# CALTRANS
# Adaptation Priorities
# REPORT




## DISTRICT 10

December
2020

This page intentionally left blank.

# CONTENTS



# TABLES

## FIGURES

This page intentionally left blank.

# Term and Definitions

- **Adaptation:** The steps taken to prepare a community or modify a targeted asset prior to a weather or climate-related disruption to minimize or avoid the impacts of that event. An example would be elevating assets in areas likely to experience increased flooding in the future.
- **Exposure:** The presence of infrastructure in places and settings where it could be adversely affected by hazards and threats, for example, a road in a floodplain**.**[1]
- **Hazards and Stressors:** Stresses on transportation system performance and condition. Whether such impacts occur today (e.g., riverine flooding that closes major highways) or whether they are part of a long- term trend (e.g., sea level rise), mainstreaming resilience efforts into an agency's functions requires an understanding of their nature, scope, and magnitude. The terms are used interchangeably to refer to transportation impacts originating primarily from natural causes (e.g., flooding or wildfire hazards).
- **Resilience:** The characteristic of a system that allows it to absorb, recover from, or more successfully adapt to adverse events.
- **Risk***:* "A combination of the likelihood that an asset will experience a particular climate impact and the severity or consequence of that impact."[2]
- **Sensitivity:** Per the Federal Highway Administration, "refers to how an asset or system responds to, or is affected by, exposure to a climate change stressor. A highly sensitive asset will experience a large degree of impact if the climate varies even a small amount, where as a less sensitive asset could withstand high levels of climate variation before exhibiting any response."[3]
- **Uncertainty:** The degree to which a future condition or system performance cannot be forecast. Both human-caused and natural disruptions, especially for longer-term climate changes, are by their very nature uncertain events (as no one knows for sure exactly when and where and with what intensity they will occur). Sensitivity tests using multiple plausible scenarios of future conditions can help one understand the range of uncertainty and its implications. This approach is used routinely when working with climate projections to help understand the range of possible conditions given different future greenhouse gas emission scenarios.
- **Vulnerability:** Per the Federal Highway Administration, "the degree to which a system is susceptible to or unable to cope with adverse effects of climate change or extreme weather events."[4]

[1] This definition is adopted from the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report. 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.
[2] FHWA. 2017. "Vulnerability Assessment and Adaptation Framework: Third Edition." Retrieved September 25, 2020 from https://www.fhwa.dot.gov/environment/sustainability/resilience/adaptation_framework/climate_adaptation.pdf
[3] Ibid.
[4] FHWA. 2014. "FHWA Order 5520. "Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Events." Dec. 15. Retrieved June 30, 2020 from https://www.fhwa.dot.gov/legsregs/directives/orders/5520.cfm

# 1. INTRODUCTION

California's climate is changing. Temperatures are warming, sea levels are rising, wet years are becoming wetter, dry years are becoming drier, and wildfires are becoming more intense. Most scientists attribute these changes to the unprecedented amounts of greenhouse gases in the atmosphere. Given that global emissions of these gases continue at record rates, further changes in California's climate are, unfortunately, very likely.

The hazards brought on by climate change pose a serious threat to California's transportation infrastructure. Higher than anticipated sea levels can regularly inundate roadways, extreme floods can severely damage bridges and culverts, rapidly moving wildfires present profound challenges to timely evacuations, and higher than anticipated temperatures can cause expensive pavement damage over a broad area. As Caltrans' assets such as bridges and culverts age, they will be forced to weather increasingly severe conditions that they were not designed to handle, adding to agency expenses and putting the safety and economic vitality of California communities at risk.

Recognizing this, Caltrans has initiated a major agency-wide effort to adapt their infrastructure so that it can withstand future conditions. The effort began by determining which assets are most likely to be adversely impacted by climate change in each Caltrans district. That assessment, described in the Caltrans Climate Change Vulnerability Assessment Report for District 10, identified stretches of the State Highway System within the district that are potentially at risk. This Adaptation Priorities Report picks up where the vulnerability assessment left off and considers the implications of those impacts on Caltrans and the traveling public, so that facilities with the greatest potential risk receive the highest priority for adaptation. District 10 anticipates that planning for, and adapting to, climate change will continue to evolve subsequent to this report's release as more data and experience is gained.

## 1.1. Purpose of Report

The purpose of this report is to prioritize the order in which assets found to be exposed to climate hazards will undergo detailed asset-level climate assessments. Since there are many potentially exposed assets in the district, detailed assessments will need to be done sequentially according to their priority level. The prioritization considers, amongst other things, the timing of the climate impacts, their severity and extensiveness, the condition of each asset (a measure of the sensitivity of the asset to damage), the number of system users affected, and the level of network redundancy in the area. Prioritization scores are generated for each potentially exposed asset based on these factors and used to rank them.

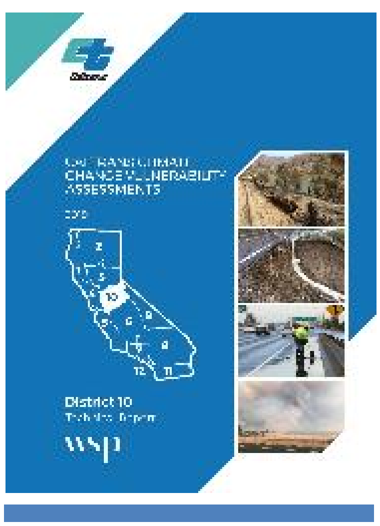
## 1.2. Report Organization

The main feature of this report is the prioritized list of potentially exposed assets within District 10. Per above, this information will inform the timing of the detailed adaptation assessments of each asset, which is the next phase of Caltrans' adaptation work. The final prioritized list of assets for District 10 can be found in Chapter 4 of this document. The interim chapters provide important background information on the prioritization process. For example, those interested in learning more about Caltrans' overall adaptation efforts, and how the prioritization fits into that, should refer to Chapter 2. Likewise, those who are interested in learning more about how the prioritization was determined should refer to Chapter 3.

# 2. CALTRANS' CLIMATE ADAPTATION FRAMEWORK

Enhancing Caltrans' capability to consider adaptation in all its activities requires an agency-wide perspective and a multi-step process to make Caltrans more resilient to future climate changes. The process for doing so will take place over many years and will, undoubtedly, evolve over time as everyone learns more about climate hazards, better data is collected, and experience shows which techniques are most effective. Researchers have just started examining what steps an overarching adaptation framework for a department of transportation should entail. Figure 1 provides a graphical illustration of one such path called the Framework for Enhancing Agency Resiliency to Natural and Anthropogenic Hazards and Threats (FEAR-NAHT).[5] This framework, developed through the National Cooperative Highway Research program (NCHRP), has been adopted by Caltrans as part of its long-term plan for incorporating adaptation into its activities (hereafter referred to as the Caltrans Climate Adaptation Framework or "Framework").

Steps 1 through 4 of the Framework represent activities that are currently underway at Caltrans Headquarters to effectively manage its new climate adaptation program and develop policies that will help jumpstart adaptation actions throughout the organization. Step 1, *Assess Current Practice*, and Step 4, *Implement Early Wins*, are both addressed within a document called the Caltrans Climate Adaptation Strategy Report. The Adaptation Strategy Report undertook a comprehensive review of all climate adaptation policies and activities currently in place or underway at Caltrans. The report also includes numerous no-regrets adaptation actions ("early wins") that can be taken in the near-term to enhance agency resiliency. Several of these strategies also touch on elements of Step 2, *Organize for Success*, and Step 3, *Develop an External Communications Strategy and Plan*. In addition to this, a comprehensive adaptation communications strategy and plan for climate change is being developed as part of a Caltrans pilot project with the Federal Highway Administration.




COVER OF THE CALTRANS
CLIMATE CHANGE VULNERABILITY ASSESSMENT
REPORT FOR DISTRICT 10

Step 5, *Understand the Hazards and Threats*, is the first step where detailed technical analyses are performed, and in this case, identify assets potentially exposed to various climate stressors. This step has been completed for a subset of the assets and hazards in District and the results are presented in the Caltrans Climate Change Vulnerability Assessment Report for District 10. The exposure information generated in the Vulnerability Assessment Report is used as an input to this study.

[5] This framework and related guidance for state DOTs is being developed as part of NCHRP 20-117, Deploying Transportation Resilience Practices in State DOTs (expected completion in 2020).

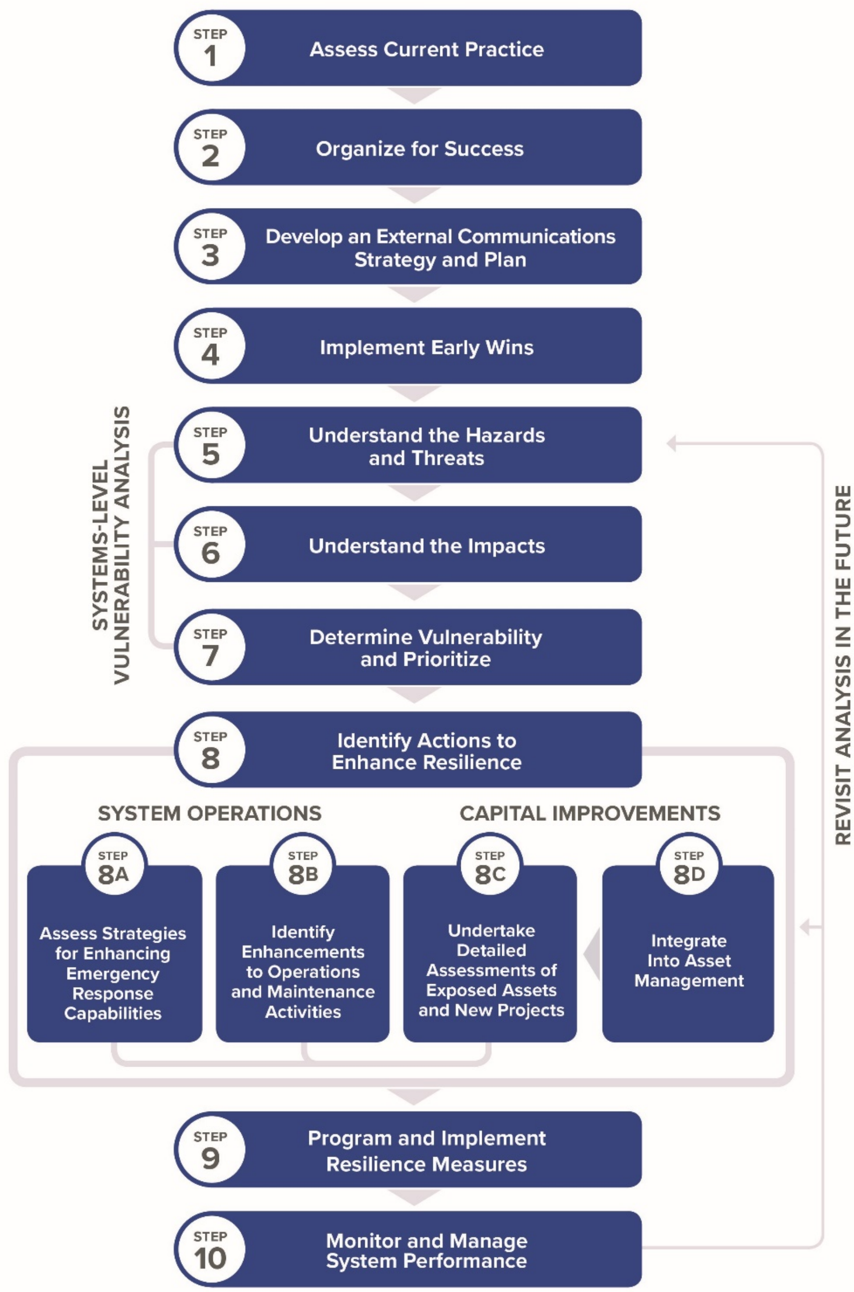



FIGURE 1: CALTRANS' CLIMATE ADAPTATION FRAMEWORK (FEAR-NAHT FRAMEWORK)

The work undertaken for this study, the District 10 Adaptation Priorities Report covers both Steps 6 and 7 in the Framework. Step 6, *Understand the Impacts*, is focused on the implications of the exposure identified in Step 5. This includes understanding the sensitivity of the asset to damage from the climate stressor(s) it is potentially exposed to and understanding the criticality of the asset to the functioning of the transportation network and the communities it serves. Developing an understanding of these considerations is part of the prioritization methodology described in the next chapter.

Step 7, *Determine Vulnerability and Prioritize*, focuses on creating and implementing a prioritization approach that considers both the nature of the exposure identified in Step 5 (its severity, extensiveness, and timing) and the consequence information developed in Step 6. The goal of the prioritization is to identify which assets should undergo detailed adaptation assessments first, because resource constraints will prevent all assets from undergoing detailed study simultaneously.

After Step 7, the Framework divides into two parallel tracks, one focused on operational measures to enhance resiliency and the consideration of adaptation (Steps 8A and 8B) and the other on identifying adaptation-enhancing capital improvement projects (Steps 8C and 8D). Collectively, these represent the next steps that should be undertaken using the information from this report. On the operations track, the results of this assessment should be reviewed for opportunities to enhance emergency response (Step 8A) and operations and maintenance (Step 8C). Caltrans' next step on the capital improvement track should be to undertake detailed assessments of the exposed facilities (Step 8C). The prioritization information generated as part of this assessment should also be integrated into the state's asset management system (Step 8D). All projects recommended through the asset management process should also undergo detailed adaptation assessments (hence the arrow from Step 8D to 8C).

Thus, there will be two parallel pathways for existing assets to get to detailed facility level adaptation assessments. The first is through this prioritization analysis which is driven primarily by the exposure to climate hazards with asset condition as a secondary consideration. The second is through the existing asset management process which is driven primarily by asset condition and will have vulnerability to climate hazards as a secondary consideration.

The detailed adaptation assessments in Step 8C will involve engineering-based analyses to verify asset exposure to pertinent climate hazards (some exposed assets featured in this report will not be exposed after closer inspection). Then, if exposure is verified, Step 8C includes the development and evaluation of adaptive measures to mitigate the risk. The highest priority assets from this study will be evaluated first and lower priority assets will be evaluated later. Once specific adaptation measures have been identified, be they operational measures or capital improvements, these projects can then be programmed (Step 9). Step 10 then focuses on continuous monitoring of system performance to track progress towards enhancing resiliency. Note the feedback loops from Step 10 to Steps 5 and 8. The arrow back to Step 5 indicates that the exposure analysis should be revisited in the future as new climate projections are developed. The arrow back to Step 8 indicates how one can learn from the performance indicators and use this data to modify the actions being undertaken to enhance resilience.

# 3. PRIORITIZATION METHODOLOGY

## 3.1. General Description of the Methodology

The methodology used to prioritize assets exposed to climate hazards draws upon both technical analyses and the on-the-ground knowledge of all district staff. The technical analysis component was undertaken first to provide an initial indication of adaptation priorities. These initial priorities were then reviewed with district staff at a workshop and, if necessary, adjusted to reflect local knowledge and recommendations. These adjustments are embedded in the final priorities shown in Chapter 4.

With respect to the technical analysis, there are a few different approaches for prioritizing assets based on their vulnerability to climate hazards. The approach selected for this study is known as the indicators approach. The indicators approach involves collecting data on a variety of variables that are determined to be important factors for prioritization. These are then put on a common scale, weighted, and used to create a score for each asset. The scores collectively account for all the variables of interest and can be ranked to determine priorities.

It is important to note that, since the prioritization process is focused on determining the order in which detailed adaptation assessments are conducted, only assets determined to be potentially exposed to a climate hazard are included in this analysis. Assets that were determined to have no exposure to the hazards studied are not included in this study.

The remainder of this chapter describes the prioritization methodology in detail. Section 3.2 begins by describing the asset types and hazards studied. Next, Section 3.3 discusses the individual prioritization metrics (factors) that were used in the technical analysis. Following this, Section 3.4 describes how those individual factors were brought together into an initial prioritization score for each asset. Lastly, Section 3.5 describes how the initial prioritization was adjusted with input from district staff.

## 3.2. Asset Types and Hazards Studied

DONNELL FIRE DAMAGE TO WOODEN BRIDGE OVER HISTORIC MIDDLE FORK STANISLAUS RIVER

Caltrans is responsible for maintaining dozens of different asset types (bridges, culverts, roadway pavement, buildings, etc.). Each of these asset types is uniquely vulnerable to a different set of climate stressors. Resource constraints only allowed this study to investigate a subset of the asset types owned by Caltrans in District 10 and, for those, only a subset of the climate stressors that could impact them. Additional exposure and prioritization analyses are needed in the future to gain a fuller understanding of Caltrans' adaptation needs.

The subset of asset types and hazards included in this study generally mirror those that were included in the District Climate Change Vulnerability Assessment Report. That said, exposure to two additional hazards was included as part of this study: (1) riverine flooding impacts to bridges and culverts and (2) temperature impacts to pavement binder grade. Table 1 shows all the asset types included in this study for District 10 and marks with an "X" the hazards that were evaluated for each in the exposure analysis.

TABLE 1: ASSET-HAZARD COMBINATIONS STUDIED

| | Sea Level Rise | Storm Surge | Wildfire | Temperature | Riverine Flooding |
|---|---|---|---|---|---|
| Pavement Binder Grade | | | | X | |
| At-Grade Roadways | X | X | | | |
| Bridges | X | X | | | X |
| Large Culverts[6] | X | X | | | X |
| Small Culverts[7] | X | X | X | | X |

The various asset-hazard combinations include:

- **Pavement binder grade exposure to temperature changes:** Binder can be thought of as the glue that holds the various aggregate materials in asphalt together. Binder is sensitive to temperature. If temperatures become too hot, the binder can become pliable and deform under the weight of traffic. On the other hand, if temperatures are too cold, the binder can shrink causing cracking of the pavement. There are various types (grades) of binder, each suited to a different temperature regime. This study considered how climate change will influence high and low temperatures and how this, in turn, could affect pavement binder grade performance.

  Assumptions were made that (1) all roadways are currently (or could be in the future) asphalt and (2) the binder grade currently in place on each segment[8] of roadway matches the specifications in the Caltrans Highway Design Manual. From here, the allowable temperature ranges of each binder grade were compared to projected temperatures in 2040, 2070, and 2100. If the temperature parameters exceeded the design tolerance of the assumed binder grade, that segment of roadway was deemed to be potentially exposed.


SR-4 SINK HOLE, MARKLEEVILLE

- **Bridge exposure to riverine flooding:** Bridges are sensitive to higher flood levels and river flows. With climate change, precipitation is generally expected to become more intense in District 10

[6] Culverts 20 feet or greater in width.
[7] Culverts less than 20 feet in width.
[8] Roadway are segmented at intersections with other roads.

leading to increased flooding on rivers and streams. These higher flows could exceed the design tolerances of bridges. In addition, wildfires are also expected to become more prevalent in District 10 with climate change. After a wildfire burns, the ground can become hard and less capable of absorbing water. As a result, flood flows can increase substantially in the aftermath of a fire, which could further exacerbate the risks to bridges. To better understand the threat posed to bridges in District 10, a flood exposure index was developed and calculated for each bridge that crosses a river or stream. The index considered both the changes in precipitation and wildfire likelihood in the area draining to the bridge in the early, mid, and late century timeframes. The index also considers the capacity of the bridge to handle higher flows using waterway adequacy information from the National Bridge Inventory (NBI). A higher score on the index indicates bridges at relatively greater risk due to a combination of higher projected flows and lower capacity.

- **Large culvert exposure to riverine flooding:** A distinction is made in the analysis between large and small culverts due to different data being available for each. Large culverts are included in the NBI and are generally 20 feet or greater in width. Small culverts are generally shorter than 20 feet in width and covered through a different inventory/inspection program. Large culverts, like bridges, are sensitive to increased flood flows. Thus, a flood exposure index was calculated for each large culvert in the same manner as was done for bridges.

- **Small culvert exposure to riverine flooding:** Small culverts (those less than 20 feet in width) are, like bridges and large culverts, also sensitive to higher flood flows. Hence, a flood exposure index like the one for bridges and large culverts was calculated for this asset type. The one difference is that the capacity component of the index for small culverts used the actual dimensions of the culvert, information that was not available for bridges and large culverts. Although the actual dimensions of small culverts were available, due to resource and data constraints, no hydraulic analyses were performed to determine overtopping potential. Instead, the size was simply used as a factor in the riverine flood exposure index.

- **Small culvert exposure to wildfire:** In addition to the higher post-fire flood flows captured in the flood exposure analysis, culverts can also be sensitive to the direct impacts of fire on the structure. Certain culvert materials (e.g. wood and plastic) can easily burn or be deformed during a fire. Thus, an assessment was made to determine the likelihood of a wildfire directly impacting each small culvert in the early, mid, and late century timeframes. This analysis was only conducted for small culverts because information on culvert construction materials was not available for large culverts.

- **At-grade roadway exposure to sea level rise:** Sea level rise, caused by the warming of ocean waters and the melting of land-based glaciers, is a prominent hazard brought on by climate change. In low-lying areas like the Sacramento-San Joaquin Delta (the Delta), at-grade roads may become subject to regular inundation as sea levels rise. This can lead to frequent road closures that disrupt travel and accessibility. In some locations with regular inundation, premature degradation roadway infrastructure may also occur.

- **Bridge exposure to sea level rise:** There are several ways in which sea level rise may adversely affect bridges. For very low bridges, a rise in sea levels may result in water overtopping the deck and impeded travel. It is important to recognize, however, that serious impacts can still occur to bridges from sea level rise even if water does not overtop the deck. For example, the navigability of Delta channels may become impeded as sea level rise diminishes clearance levels for boats.

- **Large and small culvert exposure to sea level rise:** Culverts are primarily used to convey streams and stormwater underneath roadways, and some are also used in tidally influenced areas like the Delta. Sea level rise is culverts on the Delta can change the hydraulic performance of the culvert leading to more frequent overtopping of the nearby roadway. For culverts that were not designed for a tidal setting, the frequent unanticipated presence of saltwater can also lead to corrosion and other maintenance issues that may decrease the anticipated lifespan of the asset.

- **At-grade roadway exposure to storm surge:** Storm surge refers to the elevating of coastal waters during major storm events. When strong winds blow onshore during such events, this can cause the water to pile up and reach levels much greater than during the normal tidal cycle. Sea level rise can cause the water to reach even higher during major storm events and increase the frequency and severity of inundation. Inundation of at-grade roadways from storm surge may require the road to be closed, disrupting travel. Also, the surge and wave action often associated with storm events can cause erosion of the roadway embankment.

- **Bridge exposure to storm surge:** Storm surge presents many threats to bridges that may not have been fully anticipated if sea level rise was not considered during design. Some low bridges may be overtopped by the surge and others may be affected by uplifting forces from wave action hitting the bottom of the deck. Either situation is likely to lead to the closure of the bridge and introduce the potential for serious structural damage. Even if the water is not high enough to reach the bridge deck, the elevated water levels and associated wave action can cause erosion or flooding around bridge approaches. Furthermore, if the surge approaches or recedes at a high enough velocity, scouring of soils can occur around bridge piers and abutments weakening the structure and potentially compromising the bridge's integrity. This is a particularly acute threat for surge-impacted bridges built over roadways or railroads (as opposed to over water) because scour may not have been considered during their initial designs.

- **Large and small culvert exposure to storm surge:** Storm surge can overwhelm culverts and flood roadways, impeding travel. If the velocity of the surge is great enough, the hydraulic forcing of excessive water through too small an opening can also damage the culvert. Water overtopping the roadway embankment or levee on top of the culvert may also cause erosion resulting in damages to the roadway and the culvert itself.

## 3.3. Prioritization Metrics

Metrics are the individual variables used to calculate a prioritization score for each asset. These can be thought of as the individual factors that, collectively, help determine the asset's priority for adaptation. Each of the asset-hazard combinations described in the previous section has its own unique set of factors that are used in the prioritization. The metrics were selected based on their relevancy to each asset-hazard combination and data availability. For example, the condition rating of a culvert is a very relevant metric for prioritizing culverts exposed to riverine flooding, however, it is not at all relevant to prioritizing bridges exposed to the same hazard. Table 2 provides an overview of all the metrics included in this study and denotes with an "X" their application to the various asset-hazard combinations studied.

TABLE 2: METRICS INCLUDED FOR EACH ASSET-HAZARD COMBINATION STUDIED

| Metrics | Sea Level Rise | | | | Storm Surge | | | | Wildfire | Tempera-ture | Riverine Flooding | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | At-Grade Roadways | Bridges | Large Culverts | Small Culverts | At-Grade Roadways | Bridges | Large Culverts | Small Culverts | Small Culverts | Pavement Binder Grade | Bridges | Large Culverts | Small Culverts |
| Exposure | | | | | | | | | | | | | |
| Past natural hazard impacts | X | X | X | X | X | X | X | X | X | | X | X | X |
| Lowest impactful sea level rise (SLR) increment | X | X | X | X | | | | | | | | | |
| Percent of road segment exposed to 6.6 ft. of SLR | X | | | | | | | | | | | | |
| Lowest impactful SLR increment with 100-year storm surge | | | | | X | X | X | X | | | | | |
| Percent of road segment exposed to a 100-year storm with 4.6 ft. of SLR | | | | | X | | | | | | | | |
| Initial timeframe for elevated level of concern for wildfire | | | | | | | | | X | | | | |
| Highest projected wildfire level of concern | | | | | | | | | X | | | | |
| Initial timeframe when asphalt binder grade needs to change | | | | | | | | | | X | | | |
| Maximum riverine flooding exposure score for the 2010-2039 timeframe | | | | | | | | | | | X | X | X |
| Maximum riverine flooding exposure score | | | | | | | | | | | X | X | X |
| Consequences | | | | | | | | | | | | | |
| Bridge substructure condition rating | | | | | | X | | | | | X | | |
| Channel and channel protection condition rating | | | | | | | | | | | X | X | |
| Culvert condition rating | | | | | | | X | X | | | | X | X |
| Culvert material | | | | X | | | | | X | | | | |
| Scour rating | | | | | | X | | | | | X | | |
| Average annual daily traffic (AADT) | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Average annual daily truck traffic (AADTT) | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Incremental travel distance to detour around the asset | | | | | | | | | X | | X | X | X |
| Incremental travel distance to detour around the asset for the lowest impactful SLR increment | X | X | X | X | X | X | X | X | | | | | |
| Incremental travel distance to detour around the asset under the maximum increment of SLR (6.6 feet of SLR alone and 4.6 feet of SLR with a 100-year storm.[9] | X | X | X | X | X | X | X | X | | | | | |

[9] Both sea level rise and storm surge datasets were applied when calculating detour routes. Data applied came from two different models which use different methodologies and assumptions. As such, the model results did not match up across the same flood extents. In the detour analysis, if a road was exposed to sea level rise but not surge due to differing model extents, then the detour would assume the roadway was exposed to sea level rise AND surge.

