Floodplain Assessment

Pajarito Tank 4A 18-Inch Transmission Water Main Repair

Two Mile Canyon, Los Alamos National Laboratory
Los Alamos County, New Mexico

July 2026

Prepared for	Submitted to	Prepared by
Los Alamos County Department of Public Utilities	U.S. Department of Energy National Nuclear Security Administration Los Alamos Field Office	Los Alamos County Department of Public Utilities with hydraulic analysis by Wilson & Company

Table of Contents

Acronyms

Acronym	Definition	Acronym	Definition
CGP	Construction General Permit	LAC	Los Alamos County
CMP	Corrugated metal pipe	LANL	Los Alamos National Laboratory
CCP	Concrete cylinder pipe	NEPA	National Environmental Policy Act
DIP	Ductile iron pipe	NNSA	National Nuclear Security Administration
DOE	U.S. Department of Energy	NOI	Notice of Intent
EPC-CP	Environmental Protection and Compliance - Compliance Programs	PRID/PAR	Project Review Information Database / Project Activity Review
EXID	Excavation/Fill/Soil Disturbance permit	SWPPP	Stormwater Pollution Prevention Plan
HEC-HMS	Hydrologic Engineering Center - Hydrologic Modeling System	USACE	U.S. Army Corps of Engineers
HEC-RAS	Hydrologic Engineering Center - River Analysis System	WOTUS	Waters of the United States

1.0 INTRODUCTION

The Incorporated County of Los Alamos, Department of Public Utilities (LAC DPU), proposes to repair a failed 18-inch transmission water main serving Pajarito Tank 4A on U.S. Department of Energy (DOE)/National Nuclear Security Administration (NNSA) property at Los Alamos National Laboratory (LANL). The failed segment lies at the bottom of Two Mile Canyon, west of Mercury Road, within the canyon-bottom drainage corridor identified by LANL as a floodplain. The proposed action includes temporary access-road rehabilitation, staging and work areas, replacement of approximately 100 linear feet of existing 18-inch concrete cylinder pipe with 18-inch ductile iron pipe, associated fittings and a 6-inch drain assembly, new concrete encasement, backfill, testing, monitoring, and final restoration.

This assessment was prepared to support DOE/NNSA review under Title 10 Code of Federal Regulations (CFR) Part 1022, Compliance with Floodplain and Wetland Environmental Review Requirements. Section 1022.13 requires a clear project description and location map, an evaluation of direct and indirect short- and long-term effects on the floodplain, lives, and property, and consideration of alternatives and measures that reduce impacts. The project-specific 100-year floodplain is used as the main evaluation area, and the modeled 500-year flood boundary is also shown to illustrate a less likely, more extreme storm.

Purpose and Need

A leak was identified in December 2025 after a measurable decline in Tank 4A water levels. Service was transferred to the existing 12-inch backup line, which is operational but is not intended to carry normal long-term demand. Restoring the 18-inch main is necessary to reestablish system redundancy, normal conveyance capacity, and long-term operational reliability. Continued reliance on the backup line would increase the consequences of another outage and could force a less controlled emergency repair in the canyon (LAC DPU 2026a).

