

LA-UR-20-24254

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June 2020

Floodplain Assessment for the New Mexico State Road 4 and East Jemez Road Intersection at Los Alamos National Laboratory

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ACRONYMS

CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
EISA	Energy Independence and Security Act
LANL	Los Alamos National Laboratory
NNSA	National Nuclear Security Administration
NPDES	National Pollutant Discharge Elimination System
NM 4	New Mexico State Road 4
TA	Technical Area

INTRODUCTION

The National Nuclear Security Administration (NNSA), a semi-autonomous agency within the U.S. Department of Energy (DOE), is proposing to modify and upgrade the intersection of New Mexico State Road 4 (NM 4) and East Jemez Road. The purpose of the proposed modifications and upgrades is to improve safety and increase the capacity and efficiency of the intersection. Road and intersection upgrades will add extra lanes to both NM 4 and East Jemez Road in the vicinity of the intersection and will require widening both roads. Widening East Jemez Road will encroach on the 100-year (100-yr) lower Sandia Canyon floodplain.

NNSA has prepared this floodplain assessment in accordance with 10 Code of Federal Regulations (CFR) 1022 *Compliance with Floodplain and Wetland Environmental Review Requirements*, which was promulgated to implement DOE requirements under Executive Order 11988 *Floodplain Management*. According to 10 CFR 1022, a floodplain is defined as “the lowlands adjoining inland and coastal waters and relatively flat areas and flood prone areas of offshore islands,” and a base floodplain as “the 100-year floodplain, that is, a floodplain with a 1.0 percent chance of flooding in any given year.” This floodplain assessment evaluates potential impacts to floodplain values and functions from implementation of the proposed action, identifies alternatives to the proposed action, and allows for meaningful public comment.

BACKGROUND

The United States Army Corps of Engineers (USACE) commissioned a traffic study of the NM 4 and East Jemez Road intersection which concluded that improvements to the intersection were needed to improve safety, reduce delays and provide capacity for future growth (3AEGREEN, 2018). The project will reduce intersection speeds and add lanes in key directions to promote safe and efficient traffic flow. The intersection is located primarily on Los Alamos National Laboratory (LANL) property, on the south boundary of Technical Area (TA)-72. A portion of the project is on the north border of the Tsankawi Ruins portion of Bandelier National Monument that is managed by the National Park Service (Figure 1).

Stormwater Management History

The channel in Sandia Canyon is largely ephemeral and typically only flows through the intersection following relatively intense summer thunderstorms. The 100-yr floodplain associated with Sandia Canyon is located in the northwest (NW) and southwest (SW) quadrants of the intersection with drainage running northwest to southeast crossing under East Jemez Road approximately 100ft west of the intersection and then under NM 4 approximately 500ft south of the intersection (Photos 1 and 2). Under the current intersection configuration, the 100-yr floodplain backs up behind the arched culvert (Photo 3) and overtops East Jemez Road at a low point further west (Figure 1). Below the culvert, the floodplain follows the channel for approximately 0.25 miles and then runs east under NM 4 (Photos 4 and 5).