The metrics included in this study fall into two categories: exposure metrics and consequence metrics. Exposure metrics capture the extensiveness, severity, and timing of a hazard's projected impact on an asset. Assets that have more extensive, more severe, and sooner exposure are given a higher priority. Consequence metrics provide an indication of how sensitive an exposed asset is to damage using information on the asset's condition. Consequence metrics also indicate how sensitive the overall transportation network may be to the loss of that asset should it be taken out of service by a hazard. The poorer the initial condition of the potentially exposed asset and the more critical it is to the functioning of the transportation network, the higher the priority given. The specific metrics that are included within each of these categories are described in the sections that follow.

### 3.3.1. Exposure Metrics

The following metrics were used to assess asset exposure in District 10:

- **Past natural hazard impacts:** Assets that have experienced sea level rise, weather, or fire-related impacts in the past are likely to experience more issues in the future as climate changes and should be prioritized. To obtain information on past impacts, District 10 maintenance staff were surveyed and asked to identify any at-grade roadways, bridges, large culverts, or small culverts that had experienced sea level rise, or storm surge, issues in the past. Staff was also asked to document past riverine flooding impacts for all these asset types except at-grade roadways. Care was taken to ensure that these impacts occurred on assets that had not been replaced with a more resilient design after the event occurred. In addition, staff was also asked if any small culverts were damaged directly by fire and replaced with culverts of the same material. Any asset that was identified as previously impacted by either flooding or fire was flagged and that asset was given a higher priority for adaptation.

DETWILER FIRE DAMAGE

- **Lowest impactful sea level rise increment:** Assets that are likely to be impacted by sea level rise sooner should receive higher priority for detailed facility level assessments. To consider this in the asset scoring, a metric was developed that captured the lowest (first) increment of sea level rise[10] to potentially impact each at-grade roadway, bridge[11], large culvert, and small culvert.

[10] Sea level rise areas hydrologically connected to the sea and hydrologically disconnected low-lying areas potentially vulnerable to sea level rise inundation were both used for this assessment.

[11] The lowest impactful sea level rise scenario for bridges was determined by whichever increment of sea level rise first causes inundation under the bridge. For bridges already over Delta channels, potential impacts were assumed to occur at the lowest available increment of sea level rise. No analyses were performed to compare the elevations of the bottoms of the bridge decks to the underlying water elevations. The analysis was set up this way in recognition of the impacts possible at bridges from sea level rise before water touches the deck (i.e., enhanced corrosion and structural stability, erosion, and navigability concerns).

This metric made use of the Climate Central sea level rise data used in the District 10 Climate Change Vulnerability Assessment.[12] This data is available across the Delta for the following sea level rise heights: 0.0, 0.8, 1.6, 2.5, 3.3, 4.1, 4.9, 5.7, and 6.6 feet. The lower the sea level rise increment that first impacts the asset, the higher priority it received for this metric.

- **Percent of road segment exposed to 6.6 ft. of sea level rise:** For at-grade roadway segments[13], not only is the timing of sea level rise impacts an important factor, but also the extensiveness of the impacts. All else being equal, a segment of road that is impacted over a large proportion of its length should receive higher priority than one impacted over only a small area. The 6.6 feet sea level rise increment from Climate Central was used for this metric in order to provide an indicator of more severe, potential impacts at the end of the century under a pessimistic greenhouse gas emissions scenario.

- **Lowest impactful sea level rise increment with 100-year storm surge:** As with sea level rise, assets that are likely to be impacted by storm surge sooner should receive higher priority for detailed facility level assessments. To factor this into the analysis, this metric captures the lowest (first) sea level rise increment at which the 100-year storm surge could potentially impact each at-grade roadway, bridge[14], large culvert, and small culvert. The CalFloD-3D model was used for this exercise and in the District 10 Climate Change Vulnerability Assessment storm surge assessment.[15] CalFloD-3D modeled a more limited set of future sea level rise increments than the Climate Central model (0.0, 1.6, 3.3, and 4.6 feet) with a 100-year storm event.

- **Percent of road segment exposed to a 100-year storm surge with 4.6 feet of sea level rise:** This metric measures the proportion of each at-grade roadway segment exposed to a 100-year storm surge. The highest CalFloD-3D model sea level rise and storm surge increment of 4.6 feet was applied. The highest model sea level rise increment is representative of 2080 projections under a lower probability scenario and high future emissions.[16] All else being equal, the greater the proportion of roadway length exposed to storm surge, the higher the priority of that segment.

- **Initial timeframe for elevated level of concern from wildfire:** Assets that are more likely to be impacted by wildfire sooner should be prioritized first. Using the future wildfire projections developed for the District 10 Climate Change Vulnerability Assessment Report, the initial timeframe (2010-2039, 2040-2069, 2070-2099, or Beyond 2099) for heightened wildfire risk was determined for each small culvert.[17] The most recent timeframe across the range of available

[12] See the District 10 Climate Change Vulnerability Assessment Summary and/or Technical Reports for more information: https://dot.ca.gov/programs/transportation-planning/2019-climate-change-vulnerability-assessments

[13] At-grade roadways are segmented at intersections with other roads thereby matching the segmentation used for the pavement binder grade analysis.

[14] As with sea level rise, the lowest impactful sea level rise scenario for bridges was determined by whichever increment of sea level rise first causes storm surge inundation under the bridge. For bridges already over Delta waters, potential impacts were assumed to occur at the lowest available increment of sea level rise. No analyses were performed to compare the elevations of the bottoms of the bridge decks to the underlying water elevations. The analysis was set up this way in recognition of the impacts possible at bridges from storm surge before water touches the deck (i.e., structural stability, erosion, and scour concerns).

[15] See the District 10 Climate Change Vulnerability Assessment Summary and/or Technical Reports for more information: https://dot.ca.gov/programs/transportation-planning/2019-climate-change-vulnerability-assessments

[16] See the Ocean Protection Council California Sea Level Rise Guidance (2018 Update) for more information on sea level rise projections in San Francisco Bay (these are the closest projections to the Delta): https://opc.ca.gov/webmaster/ftp/pdf/agenda_items/20180314/Item3_Exhibit-A_OPC_SLR_Guidance-rd3.pdf

[17] See the District 10 Climate Change Vulnerability Assessment Summary and/or Technical Reports for more information: https://dot.ca.gov/programs/transportation-planning/2019-climate-change-vulnerability-assessments

climate scenarios was chosen. Assets that were impacted sooner were given a higher priority for adaptation.

- **Highest projected wildfire level of concern:** Assets that are exposed to a greater wildfire risk should be prioritized. The wildfire modeling conducted for the District 10 Climate Change Vulnerability Assessment Report classified fire risk into five levels of concern (very low, low, moderate, high, and very high) at various future time periods.[18] Using this data, the highest level of concern was determined for each small culvert between now and 2100 and across all climate scenarios. Assets with higher levels of concern were given a higher priority for adaptation.

- **Initial timeframe when asphalt binder grade needs to change:** Roadway segments that are more likely to need binder grade changes sooner should be prioritized. Using the assumptions and data from the pavement binder grade exposure analysis described above, the initial timeframe (prior to 2010, 2010-2039, 2040-2069, or 2070-2099) for binder grade change was determined. Roadway segments that were found to need binder grade changes sooner were given a higher priority for detailed adaptation assessments.

- **Maximum riverine flooding exposure score for the 2010-2039 timeframe**: Assets that have relatively higher exposure to riverine flooding in the near-term should be prioritized. Using the riverine flood exposure index values calculated using the process described above, the highest score for the near-term (2010-2039) period was determined for each bridge, large culvert, and small culvert considering all climate scenarios and the range of outputs from all climate and wildfire models. Assets with the highest overall riverine flooding scores in this initial period received a higher priority for adaptation.

- **Maximum riverine flooding exposure score:** In addition to understanding the most pressing near-term needs for dealing with riverine flooding, assets that have relatively higher exposure to riverine flooding at any point over their lifespans should also be prioritized. To calculate this metric, the highest riverine flooding exposure score was determined for each asset considering all time periods (from now through 2100), all climate scenarios, and all climate and wildfire models. Assets with the highest overall riverine flooding scores received a higher priority for adaptation.

### 3.3.2. Consequence Metrics

The following metrics were used to understand the consequences of each asset's exposure, considering both asset sensitivity to damage and network sensitivity to loss of the asset:

- **Bridge substructure condition rating:** Poor bridge substructure condition can contribute to failure during riverine flooding and storm surge events. The NBI assigns a substructure condition rating to each bridge. Values range from nine to two with lower values indicating poorer condition. Bridges with poor substructure condition ratings were given higher priority for adaptation assessments.

[18] See the District 10 Climate Change Vulnerability Assessment Summary and/or Technical Reports for more information: https://dot.ca.gov/programs/transportation-planning/2019-climate-change-vulnerability-assessments

- **Channel and channel protection condition rating:** Poor channel conditions or inadequate channel protection measures can contribute to failure during riverine flooding events. The NBI assigns a channel and channel protection condition rating to each bridge and large culvert. Values range from nine to two with lower values indicating poorer condition. Bridges and large culverts with poor channel or channel protection ratings were given higher priority for adaptation assessments.

- **Culvert condition rating:** Poor culvert condition can contribute to failure during storm surge and riverine flooding events. The NBI assigns a culvert condition rating to each large culvert. Values range from nine to two with lower values indicating poorer condition. Caltrans has developed their own culvert condition rating system for small culverts. Possible ratings in the Caltrans system include good, fair, critical, and poor. Large and small culverts with poorer condition ratings in either system were prioritized.

- **Culvert material:** Culvert material determines the sensitivity of culverts to direct damage from wildfires and material degradation due to sea level rise. Caltrans includes material data in its databases on small culverts (no equivalent information exists for large culverts). Possible culvert materials include HDPE (high density polyethylene [plastic]), PVC (polyvinyl chloride [plastic]), corrugated steel pipe, composite, wood, masonry, and concrete. HDPE, PVC, corrugated steel pipe, composite, and wood culverts are all more sensitive to wildfire and any small culverts made from these materials that are exposed to an elevated risk from wildfire were prioritized for adaptation. Likewise, corrugated steel pipe and concrete are more sensitive to regular saltwater inundation and any small culverts made from these materials that are exposed to sea level rise were assigned a higher priority.

- **Scour rating:** Scour is a condition where water has eroded the soil around bridge piers and abutments. Excessive scour of bridge foundations makes bridges more prone to failure, especially during storm surge and riverine flooding events. The NBI assigns a scour condition rating to each bridge. Values range from eight to two with lower values indicating greater scour concern. Bridges with lower scour values (higher scour concern) were given higher priority for adaptation assessments.

EMERGENCY STORM DRAIN CLEANING

- **Average annual daily traffic (AADT):** AADT is a measure of the average traffic volume on a roadway. The consequences of weather and sea level rise-related failures/disruptions/maintenance are greater for assets that convey a higher volume of traffic. Disruptions on higher volume roads affect a greater proportion of the traveling public and there is a greater chance of congestion ripple effects throughout the network because alternate routes are less likely to be able to absorb the diverted traffic. AADT data was obtained from Caltrans databases and assigned to all the asset types included in this study. Exposed assets with higher AADT values were given greater priority for adaptation.

- **Average annual daily truck traffic (AADTT):** AADTT is a measure of the average truck volumes on a roadway. Efficient goods movement is important for maintaining economic resiliency and for providing relief supplies after a disaster. The consequences of weather and sea level rise-related failures/disruptions/maintenance are greater for assets that are a critical link in supply chains. AADTT data was obtained from Caltrans databases and assigned to all the asset types included in this study. Potentially exposed assets with higher AADTT values were given greater priority for adaptation.

- **Incremental travel distance to detour around the asset due to wildfire or riverine flooding closures:** This metric measures the degree of network redundancy around each asset which may be out of service due to a wildfire or riverine flood impacts. A detour routing tool was developed for this project that can find the shortest path detour around a bridge, large culvert, or small culvert and calculate the additional travel distance that would be required to take that detour. The tool was run for each of the assets studied. Assets that had very long detour routes were given greater priority for adaptation.

- **Incremental travel distance to detour around the asset for the lowest impactful SLR increment:** A more complex version of the detour routing tool was used to determine the shortest detour for the lowest impactful sea level rise increment that would result in sea level rise and storm surge affecting each asset. This provides an indication of the initial network redundancy issues that may be created by impacts in the Delta. For these hazards, the detour tool considered the inundation/erosion throughout the roadway network for each increment of sea level rise evaluated. This ensured that detours were not routed onto roads that would also be inundated or eroded under the same amount of sea level rise. In other words, when run for assets exposed to sea level rise, the detour routing algorithm ensured that no flooded roadways under that sea level rise increment could be considered a detour route. When run for assets exposed to storm surge, the detour routing algorithm ensured that no road affected by either sea level rise or storm surge at the same increment of sea level rise could be considered a detour route. As with the riverine flooding detours, assets that had very long detour routes were given greater priority for adaptation.

- **Incremental travel distance to detour around the asset under the maximum extent of SLR ( 6.6 feet of SLR and 4.6 feet of SLR with a 100-year storm):** This metric captures the level of network redundancy around exposed at-grade roadways, bridges, large culverts, and small culverts under 6.6 feet of SLR and 4.6 feet of SLR and a 100-year storm surge. As in the sea level rise and surge metrics, the Climate Central model was used for sea level rise on its own and the CalFloD-3D model was used to identify potential roadway closures under sea level rise and surge. The detour values for this metric were calculated the same way as was done for the lowest impactful sea level rise increment detour metrics described above. Likewise, assets that had very long detour routes under these sea level rise and surge increment were given greater priority for adaptation.

## 3.4. Calculation of Initial Prioritization Scores

Once all the metrics had been gathered/developed, the next step was to combine them and calculate an initial prioritization score for each asset. Calculating prioritization scores is a multi-step process that was conducted using Microsoft Excel. The primary steps are as follows:

1. **Scale the raw metrics:** Several of the metrics described in the previous section have different units of measurement. For example, the AADT metric is measured in vehicles per day whereas the incremental travel time to detour around the asset is measured in minutes. There is a need to put each metric on a common scale to be able to integrate them into one scoring system. For this study, it was decided to use a scale ranging from zero to 100 with zero indicating a value for a metric that would result in the lowest possible priority level and 100 indicating a value for a metric that would result in the highest possible priority level. The district-wide minimum and maximum values for each metric were used to set that metric's zero and 100 values. The past weather/fire impacts metric (which had binary values) was assigned a zero if the condition was false (i.e., there were no previous weather/fire impacts reported) and 100 if the condition was true. Categorized or incremental values, like the various condition rating metrics or the sea level rise increments, were generally parsed out evenly between zero and 100 (e.g., if there were seven condition rating values, the minimum and maximum values were coded as zero and 100, respectively, with the five remaining categories assigned values at intervals of 20). The remaining metrics with continuous values were allowed to fall at their proportional location within the re-scaled zero to 100 range.

2. **Apply weights:** Some metrics have been determined by Caltrans to be more important than others for determining priorities. Therefore, the relative importance of each metric was adjusted by multiplying the scaled score by a weighting factor. Metrics deemed more important to prioritization were multiplied by a larger weight. For consistency, Caltrans Headquarters staff harmonized the weights to be used in all districts based on national best practices and input from the districts. Table 3 shows the weighting schema applied to the asset-hazard combinations in District 10. The weights are percentage based and add to 100% for all the metrics within a given asset-hazard combination (column).

   In general, higher weights were assigned to the future exposure metrics (including those considering both the hazard timing and severity) as they are the primary drivers of adaptation need. This helps ensure adaptations are considered proactively before the hazards affect the assets. It also focuses the first detailed assessments on those assets that are projected most severely affected by climate change.

TABLE 3: WEIGHTS BY METRIC FOR EACH ASSET-HAZARD COMBINATION STUDIED

| Metric | Percentage Weights by Asset Class | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sea Level Rise | | | | Storm Surge | | | | Wildfire | Tempera-ture | Riverine Flooding | | |
| | At-Grade Roadways | Bridges | Large Culverts | Small Culverts | At-Grade Roadways | Bridges | Large Culverts | Small Culverts | Small Culverts | Pavement Binder Grade | Bridges | Large Culverts | Small Culverts |
| **Exposure** | | | | | | | | | | | | | |
| Past natural hazard impacts | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | - | 20% | 20% | 20% |
| Lowest impactful sea level rise (SLR) increment | 22.5% | 45% | 45% | 40% | - | - | - | - | - | - | - | - | - |
| Percent of road segment exposed to 6.6 ft. of SLR | 22.5% | - | - | - | - | - | - | - | - | - | - | - | - |
| Lowest impactful SLR increment with 100-year storm surge | - | - | - | - | 22.5% | 45% | 45% | 45% | - | - | - | - | - |
| Percent of road segment exposed to a 100-year storm with 4.6 ft. of SLR | - | - | - | - | 22.5% | - | - | - | - | - | - | - | - |
| Initial timeframe for elevated level of concern for wildfire | - | - | - | - | - | - | - | - | 17.5% | - | - | - | - |
| Highest projected wildfire level of concern | - | - | - | - | - | - | - | - | 17.5% | - | - | - | - |
| Initial timeframe when asphalt binder grade needs to change | - | - | - | - | - | - | - | - | - | 60% | - | - | - |
| Maximum riverine flooding exposure score for the 2010-2039 timeframe | - | - | - | - | - | - | - | - | - | - | 22.5% | 22.5% | 22.5% |
| Maximum riverine flooding exposure score | - | - | - | - | - | - | - | - | - | - | 22.5% | 22.5% | 22.5% |
| **Consequences** | | | | | | | | | | | | | |
| Bridge substructure condition rating | - | - | - | - | - | 1.5% | - | - | - | - | 1% | - | - |
| Channel and channel protection condition rating | - | - | - | - | - | - | - | - | - | - | 2.5% | 2.5% | - |
| Culvert condition rating | - | - | - | - | - | - | 5% | 5% | - | - | - | 2.5% | 5% |
| Culvert material | - | - | - | 15% | - | - | - | - | 20% | - | - | - | - |
| Scour rating | - | - | - | - | - | 8.5% | - | - | - | - | 6.5% | - | - |
| Average annual daily traffic (AADT) | 10% | 10% | 10% | 7% | 10% | 7% | 7% | 7% | 7% | 13% | 7% | 10% | 10% |
| Average annual daily truck traffic | 5% | 5% | 5% | 3% | 5% | 3% | 3% | 3% | 3% | 27% | 3% | 5% | 5% |
| Incremental travel distance to detour around the asset | - | - | - | - | - | - | - | - | 15% | - | 15% | 15% | 15% |
| Incremental travel distance to detour around the asset for the lowest impactful SLR increment | 10% | 10% | 10% | 7.5% | 10% | 7.5% | 10% | 10% | - | - | - | - | - |
| Incremental travel distance to detour around the asset under the maximum increment of SLR (6.6 feet of SLR alone and 4.6 feet of SLR with a 100-year storm.[19] | 10% | 10% | 10% | 7.5% | 10% | 7.5% | 10% | 10% | - | - | - | - | - |
| TOTAL | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

[19] Both sea level rise and storm surge datasets were applied when calculating detour routes. Data applied came from two different models which use different methodologies and assumptions. As such, the model results did not match up across the same flood extents. In the detour analysis, if a road was exposed to sea level rise but not surge due to differing model extents, then the detour would assume the roadway was exposed to sea level rise AND surge. See the District 10 Climate Change Vulnerability Assessment Summary and/or Technical Reports for more information about the sea level rise and surge models applied: https://dot.ca.gov/programs/transportation-planning/2019-climate-change-vulnerability-assessments

Amongst the consequence metrics, more weight is given to the AADT and detour route variables relative to the condition rating related variables (bridge substructure condition rating, channel and channel protection condition rating, culvert condition rating, and scour rating). The logic for this is as follows. First, except for the scour rating, the connection between asset condition and asset failure during a hazard event is not always straightforward. Where there is less confidence in a metric, it is weighted less.[20] Second, other prioritization systems used by Caltrans, namely the asset management system, focus on condition to prioritize assets. Thus, poor condition assets will already be prioritized through that program and, per Caltrans' Climate Adaptation Framework shown in Figure 1 will also undergo detailed adaptation assessments before upgrades are made. There is little value in duplicating that prioritization system for this report; instead this effort puts more priority on assets based on their exposure to climate change-related hazards. Lastly, the traffic volume and detour length variables are the primary measures by which impacts to users of the system are captured and, given the importance of mobility to the functioning of the state, were weighted higher.[21] An exception to some of the logic noted above can be found with small culvert exposure to wildfire and sea level rise. For these assets, nearly as much weight is given to the culvert material variable as to the AADT and detour route variables collectively. This is because the very nature of the threat to small culverts from wildfire and sea level rise is highly related to the material of the culvert. For example, if the culvert is plastic or wood, it is much more susceptible to fire damage than, say, a concrete culvert. Since they are less likely to be adversely affected by fire in the first place, one would not want to give high priority to concrete culverts for wildfire just because they convey a high AADT or have long detour routes. That is why more weight is placed on the material metric for this particular asset-hazard combination.

3. **Calculate prioritization scores for each hazard**: After the weights were applied, the next step was to calculate prioritization scores for each individual hazard. This was done by first summing the products of the weights and scaled values for all the metrics relevant to the particular asset-hazard combination being studied (i.e., summing up the products for each column in Table 3). Since there are different numbers of metrics used to calculate the score for each asset-hazard combination, these values were then re-scaled to range from zero to 100 with zero representing the lowest priority asset and 100 the highest priority asset. These interim scores provide useful information for understanding asset vulnerability to each specific hazard.

4. **Calculate cross-hazard prioritization scores:** While the prioritization scores for each hazard provide useful information, they do not provide the full picture on the threats posed to each asset. It was decided that the final scores used as the basis for prioritization need to look holistically across all the hazards analyzed. This cross-hazard perspective provides a better view of the collective threats faced by each asset and a better basis for prioritization. To calculate the cross-hazard scores, the scores for each hazard analyzed for the asset were summed. These were then re-scaled yet again to a zero to 100 scale since different asset types have different

[20] Note that the scour rating metric is weighted somewhat higher than the other condition related assets because of its more direct connection to asset failure.

[21] Within the traffic volume related metrics, note that slightly more weight is given to AADT as opposed to truck AADT given that most of the traffic on a roadway is non-truck. Thus, it was reasoned that the total volume should factor in somewhat more heavily than the truck volume. One exception to this was for temperature impacts to pavement. This asset-hazard combination is unique in that the traffic volume information is not just an indicator of how many users may be affected by necessary pavement repairs but also an indicator of how much damage may occur to the pavement should temperatures exceed binder grade design thresholds. Given that, for this asset-hazard combination, more weight is given to truck volumes since trucks do disproportionately more damage to temperature-weakened pavement.

numbers of hazards. As before, the higher the score, the higher the adaptation priority of that asset. These cross-hazard scores represent the final scores calculated for each asset during the technical assessment portion of the methodology.

5. **Assign priority levels**: The final step in the technical assessment was to group together assets into different priority levels based on their cross-hazard scores. This was done to make the outputs more oriented to future actions, decrease the tendency to read too much into minor differences in the cross-hazard scores, and better facilitate dialogue at the workshop with District 10 staff. Five priority levels were developed (Priority 1, 2, 3, 4, and 5) and assets were assigned to those groups on a district-wide basis. An equal number of assets were assigned to each priority level to help facilitate administration of the facility-level adaptation assessments that will follow this study.

## 3.5. Adjustments to Prioritization

A workshop was held with District 10 to review the scoring methodology and go over the preliminary results. District 10 staff could adjust asset priorities based upon their own judgement and on-the-ground knowledge. District staff, who possess an intimate knowledge of their assets, may have information about the assets or their environmental context that is not easily captured in an indicator-based scoring methodology. After the workshop and reviewing the scoring and prioritization, District 10 staff accepted the prioritization as-is and did not adjust any of the assets' rankings.

# 4. DISTRICT ADAPTATION PRIORITIES

This chapter presents Caltrans' priorities for undertaking detailed adaptation assessments of assets exposed to climate change in District 10. The material presented in this chapter reflects the results of the technical analysis and the coordination with District 10 staff described in the previous chapter. The information is broken out by asset type with priorities for bridges discussed in the first section, followed by those for large culverts, small culverts, and roadways.

## 4.1. Bridges

A total of 248 bridges were assessed for vulnerability to sea level rise, storm surge, and enhanced riverine flooding associated with climate change. All these bridges should eventually undergo detailed adaptation assessments. However, due to resource limitations, this will not be possible to do all at once. Instead, the bridges will be analyzed over time according to the priorities presented here.

Figure 2 provides a map of all the bridges assessed for exposure to sea level rise, surge, and riverine flooding in the district. The color of the points corresponds to the priority assigned to each bridge; darker red colors indicate higher priority assets. The map shows that high priority bridges are scattered throughout the district. That said, there are a few clusters of areas that have several high priority bridges. The top 17 Priority 1 bridges with the highest cross-hazard prioritization scores are in San Joaquin County in the Delta, where they are exposed to both near-term sea level rise and storm surge and high future flows on the San Joaquin River. Other notable clusters of high priority bridges are located along State Route 140 in Mariposa County, where there is heightened risk for riverine flooding.

Table 4 presents a summary of all the Priority 1 bridges in District 10 sorted by their cross-hazard prioritization scores. A complete listing of all bridges ranked by their prioritization scores appears in Table 8 in the appendix.