1.1 PROJECT LOCATION

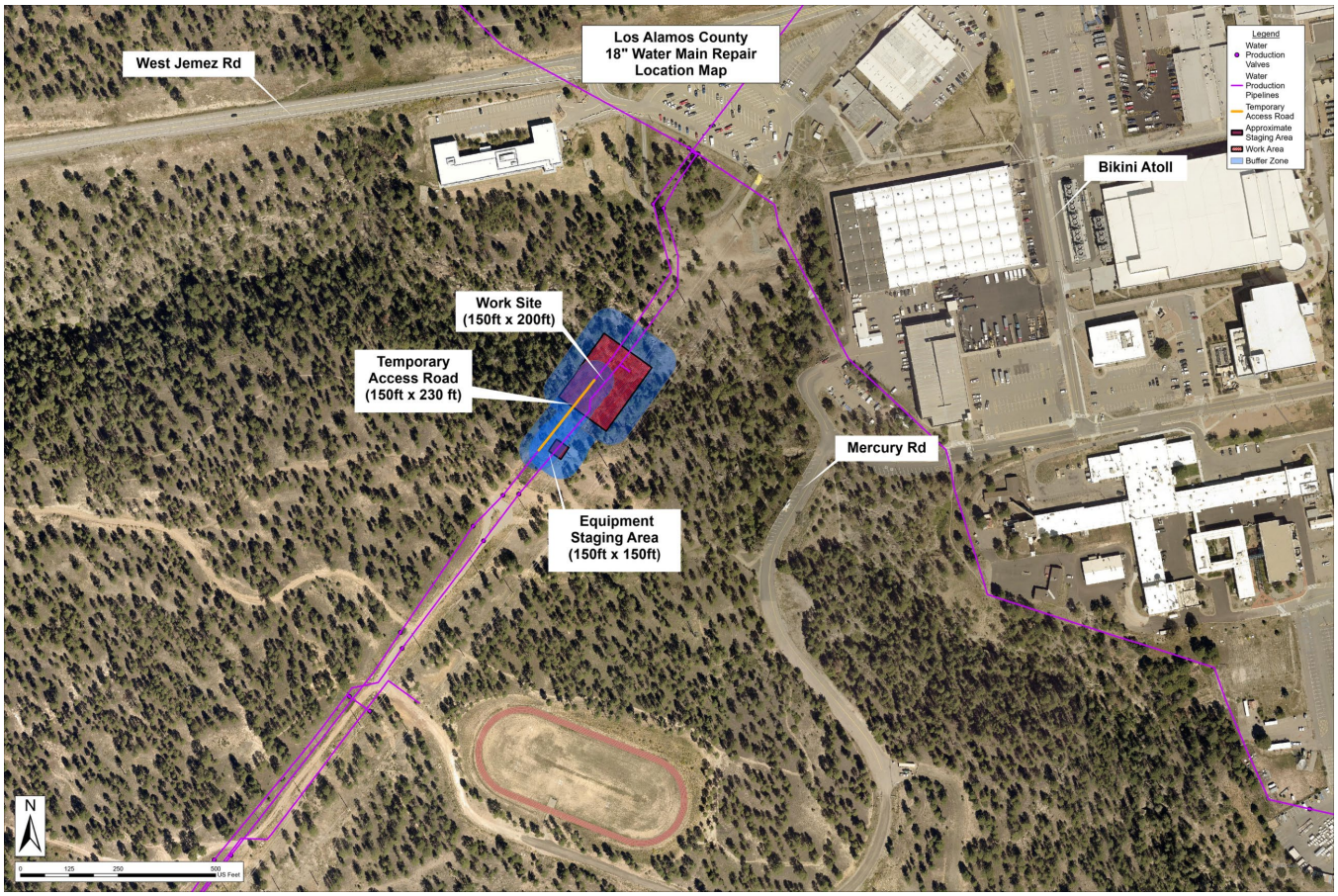

Figure 1. Proposed work site, equipment staging area, temporary access road and buffer zone, and existing water-system alignment (LAC DPU 2026c).

Figure 1 shows the 22,500-square-foot equipment staging area, 30,000-square-foot work site, and a 150-foot-wide by 230-foot-long access-road buffer. The road itself will be about 20 feet wide within the buffer, which allows minor field positioning while keeping the route inside the mapped project area and easement. The full buffer will not be cleared or graded; disturbance will be limited to the road and areas needed for construction and restoration (LAC DPU 2026c).

The new waterline will remain within the existing 60-foot-wide Waterline Easement No. 2. The temporary access road will also remain within the easement and will stay in place for one year to support inspection of the repaired pipe and maintenance of the road and drainage controls. After monitoring, the premises will be restored to a condition reasonably satisfactory to DOE/NNSA (DOE/NNSA 2026).

2.0 BACKGROUND AND EXISTING CONDITIONS

The failed pipe is located at the bottom of an approximately 85-foot-deep canyon. Steep forested slopes, exposed rock, limited working room, and the absence of an active maintained road constrain access for excavation equipment, pipe, concrete, personnel, and emergency response. Construction staging is therefore proposed on the south canyon rim, with access to the repair area along an apparent former utility route (LAC DPU 2026a, 2026c).

Site and Drainage Setting

The project watershed is approximately 0.395 square mile, or about 253 acres. Land cover is predominantly forest and shrub/scrub, with smaller developed and disturbed areas associated with LANL facilities. Runoff follows natural topographic lows and the canyon corridor toward the downstream Mercury Road crossing, where an existing circular pipe approximately 6 feet in diameter and 300 feet long provides the principal modeled conveyance control (Wilson & Company 2026).

Site photographs taken May 27, 2026, show a narrow, discontinuous former travel route with exposed earth and rock, shallow ruts, fallen logs, and localized erosion. The route is bordered by live trees and shrubs, but portions of the apparent travel surface contain comparatively little live vegetation. No standing or flowing surface water was visible during the site visit. The photographs document a dry condition on one date and do not establish the absence of flood hazard during storm events.

Floodplain and Hydraulic Information

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map reviewed by Wilson & Company does not show a mapped FEMA Special Flood Hazard Area at the project location. Because a FEMA floodplain is not mapped at the site, Wilson developed project-specific rainfall-runoff and two-dimensional flow models for the 10-, 100-, and 500-year storms. The resulting flood boundaries are used for this project assessment and construction planning; they do not revise the FEMA map (Wilson & Company 2026).

Environmental Review Context

The biological and cultural resource reviews for the final project footprint were completed through PRID/PAR 26P-0007. The project will follow the LANL Biological Resources Management Plan and all project-specific direction provided by LANL, including any wildlife-noise or work-hour restrictions. Vegetation work is limited to moving or removing dead and fallen material that blocks the access route; live trees and shrubs will remain. Active bird nests will not be disturbed, and work will stop while LANL biologists are contacted if an active nest is found. LANL cultural resource staff completed a walkdown and assessment of the work area, marked the nearby archaeological site for avoidance, and approved the project footprint. All work will remain outside the marked 30-foot no-work buffer and will not affect the archaeological site. If an inadvertent cultural resource discovery is made, work will stop and LAC DPU will notify DOE/NNSA and LANL in accordance with the LANL Cultural Resources Management Plan. The project will also follow the approved stormwater, excavation, utility-protection, waste-management, and final-cleanup requirements. The final work and staging limits do not affect the Fitness Trail (LANL 2026a, 2026b).

2.1 SITE PHOTOGRAPHS - ACCESS ROUTE

Photograph 1. View southwest along a narrow portion of the apparent former access route. May 27, 2026.

Photograph 2. View east-northeast showing exposed rock and dead or fallen woody material across the route. May 27, 2026.

Photograph 3. View southeast along an existing earthen and rocky portion of the proposed access route. May 27, 2026.

Photograph 4. View southeast showing a large fallen tree and other dead woody material requiring removal for access. May 27, 2026.

Compass directions are based on image metadata and are approximate magnetic bearings. Photographs are included to document the existing route and vegetation condition before construction.

2.2 SITE PHOTOGRAPHS - CANYON TERRAIN

Photograph 5. View north-northwest across steep, forested terrain adjacent to the proposed route. May 27, 2026.

Photograph 6. View east across exposed rock, deadfall, and irregular ground near the canyon route. May 27, 2026.

Photograph 7. View east-northeast along a rough segment of the proposed access alignment. May 27, 2026.

Photograph 8. View north-northwest down the steep, rocky canyon slope toward the repair area. May 27, 2026.

Photograph 9. View upstream at the canyon-bottom repair area and approximate location of the failed 18-inch transmission main. Late February 2026.