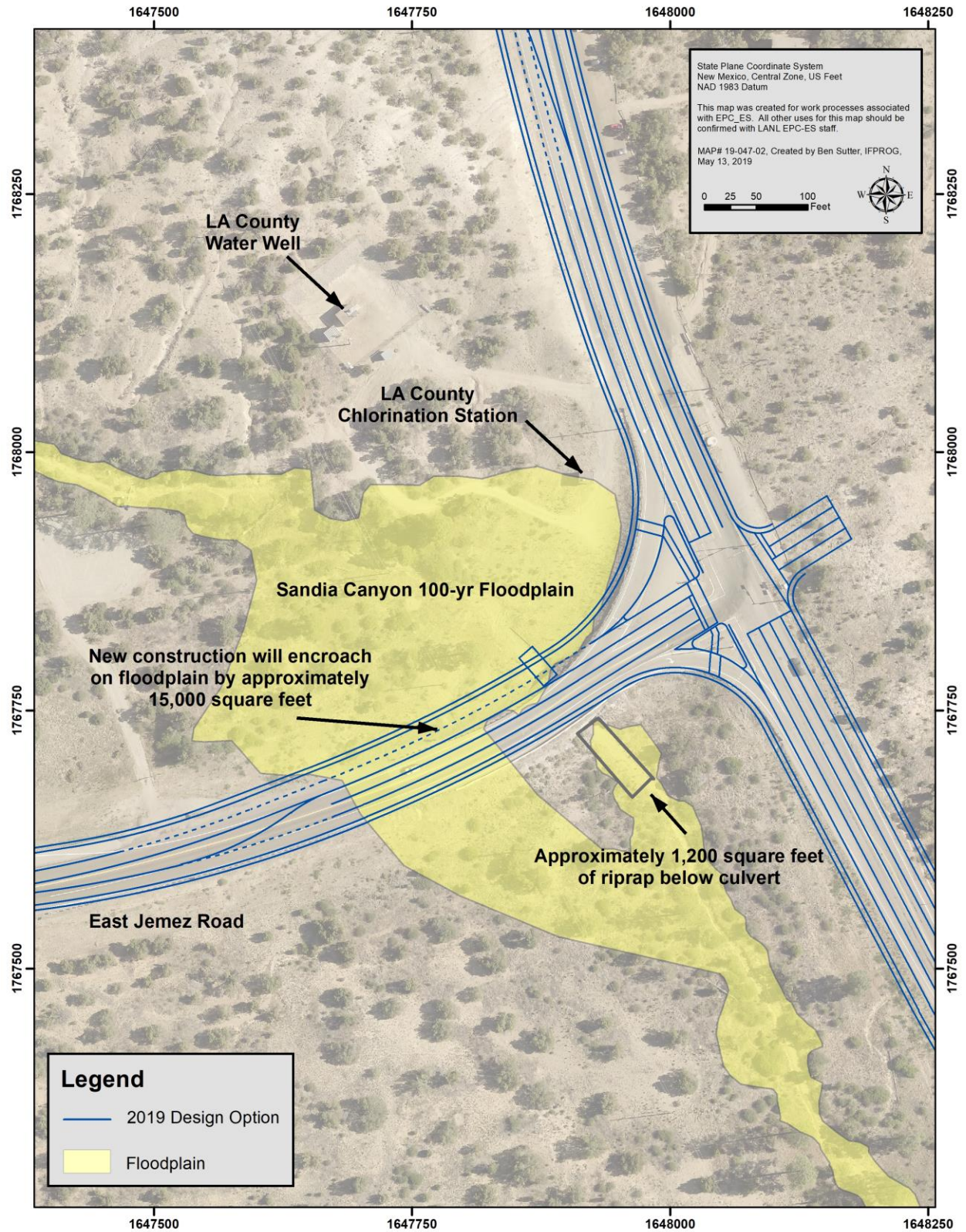


Figure 1. Aerial photo showing current intersection configuration with new configuration overlay and 100-yr floodplain.

Project Description

The project will address needed improvements to the intersection, which will widen and reconfigure the existing three-way intersection of East Jemez Road and NM 4 near Los Alamos, NM into a four-way intersection (Figure 2). The fourth leg will provide access to a proposed parking lot to be constructed by the National Park Service as part of the Tsankawi Unit Management Plan. The Tsankawi trailhead parking area development is a connected action that was covered under an Environmental Assessment written by the National Park Service. A Finding of No Significant Impact was approved for the National Park Service Tsankawi Unit Management Plan and Environmental Assessment on July 21, 2015 (NPS 2015).

The project includes the following improvements to the intersection: (1) a 5° intersection realignment with a second northbound left turn lane added to East Jemez Road, (2) a second northbound through lane added to NM 4 along with right and left turn bays to the proposed Tsankawi trailhead parking lot, and (3) acceleration and deceleration lanes would be added to southbound NM 4 and westbound East Jemez Road. East Jemez Road would be widened to the north to accommodate the new lanes. New construction would encroach on the 100-yr floodplain north of the intersection by an estimated 15,000ft².