TABLE 4: PRIORITY 1 BRIDGES

| Priority | Bridge Number | County [22] | Route | Feature Crossed | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|---|
| 1 | 29 0252L | SJ | INTERSTATE 5 SB | SAN JOAQUIN RIVER 04 | R14.46 | 100.00 |
| 1 | 29 0252R | SJ | I-5 NB & SR 120 EB | SAN JOAQUIN RIVER 05 | R14.46 | 94.84 |
| 1 | 29 0221L | SJ | INTERSTATE 5 SB | FRENCH CAMP SLOUGH | R23.25 | 83.80 |
| 1 | 29 0045 | SJ | STATE ROUTE 4 | OLD RIVER | 0.01 | 81.72 |
| 1 | 29 0043 | SJ | STATE ROUTE 12 | MOKELUMNE RIVER | 0.01 | 80.74 |
| 1 | 29 0101 | SJ | STATE ROUTE 12 | LITTLE POTATO SLOUGH | R4.44 | 80.44 |
| 1 | 29 0177L | SJ | INTERSTATE 5 SB | BEAR CREEK | 34.26 | 77.07 |
| 1 | 29 0177R | SJ | INTERSTATE 5 NB | BEAR CREEK | 34.25 | 77.04 |
| 1 | 29 0049 | SJ | STATE ROUTE 4 | MIDDLE RIVER | 4.42 | 76.83 |
| 1 | 29 0197L | SJ | INTERSTATE 5 | MOKELUMNE RIVER | 49.78 | 73.62 |
| 1 | 29 0197R | SJ | INTERSTATE 5 | MOKELUMNE RIVER | 49.78 | 72.68 |
| 1 | 29 0221R | SJ | INTERSTATE 5 NB | FRENCH CAMP SLOUGH | R23.25 | 67.26 |

[22] ALP = Alpine; AMA = Amador; CAL = Calaveras; MER = Merced; MPA = Mariposa; SJ = San Joaquin; STA = Stanislaus; TUO = Tuolumne

| Priority | Bridge Number | County 22 | Route | Feature Crossed | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|---|
| 1 | 29 0223L | SJ | INTERSTATE 5 SB | WALKER SLOUGH | R23.93 | 64.46 |
| 1 | 29 0223R | SJ | INTERSTATE 5 NB | WALKER SLOUGH | R23.93 | 57.36 |
| 1 | 29 0050 | SJ | SR 4 | SAN JOAQUIN RIVER | 14.15 | 48.65 |
| 1 | 29 0240L | SJ | SR 4 WB | SPBR & GARFIELD AVE | R15.67 | 44.20 |
| 1 | 29 0240R | SJ | SR 4 EB | SPBR & GARFIELD AVE | R15.67 | 44.20 |
| 1 | 38 0039 | STA | STATE ROUTE 4 | DUCK CREEK | 0.88 | 42.54 |
| 1 | 40 0007 | MPA | STATE ROUTE 140 | SWEETWATER CREEK | 37.83 | 42.32 |
| 1 | 29 0176L | SJ | ROUTE 5 | WEBER,PERSHING,FREMONT | 26.47 | 42.17 |
| 1 | 29 0176R | SJ | ROUTE 5 | WEBER,PERSHING,FREMONT | 26.47 | 40.09 |
| 1 | 31 0009 | ALP | STATE ROUTE 4 | NORTH FORK MOKELUMNE RIV | 12.94 | 38.74 |
| 1 | 29 0173L | SJ | INTERSTATE 5 SB | SHIMIZU DR & SMITH CANAL | 28.26 | 36.06 |
| 1 | 30 0036 | CAL | STATE ROUTE 4 | W BRANCH CHEROKEE CREEK | 16.15 | 34.51 |
| 1 | 40 0004 | MPA | STATE ROUTE 140 | BEAR CREEK | R31.29 | 34.34 |
| 1 | 29 0173R | SJ | INTERSTATE 5 NB | SHIMIZU DR & SMITH CANAL | 28.26 | 33.40 |
| 1 | 38 0040 | STA | STATE ROUTE 4 | ROCK CREEK | R1.68 | 32.08 |
| 1 | 29 0042 | SJ | STATE ROUTE 26 | DUCK CREEK | 16.87 | 31.01 |
| 1 | 32 0012 | TUO | STATE ROUTE 108 | EAGLE CREEK | 53.03 | 30.52 |
| 1 | 30 0007 | CAL | STATE ROUTE 12 | N. FORK CALAVERAS RIVER | 17.25 | 29.65 |
| 1 | 39 0199 | MER | STATE ROUTE 165 | CALIFORNIA AQUEDUCT | 1.08 | 28.65 |
| 1 | 40 0006 | MPA | STATE ROUTE 140 | SLATE GULCH | 37.09 | 28.52 |
| 1 | 39 0061 | MER | STATE ROUTE 59 | DEADMANS CREEK | 7.9 | 28.06 |
| 1 | 31 0012 | ALP | STATE ROUTE 4 | SILVER CREEK | 27.98 | 27.94 |
| 1 | 29 0017 | SJ | STATE ROUTE 99 SB | LITTLEJOHNS CREEK | 12.53 | 27.32 |
| 1 | 29 0180L | SJ | INTERSTATE 205 WB | CANAL ROAD | R11.72 | 27.29 |
| 1 | 29 0180R | SJ | INTERSTATE 205 EB | CANAL ROAD | R11.72 | 27.29 |
| 1 | 29 0214L | SJ | INTERSTATE 205 WB | EL RANCHO ROAD | R10.48 | 27.29 |
| 1 | 29 0214R | SJ | INTERSTATE 205 EB | EL RANCHO ROAD | R10.48 | 27.29 |
| 1 | 38 0126R | STA | INTERSTATE 5 NB | INGRAM CREEK | 23.07 | 27.09 |
| 1 | 31 0015 | ALP | STATE ROUTE 88 | CAPLES LAKE SPILLWAY | 0.46 | 26.85 |
| 1 | 31 0013 | ALP | STATE ROUTE 4 | EAST FORK CARSON RIVER | 29.78 | 26.76 |
| 1 | 26 0050 | AMA | STATE ROUTE 104 | DRY CREEK | R3.62 | 26.64 |

| Priority | Bridge Number | County [22] | Route | Feature Crossed | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|---|
| 1 | 31 0001 | ALP | STATE ROUTE 89 | EAST FORK CARSON RIVER | 13.3 | 26.57 |
| 1 | 31 0018 | ALP | STATE ROUTE 4 | PACIFIC CREEK | 11.99 | 25.56 |
| 1 | 30 0020 | CAL | STATE ROUTE 49 | SIX MILE CREEK | 6.51 | 25.53 |
| 1 | 38 0126L | STA | INTERSTATE 5 SB | INGRAM CREEK | 23.07 | 23.64 |
| 1 | 31 0008 | ALP | STATE ROUTE 4 | JACKASS GULCH | R7.82 | 23.47 |
| 1 | 29 0237R | SJ | SR 4 EB | LINCOLN, UP RR, BNSF RY | R16.2 | 23.36 |

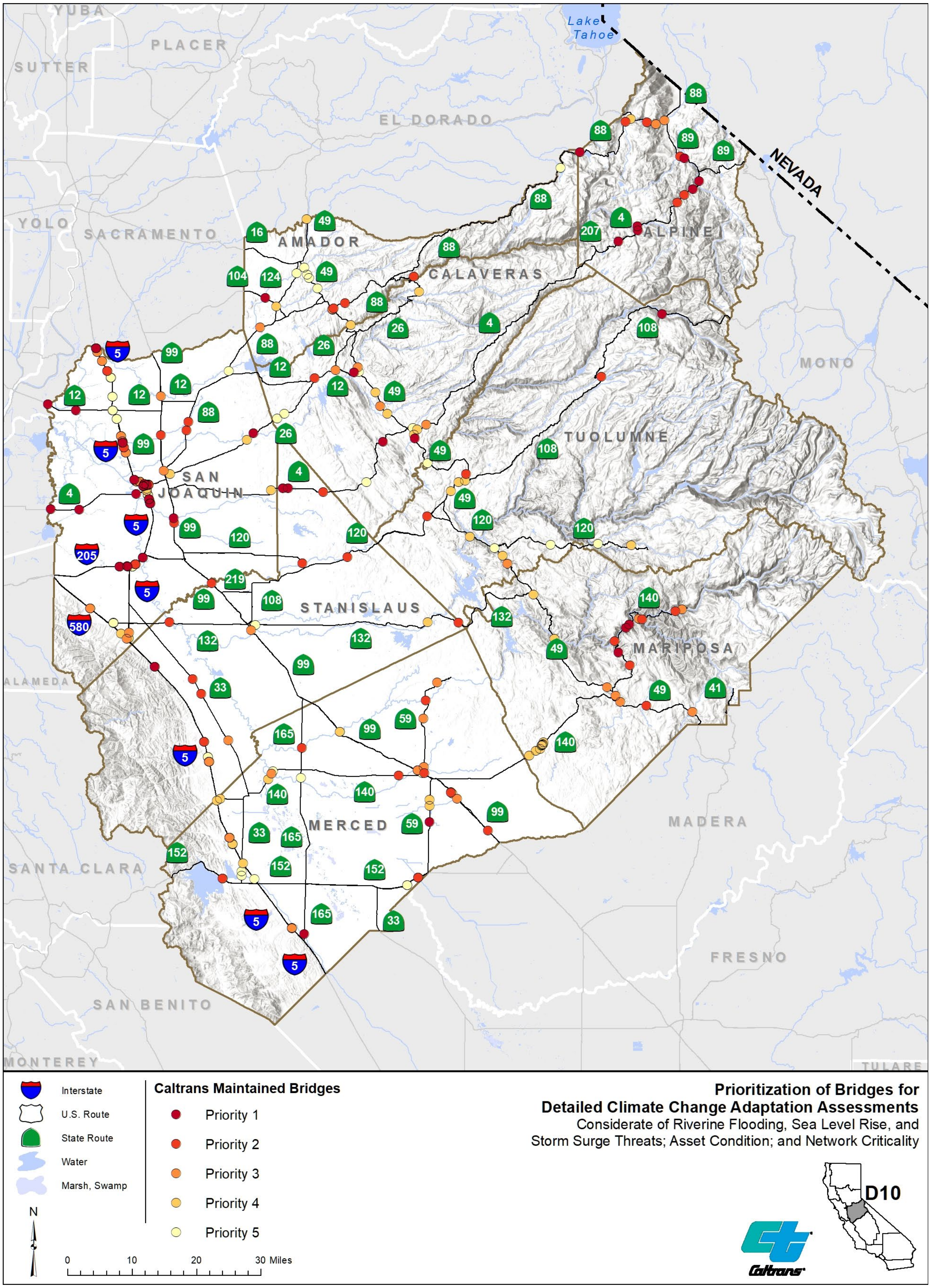



FIGURE 2: PRIORITIZATION OF BRIDGES FOR DETAILED ADAPTATION ASSESSMENTS

## 4.2. Large Culverts

A total of 14 large culverts were assessed for vulnerability to more severe riverine flooding associated with climate change. Figure 3 provides a map of all the large culverts potentially exposed to sea level rise, storm surge, and enhanced riverine flooding in the district and are colored by their priority level. Given the limited number of large culverts in District 10, it is hard to draw spatial patterns to the vulnerabilities. The top two Priority 1 large culverts with the highest cross-prioritization hazard score are in San Joaquin and Merced Counties. Both large culverts received higher scores due to riverine flood exposure and high traffic volumes. The remaining exposed large culverts are distributed throughout District 10.

Table 5 presents a summary of the two Priority 1 large culverts in District 10 sorted by their cross-hazard prioritization scores. A complete listing of all large culverts ranked by their prioritization scores appears in Table 9 in the appendix.

TABLE 5: PRIORITY 1 LARGE CULVERTS

| Priority | Culvert System Number | County[23] | Route | Feature Crossed | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|---|
| 1 | 29 0339 | SJ | STATE ROUTE 132 | LONE TREE CREEK | 2.7 | 100.00 |
| 1 | 39 0040 | MER | STATE ROUTE 152 | LOS BANOS CREEK | 18.2 | 96.21 |

[23] CAL = Calaveras; MER = Merced; MPA = Mariposa; SJ = San Joaquin; STA = Stanislaus

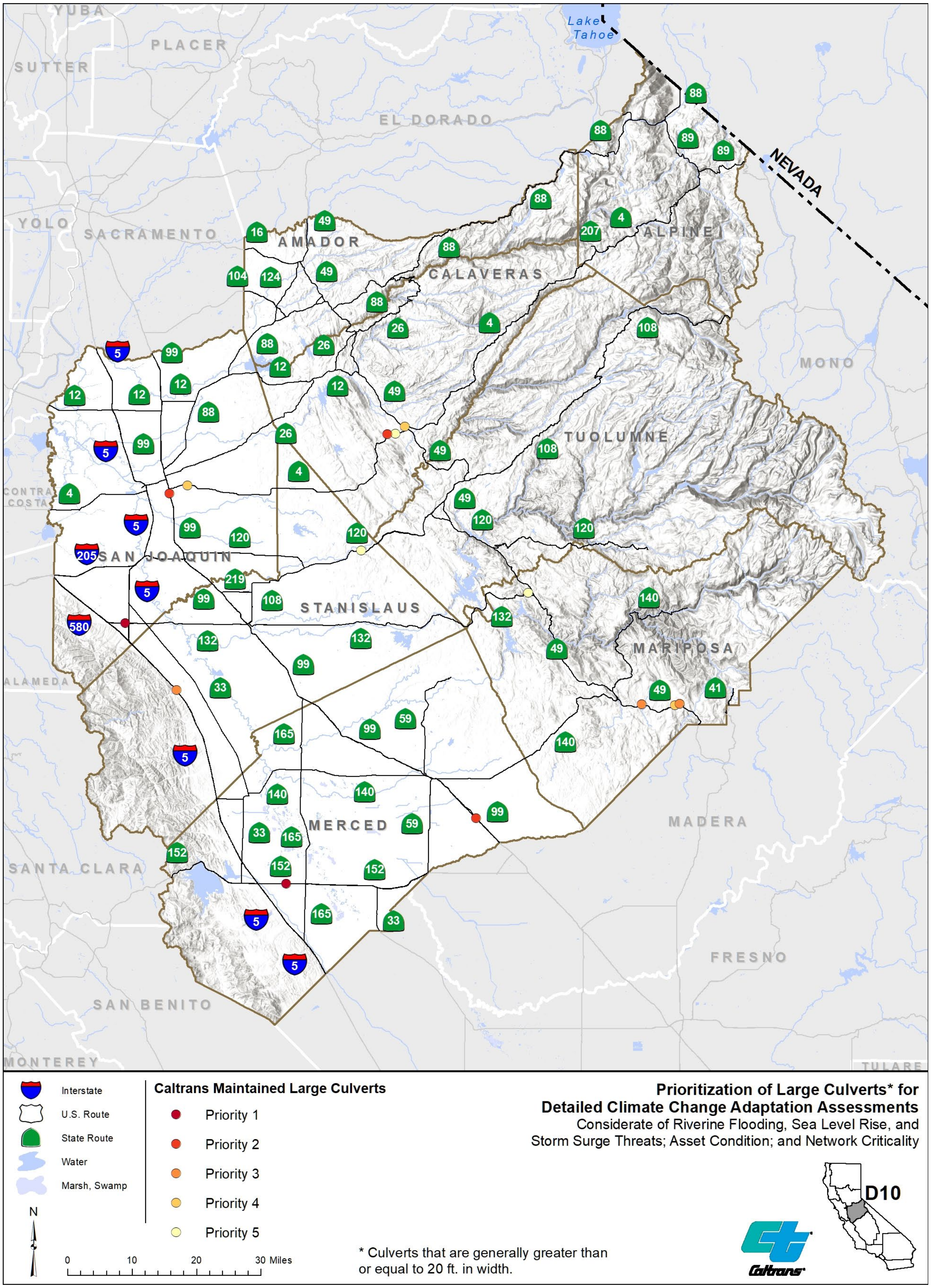



FIGURE 3: PRIORITIZATION OF LARGE CULVERTS FOR DETAILED ADAPTATION ASSESSMENTS

## 4.3. Small Culverts

A total of 588 small culverts were assessed for vulnerability to sea level rise, storm surge, and more severe riverine flooding and wildfire associated with climate change. Figure 4 provides a map of all the small culverts potentially exposed to more severe riverine flooding and wildfire in the district. The small culverts are colored by their priority level.

The map indicates several clusters of high priority small culverts. Notable clusters can be found along several different roadways in Alpine, Tuolumne, and Mariposa Counties, which are noted for their mountainous, rugged terrain and winding roadways. Specifically, small culverts with high cross-hazard prioritization scores include those on State Route 140 in Mariposa County, State Route 108 in Tuolumne County, and State Route 4 in Alpine County. Several of these assets also entail long detour routes to get around if closed.

Table 6 presents a summary of all the Priority 1 small culverts in District 10 sorted by their cross-hazard prioritization scores. A complete listing of all small culverts ranked by their prioritization scores appears in Table 10 in the appendix.

TABLE 6: PRIORITY 1 SMALL CULVERTS

| Priority | Culvert System Number | County[24] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 1 | 310044002845 | ALP | 4 | 28.45 | 100.00 |
| 1 | 321080005298 | TUO | 108 | 52.98 | 90.97 |
| 1 | 321084005425 | TUO | 108 | 54.25 | 90.87 |
| 1 | 321084005351 | TUO | 108 | 53.51 | 90.29 |
| 1 | 321080005163 | TUO | 108 | 51.63 | 90.29 |
| 1 | 321084005361 | TUO | 108 | 53.61 | 90.27 |
| 1 | 321080005219 | TUO | 108 | 52.19 | 90.22 |
| 1 | 321080004931 | TUO | 108 | 49.31 | 89.24 |
| 1 | 321080004924 | TUO | 108 | 49.24 | 89.23 |
| 1 | 321084005491 | TUO | 108 | 54.91 | 88.72 |
| 1 | 321084005483 | TUO | 108 | 54.83 | 88.72 |
| 1 | 321084005642 | TUO | 108 | 56.42 | 88.70 |
| 1 | 321084005539 | TUO | 108 | 55.39 | 88.65 |
| 1 | 321084005443 | TUO | 108 | 54.43 | 88.57 |
| 1 | 321084005756 | TUO | 108 | 57.56 | 88.38 |
| 1 | 310040003037 | ALP | 4 | 30.37 | 88.20 |
| 1 | 321080004900 | TUO | 108 | 49 | 87.78 |
| 1 | 321080005110 | TUO | 108 | 51.1 | 86.77 |
| 1 | 310044002911 | ALP | 4 | 29.11 | 86.34 |
| 1 | 300044106135 | CAL | 4 | 61.35 | 86.21 |
| 1 | 312070000062 | ALP | 207 | 0.62 | 86.13 |
| 1 | 312070000012 | ALP | 207 | 0.12 | 85.61 |

[24] ALP = Alpine; AMA = Amador; CAL = Calaveras; MER = Merced; MPA = Mariposa; SJ = San Joaquin; STA = Stanislaus; TUO = Tuolumne

| Priority | Culvert System Number | County[24] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 1 | 310040003005 | ALP | 4 | 30.05 | 82.78 |
| 1 | 310040003024 | ALP | 4 | 30.24 | 82.72 |
| 1 | 321084005692 | TUO | 108 | 56.92 | 81.51 |
| 1 | 401400003917 | MPA | 140 | 39.17 | 79.58 |
| 1 | 401400003927 | MPA | 140 | 39.27 | 79.58 |
| 1 | 401400003876 | MPA | 140 | 38.76 | 78.97 |
| 1 | 401400003850 | MPA | 140 | 38.5 | 77.80 |
| 1 | 401400003761 | MPA | 140 | 37.61 | 75.55 |
| 1 | 310890001174 | ALP | 89 | 11.74 | 75.17 |
| 1 | 401400004181 | MPA | 140 | 41.81 | 74.88 |
| 1 | 310890001057 | ALP | 89 | 10.57 | 74.49 |
| 1 | 401400003765 | MPA | 140 | 37.65 | 73.75 |
| 1 | 401400003771 | MPA | 140 | 37.71 | 73.75 |
| 1 | 321080004816 | TUO | 108 | 48.16 | 72.78 |
| 1 | 310890001139 | ALP | 89 | 11.39 | 72.26 |
| 1 | 300264000954 | CAL | 26 | 9.54 | 71.75 |
| 1 | 310890001181 | ALP | 89 | 11.81 | 71.51 |
| 1 | 310044000378 | ALP | 4 | 3.78 | 71.21 |
| 1 | 321080004654 | TUO | 108 | 46.54 | 71.00 |
| 1 | 321080004711 | TUO | 108 | 47.11 | 71.00 |
| 1 | 321080004748 | TUO | 108 | 47.48 | 70.98 |
| 1 | 321080004731 | TUO | 108 | 47.31 | 70.98 |
| 1 | 321080004715 | TUO | 108 | 47.15 | 70.94 |
| 1 | 401400004976 | MPA | 140 | 49.76 | 70.85 |
| 1 | 310880000006 | ALP | 88 | 0.06 | 69.34 |
| 1 | 310040002709 | ALP | 4 | 27.09 | 68.05 |
| 1 | 310044000657 | ALP | 4 | 6.57 | 67.41 |
| 1 | 380040000309 | STA | 4 | 3.09 | 67.25 |
| 1 | 321080004801 | TUO | 108 | 48.01 | 67.25 |
| 1 | 310044000745 | ALP | 4 | 7.45 | 66.70 |
| 1 | 401400004944 | MPA | 140 | 49.44 | 66.69 |
| 1 | 310044000587 | ALP | 4 | 5.87 | 66.21 |
| 1 | 310044000477 | ALP | 4 | 4.77 | 66.11 |
| 1 | 310045200487 | ALP | 4 | 4.87 | 65.99 |
| 1 | 321084005854 | TUO | 108 | 58.54 | 65.94 |
| 1 | 310044000739 | ALP | 4 | 7.39 | 65.89 |
| 1 | 310044000360 | ALP | 4 | 3.6 | 65.81 |
| 1 | 310044000366 | ALP | 4 | 3.66 | 65.81 |
| 1 | 310890000802 | ALP | 89 | 8.02 | 65.62 |
| 1 | 310044000644 | ALP | 4 | 6.44 | 65.61 |

| Priority | Culvert System Number | County[24] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 1 | 310044000653 | ALP | 4 | 6.53 | 65.55 |
| 1 | 380044000544 | STA | 4 | 5.44 | 64.71 |
| 1 | 321084005805 | TUO | 108 | 58.05 | 64.43 |
| 1 | 310890000788 | ALP | 89 | 7.88 | 64.34 |
| 1 | 321084006220 | TUO | 108 | 62.2 | 64.18 |
| 1 | 321084006194 | TUO | 108 | 61.94 | 64.16 |
| 1 | 321084006049 | TUO | 108 | 60.49 | 64.16 |
| 1 | 321084005850 | TUO | 108 | 58.5 | 64.15 |
| 1 | 321084006030 | TUO | 108 | 60.3 | 64.15 |
| 1 | 321084005845 | TUO | 108 | 58.45 | 64.14 |
| 1 | 321084006190 | TUO | 108 | 61.9 | 64.13 |
| 1 | 321084006097 | TUO | 108 | 60.97 | 64.10 |
| 1 | 380044000668 | STA | 4 | 6.68 | 63.60 |
| 1 | 310884001557 | ALP | 88 | 15.57 | 63.20 |
| 1 | 310044000821 | ALP | 4 | 8.21 | 63.12 |
| 1 | 380044000602 | STA | 4 | 6.02 | 63.09 |
| 1 | 320490000058 | TUO | 49 | 0.58 | 62.87 |
| 1 | 310880001737 | ALP | 88 | 17.37 | 62.87 |
| 1 | 320494000508 | TUO | 49 | 5.08 | 62.74 |
| 1 | 310880001665 | ALP | 88 | 16.65 | 62.55 |
| 1 | 300040002964 | CAL | 4 | 29.64 | 62.53 |
| 1 | 401400004392 | MPA | 140 | 43.92 | 62.12 |
| 1 | 310044000421 | ALP | 4 | 4.21 | 61.41 |
| 1 | 380044000511 | STA | 4 | 5.11 | 61.17 |
| 1 | 401400004884 | MPA | 140 | 48.84 | 60.99 |
| 1 | 310040002636 | ALP | 4 | 26.36 | 60.98 |
| 1 | 400490003925 | MPA | 49 | 39.25 | 60.76 |
| 1 | 321084006229 | TUO | 108 | 62.29 | 60.57 |
| 1 | 321084006120 | TUO | 108 | 61.2 | 60.49 |
| 1 | 321084006249 | TUO | 108 | 62.49 | 60.27 |
| 1 | 321084006349 | TUO | 108 | 63.49 | 59.95 |
| 1 | 401324100956 | MPA | 132 | 9.56 | 59.45 |
| 1 | 310040002186 | ALP | 4 | 21.86 | 59.10 |
| 1 | 401400004519 | MPA | 140 | 45.19 | 58.72 |
| 1 | 401400004531 | MPA | 140 | 45.31 | 58.67 |
| 1 | 300264000334 | CAL | 26 | 3.34 | 58.21 |
| 1 | 310884001593 | ALP | 88 | 15.93 | 58.12 |
| 1 | 321084006265 | TUO | 108 | 62.65 | 58.08 |
| 1 | 310044002515 | ALP | 4 | 25.15 | 57.82 |
| 1 | 260884106474 | AMA | 88 | 64.74 | 57.28 |

| Priority | Culvert System Number | County[24] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 1 | 401400003224 | MPA | 140 | 32.24 | 57.06 |
| 1 | 310884001950 | ALP | 88 | 19.5 | 57.03 |
| 1 | 310880001636 | ALP | 88 | 16.36 | 56.92 |
| 1 | 401400004507 | MPA | 140 | 45.07 | 56.87 |
| 1 | 401400004792 | MPA | 140 | 47.92 | 56.85 |
| 1 | 401400004624 | MPA | 140 | 46.24 | 56.85 |
| 1 | 401400004776 | MPA | 140 | 47.76 | 56.84 |
| 1 | 380044000567 | STA | 4 | 5.67 | 56.84 |
| 1 | 401400004659 | MPA | 140 | 46.59 | 56.84 |
| 1 | 310894101903 | ALP | 89 | 19.03 | 56.46 |
| 1 | 310880001721 | ALP | 88 | 17.21 | 56.33 |
| 1 | 300264000009 | CAL | 26 | 0.09 | 55.82 |
| 1 | 310894101938 | ALP | 89 | 19.38 | 55.65 |
| 1 | 380040000271 | STA | 4 | 2.71 | 54.64 |

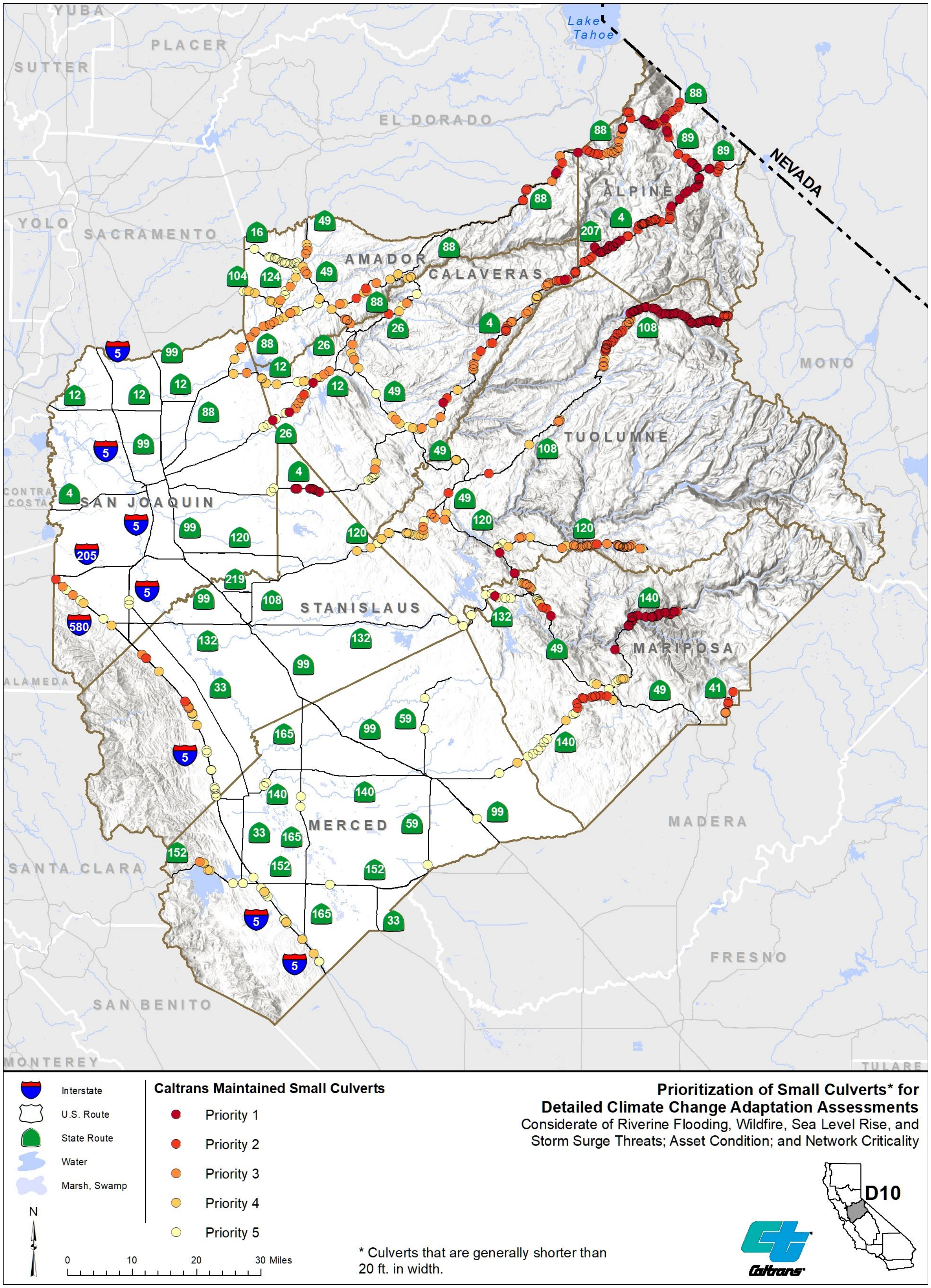



FIGURE 4: PRIORITIZATION OF SMALL CULVERTS FOR DETAILED ADAPTATION ASSESSMENTS

## 4.4. Roadways

A total of 3,323 roadway segments were assessed for vulnerability to sea level rise, storm surge, and temperature changes that affect pavement performance. To make the analysis as detailed as possible, the original segments were short with beginning and end points at intersections with other streets (including smaller local streets) in the roadway network. Once the processing of vulnerability scores was complete, smaller segments sharing the same priority score as their neighbors on the same route were consolidated into longer segments to simplify the presentation of the results. This reduced the number of segments to 478, the results for which are presented here.