Photograph 9 shows the constrained canyon-bottom work area and the approximate location of the failed transmission main.

2.3 HYDROLOGIC AND HYDRAULIC BASIS

Wilson & Company used two computer models to estimate how stormwater may move through Two Mile Canyon. The Hydrologic Engineering Center's Hydrologic Modeling System (HEC-HMS) estimates how much runoff is produced by a storm, while the Hydrologic Engineering Center's River Analysis System (HEC-RAS) shows where that water is likely to flow and spread across the ground. The models used the approximately 253-acre drainage area, local soils and vegetation, National Oceanic and Atmospheric Administration (NOAA) rainfall data, available topography, and the existing downstream crossing. The estimated travel time from the farthest part of the drainage area to the project area is about 23 minutes. This means crews may have limited warning when a strong storm develops, so weather monitoring and a clear evacuation plan are important (Wilson & Company 2026).

Table 1. Project-specific hydrologic results (Wilson & Company 2026).

Storm Event	Estimated Peak Flow	What It Means for This Project
10-year storm	11.1 cubic feet per second (cfs)	A storm with about a 10 percent chance of occurring in any year. This flow is used to size the temporary swale and 24-inch culvert used during construction and monitoring.
100-year storm	103.4 cfs	A storm with about a 1 percent chance of occurring in any year. This storm defines the floodplain evaluated for the project.
500-year storm	230.4 cfs	A much larger storm with about a 0.2 percent chance of occurring in any year. It is shown to illustrate a less likely, more extreme flood risk.

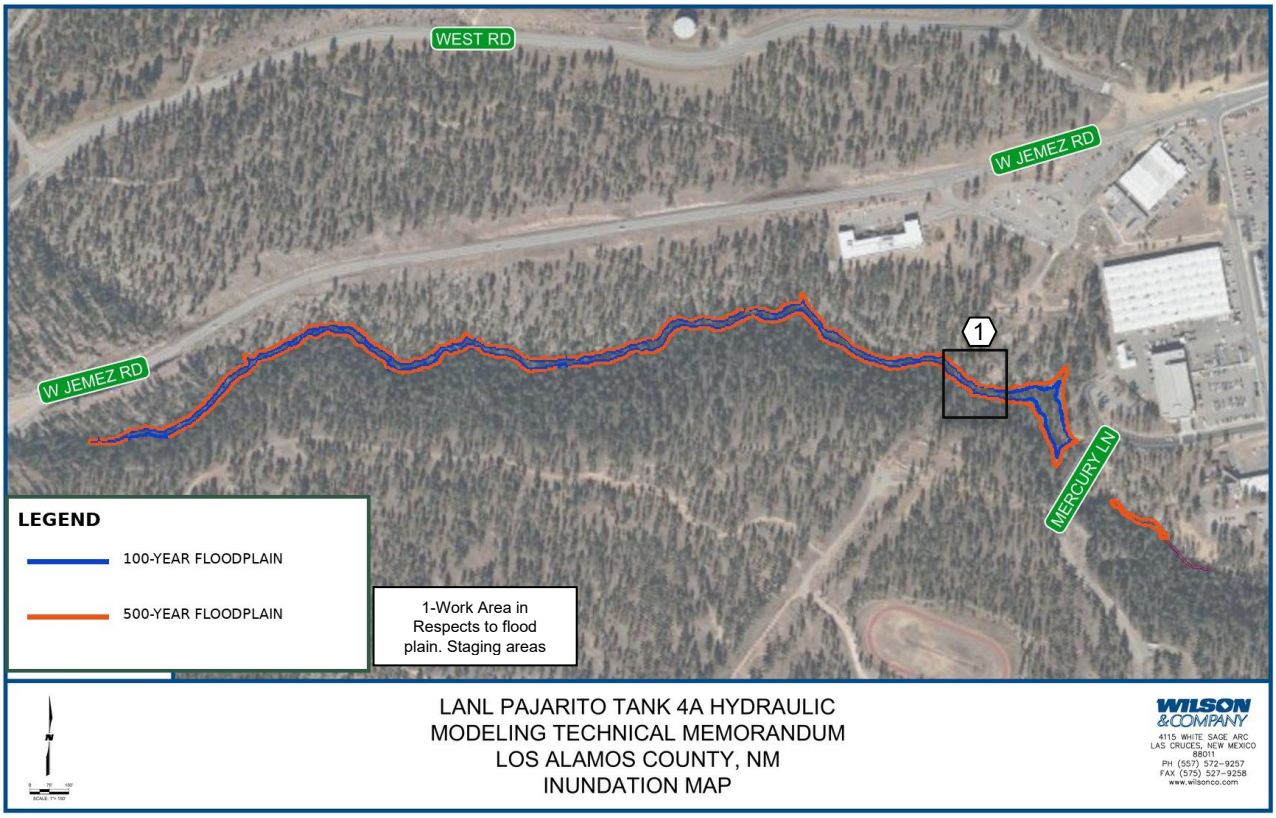

Figure 2. Project-specific 100-year and 500-year inundation limits (Wilson & Company 2026).

The available mapping demonstrates that the repair area and portions of the access route follow the modeled drainage corridor. A planning-level georeferenced overlay of the mapped work-site and temporary access-road footprints indicates that approximately 8,600 square feet (0.20 acre) lies within the modeled 100-year floodplain. The equipment staging area lies outside the modeled boundary.

3.0 PROJECT DESCRIPTION

The proposed action will remove and replace approximately 100 linear feet of failed 18-inch concrete cylinder pipe (CCP) with restrained 18-inch ductile iron pipe (DIP), associated fittings, and the 6-inch drain assembly. Existing concrete encasement and backfill will be removed only as needed to reach the failed pipe and make sound connections. The new DIP will be installed with approximately 4 feet of cover. New concrete encasement will be placed around the replacement pipe through the canyon bottom to prevent flowing water from undercutting the pipe and to help stabilize the arroyo bed. This new concrete is a protective structure around the replacement pipe and is separate from the existing concrete cylinder pipe itself. A fast-setting cement-based grout will seal small gaps at the connections to the existing pipe. The grout will be mixed and placed only where needed and kept out of the soil and drainage channel. After it hardens, it becomes part of the sealed pipe connection and is not expected to release material into the environment (LAC DPU 2026b).

Construction access will use the final mapped route shown on Figure 1: an approximately 20-foot-wide, 230-foot-long road within a 150-foot-wide buffer inside the existing easement. The full buffer will not be graded. The road will follow the apparent former utility path and will be smoothed with varying grading generally limited to approximately 3 inches. Existing earth will be used, and no imported aggregate will be placed. Only dead and fallen vegetation that blocks safe access will be moved or removed. Live trees and shrubs will remain, and the work will follow the LANL Biological Resources Management Plan and any additional project-specific direction provided by LANL. Stormwater controls are part of the proposed action. A Stormwater Pollution Prevention Plan (SWPPP) will be implemented for the work site, road, staging area, and other construction support areas. A temporary side swale and one 24-inch corrugated metal pipe (CMP) will carry the modeled 10-year storm flow past the active work area. The swale, culvert outlet, soil stockpiles, and other areas exposed to concentrated runoff will be protected with erosion-control measures such as matting, check structures, sediment controls, and temporary rock protection. Crews will monitor weather forecasts, keep the drainage path clear, and leave the canyon before heavy runoff reaches the work area.

Removed pipe, concrete, soil, rock, packaging, and other construction debris will be collected and stored so stormwater cannot carry it into the canyon drainage. Los Alamos County is responsible for all project waste and will transport and dispose of it in accordance with applicable federal and New Mexico requirements. Concrete washout will be collected in a leak-proof container in the LANL-approved staging area, allowed to harden, and removed for proper disposal. Routine fueling, maintenance, and storage of fuel, hydraulic fluid, and similar materials will also occur in the LANL-approved staging area outside the mapped floodplain. Equipment working in the canyon will be inspected for leaks, and spill kits will be available for immediate response.

The failed main is already out of service, the 6-inch drain will not be used, and no pipeline, flushing, testing, or disinfection water will be discharged to the canyon. The access road, swale, CMP, and erosion controls will remain in place for one year after the repair so crews can inspect the repaired pipe and surrounding repair area for signs of rust or other deterioration, leakage, movement, failure, settlement, or undercutting. The road and drainage features will also be inspected and maintained for stability, erosion, washouts, blocked drainage, and other damage. After the monitoring period, temporary improvements will be removed or restored, the original drainage pattern will be reestablished, and disturbed ground will be stabilized and revegetated. The final work and staging limits do not affect the Fitness Trail.

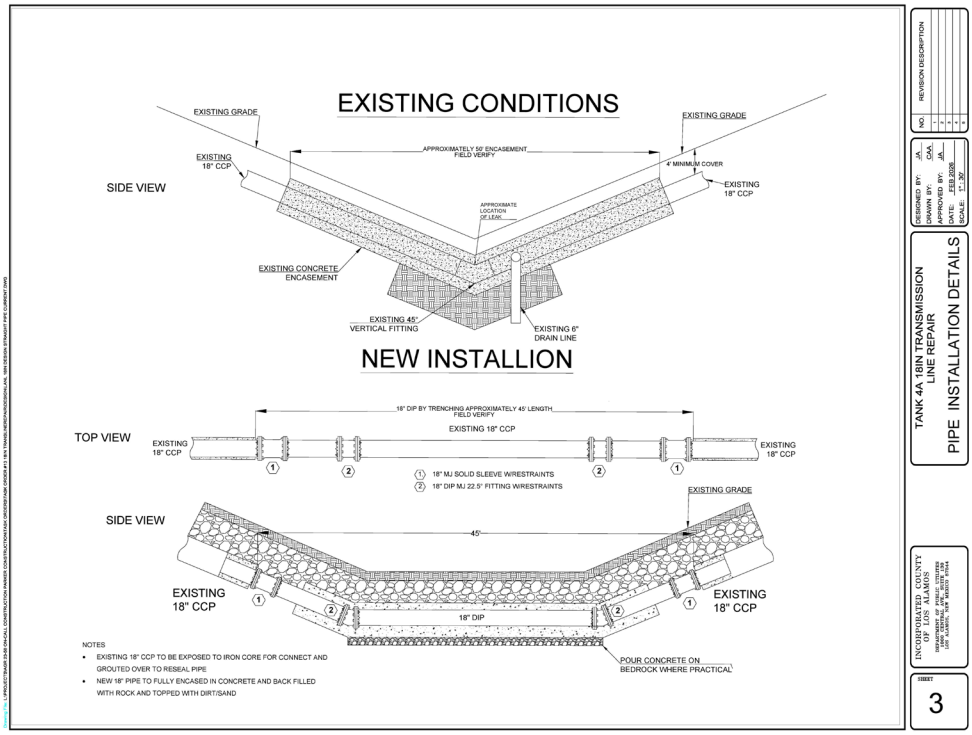

Figure 3. Pipe-installation detail. The drawing depicts the approximately 45-foot straight canyon-bottom segment; the current total repair scope is approximately 100 feet (LAC DPU 2026a, 2026b).

Table 2. Proposed action and final project design.

Element	Final Project Design
Pipe repair	Replace approximately 100 linear feet of 18-inch CCP in place with restrained 18-inch DIP, fittings, and the 6-inch drain assembly.
Existing material removal	Remove existing concrete encasement, failed pipe, fittings, backfill, and other material only as needed to complete the repair.
New pipe protection	Install approximately 4 feet of cover and new concrete encasement around the DIP through the canyon bottom to prevent undercutting and stabilize the arroyo bed.
Pipe connections	Seal small gaps at the existing-pipe connections with fast-setting cement-based grout placed in controlled amounts.
Access road	Use the final mapped route, approximately 20 feet wide by 230 feet long, within the 150-foot-wide buffer shown on Figure 1 and within the existing easement.
Road work	Smooth the existing route with varying grading generally up to approximately 3 inches; use existing earth only; place no imported aggregate.
Vegetation and biological protection	Move or remove only dead and fallen vegetation that blocks access; retain live trees and shrubs; follow the LANL Biological Resources Management Plan and project-specific LANL direction.
Temporary drainage and erosion control	Install and maintain a side swale, one 24-inch CMP, stabilized outlet, sediment controls, and other erosion protection needed to keep runoff away from the active work area.
Materials and waste	Collect removed pipe, concrete, soil, rock, packaging, and other debris; store it securely; LAC will remove and dispose of all project waste under applicable federal and New Mexico requirements.
Fueling and maintenance	Perform routine fueling, maintenance, and storage of fuel and hydraulic fluids in the LANL-approved staging area outside the mapped floodplain; inspect equipment and keep spill-response materials available.
Concrete washout	Use a leak-proof washout container in the LANL-approved staging area; allow washout to harden and remove it for proper disposal.
Construction window	Approximately 4 to 6 weeks.
Monitoring and restoration	Keep the road and drainage controls in service for one year so crews can inspect the repaired pipe and surrounding repair area for rust or other deterioration, leakage, movement, failure, settlement, or undercutting; inspect and maintain the road, swale, CMP, and erosion controls; then restore the site.
Pipeline water	The failed line remains out of service; the 6-inch drain will not be used; no pipeline, flushing, testing, or disinfection water will be discharged to the canyon.
Trail access	The final work, staging, and access limits do not affect the Fitness Trail.

4.0 FLOODPLAIN IMPACTS

4.1 Short-Term Impacts

Direct short-term effects will result from preparing and using the temporary access road, moving dead and fallen vegetation, operating equipment, excavating the trench, removing failed pipe and concrete, installing the new pipe and concrete encasement, placing grout, handling soil and rock, backfilling, installing drainage controls, and restoring the site. These activities will temporarily disturb and compact soil, change small surface contours within the work area, create construction noise and dust, and reduce surface roughness along the access route.

The main indirect risks are erosion, movement of sediment or loose material during storms, concentrated flow and scour near the temporary swale and culvert, blockage of the natural drainage path, and exposure of workers or equipment to sudden runoff. Weather forecasts will be monitored throughout the work. The road, drainage controls, excavation, stockpiles, and canyon access will be inspected before and after storms, and crews will leave the canyon when heavy runoff is possible.

The existing 18-inch main is already failed and out of service. It will not be drained during construction, the 6-inch drain will not be operated, and no water from the pipe will be released to the canyon. No flushing, pressure-test, disinfection, or commissioning water will be discharged to the canyon. Rainwater entering the excavation will be managed as construction stormwater under the SWPPP.

Concrete washout, removed pipe and concrete, excess soil and rock, packaging, and other project waste could affect soil or water quality if left unsecured. These materials will be kept in designated containers or stable stockpiles, protected from storm runoff, and removed from the site by LAC. Fuel, hydraulic fluid, and maintenance materials will not be stored handled in the canyon-bottom floodplain. Those activities will occur in the LANL-approved staging area outside the mapped floodplain, with secondary containment, leak inspections, and spill-response supplies.

LANL cultural resource staff completed a walkdown and marked the nearby archaeological site before construction. The final project footprint is outside the marked 30-foot no-work buffer, so the project will not affect the archaeological site. The work area will remain within the approved limits. If an inadvertent cultural resource discovery is made, work will stop and LAC will notify DOE/NNSA and LANL. The final access and staging limits do not affect the Fitness Trail.

Table 3. Short-term impacts and minimization measures.

Potential Effect	Where or When It Could Occur	Avoidance or Minimization	Management Location and Disposal
Soil disturbance and compaction	Access road, trench, and work area during construction and the one-year monitoring period	Use the existing route, limit grading to about 3 inches, use no imported aggregate, keep traffic inside the final footprint, and restore disturbed ground.	Reuse suitable soil and rock onsite for backfill and restoration; remove excess material through LAC-approved disposal.
Sediment and erosion	Road, trench, swale, culvert outlet, stockpiles, and downstream drainage during storms	Use the SWPPP, sediment controls, stabilized swale and culvert, protected stockpiles, frequent inspections, and prompt repairs.	Keep soil and rock in stable stockpiles within the work area and away from the active flow path; remove excess material through LAC.
Temporary flow obstruction and storm safety	Workers, equipment, open trench, and materials at the canyon bottom	Keep the natural drainage path and temporary swale clear; monitor forecasts; secure the site; and use a storm shutdown and canyon evacuation plan.	Move portable equipment and loose materials to secure areas before heavy rainfall; keep the access route open for evacuation.
Vegetation and wildlife	Dead and fallen vegetation along the access route and wildlife near the work area	Move or remove only material blocking safe access; retain live vegetation; follow the LANL Biological Resources Management Plan; stop work if an active nest is found.	Place removed dead vegetation in an approved location where it will not block drainage or create a safety hazard.
Fuel, hydraulic fluids, and maintenance materials	Equipment operation and the LANL-approved staging area	Perform routine fueling, maintenance, and bulk storage outside the mapped floodplain; inspect equipment for leaks; use secondary containment and spill kits.	Handle and store these materials in the LANL-approved staging area; in the event of an unplanned release to collect contaminated absorbents or soil for LAC disposal under applicable requirements.
Concrete washout	Concrete placement and cleanup	Use a leak-proof washout container and prevent any washout from reaching soil or the drainage channel.	Locate the container in the LANL-approved staging area, allow the washout to harden, and remove it for proper disposal by LAC.

Potential Effect	Where or When It Could Occur	Avoidance or Minimization	Management Location and Disposal
Construction debris and removed materials	Pipe removal, concrete removal, packaging, excess soil, rock, and general construction waste	Use labeled containers and stable stockpiles; secure materials before storms; keep all debris out of the drainage path.	LAC is responsible for all project waste and will remove and dispose of it under applicable federal and New Mexico requirements.
Cultural resources	Marked archaeological site near the project footprint and an inadvertent cultural resource discovery	Completed walkdown and flagging; maintain the marked 30-foot no-work buffer; stop work and notify DOE/NNSA and LANL if an inadvertent cultural resource discovery is made.	No project material or waste will be placed inside the marked avoidance area.
Human health and worker safety	Equipment travel, open trench, steep terrain, dust, noise, and sudden storm runoff	Use trained personnel, safe access and egress, traffic controls, daily site checks, weather monitoring, protective equipment, and the storm evacuation plan.	Keep emergency access clear and store equipment and materials so they do not create trip, rollover, or flood hazards.

4.2 LONG-TERM AND INDIRECT IMPACTS

The replacement waterline will be buried in the existing alignment and will be concrete encased through the canyon-bottom segment. No permanent building, wall, road embankment, or other above-ground obstruction will be placed in the floodplain. After backfill and restoration, the finished ground will be returned as closely as practical to the existing arroyo contours and drainage pattern.

The temporary access road will remain in place for approximately one year after construction so crews can inspect the repaired pipe and surrounding repair area. Inspections will look for signs of rust or other deterioration, leakage, pipe movement or failure, settlement, or stormwater undercutting the pipe or its concrete encasement. The road, swale, 24-inch CMP, and erosion controls will also be inspected and maintained so the route remains stable and usable and does not cause additional erosion. Washouts, blocked drainage, unstable ground, or other damage will be repaired promptly. At the end of the one-year monitoring period, the temporary improvements will be removed or restored as described in the easement.

Potential long-term adverse effects are limited to residual soil compaction, delayed revegetation, or localized erosion if restoration or maintenance is incomplete. The site will be roughened or decompacted where needed, positive drainage will be restored, temporary controls will be removed when they are no longer needed, and disturbed ground will be stabilized and revegetated.

Natural and Beneficial Floodplain Values

Floodplain values at the site include conveyance and temporary storage of storm runoff, soil and sediment transport, forest and shrub habitat, open-space and aesthetic values, and cultural-resource values. The project would temporarily affect these functions within the disturbance footprint but would not permanently convert the canyon corridor to an incompatible land use. Avoidance of live vegetation and cultural resources, retention of drainage conveyance, and final restoration are expected to preserve the long-term functions of the floodplain.

Effects on Lives and Property

The main life-safety concern is worker and equipment exposure to fast runoff during construction and monitoring. Other concerns include steep and uneven terrain, open excavation, moving equipment, noise, dust, fuel or hydraulic-fluid leaks, and unstable road or trench conditions. Weather forecasts and site conditions will be checked throughout each workday. Heavy-rain shutdown and canyon-evacuation procedures, trained personnel, safe access and egress, equipment inspections, spill response, and prompt repair of erosion or road damage will reduce these risks. The completed buried pipe is not expected to increase flood depths or redirect the main flow path.

Beneficial Effects

Restoring the primary 18-inch water main would reestablish system redundancy and reduce the likelihood that a future failure of the backup line would require a more urgent and less controlled response in the canyon. Replacement of the failed segment also reduces the risk of future uncontrolled leakage at the existing break.

5.0 MITIGATION AND ENVIRONMENTAL REQUIREMENTS

5.1 Floodplain, Stormwater, and Construction Controls

1. All work, staging, travel, stockpiling, fueling, maintenance, waste storage, and drainage controls will remain within the final mapped easement, Project Review Information Database/Project Activity Review (PRID/PAR), and Excavation/Fill/Soil Disturbance (EXID) limits.
2. Prepare, certify, and implement the project SWPPP; obtain U.S. Environmental Protection Agency (EPA) Construction General Permit (CGP) coverage through the required Notice of Intent (NOI) process; include the road, work site, staging area, and other construction support areas; and install controls before soil disturbance. The EPA NOI process requires a minimum 14-day waiting period after submittal before soil-disturbing work may begin.
3. Maintain the existing drainage path as much as practical. Construct the temporary swale beside the access road and install the 24-inch CMP at the crossing to carry the modeled 10-year flow of 11.1 cfs past the active work area.
4. Shape the swale as a minimum 3-horizontal-to-1-vertical triangular or shallow trapezoidal channel with an approximate slope of 0.040 foot per foot. Keep the swale clear of sediment, debris, stockpiles, and equipment so water can pass through the construction area.
5. Install temporary rock protection, erosion-control matting, check structures, or equivalent stabilization at the CMP outlet and other areas where concentrated flow could erode the soil. Maintain these measures through the construction and one-year monitoring periods.
6. Monitor weather forecasts and define a storm shutdown and canyon evacuation procedure. Secure the site before forecast heavy rainfall, maintain access for safe evacuation, and relocate movable equipment and materials from the active conveyance area when practicable.
7. Inspect the road, swale, CMP, outlets, stockpiles, trench protection, and sediment controls at the frequency required by the CGP and after storm events. Look specifically for erosion, washouts, blowouts, settlement, blockage, or unstable road conditions and repair problems promptly.
8. Do not discharge pipeline water, flushing water, hydrostatic-test water, disinfectant water, or water from the 6-inch drain to the canyon. Manage rainwater entering the excavation under the SWPPP and applicable LANL direction.
9. Place concrete washout in a leak-proof container in the LANL-approved staging area, allow it to harden, and remove it for proper disposal. Conduct routine fueling and maintenance and store fuel, hydraulic fluid, and similar materials in the same approved staging area outside the mapped floodplain. Use secondary containment, inspect equipment for leaks, and keep spill-response materials onsite. LAC is responsible for collecting, transporting, and disposing of all project-generated waste in accordance with applicable federal and New Mexico requirements.

The hydraulic model shows that the 24-inch CMP can carry the planned 10-year construction flow while keeping the modeled inlet water level about 0.86 foot below the allowable level. The culvert outlet will maintain downhill drainage and will be stabilized to prevent erosion (Wilson & Company 2026).

5.2 RESOURCE PROTECTION AND PROJECT COORDINATION

Table 4. PRID/PAR requirements and project commitments (LANL 2026a, 2026b).

Resource / Requirement	Project Commitment	Applicable LANL Plan or Requirement
Biological resources	Move or remove only dead and fallen vegetation that blocks safe access. Retain live trees and shrubs. Do not disturb active nests; stop work and contact LANL biologists if one is found. Follow any additional LANL direction, including wildlife-noise or work-hour limits, provided during the work.	LANL Biological Resources Management Plan and project-specific biological review measures.
Cultural resources	The project area has been walked down, assessed, and marked. Keep all work outside the staked 30-foot no-work buffer. The approved project footprint will not affect the archaeological site. Stop work and notify DOE/NNSA and LANL if an inadvertent cultural resource discovery is made.	LANL Cultural Resources Management Plan and completed project walkdown, survey, and avoidance marking.
EXID and excavation safety	Obtain the EXID permit at least 30 days before construction as required by the easement. Required personnel will complete applicable LANL excavation training and follow the approved excavation limits and safety controls.	LANL Excavation/Fill/Soil Disturbance requirements and the easement amendment.
Existing utilities	Complete utility locating and potholing as required, protect minimum cover and clearances, and coordinate equipment and staging near primary electric lines and water-system facilities.	LANL utility-clearance and excavation requirements.
Trails and public safety	The final work, staging, and access limits do not affect the Fitness Trail. Project vehicles and workers will remain within the approved access and work areas.	Final project map and PRID/PAR coordination.
Fire danger	Review the LANL Fire Danger Matrix before outdoor work and each morning and afternoon. Follow the restrictions and controls for the daily fire-danger rating.	LANL Fire Danger Matrix.
Waste and cleanup	LAC is responsible for all project waste. Label LAC waste containers, keep debris out of the drainage corridor, remove pipe, concrete, packaging, excess materials, and washout, clear the staging area, and complete final cleanup under applicable federal and New Mexico requirements.	PRID/PAR site-cleanup and County waste-management responsibilities.
Site restoration	After the one-year monitoring period, remove or restore the road, CMP, swale, and temporary controls; restore contours and drainage; stabilize and revegetate disturbed ground; and inspect and repair erosion until the site is stable.	Easement restoration requirements and LANL biological/stormwater guidance.

5.3 Clean Water Act Coordination

On April 15, 2026, the U.S. Army Corps of Engineers (USACE) explained that a Section 404 permit is needed only when dredged or fill material is placed in waters of the United States (WOTUS). The Corps also explained that dry, ephemeral drainages may not be federally regulated and that a formal no-permit letter is not required when no regulated water will be affected (USACE 2026).

Based on the project information, the dry and ephemeral character of the drainage, and the planned work, the project does not require a Section 404 permit or a related Section 401 water-quality certification. The April 15, 2026 email is retained in the project record.

6.0 ALTERNATIVES

10 CFR Part 1022 requires consideration of alternate sites, alternate actions, no action, and measures that avoid or mitigate adverse floodplain effects. The following alternatives were considered at a planning level.

No Action

Under the no-action alternative, the failed 18-inch main would remain out of service and the system would continue to rely on the 12-inch backup line. This would avoid immediate construction disturbance but would not restore redundancy or normal conveyance capacity. A later failure or capacity limitation could require emergency work under less favorable conditions. No action does not meet the project purpose and need.

Localized Spot Repair

A spot repair limited to the visibly failed fitting or shortest possible pipe segment could reduce excavation. However, access would still be required, the existing pipe is concrete-encased, and the repair must provide reliable tie-ins to sound pipe and address associated fittings and the drain assembly. A very limited repair would provide less confidence in long-term reliability and is not preferred over replacement of the approximately 100-foot affected segment.

Trenchless Lining or Sliplining

A liner could reduce portions of open excavation, but it would reduce the available internal diameter and would not directly replace failed fittings, the canyon-bottom encasement, or the drain assembly. Launch and receiving access and removal of obstructing fittings would still be required. For this short, damaged segment, the proposed in-place DIP replacement better satisfies capacity and reliability needs.

Access Without a Temporary Road

Lowering pipe, equipment, and concrete from the canyon rim by crane, winch, or cable could reduce road grading. The steep approximately 85-foot canyon, restricted working area, heavy pipe and concrete operations, safe personnel access, emergency egress, and need to remove existing CCP make this alternative less practicable and potentially less safe. It was not selected.

Proposed Action

The proposed action combines reliable in-place pipe replacement with the final mapped access route shown in Figure 1. The route follows an apparent former utility path and is the only access route proposed for this project. Temporary drainage, stormwater controls, limited movement or removal of dead and fallen vegetation, one-year inspection and maintenance access, and final restoration reduce floodplain effects while meeting the operational need.

7.0 CONCLUSIONS

The Pajarito Tank 4A 18-inch transmission-main repair and part of the temporary access road are located within the Two Mile Canyon 100-year floodplain. No other canyon or floodplain will be affected by the proposed action. The repair must occur at the existing failed waterline because the pipe, concrete encasement, fittings, and required tie-in points are already located at the canyon bottom. There is no practical alternative that would restore this part of the water system without work at the failed location.

Project-specific modeling estimates a 100-year peak flow of 103.4 cfs and a 500-year peak flow of 230.4 cfs. The temporary side swale and 24-inch CMP are designed to carry the 10-year construction flow of 11.1 cfs, and the outlet and other fast-flow areas will be protected from erosion. The 100-year storm defines the floodplain evaluated in this assessment, while the 500-year storm shows the possible reach of a less likely, more extreme event (Wilson & Company 2026).

Short-term effects will include shallow grading, soil disturbance and compaction, trenching, temporary drainage changes, equipment traffic, construction noise and dust, movement or removal of dead and fallen vegetation, and the possibility of erosion, sediment movement, concrete washout, or spills. Live trees and shrubs will remain. The project will follow the LANL Biological Resources Management Plan, the LANL Cultural Resources Management Plan, the SWPPP and CGP controls, the completed archaeological avoidance marking, and the waste, spill-prevention, inspection, and storm-response measures described in this assessment.

The selected route follows an apparent former utility path. Limiting grading, using no imported aggregate, maintaining temporary drainage, keeping fuel and maintenance activities outside the mapped floodplain, protecting biological and cultural resources, and restoring the site after the one-year monitoring period reduce floodplain disturbance to the smallest practical area. The completed waterline will be buried and concrete encased in the existing alignment, with no permanent above-ground obstruction. With the measures in Section 5, the project will have temporary and localized effects but no significant long-term adverse effect on floodplain flow, flood storage, natural and beneficial values, lives, or property.

8.0 LITERATURE CITED

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DOE/NNSA. 2026. Grant of Easement, Amendment No. 6 - Easement Modification (Waterline Easement No. 2), Contract No. DE-RE32-98AL79408, June 16, 2026.

LANL. 2026a. Environmental Requirements Summary, PRID/PAR 26P-0007, LAC 18-Inch Transmission Water Main Repair, March 9, 2026.

LANL. 2026b. PRID/PAR 26P-0007 Subject Matter Expert Comments, LAC 18-Inch Transmission Water Main Repair, March 9, 2026.

Los Alamos County Department of Public Utilities (LAC DPU). 2026a. Pipeline Failure and Planned Remediation Narrative, Pajarito Tank 4A 18-Inch Transmission Line Repair.

LAC DPU. 2026b. Tank 4A 18-Inch Transmission Line Repair, Pipe Installation Details and Concrete Details, February 2026.

LAC DPU. 2026c. Los Alamos County 18-Inch Water Main Repair Location Map, August 17, 2026.

LAC DPU. 2026d. Two Mile Canyon site photographs, late February and May 27, 2026.

Pathfinder Environmental, LLC. 2024. Floodplain Assessment for the Los Alamos County Waterline and San Ildefonso Pueblo Fiber Optic Cable, Los Alamos County, New Mexico. February 2024. Used as a format and organizational reference.

U.S. Army Corps of Engineers (USACE). 2026. Email correspondence from Forrest Luna, Regulatory Specialist, Albuquerque District, regarding Section 404 permitting for the Tank 4A 18-Inch Transmission Line Repair, April 15, 2026.

Wilson & Company. 2026. LANL Pajarito Tank 4A Hydraulic Modeling Technical Memorandum. Prepared for Los Alamos County, June 26, 2026.

APPENDIX A PROJECT DATA SUMMARY

Table A-1. Project data summary.

Topic	Current Value / Basis	Project Basis or Commitment
Project location	Two Mile Canyon on LANL property, west of Mercury Road	Defined by PRID/PAR, project scope, easement, and project map.
Pipe repair	Approximately 100 feet of 18-inch CCP replaced in place with 18-inch DIP	Final repair scope; the drawing detail shows the approximately 45-foot straight canyon-bottom segment.
Work site	150 feet by 200 feet; 30,000 square feet	Defined in the project map and easement.
Staging	150 feet by 150 feet; 22,500 square feet	Defined in the project map and easement; fueling, maintenance, washout, and material storage occur here.
Access road and buffer	Road approximately 20 feet wide by 230 feet long within a 150-foot-wide buffer	Final mapped access route and buffer; the road remains within the existing easement.
Road grading	Varying, generally up to approximately 3 inches; no imported aggregate	Final road construction method.
Vegetation	Dead and fallen material that blocks access; live trees and shrubs remain	LANL Biological Resources Management Plan and completed project biological review.
Construction	Approximately 4 to 6 weeks	Project construction duration.
Monitoring	Road and drainage controls retained for one year after repair	Inspect the repaired pipe and surrounding repair area for rust or other deterioration, leakage, movement, failure, settlement, or undercutting. Inspect and maintain the road, swale, CMP, and erosion controls for stability, washouts, blocked drainage, and erosion.
Restoration	Restore the premises after the one-year monitoring period	Remove or restore temporary improvements, reestablish drainage, stabilize soil, and revegetate disturbed ground.
Pipeline water	No drain-down and no pipeline, testing, or disinfection water discharged to the canyon; 6-inch drain not used	Final project commitment.
100-year flow	103.4 cfs	Wilson model used to define the floodplain evaluated in this assessment.
Modeled 100-year overlap	Approximately 8,600 square feet (0.20 acre) of the mapped work-site and access-road footprint	Planning-level georeferenced overlay used in this assessment.
500-year flow	230.4 cfs	Supplemental extreme-storm information.
Temporary drainage	24-inch CMP and adjacent swale; 10-year design flow of 11.1 cfs	Final temporary drainage and erosion-control concept.
CGP/SWPPP	Required for the road, work site, staging area, and construction support areas	The project will implement the SWPPP, NOI, operator certification, controls, inspections, and EPA waiting-period requirements.
EXID	Required; easement requires the permit at least 30 days before work	The project will follow the approved excavation limits, permit conditions, and training requirements.
Cultural resources	Nearby site assessed and staked; 30-foot no-work buffer maintained	Completed LANL walkdown and cultural resource review; the project will not affect the site.