Approximately 1200 ft² of Class B riprap (minimum 6” diameter angular rock) would be placed in the channel below the arched culvert for outlet erosion control.

FLOODPLAIN IMPACTS

Activities associated with the proposed project would involve work within the 100-yr floodplain. The following floodplain impact assessment discusses the long- and short-term impacts (positive, negative, direct, and indirect) of the proposed project on the floodplain.

Short-term Impacts

Short-term direct and indirect impacts to the floodplain include temporary ground disturbance associated with the construction of extra lanes to East Jemez Road, extension of an existing culvert, and the addition of riprap below the existing culvert. Construction activities will also increase the short-term potential for soil erosion and contaminant transport and spills or leaks (fuel, oil, hydraulic fluid). However, these impacts would be avoided or minimized by adherence to permits and other requirements as discussed below.

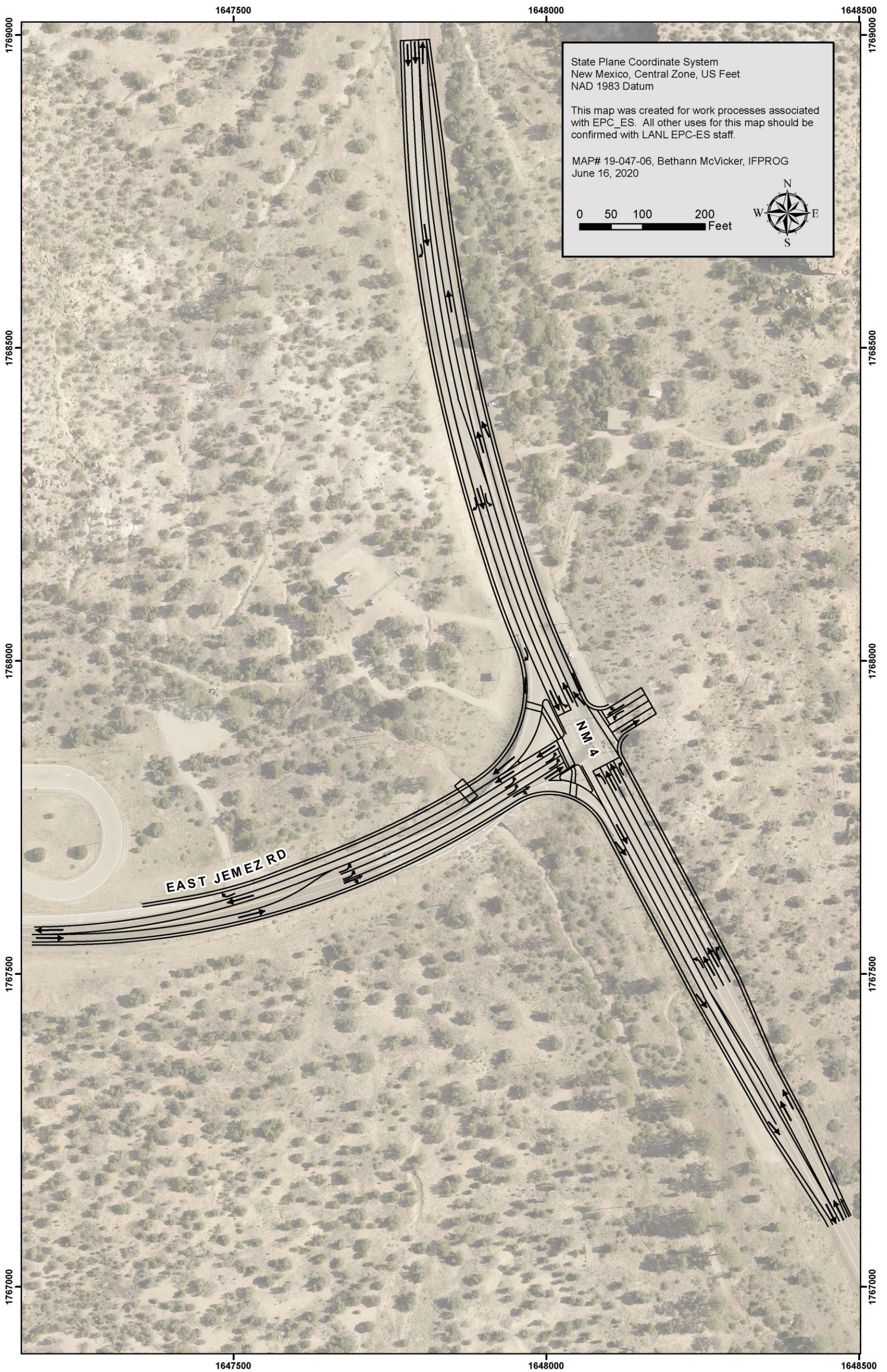


Figure 2. Overview of proposed intersection improvements.

LANL maintains a Permits and Requirements Identification (PR-ID) process for LANL subject matter experts to identify, evaluate and resolve project-specific issues such as worker health and safety, presence of underground utilities, contaminated soils, threatened and endangered species habitat, cultural resources, floodplains or wetlands, regulatory agency authorizations such as US Army Corp of Engineers permit requirements. The following requirements apply to this project:

- Project personnel must coordinate with Triad archeologists in EPC-ES to discuss protections for any cultural resources (archaeological sites or historic buildings) that may occur in the project area. Any inadvertent discoveries¹ will be immediately reported to the Environmental Protection and Compliance Division Cultural Resources Team.
- This project will require National Pollutant Discharge Elimination System (NPDES) Construction General Permit coverage. This permit requires controls to limit soil erosion, sediment loss, and spills and leaks during and after construction. Controls include temporary perimeter controls to reduce sediment transport during construction and final stabilization to control erosion after project activities are completed. Vegetation stabilization will be completed in accordance with the LANL Seeding Specification 32-9219 (https://engstandards.lanl.gov/specs/32_9219R4.doc).