Figure 5 provides a map of all the consolidated roadway segments potentially exposed to sea level rise, storm surge, and pavement degrading temperature changes in the district. Each segment of roadway is colored by priority level. 23 of the top 24 roadway segments receiving the highest cross-hazard prioritization scores are in San Joaquin County. Like the bridge analysis, these roadway segments are higher priority due to sea level rise and storm surge hazards in the Delta. Many of these highways are also high traffic routes, such as Interstate 5 and State Route 12.

Table 7 presents a summary of all the Priority 1 roadways in District 10 sorted by their cross-hazard prioritization scores. A complete listing of all roadways ranked by their prioritization scores appears in Table 11 in the appendix.

TABLE 7: PRIORITY 1 ROADWAYS

| Priority | Route | Carriageway[25] | From County & Postmile / To County & Postmile[26] | Average Cross-Hazard Prioritization Score[27] |
|---|---|---|---|---|
| 1 | 12 | P | SJ 12 0.003 / SJ 12 R4.66 | 66.94 |
| 1 | 12 | P | SJ 12 10.178 / SJ 12 10.213 | 66.94 |
| 1 | 12 | P | SJ 12 10.455 / SJ 12 10.821 | 66.94 |
| 1 | 12 | P | SJ 12 M4.98 / SJ 12 10.156 | 66.94 |
| 1 | 12 | P | SJ 12 10.454 / SJ 12 10.659 | 53.66 |
| 1 | 12 | P | SJ 12 6.05 / SJ 12 6.133 | 53.66 |
| 1 | 12 | P | SJ 12 8.724 / SJ 12 8.926 | 53.66 |
| 1 | 12 | P | SJ 12 9.575 / SJ 12 10.211 | 53.66 |
| 1 | 4 | P | CC 4 48.392 / SJ 4 12.889 | 43.18 |
| 1 | 4 | P | SJ 4 12.966 / SJ 4 15.905 | 43.18 |
| 1 | 4 | P | SJ 4 R15.318 / SJ 4 R16.033 | 43.18 |
| 1 | 4 | P | SJ 4 R16.069 / SJ 4 R16.069 | 43.18 |
| 1 | 4 | P | SJ 4 10.186 / SJ 4 10.517 | 42.42 |
| 1 | 4 | P | SJ 4 10.692 / SJ 4 11.746 | 42.42 |
| 1 | 4 | P | SJ 4 11.789 / SJ 4 11.955 | 42.42 |
| 1 | 4 | P | SJ 4 12.216 / SJ 4 12.889 | 42.42 |
| 1 | 4 | P | SJ 4 14.471 / SJ 4 15.906 | 42.42 |

[25] Caltrans' alignment codes designate the carriageway on divided roadways: "P" always represents northbound or eastbound carriageways whereas "S" always represents southbound or westbound carriageways. Undivided roadways are always indicated with a "P".
[26] CAL = Calaveras; MER = Merced; MPA = Mariposa; SJ = San Joaquin; STA = Stanislaus
[27] These values represent the average of the cross-hazard prioritization scores amongst all the abutting small segments on the same route sharing a common priority level that were aggregated to form the longer segments listed in this table.

| Priority | Route | Carriageway[25] | From County & Postmile / To County & Postmile[26] | Average Cross-Hazard Prioritization Score[27] |
|---|---|---|---|---|
| 1 | 4 | P | SJ 4 R15.327 / SJ 4 R16.008 | 42.42 |
| 1 | 4 | P | SJ 4 R16.044 / SJ 4 R16.044 | 42.42 |
| 1 | 4 | P | SJ 4 R16.093 / SJ 4 R16.266 | 42.42 |
| 1 | 4 | P | SJ 4 R6.006 / SJ 4 R6.119 | 42.42 |
| 1 | 4 | P | SJ 4 R8.519 / SJ 4 R8.722 | 42.42 |
| 1 | 4 | P | SJ 4 T13.935 / SJ 4 T14.126 | 42.42 |
| 1 | 5 | P | MER 5 0.008 / MER 5 6.286 | 38.61 |
| 1 | 5 | P | MER 5 6.458 / STA 5 0.009 | 38.61 |
| 1 | 5 | P | SJ 5 2.461 / SJ 5 R21.719 | 38.61 |
| 1 | 5 | P | SJ 5 25.368 / SJ 5 26.155 | 38.61 |
| 1 | 5 | P | SJ 5 26.198 / SJ 5 26.198 | 38.61 |
| 1 | 5 | P | SJ 5 26.204 / SJ 5 26.571 | 38.61 |
| 1 | 5 | P | SJ 5 26.966 / SJ 5 27.947 | 38.61 |
| 1 | 5 | P | SJ 5 28.295 / SJ 5 29.57 | 38.61 |
| 1 | 5 | P | SJ 5 29.646 / SJ 5 34.269 | 38.61 |
| 1 | 5 | P | SJ 5 34.293 / SJ 5 39.292 | 38.61 |
| 1 | 5 | P | SJ 5 39.593 / SJ 5 41.931 | 38.61 |
| 1 | 5 | P | SJ 5 44.439 / SAC 5 0.018 | 38.61 |
| 1 | 5 | P | SJ 5 R22.525 / SJ 5 25.36 | 38.61 |
| 1 | 5 | P | STA 5 0.879 / STA 5 9.456 | 38.61 |
| 1 | 5 | P | STA 5 23.244 / STA 5 28.011 | 38.61 |
| 1 | 5 | P | MER 5 0.009 / MER 5 6.069 | 38.32 |
| 1 | 5 | P | MER 5 6.443 / STA 5 0.003 | 38.32 |
| 1 | 5 | P | SJ 5 2.461 / SJ 5 R21.698 | 38.32 |
| 1 | 5 | P | SJ 5 25.652 / SJ 5 26.132 | 38.32 |
| 1 | 5 | P | SJ 5 26.163 / SJ 5 26.165 | 38.32 |
| 1 | 5 | P | SJ 5 26.172 / SJ 5 26.172 | 38.32 |
| 1 | 5 | P | SJ 5 26.213 / SJ 5 26.542 | 38.32 |
| 1 | 5 | P | SJ 5 26.971 / SJ 5 28.29 | 38.32 |
| 1 | 5 | P | SJ 5 28.324 / SJ 5 29.569 | 38.32 |
| 1 | 5 | P | SJ 5 29.647 / SJ 5 34.261 | 38.32 |
| 1 | 5 | P | SJ 5 34.285 / SJ 5 39.14 | 38.32 |
| 1 | 5 | P | SJ 5 39.583 / SJ 5 42.668 | 38.32 |
| 1 | 5 | P | SJ 5 44.423 / SJ 5 49.818 | 38.32 |
| 1 | 5 | P | SJ 5 R22.775 / SJ 5 25.365 | 38.32 |
| 1 | 5 | P | STA 5 0.884 / STA 5 9.449 | 38.32 |
| 1 | 5 | P | STA 5 23.002 / STA 5 0.159 | 38.32 |
| 1 | 205 | P | ALA 205 L0.005 / SJ 205 R13.299 | 36.97 |
| 1 | 205 | P | ALA 205 L0.005 / SJ 205 R12.867 | 35.66 |
| 1 | 120 | P | SJ 120 6.244 / SJ 120 6.197 | 29.30 |

| Priority | Route | Carriageway[25] | From County & Postmile / To County & Postmile[26] | Average Cross-Hazard Prioritization Score[27] |
|---|---|---|---|---|
| 1 | 120 | P | SJ 120 R0.505 / SJ 120 T7.131 | 29.30 |
| 1 | 99 | P | MER 99 0 / MER 99 R11.71 | 28.67 |
| 1 | 99 | P | MER 99 13.094 / MER 99 27.35 | 28.67 |
| 1 | 99 | P | SJ 99 5.309 / SJ 99 17.213 | 28.67 |
| 1 | 99 | P | MER 99 0.004 / MER 99 R11.726 | 28.51 |
| 1 | 99 | P | MER 99 13.11 / MER 99 27.485 | 28.51 |
| 1 | 99 | P | SJ 99 5.582 / SJ 99 17.213 | 28.51 |
| 1 | 580 | S | SJ 580 15.341R / SJ 580 8.344 | 28.46 |
| 1 | 580 | S | SJ 580 7.972 / SJ 580 1.398 | 28.46 |
| 1 | 120 | P | SJ 120 6.197 / SJ 120 6.245 | 27.96 |
| 1 | 120 | P | SJ 120 R0.493 / SJ 120 T7.132 | 27.96 |
| 1 | 120 | P | STA 120 11.049 / STA 120 17.052 | 27.96 |
| 1 | 120 | P | STA 120 6.901 / STA 120 10.118 | 27.96 |
| 1 | 580 | P | ALA 580 0.092R / SJ 580 8.299 | 27.85 |
| 1 | 580 | P | SJ 580 8.153 / SJ 580 1.413 | 27.85 |
| 1 | 59 | P | MER 59 14.782 / MER 59 14.805 | 27.27 |
| 1 | 59 | P | MER 59 15.033 / MER 59 15.157 | 27.27 |
| 1 | 59 | P | MER 59 15.347 / MER 59 15.37 | 27.27 |
| 1 | 152 | P | MER 152 11.277 / MER 152 13.553 | 26.64 |
| 1 | 152 | P | MER 152 13.835 / MER 152 14.713 | 26.64 |
| 1 | 152 | P | MER 152 R9.799 / MER 152 R10.931 | 26.64 |
| 1 | 152 | P | MER 152 11.281 / MER 152 13.531 | 26.60 |
| 1 | 152 | P | MER 152 13.833 / MER 152 14.709 | 26.60 |
| 1 | 152 | P | MER 152 R7.909 / MER 152 R10.928 | 26.60 |
| 1 | 132 | P | SJ 132 3.226 / SJ 132 4.246 | 26.34 |
| 1 | 132 | P | SJ 132 L0.582 / SJ 132 0.245 | 26.34 |
| 1 | 132 | P | SJ 132 3.226 / SJ 132 6.702 | 25.99 |
| 1 | 132 | P | SJ 132 7.096 / STA 132 1.377 | 25.99 |
| 1 | 132 | P | SJ 132 L0.094 / SJ 132 0.245 | 25.99 |
| 1 | 132 | P | STA 132 1.687 / STA 132 4.409 | 25.99 |
| 1 | 132 | P | STA 132 4.534 / STA 132 6.126 | 25.99 |
| 1 | 132 | P | STA 132 6.602 / STA 132 8.328 | 25.99 |
| 1 | 140 | P | MER 140 35.548 / MER 140 35.75 | 25.72 |
| 1 | 140 | P | MER 140 35.874 / MER 140 35.947 | 25.72 |
| 1 | 49 | P | AMA 49 4.805 / AMA 49 5.714 | 25.63 |
| 1 | 49 | P | AMA 49 5.991 / AMA 49 6.047 | 25.63 |
| 1 | 49 | P | AMA 49 R7.065 / AMA 49 R8.434 | 25.63 |
| 1 | 49 | P | AMA 49 R8.734 / AMA 49 14.661 | 25.63 |
| 1 | 49 | P | TUO 49 15.138 / TUO 49 15.697 | 25.63 |
| 1 | 49 | P | TUO 49 16.017 / TUO 49 17.002 | 25.63 |

| Priority | Route | Carriageway[25] | From County & Postmile / To County & Postmile[26] | Average Cross-Hazard Prioritization Score[27] |
|---|---|---|---|---|
| 1 | 49 | P | TUO 49 17.937 / TUO 49 20.616 | 25.63 |
| 1 | 49 | P | TUO 49 R10.6 / TUO 49 14.327 | 25.63 |
| 1 | 108 | P | TUO 108 R0.04 / TUO 108 R4.568 | 25.58 |
| 1 | 165 | P | MER 165 8.137 / MER 165 8.81 | 25.51 |
| 1 | 88 | P | AMA 88 12.679 / AMA 88 12.775 | 25.45 |
| 1 | 88 | P | AMA 88 14.902 / AMA 88 15.591 | 25.45 |
| 1 | 88 | P | SJ 88 14.775 / SJ 88 16.275 | 25.45 |

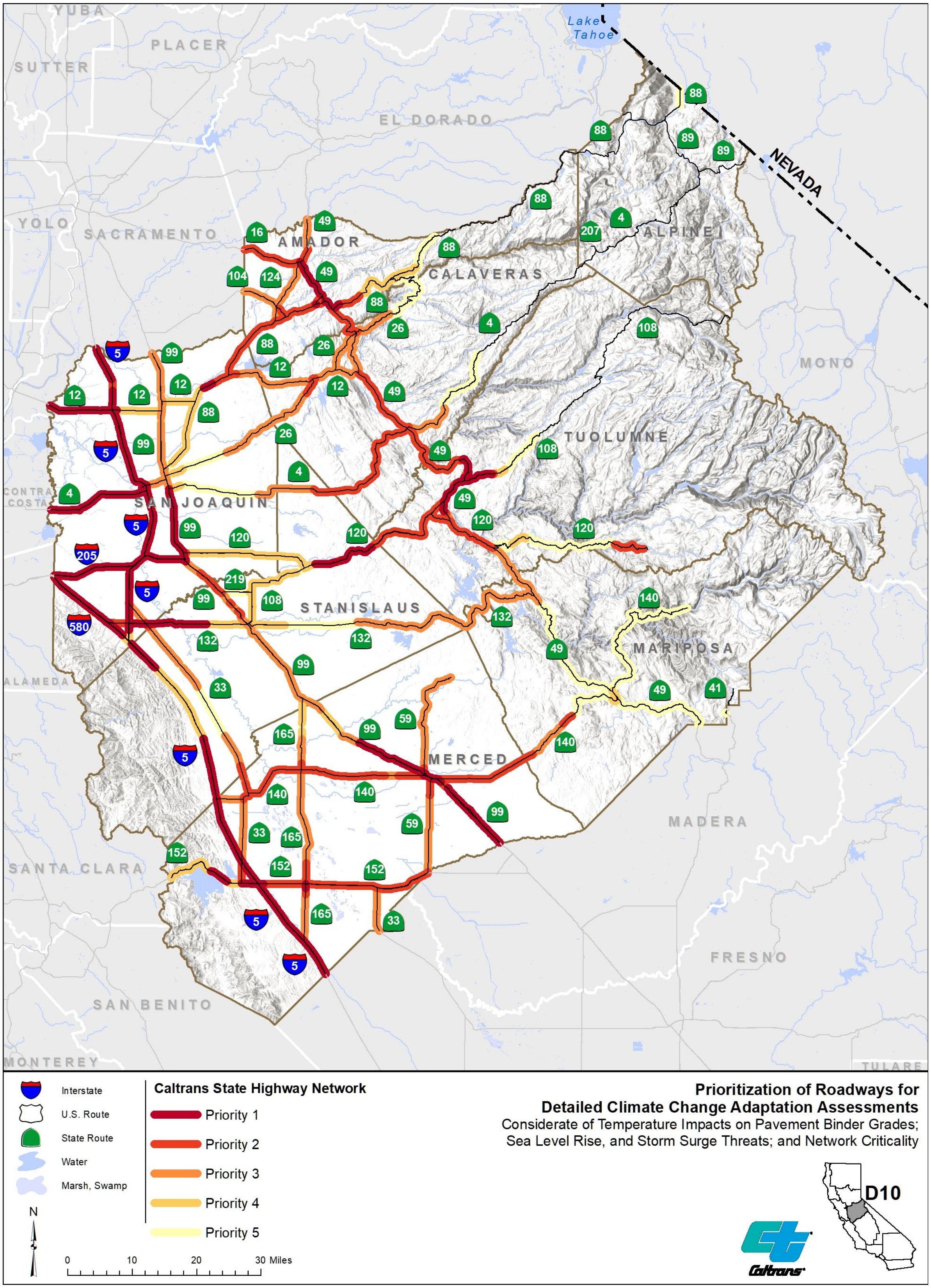



FIGURE 5: PRIORITIZATION OF ROADWAYS FOR DETAILED ADAPTATION ASSESSMENTS

# 5. NEXT STEPS

This report has identified the bridge, large culvert, small culvert, and roadway assets exposed to a variety of climate hazards in District 10 and assigned them priority levels for detailed assessments based on their vulnerability rating. Caltrans' next step will be to begin undertaking these detailed adaptation assessments for the identified assets starting with the highest priority (Priority 1) assets first and then proceeding to lower priority assets thereafter. These detailed adaptation assessments will take a closer look at the exposure to each asset using more localized climate projections and more detailed engineering analyses. If impacts are verified, Caltrans will develop and evaluate adaptation options for the asset to ensure that it is able to withstand future climate changes. Importantly, the detailed adaptation assessments will include coordination with key stakeholder groups whose actions affect or are affected by the asset and its adaptation.

CALIFORNIA HIGHWAY 120

Another next step will be to integrate the prioritization measures into the asset management system used in the district. This will ensure that climate change is a consideration in the identification of future projects alongside traditional asset condition metrics. As noted previously, assets identified for capital investments, especially those flagged as being a high priority for climate change, should then undergo detailed climate change assessments prior to project programming.

In addition, district staff can use the results of this study be a useful starting point to begin discussions with various important stakeholders in the district about addressing climate change and its impacts. This includes state and federal environmental agencies, the National Forest Service, forest product companies (major landowners in the district whose actions directly affect the road network), and others. Multi-agency stakeholder coordination and involvement of the private sector are essential because the impacts from climate change, and ability to effectively address those impacts, cross both jurisdictional and ownership boundaries. For example, Caltrans could increase the size of a culvert to accommodate higher stormwater and debris flows while the more cost-effective solution may be better land management in the adjacent drainage area. The approach to climate change cannot just be Caltrans-centric. A common framework across all state agencies must be established for truly effective long-term solutions to be achieved.

# 6. APPENDIX

TABLE 8: PRIORITIZATION OF BRIDGES FOR DETAILED CLIMATE CHANGE ADAPTATION ASSESSMENTS

| Priority | Bridge Number | County[28] | Route | Feature Crossed | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|---|
| 1 | 29 0252L | SJ | INTERSTATE 5 SB | SAN JOAQUIN RIVER 04 | R14.46 | 100.00 |
| 1 | 29 0252R | SJ | I-5 NB & SR 120 EB | SAN JOAQUIN RIVER 05 | R14.46 | 94.84 |
| 1 | 29 0221L | SJ | INTERSTATE 5 SB | FRENCH CAMP SLOUGH | R23.25 | 83.80 |
| 1 | 29 0045 | SJ | STATE ROUTE 4 | OLD RIVER | 0.01 | 81.72 |
| 1 | 29 0043 | SJ | STATE ROUTE 12 | MOKELUMNE RIVER | 0.01 | 80.74 |
| 1 | 29 0101 | SJ | STATE ROUTE 12 | LITTLE POTATO SLOUGH | R4.44 | 80.44 |
| 1 | 29 0177L | SJ | INTERSTATE 5 SB | BEAR CREEK | 34.26 | 77.07 |
| 1 | 29 0177R | SJ | INTERSTATE 5 NB | BEAR CREEK | 34.25 | 77.04 |
| 1 | 29 0049 | SJ | STATE ROUTE 4 | MIDDLE RIVER | 4.42 | 76.83 |
| 1 | 29 0197L | SJ | INTERSTATE 5 | MOKELUMNE RIVER | 49.78 | 73.62 |
| 1 | 29 0197R | SJ | INTERSTATE 5 | MOKELUMNE RIVER | 49.78 | 72.68 |
| 1 | 29 0221R | SJ | INTERSTATE 5 NB | FRENCH CAMP SLOUGH | R23.25 | 67.26 |
| 1 | 29 0223L | SJ | INTERSTATE 5 SB | WALKER SLOUGH | R23.93 | 64.46 |
| 1 | 29 0223R | SJ | INTERSTATE 5 NB | WALKER SLOUGH | R23.93 | 57.36 |
| 1 | 29 0050 | SJ | SR 4 | SAN JOAQUIN RIVER | 14.15 | 48.65 |
| 1 | 29 0240L | SJ | SR 4 WB | SPBR & GARFIELD AVE | R15.67 | 44.20 |
| 1 | 29 0240R | SJ | SR 4 EB | SPBR & GARFIELD AVE | R15.67 | 44.20 |
| 1 | 38 0039 | STA | STATE ROUTE 4 | DUCK CREEK | 0.88 | 42.54 |
| 1 | 40 0007 | MPA | STATE ROUTE 140 | SWEETWATER CREEK | 37.83 | 42.32 |
| 1 | 29 0176L | SJ | ROUTE 5 | WEBER,PERSHING,FREMONT | 26.47 | 42.17 |
| 1 | 29 0176R | SJ | ROUTE 5 | WEBER,PERSHING,FREMONT | 26.47 | 40.09 |
| 1 | 31 0009 | ALP | STATE ROUTE 4 | NORTH FORK MOKELUMNE RIV | 12.94 | 38.74 |
| 1 | 29 0173L | SJ | INTERSTATE 5 SB | SHIMIZU DR & SMITH CANAL | 28.26 | 36.06 |
| 1 | 30 0036 | CAL | STATE ROUTE 4 | W BRANCH CHEROKEE CREEK | 16.15 | 34.51 |
| 1 | 40 0004 | MPA | STATE ROUTE 140 | BEAR CREEK | R31.29 | 34.34 |
| 1 | 29 0173R | SJ | INTERSTATE 5 NB | SHIMIZU DR & SMITH CANAL | 28.26 | 33.40 |
| 1 | 38 0040 | STA | STATE ROUTE 4 | ROCK CREEK | R1.68 | 32.08 |
| 1 | 29 0042 | SJ | STATE ROUTE 26 | DUCK CREEK | 16.87 | 31.01 |
| 1 | 32 0012 | TUO | STATE ROUTE 108 | EAGLE CREEK | 53.03 | 30.52 |
| 1 | 30 0007 | CAL | STATE ROUTE 12 | N. FORK CALAVERAS RIVER | 17.25 | 29.65 |
| 1 | 39 0199 | MER | STATE ROUTE 165 | CALIFORNIA AQUEDUCT | 1.08 | 28.65 |
| 1 | 40 0006 | MPA | STATE ROUTE 140 | SLATE GULCH | 37.09 | 28.52 |
| 1 | 39 0061 | MER | STATE ROUTE 59 | DEADMANS CREEK | 7.9 | 28.06 |
| 1 | 31 0012 | ALP | STATE ROUTE 4 | SILVER CREEK | 27.98 | 27.94 |

