqueduct that causes damage to homes nearby is there an insurance policy in place to compensate homeowners?

10D. Is there an earthquake policy in place that covers damage to homes in the event of an earthquake?

10E. What is the timeframe to complete the new aqueduct?

10F. When will the new route be decided?

Thanks for your time. I look forward to hearing back from you. Can you please reply that you received these questions?

Response

10A. In other areas of Utah County where large diameter water pipelines have been constructed through existing neighborhoods, there has not been a drop in home values. The value of homes continues to increase in today's housing market. The pipeline would be buried and not visible and unless a seismic event greater than a 975-year event occurs, there would be no issues as a result of a pipeline being under the streets.

10B. See Response 10A above. No. After construction, there would be no long-term impact to homeowners.

10C. See Response 3C above.

10D. Please contact your homeowners insurance company to determine what policies could be obtained.

10 E. Design of the AA-1 project is anticipated to start in late fall of 2022 and would last for approximately one year. Construction is estimated to begin in the spring of 2024 and be completed by the fall of 2026. Construction in the neighborhoods would take approximately 6 months, with full construction of the pipeline schedule being closer to 2 years.

10F. Currently, the JLAs are in the NEPA phase of the project and are producing this Environmental Assessment (EA). It is anticipated that the new route would have approval for construction upon completion of this EA and subsequent decision document. The EA is anticipated to be completed in the fall of 2022.

**Comment & Response 11** CommentMy concerns about the proposed rerouting of the Alpine Aqueduct are as follows:

11A. Moving it into our neighborhood increases the risk to life and property in the event of an earthquake. It does not reduce the number of fault lines crossed but put the risk directly among people and their homes. I understand that the intent is to avoid the landslide area but putting it through the neighborhood also makes it far less accessible for repairs, which seems like a paramount concern if the primary goal is to keep water flowing to the million + users. Surely there will be some repairs required either way.

11B. It also seems like the damage would be much more likely to be catastrophic in an earthquake as opposed to the damage and maintenance required in the slow-moving slide area. As a result, the risk to us and our homes would be compounded - from earthquake damage and then significant flood damage as well.

11C. At the open house, much was made of how much more flexible the new pipe would be - we were shown a sharply bent piece of metal. But surely replacing the current pipe in its



current location with more flexible material would make it much more resilient to movement of the landslide as well. Wouldn't the likely maintenance be reduced in that case as well? I would like the team to consider the potential for reducing maintenance costs in the current location.

11D. I'd also like the team to consider and share the cost comparison between the expected maintenance at the current location, the costs if the existing pipe were upgraded in the current location, and the costs of building the pipe in alternate, much longer route plus its maintaining it there. I was surprised that a cost comparison did not figure more prominently in the criteria defined in the materials I was sent. I expect that costs are rapidly rising with the recent building boom in Utah and the inflation around the country.

11E. In addition, I'd like the study team to consider putting in a gate in the pipe at the east side of the slide area so that the flow of water could more easily be stopped if repairs were needed. It seems like that would mitigate flood damage and facilitate repair and continued water flow more quickly than if the aqueduct has to be accessed under our roads and the water flow stopped well above us in the canyon.

11F. Also, at the open house, we were told that the study team had drilled extensively in the slide area to determine that tunneling to put the aqueduct below ground there was not feasible. But when I asked whether they had drilled under our neighborhood to test the stability of that soil, I was told they had not. I would very much like to see the results of such testing.

11G. We had a sewer line leak about 14 years ago. It was dug up and repaired - about 12 feet down at the street in front of our home. The area in the road and our gutter almost immediately settled and created a dip in the road and the curb where water collects and mosquitos breed in the summer. Many of our neighbors have experienced significant settling of their homes as well - one of them has had to shore up their foundation at significant cost. So, I'm concerned about whether the construction would exacerbate all of that and whether it is really suitable for putting such a large pipe in.

11H. Finally, I'm concerned about the damage construction may cause to our homes. The digging and heavy equipment 30 feet from my front door and going 30+ feet down will surely cause significant vibration. So, I'm concerned about what that will do to the stability of our foundation and the whole structure. Thanks for your consideration. I am hopeful that you can find the best solution and I wish you luck with the project.

### Response

11A. The *Resiliency Assessment* (Jacobs 2021) extensively evaluated 15 Options and what would provide the best long-term reliability and resiliency for the AA-1 pipeline that provides critical water supply to over 1.6 million residents. Several options were evaluated that would utilize the existing AA-1 alignment and right-of-way. However, these alternatives would not avoid the landslide complex and would still be at risk of failure. The JLAs determined that the

pipeline be moved outside of the landslide complex, which is located directly north of the residential area. Monitors in the landslide complex indicate that the area is constantly moving and continues to put more stress and strain on the existing AA-1 pipeline. As described in the EA and *Resiliency Assessment*, other alternatives were evaluated but eliminated.

11B and 11C. The realigned AA-1 pipeline would be designed and constructed to withstand the 975-year seismic event. The landslide is anticipated to move up 10 feet during a 975-year seismic which would result in damage to the pipeline if it remained in that location. No upgrades or replacement within the alignment of the existing AA-1 pipeline would be able to withstand the amount of landslide movement that is anticipated during an earthquake.

11D. Continual and ongoing maintenance are one concern regarding the existing AA-1 pipeline. However, the JLAs are concerned that leaving the existing AA-1 pipeline in its current location leaves this critical water pipeline susceptible to failure from the continual movement of the landslide and/or the anticipated seismic activity along the Wasatch Fault Zone.

11E. See Responses 8C and 8D.

11F. During the *Resiliency Assessment*, the JLAs reviewed geotechnical reports. A geotechnical report was prepared prior to construction of the neighborhood per Orem City code. The subsurface materials appear to support the realignment of the AA-1 pipeline.

11G and 11H. See Section 3.17 in Chapter 3 for more information.



Spencer J. Cox  
Governor

Deidre M. Henderson  
Lieutenant Governor

Jill Remington Love  
Executive Director  
Utah Department of Cultural  
and Community Engagement

Christopher Merritt  
State Historic Preservation Officer

May 16, 2022

Sarah Sutherland  
Environmental Programs Manager  
Central Utah Water Conservancy District  
355 W. University Parkway  
Orem, Utah 84058-7100

RE: Alpine Aqueduct Reach 1 Replacement and Resiliency Project, Utah County (U22HX0280)

For future correspondence, please reference Case No. 22-0825

Dear Environmental Programs Manager Sutherland,

The Utah State Historic Preservation Office received your request for our comment on the above-referenced undertaking on May 13, 2022.

We concur with your determinations of eligibility and “No Historic Properties Affected” for this undertaking.

This letter serves as our comment on the determination you have made within the consultation process specified in §36CFR800.4. Additionally, Utah Code 9-8-404(1)(a) denotes that your agency is responsible for all final decisions regarding cultural resources for this undertaking. Our comments here are provided as specified in U.C.A. 9-8-404(3)(a)(i).

If you have questions, please contact me at 801-245-7246 or by email at [sagardy@utah.gov](mailto:sagardy@utah.gov).

Sincerely,

Savanna Agardy  
Compliance Archaeologist



## Appendix B: Supporting Documentation

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## MEMORANDUM

**TO:** Project File  
**FROM:** Marley Madsen, Biologist  
**DATE:** May 11, 2022  
**SUBJECT:** Migratory Bird Nesting Survey  
Alpine Aqueduct Environmental Assessment

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### INTRODUCTION

Central Utah Water Conservancy District (District) and the Department of the Interior – Central Utah Project Completion Act Office (Interior) are evaluating alternatives to increase the resiliency and reliability of the Alpine Aqueduct Reach 1 (AA-1). The District and Interior, as Joint Lead Agencies (JLAs), have initiated an Environmental Assessment (EA) to analyze and disclose the potential impacts of the Alpine Aqueduct Reach 1 Replacement and Resiliency Project (Project).

Migratory birds receive protections from the Migratory Bird Treaty Act (MBTA) of 1918, and Executive Order (EO) 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds* requires federal agencies taking actions that could result in take or other negative effects to migratory birds to comply with MBTA. Almost all bird species in the United States are covered by the MBTA. Additionally, the Bald and Golden Eagle Protection Act (BGEPA), originally passed in 1940, provides protection to eagles by prohibiting take.

To ensure project compliance with the MBTA and BGEPA, a nesting bird survey was conducted in the study area. The purpose of this report is to document the results of that survey.

### EVALUATION METHODS

On May 6, 2022, Marley Madsen and Gabriella Lawson of Horrocks Engineers conducted a survey of the study area to locate any existing migratory bird nests and to assess habitat suitability for birds. Prior to conducting the survey, areas of potentially suitable habitat were identified from aerial imagery and previous nest occurrence data was reviewed. Survey efforts in the field focused on potentially suitable habitat and the locations of previously recorded nests. At each of these locations, the surveyors listened for bird calls and used binoculars to look for birds and bird sign (e.g., nests, whitewash). When birds or sign were detected, the surveyors attempted to determine if a nest was occupied and to identify the species. The survey took place during the breeding season for most species of birds known to occur in the area.





## SURVEY RESULTS

### Habitat Conditions

The habitat in the study area can be classified as northern mountain brush complex using *Woody Plants of Utah* (Van Buren et al. 2011). This vegetative community occurs in the foothills of mountain ranges and is dominated by shrubs such as Gambel oak (*Quercus gambelii*), bigtooth maple (*Acer grandidentatum*), box elder (*Acer negundo*), curl-leaf mountain mahogany (*Cercocarpus ledifolius*), alderleaf mountain mahogany (*Cercocarpus montanus*), and sagebrush (*Artemisia* spp.).

Due to the 2020 Range Fire, which burned approximately 3,500 acres at the mouth of Provo Canyon, very few trees and shrubs are present in the study area. Instead, the study area is dominated by various species of native and non-native grasses and forbs such as intermediate wheatgrass (*Thinopyrum intermedium*), crested wheatgrass (*Agropyron cristatum*), and bulbous bluegrass (*Poa bulbosa*), and cheat grass (*Bromus tectorum*) (see Figure 1).

In addition to the grassland habitats available in the study area, suitable habitat for migratory birds occurs in small patches of oakbrush, sagebrush, and Utah juniper (*Juniperus osteosperma*), as well as along the large limestone cliffs at the mouth of Provo Canyon (see Figure 2).



**Figure 1:** General habitat conditions in study area. Photo was taken along the Bonneville Shoreline Trail looking south toward Orem/Provo.



**Figure 2:** General habitat conditions along the limestone cliffs on the eastern edge of the study area. The spillway and cement roadway can be seen in the middle/right of the photo. Image was taken using Google Earth Street View.

### **Migratory Birds**

Six large platform nests were observed in and near the study area during surveys (see attached survey results map). Only one nest was able to be positively identified as belonging to mated pair of red-tailed hawks. The red-tailed hawk nest is located along the limestone cliffs near the eastern edge of the study area (see attached survey results map). The other five nests are located in scattered Utah juniper trees and may belong to common ravens or other large predatory birds (see Figure 3). Other nests belonging to small migratory species undoubtedly occur in and near the study area. For example, flocks of white-throated swifts and barn swallows were observed by the limestone cliffs and there are likely dozens of nests along the cliff face.



**Figure 3:** An example of a migratory bird nest found in the study area. This nest is located in a Utah juniper and belongs to an unknown species of bird.

Several different species of migratory birds and raptors were observed in and near the study area:

- Turkey vulture (*Cathartes aura*)
- Red-tailed hawk (*Buteo jamaicensis*)
- Great-horned owl (*Bubo virginianus*)
- American kestrel (*Falco sparverius*)
- Barn swallow (*Hirundo rustica*)
- Spotted towhee (*Pipilo maculatus*)
- Warbling vireo (*Vireo gilvus*)
- White-throated swift (*Aeronautes saxatalis*)
- American robin (*Turdus migratorius*)
- Lazuli bunting (*Passerina amoena*)
- Stellar's jay (*Cyanocitta stelleri*)

It is unlikely this is a comprehensive list of all the migratory birds and raptors that occur in the study area. However, it does provide evidence that the study area contains enough suitable habitat to support a diverse bird community.

### RECOMMENDED MITIGATION

The following mitigation measures are recommended to avoid impacts to migratory birds:

- All vegetation in the construction area must be cleared and grubbed outside the breeding season for most migratory birds (May 1 – August 31).
- Construction activities, including storing equipment and parking vehicles, must not take place directly above or below the red-tailed hawk nest during the nesting season (May 1 – August 31).

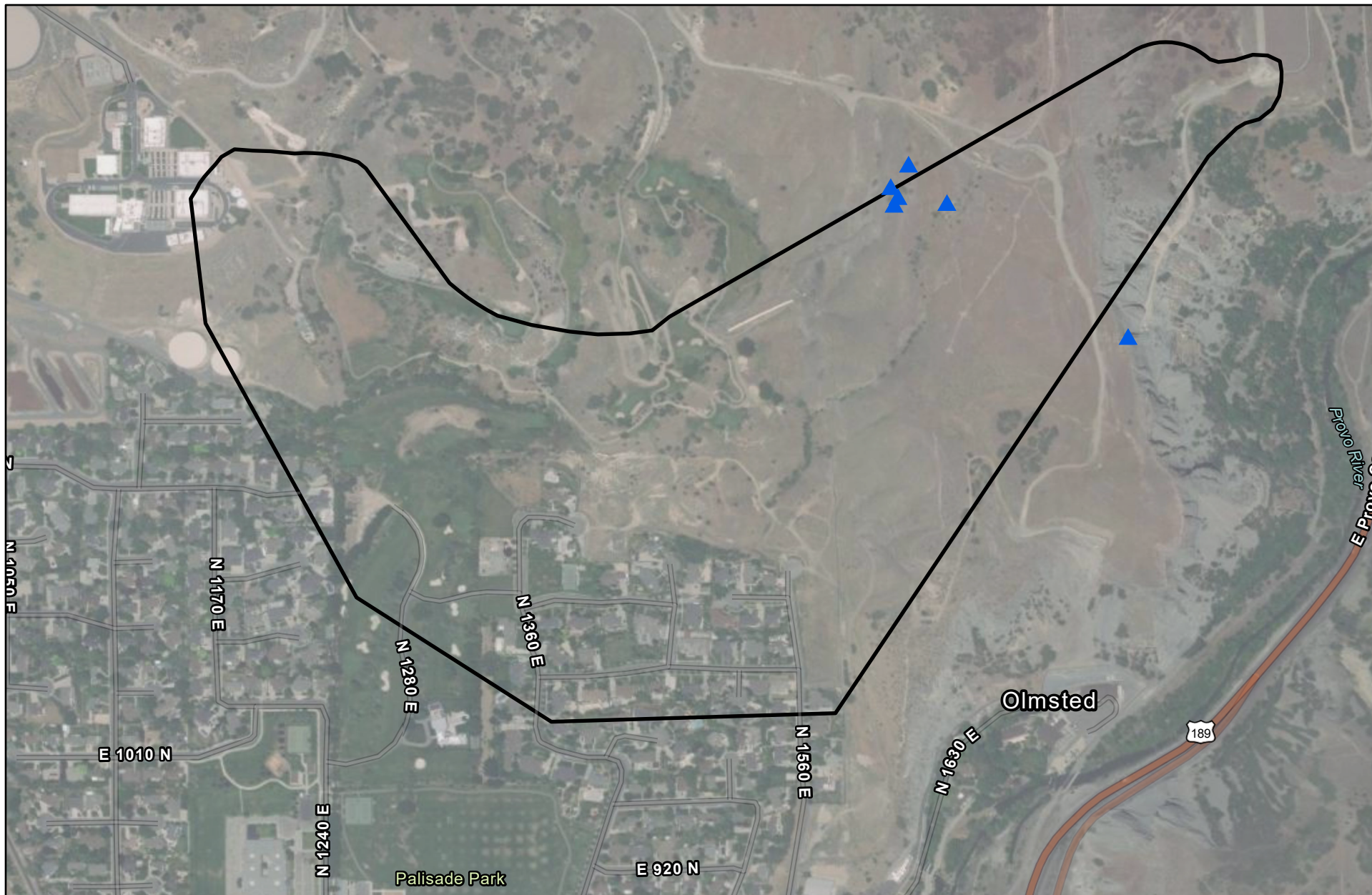
### CONCLUSION

There is suitable habitat in the study area for migratory birds. A total of six nests, one belonging to a pair of red-tailed hawks and five belonging to other large birds, were found in and near the study area boundary. At least eleven species of migratory birds occur in and near the study area. If the recommended mitigation measures are implemented, the project would not result in take to migratory birds.

### REFERENCES

Van Buren, R., Cooper, J.G., Shultz, L.M., and Harper, K.T. 2011. *Woody Plants of Utah*. Utah State University Press. Logan, Utah.





 Study Area

 Nest

0 400 800 1,600 Feet  
1 in = 800 ft



Alpine Aqueduct  
Migratory Bird Survey Results

## MEMORANDUM

**TO:** Project File  
**FROM:** Gabriella Lawson, Environmental Specialist  
**DATE:** May 11, 2022  
**SUBJECT:** Yellow-billed Cuckoo Habitat Noise Analysis  
Alpine Aqueduct Environmental Assessment

### INTRODUCTION

Central Utah Water Conservancy District (District) and the Department of the Interior – Central Utah Project Completion Act Office (Interior) are evaluating alternatives to increase the resiliency and reliability of the Alpine Aqueduct Reach 1 (AA-1). The District and Interior, as Joint Lead Agencies (JLAs), have initiated an Environmental Assessment (EA) to analyze and disclose the potential impacts of the Alpine Aqueduct Reach 1 Replacement and Resiliency Project (Project).

Section 7 of the Endangered Species Act (ESA) of 1973 (7 USC §136, 16 USC §1531 et seq.), as amended, requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) if listed species or designated Critical Habitat may be affected by the Preferred Alternative. If adverse impacts would occur as a result of the Preferred Alternative, the ESA requires federal agencies to evaluate the likely effects and ensure that it neither jeopardizes the continued existence of federally listed ESA species, nor results in the destruction or adverse modification of designated Critical Habitat.

Yellow-billed Cuckoo (*Coccyzus americanus*) are federally listed threatened species. Found in mixed native and non-native riparian woodlands. Patches vary in size and shape but must be ≥12-acres and 100m wide or more in at least one location. Quality habitat is structurally diverse with a multi-layered overstory and dense understory. No critical habitat for yellow-billed cuckoo (YBC) exists in or within 0.5-miles of the study area, and no YBC have been observed nearby. However, there is habitat that meets USFWS guidelines for suitable habitat within 0.5-miles of the study area along the Provo River at the mouth of Provo Canyon.

To ensure project compliance with USFWS guidelines, a noise screening was conducted to identify whether noise from project activities would increase the noise levels within suitable habitat for yellow-billed cuckoo. The purpose of this report is to document the results of that screening.

### EVALUATION METHODS

The ambient noise level is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average,



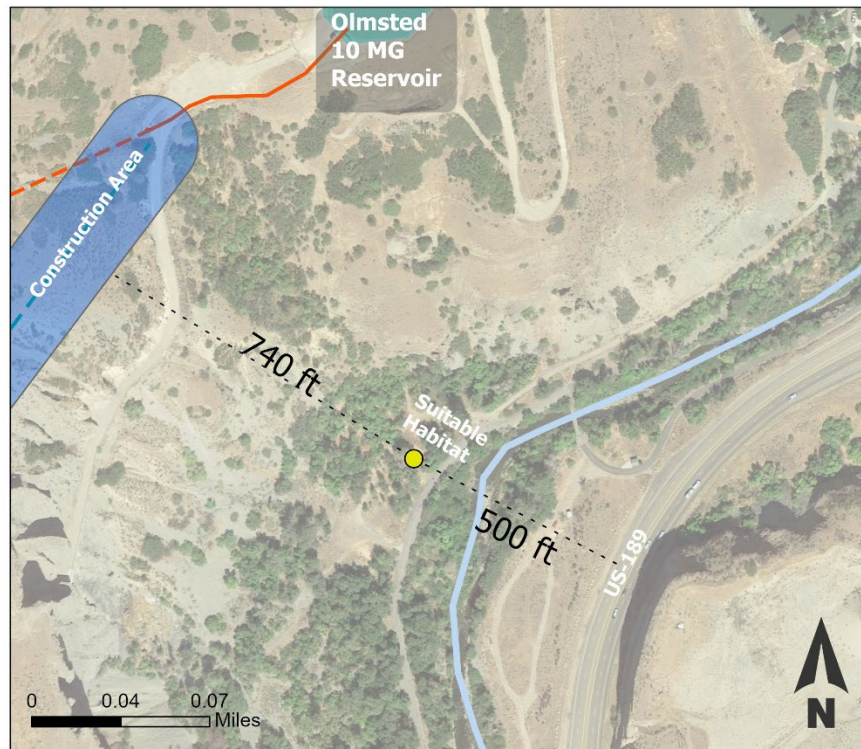
or equivalent, sound level (Leq) over a given period. The sound levels described in this memo are expressed as Leq. Table 1 shows the relationship between decibel changes and the corresponding relative loudness. The Federal Highway Administration Traffic Noise Screening Tool and Roadway Construction Noise Model were used to predict noise levels within adjacent suitable, yellow-billed cuckoo habitat.

**Table 1. Sound Level Change vs. Relative Loudness**

Sound Level Change	Relative Loudness
1 dBA	No perceptible change
3 dBA	Barely perceptible change
5 dBA	Readily perceptible change
10 dBA increase	Perceived as twice as loud

### HABITAT LOCATION

Construction noise levels were analyzed for suitable habitat closest (approximately 740-feet) to the proposed construction area (See Figure 1). Traffic noise levels were analyzed for the same suitable habitat point, located 500 feet to the west of mile marker 8.1.



**Figure 1. Suitable Habitat Distance to Construction and Roadway**

### BASELINE ROADWAY NOISE LEVELS

Baseline roadway noise levels were calculated using the Federal Highway Administration's (FHWA) Traffic Noise Screening Tool (TNST). Average Annual Daily Traffic on US-189 in 2019 was

28,000 vehicles per day with total truck volumes at 26.4% (20.2% single unit, 6.2% combination unit). Average hourly traffic was set at 2,800 vehicles (700 per lane) as best practice is to take 10% of daily traffic volumes to reflect peak noise. FHWA TNST calculated noise levels to be 59.22 dBA in the closest suitable habitat.

**Project Settings**

# Near Lanes	2	Near Lane Grade %	2	Ground Type	Lawn
# Far Lanes	2	Far Lane Grade %	-2	Traffic Average Period	Hourly
Lane Width (ft)	12	Receiver Distance (ft)	500	NAC Category	B
Pavement Type	Average	Receiver Height (ft)	5		

☐ Compute Substantial Increase

**Traffic Input**

Diagram	NL 1	NL 2	FL 2	FL 1	
Lane Speed (mph)	55	Auto (% of Hourly Traffic)	74	Auto Hourly Traffic	518
Average Total Traffic	700	MT (% of Hourly Traffic)	20	MT Hourly Traffic	140
Average Hourly Traffic	700	HT (% of Hourly Traffic)	6	HT Hourly Traffic	42

**Computations and Results**

Far lane 1

Start Computation Write Summary

Progress 100%

Near Lane LAeq 1hr (dBA) 56.82 Far Lane LAeq 1hr (dBA) 55.50

Greater than NAC - 3 dB? NO Total Lane LAeq 1hr (dBA) 59.22

Figure 2. FHWA TNST Results for Baseline Roadway Noise Levels

## CONSTRUCTION ACTIVITY NOISE LEVELS

Construction activity noise levels were calculated using FHWA's Roadway Construction Noise Model (RCNM). The RCNM enables the prediction of construction noise levels for a variety of construction operations based on a compilation of empirical data and the application of acoustical propagation formulas. The noise levels were analyzed for construction in the closest suitable habitat (740 feet away) for each piece of equipment that will be used individually and those that are likely to be used together. Results from the analysis are described in the following sections.

### Blasting

The RCNM calculated the noise levels (Leq) associated with blasting to be **50.6 dBA** in the closest suitable habitat, **8.62 dBA less than the baseline roadway noise level**.

**Input Data**

Case Description:

**Receptor**

	Description	Land Use	Daytime Baseline (dBA)	Evening Baseline (dBA)	Nighttime Baseline (dBA)
1	Cuckoo Habitat	Residential	66.0	66.0	66.0
2					
3					
4					

Noise Metric: Leq  
Noise Limit Criteria  
Receptor #1  
Noise Limits

**Equipment**
Receptor #1: Cuckoo Habitat

	Active	Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Distance to Receptor (feet)	Estimated Shielding (dBA)
1	<input type="checkbox"/>	Concrete Mixer Truck	<input type="checkbox"/>	40%	85.0	78.8	740.0	0.0
2	<input type="checkbox"/>	Backhoe	<input type="checkbox"/>	40%	80.0	77.6	740.0	0.0
3	<input type="checkbox"/>	Concrete Mixer Truck	<input type="checkbox"/>	40%	85.0	78.8	740.0	0.0
4	<input checked="" type="checkbox"/>	Blasting	<input checked="" type="checkbox"/>	1%	94.0	N/A	740.0	0.0
5	<input type="checkbox"/>	Excavator	<input type="checkbox"/>	40%	85.0	80.7	740.0	0.0
6	<input type="checkbox"/>	Jackhammer	<input checked="" type="checkbox"/>	20%	85.0	88.9	740.0	0.0

**Results**
Receptor #1: Cuckoo Habitat

	Equipment	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
		Lmax*	Leq	Day		Evening		Night		Day		Evening		Night	
				Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
	Total	70.6	50.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	Blasting	70.6	50.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2															
3															
4															
5															

\*Total Lmax is the value for the loudest piece of equipment.

Figure 3. RCNM Result for Blasting

### Jack Hammering

The RCNM calculated the noise levels (Leq) associated with blasting to be **58.5 dBA** in the closest suitable habitat, **0.72 dBA less than the baseline roadway noise level**.

**Input Data**

Case Description:

**Receptor**

	Description	Land Use	Daytime Baseline (dBA)	Evening Baseline (dBA)	Nighttime Baseline (dBA)
1	Cuckoo Habitat	Residential	66.0	66.0	66.0
2					
3					
4					

Noise Metric: Leq

Noise Limit Criteria

Receptor #1

Noise Limits

**Equipment**
**Receptor #1: Cuckoo Habitat**

	Active	Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Distance to Receptor (feet)	Estimated Shielding (dBA)
1	<input type="checkbox"/>	Concrete Mixer Truck	<input type="checkbox"/>	40%	85.0	<input checked="" type="checkbox"/>	78.8	740.0
2	<input type="checkbox"/>	Backhoe	<input type="checkbox"/>	40%	80.0	<input checked="" type="checkbox"/>	77.6	740.0
3	<input type="checkbox"/>	Concrete Mixer Truck	<input type="checkbox"/>	40%	85.0	<input checked="" type="checkbox"/>	78.8	740.0
4	<input type="checkbox"/>	Blasting	<input checked="" type="checkbox"/>	1%	94.0	<input type="checkbox"/>	N/A	740.0
5	<input type="checkbox"/>	Excavator	<input type="checkbox"/>	40%	85.0	<input checked="" type="checkbox"/>	80.7	740.0
6	<input checked="" type="checkbox"/>	Jackhammer	<input checked="" type="checkbox"/>	20%	85.0	<input checked="" type="checkbox"/>	88.9	740.0

**Results**

**Receptor #1: Cuckoo Habitat**

	Equipment	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
		Lmax*	Leq	Day		Evening		Night		Day		Evening		Night	
				Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
	<b>Total</b>	<b>65.5</b>	<b>58.5</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	Jackhammer	65.5	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2															
3															
4															
5															

\*Total Lmax is the value for the loudest piece of equipment.

Figure 4. RCNM Result for Jack Hammering

### Concrete Mixer

The RCNM calculated the noise levels (Leq) associated with blasting to be **51.4 dBA** in the closest suitable habitat, **7.82 dBA less than the baseline roadway noise level**.

**Input Data**

Case Description:

**Receptor**

	Description	Land Use	Daytime Baseline (dBA)	Evening Baseline (dBA)	Nighttime Baseline (dBA)
1	Cuckoo Habitat	Residential	66.0	66.0	66.0
2					
3					
4					

Noise Metric: Leq

Noise Limit Criteria

Receptor #1

Noise Limits

**Equipment**

Receptor #1: Cuckoo Habitat

	Active	Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Distance to Receptor (feet)	Estimated Shielding (dBA)
1	<input type="checkbox"/>	Dump Truck	<input type="checkbox"/>	40%	84.0	76.5	740.0	0.0
2	<input type="checkbox"/>	Backhoe	<input type="checkbox"/>	40%	80.0	77.6	740.0	0.0
3	<input checked="" type="checkbox"/>	Concrete Mixer Truck	<input type="checkbox"/>	40%	85.0	78.8	740.0	0.0
4	<input type="checkbox"/>	Blasting	<input checked="" type="checkbox"/>	1%	94.0	N/A	740.0	0.0
5	<input type="checkbox"/>	Excavator	<input type="checkbox"/>	40%	85.0	80.7	740.0	0.0
6	<input type="checkbox"/>	Jackhammer	<input checked="" type="checkbox"/>	20%	85.0	88.9	740.0	0.0

**Results**

Receptor #1: Cuckoo Habitat

	Equipment	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
		Lmax*	Leq	Day		Evening		Night		Day		Evening		Night	
				Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
	Total	55.4	51.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	Concrete Mixer Truck	55.4	51.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2															
3															
4															
5															

\*Total Lmax is the value for the loudest piece of equipment.

Figure 5 RCNM Result for Concrete Mixer Truck



### Front End Loader

The RCNM calculated the noise levels (Leq) associated with blasting to be **51.7 dBA** in the closest suitable habitat, **7.52 dBA less than the baseline roadway noise level**.

Input Data

Case Description:

Receptor

	Description	Land Use	Daytime Baseline (dBA)	Evening Baseline (dBA)	Nighttime Baseline (dBA)
1	Cuckoo Habitat	Residential	66.0	66.0	66.0
2					
3					
4					

Noise Metric: Leq

Noise Limit Criteria

Receptor #1

Noise Limits

Equipment

Receptor #1: Cuckoo Habitat

	Active	Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Distance to Receptor (feet)	Estimated Shielding (dBA)
4	<input type="checkbox"/>	Blasting	<input checked="" type="checkbox"/>	1%	94.0	N/A	740.0	0.0
5	<input type="checkbox"/>	Excavator	<input type="checkbox"/>	40%	85.0	80.7	740.0	0.0
6	<input type="checkbox"/>	Jackhammer	<input checked="" type="checkbox"/>	20%	85.0	88.9	740.0	0.0
7	<input checked="" type="checkbox"/>	Front End Loader	<input type="checkbox"/>	40%	80.0	79.1	740.0	0.0
8	<input type="checkbox"/>		<input type="checkbox"/>					
9	<input type="checkbox"/>		<input type="checkbox"/>					

Results

Receptor #1: Cuckoo Habitat

	Equipment	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
		Lmax*	Leq	Day		Evening		Night		Day		Evening		Night	
				Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
	Total	55.7	51.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	Front End Loader	55.7	51.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2															
3															
4															
5															

\*Total Lmax is the value for the loudest piece of equipment.

Figure 6. RCNM Result for Front End Loader

### Dump Truck

The RCNM calculated the noise levels (Leq) associated with blasting to be **49.1 dBA** in the closest suitable habitat, **10.12 dBA less** than the baseline roadway noise level.

**Input Data**

Case Description:

**Receptor**

	Description	Land Use	Daytime Baseline (dBA)	Evening Baseline (dBA)	Nighttime Baseline (dBA)
1	Cuckoo Habitat	Residential	66.0	66.0	66.0
2					
3					
4					

Noise Metric: Leq  
Noise Limit Criteria  
Receptor #1  
Noise Limits

**Equipment**
Receptor #1: Cuckoo Habitat

	Active	Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Distance to Receptor (feet)	Estimated Shielding (dBA)
1	<input checked="" type="checkbox"/>	Dump Truck	<input type="checkbox"/>	40%	84.0	76.5	740.0	0.0
2	<input type="checkbox"/>	Backhoe	<input type="checkbox"/>	40%	80.0	77.6	740.0	0.0
3	<input type="checkbox"/>	Concrete Mixer Truck	<input type="checkbox"/>	40%	85.0	78.8	740.0	0.0
4	<input type="checkbox"/>	Blasting	<input checked="" type="checkbox"/>	1%	94.0	N/A	740.0	0.0
5	<input type="checkbox"/>	Excavator	<input type="checkbox"/>	40%	85.0	80.7	740.0	0.0
6	<input type="checkbox"/>	Jackhammer	<input checked="" type="checkbox"/>	20%	85.0	88.9	740.0	0.0

**Results**
Receptor #1: Cuckoo Habitat

	Equipment	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
		Lmax*	Leq	Day		Evening		Night		Day		Evening		Night	
				Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
	Total	53.0	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	Dump Truck	53.0	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2															
3															
4															
5															

\*Total Lmax is the value for the loudest piece of equipment.

Figure 7. RCNM Results for Dump Truck

### Track Hoe

The RCNM calculated the noise levels (Leq) associated with blasting to be **53.3 dBA** in the closest suitable habitat, **5.92 dBA less** than the baseline roadway noise level.

**Input Data**

Case Description:

**Receptor**

	Description	Land Use	Daytime Baseline (dBA)	Evening Baseline (dBA)	Nighttime Baseline (dBA)
1	Cuckoo Habitat	Residential	66.0	66.0	66.0
2					
3					
4					

Noise Metric: Leq

Noise Limit Criteria

Receptor #1

Noise Limits

**Equipment**

Receptor #1: Cuckoo Habitat

	Active	Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Distance to Receptor (feet)	Estimated Shielding (dBA)
1	<input type="checkbox"/>	Dump Truck	<input type="checkbox"/>	40%	84.0	<input checked="" type="checkbox"/>	76.5	740.0
2	<input type="checkbox"/>	Backhoe	<input type="checkbox"/>	40%	80.0	<input checked="" type="checkbox"/>	77.6	740.0
3	<input type="checkbox"/>	Concrete Mixer Truck	<input type="checkbox"/>	40%	85.0	<input checked="" type="checkbox"/>	78.8	740.0
4	<input type="checkbox"/>	Blasting	<input checked="" type="checkbox"/>	1%	94.0	<input checked="" type="checkbox"/>	N/A	740.0
5	<input checked="" type="checkbox"/>	Excavator	<input type="checkbox"/>	40%	85.0	<input checked="" type="checkbox"/>	80.7	740.0
6	<input type="checkbox"/>	Jackhammer	<input checked="" type="checkbox"/>	20%	85.0	<input checked="" type="checkbox"/>	88.9	740.0

**Results**

Receptor #1: Cuckoo Habitat

	Equipment	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
		Lmax*	Leq	Day		Evening		Night		Day		Evening		Night	
				Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
	<b>Total</b>	<b>57.3</b>	<b>53.3</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	Excavator	57.3	53.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2															
3															
4															
5															

\*Total Lmax is the value for the loudest piece of equipment.

Figure 8. RCNM Results for Track Hoe

# Yellow-billed Cuckoo Noise Screening Analysis Alpine Aqueduct Environmental Assessment

## Loaders, track hoe, dump truck

The RCNM calculated the noise levels (Leq) associated with blasting to be **56.5 dBA** in the closest suitable habitat, **2.72 dBA less** than the baseline roadway noise level.

Input Data

Case Description:

Receptor

	Description	Land Use	Daytime Baseline (dBA)	Evening Baseline (dBA)	Nighttime Baseline (dBA)
1	Cuckoo Habitat	Residential	66.0	66.0	66.0
2					
3					
4					

Noise Metric: Leq

Noise Limit Criteria

Receptor #1

Noise Limits

Equipment

Receptor #1: Cuckoo Habitat

	Active	Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Distance to Receptor (feet)	Estimated Shielding (dBA)
1	<input checked="" type="checkbox"/>	Dump Truck	<input type="checkbox"/>	40%	84.0	<input checked="" type="checkbox"/>	76.5	740.0
2	<input type="checkbox"/>	Backhoe	<input type="checkbox"/>	40%	80.0	<input checked="" type="checkbox"/>	77.6	740.0
3	<input type="checkbox"/>	Concrete Mixer Truck	<input type="checkbox"/>	40%	85.0	<input checked="" type="checkbox"/>	78.8	740.0
4	<input type="checkbox"/>	Blasting	<input checked="" type="checkbox"/>	1%	94.0	<input type="checkbox"/>	N/A	740.0
5	<input checked="" type="checkbox"/>	Excavator	<input type="checkbox"/>	40%	85.0	<input checked="" type="checkbox"/>	80.7	740.0
6	<input type="checkbox"/>	Jackhammer	<input checked="" type="checkbox"/>	20%	85.0	<input checked="" type="checkbox"/>	88.9	740.0

Results

Receptor #1: Cuckoo Habitat

	Equipment	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
		Lmax*	Leq	Day		Evening		Night		Day		Evening		Night	
				Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
	Total	57.3	56.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	Dump Truck	53.0	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Excavator	57.3	53.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Front End Loader	55.7	51.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4															
5															

\*Total Lmax is the value for the loudest piece of equipment.

Figure 9. RCNM Results for Loaders, Track Hoe, and Dump Truck

## SUMMARY

On average, noise from construction will be 6.2 dBA less than the baseline roadway noise level within the suitable yellow-billed cuckoo habitat. No construction activities were found to be louder than the baseline roadway noise levels within the potential suitable habitat for yellow-billed cuckoo (Table 2).

**Table 2. Construction vs. Baseline Roadway Noise Level**


Construction Activity	Baseline Roadway Noise Level (dBA)	Construction Activity Noise Level (dBA)	Difference
Blasting	59.22	50.6	-8.62
Jack Hammering	59.22	58.5	-0.72
Concrete Mixer	59.22	51.4	-7.82
Front End Loader	59.22	51.7	-7.52
Dump Truck	59.22	49.1	-10.12
Track Hoe	59.22	53.3	-5.92
Loaders, track hoe, dump truck	59.22	56.5	-2.72



### MEMORANDUM

**DATE:** May 9, 2022

**TO:** Central Utah Water Conservancy District (CUWCD) and  
Department of Interior—Central Utah Project Completion Act Office

**FROM:** Heather Boekweg, Horrocks 

**CC:** Chuck Easton

**SUBJECT:** Waters of the United States for Alpine Aqueduct Reach 1  
Replacement and Resiliency Project

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### Introduction

In April 2022, the Central Utah Water Conservancy District (CUWCD) and the Department of Interior—Central Utah Project Completion Act Office contracted with Horrocks to provide a waters of the United States investigation of a 26.52-acre site located west of Provo Canyon in Orem, Utah County, Utah along the southern extent of Mount Timpanogos within the Wasatch Range. This memorandum includes a summary of Horrocks' findings regarding waters of the United States.

### Proposed Project

The CUWCD proposes to relocate the Alpine Aqueduct Reach 1 (AA-1) pipeline to avoid an existing landslide complex and perform design and construction across the Wasatch Fault Zone to ensure AA-1 can withstand seismic events. In addition to the new pipeline alignment, two tunnel options are being considered for connection to the Alpine Tunnel.

### Project Area Conditions

The project area measures 26.52 acres and is located in Utah County, Orem, Utah (see Figures 1–2) on privately-owned land and private inholdings of the Uinta National Forest in Section 1 and 12 of Township 6 South, Range 2 East; and Sections 6 and 7 of Township 6 South, Range 3 East, of the Salt Lake Meridian. Elevations within the project area range from a low of approximately 4,904 feet above sea level (1,494 meters) near Orchard North neighborhoods to a high of approximately 5,449 feet above sea level (1,660 meters) at the top of a shoulder ridge overlooking Olmsted. Soils in the area are generally disturbed by housing construction, roadways, and recreational activities. Dominant vegetation in the project area includes bunch grasses, sagebrush, rabbitbrush, mountain mahogany, cliffrose, and invasive weeds (see Figures 3–4).



## Literature Search and Site Visit

As part of its wetland and water resource analysis, Horrocks performed a literature search and an examination of aerial imagery within the project area. An investigation of the project area was also conducted on April 28, 2022.

### National Wetland Inventory

Horrocks performed a search of the project area using the United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) Wetland Mapper tool. One riverine habitat (R4SBC) is shown to cross the project area in a northwest to southeast direction (see Figure 5). This system is considered intermittent, as channels that contain flowing water are only present part of the year. No other wetlands, streams, rivers, lakes, or ponds were identified within the project area.

### Floodplains

Using the Federal Emergency Management Agency's (FEMA) Flood Map Service Center online tool, Horrocks generated a Flood Insurance Rate Map (maps 49049C0333F and 49049C0334F) of the project area (see Figure 6). The project area is located within the FEMA-designated "area of minimal disturbance, Zone X." Zone X is defined as a "minimal risk area outside the 1-percent and 0.2-percent-annual-chance floodplains."

### Site Investigation

The site visit conducted on April 28, 2022 found a lack of appropriate hydrology indicators (including vegetation and soil indicators) within the project area. Small valleys, gulches, or gullies (all uplands) that collect stormwater were identified within the area (see Figure 4); these dissipate across the surface of uplands at the mouth of these features. None were found to possess an ordinary high water mark. Additionally, artificial irrigation features (hose bibs, rock-line ditches) were observed in and around the golf course. No permanent water exists within the project area.

## Recommendations

Due to the lack of hydrology indicators within the project area, Horrocks recommends that the proposed project would not impact wetlands or other waters of the United States. Horrocks also recommends that the project would not result in impacts to mudflats; lakes; or perennial, intermittent, or ephemeral streams as these resources are not present within the project area.

### Attachments

Figure 1: Project Area on Aerial Imagery

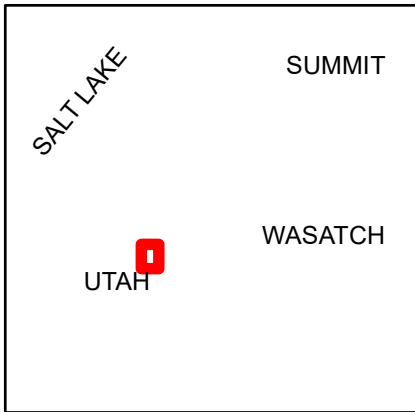
Figure 2: Project Area on Topographic Map

Figure 3: Photo of the project area and general site conditions.

Figure 4: Typical gully within the project area.

Figure 5: Project Area and NWI Wetlands

Figure 6: The Project Area on FEMA Flood Maps



1

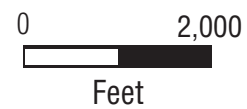
## Project Area on Aerial Imagery

Produced by  
Horrocks Engineers  
May 2022



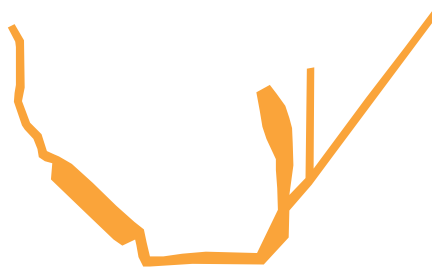
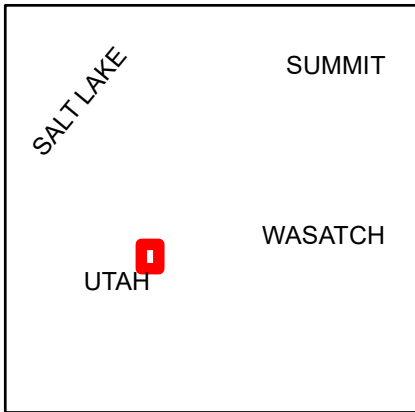
Project Area

Google Imagery  
Mapped in NAD 1983 UTM Zone 12 N



T6S, R2E Sections 1, 12  
T6S, R3E Sections 6, 7





## 2 Project Area on Topographic Map

Produced by  
Horrocks Engineers  
May 2022



USGS 7.5' Topo Quad(s):  
Orem, UT  
Mapped in NAD 1983 UTM Zone 12 N

0 2,000  
Feet

T6S, R2E Sections 1, 12  
T6S, R3E Sections 6, 7







Figure 3: Photo of the project area and general site conditions.



Figure 4: Typical gully within the project area.





5

Project Area and  
NWI Wetlands

Google Imagery  
Map Date: May 2022



Project Area



Riverine  
Wetlands

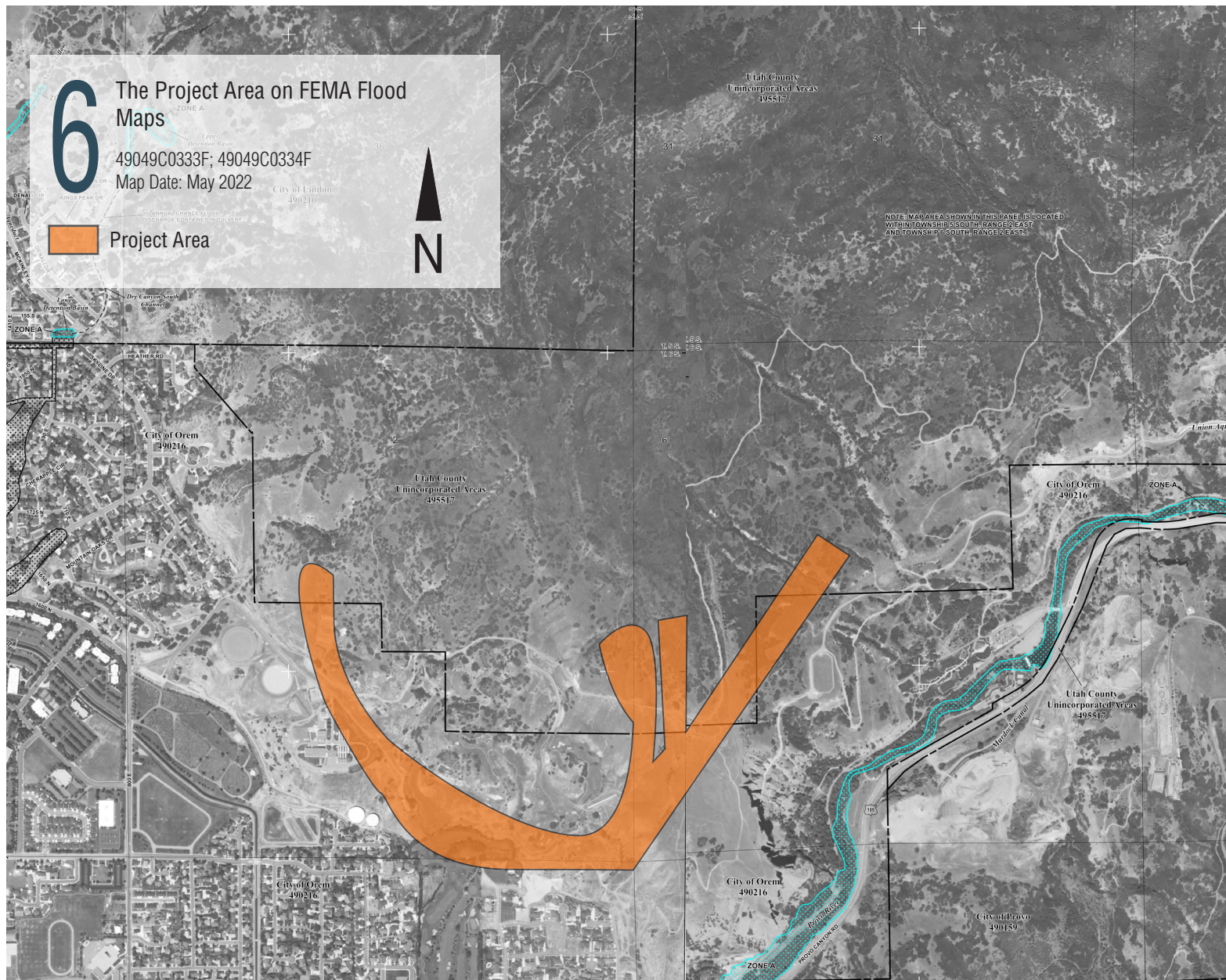


Freshwater  
Forested/Shrub  
Wetlands

40

Silver Creek





This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Utah County, Utah



## Utah Ecological Services Field Office

 (801) 975-3331

2369 West Orton Circle, Suite 50  
West Valley City, UT 84119-7603

<http://www.fws.gov/utahfieldoffice/>



# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species<sup>1</sup> and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries<sup>2</sup>).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

- 
1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
  2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

## Mammals

NAME	STATUS
<b>Canada Lynx</b> <i>Lynx canadensis</i> There is <b>final</b> critical habitat for this species. The location of the critical habitat is not available. <a href="https://ecos.fws.gov/ecp/species/3652">https://ecos.fws.gov/ecp/species/3652</a>	Threatened

## Birds

NAME	STATUS
<b>Yellow-billed Cuckoo</b> <i>Coccyzus americanus</i> There is <b>final</b> critical habitat for this species. The location of the critical habitat is not available. <a href="https://ecos.fws.gov/ecp/species/3911">https://ecos.fws.gov/ecp/species/3911</a>	Threatened

## Fishes

NAME	STATUS
<b>June Sucker</b> <i>Chasmistes liorus</i> Wherever found There is <b>final</b> critical habitat for this species. The location of the critical habitat is not available. <a href="https://ecos.fws.gov/ecp/species/4133">https://ecos.fws.gov/ecp/species/4133</a>	Threatened

## Insects

NAME	STATUS
<b>Monarch Butterfly</b> <i>Danaus plexippus</i> Wherever found No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/9743">https://ecos.fws.gov/ecp/species/9743</a>	Candidate

## Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

## Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.



Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

MIGRATORY BIRD INFORMATION IS NOT AVAILABLE AT THIS TIME

**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the migratory birds potentially occurring in my specified location?**

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

**What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

### How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

### What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

### Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

### What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

## Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

## Facilities

### Wildlife refuges and fish hatcheries

REFUGE AND FISH HATCHERY INFORMATION IS NOT AVAILABLE AT THIS TIME

## Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the [NWI map](#) to view wetlands at this location.

### Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted.

Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

### **Data exclusions**

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

### **Data precautions**

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.



Utah Division of Wildlife Resources  
Utah Natural Heritage Program  
1594 W. North Temple  
PO Box 146301  
Salt Lake City, UT 84116

## Utah Natural Heritage Program Online Species Search Report

### Project Information

#### Project Name

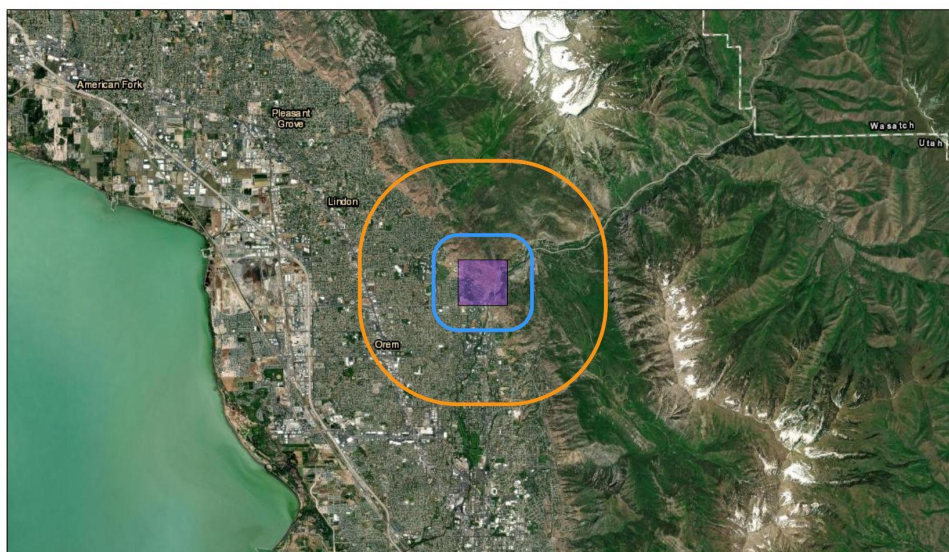
Alpine Aqueduct

#### Project Description

New pipeline

#### Location Description

Provo Canyon / Orem



March 16, 2022

1:146,780  
0 0.75 1.5 3 mi  
0 1.5 3 6 km  
Esri, HERE, Garmin, Earthstar Geographics

### Animals within a 1/2 mile radius

Common Name	Scientific Name	State Status	U.S. ESA Status	Last Observation Year
Columbia Spotted Frog	<i>Rana luteiventris</i>	SGCN		1941
Least Chub	<i>Notichthys phlegethontis</i>	SGCN		1931
Northern Leopard Frog	<i>Lithobates pipiens</i>	SGCN		1992
Peregrine Falcon	<i>Falco peregrinus</i>	SGCN		2006
Townsend's Big-eared Bat	<i>Corynorhinus townsendii</i>	SGCN		2012

### Plants within a 1/2 mile radius

Common Name	Scientific Name	State Status	U.S. ESA Status	Last Observation Year
No Species Found				



## Animals within a 2 mile radius

Common Name	Scientific Name	State Status	U.S. ESA Status	Last Observation Year
Columbia Spotted Frog	Rana luteiventris	SGCN		1965
Kit Fox	Vulpes macrotis	SGCN		1972
Least Chub	Notichthys phlegethontis	SGCN		1931
Northern Leopard Frog	Lithobates pipiens	SGCN		1992
Peregrine Falcon	Falco peregrinus	SGCN		2006
Townsend's Big-eared Bat	Corynorhinus townsendii	SGCN		2012

## Plants within a 2 mile radius

Common Name	Scientific Name	State Status	U.S. ESA Status	Last Observation Year
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**No Species Found**

## Definitions

### State Status

SGCN	Species of greatest conservation need listed in the <a href="#">Utah Wildlife Action Plan</a>
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### U.S. Endangered Species Act

LE	A taxon that is listed by the U.S. Fish and Wildlife Service as "endangered" with the probability of worldwide extinction
LT	A taxon that is listed by the U.S. Fish and Wildlife Service as "threatened" with becoming endangered
LE;XN	An "endangered" taxon that is considered by the U.S. Fish and Wildlife Service to be "experimental and nonessential" in its designated use areas in Utah
C	A taxon for which the U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threats to justify it being a "candidate" for listing as endangered or threatened
PT/PE	A taxon "proposed" to be listed as "endangered" or "threatened" by the U.S. Fish and Wildlife Service

## Disclaimer

The information provided in this report is based on data existing in the Utah Division of Wildlife Resources' central database at the time of the request. It should not be regarded as a final statement on the occurrence of any species on or near the designated site, nor should it be considered a substitute for on-the-ground biological surveys. Moreover, because the Utah Division of Wildlife Resources' central database is continually updated, any given response is only appropriate for its respective request.

The UDWR provides no warranty, nor accepts any liability, occurring from any incorrect, incomplete, or misleading data, or from any incorrect, incomplete, or misleading use of these data.

The results are a query of species tracked by the Utah Natural Heritage Program, which includes all species listed under the U.S. Endangered Species Act and species on the Utah Wildlife Action Plan. Other significant wildlife values might also be present on the designated site. Please [contact](#) UDWR's regional habitat manager if you have any questions.

For additional information about species listed under the Endangered Species Act and their Critical Habitats that may be affected by activities in this area or for information about Section 7 consultation under the Endangered Species Act, please visit <https://ecos.fws.gov/ipac/> or contact the [U.S. Fish and Wildlife Service Utah Ecological Services Field Office](#) at (801) 975-3330 or [utahfieldoffice\\_esa@fws.gov](mailto:utahfieldoffice_esa@fws.gov).

Please contact our office at (801) 538-4759 or [habitat@utah.gov](mailto:habitat@utah.gov) if you require further assistance.

Your project is located in the following UDWR region(s): Central region

### Report generated for:

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