



Record of Decision

in support of the Environmental Impact Statement

Logan Northern Canal Reconstruction Project

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1.0 Decision To Be Made

This Record of Decision (ROD) documents the decision by the Utah office of the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS-Utah) to disburse Emergency Watershed Protection Program (EWPP) funds for the Logan Northern Canal Reconstruction project. Because the EWPP is a Federal program, activity associated with the EWPP is subject to the provisions of the National Environmental Policy Act of 1969 (NEPA). Federal funding, along with matching funds from project stakeholders, will be used to implement the proposed project.

NRCS prepared a Final Environmental Impact Statement (EIS) for the project. The Final EIS describes the project and the impacts of the project and proposes mitigation for identified impacts. The EIS finds that the project will not cause any significant effects on the natural or built environment.

NRCS has selected what is described in the EIS as the Purple Alternative as well as mitigation measures that are associated with that alternative and identified in the Final EIS. The selected alternative will re-establish delivery of Logan Northern Canal (LN Canal) water using part of the LN Canal system and part of another local canal called the Logan, Hyde Park and Smithfield Canal (LHPS Canal).

2.0 Introduction

The Logan Northern Canal Reconstruction project area is located in the northeastern part of Cache County in northern Utah. Cache County covers an area of about 1,165 square miles. The study area includes unincorporated areas of Cache County and parts of the cities of Logan, North Logan, and Hyde Park.

In July 2009, a landslide occurred along a hillside in the city of Logan in Cache County. As a result of the landslide, a section of the LN Canal, a locally managed irrigation canal, broke away. This landslide and breach have prevented the canal from distributing water and has required the indefinite closure of a section of the canal. This closure affects other parts of the local irrigation water delivery system, with the result that the canal is not delivering all water allocated to local water shareholders. The purposes of the proposed action are to restore safe water delivery capability to the LN Canal and to address remaining hazards in the 2009 landslide zone. Project objectives include:

- Meeting the EWPP requirements.
- Meeting the Uinta-Wasatch-Cache National Forest management direction, standards, and guidelines.
- Meeting the U.S. Army Corps of Engineers (USACE) Clean Water Act (CWA) permitting requirements.
- Achieving the local sponsor's objectives to restore water for all canal users in a safe manner, promote amenities and citizen use along the canal route for recreation and aesthetic appreciation, promote secondary benefits of the rebuilt canal, minimize temporary and permanent impacts to private and public property, minimize unknown cost and time associated with the project, minimize the need for specialized construction techniques, and minimize the operation and management cost for overseeing the canal system in the future.

Cache County is the local sponsor of the project. The project could affect National Forest System land, which is administered by the U.S. Forest Service (USFS), in Logan Canyon, and waters of the United States (waters of the U.S.), which are regulated under Section 404 of the CWA by USACE. Because of this, USFS and USACE participated in the EIS process as cooperating agencies.

3.0 Description of the Selected Alternative

The selected alternative is the preferred alternative identified in the Final EIS. NRCS has identified the 1500 North option as part of the selected alternative. The 1500 North option will minimize effects to Lundstrom Park. The selected alternative will re-establish water delivery in the following manner:

- Move the point of diversion (POD) for some of the LN Canal water upstream to the LHPS Canal POD structure on the Logan River below Second Dam.
- Reconstruct the LHPS Canal POD (on land administered by the USFS) to accommodate an increase in the amount of water that could be diverted, which will allow water to be diverted for LN Canal shareholders and LHPS Canal shareholders.
- Reconstruct the LHPS Canal as a box culvert between the POD and about 1500 North in Logan. About 1 mile of the affected section of the LHPS Canal is on land administered by the USFS (a segment of about 0.8 mile and a segment of about 0.2 mile; the segments are separated by land that is privately owned).
- Divert some of the LN Canal shares from the box culvert at 1500 North into a pipeline that travels under city streets and discharges to the existing LN Canal at about 1500 North. The box culvert will end at 1500 North, and LHPS Canal shares will continue to flow in the existing LHPS Canal to its shareholders downstream.
- At the new 1500 North discharge point on the LN Canal, send some water to upstream users in a pressure pipe that is installed in the existing canal maintenance road. The remaining water will be discharged into the existing LN Canal for delivery to downstream users.
- For LN Canal shareholders between the POD and the Laub Diversion, construct a 10-inch-diameter pipeline in the existing canal.

The selected alternative also includes removing structures from 14 properties along Canyon Road in Logan at the toe of the historically unstable part of the Logan Bluff; the 2009 landslide occurred in this unstable area. NRCS can buy structures from willing sellers only. Although this alternative can be constructed if property owners are not willing to sell, any structures that remain in the unstable area could be at risk of damage during future landslides.

The structural features of the selected alternative include the following:

- A modified LHPS Canal POD structure on the Logan River just below Second Dam. This modification is needed to accommodate diversion of as much as 130 cubic feet per second (cfs), hydraulic gates, trash racks, and a fish screen.
- A reconstructed flow gage in the LHPS Canal (the existing gage is just downstream of the POD).