[28] ALP = Alpine; AMA = Amador; CAL = Calaveras; MER = Merced; MPA = Mariposa; SJ = San Joaquin; STA = Stanislaus; TUO = Tuolumne

| Priority | Bridge Number | County[28] | Route | Feature Crossed | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|---|
| 1 | 29 0017 | SJ | STATE ROUTE 99 SB | LITTLEJOHNS CREEK | 12.53 | 27.32 |
| 1 | 29 0180L | SJ | INTERSTATE 205 WB | CANAL ROAD | R11.72 | 27.29 |
| 1 | 29 0180R | SJ | INTERSTATE 205 EB | CANAL ROAD | R11.72 | 27.29 |
| 1 | 29 0214L | SJ | INTERSTATE 205 WB | EL RANCHO ROAD | R10.48 | 27.29 |
| 1 | 29 0214R | SJ | INTERSTATE 205 EB | EL RANCHO ROAD | R10.48 | 27.29 |
| 1 | 38 0126R | STA | INTERSTATE 5 NB | INGRAM CREEK | 23.07 | 27.09 |
| 1 | 31 0015 | ALP | STATE ROUTE 88 | CAPLES LAKE SPILLWAY | 0.46 | 26.85 |
| 1 | 31 0013 | ALP | STATE ROUTE 4 | EAST FORK CARSON RIVER | 29.78 | 26.76 |
| 1 | 26 0050 | AMA | STATE ROUTE 104 | DRY CREEK | R3.62 | 26.64 |
| 1 | 31 0001 | ALP | STATE ROUTE 89 | EAST FORK CARSON RIVER | 13.3 | 26.57 |
| 1 | 31 0018 | ALP | STATE ROUTE 4 | PACIFIC CREEK | 11.99 | 25.56 |
| 1 | 30 0020 | CAL | STATE ROUTE 49 | SIX MILE CREEK | 6.51 | 25.53 |
| 1 | 38 0126L | STA | INTERSTATE 5 SB | INGRAM CREEK | 23.07 | 23.64 |
| 1 | 31 0008 | ALP | STATE ROUTE 4 | JACKASS GULCH | R7.82 | 23.47 |
| 1 | 29 0237R | SJ | SR 4 EB | LINCOLN, UP RR, BNSF RY | R16.2 | 23.36 |
| 2 | 29 0237L | SJ | SR 4 WB | LINCOLN, UP RR, BNSF RY | R16.2 | 23.07 |
| 2 | 29 0247L | SJ | INTERSTATE 5 SB | BEAVER SLOUGH | 45.87 | 22.33 |
| 2 | 29 0247R | SJ | INTERSTATE 5 NB | BEAVER SLOUGH | 45.86 | 22.30 |
| 2 | 29 0199L | SJ | INTERSTATE 5 SB | MOSHER SLOUGH | 33.5 | 22.16 |
| 2 | 29 0199R | SJ | INTERSTATE 5 NB | MOSHER SLOUGH | 33.49 | 22.13 |
| 2 | 38 0041 | STA | STATE ROUTE 4 | HOODS CREEK | 7.28 | 21.80 |
| 2 | 39 0250 | MER | STATE ROUTE 59 | MERCED RIVER | 27.15 | 21.27 |
| 2 | 31 0014 | ALP | STATE ROUTE 88 | WEST FORK CARSON RIVER | 12.46 | 21.12 |
| 2 | 40 0023 | MPA | STATE ROUTE 49 | W FORK CHOWCHILLA RIVER | 11.44 | 21.04 |
| 2 | 38 0111L | STA | INTERSTATE 5 SB | CROW CREEK | 8.94 | 21.01 |
| 2 | 38 0111R | STA | INTERSTATE 5 NB | CROW CREEK | 8.95 | 21.00 |
| 2 | 30 0049 | CAL | STATE ROUTE 26 | N. FORK MOKELUMNE RIVER | 38.31 | 20.43 |
| 2 | 29 0023 | SJ | STATE ROUTE 99 SB | LONE TREE SLOUGH | 11.8 | 20.17 |
| 2 | 38 0065 | STA | STATE ROUTE 120 | BLITZ CREEK | 12.22 | 20.16 |
| 2 | 29 0061 | SJ | U.S. HIGHWAY 88 | MOSHER SLOUGH | 7.53 | 19.84 |
| 2 | 29 0004 | SJ | STATE ROUTE 99 SB | BEAR CREEK | 25.64 | 19.65 |
| 2 | 39 0217 | MER | STATE ROUTE 165 | MERCED RIVER | 30.29 | 19.33 |
| 2 | 40 0003 | MPA | STATE ROUTE 140 | BEAR CREEK | 28.33 | 19.09 |
| 2 | 38 0045 | STA | STATE ROUTE 132 | SAN JOAQUIN RIVER 07 | R2.43 | 18.32 |
| 2 | 29 0032L | SJ | INTERSTATE 5 SB | PARADISE CUT | R12.99 | 18.22 |

| Priority | Bridge Number | County[28] | Route | Feature Crossed | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|---|
| 2 | 38 0023 | STA | STATE ROUTE 120 | STANISLAUS RIVER | 4.26 | 17.97 |
| 2 | 39 0001L | MER | STATE ROUTE 99 SB | DUTCHMAN CREEK | 2.62 | 17.96 |
| 2 | 29 0032R | SJ | INTERSTATE 5 NB | PARADISE CUT | R13.01 | 17.95 |
| 2 | 39 0094 | MER | STATE ROUTE 140 | BLACK RASCAL CREEK | 31.6 | 17.88 |
| 2 | 40 0009 | MPA | STATE ROUTE 140 | MERCED RIVER | 49.85 | 17.71 |
| 2 | 26 0002 | AMA | STATE ROUTE 88 | ROCKY CREEK | 16.66 | 17.69 |
| 2 | 29 0239L | SJ | STATE ROUTE 4 | MADISON STREET | R16.47 | 17.58 |
| 2 | 29 0239R | SJ | STATE ROUTE 4 | MADISON STREET | R16.47 | 17.58 |
| 2 | 39 0034L | MER | STATE ROUTE 152 WB | EASTSIDE BYPASS CHANNEL | R39.29 | 17.39 |
| 2 | 31 0011 | ALP | STATE ROUTE 4 | SILVER CREEK | 26.15 | 17.00 |
| 2 | 26 0037 | AMA | STATE ROUTE 88 | MIDDLE FORK JACKSON CRK | 14.56 | 16.91 |
| 2 | 38 0063 | STA | STATE ROUTE 132 | QUARTZ LEDGE CREEK | 49.62 | 16.77 |
| 2 | 40 0008 | MPA | STATE ROUTE 140 | SOUTH FORK MERCED RIVER | 43.22 | 16.57 |
| 2 | 29 0013L | SJ | STATE ROUTE 99 SB | STANISLAUS RIVER | 0 | 16.55 |
| 2 | 38 0020 | STA | STATE ROUTE 33 | SALADO CREEK | 13.94 | 16.48 |
| 2 | 31 0010 | ALP | STATE ROUTE 4 | RAYMOND MEADOW CREEK | 24.47 | 16.46 |
| 2 | 31 0026 | ALP | STATE ROUTE 88 | WEST FORK CARSON RIVER | 16.13 | 16.44 |
| 2 | 39 0034R | MER | STATE ROUTE 152 EB | EASTSIDE BYPASS CHANNEL | R39.29 | 16.42 |
| 2 | 39 0145L | MER | STATE ROUTE 152 WB | SAN LUIS DAM FOREBAY | R10.05 | 16.11 |
| 2 | 40 0005 | MPA | STATE ROUTE 140 | BEAR CREEK | 34.08 | 16.06 |
| 2 | 32 0006 | TUO | STATE ROUTE 49 | WOODS CREEK | 17.49 | 16.01 |
| 2 | 32 0010 | TUO | STATE ROUTE 108 | S FORK STANISLAUS RIVER | 31.24 | 15.76 |
| 2 | 38 0019 | STA | STATE ROUTE 33 | DEL PUERTO CREEK | 16.54 | 15.58 |
| 2 | 39 0009L | MER | STATE ROUTE 59 SB | BEAR CREEK | 15.23 | 15.31 |
| 2 | 30 0002 | CAL | STATE ROUTE 12 | COSGROVE CREEK | 10.32 | 15.30 |
| 2 | 29 0062 | SJ | U.S. HIGHWAY 88 | BEAR CREEK | 8.91 | 15.10 |
| 2 | 31 0002 | ALP | STATE ROUTE 89 | MARKLEEVILLE CREEK | 14.69 | 15.06 |
| 2 | 39 0007L | MER | STATE ROUTE 99 SB | MILES CREEK | 10.83 | 14.94 |
| 2 | 32 0034 | TUO | STATE ROUTE 120 | ALKALI CREEK | 11.29 | 14.64 |
| 3 | 29 0200L | SJ | INTERSTATE 5 SB | MCAULIFFE RD | 34.46 | 14.36 |
| 3 | 29 0209R | SJ | INTERSTATE 5 NB | EIGHT MILE RD | 35.3 | 14.36 |
| 3 | 26 0036 | AMA | STATE ROUTE 88 | SOUTH FORK JACKSON CREEK | 14.3 | 14.17 |
| 3 | 38 0107L | STA | INTERSTATE 5 SB | ORESTIMBA CREEK | 5.73 | 14.13 |

| Priority | Bridge Number | County[28] | Route | Feature Crossed | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|---|
| 3 | 39 0087 | MER | S BR INGALSBE SLGH | SOUTH BR INGALSBE SLOUGH | 31.25 | 14.12 |
| 3 | 38 0107R | STA | INTERSTATE 5 NB | ORESTIMBA CREEK | 5.73 | 14.11 |
| 3 | 39 0069 | MER | STATE ROUTE 59 | EDENDALE CREEK | 24.09 | 13.81 |
| 3 | 40 0044 | MPA | STATE ROUTE 49 | MARIPOSA CREEK | 19.61 | 13.56 |
| 3 | 30 0006 | CAL | STATE ROUTE 12 | HAUPT CREEK | 13.93 | 13.55 |
| 3 | 40 0048 | MPA | STATE ROUTE 49 | E FORK CHOWCHILLA RIVER | 2.87 | 13.44 |
| 3 | 39 0153L | MER | INTERSTATE 5 SB | ORTIGALITA CREEK | 8.89 | 13.43 |
| 3 | 40 0010 | MPA | STATE ROUTE 140 | CRANE CREEK | 50.93 | 13.40 |
| 3 | 31 0003 | ALP | STATE ROUTE 89 | WEST FORK CARSON RIVER | 21.31 | 12.94 |
| 3 | 29 0195R | SJ | INTERSTATE 5 | BUENA VISTA UC | 27.28 | 12.87 |
| 3 | 39 0068 | MER | STATE ROUTE 59 | BLACK RASCAL CANAL | 16.27 | 12.86 |
| 3 | 39 0153R | MER | INTERSTATE 5 NB | ORTIGALITA CREEK | 8.89 | 12.82 |
| 3 | 38 0078L | STA | STATE ROUTE 99 SB | ZEFF RD & TUOLUMNE RIVER | R14.93 | 12.81 |
| 3 | 29 0248L | SJ | INTERSTATE 5 SB | BARBER ROAD | 49.18 | 12.81 |
| 3 | 39 0091 | MER | STATE ROUTE 140 | NORTH BRANCH MUD SLOUGH | 11.32 | 12.80 |
| 3 | 29 0116 | SJ | STATE ROUTE 99 SB | STOCKTON DIVERTING CANAL | 20.12 | 12.78 |
| 3 | 29 0235L | SJ | SR 4 WB | E4-N5, W4-S5 CONN RAMPS | R16.02 | 12.59 |
| 3 | 29 0235R | SJ | SR 4 EB | E4-N5, W4-S5 CONN RAMPS | R16.01 | 12.59 |
| 3 | 29 0250L | SJ | INTERSTATE 5 SB | WALNUT GROVE ROAD | 47.61 | 12.58 |
| 3 | 29 0250R | SJ | INTERSTATE 5 NB | WALNUT GROVE ROAD | 47.6 | 12.58 |
| 3 | 39 0004 | MER | STATE ROUTE 99 | DUCK SLOUGH | 9.43 | 12.54 |
| 3 | 29 0212R | SJ | INTERSTATE 5 NB | W HAMMER LANE | 32.66 | 12.33 |
| 3 | 26 0051 | AMA | STATE ROUTE 88 | JACKSON CREEK OVERFLOW | 2.94 | 12.32 |
| 3 | 38 0021 | STA | STATE ROUTE 33 | ORESTIMBA CREEK | 5.57 | 12.32 |
| 3 | 31 0025 | ALP | STATE ROUTE 88 | WEST FORK CARSON RIVER | 17.76 | 12.16 |
| 3 | 40 0021 | MPA | STATE ROUTE 49 | STOCKTON CREEK | 17.2 | 12.14 |
| 3 | 29 0195L | SJ | INTERSTATE 5 | BUENA VISTA UC | 27.28 | 12.10 |
| 3 | 40 0002 | MPA | STATE ROUTE 140 | MARIPOSA CREEK | 21.19 | 11.98 |
| 3 | 39 0010R | MER | STATE ROUTE 99 NB | BLACK RASCAL CANAL | 17.3 | 11.83 |
| 3 | 39 0010L | MER | STATE ROUTE 99 SB | BLACK RASCAL CANAL | 17.3 | 11.70 |
| 3 | 30 0017 | CAL | STATE ROUTE 49 | SAN ANTONIO CREEK | 14.09 | 11.68 |
| 3 | 30 0031 | CAL | STATE ROUTE 49 | NORTH FORK CALAVERAS RIV | R21.49 | 11.54 |
| 3 | 39 0176L | MER | INTERSTATE 5 | QUINTO CREEK | 25.96 | 11.53 |
| 3 | 29 0212L | SJ | INTERSTATE 5 SB | W HAMMER LANE | 32.66 | 11.50 |
| 3 | 29 0171L | SJ | INTERSTATE 580 | HOSPITAL CREEK | 0.49 | 11.37 |

| Priority | Bridge Number | County[28] | Route | Feature Crossed | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|---|
| 3 | 29 0196 | SJ | INTERSTATE 5 | UP RR SPUR, W ACACIA ST | 27.79 | 11.23 |
| 3 | 29 0209L | SJ | INTERSTATE 5 SB | EIGHT MILE RD | 35.3 | 11.17 |
| 3 | 30 0009 | CAL | STATE ROUTE 4 | SIX MILE CREEK | 24.03 | 11.07 |
| 3 | 29 0200R | SJ | INTERSTATE 5 NB | MCAULIFFE RD | 34.46 | 11.06 |
| 3 | 26 0035 | AMA | STATE ROUTE 49 | JACKSON CREEK | 4.1 | 11.03 |
| 3 | 39 0176R | MER | INTERSTATE 5 | QUINTO CREEK | 25.96 | 11.03 |
| 3 | 32 0033 | TUO | STATE ROUTE 49 | JACKASS GULCH | R2.99 | 10.97 |
| 3 | 29 0081L | SJ | INTERSTATE 580 | CORRAL HOLLOW CREEK | 7.88 | 10.96 |
| 3 | 29 0081R | SJ | INTERSTATE 580 | CORRAL HOLLOW CREEK | 7.88 | 10.95 |
| 3 | 40 0058 | MPA | STATE ROUTE 140 | MERCED RIVER | 42.5 | 10.94 |
| 3 | 29 0002L | SJ | STATE ROUTE 99 SB | MOKELUMNE RI,FRONTAGE R | 31.72 | 10.93 |
| 3 | 29 0187L | SJ | INTERSTATE RTE 5 S | CALIFORNIA AQUEDUCT | 2.07 | 10.91 |
| 4 | 39 0174L | MER | INTERSTATE 5 | DELTA-MENDOTA CANAL | 24.84 | 10.84 |
| 4 | 39 0063 | MER | STATE ROUTE 59 | MARIPOSA CREEK | 10.38 | 10.79 |
| 4 | 30 0019 | CAL | STATE ROUTE 49 | ANGELS CREEK | 7.16 | 10.73 |
| 4 | 39 0065 | MER | STATE ROUTE 59 | OWENS CREEK | 11.37 | 10.72 |
| 4 | 32 0032 | TUO | STATE ROUTE 49 | MOCCASIN CREEK | 4.47 | 10.69 |
| 4 | 30 0018 | CAL | STATE ROUTE 49 | SAN DOMINGO CREEK | 12.51 | 10.68 |
| 4 | 39 0181L | MER | INTERSTATE 5 SB | GARZAS CREEK | 32.11 | 10.66 |
| 4 | 32 0018 | TUO | STATE ROUTE 120 | DON PEDRO RESERVOIR | R19.61 | 10.59 |
| 4 | 30 0016 | CAL | STATE ROUTE 49 | CALAVERITAS CREEK | 16.41 | 10.55 |
| 4 | 29 0225L | SJ | INTERSTATE 5 SB | STATE RTE 4 (CHARTER WY) | 25.35 | 10.54 |
| 4 | 29 0225R | SJ | INTERSTATE 5 NB | STATE RTE 4 (CHARTER WY) | 25.35 | 10.54 |
| 4 | 39 0145R | MER | STATE ROUTE 152 EB | SAN LUIS DAM FOREBAY | R10.05 | 10.48 |
| 4 | 29 0232L | SJ | INTERSTATE 5 SB | STATE ROUTE 4 | 26.12 | 10.48 |
| 4 | 29 0232R | SJ | INTERSTATE 5 NB | STATE ROUTE 4 | 26.12 | 10.48 |
| 4 | 29 0141L | SJ | INTERSTATE 580 | LONE TREE CREEK | 1.7 | 10.41 |
| 4 | 31 0017 | ALP | STATE ROUTE 89 | WEST FORK CARSON RIVER | 21.46 | 10.39 |
| 4 | 29 0117R | SJ | INTERSTATE RTE 5 N | HOSPITAL CREEK | 1.1 | 10.36 |
| 4 | 40 0011 | MPA | STATE ROUTE 140 | MILES CREEK | 0.79 | 10.23 |
| 4 | 39 0167L | MER | INTERSTATE 5 | SAN LUIS WASTEWAY | 21.42 | 10.23 |
| 4 | 40 0047 | MPA | STATE ROUTE 49 | MERCED RIVER | R34.35 | 10.00 |
| 4 | 29 0117L | SJ | INTERSTATE RTE 5 S | HOSPITAL CREEK | 1.1 | 9.95 |
| 4 | 26 0005 | AMA | STATE ROUTE 104 | SUTTER CREEK | R5.86 | 9.79 |
| 4 | 40 0012 | MPA | STATE ROUTE 140 | MILES CREEK | 2.13 | 9.78 |

| Priority | Bridge Number | County[28] | Route | Feature Crossed | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|---|
| 4 | 30 0052 | CAL | STATE ROUTE 26 | M. FORK MOKELUMNE RIVER | R33.65 | 9.77 |
| 4 | 32 0059 | TUO | SR 108 | SR 49 NB & WOODS CREEK | R.03 | 9.57 |
| 4 | 40 0013 | MPA | STATE ROUTE 140 | MILES CREEK | 2.89 | 9.47 |
| 4 | 40 0016 | MPA | STATE ROUTE 140 | MILES CREEK | 3.64 | 9.41 |
| 4 | 40 0018 | MPA | STATE ROUTE 140 | MILES CREEK | 4.06 | 9.36 |
| 4 | 29 0056 | SJ | STATE ROUTE 4 | DUCK CREEK | 36.8 | 9.31 |
| 4 | 39 0090 | MER | STATE ROUTE 140 | LOS BANOS CREEK | 10.31 | 9.16 |
| 4 | 40 0014 | MPA | STATE ROUTE 140 | MILES CREEK | 3.46 | 9.16 |
| 4 | 40 0015 | MPA | STATE ROUTE 140 | MILES CREEK | 3.5 | 9.15 |
| 4 | 32 0004 | TUO | STATE ROUTE 49 | WOODS CREEK | 13.52 | 9.13 |
| 4 | 40 0017 | MPA | STATE ROUTE 140 | MILES CREEK | 3.81 | 9.10 |
| 4 | 39 0007R | MER | STATE ROUTE 99 NB | MILES CREEK | 10.83 | 9.09 |
| 4 | 26 0012 | AMA | STATE ROUTE 49 | MOKELUMNE RIVER | 0.01 | 9.08 |
| 4 | 40 0019 | MPA | STATE ROUTE 49 | MAXWELL CREEK | 44.62 | 8.89 |
| 4 | 38 0154 | STA | STATE ROUTE 132 | TUOLUMNE RIVER | R43.77 | 8.70 |
| 4 | 26 0033 | AMA | STATE ROUTE 49 | COSUMNES RIVER | 22.09 | 8.55 |
| 4 | 29 0229L | SJ | INTERSTATE 5 | ANDERSON STREET | 25.64 | 8.54 |
| 4 | 39 0174R | MER | INTERSTATE 5 | DELTA-MENDOTA CANAL | 24.86 | 8.46 |
| 4 | 32 0036 | TUO | SR 120 | SOUTH FORK TUOLUMNE RIV | R53.02 | 8.46 |
| 4 | 39 0006L | MER | STATE ROUTE 99 SB | OWENS CREEK | 10.55 | 7.99 |
| 4 | 30 0056 | CAL | STATE ROUTE 4 | ANGELS CREEK | R22.8 | 7.95 |
| 4 | 29 0041 | SJ | STATE ROUTE 26 | CALAVERAS RIVER | 15.3 | 7.91 |
| 4 | 29 0040 | SJ | STATE ROUTE 26 | STOCKTON DIVERTING CANAL | 1.9 | 7.79 |
| 4 | 39 0168 | MER | STATE ROUTE 140 | DELTA-MENDOTA CANAL | 0.58 | 7.63 |
| 4 | 29 0248R | SJ | INTERSTATE 5 | BARBER ROAD | 49.18 | 7.43 |
| 4 | 39 0015L | MER | STATE ROUTE 99 SB | MERCED RIVER | R31 | 7.39 |
| 4 | 32 0005 | TUO | STATE ROUTE 49 | WOODS CREEK | 15.49 | 7.26 |
| 5 | 29 0198R | SJ | INTERSTATE 5 | CARLTON AVE | 27.66 | 7.23 |
| 5 | 26 0049 | AMA | STATE ROUTE 88 | SILVER LAKE SPILLWAY | R65.82 | 7.22 |
| 5 | 29 0222L | SJ | INTERSTATE 5 SB | DOWNING AVENUE | R23.66 | 7.14 |
| 5 | 29 0224L | SJ | INTERSTATE 5 | EIGHTH STREET | 24.64 | 7.14 |
| 5 | 29 0198L | SJ | INTERSTATE 5 | CARLTON AVE | 27.66 | 7.08 |
| 5 | 39 0015R | MER | STATE ROUTE 99 NB | MERCED RIVER | R30.97 | 7.03 |
| 5 | 30 0055 | CAL | STATE ROUTE 4 | CREEK & PENSTOCK PIPE | 22.2 | 6.98 |
| 5 | 39 0246 | MER | STATE ROUTE 165 | SAN JOAQUIN RIVER 12 | 25.6 | 6.81 |
| 5 | 29 0265L | SJ | INTERSTATE 5 SB | TOM PAINE SLOUGH | R12.39 | 6.81 |

| Priority | Bridge Number | County[28] | Route | Feature Crossed | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|---|
| 5 | 29 0265R | SJ | INTERSTATE 5 NB | TOM PAINE SLOUGH | R12.39 | 6.59 |
| 5 | 30 0024 | CAL | STATE ROUTE 26 | INDIAN CREEK | 2.46 | 6.53 |
| 5 | 29 0231R | SJ | ROUTE 5 NB | CHURCH STREET | 25.99 | 6.33 |
| 5 | 32 0040 | TUO | STATE ROUTE 49 | NEW MELONES RESVERVOIR | R27.28 | 5.85 |
| 5 | 38 0152 | STA | STATE ROUTE 132 | DRY CREEK | 15.64 | 5.79 |
| 5 | 29 0064 | SJ | U.S. HIGHWAY 88 | MOKELUMNE RIVER | 19.8 | 5.70 |
| 5 | 29 0188L | SJ | INTERSTATE 5 | MONTE DIABLO AVE | 27.91 | 5.68 |
| 5 | 29 0188R | SJ | INTERSTATE 5 | MONTE DIABLO AVE | 27.91 | 5.68 |
| 5 | 30 0023 | CAL | STATE ROUTE 26 | INDIAN CREEK | 0.82 | 5.61 |
| 5 | 32 0058 | TUO | STATE ROUTE 120 | BIG CREEK | R37.78 | 5.60 |
| 5 | 39 0190 | MER | SR 33 (JENSEN AVE) | CALIFORNIA AQUEDUCT | R14.41 | 5.44 |
| 5 | 39 0028L | MER | STATE ROUTE 152 WB | SAN JOAQUIN RIVER | R37.16 | 5.09 |
| 5 | 39 0132L | MER | STATE ROUTE 99 SB | BEAR CREEK | 16.38 | 5.03 |
| 5 | 32 0035 | TUO | STATE ROUTE 120 | SOUTH FORK TUOLUMNE RIV | 46.82 | 4.65 |
| 5 | 39 0162L | MER | INTERSTATE 5 | CALIFORNIA AQUEDUCT | 18.46 | 4.63 |
| 5 | 29 0254L | SJ | INTERSTATE 5 SB | I-5 FRONTAGE ROAD | 38.06 | 4.49 |
| 5 | 29 0254R | SJ | INTERSTATE 5 NB | I-5 FRONTAGE ROAD | 38.06 | 4.49 |
| 5 | 29 0245L | SJ | INTERSTATE 5 SB | TURNER ROAD | 41.66 | 4.26 |
| 5 | 29 0245R | SJ | INTERSTATE 5 NB | TURNER ROAD | 41.66 | 4.26 |
| 5 | 29 0246L | SJ | INTERSTATE 5 SB | PELTIER ROAD | 44.72 | 4.26 |
| 5 | 29 0246R | SJ | INTERSTATE 5 NB | PELTIER ROAD | 44.71 | 4.26 |
| 5 | 26 0017 | AMA | STATE ROUTE 49 | RANCHERIA CREEK | 12.14 | 4.24 |
| 5 | 39 0092 | MER | STATE ROUTE 140 | SAN JOAQUIN RIVER 11 | 11.79 | 4.20 |
| 5 | 38 0108L | STA | INTERSTATE 5 SB | CALIFORNIA AQUEDUCT | 6.47 | 4.17 |
| 5 | 38 0108R | STA | INTERSTATE 5 NB | CALIFORNIA AQUEDUCT | 6.47 | 4.16 |
| 5 | 29 0255L | SJ | INTERSTATE 5 SB | STATE ROUTE 12 | 39.55 | 3.77 |
| 5 | 29 0255R | SJ | INTERSTATE 5 NB | STATE ROUTE 12 | 39.55 | 3.77 |
| 5 | 39 0121 | MER | STATE ROUTE 33 | DELTA-MENDOTA CANAL | R15.11 | 3.65 |
| 5 | 29 0224R | SJ | INTERSTATE 5 | EIGHTH STREET | 24.64 | 3.40 |
| 5 | 26 0028 | AMA | STATE ROUTE 124 | DRY CREEK | R8.5 | 2.75 |
| 5 | 29 0206R | SJ | STATE ROUTE 132 E | CALIFORNIA AQUEDUCT | 0.81 | 2.58 |
| 5 | 26 0040 | AMA | STATE ROUTE 49 | SUTTER CREEK | R8.32 | 2.51 |
| 5 | 39 0028R | MER | STATE ROUTE 152 EB | San Joaquin River | R37.4 | 2.46 |
| 5 | 30 0030 | CAL | STATE ROUTE 49 | MURRAY CREEK | R20.69 | 2.22 |
| 5 | 26 0018 | AMA | STATE ROUTE 49 | DRY CREEK | 13.57 | 2.14 |
| 5 | 32 0039 | TUO | STATE ROUTE 120 | MOCCASIN CREEK | R24.09 | 1.51 |

| Priority | Bridge Number | County[28] | Route | Feature Crossed | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|---|
| 5 | 29 0206L | SJ | STATE ROUTE 132 W | CALIFORNIA AQUEDUCT | 0.81 | 1.39 |
| 5 | 26 0043 | AMA | STATE ROUTE 49 | AMADOR CREEK | R10.56 | 0.48 |
| 5 | 29 0222R | SJ | INTERSTATE 5 NB | DOWNING AVENUE | R23.66 | 0.00 |
| 5 | 30 0034 | CAL | STATE ROUTE 4 | LITTLEJOHNS CREEK | R5.89 | 0.00 |