- This project will require compliance with the Energy Independence and Security Act (EISA), Section 438, which requires that stormwater runoff from new Federal construction or re-construction projects be released at pre-development levels. Stormwater runoff will be conveyed from the new road surface to the associated drainage by a series of riprap-lined swales, rundowns and energy dissipation structures designed to meet EISA requirements.
- This project will require a Section 404 USACE permit prior to the start of construction. Soil disturbing activities within streams (including ephemeral streams) and/or wetlands are evaluated to determine if work will require a Section 404 USACE permit and adherence to State 401 Certification requirements. The 401 Certification issued by the State ensures that the Federal permit is consistent with State law and otherwise complies with New Mexico Water Quality Standards. Project activities during construction may be subject to periodic inspections by the USACE or New Mexico Environment Department

¹ Inadvertent Discoveries: During all ground-disturbing project activities, you must immediately stop work if you encounter bones (possible burials), clusters or alignments of rock situated above bedrock (possible masonry walls), charcoal stains (possible hearths or burned wooden structures), or clusters of artifacts such as pottery, pieces of chipped stone, and historic debris such as cans or glass. The LANL Cultural Resources SME will arrange an emergency field inspection to be conducted prior to the resumption of project ground-disturbing activities at the specific location of the inadvertent discovery.

to ensure that the project's activities result in minimal individual and cumulative effects on the aquatic environment.

- This project would involve disturbance of a designated Area of Concern (AOC)² and mitigating activities must be identified and followed. Project personnel will work with Triad to identify contaminants of potential concern and develop an appropriate Site-Specific Health and Safety Plan for working in the AOC.

Work within the Sandia Canyon 100-yr floodplain will impact the Sandia Canyon AOC C-00-007, which has the same footprint as the 100-yr floodplain. The 100-yr floodplain represents the extent to which post-Lab aged sediments (and contaminants) could have been deposited and therefore, is used to delineate the extent of the AOC. Sandia Canyon originates on LANL property within TA-03 at an elevation of approximately 7300ft and trends east-southeast across LANL.

Historically, LANL has used Sandia Canyon for disposal of industrial and sanitary wastewaters. The largest discharges have been from the outfall at the TA-03 power plant (up to 300,000 gal. per day) and cooling towers at TA-53 (seasonally up to 200,000 gal. per day). The TA-03 outfall receives effluent from the Sanitary Wastewater System Consolidation facility at TA-46, which is used as cooling water.

Several inorganic chemicals (cadmium, lead, silver, and zinc) and radionuclides (plutonium-238/-239/-240, and uranium) have been detected slightly above background values in Sandia Canyon sediments at the eastern LANL boundary. Chromium was detected at low concentrations above the background value, and PCBs were detected at low concentrations just south of the East Jemez-State Road 4 intersection.

The project plans to manage excavated material within the boundary of AOC C-00-007, and return it to the point and depth of the excavation, or within the AOC site boundary, upon completion of the project. If the project is unable to manage excavated material within the boundary of the AOC C-00-007, then the project will manage, characterize, and dispose of the material in accordance with federal and state environmental compliance requirements.

In addition, short-term direct and indirect impacts from the project will be avoided or minimized through implementation of the following LANL best management practices for construction work in floodplains:

- Disturbed areas associated with the project will be stabilized and revegetated in accordance with the requirements of the NPDES Construction General Permit. Vegetation stabilization practices must “establish uniform, perennial vegetation that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas.” Stabilization must be initiated immediately following completion of

² An AOC is any area having a known or suspected release of hazardous waste or hazardous constituents that is not from a solid waste management unit and that the Secretary of NMED has determined may pose a current or potential threat to human health or the environment

construction activities and installation completed within 7 days. The Project has incorporated the LANL Seeding Specification 32-9219 (https://engstandards.lanl.gov/specs/32_9219R4.doc).

- Hazardous materials, chemicals, fuels, and oils will not be stored within the floodplain.
- Heavy equipment will not be used if conditions are too wet to prevent damage to the soil structure.
- Equipment will be refueled at least 100ft from any drainage, including dry arroyos.

Potential direct effects to migratory birds and other biological resources would include short-term disturbance from noise and human presence during construction. Adult migratory birds would give way to construction equipment to avoid being killed or injured. The Migratory Bird Treaty Act prohibits killing migratory birds, including nestlings and eggs in an active nest. Therefore, if vegetation removal is required, it would be coordinated to occur outside of the nesting season for migratory birds (May 15 through July 31). If construction activities occur during the nesting season, an onsite inspection for bird nests from LANL Biological Resource subject matter experts will be required. Construction activities will conform to requirements stipulated in the Migratory Bird Best Management Practices Source Document for Los Alamos National Laboratory (LANL 2011).

Long-term Impacts

Long-term direct and indirect impacts to the floodplain of the proposed intersection project are primarily through a change in flood storage volume, a result of widening East Jemez Road. New construction will encroach on the 100-yr floodplain by an estimated 15,000 ft². However, a retaining wall would be constructed along the north side of East Jemez Road, which will prevent a 100-yr flood from overtopping the road and should expand the upstream extent of the floodplain, thereby mitigating floodplain losses due to road expansion. The retaining wall is 42in high, which in the event of a >100-yr flooding event, could result in a ponded area at 6501ft elevation, as shown in Figure 3. No impacts to upstream facilities are anticipated.

The culvert under East Jemez Road at the intersection was designed to NMDOT specifications to pass a 50-yr flood event. LANL Roads and Grounds personnel periodically inspect the culvert and conduct maintenance as needed. The addition of the 42” concrete wall along the north side of NM 4 would increase the intersection capacity to a 100-yr event. Rip rap outlet protection will be placed below the culvert to reduce in-channel flow velocity and protect against possible erosion at the outlet.

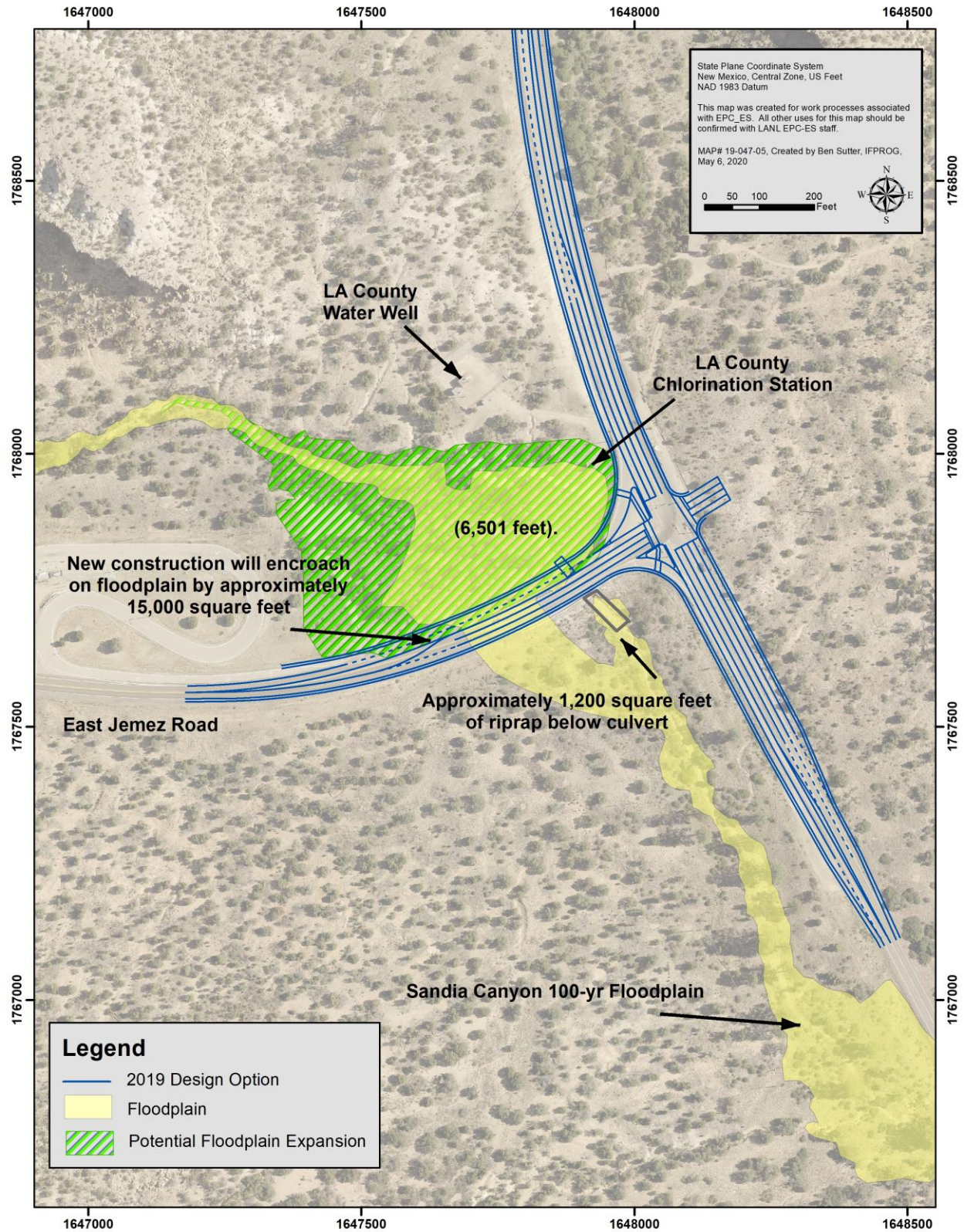


Figure 3. Map showing 100-yr floodplain (yellow shaded area) and potential floodplain expansion (green striped) at 6501ft elevation.

Although floodplain elevations will change, the proposed changes will not obstruct rising floodwater other than the retaining wall to prevent overtopping the road. With the exception of proposed widening of East Jemez Road, changes to the floodplain are expected to be minimal, and not increase surface water velocities from the floodplain to the channel.

The Lower Sandia Watershed Controls Project, located in TA-72 less than half a mile upstream from the Intersection Project, installed controls to reduce the velocity of flooding events and trap sediment moving down the channel. These controls will slow floodwater velocities to the Intersection Project area and increase infiltration, thereby providing flood attenuation/mitigation benefits to flows that reach the intersection.

An evaluation of the proposed action considered conservation of habitat for existing flora and fauna, cultural resources, aesthetic values, and public interest. The proposed actions may remove potential habitat, but disturbed soil will be revegetated with native species in order to minimize any habitat loss. The proposed action will not impact cultural resources because it does not involve ground disturbing activities near cultural resource sites. The proposed action is not considered to negatively impact aesthetic values since most activities will occur in areas that have been previously disturbed.

The floodplain identified within the proposed actions is entirely located within LANL property, and uninhabited by people beyond facility personnel. The County of Los Alamos maintains a water well on DOE/NNSA property NW of the intersection and outside of the 100-yr floodplain. There is a chlorination station located within the 100-yr floodplain, but no hazardous materials are stored in the building. The county has plans to remove the existing chlorination building and build a new one next to the well.

ALTERNATIVES

Five different design options for the intersection project were evaluated and described in a Conceptual Design Document (3AEGreen. 2018). Option 1 maintained the current intersection alignment and had shorter acceleration lanes, Option 2 realigned the intersection and also had shorter acceleration lanes, Option 3 was the same as Option 2 but added dedicated dual left turn lanes on East Jemez Road for northbound traffic turning onto NM 4. Option 4 is the same as Option 3 except the posted speed was reduced to 45 mph on northbound NM 4 and eastbound East Jemez Road. The chosen option is the same as Option 4 with an extended northbound acceleration lane and the westbound acceleration lane was extended to become the right turn bay to the truck inspection station. This chosen option was modified from the original conceptual design to include a retaining wall to prevent floodwater overtopping East Jemez Drive during a 100-yr event. A No Action alternative was rejected due to long-standing safety and traffic flow issues at the intersection.

CONCLUSIONS

The proposed intersection project will not result in adverse impacts to the floodplain values or functions. Short-term impacts will be avoided or minimized by adherence to permits and other requirements. Any material excavated within the boundary of the AOC C-00-007 will be managed in accordance with federal and state environmental compliance requirements. With the exception of proposed widening of East Jemez Road, long-term changes to the floodplain are expected to be minimal,

Although floodplain elevations will change, the proposed changes will not obstruct rising floodwater other than the retaining wall to prevent overtopping the road. With the exception of proposed widening of East Jemez Road, changes to the floodplain are expected to be minimal, and not increase surface water velocities from the floodplain to the channel. No impacts to lives or private property associated with floodplain disturbance are anticipated from this projects.

DOE/NNSA has published this Floodplain Assessment for a 15 day for public review and comment period. After the close of the public comment period and prior to issuing a floodplain statement of findings DOE/NNSA will reevaluate the practicability of alternatives to the proposed floodplain action, mitigating measures and take into account all substantive comments received during the public comment period. DOE/NNSA will endeavor to allow 15 days of public review prior to implementing the proposed action.

LITERATURE CITED

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Photos



Photo 1. View of floodplain north of East Jemez Road, facing east.



Photo 2. View of floodplain north of East Jemez Road, facing west.



Photo 3. View of 18.25ft by 7.5ft multi-plate arch culvert under Ease Jemez Road, facing north. The culvert is partially filled with sediment.



Photo 4. View of channel/floodplain south of East Jemez Road, facing south.



Photo 5. View of double box culvert under State Route 4, facing east.