- About 2.6 miles of new box culvert to convey irrigation water from the LHPS Canal POD to 1500 North in the existing LHPS Canal alignment. About 1.6 miles of 6-foot-wide by 6-foot-deep box culvert will be needed between the LHPS Canal POD and the mouth of Logan Canyon (called the Logan Canyon section), and about 1.0 mile of 12-foot-wide by 5-foot-deep box culvert will be needed from the Logan Golf & Country Club to 1500 North.
- A new stormwater channel for about 1.0 mile in the LHPS Canal alignment to convey stormwater.
- Modified road crossings at Cedar Heights Drive and 1500 North where they cross the LHPS Canal to accommodate the new box culvert. Also, modified private driveways and pedestrian crossings that cross the LHPS Canal and LN Canal.
- Restored vegetation and landscaping that is removed during project construction from private property outside the canal easement along the LHPS Canal.
- A water-control structure at 1500 North to transition water from the box culvert to the existing open channel. The new structure will combine irrigation water and stormwater for conveyance downstream.
- A new headgate at 1500 North to allow LN Canal water to be diverted into a new pressurized pipeline system running west to the LN Canal.
- About 1.2 miles of new 42-inch-diameter pressure pipe to convey 40 cfs of LN Canal water from the LHPS Canal to the LN Canal. The pipeline, which will require air vents and a flow meter, will be routed under city streets and through and under a field to connect to the LN Canal at 1500 North.
- A new water-control structure at the LN Canal to discharge water from the pipe system to the LN Canal system. The structure will include pressure-reducing valves, flow control, and energy-dissipation measures. Water will be divided at the structure into the existing LN Canal open channel to serve shareholders to the north (downstream of 1500 North) and into a pressurized pipeline system traveling to the south (upstream of about 1500 North).
- About 1 mile of 10-inch-diameter pressure pipe from 1500 North to 400 North installed in the existing canal maintenance road. The pressure pipe, which will not affect the existing LN Canal, will convey about 2 cfs for use by shareholders in this reach. These shareholders could access water from the pressure pipe or from the LN Canal. Access from the canal will be available for water not taken from the pressure pipe and that is discharged from the pipe into the LN Canal at about 400 North.
- A new water-control structure to discharge water not taken directly from the pressure pipe into the existing LN Canal at 400 North. This water will supply the Temple Ditch (a LN Canal shareholder) and will provide water in the canal to the north (downstream) to prevent stagnant pools between 400 North and 1500 North.

- About 1 mile of 10-inch-diameter pipe in the current LN Canal alignment between the LN Canal POD and the Laub Diversion at about 1100 East. This pipeline will carry up to 2 cfs for delivery to shareholders in this area. The POD will not need to be modified to accommodate the 10-inch pipeline.

3.1 Mitigation and Unavoidable Effects

The selected alternative will not cause any significant environmental effects. However, the Final EIS identifies unavoidable, non-significant effects and measures that will minimize some of those effects. As the local sponsor, Cache County will have primary responsibility for implementing the mitigation measures adopted as part of the selected alternative. NRCS will work with Cache County throughout the design and construction process to ensure that applicable mitigation measures are implemented.

3.1.1 Adopted Mitigation Measures

NRCS has determined that the project will not cause and significant effects to the natural or human environment. Implementation of the selected alternative and the following mitigation measures presented in the Final EIS will further minimize potential project effects.

3.1.1.1 Land-Use Plans, Policies, and Controls

NRCS determined that no additional mitigation measures are needed to further minimize project effects to land-use plans, policies, and controls as described in the Final EIS.

3.1.1.2 Social and Economic Resources

NRCS determined that no additional mitigation measures are needed to further minimize project effects to social and economic resources as described in the Final EIS.

3.1.1.3 Natural Resources

- **Biological Resources.** After construction, Cache County or its contractor would use native riparian plants wherever possible as part of routine restoration of the work areas around the LHPS Canal POD (page 5-55 of the Final EIS).
- **Biological Resources.** Any modifications to the LHPS Canal POD structure will include a device to prevent fish from entering the canals and/or from becoming trapped at the POD structure. USFS will review and must approve the design of the proposed fish-exclusion structure (page 5-55 of the Final EIS).
- **Biological Resources.** To accommodate Cache County's desire to consider options for greenways along canals in the study area in the future, modifications to the LHPS and LN Canals will include components that will allow the installation of low-flow irrigation systems to serve land in the canal easements (page 5-55 of the Final EIS).

- **Surface Waters.** As the canal system operator and USFS special-use permit holder, the Cache Highline Water Users' Association will work with USFS to meet USFS Standard S5 by developing a plan to determine a minimum amount of water that will be allowed to flow past the LHPS Canal POD during the irrigation season in order to maintain beneficial uses downstream. The process will require observing the depth of pools in the Logan River below the LHPS Canal POD under various flow rates at and possibly above and below 5 cfs as needed. Monitoring of various flow rates and river response will occur within the first year after the project is completed. After USFS determines the appropriate flow rate, that rate will become a requirement of the special-use permit. The flow that passes the LHPS Canal POD will likely need to be monitored and reported to USFS annually by the special-use permit holder(s) in accordance with special-use permit conditions (page 5-77 of the Final EIS).
- **Stormwater.** Cache County and its contractor will work with the Logan, Hyde Park and Smithfield Canal Company; the Logan & Northern Irrigation Company; the City of Logan; and the City of North Logan to develop a stormwater management and maintenance program for the LHPS Canal between the Logan Golf & Country Club and 1500 North and the LN Canal between the LN Canal POD and 1500 North (page 5-87 of the Final EIS). *Please note that the text of this measure in the Final EIS incorrectly excluded the LN Canal between the LN Canal POD and 1500 North. This reach of the LN Canal was included in Table S-1 and Table 5-8, Summary of Impacts and Mitigation, in the Final EIS.*

3.1.1.4 Construction Impacts

- **Community Resources, Quality of Life, Landscape Resources, and Scenic Beauty.** Cache County or its contractor will develop a plan that specifies acceptable work hours and work days in areas that have sensitive receptors such as churches, areas near Utah State University (USU), and residential neighborhoods; describes how access to private properties and businesses in affected areas will be maintained; and describes how it will communicate information about the project construction schedule with USU and area residents (page 5-103 of the Final EIS).
- **Recreation.** Cache County and its contractor will work with the Logan Golf & Country Club to ensure that this facility remains accessible during construction and that water delivery during construction meets the golf course operator's turf irrigation needs (page 5-106 of the Final EIS).
- **Recreation.** Cache County and its contractor will work with the City of Logan to ensure that Lundstrom Park remains accessible during construction and that construction areas are fenced to prevent park users from accessing potentially unsafe work areas (page 5-106 of the Final EIS).
- **Recreation.** Cache County and its contractor will place signs on the segment of the Bonneville Shoreline Trail that inform the public of the work schedule, work activity,

and potential temporary trail closures and detours. Signs will be placed at least 2 weeks before the start of construction activity that will affect the trail crossing (page 5-107 of the Final EIS).