### TABLE 9: PRIORITIZATION OF LARGE CULVERTS FOR DETAILED CLIMATE CHANGE ADAPTATION ASSESSMENTS

| Priority | Culvert System Number | County[29] | Route | Feature Crossed | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|---|
| 1 | 29 0339 | SJ | STATE ROUTE 132 | LONE TREE CREEK | 2.7 | 100.00 |
| 1 | 39 0040 | MER | STATE ROUTE 152 | LOS BANOS CREEK | 18.2 | 96.21 |
| 2 | 29 0012 | SJ | STATE ROUTE 99 | DUCK CREEK | 16.47 | 87.57 |
| 2 | 30 0047 | CAL | STATE ROUTE 4 | WATERMAN CREEK | 17.6 | 80.08 |
| 2 | 39 0002L | MER | STATE ROUTE 99 SB | DEADMANS CREEK | 5.22 | 56.14 |
| 3 | 40 0035 | MPA | STATE ROUTE 49 | PEG LEG CREEK | 12.21 | 47.77 |
| 3 | 38 0121 | STA | INTERSTATE 5 | DEL PUERTO CREEK | 18.13 | 47.08 |
| 3 | 40 0024 | MPA | STATE ROUTE 49 | OLIVER CREEK | 5.46 | 39.76 |
| 4 | 40 0028 | MPA | STATE ROUTE 49 | DELONG CREEK | 6.18 | 37.04 |
| 4 | 30 0042 | CAL | STATE ROUTE 49 | CHEROKEE CREEK | 9.01 | 23.36 |
| 4 | 29 0053 | SJ | STATE ROUTE 4 | DUCK CREEK | R22.72 | 22.44 |
| 5 | 40 0025 | MPA | STATE ROUTE 132 | BLACKS CREEK | 17.74 | 22.36 |
| 5 | 38 0009 | STA | STATE ROUTE 120 | WILDCAT CREEK | R15.04 | 19.16 |
| 5 | 30 0050 | CAL | STATE ROUTE 4 | CHEROKEE CREEK | R19.08 | 0.00 |

[29] ALP = Alpine; AMA = Amador; CAL = Calaveras; MER = Merced; MPA = Mariposa; SJ = San Joaquin; STA = Stanislaus; TUO = Tuolumne

TABLE 10: PRIORITIZATION OF SMALL CULVERTS FOR DETAILED CLIMATE CHANGE ADAPTATION ASSESSMENTS

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 1 | 310044002845 | ALP | 4 | 28.45 | 100.00 |
| 1 | 321080005298 | TUO | 108 | 52.98 | 90.97 |
| 1 | 321084005425 | TUO | 108 | 54.25 | 90.87 |
| 1 | 321084005351 | TUO | 108 | 53.51 | 90.29 |
| 1 | 321080005163 | TUO | 108 | 51.63 | 90.29 |
| 1 | 321084005361 | TUO | 108 | 53.61 | 90.27 |
| 1 | 321080005219 | TUO | 108 | 52.19 | 90.22 |
| 1 | 321080004931 | TUO | 108 | 49.31 | 89.24 |
| 1 | 321080004924 | TUO | 108 | 49.24 | 89.23 |
| 1 | 321084005491 | TUO | 108 | 54.91 | 88.72 |
| 1 | 321084005483 | TUO | 108 | 54.83 | 88.72 |
| 1 | 321084005642 | TUO | 108 | 56.42 | 88.70 |
| 1 | 321084005539 | TUO | 108 | 55.39 | 88.65 |
| 1 | 321084005443 | TUO | 108 | 54.43 | 88.57 |
| 1 | 321084005756 | TUO | 108 | 57.56 | 88.38 |
| 1 | 310040003037 | ALP | 4 | 30.37 | 88.20 |
| 1 | 321080004900 | TUO | 108 | 49 | 87.78 |
| 1 | 321080005110 | TUO | 108 | 51.1 | 86.77 |
| 1 | 310044002911 | ALP | 4 | 29.11 | 86.34 |
| 1 | 300044106135 | CAL | 4 | 61.35 | 86.21 |
| 1 | 312070000062 | ALP | 207 | 0.62 | 86.13 |
| 1 | 312070000012 | ALP | 207 | 0.12 | 85.61 |
| 1 | 310040003005 | ALP | 4 | 30.05 | 82.78 |
| 1 | 310040003024 | ALP | 4 | 30.24 | 82.72 |
| 1 | 321084005692 | TUO | 108 | 56.92 | 81.51 |
| 1 | 401400003917 | MPA | 140 | 39.17 | 79.58 |
| 1 | 401400003927 | MPA | 140 | 39.27 | 79.58 |
| 1 | 401400003876 | MPA | 140 | 38.76 | 78.97 |
| 1 | 401400003850 | MPA | 140 | 38.5 | 77.80 |
| 1 | 401400003761 | MPA | 140 | 37.61 | 75.55 |
| 1 | 310890001174 | ALP | 89 | 11.74 | 75.17 |
| 1 | 401400004181 | MPA | 140 | 41.81 | 74.88 |
| 1 | 310890001057 | ALP | 89 | 10.57 | 74.49 |
| 1 | 401400003765 | MPA | 140 | 37.65 | 73.75 |
| 1 | 401400003771 | MPA | 140 | 37.71 | 73.75 |
| 1 | 321080004816 | TUO | 108 | 48.16 | 72.78 |

[30] ALP = Alpine; AMA = Amador; CAL = Calaveras; MER = Merced; MPA = Mariposa; SJ = San Joaquin; STA = Stanislaus; TUO = Tuolumne

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 1 | 310890001139 | ALP | 89 | 11.39 | 72.26 |
| 1 | 300264000954 | CAL | 26 | 9.54 | 71.75 |
| 1 | 310890001181 | ALP | 89 | 11.81 | 71.51 |
| 1 | 310044000378 | ALP | 4 | 3.78 | 71.21 |
| 1 | 321080004654 | TUO | 108 | 46.54 | 71.00 |
| 1 | 321080004711 | TUO | 108 | 47.11 | 71.00 |
| 1 | 321080004748 | TUO | 108 | 47.48 | 70.98 |
| 1 | 321080004731 | TUO | 108 | 47.31 | 70.98 |
| 1 | 321080004715 | TUO | 108 | 47.15 | 70.94 |
| 1 | 401400004976 | MPA | 140 | 49.76 | 70.85 |
| 1 | 310880000006 | ALP | 88 | 0.06 | 69.34 |
| 1 | 310040002709 | ALP | 4 | 27.09 | 68.05 |
| 1 | 310044000657 | ALP | 4 | 6.57 | 67.41 |
| 1 | 380040000309 | STA | 4 | 3.09 | 67.25 |
| 1 | 321080004801 | TUO | 108 | 48.01 | 67.25 |
| 1 | 310044000745 | ALP | 4 | 7.45 | 66.70 |
| 1 | 401400004944 | MPA | 140 | 49.44 | 66.69 |
| 1 | 310044000587 | ALP | 4 | 5.87 | 66.21 |
| 1 | 310044000477 | ALP | 4 | 4.77 | 66.11 |
| 1 | 310045200487 | ALP | 4 | 4.87 | 65.99 |
| 1 | 321084005854 | TUO | 108 | 58.54 | 65.94 |
| 1 | 310044000739 | ALP | 4 | 7.39 | 65.89 |
| 1 | 310044000360 | ALP | 4 | 3.6 | 65.81 |
| 1 | 310044000366 | ALP | 4 | 3.66 | 65.81 |
| 1 | 310890000802 | ALP | 89 | 8.02 | 65.62 |
| 1 | 310044000644 | ALP | 4 | 6.44 | 65.61 |
| 1 | 310044000653 | ALP | 4 | 6.53 | 65.55 |
| 1 | 380044000544 | STA | 4 | 5.44 | 64.71 |
| 1 | 321084005805 | TUO | 108 | 58.05 | 64.43 |
| 1 | 310890000788 | ALP | 89 | 7.88 | 64.34 |
| 1 | 321084006220 | TUO | 108 | 62.2 | 64.18 |
| 1 | 321084006194 | TUO | 108 | 61.94 | 64.16 |
| 1 | 321084006049 | TUO | 108 | 60.49 | 64.16 |
| 1 | 321084005850 | TUO | 108 | 58.5 | 64.15 |
| 1 | 321084006030 | TUO | 108 | 60.3 | 64.15 |
| 1 | 321084005845 | TUO | 108 | 58.45 | 64.14 |
| 1 | 321084006190 | TUO | 108 | 61.9 | 64.13 |
| 1 | 321084006097 | TUO | 108 | 60.97 | 64.10 |
| 1 | 380044000668 | STA | 4 | 6.68 | 63.60 |
| 1 | 310884001557 | ALP | 88 | 15.57 | 63.20 |

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 1 | 310044000821 | ALP | 4 | 8.21 | 63.12 |
| 1 | 380044000602 | STA | 4 | 6.02 | 63.09 |
| 1 | 320490000058 | TUO | 49 | 0.58 | 62.87 |
| 1 | 310880001737 | ALP | 88 | 17.37 | 62.87 |
| 1 | 320494000508 | TUO | 49 | 5.08 | 62.74 |
| 1 | 310880001665 | ALP | 88 | 16.65 | 62.55 |
| 1 | 300040002964 | CAL | 4 | 29.64 | 62.53 |
| 1 | 401400004392 | MPA | 140 | 43.92 | 62.12 |
| 1 | 310044000421 | ALP | 4 | 4.21 | 61.41 |
| 1 | 380044000511 | STA | 4 | 5.11 | 61.17 |
| 1 | 401400004884 | MPA | 140 | 48.84 | 60.99 |
| 1 | 310040002636 | ALP | 4 | 26.36 | 60.98 |
| 1 | 400490003925 | MPA | 49 | 39.25 | 60.76 |
| 1 | 321084006229 | TUO | 108 | 62.29 | 60.57 |
| 1 | 321084006120 | TUO | 108 | 61.2 | 60.49 |
| 1 | 321084006249 | TUO | 108 | 62.49 | 60.27 |
| 1 | 321084006349 | TUO | 108 | 63.49 | 59.95 |
| 1 | 401324100956 | MPA | 132 | 9.56 | 59.45 |
| 1 | 310040002186 | ALP | 4 | 21.86 | 59.10 |
| 1 | 401400004519 | MPA | 140 | 45.19 | 58.72 |
| 1 | 401400004531 | MPA | 140 | 45.31 | 58.67 |
| 1 | 300264000334 | CAL | 26 | 3.34 | 58.21 |
| 1 | 310884001593 | ALP | 88 | 15.93 | 58.12 |
| 1 | 321084006265 | TUO | 108 | 62.65 | 58.08 |
| 1 | 310044002515 | ALP | 4 | 25.15 | 57.82 |
| 1 | 260884106474 | AMA | 88 | 64.74 | 57.28 |
| 1 | 401400003224 | MPA | 140 | 32.24 | 57.06 |
| 1 | 310884001950 | ALP | 88 | 19.5 | 57.03 |
| 1 | 310880001636 | ALP | 88 | 16.36 | 56.92 |
| 1 | 401400004507 | MPA | 140 | 45.07 | 56.87 |
| 1 | 401400004792 | MPA | 140 | 47.92 | 56.85 |
| 1 | 401400004624 | MPA | 140 | 46.24 | 56.85 |
| 1 | 401400004776 | MPA | 140 | 47.76 | 56.84 |
| 1 | 380044000567 | STA | 4 | 5.67 | 56.84 |
| 1 | 401400004659 | MPA | 140 | 46.59 | 56.84 |
| 1 | 310894101903 | ALP | 89 | 19.03 | 56.46 |
| 1 | 310880001721 | ALP | 88 | 17.21 | 56.33 |
| 1 | 300264000009 | CAL | 26 | 0.09 | 55.82 |
| 1 | 310894101938 | ALP | 89 | 19.38 | 55.65 |
| 1 | 380040000271 | STA | 4 | 2.71 | 54.64 |

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 2 | 321084006359 | TUO | 108 | 63.59 | 54.55 |
| 2 | 321084006364 | TUO | 108 | 63.64 | 54.55 |
| 2 | 321084006271 | TUO | 108 | 62.71 | 54.52 |
| 2 | 321084006640 | TUO | 108 | 66.4 | 54.49 |
| 2 | 321084006543 | TUO | 108 | 65.43 | 54.48 |
| 2 | 321084006576 | TUO | 108 | 65.76 | 54.47 |
| 2 | 321084006616 | TUO | 108 | 66.16 | 54.47 |
| 2 | 310044100088 | ALP | 4 | 0.88 | 54.46 |
| 2 | 321084006570 | TUO | 108 | 65.7 | 54.42 |
| 2 | 321084006627 | TUO | 108 | 66.27 | 54.40 |
| 2 | 300044106088 | CAL | 4 | 60.88 | 54.29 |
| 2 | 310044000950 | ALP | 4 | 9.5 | 54.13 |
| 2 | 310044001394 | ALP | 4 | 13.94 | 54.04 |
| 2 | 310040001406 | ALP | 4 | 14.06 | 54.04 |
| 2 | 310894102005 | ALP | 89 | 20.05 | 54.03 |
| 2 | 310044001522 | ALP | 4 | 15.22 | 53.87 |
| 2 | 300260002458 | CAL | 26 | 24.58 | 53.83 |
| 2 | 310884002017 | ALP | 88 | 20.17 | 53.80 |
| 2 | 310894000546 | ALP | 89 | 5.46 | 53.63 |
| 2 | 310884001810 | ALP | 88 | 18.1 | 53.55 |
| 2 | 310884001908 | ALP | 88 | 19.08 | 53.55 |
| 2 | 310890001304 | ALP | 89 | 13.04 | 53.48 |
| 2 | 300044106046 | CAL | 4 | 60.46 | 53.47 |
| 2 | 300044106181 | CAL | 4 | 61.81 | 53.36 |
| 2 | 310884002224 | ALP | 88 | 22.24 | 53.27 |
| 2 | 401400004571 | MPA | 140 | 45.71 | 53.22 |
| 2 | 401400004598 | MPA | 140 | 45.98 | 53.20 |
| 2 | 310044002101 | ALP | 4 | 21.01 | 53.15 |
| 2 | 401400004617 | MPA | 140 | 46.17 | 53.15 |
| 2 | 310884002124 | ALP | 88 | 21.24 | 53.11 |
| 2 | 310044001606 | ALP | 4 | 16.06 | 52.89 |
| 2 | 310044001966 | ALP | 4 | 19.66 | 52.88 |
| 2 | 310044001604 | ALP | 4 | 16.04 | 52.85 |
| 2 | 310894101833 | ALP | 89 | 18.33 | 52.55 |
| 2 | 310894002156 | ALP | 89 | 21.56 | 52.51 |
| 2 | 401400001261 | MPA | 140 | 12.61 | 52.49 |
| 2 | 310044000964 | ALP | 4 | 9.64 | 52.32 |
| 2 | 310040001215 | ALP | 4 | 12.15 | 52.29 |
| 2 | 310044001376 | ALP | 4 | 13.76 | 52.27 |
| 2 | 310044001362 | ALP | 4 | 13.62 | 52.26 |

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 2 | 310044001383 | ALP | 4 | 13.83 | 52.24 |
| 2 | 310044001320 | ALP | 4 | 13.2 | 52.12 |
| 2 | 310044001541 | ALP | 4 | 15.41 | 52.09 |
| 2 | 310044001743 | ALP | 4 | 17.43 | 52.09 |
| 2 | 260884005588 | AMA | 88 | 55.88 | 52.04 |
| 2 | 310044100161 | ALP | 4 | 1.61 | 52.04 |
| 2 | 321080003823 | TUO | 108 | 38.23 | 52.01 |
| 2 | 260884005599 | AMA | 88 | 55.99 | 51.94 |
| 2 | 260884005772 | AMA | 88 | 57.72 | 51.80 |
| 2 | 260884005799 | AMA | 88 | 57.99 | 51.72 |
| 2 | 401400004863 | MPA | 140 | 48.63 | 51.67 |
| 2 | 295804001488 | SJ | 580 | 14.88 | 51.50 |
| 2 | 310040001926 | ALP | 4 | 19.26 | 51.10 |
| 2 | 401404001867 | MPA | 140 | 18.67 | 51.09 |
| 2 | 401400001475 | MPA | 140 | 14.75 | 50.74 |
| 2 | 321080004044 | TUO | 108 | 40.44 | 50.73 |
| 2 | 310890002265 | ALP | 89 | 22.65 | 50.50 |
| 2 | 321080004184 | TUO | 108 | 41.84 | 50.29 |
| 2 | 401400001447 | MPA | 140 | 14.47 | 50.27 |
| 2 | 321080004103 | TUO | 108 | 41.03 | 50.25 |
| 2 | 321080003787 | TUO | 108 | 37.87 | 50.25 |
| 2 | 321080003863 | TUO | 108 | 38.63 | 50.25 |
| 2 | 321080003918 | TUO | 108 | 39.18 | 50.25 |
| 2 | 321080004001 | TUO | 108 | 40.01 | 50.25 |
| 2 | 321080003924 | TUO | 108 | 39.24 | 50.23 |
| 2 | 321080003836 | TUO | 108 | 38.36 | 50.23 |
| 2 | 321080004177 | TUO | 108 | 41.77 | 50.17 |
| 2 | 260884106459 | AMA | 88 | 64.59 | 50.08 |
| 2 | 260884106533 | AMA | 88 | 65.33 | 49.90 |
| 2 | 401400001181 | MPA | 140 | 11.81 | 49.56 |
| 2 | 400490003017 | MPA | 49 | 30.17 | 49.55 |
| 2 | 400490004098 | MPA | 49 | 40.98 | 49.38 |
| 2 | 400490004199 | MPA | 49 | 41.99 | 49.28 |
| 2 | 310880002310 | ALP | 88 | 23.1 | 49.25 |
| 2 | 310044001625 | ALP | 4 | 16.25 | 49.17 |
| 2 | 310044001425 | ALP | 4 | 14.25 | 48.68 |
| 2 | 310045201416 | ALP | 4 | 14.16 | 48.64 |
| 2 | 310044001630 | ALP | 4 | 16.3 | 48.62 |
| 2 | 310894001520 | ALP | 89 | 15.2 | 48.50 |
| 2 | 310894001521 | ALP | 89 | 15.21 | 48.50 |

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 2 | 401404001747 | MPA | 140 | 17.47 | 48.29 |
| 2 | 310890000629 | ALP | 89 | 6.29 | 48.29 |
| 2 | 401404001666 | MPA | 140 | 16.66 | 48.01 |
| 2 | 310890000492 | ALP | 89 | 4.92 | 47.98 |
| 2 | 310884000314 | ALP | 88 | 3.14 | 47.62 |
| 2 | 260880006716 | AMA | 88 | 67.16 | 47.61 |
| 2 | 401440005007 | MPA | 144 | 50.07 | 47.27 |
| 2 | 300040004159 | CAL | 4 | 41.59 | 47.19 |
| 2 | 310884001145 | ALP | 88 | 11.45 | 46.81 |
| 2 | 310884001132 | ALP | 88 | 11.32 | 46.72 |
| 2 | 300044004404 | CAL | 4 | 44.04 | 46.44 |
| 2 | 320494001306 | TUO | 49 | 13.06 | 46.26 |
| 2 | 321080004242 | TUO | 108 | 42.42 | 46.07 |
| 2 | 310884000173 | ALP | 88 | 1.73 | 45.94 |
| 2 | 310884001122 | ALP | 88 | 11.22 | 45.92 |
| 2 | 300044106368 | CAL | 4 | 63.68 | 45.83 |
| 2 | 401404001602 | MPA | 140 | 16.02 | 45.70 |
| 2 | 400410000438 | MPA | 41 | 4.38 | 45.67 |
| 2 | 400414000214 | MPA | 41 | 2.14 | 45.61 |
| 2 | 310890002296 | ALP | 89 | 22.96 | 45.60 |
| 2 | 260880002137 | AMA | 88 | 21.37 | 45.46 |
| 2 | 401404001657 | MPA | 140 | 16.57 | 45.27 |
| 2 | 300040104704 | CAL | 4 | 47.04 | 45.14 |
| 2 | 300040004735 | CAL | 4 | 47.35 | 45.04 |
| 2 | 310044100010 | ALP | 4 | 0.1 | 45.02 |
| 2 | 300044106343 | CAL | 4 | 63.43 | 44.85 |
| 2 | 300044106361 | CAL | 4 | 63.61 | 44.79 |
| 2 | 321200104670 | TUO | 120 | 46.7 | 44.77 |
| 2 | 380058001590 | STA | 5 | 15.9 | 44.68 |
| 2 | 300040104755 | CAL | 4 | 47.55 | 44.68 |
| 2 | 310884000372 | ALP | 88 | 3.72 | 44.10 |
| 2 | 310884000232 | ALP | 88 | 2.32 | 44.09 |
| 2 | 300260000718 | CAL | 26 | 7.18 | 44.00 |
| 2 | 400414000247 | MPA | 41 | 2.47 | 43.87 |
| 2 | 321080004285 | TUO | 108 | 42.85 | 43.62 |
| 2 | 380054002498 | STA | 5 | 24.98 | 43.60 |
| 2 | 321084100414 | TUO | 108 | 4.14 | 43.53 |
| 2 | 300044003061 | CAL | 4 | 30.61 | 43.04 |
| 2 | 260884001866 | AMA | 88 | 18.66 | 42.96 |
| 3 | 300260000648 | CAL | 26 | 6.48 | 42.62 |

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 3 | 321200105497 | TUO | 120 | 54.97 | 42.61 |
| 3 | 400414000032 | MPA | 41 | 0.32 | 42.59 |
| 3 | 400414000022 | MPA | 41 | 0.22 | 42.57 |
| 3 | 321200000950 | TUO | 120 | 9.5 | 42.36 |
| 3 | 321200000892 | TUO | 120 | 8.92 | 42.30 |
| 3 | 321200003980 | TUO | 120 | 39.8 | 42.30 |
| 3 | 310884100675 | ALP | 88 | 6.75 | 42.17 |
| 3 | 300040000863 | CAL | 4 | 8.63 | 42.13 |
| 3 | 310884100609 | ALP | 88 | 6.09 | 42.06 |
| 3 | 300490001090 | CAL | 49 | 10.9 | 41.94 |
| 3 | 260884106287 | AMA | 88 | 62.87 | 41.93 |
| 3 | 380054001473 | STA | 5 | 14.73 | 41.74 |
| 3 | 321080004413 | TUO | 108 | 44.13 | 41.72 |
| 3 | 321080004424 | TUO | 108 | 44.24 | 41.72 |
| 3 | 310884000430 | ALP | 88 | 4.3 | 41.67 |
| 3 | 380054002586 | STA | 5 | 25.86 | 41.56 |
| 3 | 401204004345 | MPA | 120 | 43.45 | 41.54 |
| 3 | 321200104565 | TUO | 120 | 45.65 | 41.52 |
| 3 | 260490001223 | AMA | 49 | 12.23 | 41.46 |
| 3 | 260880000462 | AMA | 88 | 4.62 | 41.41 |
| 3 | 260490001286 | AMA | 49 | 12.86 | 41.40 |
| 3 | 321200105308 | TUO | 120 | 53.08 | 41.36 |
| 3 | 321080004462 | TUO | 108 | 44.62 | 41.23 |
| 3 | 321080004479 | TUO | 108 | 44.79 | 41.21 |
| 3 | 321200004432 | TUO | 120 | 44.32 | 41.21 |
| 3 | 321080004544 | TUO | 108 | 45.44 | 41.14 |
| 3 | 321204003188 | TUO | 120 | 31.88 | 41.08 |
| 3 | 290124002600 | SJ | 12 | 26 | 40.99 |
| 3 | 260880000533 | AMA | 88 | 5.33 | 40.82 |
| 3 | 400414000026 | MPA | 41 | 0.26 | 40.78 |
| 3 | 260490001633 | AMA | 49 | 16.33 | 40.76 |
| 3 | 321200003226 | TUO | 120 | 32.26 | 40.68 |
| 3 | 300044003880 | CAL | 4 | 38.8 | 40.66 |
| 3 | 401204004325 | MPA | 120 | 43.25 | 40.57 |
| 3 | 321200004854 | TUO | 120 | 48.54 | 40.57 |
| 3 | 310884000359 | ALP | 88 | 3.59 | 40.51 |
| 3 | 321084101870 | TUO | 108 | 18.7 | 40.35 |
| 3 | 401204004212 | MPA | 120 | 42.12 | 40.32 |
| 3 | 295804001330 | SJ | 580 | 13.3 | 40.23 |
| 3 | 295804001124 | SJ | 580 | 11.24 | 40.23 |

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 3 | 300044106024 | CAL | 4 | 60.24 | 40.19 |
| 3 | 401204004205 | MPA | 120 | 42.05 | 40.16 |
| 3 | 261244000348 | AMA | 124 | 3.48 | 40.12 |
| 3 | 300490102281 | CAL | 49 | 22.81 | 40.00 |
| 3 | 310884001040 | ALP | 88 | 10.4 | 39.98 |
| 3 | 380054002498 | STA | 5 | 24.98 | 39.97 |
| 3 | 260880000836 | AMA | 88 | 8.36 | 39.91 |
| 3 | 300044003838 | CAL | 4 | 38.38 | 39.65 |
| 3 | 300124001193 | CAL | 12 | 11.93 | 39.47 |
| 3 | 300044004910 | CAL | 4 | 49.1 | 39.43 |
| 3 | 300260000559 | CAL | 26 | 5.59 | 39.31 |
| 3 | 300040004375 | CAL | 4 | 43.75 | 39.30 |
| 3 | 300044002703 | CAL | 4 | 27.03 | 39.29 |
| 3 | 300044104813 | CAL | 4 | 48.13 | 39.26 |
| 3 | 300044004916 | CAL | 4 | 49.16 | 39.25 |
| 3 | 310884000915 | ALP | 88 | 9.15 | 39.04 |
| 3 | 310880000761 | ALP | 88 | 7.61 | 39.00 |
| 3 | 321084101898 | TUO | 108 | 18.98 | 39.00 |
| 3 | 300260002880 | CAL | 26 | 28.8 | 38.95 |
| 3 | 310884000807 | ALP | 88 | 8.07 | 38.95 |
| 3 | 380054001492 | STA | 5 | 14.92 | 38.94 |
| 3 | 260490001708 | AMA | 49 | 17.08 | 38.90 |
| 3 | 321204105252 | TUO | 120 | 52.52 | 38.84 |
| 3 | 321204105260 | TUO | 120 | 52.6 | 38.84 |
| 3 | 321252001294 | TUO | 125 | 12.94 | 38.76 |
| 3 | 321204105230 | TUO | 120 | 52.3 | 38.76 |
| 3 | 321205205229 | TUO | 120 | 52.29 | 38.76 |
| 3 | 321204001221 | TUO | 120 | 12.21 | 38.61 |
| 3 | 300044105832 | CAL | 4 | 58.32 | 38.47 |
| 3 | 260884001576 | AMA | 88 | 15.76 | 38.44 |
| 3 | 300044105790 | CAL | 4 | 57.9 | 38.42 |
| 3 | 300044105848 | CAL | 4 | 58.48 | 38.40 |
| 3 | 401204004236 | MPA | 120 | 42.36 | 38.35 |
| 3 | 300260000459 | CAL | 26 | 4.59 | 38.29 |
| 3 | 300044003913 | CAL | 4 | 39.13 | 38.28 |
| 3 | 400490004652 | MPA | 49 | 46.52 | 38.21 |
| 3 | 391524100549 | MER | 152 | 5.49 | 38.15 |
| 3 | 400490004668 | MPA | 49 | 46.68 | 38.08 |
| 3 | 400490004598 | MPA | 49 | 45.98 | 38.06 |
| 3 | 400490004704 | MPA | 49 | 47.04 | 38.02 |

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 3 | 321200004456 | TUO | 120 | 44.56 | 38.02 |
| 3 | 321204001473 | TUO | 120 | 14.73 | 38.01 |
| 3 | 260880006838 | AMA | 88 | 68.38 | 38.01 |
| 3 | 300040004047 | CAL | 4 | 40.47 | 37.98 |
| 3 | 300490102552 | CAL | 49 | 25.52 | 37.97 |
| 3 | 321200004522 | TUO | 120 | 45.22 | 37.96 |
| 3 | 321204105104 | TUO | 120 | 51.04 | 37.91 |
| 3 | 321204105090 | TUO | 120 | 50.9 | 37.90 |
| 3 | 321204105084 | TUO | 120 | 50.84 | 37.90 |
| 3 | 321204105152 | TUO | 120 | 51.52 | 37.89 |
| 3 | 321204105046 | TUO | 120 | 50.46 | 37.89 |
| 3 | 300120001288 | CAL | 12 | 12.88 | 37.88 |
| 3 | 321204105179 | TUO | 120 | 51.79 | 37.88 |
| 3 | 321204105150 | TUO | 120 | 51.5 | 37.87 |
| 3 | 260880000206 | AMA | 88 | 2.06 | 37.86 |
| 3 | 321204105093 | TUO | 120 | 50.93 | 37.85 |
| 3 | 321204105052 | TUO | 120 | 50.52 | 37.85 |
| 3 | 321200004384 | TUO | 120 | 43.84 | 37.81 |
| 3 | 260490000022 | AMA | 49 | 0.22 | 37.79 |
| 3 | 260494000112 | AMA | 49 | 1.12 | 37.79 |
| 3 | 260880000350 | AMA | 88 | 3.5 | 37.77 |
| 3 | 300044005185 | CAL | 4 | 51.85 | 37.67 |
| 3 | 321200004424 | TUO | 120 | 44.24 | 37.67 |
| 3 | 260490000144 | AMA | 49 | 1.44 | 37.66 |
| 3 | 321204001208 | TUO | 120 | 12.08 | 37.66 |
| 3 | 260884002077 | AMA | 88 | 20.77 | 37.66 |
| 3 | 300044002316 | CAL | 4 | 23.16 | 37.47 |
| 3 | 260880000082 | AMA | 88 | 0.82 | 37.44 |
| 3 | 300044005240 | CAL | 4 | 52.4 | 37.41 |
| 3 | 260880102392 | AMA | 88 | 23.92 | 37.32 |
| 3 | 310880100737 | ALP | 88 | 7.37 | 37.31 |
| 3 | 260490000100 | AMA | 49 | 1 | 37.30 |
| 3 | 290884002409 | SJ | 88 | 24.09 | 37.15 |
| 3 | 261240000615 | AMA | 124 | 6.15 | 37.02 |
| 3 | 321080003585 | TUO | 108 | 35.85 | 37.01 |
| 3 | 321080003518 | TUO | 108 | 35.18 | 37.01 |
| 3 | 321080003537 | TUO | 108 | 35.37 | 37.00 |
| 4 | 321080003642 | TUO | 108 | 36.42 | 36.96 |
| 4 | 260884001635 | AMA | 88 | 16.35 | 36.95 |
| 4 | 260490000416 | AMA | 49 | 4.16 | 36.94 |

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 4 | 295804000366 | SJ | 580 | 3.66 | 36.93 |
| 4 | 300044105498 | CAL | 4 | 54.98 | 36.87 |
| 4 | 380054001545 | STA | 5 | 15.45 | 36.85 |
| 4 | 380054001545 | STA | 5 | 15.45 | 36.80 |
| 4 | 260494001811 | AMA | 49 | 18.11 | 36.78 |
| 4 | 260494001759 | AMA | 49 | 17.59 | 36.77 |
| 4 | 321200000772 | TUO | 120 | 7.72 | 36.74 |
| 4 | 321200105527 | TUO | 120 | 55.27 | 36.71 |
| 4 | 300490001003 | CAL | 49 | 10.03 | 36.70 |
| 4 | 320494002150 | TUO | 49 | 21.5 | 36.64 |
| 4 | 261040000941 | AMA | 104 | 9.41 | 36.62 |
| 4 | 260260000106 | AMA | 26 | 1.06 | 36.61 |
| 4 | 321200000725 | TUO | 120 | 7.25 | 36.59 |
| 4 | 260884000909 | AMA | 88 | 9.09 | 36.47 |
| 4 | 260260000050 | AMA | 26 | 0.5 | 36.46 |
| 4 | 260260000056 | AMA | 26 | 0.56 | 36.46 |
| 4 | 300490001163 | CAL | 49 | 11.63 | 36.46 |
| 4 | 300044105555 | CAL | 4 | 55.55 | 36.38 |
| 4 | 300044105565 | CAL | 4 | 55.65 | 36.38 |
| 4 | 300044105572 | CAL | 4 | 55.72 | 36.38 |
| 4 | 391404004900 | MER | 140 | 49 | 36.32 |
| 4 | 380054001473 | STA | 5 | 14.73 | 36.29 |
| 4 | 321084101927 | TUO | 108 | 19.27 | 36.22 |
| 4 | 300120000832 | CAL | 12 | 8.32 | 36.17 |
| 4 | 260880006820 | AMA | 88 | 68.2 | 36.11 |
| 4 | 321080004490 | TUO | 108 | 44.9 | 36.10 |
| 4 | 321204004042 | TUO | 120 | 40.42 | 36.09 |
| 4 | 290884002195 | SJ | 88 | 21.95 | 36.08 |
| 4 | 260884000715 | AMA | 88 | 7.15 | 36.03 |
| 4 | 300044003826 | CAL | 4 | 38.26 | 36.03 |
| 4 | 260884000395 | AMA | 88 | 3.95 | 36.00 |
| 4 | 300124001116 | CAL | 12 | 11.16 | 35.98 |
| 4 | 401404001981 | MPA | 140 | 19.81 | 35.94 |
| 4 | 260490001380 | AMA | 49 | 13.8 | 35.92 |
| 4 | 260880102687 | AMA | 88 | 26.87 | 35.88 |
| 4 | 380054001378 | STA | 5 | 13.78 | 35.86 |
| 4 | 401404000906 | MPA | 140 | 9.06 | 35.86 |
| 4 | 260880000467 | AMA | 88 | 4.67 | 35.79 |
| 4 | 300124001061 | CAL | 12 | 10.61 | 35.74 |
| 4 | 400490004267 | MPA | 49 | 42.67 | 35.74 |

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 4 | 290124002400 | SJ | 12 | 24 | 35.73 |
| 4 | 260884000614 | AMA | 88 | 6.14 | 35.73 |
| 4 | 391525200743 | MER | 152 | 7.43 | 35.68 |
| 4 | 300490002129 | CAL | 49 | 21.29 | 35.67 |
| 4 | 391524100768 | MER | 152 | 7.68 | 35.66 |
| 4 | 320490101018 | TUO | 49 | 10.18 | 35.60 |
| 4 | 391524100623 | MER | 152 | 6.23 | 35.54 |
| 4 | 380054002208 | STA | 5 | 22.08 | 35.52 |
| 4 | 321204002949 | TUO | 120 | 29.49 | 35.51 |
| 4 | 321202100534 | TUO | 120 | 5.34 | 35.42 |
| 4 | 321204100569 | TUO | 120 | 5.69 | 35.35 |
| 4 | 321200000807 | TUO | 120 | 8.07 | 35.34 |
| 4 | 300490102315 | CAL | 49 | 23.15 | 35.31 |
| 4 | 300264002674 | CAL | 26 | 26.74 | 35.23 |
| 4 | 321084101893 | TUO | 108 | 18.93 | 35.21 |
| 4 | 321084101297 | TUO | 108 | 12.97 | 35.16 |
| 4 | 300044003806 | CAL | 4 | 38.06 | 35.13 |
| 4 | 260881202865 | AMA | 88 | 28.65 | 35.01 |
| 4 | 295804000916 | SJ | 580 | 9.16 | 34.99 |
| 4 | 300040003301 | CAL | 4 | 33.01 | 34.96 |
| 4 | 401204004269 | MPA | 120 | 42.69 | 34.94 |
| 4 | 300044105884 | CAL | 4 | 58.84 | 34.88 |
| 4 | 300044105867 | CAL | 4 | 58.67 | 34.78 |
| 4 | 321200103400 | TUO | 120 | 34 | 34.76 |
| 4 | 300260000503 | CAL | 26 | 5.03 | 34.75 |
| 4 | 300044106011 | CAL | 4 | 60.11 | 34.71 |
| 4 | 300044106012 | CAL | 4 | 60.12 | 34.71 |
| 4 | 380054001373 | STA | 5 | 13.73 | 34.60 |
| 4 | 400490004673 | MPA | 49 | 46.73 | 34.59 |
| 4 | 261044000482 | AMA | 104 | 4.82 | 34.59 |
| 4 | 401404002464 | MPA | 140 | 24.64 | 34.57 |
| 4 | 300490102410 | CAL | 49 | 24.1 | 34.57 |
| 4 | 400490004696 | MPA | 49 | 46.96 | 34.55 |
| 4 | 261240000780 | AMA | 124 | 7.8 | 34.54 |
| 4 | 401404002527 | MPA | 140 | 25.27 | 34.54 |
| 4 | 400490004564 | MPA | 49 | 45.64 | 34.54 |
| 4 | 390054000654 | MER | 5 | 6.54 | 34.53 |
| 4 | 381200001421 | STA | 120 | 14.21 | 34.53 |
| 4 | 400490004578 | MPA | 49 | 45.78 | 34.50 |
| 4 | 401404002510 | MPA | 140 | 25.1 | 34.47 |

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 4 | 380054001175 | STA | 5 | 11.75 | 34.45 |
| 4 | 260880000830 | AMA | 88 | 8.3 | 34.44 |
| 4 | 400490004687 | MPA | 49 | 46.87 | 34.42 |
| 4 | 300124000128 | CAL | 12 | 1.28 | 34.42 |
| 4 | 300124000112 | CAL | 12 | 1.12 | 34.30 |
| 4 | 321204100536 | TUO | 120 | 5.36 | 34.24 |
| 4 | 261040000181 | AMA | 104 | 1.81 | 34.16 |
| 4 | 321204100565 | TUO | 120 | 5.65 | 34.16 |
| 4 | 261044000447 | AMA | 104 | 4.47 | 34.10 |
| 4 | 300044102220 | CAL | 4 | 22.2 | 34.09 |
| 4 | 321200003211 | TUO | 120 | 32.11 | 33.96 |
| 4 | 261040000080 | AMA | 104 | 0.8 | 33.94 |
| 4 | 381200001675 | STA | 120 | 16.75 | 33.89 |
| 4 | 300040002504 | CAL | 4 | 25.04 | 33.87 |
| 4 | 260884002020 | AMA | 88 | 20.2 | 33.87 |
| 4 | 300044002291 | CAL | 4 | 22.91 | 33.86 |
| 4 | 390054001597 | MER | 5 | 15.97 | 33.75 |
| 4 | 261240000283 | AMA | 124 | 2.83 | 33.61 |
| 4 | 400490004310 | MPA | 49 | 43.1 | 33.56 |
| 4 | 300044000978 | CAL | 4 | 9.78 | 33.53 |
| 4 | 390054001597 | MER | 5 | 15.97 | 33.51 |
| 4 | 400490004315 | MPA | 49 | 43.15 | 33.50 |
| 4 | 300124000400 | CAL | 12 | 4 | 33.47 |
| 4 | 300124000238 | CAL | 12 | 2.38 | 33.38 |
| 4 | 260880000178 | AMA | 88 | 1.78 | 33.31 |
| 4 | 321202100096 | TUO | 120 | 0.96 | 33.24 |
| 4 | 390054001017 | MER | 5 | 10.17 | 33.06 |
| 4 | 390054001017 | MER | 5 | 10.17 | 33.06 |
| 4 | 390054000372 | MER | 5 | 3.72 | 33.04 |
| 4 | 320490002158 | TUO | 49 | 21.58 | 33.04 |
| 4 | 321200100253 | TUO | 120 | 2.53 | 32.88 |
| 4 | 290880002370 | SJ | 88 | 23.7 | 32.83 |
| 4 | 400490002139 | MPA | 49 | 21.39 | 32.80 |
| 4 | 400490004722 | MPA | 49 | 47.22 | 32.79 |
| 4 | 320494002163 | TUO | 49 | 21.63 | 32.78 |
| 5 | 400490002188 | MPA | 49 | 21.88 | 32.71 |
| 5 | 261240000965 | AMA | 124 | 9.65 | 32.68 |
| 5 | 321202100260 | TUO | 120 | 2.6 | 32.65 |
| 5 | 260164000786 | AMA | 16 | 7.86 | 32.58 |
| 5 | 321204100001 | TUO | 120 | 0.01 | 32.55 |

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 5 | 401324101125 | MPA | 132 | 11.25 | 32.55 |
| 5 | 260884001302 | AMA | 88 | 13.02 | 32.52 |
| 5 | 321204100001 | TUO | 120 | 0.01 | 32.44 |
| 5 | 261240000671 | AMA | 124 | 6.71 | 32.43 |
| 5 | 260884000969 | AMA | 88 | 9.69 | 32.37 |
| 5 | 400490004365 | MPA | 49 | 43.65 | 32.29 |
| 5 | 400490004373 | MPA | 49 | 43.73 | 32.29 |
| 5 | 295804000530 | SJ | 580 | 5.3 | 32.21 |
| 5 | 400490004339 | MPA | 49 | 43.39 | 32.20 |
| 5 | 321200001031 | TUO | 120 | 10.31 | 32.12 |
| 5 | 321084101927 | TUO | 108 | 19.27 | 32.02 |
| 5 | 391520001147 | MER | 152 | 11.47 | 32.02 |
| 5 | 381321205057 | STA | 132 | 50.57 | 31.92 |
| 5 | 260164000849 | AMA | 16 | 8.49 | 31.85 |
| 5 | 390054001674 | MER | 5 | 16.74 | 31.74 |
| 5 | 391520001147 | MER | 152 | 11.47 | 31.72 |
| 5 | 300124000854 | CAL | 12 | 8.54 | 31.71 |
| 5 | 401324100998 | MPA | 132 | 9.98 | 31.70 |
| 5 | 260164000890 | AMA | 16 | 8.9 | 31.66 |
| 5 | 390054001881 | MER | 5 | 18.81 | 31.61 |
| 5 | 260164100621 | AMA | 16 | 6.21 | 31.52 |
| 5 | 401324100894 | MPA | 132 | 8.94 | 31.50 |
| 5 | 260164100530 | AMA | 16 | 5.3 | 31.46 |
| 5 | 401324101220 | MPA | 132 | 12.2 | 31.44 |
| 5 | 321209102454 | TUO | 120 | 24.54 | 31.37 |
| 5 | 295804000985 | SJ | 580 | 9.85 | 31.37 |
| 5 | 300260000592 | CAL | 26 | 5.92 | 31.34 |
| 5 | 260164100513 | AMA | 16 | 5.13 | 31.26 |
| 5 | 300260000746 | CAL | 26 | 7.46 | 31.23 |
| 5 | 260164100501 | AMA | 16 | 5.01 | 31.19 |
| 5 | 260490001667 | AMA | 49 | 16.67 | 31.08 |
| 5 | 321200003219 | TUO | 120 | 32.19 | 31.04 |
| 5 | 300494001617 | CAL | 49 | 16.17 | 31.01 |
| 5 | 300044102142 | CAL | 4 | 21.42 | 30.94 |
| 5 | 260164100684 | AMA | 16 | 6.84 | 30.84 |
| 5 | 260164100676 | AMA | 16 | 6.76 | 30.80 |
| 5 | 401324100782 | MPA | 132 | 7.82 | 30.61 |
| 5 | 261040000055 | AMA | 104 | 0.55 | 30.61 |
| 5 | 321204100600 | TUO | 120 | 6 | 30.61 |
| 5 | 391404004578 | MER | 140 | 45.78 | 30.54 |

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 5 | 260160100148 | AMA | 16 | 1.48 | 30.53 |
| 5 | 261040000000 | AMA | 104 | 0 | 30.51 |
| 5 | 380054000142 | STA | 5 | 1.42 | 30.50 |
| 5 | 300124000734 | CAL | 12 | 7.34 | 30.50 |
| 5 | 260164100441 | AMA | 16 | 4.41 | 30.46 |
| 5 | 260164100413 | AMA | 16 | 4.13 | 30.43 |
| 5 | 260164100702 | AMA | 16 | 7.02 | 30.28 |
| 5 | 300040102293 | CAL | 4 | 22.93 | 30.28 |
| 5 | 380054001336 | STA | 5 | 13.36 | 30.28 |
| 5 | 321200100643 | TUO | 120 | 6.43 | 30.11 |
| 5 | 300260002797 | CAL | 26 | 27.97 | 30.03 |
| 5 | 400494004750 | MPA | 49 | 47.5 | 30.01 |
| 5 | 401404002429 | MPA | 140 | 24.29 | 30.00 |
| 5 | 300044000750 | CAL | 4 | 7.5 | 29.86 |
| 5 | 401404002373 | MPA | 140 | 23.73 | 29.85 |
| 5 | 391520101195 | MER | 152 | 11.95 | 29.82 |
| 5 | 381324004866 | STA | 132 | 48.66 | 29.75 |
| 5 | 300044000692 | CAL | 4 | 6.92 | 29.74 |
| 5 | 390054000977 | MER | 5 | 9.77 | 29.58 |
| 5 | 300264000278 | CAL | 26 | 2.78 | 29.44 |
| 5 | 300044000779 | CAL | 4 | 7.79 | 29.40 |
| 5 | 390054000654 | MER | 5 | 6.54 | 29.37 |
| 5 | 261240000522 | AMA | 124 | 5.22 | 29.36 |
| 5 | 300044000635 | CAL | 4 | 6.35 | 29.31 |
| 5 | 261240000453 | AMA | 124 | 4.53 | 29.30 |
| 5 | 400490001916 | MPA | 49 | 19.16 | 29.18 |
| 5 | 300044000716 | CAL | 4 | 7.16 | 29.15 |
| 5 | 290050000632 | SJ | 5 | 6.32 | 28.76 |
| 5 | 261240000911 | AMA | 124 | 9.11 | 28.73 |
| 5 | 401404000053 | MPA | 140 | 0.53 | 28.70 |
| 5 | 300264000058 | CAL | 26 | 0.58 | 28.67 |
| 5 | 300260003287 | CAL | 26 | 32.87 | 28.56 |
| 5 | 321204100095 | TUO | 120 | 0.95 | 28.50 |
| 5 | 380054000442 | STA | 5 | 4.42 | 28.49 |
| 5 | 380054000442 | STA | 5 | 4.42 | 28.32 |
| 5 | 401404000489 | MPA | 140 | 4.89 | 27.97 |
| 5 | 321204002763 | TUO | 120 | 27.63 | 27.76 |
| 5 | 290264001949 | SJ | 26 | 19.49 | 27.59 |
| 5 | 290260001872 | SJ | 26 | 18.72 | 27.57 |
| 5 | 321201102476 | TUO | 120 | 24.76 | 27.30 |

| Priority | Culvert System Number | County[30] | Route | Postmile | Cross-Hazard Prioritization Score |
|---|---|---|---|---|---|
| 5 | 401400000142 | MPA | 140 | 1.42 | 27.24 |
| 5 | 401404001099 | MPA | 140 | 10.99 | 27.09 |
| 5 | 401404001060 | MPA | 140 | 10.6 | 27.05 |
| 5 | 401404000413 | MPA | 140 | 4.13 | 26.98 |
| 5 | 380054000027 | STA | 5 | 0.27 | 26.87 |
| 5 | 380054000027 | STA | 5 | 0.27 | 26.70 |
| 5 | 380054000078 | STA | 5 | 0.78 | 26.60 |
| 5 | 401320100263 | MPA | 132 | 2.63 | 25.49 |
| 5 | 290044003763 | SJ | 4 | 37.63 | 24.89 |
| 5 | 390054001072 | MER | 5 | 10.72 | 24.47 |
| 5 | 390054001072 | MER | 5 | 10.72 | 24.47 |
| 5 | 401400000309 | MPA | 140 | 3.09 | 23.45 |
| 5 | 391654002280 | MER | 165 | 22.8 | 23.14 |
| 5 | 290044003669 | SJ | 4 | 36.69 | 22.25 |
| 5 | 391654002112 | MER | 165 | 21.12 | 22.12 |
| 5 | 391400000974 | MER | 140 | 9.74 | 21.67 |
| 5 | 380054000720 | STA | 5 | 7.2 | 19.72 |
| 5 | 401404000251 | MPA | 140 | 2.51 | 19.15 |
| 5 | 390054001509 | MER | 5 | 15.09 | 18.98 |
| 5 | 380054000174 | STA | 5 | 1.74 | 15.97 |
| 5 | 391400000910 | MER | 140 | 9.1 | 14.69 |
| 5 | 295800001263 | SJ | 580 | 12.63 | 14.03 |
| 5 | 390590002760 | MER | 59 | 27.6 | 12.93 |
| 5 | 390054001565 | MER | 5 | 15.65 | 12.74 |
| 5 | 380054000759 | STA | 5 | 7.59 | 11.69 |
| 5 | 290054000698 | SJ | 5 | 6.98 | 11.55 |
| 5 | 390054000215 | MER | 5 | 2.15 | 10.60 |
| 5 | 390054000215 | MER | 5 | 2.15 | 10.48 |
| 5 | 391522002504 | MER | 152 | 25.04 | 9.33 |
| 5 | 390990000513 | MER | 99 | 5.13 | 9.14 |
| 5 | 390590002215 | MER | 59 | 22.15 | 6.15 |
| 5 | 390590000129 | MER | 59 | 1.29 | 0.00 |

TABLE 11: PRIORITIZATION OF ROADWAYS FOR DETAILED CLIMATE CHANGE ADAPTATION ASSESSMENTS

| Priority | Route | Carriageway[31] | From County & Postmile / To County & Postmile[32] | Average Cross-Hazard Prioritization Score[33] |
|---|---|---|---|---|
| 1 | 12 | P | SJ 12 0.003 / SJ 12 R4.66 | 66.94 |
| 1 | 12 | P | SJ 12 10.178 / SJ 12 10.213 | 66.94 |
| 1 | 12 | P | SJ 12 10.455 / SJ 12 10.821 | 66.94 |
| 1 | 12 | P | SJ 12 M4.98 / SJ 12 10.156 | 66.94 |
| 1 | 12 | P | SJ 12 10.454 / SJ 12 10.659 | 53.66 |
| 1 | 12 | P | SJ 12 6.05 / SJ 12 6.133 | 53.66 |
| 1 | 12 | P | SJ 12 8.724 / SJ 12 8.926 | 53.66 |
| 1 | 12 | P | SJ 12 9.575 / SJ 12 10.211 | 53.66 |
| 1 | 4 | P | CC 4 48.392 / SJ 4 12.889 | 43.18 |
| 1 | 4 | P | SJ 4 12.966 / SJ 4 15.905 | 43.18 |
| 1 | 4 | P | SJ 4 R15.318 / SJ 4 R16.033 | 43.18 |
| 1 | 4 | P | SJ 4 R16.069 / SJ 4 R16.069 | 43.18 |
| 1 | 4 | P | SJ 4 10.186 / SJ 4 10.517 | 42.42 |
| 1 | 4 | P | SJ 4 10.692 / SJ 4 11.746 | 42.42 |
| 1 | 4 | P | SJ 4 11.789 / SJ 4 11.955 | 42.42 |
| 1 | 4 | P | SJ 4 12.216 / SJ 4 12.889 | 42.42 |
| 1 | 4 | P | SJ 4 14.471 / SJ 4 15.906 | 42.42 |
| 1 | 4 | P | SJ 4 R15.327 / SJ 4 R16.008 | 42.42 |
| 1 | 4 | P | SJ 4 R16.044 / SJ 4 R16.044 | 42.42 |
| 1 | 4 | P | SJ 4 R16.093 / SJ 4 R16.266 | 42.42 |
| 1 | 4 | P | SJ 4 R6.006 / SJ 4 R6.119 | 42.42 |
| 1 | 4 | P | SJ 4 R8.519 / SJ 4 R8.722 | 42.42 |
| 1 | 4 | P | SJ 4 T13.935 / SJ 4 T14.126 | 42.42 |
| 1 | 5 | P | MER 5 0.008 / MER 5 6.286 | 38.61 |
| 1 | 5 | P | MER 5 6.458 / STA 5 0.009 | 38.61 |
| 1 | 5 | P | SJ 5 2.461 / SJ 5 R21.719 | 38.61 |
| 1 | 5 | P | SJ 5 25.368 / SJ 5 26.155 | 38.61 |
| 1 | 5 | P | SJ 5 26.198 / SJ 5 26.198 | 38.61 |
| 1 | 5 | P | SJ 5 26.204 / SJ 5 26.571 | 38.61 |
| 1 | 5 | P | SJ 5 26.966 / SJ 5 27.947 | 38.61 |
| 1 | 5 | P | SJ 5 28.295 / SJ 5 29.57 | 38.61 |
| 1 | 5 | P | SJ 5 29.646 / SJ 5 34.269 | 38.61 |
| 1 | 5 | P | SJ 5 34.293 / SJ 5 39.292 | 38.61 |
| 1 | 5 | P | SJ 5 39.593 / SJ 5 41.931 | 38.61 |

[31] Caltrans' alignment codes designate the carriageway on divided roadways: "P" always represents northbound or eastbound carriageways whereas "S" always represents southbound or westbound carriageways. Undivided roadways are always indicated with a "P".
[32] ALP = Alpine; AMA = Amador; CAL = Calaveras; MER = Merced; MPA = Mariposa; SJ = San Joaquin; STA = Stanislaus; TUO = Tuolumne
[33] The average of the cross-hazard prioritization scores amongst all the abutting small segments on the same route sharing a common priority level that were aggregated to form the longer segments listed in this table.

| Priority | Route | Carriageway[31] | From County & Postmile / To County & Postmile[32] | Average Cross-Hazard Prioritization Score[33] |
|---|---|---|---|---|
| 1 | 5 | P | SJ 5 44.439 / SAC 5 0.018 | 38.61 |
| 1 | 5 | P | SJ 5 R22.525 / SJ 5 25.36 | 38.61 |
| 1 | 5 | P | STA 5 0.879 / STA 5 9.456 | 38.61 |
| 1 | 5 | P | STA 5 23.244 / STA 5 28.011 | 38.61 |
| 1 | 5 | P | MER 5 0.009 / MER 5 6.069 | 38.32 |
| 1 | 5 | P | MER 5 6.443 / STA 5 0.003 | 38.32 |
| 1 | 5 | P | SJ 5 2.461 / SJ 5 R21.698 | 38.32 |
| 1 | 5 | P | SJ 5 25.652 / SJ 5 26.132 | 38.32 |
| 1 | 5 | P | SJ 5 26.163 / SJ 5 26.165 | 38.32 |
| 1 | 5 | P | SJ 5 26.172 / SJ 5 26.172 | 38.32 |
| 1 | 5 | P | SJ 5 26.213 / SJ 5 26.542 | 38.32 |
| 1 | 5 | P | SJ 5 26.971 / SJ 5 28.29 | 38.32 |
| 1 | 5 | P | SJ 5 28.324 / SJ 5 29.569 | 38.32 |
| 1 | 5 | P | SJ 5 29.647 / SJ 5 34.261 | 38.32 |
| 1 | 5 | P | SJ 5 34.285 / SJ 5 39.14 | 38.32 |
| 1 | 5 | P | SJ 5 39.583 / SJ 5 42.668 | 38.32 |
| 1 | 5 | P | SJ 5 44.423 / SJ 5 49.818 | 38.32 |
| 1 | 5 | P | SJ 5 R22.775 / SJ 5 25.365 | 38.32 |
| 1 | 5 | P | STA 5 0.884 / STA 5 9.449 | 38.32 |
| 1 | 5 | P | STA 5 23.002 / STA 5 0.159 | 38.32 |
| 1 | 205 | P | ALA 205 L0.005 / SJ 205 R13.299 | 36.97 |
| 1 | 205 | P | ALA 205 L0.005 / SJ 205 R12.867 | 35.66 |
| 1 | 120 | P | SJ 120 6.244 / SJ 120 6.197 | 29.30 |
| 1 | 120 | P | SJ 120 R0.505 / SJ 120 T7.131 | 29.30 |
| 1 | 99 | P | MER 99 0 / MER 99 R11.71 | 28.67 |
| 1 | 99 | P | MER 99 13.094 / MER 99 27.35 | 28.67 |
| 1 | 99 | P | SJ 99 5.309 / SJ 99 17.213 | 28.67 |
| 1 | 99 | P | MER 99 0.004 / MER 99 R11.726 | 28.51 |
| 1 | 99 | P | MER 99 13.11 / MER 99 27.485 | 28.51 |
| 1 | 99 | P | SJ 99 5.582 / SJ 99 17.213 | 28.51 |
| 1 | 580 | S | SJ 580 15.341R / SJ 580 8.344 | 28.46 |
| 1 | 580 | S | SJ 580 7.972 / SJ 580 1.398 | 28.46 |
| 1 | 120 | P | SJ 120 6.197 / SJ 120 6.245 | 27.96 |
| 1 | 120 | P | SJ 120 R0.493 / SJ 120 T7.132 | 27.96 |
| 1 | 120 | P | STA 120 11.049 / STA 120 17.052 | 27.96 |
| 1 | 120 | P | STA 120 6.901 / STA 120 10.118 | 27.96 |
| 1 | 580 | P | ALA 580 0.092R / SJ 580 8.299 | 27.85 |
| 1 | 580 | P | SJ 580 8.153 / SJ 580 1.413 | 27.85 |
| 1 | 59 | P | MER 59 14.782 / MER 59 14.805 | 27.27 |
| 1 | 59 | P | MER 59 15.033 / MER 59 15.157 | 27.27 |

| Priority | Route | Carriageway[31] | From County & Postmile / To County & Postmile[32] | Average Cross-Hazard Prioritization Score[33] |
|---|---|---|---|---|
| 1 | 59 | P | MER 59 15.347 / MER 59 15.37 | 27.27 |
| 1 | 152 | P | MER 152 11.277 / MER 152 13.553 | 26.64 |
| 1 | 152 | P | MER 152 13.835 / MER 152 14.713 | 26.64 |
| 1 | 152 | P | MER 152 R9.799 / MER 152 R10.931 | 26.64 |
| 1 | 152 | P | MER 152 11.281 / MER 152 13.531 | 26.60 |
| 1 | 152 | P | MER 152 13.833 / MER 152 14.709 | 26.60 |
| 1 | 152 | P | MER 152 R7.909 / MER 152 R10.928 | 26.60 |
| 1 | 132 | P | SJ 132 3.226 / SJ 132 4.246 | 26.34 |
| 1 | 132 | P | SJ 132 L0.582 / SJ 132 0.245 | 26.34 |
| 1 | 132 | P | SJ 132 3.226 / SJ 132 6.702 | 25.99 |
| 1 | 132 | P | SJ 132 7.096 / STA 132 1.377 | 25.99 |
| 1 | 132 | P | SJ 132 L0.094 / SJ 132 0.245 | 25.99 |
| 1 | 132 | P | STA 132 1.687 / STA 132 4.409 | 25.99 |
| 1 | 132 | P | STA 132 4.534 / STA 132 6.126 | 25.99 |
| 1 | 132 | P | STA 132 6.602 / STA 132 8.328 | 25.99 |
| 1 | 140 | P | MER 140 35.548 / MER 140 35.75 | 25.72 |
| 1 | 140 | P | MER 140 35.874 / MER 140 35.947 | 25.72 |
| 1 | 49 | P | AMA 49 4.805 / AMA 49 5.714 | 25.63 |
| 1 | 49 | P | AMA 49 5.991 / AMA 49 6.047 | 25.63 |
| 1 | 49 | P | AMA 49 R7.065 / AMA 49 R8.434 | 25.63 |
| 1 | 49 | P | AMA 49 R8.734 / AMA 49 14.661 | 25.63 |
| 1 | 49 | P | TUO 49 15.138 / TUO 49 15.697 | 25.63 |
| 1 | 49 | P | TUO 49 16.017 / TUO 49 17.002 | 25.63 |
| 1 | 49 | P | TUO 49 17.937 / TUO 49 20.616 | 25.63 |
| 1 | 49 | P | TUO 49 R10.6 / TUO 49 14.327 | 25.63 |
| 1 | 108 | P | TUO 108 R0.04 / TUO 108 R4.568 | 25.58 |
| 1 | 165 | P | MER 165 8.137 / MER 165 8.81 | 25.51 |
| 1 | 88 | P | AMA 88 12.679 / AMA 88 12.775 | 25.45 |
| 1 | 88 | P | AMA 88 14.902 / AMA 88 15.591 | 25.45 |
| 1 | 88 | P | SJ 88 14.775 / SJ 88 16.275 | 25.45 |
| 2 | 165 | P | MER 165 26.872 / MER 165 27.88 | 25.02 |
| 2 | 165 | P | MER 165 7.232 / MER 165 8.137 | 25.02 |
| 2 | 165 | P | MER 165 8.81 / MER 165 12.065 | 25.02 |
| 2 | 5 | P | MER 5 6.286 / MER 5 6.458 | 24.85 |
| 2 | 5 | P | SJ 5 27.947 / SJ 5 28.226 | 24.85 |
| 2 | 5 | P | SJ 5 41.931 / SJ 5 44.439 | 24.85 |
| 2 | 5 | P | STA 5 0.009 / STA 5 0.879 | 24.85 |
| 2 | 5 | P | MER 5 6.069 / MER 5 6.443 | 24.81 |
| 2 | 5 | P | SJ 5 42.668 / SJ 5 44.423 | 24.81 |
| 2 | 5 | P | STA 5 0.003 / STA 5 0.884 | 24.81 |

| Priority | Route | Carriageway[31] | From County & Postmile / To County & Postmile[32] | Average Cross-Hazard Prioritization Score[33] |
|---|---|---|---|---|
| 2 | 108 | P | TUO 108 L0.002 / TUO 108 L2.808 | 24.78 |
| 2 | 108 | P | TUO 108 R0 / TUO 108 R0.04 | 24.78 |
| 2 | 108 | P | TUO 108 R4.568 / TUO 108 R4.843 | 24.78 |
| 2 | 152 | P | MER 152 13.531 / MER 152 13.833 | 24.75 |
| 2 | 152 | P | MER 152 14.709 / MAD 152 R0 | 24.75 |
| 2 | 152 | P | MER 152 13.553 / MER 152 13.835 | 24.74 |
| 2 | 152 | P | MER 152 14.713 / MAD 152 R0.026 | 24.74 |
| 2 | 88 | P | AMA 88 12.775 / AMA 88 14.25 | 24.73 |
| 2 | 88 | P | AMA 88 14.292 / AMA 88 14.902 | 24.73 |
| 2 | 88 | P | AMA 88 15.591 / AMA 88 19.32 | 24.73 |
| 2 | 88 | P | SJ 88 16.275 / AMA 88 12.679 | 24.73 |
| 2 | 16 | P | SAC 16 R23.95 / AMA 16 9.372 | 24.40 |
| 2 | 140 | P | MER 140 31.51 / MER 140 35.548 | 24.39 |
| 2 | 140 | P | MER 140 35.75 / MER 140 35.78 | 24.39 |
| 2 | 140 | P | MER 140 35.79 / MER 140 35.874 | 24.39 |
| 2 | 140 | P | MER 140 35.947 / MER 140 43.672 | 24.39 |
| 2 | 140 | P | MER 140 4.194 / MER 140 4.519 | 24.39 |
| 2 | 140 | P | MER 140 4.596 / MER 140 29.47 | 24.39 |
| 2 | 140 | P | MER 140 43.759 / MPA 140 1.449 | 24.39 |
| 2 | 140 | P | MPA 140 8.399 / MPA 140 10.237 | 24.39 |
| 2 | 99 | P | MER 99 R11.71 / MER 99 13.094 | 24.33 |
| 2 | 99 | P | SJ 99 1.708 / SJ 99 2.38 | 24.33 |
| 2 | 99 | P | STA 99 R17.974 / STA 99 M18.752 | 24.33 |
| 2 | 99 | P | STA 99 R20.216 / STA 99 R20.563 | 24.33 |
| 2 | 99 | P | STA 99 R22.552 / SJ 99 0.558 | 24.33 |
| 2 | 99 | P | MER 99 R11.726 / MER 99 13.11 | 24.32 |
| 2 | 99 | P | SJ 99 1.71 / SJ 99 2.376 | 24.32 |
| 2 | 99 | P | STA 99 R17.989 / STA 99 M18.518 | 24.32 |
| 2 | 99 | P | STA 99 R22.555 / SJ 99 0.885 | 24.32 |
| 2 | 12 | P | CAL 12 9.928 / CAL 12 10.404 | 24.25 |
| 2 | 12 | P | SJ 12 23.168 / SJ 12 24.41 | 24.25 |
| 2 | 33 | P | MER 33 27.111 / MER 33 28.695 | 24.19 |
| 2 | 33 | P | MER 33 29.73 / STA 33 1.264 | 24.19 |
| 2 | 33 | P | MER 33 R13.597 / MER 33 16.646 | 24.19 |
| 2 | 33 | P | MER 33 R5.575 / MER 33 L5.678 | 24.19 |
| 2 | 33 | P | SJ 33 0.16 / SJ 33 0.962 | 24.19 |
| 2 | 4 | P | STA 4 5.718 / CAL 4 R21.447 | 24.17 |
| 2 | 49 | P | AMA 49 14.661 / AMA 49 17.22 | 24.15 |
| 2 | 49 | P | AMA 49 3.891 / AMA 49 4.805 | 24.15 |
| 2 | 49 | P | AMA 49 5.714 / AMA 49 5.992 | 24.15 |

| Priority | Route | Carriageway[31] | From County & Postmile / To County & Postmile[32] | Average Cross-Hazard Prioritization Score[33] |
|---|---|---|---|---|
| 2 | 49 | P | AMA 49 6.047 / AMA 49 R7.065 | 24.15 |
| 2 | 49 | P | AMA 49 R8.434 / AMA 49 R8.734 | 24.15 |
| 2 | 49 | P | CAL 49 18.788 / CAL 49 20.465 | 24.15 |
| 2 | 49 | P | CAL 49 27.612 / AMA 49 3.634 | 24.15 |
| 2 | 49 | P | CAL 49 8.167 / CAL 49 18.679 | 24.15 |
| 2 | 49 | P | TUO 49 14.327 / TUO 49 15.138 | 24.15 |
| 2 | 49 | P | TUO 49 15.697 / TUO 49 16.017 | 24.15 |
| 2 | 49 | P | TUO 49 17.002 / TUO 49 17.937 | 24.15 |
| 2 | 49 | P | TUO 49 20.616 / CAL 49 7.966 | 24.15 |
| 2 | 49 | P | TUO 49 R10.128 / TUO 49 R10.6 | 24.15 |
| 2 | 49 | P | AMA 49 2.728 / AMA 49 3.62 | 24.10 |
| 2 | 49 | P | AMA 49 3.821 / AMA 49 4.805 | 24.10 |
| 2 | 49 | P | AMA 49 5.714 / AMA 49 5.989 | 24.10 |
| 2 | 49 | P | AMA 49 6.047 / AMA 49 R7.065 | 24.10 |
| 2 | 49 | P | CAL 49 18.884 / CAL 49 19.808 | 24.10 |
| 2 | 49 | P | CAL 49 8.066 / CAL 49 9.215 | 24.10 |
| 2 | 49 | P | TUO 49 15.138 / TUO 49 14.327 | 24.10 |
| 2 | 49 | P | TUO 49 16.017 / TUO 49 15.697 | 24.10 |
| 2 | 49 | P | TUO 49 17.733 / TUO 49 17.002 | 24.10 |
| 2 | 132 | P | SJ 132 0.245 / SJ 132 3.183 | 24.09 |
| 2 | 132 | P | SJ 132 6.702 / SJ 132 7.096 | 24.09 |
| 2 | 132 | P | STA 132 1.377 / STA 132 1.687 | 24.09 |
| 2 | 132 | P | STA 132 4.409 / STA 132 4.534 | 24.09 |
| 2 | 132 | P | STA 132 6.126 / STA 132 6.602 | 24.09 |
| 2 | 132 | P | SJ 132 0.245 / SJ 132 3.18 | 24.09 |
| 2 | 132 | P | SJ 132 6.702 / SJ 132 7.096 | 24.09 |
| 2 | 132 | P | STA 132 1.377 / STA 132 1.687 | 24.09 |
| 2 | 132 | P | STA 132 4.409 / STA 132 4.534 | 24.09 |
| 2 | 132 | P | STA 132 6.126 / STA 132 6.602 | 24.09 |
| 2 | 120 | P | SJ 120 6.245 / SJ 120 6.585 | 23.98 |
| 2 | 120 | P | STA 120 10.118 / STA 120 11.049 | 23.98 |
| 2 | 120 | P | STA 120 17.052 / TUO 120 R23.9 | 23.98 |
| 2 | 120 | P | TUO 120 50.084 / TUO 120 R55.552 | 23.98 |
| 2 | 59 | P | MER 59 12.085 / MER 59 14.77 | 23.93 |
| 2 | 59 | P | MER 59 14.805 / MER 59 15.033 | 23.93 |
| 2 | 59 | P | MER 59 15.157 / MER 59 15.347 | 23.93 |
| 2 | 59 | P | MER 59 15.37 / MER 59 16.109 | 23.93 |
| 2 | 59 | P | MER 59 R0 / MER 59 R0.216 | 23.93 |
| 2 | 88 | P | AMA 88 13.495 / AMA 88 13.912 | 23.87 |
| 2 | 88 | P | AMA 88 14.123 / AMA 88 14.249 | 23.87 |

| Priority | Route | Carriageway[31] | From County & Postmile / To County & Postmile[32] | Average Cross-Hazard Prioritization Score[33] |
|---|---|---|---|---|
| 2 | 88 | P | AMA 88 3.307 / AMA 88 3.748 | 23.87 |
| 2 | 88 | P | AMA 88 5.092 / AMA 88 5.32 | 23.87 |
| 2 | 88 | P | SJ 88 17.505 / SJ 88 18.534 | 23.87 |
| 2 | 140 | P | MER 140 36.482 / MER 140 36.647 | 23.79 |
| 2 | 140 | P | MER 140 4.519 / MER 140 4.755 | 23.79 |
| 2 | 140 | P | MER 140 43.7 / MER 140 44.066 | 23.79 |
| 2 | 120 | P | SJ 120 6.44 / SJ 120 6.244 | 23.74 |
| 2 | 120 | P | STA 120 10.118 / STA 120 11.049 | 23.74 |
| 2 | 120 | P | STA 120 17.973 / STA 120 6.957 | 23.74 |
| 2 | 33 | P | MER 33 R16.069 / MER 33 R16.421 | 23.69 |
| 2 | 33 | P | MER 33 R16.613 / MER 33 16.656 | 23.69 |
| 2 | 59 | P | MER 59 13.622 / MER 59 14.77 | 23.64 |
| 2 | 59 | P | MER 59 14.98 / MER 59 15.033 | 23.64 |
| 2 | 59 | P | MER 59 15.157 / MER 59 15.347 | 23.64 |
| 2 | 59 | P | MER 59 15.854 / MER 59 15.95 | 23.64 |
| 2 | 26 | P | CAL 26 17.91 / CAL 26 18.143 | 23.64 |
| 2 | 26 | P | CAL 26 7.727 / CAL 26 10.302 | 23.64 |
| 2 | 104 | P | AMA 104 8.386 / AMA 104 9.888 | 23.59 |
| 2 | 104 | P | AMA 104 R6.551 / AMA 104 R8.201 | 23.59 |
| 3 | 33 | P | MER 33 16.646 / MER 33 26.464 | 23.26 |
| 3 | 33 | P | MER 33 28.695 / MER 33 29.73 | 23.26 |
| 3 | 33 | P | MER 33 L0 / MER 33 R5.575 | 23.26 |
| 3 | 33 | P | SJ 33 0.962 / SJ 33 5.001 | 23.26 |
| 3 | 33 | P | STA 33 1.264 / STA 33 6.468 | 23.26 |
| 3 | 33 | P | STA 33 15.196 / STA 33 18.9 | 23.26 |
| 3 | 33 | P | STA 33 19.92 / SJ 33 0.16 | 23.26 |
| 3 | 104 | P | AMA 104 0 / AMA 104 R6.551 | 23.25 |
| 3 | 104 | P | AMA 104 9.888 / AMA 104 10.072 | 23.25 |
| 3 | 49 | P | AMA 49 3.62 / AMA 49 3.821 | 23.25 |
| 3 | 49 | P | CAL 49 18.679 / CAL 49 18.884 | 23.25 |
| 3 | 49 | P | CAL 49 7.966 / CAL 49 8.066 | 23.25 |
| 3 | 12 | P | CAL 12 10.404 / CAL 12 18.201 | 23.22 |
| 3 | 12 | P | SJ 12 24.41 / CAL 12 9.928 | 23.22 |
| 3 | 165 | P | MER 165 12.065 / MER 165 26.872 | 23.22 |
| 3 | 165 | P | MER 165 27.88 / MER 165 31.868 | 23.22 |
| 3 | 165 | P | MER 165 L0 / MER 165 7.232 | 23.22 |
| 3 | 49 | P | AMA 49 17.22 / AMA 49 22.11 | 23.22 |
| 3 | 49 | P | AMA 49 3.634 / AMA 49 3.891 | 23.22 |
| 3 | 49 | P | CAL 49 18.679 / CAL 49 18.788 | 23.22 |
| 3 | 49 | P | CAL 49 20.465 / CAL 49 27.612 | 23.22 |

| Priority | Route | Carriageway[31] | From County & Postmile / To County & Postmile[32] | Average Cross-Hazard Prioritization Score[33] |
|---|---|---|---|---|
| 3 | 49 | P | CAL 49 7.966 / CAL 49 8.167 | 23.22 |
| 3 | 49 | P | MPA 49 43.308 / TUO 49 R6.468 | 23.22 |
| 3 | 49 | P | TUO 49 R8.779 / TUO 49 R10.128 | 23.22 |
| 3 | 59 | P | MAD 59 L0.157 / MAD 59 L0.159 | 23.20 |
| 3 | 59 | P | MER 59 16.109 / MER 59 33.71 | 23.20 |
| 3 | 59 | P | MER 59 L14.416R / MER 59 14.805 | 23.20 |
| 3 | 59 | P | MER 59 R0.216 / MER 59 12.085 | 23.20 |
| 3 | 33 | P | MER 33 16.656 / MER 33 16.956 | 23.17 |
| 3 | 33 | P | SJ 33 4.491 / SJ 33 5.001 | 23.17 |
| 3 | 124 | P | AMA 124 0 / AMA 124 2.291 | 23.12 |
| 3 | 124 | P | AMA 124 R2.291 / AMA 124 R10.335 | 23.12 |
| 3 | 140 | P | MER 140 43.672 / MER 140 43.7 | 23.11 |
| 3 | 140 | P | MPA 140 1.449 / MPA 140 2.528 | 23.11 |
| 3 | 140 | P | MER 140 0 / MER 140 4.194 | 23.10 |
| 3 | 140 | P | MER 140 29.47 / MER 140 31.51 | 23.10 |
| 3 | 140 | P | MER 140 4.519 / MER 140 4.596 | 23.10 |
| 3 | 140 | P | MER 140 43.672 / MER 140 43.759 | 23.10 |
| 3 | 140 | P | MPA 140 1.449 / MPA 140 8.399 | 23.10 |
| 3 | 26 | P | CAL 26 10.435 / CAL 26 17.91 | 23.08 |
| 3 | 26 | P | CAL 26 18.143 / CAL 26 24.78 | 23.08 |
| 3 | 26 | P | SJ 26 11.376 / CAL 26 7.727 | 23.08 |
| 3 | 26 | P | CAL 26 7.418 / CAL 26 7.727 | 23.07 |
| 3 | 59 | P | MER 59 16.991 / MER 59 18.258 | 23.02 |
| 3 | 59 | P | MER 59 22.921 / MER 59 23.301 | 23.02 |
| 3 | 59 | P | MER 59 L14.423R / MER 59 14.782 | 23.02 |
| 3 | 132 | P | SJ 132 3.183 / SJ 132 3.226 | 22.87 |
| 3 | 132 | P | STA 132 33.257 / STA 132 33.38 | 22.87 |
| 3 | 132 | P | STA 132 35.913 / STA 132 36.056 | 22.87 |
| 3 | 132 | P | STA 132 45.74 / STA 132 45.887 | 22.87 |
| 3 | 132 | P | STA 132 R43.959 / STA 132 R44.115 | 22.87 |
| 3 | 132 | P | TUO 132 3.951 / TUO 132 4.086 | 22.87 |
| 3 | 132 | P | TUO 132 7.041 / TUO 132 7.122 | 22.87 |
| 3 | 132 | P | TUO 132 R5.67 / TUO 132 R5.771 | 22.87 |
| 3 | 132 | P | SJ 132 3.18 / SJ 132 3.226 | 22.86 |
| 3 | 132 | P | STA 132 R31.683 / MPA 132 18.746 | 22.86 |
| 3 | 4 | P | CAL 4 R21.447 / CAL 4 28.75 | 21.68 |
| 3 | 4 | P | SJ 4 12.889 / SJ 4 12.966 | 21.68 |
| 3 | 4 | P | SJ 4 34.143 / STA 4 5.718 | 21.68 |
| 3 | 4 | P | SJ 4 R16.079 / SJ 4 R16.267 | 21.68 |
| 3 | 4 | P | SJ 4 R16.995 / SJ 4 R19.294 | 21.68 |

| Priority | Route | Carriageway[31] | From County & Postmile / To County & Postmile[32] | Average Cross-Hazard Prioritization Score[33] |
|---|---|---|---|---|
| 3 | 5 | P | SJ 5 25.365 / SJ 5 25.652 | 19.46 |
| 3 | 5 | P | SJ 5 39.14 / SJ 5 39.57 | 19.46 |
| 3 | 5 | P | SJ 5 R21.698 / SJ 5 R22.775 | 19.46 |
| 3 | 99 | P | MER 99 27.35 / MER 99 R30.188 | 19.28 |
| 3 | 99 | P | MER 99 R35.542 / STA 99 R0.523 | 19.28 |
| 3 | 99 | P | SJ 99 0.558 / SJ 99 1.708 | 19.28 |
| 3 | 99 | P | SJ 99 17.213 / SJ 99 18.955 | 19.28 |
| 3 | 99 | P | SJ 99 19.284 / SJ 99 27.401 | 19.28 |
| 3 | 99 | P | SJ 99 2.38 / SJ 99 5.309 | 19.28 |
| 3 | 99 | P | SJ 99 28.479 / SJ 99 31.579 | 19.28 |
| 3 | 99 | P | SJ 99 32.602 / SJ 99 38.783 | 19.28 |
| 3 | 99 | P | STA 99 M18.752 / STA 99 R20.216 | 19.28 |
| 3 | 99 | P | STA 99 R1.644 / STA 99 R17.974 | 19.28 |
| 3 | 99 | P | STA 99 R20.563 / STA 99 R22.552 | 19.28 |
| 3 | 99 | P | MER 99 27.485 / MER 99 R30.382 | 19.27 |
| 3 | 99 | P | MER 99 R35.565 / STA 99 R0.518 | 19.27 |
| 3 | 99 | P | SJ 99 0.885 / SJ 99 1.71 | 19.27 |
| 3 | 99 | P | SJ 99 17.213 / SJ 99 18.88 | 19.27 |
| 3 | 99 | P | SJ 99 19.287 / SJ 99 27.5 | 19.27 |
| 3 | 99 | P | SJ 99 2.376 / SJ 99 5.582 | 19.27 |
| 3 | 99 | P | SJ 99 28.479 / SJ 99 31.58 | 19.27 |
| 3 | 99 | P | SJ 99 32.573 / SJ 99 38.779 | 19.27 |
| 3 | 99 | P | STA 99 M18.518 / STA 99 R22.555 | 19.27 |
| 3 | 99 | P | STA 99 R1.639 / STA 99 R17.989 | 19.27 |
| 3 | 4 | P | SJ 4 12.889 / SJ 4 12.966 | 18.69 |
| 3 | 4 | P | SJ 4 R16.994 / SJ 4 R19.303 | 18.69 |
| 3 | 88 | P | SJ 88 0 / SJ 88 0.157 | 18.35 |
| 3 | 219 | P | STA 219 0.076 / STA 219 0.152 | 18.05 |
| 3 | 219 | P | STA 219 0.076 / STA 219 0.157 | 18.05 |
| 3 | 5 | P | SJ 5 28.226 / SJ 5 28.295 | 17.87 |
| 3 | 5 | P | SJ 5 R21.719 / SJ 5 R22.525 | 17.87 |
| 4 | 5 | P | SJ 5 0.159R / SJ 5 2.461 | 16.16 |
| 4 | 5 | P | STA 5 9.449 / STA 5 23.002 | 16.16 |
| 4 | 5 | P | SJ 5 39.292 / SJ 5 39.581 | 16.15 |
| 4 | 5 | P | STA 5 28.011 / SJ 5 2.461 | 16.15 |
| 4 | 5 | P | STA 5 9.456 / STA 5 23.244 | 16.15 |
| 4 | 4 | P | SJ 4 15.906 / SJ 4 15.912 | 16.10 |
| 4 | 4 | P | SJ 4 R16.266 / SJ 4 R16.994 | 16.10 |
| 4 | 99 | P | MER 99 R30.188 / MER 99 R35.542 | 15.53 |
| 4 | 99 | P | SJ 99 18.955 / SJ 99 19.284 | 15.53 |

| Priority | Route | Carriageway[31] | From County & Postmile / To County & