

### Introduction

It is absolutely necessary that dams are designed and built to protect downstream communities. This includes building all Sites Reservoir dams to withstand earthquake ground motions that may occur throughout the life of the project. The proposed Sites Reservoir is in a moderate seismic region. In addition to hazards posed by the seismic setting, the project design is also considering the potential for reservoir-triggered seismicity, which may occur when water in the reservoir puts pressure on faults and causes earthquakes. Concerns have been raised by environmental groups that seismic hazards in the area is a reason that the reservoir should not be built. The following FAQ describes potential seismic hazards and how the Sites Reservoir Project will address these hazards in the design, construction, and maintenance of the Sites Reservoir dams.

#### 1. What are the seismic hazards for dams?

**All dams face seismic hazards. Sites Reservoir is being developed to the most up-to-date design criteria that incorporates state of the art real-time monitoring and applies lessons learned from historical case studies to reduce seismic risks.** If not considered appropriately, seismic events can produce cracks, liquefy soils, and cause instability in and around dams. Dams must be designed for the seismic considerations of the area to provide safe and stable facilities that can withstand these types of hazards. All modern era dam designs, including the Sites Reservoir dams, conservatively consider the potential seismic hazards in the vicinity of the dams, resulting in robust structures that will perform well and keep the public safe.



Figure 1. Lower San Fernando Dam after the San Fernando earthquake (1971). (Courtesy of the National Information Service for Earthquake Engineering, EERC, University of California, Berkeley)

#### 2. What are the potential seismic hazards for Sites Reservoir?

**Sites Reservoir will be in a moderate risk seismic area and will be designed with the most current seismic design criteria.** The proposed Sites Reservoir Project is located outside of the Pacific and North American tectonic plate boundary area as shown on Figure 2. The Sites Project is located in a more moderate seismic zone and contains older, less active faults. However, the project area is not immune to seismic activity. Current research indicates that a segment of the Great Valley fault system would be the main source of seismic activity for the project area. For the design of the Sites Reservoir dams, the seismic setting and potential seismic hazards at the dam sites are being characterized and evaluated using state of the art methods to help develop robust dam designs that will withstand intense seismic shaking.

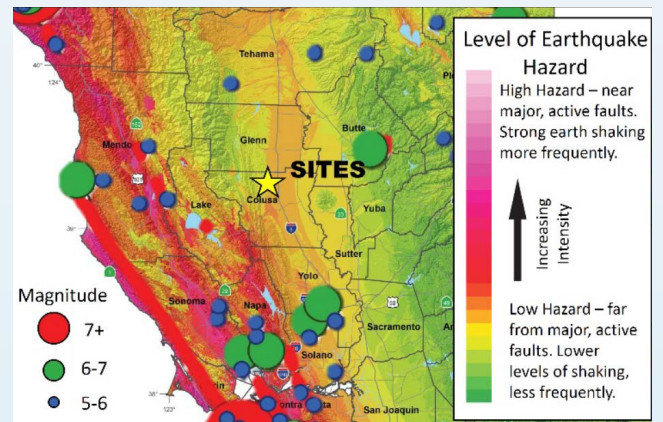


Figure 2. Earthquake Hazard and Historic Earthquakes in Northern California (modified from CGS, 2016, Map Sheet 48)

## Frequently Asked Questions: Sites Reservoir Seismic Hazards

In some instances, the filling of a reservoir has been observed to impact seismicity within its vicinity. This phenomenon is known as reservoir-triggered seismicity. It can occur in regions where there are active faults or where faults are close to failure. The filling of the reservoir can load existing faults and push them to move, resulting in earthquakes and ground shaking. The likelihood and size of potential reservoir triggered earthquakes decrease over time after reservoir filling. Scientists and engineers acknowledge the potential impact of a reservoir on the seismic activity in its vicinity and the need to evaluate and design for this occurrence – the magnitude of which would be governed by the seismic setting of the region. The Authority will evaluate the potential for this hazard and, if determined to be a controlling risk factor, design facilities to withstand reservoir triggered seismicity for the existing moderate seismic setting of the area.

### 3. What is the Sites Project Authority doing to address seismic concerns?

**In alignment with the Authority’s core value for public safety, design, construction, and operation of the reservoir will be implemented in a manner that satisfies regulatory/permitting requirements and exceeds standards for safety and security.**

This includes extensive geotechnical explorations to gather information for design and construction of project facilities, including approximately 910 geotechnical borings to collect subsurface data, 220 test pits to evaluate potential borrow materials for dam construction, and 3,900 linear feet of fault trenching (a segment of which is shown in Figure 3) to confirm the locations of nearby faults and determine their potential earthquake activity. These thorough field investigations will allow engineers and scientists to characterize the dam and foundation conditions and design the dam to perform under potential seismic events.

The Authority also draws valuable lessons from recent and historical case studies that showcase how dams have performed during significant seismic events. These past experiences underscore the importance of obtaining enough data early in the design process. By conducting these in-depth geotechnical explorations, the Authority will proactively anticipate and address potential challenges, ensuring that the designs are well-informed and robust. Furthermore, staff continue to work with landowners and the local community during these activities to maintain close coordination and transparent communication for all on-site activities.

The Authority has also established regular communications with the state regulator, the California Division of Safety of Dams (DSOD), to ensure that the proposed facilities meet modern-day standards for seismic performance. Early engagement with regulators allows the dam designs to be subjected to rigorous scrutiny to meet the highest public safety standards. By being transparent about design criteria and approaches, and proactively involving regulatory authorities, the Authority aims to foster trust and confidence within the community.



Figure 3. Fault Trench Excavation for Sites Project, October 2023.

#### 4. What happens after construction?

**The Authority will invest in and implement a rigorous dam safety monitoring and maintenance program.** As part of operations and regular maintenance, each dam will be continuously monitored with instrumentation that notifies personnel of any movement, ground motions from earthquakes, and other aspects of dam performance. The instrumentation program will be used to verify that the dams are performing as expected under regular operations and seismic conditions. The monitoring program will be periodically reviewed and updated as standards change or as more information on the performance of the reservoir and dams are gathered. The instrumentation and dam safety monitoring plan will include:

- threshold action levels to facilitate timely response for any abnormal or unexpected behavior at the dams
- seismographs to monitor and record ground motions experienced at the dams and trigger post-event inspections to assess embankment integrity after earthquake events
- frequent surveys and data collection to capture the dam's behavior over time and allow for analysis and evaluation of the performance of the dams

These proactive measures will effectively reduce potential risks to public safety and allow the Authority to safely manage and operate the reservoir and dams.

If an emergency were to occur in relation to Sites Reservoir dams, in alignment with modern-day dam safety standards and in compliance with DSOD and California Office of Emergency Services (CalOES) regulations, the Sites Reservoir Project will develop an Emergency Action Plan (EAP) that will include emergency response procedures to be taken in the event of damage or unexpected behavior of a dam, as well as inundation maps to guide emergency responses. The EAP will include procedures on emergency level determination to assist in communication with affected communities, as well as notification flowcharts that will show the chain of communication to be followed. There will also be periodic exercises of the EAP to enhance preparation for any emergency response and maintenance of up-to-date emergency contact information. Public safety is of the utmost importance to the Authority and a robust, regularly updated EAP will be critical to assuring public safety in case of an emergency.