- ***Agriculture.*** If construction will affect the delivery of irrigation water in a manner that could be harmful to shareholders who have been able to obtain some or all of their shares since the 2009 landslide, Cache County and its contractor will work with the Logan & Northern Irrigation Company; the Logan, Hyde Park and Smithfield Canal Company; the Cities of Logan and North Logan; USU; and other canal companies as appropriate to identify ways that the shareholders' allocated water can be delivered (page 5-109 of the Final EIS). *Please see the similar measure under Water Resources below. Cache County can combine these two measures as appropriate.*
- ***Biological Resources and Water Resources.*** Before the start of construction at the LHPS Canal POD, Cache County or its contractor will prepare a site-specific construction-management plan that addresses how construction near or in the Logan River will take place. The plan will include details about dewatering or temporarily rerouting the river, construction limits near the river, standards for equipment use near the river, and postconstruction restoration of disturbed areas along the river. This plan will be reviewed and approved by the Utah Division of Water Rights in compliance with a Stream Alteration Permit before construction in or near the river could begin. USFS will also review construction plans (pages 5-113 and 5-124 of the Final EIS).
- ***Biological Resources.*** Cache County or its contractor will define a work zone along the project alignment within which all activity is to take place. The contractor will not remove vegetation or unnecessarily disturb areas outside of the work zone. The defined construction area will be shown on construction plans, and the construction contractor will make sure all workers know the boundary location. The contractor will provide extra protection measures for sensitive areas such as private residential landscaping and public parks to ensure that impacts to surrounding vegetation are avoided (page 5-113 of the Final EIS).
- ***Biological Resources.*** Cache County or its contractor will apply best management practices (BMPs) to ensure that construction does not introduce noxious weeds or invasive species or does not cause the spread of existing populations of noxious weeds or invasive species. BMPs will include actions such as bringing in clean equipment, cleaning equipment before it leaves the work area, and using materials that are weed-free (page 5-113 of the Final EIS).
- ***Special-Status Species.*** To ensure that the known population of Logan buckwheat (*Eriogonum loganum*) is not disturbed during construction, Cache County or its contractor will verify the extent of the existing population before construction begins. This verification will take place when the plant is conspicuous and identifiable. If the

verification finds that the population has spread into the expected work area, Cache County or its contractor will work with USFS to develop and implement a plan to protect the population. If the verification finds that the plant is still present but outside the work area, Cache County or its contractor will place protective fences around the population and ensure that work crews avoid the area (page 5-115 of the Final EIS).

- ***Special-Status Species.*** If construction work occurs during the nesting period (between April 30 and August 31), Cache County or its contractor will conduct a survey for nesting migratory birds in areas to be cleared no sooner than 1 week prior to the start of clearing. If an active nest is found, the nest will be protected from construction activities until the young have fledged (page 5-115 of the Final EIS). *Please note that Table S-1 and Table 5-8, Summary of Impacts and Mitigation, in the Final EIS incorrectly note the beginning of the period as April 10. The work period is April 30 through August 31 as written in the text of the Final EIS on page 5-115.*
- ***Special-Status Species.*** If work in Logan Canyon occurs in December through February, Cache County or its contractors will coordinate with USFS and/or the U.S. Fish and Wildlife Service (USFWS) to determine if a survey for bald eagles in or near the work zone is needed. If a survey is needed, the results of the survey will determine whether Cache County or its contractor needs to restrict construction times to avoid disrupting any bald eagles that might be roosting along the Logan River (page 5-116 of the Final EIS).
- ***Cultural and Tribal Resources.*** In the event of an unanticipated discovery of archaeological materials during construction, work will cease and Cache County or its contractor will contact the NRCS Cultural Resources Specialist (CRS). NRCS will investigate the discovery and would enter into consultation per 36 Code of Federal Regulations (CFR) 800.6 to develop the appropriate methods for treating the discovery. Construction in the area of the discovery might need to be halted throughout this review and consultation process. After a discovery, continuation of work would be contingent on approval by the NRCS CRS in consultation with the Utah State Historic Preservation Officer and other consulting parties (page 5-116 of the Final EIS).
- ***Water Resources.*** The construction contractor will protect the wetland along 1500 North by excluding all equipment from the area, not storing materials in the area, and ensuring that construction workers know to avoid the area. The contractor will fully fence the area so that workers understand the limits of the wetland. Areas that provide wetland hydrology outside of the delineated wetland will also be protected from excavation or other ground-disturbing activities. Cache County and its contractor will ensure that the area identified for protection is large enough to protect the wetland feature and maintain the wetland's hydrology in compliance with CWA Section 404. The boundaries of the wetland area will be shown on construction plans (page 5-124 of the Final EIS).

- **Water Resources.** The construction plans will identify the location of the 700 North well head. The construction contractor will ensure that the well head is protected from disturbance during construction (page 5-124 of the Final EIS).
- **Water Resources.** Cache County and its contractor will work with the Logan, Hyde Park and Smithfield Canal Company to develop an irrigation-water-delivery plan for the LHPS Canal if construction occurs during the irrigation season. Cache County will also work with the Logan & Northern Irrigation Company and the Utah Department of Transportation (UDOT) to develop a delivery plan for the short reach of the LN Canal (between the LN Canal POD and the Laub Diversion) if construction occurs during the irrigation season. The plan will attempt to identify expected construction schedules and expected service interruptions (page 5-124 of the Final EIS).
- **Water Resources.** Cache County and its contractor will work with the canal companies and municipalities to develop a temporary stormwater-conveyance plan for the canals during construction. The plan will attempt to identify expected construction schedules, expected impacts to stormwater conveyance systems, and potential temporary bypass measures (page 5-125 of the Final EIS).
- **Noise.** Before starting construction, Cache County and its contractor will develop a work plan that identifies hours and days of work and limitations in areas close to highly sensitive noise receptors at specific times, if warranted. The plan will identify the highly sensitive noise receptors, which will include but might not be limited to public recreation areas, churches, and residential areas that are very close to the construction areas. Cache County or its contractor will communicate its construction schedule with people at sensitive receptors and will work with potentially affected parties to identify appropriate work time restrictions (page 5-127 of the Final EIS).
- **Noise.** The construction contractor will apply BMPs that will reduce construction-related noise impacts. These measures might include restrictions on equipment idling and restrictions on types of equipment in noise-sensitive areas (page 5-126 of the Final EIS).
- **Air Quality.** Before starting construction, Cache County and its contractor will develop an air-quality-management plan that identifies dust-control measures for equipment use along the construction corridor, appropriate staging locations and measures to reduce dust at those locations, and potential restrictions (such as idling restrictions and limitations on the types of equipment that could be used) during times when the State determines that the air quality is unhealthy. Cache County or its contractor will communicate its construction schedule with people living, working, and recreating near the construction area so that all potentially affected people are aware that construction activity could temporarily reduce local air quality (page 5-127 of the Final EIS).

Additionally, NRCS will complete mitigation in support of compliance with Section 106 of the National Historic Preservation Act. Detailed mitigation requirements for effects to resources that are eligible for listing on the National Register of Historic Places is currently in development as part of a Memorandum of Agreement between NRCS and the Utah State Historic Preservation Officer.

This Record of Decision adopts all of the mitigation measures proposed in the Final EIS.

3.1.2 Unavoidable Project Effects

The Final EIS identifies impacts that are unavoidable but are still not considered to be significant. Some of the mitigation measures identified above will lessen some of these unavoidable effects. The unavoidable impacts of the selected alternative include the following:

- Convert 2.6 acres of undeveloped land to permanent canal easement; permanent change from residential to development-restricted nonresidential use on 14 parcels in Logan.
- Relocate residents living in structures on 14 properties along the north side of Canyon Road between about 750 East and 1100 East in Logan.
- Change in how the LHPS Canal integrates with the Logan Golf & Country Club.
- Change in the appearance of the canal would affect people's perception of the scenic quality of their properties and their perception of quality of life.
- Permanently change an open section of the LHPS Canal that has historically been used for tubing between the LHPS Canal POD and the Logan Golf & Country Club by enclosing the canal in a box culvert.
- Removing residential structures from along the north side of Canyon Road between about 750 East and 1100 East in Logan would change the way the area looks from adjacent properties.
- Permanent loss of 0.3 acre of farmland.
- Permanent loss of vegetation where the POD structure is enlarged and along canals where vegetation clearing is required to construct the improvements.
- Loss of use of open canal by locally common wildlife.
- Adverse effects to cultural resources that are potentially eligible for listing on the National Register of Historic Places (NRHP). These resources include the LN Canal, LHPS Canal, and a residential structure along Canyon Road. Potential impacts could be mitigated through data recovery efforts or other mitigation specified in a Memorandum of Agreement, but the effect would still be adverse, since the resources would be modified or removed.

- Because the LHPS Canal crosses the East Cache fault zone, the canal will continue to be at risk of damage from a surface fault rupture caused by a large earthquake. This impact, while unlikely, is unavoidable.
- The Logan Bluff is unstable due to soil properties, topography, and drainage. Based on the long history of landslides in this area and the characteristics of the bluff, future landslides are likely. These landslides could cause property damage or result in injury or death.
- Water not lost to seepage would not recharge local groundwater. The amounts not lost to seepage would be about 7,400 acre-feet.

4.0 Other Alternatives Considered in the EIS

4.1 Initial Alternatives

NRCS identified a range of initial alternatives that would meet the need for and purposes of the proposed action. These action alternatives were:

- Purple Alternative (the selected alternative): LHPS Canal POD, LHPS Canal to 1500 North, west to LN Canal at 1500 North
- Orange Alternative: LHPS Canal POD, LHPS Canal to 2900 North or 3100 North, west to LN Canal at 2900 North or 3100 North
- Green Alternative: LHPS Canal POD, LHPS Canal to US 89 at canyon mouth, US 89 to LN Canal
- Yellow Alternative: LN Canal POD, LN Canal to Canyon Road, Canyon Road to LN Canal at about 400 North
- Blue Alternative: LN Canal POD, existing LN Canal alignment to 400 North

4.2 Alternatives Evaluated in the EIS

After a multi-step alternatives development and screening process, NRCS eliminated the Green and Yellow Alternatives from detailed analysis. The following sections summarize the No-Action Alternative and the Orange and Blue Alternatives. The selected alternative is described in Section 3.0, Description of the Selected Alternative.

Under the No-Action Alternative, the LN Canal irrigation water delivery system would not be temporarily or permanently modified or reconstructed, and the LN Canal irrigation water would not be delivered to users downstream of the Laub Diversion (a diversion structure along Canyon Road at about 1100 East in Logan) using the LN Canal.

4.2.1 No-Action Alternative

The No-Action Alternative would not result in any physical changes to the LN Canal, LN Canal POD, LHPS Canal, or LHPS Canal POD. Under the No-Action Alternative, NRCS would not distribute funding to Cache County to repair the LN Canal system. The No-Action Alternative would not address the existing landslide area along Canyon Road in Logan.

Because the future, long-term use of the temporary system used in 2009 and 2010 is not likely, the No-Action Alternative assumes that the temporary system would not be used to deliver LN Canal shares in the future.

Under the No-Action Alternative, LN Canal shareholders between the existing LN Canal POD and the Laub Diversion would continue to receive water using the existing LN Canal. No more than 2 cfs would be diverted from the POD and conveyed in the canal to the Laub Diversion. At the Laub Diversion, unused irrigation water would be routed back to the Logan River. Shareholders downstream of the Laub Diversion would not receive water through the LN Canal. The reach of the LN Canal downstream of the Laub Diversion would be abandoned in place by the Logan & Northern Irrigation Company. Intact sections of the canal could still be used to collect and convey stormwater and water from other sources along the canal (such as water from seeps and springs).

Under this alternative, it is likely that the long-term maintenance and management of the canal sections that are intact would become the responsibility of parties who continue to use the canal for conveying stormwater (that is, the Cities of Logan and North Logan, USU, UDOT, and/or Cache County).

Because estimating how the irrigation practices of affected shareholders might change under a No-Action Alternative is speculative, the EIS assumes that LN Canal shareholders downstream of the Laub Diversion would not irrigate any of the land irrigated using LN Canal water before the 2009 landslide. This would affect the amount of land in agricultural production and how municipalities that rely on LN Canal shares would operate their irrigation systems and, possibly, other municipal systems that rely on canal water exchanges.

If the No-Action Alternative were implemented, Cache County and the Logan & Northern Irrigation Company could seek funding from other sources in order to restore safe water delivery to LN Canal shareholders. However, because identifying other sources of funding and the amounts of funding that Cache County and irrigation company might be able to secure is speculative, the EIS assumes that adequate funding to restore safe delivery of irrigation water would not be available under the No-Action Alternative.

4.2.2 Orange Alternative

4.2.2.1 Elements of the Orange Alternative

The Orange Alternative would re-establish delivery of LN Canal water in the following manner:

- Move the POD for the some of the LN Canal water upstream to the LHPS Canal POD structure on the Logan River below Second Dam (same as proposed for the selected alternative).
- Reconstruct the LHPS Canal POD to accommodate an increase in the amount of water that could be diverted, which would allow water to be diverted for LN Canal shareholders and LHPS Canal shareholders (same as proposed for the selected alternative).
- Reconstruct the LHPS Canal as a box culvert between the POD and either 2900 North (2900 North option) or 3100 North (3100 North option) in North Logan.
- Divert the LN Canal shares from the box culvert at 2900 North/3100 North into a pipeline that travels under undeveloped land and/or city streets and discharges to the existing LN Canal at 2900 North/3100 North. The box culvert would end at either 2900 North or 3100 North, and LHPS Canal shares would continue to flow in the existing LHPS Canal to its shareholders downstream.
- At the new 2900 North/3100 North discharge point on the LN Canal, send some water to upstream users in a pressure pipe that is installed in the existing canal maintenance road. The remaining water would be discharged into the existing LN Canal for delivery to downstream users.
- For LN Canal shareholders between the POD and the Laub Diversion, construct a 10-inch-diameter pipeline in the existing canal.

Like the selected alternative, the Orange Alternative would include removing structures from 14 properties along Canyon Road in Logan at the toe of the historically unstable part of the Logan Bluff.

4.2.2.2 Structural Features of the Orange Alternative

The structural features of the Orange Alternative include the following:

- Modified LHPS Canal POD structure on the Logan River just below Second Dam, as described for the selected alternative.
- About 1.6 miles of new 6-foot-wide by 6-foot-deep box culvert, as described for the selected alternative. With this alternative, the 12-foot-wide by 5-foot-deep box culvert described for the selected alternative would extend for about 3.3 miles from

the golf course to 2900 North or about 3.6 miles from the golf course to 3100 North in the LHPS Canal alignment.

- A new stormwater channel for about 3.3 miles to 2900 North or 3.6 miles to 3100 North in the LHPS Canal alignment to convey stormwater.
- Modify Cedar Heights Drive, 1770 East, 1800 East, and Cottonwood Lane where these streets cross the LHPS Canal to accommodate the new box culvert. Also modify several private driveways and pedestrian crossings that cross the LHPS Canal and LN Canal.
- Restore vegetation and landscaping that is removed during project construction from private property outside the canal easement along the LHPS Canal.
- A water-control structure at either 2900 North or 3100 North to transition water from the box culvert to the existing open channel. The new structure would allow stormwater to combine with irrigation water.
- A new headgate structure at either 2900 North or 3100 North to allow LN Canal water to be diverted into a new pressurized pipeline system running west to the LN Canal.
- About 0.5 mile to 0.6 mile of new 36-inch-diameter pressure pipe to convey 30 cfs from the LHPS Canal and the LN Canal along 2900 North or 3100 North, respectively. The new pipeline would require air vents and a flow meter.
- A new water-control structure at the LN Canal to discharge water from the pipe system to the LN Canal system. The structure would include pressure-reducing valves, flow control, and energy-dissipation measures. Water would be divided at the structure into the existing LN Canal flow to serve shareholders to the north (downstream of 2900 North or 3100 North) and into a pressurized pipeline system traveling to the south (upstream of about 2900 North or 3100 North).
- About 2.1 miles of 26-inch-diameter pressure pipe from 2900 North to 1500 North, or 2.5 miles from 3100 North to 1500 North, to convey 15 cfs of irrigation water to upstream shareholders. This pipeline would be installed in the existing canal maintenance road.
- As described for the selected alternative, about 1 mile of 10-inch-diameter pressure pipe to deliver water to shareholders between 1500 North and 400 North.
- As described for the selected alternative, a new water-control structure to discharge water into the existing LN Canal at 400 North.
- As described for the selected alternative, about 1 mile of 10-inch-diameter pipe to deliver water to shareholders between the LN Canal POD and the Laub Diversion.

4.2.3 Blue Alternative

NRCS chose to evaluate the Blue Alternative as a result of public comments received during scoping. The Blue Alternative would re-establish delivery of LN Canal water in the following manner:

- Use the existing LN Canal POD just below First Dam.
- Reconstruct the LN Canal POD to accommodate a closed conduit instead of an open canal.
- Reconstruct the LN Canal as a pipeline between the POD and about 400 North in Logan.
- Discharge LN Canal water into the LN Canal at 400 North for delivery to downstream users.
- For LN Canal shareholders between the POD and the Laub Diversion, construct a 10-inch-diameter pipeline in the existing canal.

Like the selected alternative, the Blue Alternative would include removing structures from 14 properties along Canyon Road in Logan at the toe of the historically unstable part of the Logan Bluff. The EWPP guidelines allow NRCS to purchase structures using EWPP funds from willing sellers only. However, because the Blue Alternative would require most of the area that abuts the LN Canal along the north side of Canyon Road between about 750 East and 1100 East to support structural controls, all structures would need to be removed from this area. If sellers are not willing, the structures would need to be condemned in order for the alternative to be constructed.

The Blue Alternative is the only alternative that would restore LN Canal water delivery solely using the existing LN Canal alignment. Because the Logan Bluff area remains unstable, this alternative includes special structural measures intended to address the continued risks to life and property in and near this area. The Blue Alternative would not eliminate these future risks but proposes structural features, management controls, and structural controls that would address some of the risk.

For the purpose of this alternative, NRCS defined two zones along the Logan Bluff to help determine specific management and structural controls. These zones, called Zone 1 and Zone 2, are based on topography, landslide history, geology or soil characteristics, and available documentation. The Blue Alternative focuses on potential management and structural controls in the two zones that would provide engineered structures to ensure that the public would be generally protected against a pipeline failure due to a future landslide. Zone 2 is the historic landslide area within which structures would be purchased under the selected alternative.

The general structural features and management and structural controls of the Blue Alternative are described in the following sections.

4.2.3.1 General Structural Features of the Blue Alternative

The structural features of the Blue Alternative would include the following:

- Demolish the existing LN Canal conveyance structure between the LN Canal POD and 400 North.
- Modified LN Canal POD structure on the Logan River just below First Dam to accommodate a design flow of up to 80 cfs and a new flow-control gate.
- About 1.7 miles of 60-inch-diameter to 72-inch-diameter steel pipe in the existing LN Canal alignment to convey irrigation water (using gravity flow) from the LN Canal POD to 400 North/600 East.
- About 1.6 miles of a new 4-foot-wide lined drainage channel to convey stormwater and other water (such as water from seeps and springs) from the hillside upslope of the new pipeline. This channel would convey water parallel to the pipeline alignment and would eventually discharge into the existing irrigation canal at 400 North/600 East.
- A top-of-slope runoff-control network consisting of a berm or other system at the top of the bluff to prevent stormwater runoff from traveling down the hillside. This berm would be about 2 feet high, would be protected from erosion, and would be about 5,000 linear feet long.
- A new water-control structure at about 400 North/600 East to discharge water from the irrigation pipe system and drainage channel to the existing LN Canal. The structure would include flow-control measures and energy-dissipation measures.
- As described for the selected alternative, about 1 mile of a 10-inch-diameter pipe to deliver water to shareholders between the LN Canal POD and the Laub Diversion.

4.2.3.2 Management Controls of the Blue Alternative

Management controls in Zones 1 and 2 would include the following:

- A flow-detection system that would monitor flows along the length of the pipeline. In case of a drop in flow rate, this system could broadcast an alarm or otherwise alert the canal operators and local public safety agencies. The flow-detection system could be coordinated to activate a shutoff gate at the POD.
- A canal management plan as required by the Water Conveyance Facilities Safety Act. This plan would identify the cities and counties that the canal passes through, would identify the canal components (such as PODs, bridges, and stormwater entry points), and would include a maintenance and improvement plan, information about insurance coverage, a slope stability assessment, a stormwater assessment, and an emergency response plan. The emergency response plan would explain how public safety and emergency response agencies would be notified in the event of an emergency, their respective roles in the event of an emergency, how the public would

be protected in the event of an emergency, and how the canal would be repaired following an emergency. The Utah Division of Water Resources and NRCS funding would also require long-term operation and maintenance plans and service agreements.

- A public outreach and information plan to inform the general public and the adjacent landowners about the presence of the pipeline, instructions on whom to contact and what to do in case of an emergency associated with a future landslide, and how such a landslide might affect the pipeline.
- A visual assessment plan that would identify appropriate intervals for visual inspections of the pipeline and pipeline corridor for evidence of landslides or other problems.
- Benchmarks such as survey monuments installed along the pipeline and along the hillside above and below the pipeline and annual monitoring of these benchmarks to identify land movements. Cache County would be responsible for the recordkeeping associated with annual monitoring.
- Public warning signs along the alignment with emergency phone numbers.

4.2.3.3 Structural Controls of the Blue Alternative

The Blue Alternative would also require structural controls in Zones 1 and 2 to protect the pipeline against future landslides. These structural controls would include the following:

- About seventy-five 36-inch-diameter drilled shaft foundations placed about every 20 feet. These shaft foundations would be drilled to a depth of about 75 feet to support 1.4 miles of pipe (Zone 1 exclusive of Zone 2). These foundations would protect the pipeline against landslide movement since they would extend through the sliding mass and into stable, undisturbed material. These foundations would include tie-backs, which are steel bars drilled horizontally about 100 feet into the slope. These tie-backs would provide added lateral stability.
- About 90 subsurface sub-horizontal drains placed about every 50 feet. These drains would be drilled horizontally into the uphill slope to collect and control groundwater that is trapped, or perched, on top of an underlying impervious layer. The drains, which would increase the stability of the structural controls in Zones 1 and 2, would extend far enough to reach the point where gravels contact the underlying finer-grained sands and would convey groundwater to the drainage channel. An array of five or six horizontal drains would be installed about 50 feet into the bluff in a fan pattern at each of the 90 primary drain locations.
- Assuming that residential structures on the 14 properties would be acquired or condemned, a soil buttress below the pipeline would be constructed for about 0.6 mile in Zone 2. This buttress, which would be a large mass of soil, would retain the slope and reduce the risk of slope failure below the pipeline. The buttress would

consist of about 130,000 cubic yards of granular fill (gravels) placed about 40 feet from the toe of the existing hillside and sloping upward at a ratio 1.5 to 1 (horizontal to vertical).

4.3 Environmentally Preferable Alternative

NEPA Section 1505.2(b) requires that, in cases where an EIS has been prepared, the Record of Decision identify “alternatives which were considered to be environmentally preferable.” The environmentally preferable alternative is the alternative that causes the least damage to the biological and physical environment; it also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources.

The Final EIS states that the Blue Alternative is the *action* alternative that would be the environmentally preferable alternative. However, the No-Action Alternative is environmentally preferable to the Blue Alternative. The No-Action Alternative would adversely affect the economy of the study area because of lost agricultural production and could result in regional land-use changes if farmland is converted to other uses. However, when compared to the action alternatives, the No-Action Alternative would not cause significant damage to the biological and physical environment, and it would not affect any historic, cultural, or natural resources. Because of this, the No-Action Alternative is, *overall*, the environmentally preferable alternative.

NRCS did not select the No-Action Alternative because it would not meet the basic project need and purposes. See Section 5.0 below for detailed information regarding NRCS’s decision to select the Purple Alternative over the Blue Alternative, which is the environmentally preferable *action* alternative.

5.0 Explanation of the Decision

5.1 Selected Alternative

In identifying the preferred alternative, NRCS carefully considered the requirements and intent of the EWPP and the expected beneficial and adverse environmental consequences of each action alternative and a no-action alternative. NRCS’s decision to identify the Purple Alternative as the selected alternative is based on the following considerations:

- The Purple Alternative best fits the EWPP objective to relieve imminent hazards to life and property while still providing for delivery of LN Canal shares in a manner that is economical. Though the Blue Alternative includes measures to minimize some risk associated with the instability of the Logan Bluff, the Purple Alternative also includes removing structures and could be accomplished using construction techniques that are less damaging compared to some of the construction details (such as horizontal drains, drilled pile foundations, and the soil buttress) associated with the Blue Alternative. The Orange Alternative would require the same types of

construction techniques as the Purple Alternative, but NRCS believes that the Purple Alternative is more beneficial than adverse in the extent and intensity of its environmental and economic effects than the Orange Alternative.

- The Blue Alternative includes measures to stabilize the new pipeline. However, completely protecting the Logan Bluff area from landslide-related hazards is not reasonable given the funding and program limitations of the EWPP. The area along the Blue Alternative alignment would remain susceptible to damage from landslides, and the effects of flooding from a ruptured pipeline cannot be completely eliminated. Because flooding increases the area susceptible to damage, NRCS believes that an alternative that eliminates a large irrigation conveyance system from the area is required.
- The Purple Alternative would conserve about 7,500 acre-feet of water per year by repairing leaks in the Logan Canyon section of the LHPS Canal, a segment that currently loses a substantial percentage of water that is diverted from the Logan River. This amount is more than the Blue Alternative but less than that conserved by the Orange Alternative (the Orange Alternative would enclose a longer section of open canal and thus further reduce losses associated with evaporation and leakage). However, allowing some water to continue to percolate into the groundwater can have a beneficial effect on groundwater recharge. NRCS feels that the Purple Alternative best balances the water conservation and groundwater recharge benefits.
- The Purple Alternative would have about 2.6 acres of permanent impact to land along the project corridor and would require fewer permanent and temporary construction easements than the Orange Alternative.
- The Orange and Blue Alternatives could affect Federal Emergency Management Agency (FEMA)-regulated floodplains. The Purple Alternative is the only alternative that would not cross any FEMA-regulated floodplains.
- The Purple Alternative would have fewer temporary and permanent impacts to public roads than the Orange Alternative and fewer temporary (construction) impacts to utilities than the Orange and Blue Alternatives.
- The Purple Alternative would disturb less vegetation along the LHPS Canal than the Orange Alternative. Also, because the Purple Alternative would allow more of the LHPS Canal to remain open than the Orange Alternative, it would continue to provide wildlife and aesthetic benefits along the LHPS Canal north of Lundstrom Park/1500 North.
- The Purple Alternative is the least-expensive alternative and, considering all adverse impacts and benefits, is the most efficient in achieving the desired outcome of restoring the water delivery capability of the LN Canal.

5.2 Factors Considered in the Decision

5.2.1 EWPP Regulations and Guidance

The EWPP regulations (7 CFR 624) and manual (EWPP Manual, Title 390, Part 511) identify specific requirements for program funding. These requirements include but are not limited to the following:

- Sponsors must contribute their share of the project costs. The NRCS contribution cannot exceed 75% of the project cost (7 CFR 624.7[b]).
 - The selected alternative was the least-costly action alternative studied. Selecting this alternative ensures that NRCS can contribute a level of funding that is within its budget and that is commensurate with initial funding projections.
- NRCS can provide assistance only for measures that provide protection from additional flooding or soil erosion; that reduce threats to life or property from a watershed impairment, including sediment and debris removal; that restore the hydraulic capacity to the maximum extent practical; and are economically and environmentally defensible and technically sound (7 CFR 624.6[c]).
 - The selected alternative will lessen the future risks of flooding and soil erosion along the Logan Bluff because it will not carry water across a historically unstable area. The Orange Alternative would have accomplished this as well but would have been less economical than the selected alternative.
 - The selected alternative will reduce threats to life and property that are related to transporting irrigation water in an irrigation canal across the Logan Bluff.
 - The LHPS Canal modifications that are part of the selected alternative will restore delivery of LN Canal water as well as LHPS Canal water in a safe manner.
 - The selected alternative is the most economical action alternative studied. The selected alternative will not cause any significant environmental effects and is environmentally sound. Preliminary design for the selected alternative described in the Final EIS is technically simple and will not require specialized or overly complex construction techniques.
- EWPP funds cannot be used to solve watershed or natural problems that existed prior to the natural disaster (Title 390, Part 511.4[v]).
 - The selected alternative solves the problem of interrupted delivery of LN Canal irrigation water. The selected alternative does not include modifications to the Logan Bluff to correct instability that existed prior to the emergency.
- EWPP funds can be used for structural, enduring, long-life conservation practices including, but not limited to, grassed waterways, terraces, embankment ponds,

diversions, and water-conservation systems except where the recovery practices are eligible for assistance under the Emergency Conservation Program administered by the Farm Service Agency (7 CFR 624.6[b][3]).

- The selected alternative will result in a secondary benefit of water conservation, but water conservation is not the focus of the project. The selected alternative will enable the continuation of conservation practices that previously relied on the delivery of LN Canal water but that have been interrupted since the original emergency.
- When planning the recovery practices, NRCS will emphasize measures that are the most economical and are to be accomplished using the least damaging practical construction techniques and equipment that retain as much of the existing characteristics of the landscape and habitat as possible (7 CFR 624.6[e]).
 - The selected alternative is the most economical action alternative studied. The selected alternative can be constructed using simple construction techniques and will concentrate construction in areas that previously contained canals (LHPS Canal easement and LN Canal easement) or that have been previously disturbed (road right-of-way).
- NRCS may determine that a measure is not eligible for assistance for any reason, including economic and environmental factors or technical feasibility (7 CFR 624.6[f]).
 - NRCS has determined that the selected alternative as proposed in the Final EIS (including associated mitigation measures) is economically, environmentally, and technically feasible given the amount of EWPP funding available.

5.2.2 Other Federal Regulations and Guidance

NRCS also based its decision on Federal regulations and guidance that could apply to the project. The regulations and guidance considered in detail include the following:

- ***Section 404 of the Clean Water Act.*** Any of the action alternatives would have affected the LN Canal and/or LHPS Canal, both of which are non-wetland waters of the U.S. Discharging fill to the canals would need to comply with the provisions of Section 404 of the Clean Water Act. NRCS expects that any of the action alternatives could be authorized under CWA Section 404 Nationwide Permit 37, Emergency Watershed Protection and Rehabilitation.
- ***National Forest Management Plan Standards and Guidelines.*** Two of the action alternatives (the selected alternative and the Orange Alternative) would have been partially located on land subject to the standards and guidelines of the *Revised Forest Plan for the Wasatch-Cache National Forest*. NRCS worked with USFS, which oversees implementation of the Forest Plan, as it conducted the environmental analyses documented in the EIS. The preferred alternative as proposed (including

mitigation measures) can be implemented in compliance with the Forest Plan standards and guidelines.

- ***National Historic Preservation Act (NHPA)***. Any of the action alternatives would have affected resources regulated under the NHPA. Any of the alternatives would affect the canal structures, which are probably eligible for listing on the National Register of Historic Places. All of the action alternatives would also affect a potentially eligible historic structure (residential house) along Canyon Road.
- ***Wetlands (Executive Order 11990)***. The selected alternative would not permanently affect any wetlands. The construction contractor can and will avoid any temporary (construction-related) wetland effects to one wetland feature along 1500 North.
- ***Floodplains (Executive Order 11988)***. The selected alternative would not cross any mapped FEMA floodplains.
- ***Environmental Justice (Executive Order 12898)***. The selected alternative would not cause any disproportionate adverse human health or environmental effects to environmental justice populations.
- ***Tribal Consultation and Coordination (Executive Order 13175)***. NRCS sought input from tribal representatives during the EIS process. Tribal representatives did not respond to coordination letters. The selected alternative would not affect any known tribal resources.

6.0 Recommendation

As the State Conservationist for the NRCS, I am the responsible Federal Official for all NRCS projects in Utah.

I conclude that:

1. The proposed Logan Northern Canal Reconstruction project uses all practicable means, consistent with other essential considerations of national policy, to meet the goals established in NEPA.
2. The project will serve the overall public interest.
3. The Final EIS has been prepared, reviewed, and accepted in accordance with the provisions of NEPA as implemented by the department's guidelines for the preparation of environmental impact statements.
4. The project meets the needs of the local sponsor.

I propose to implement the selected alternative as the Logan Northern Canal Reconstruction project.

By:



BRONSON SMART
Acting State Conservationist
Natural Resources Conservation Service
United States Department of Agriculture

Date: 10/3/11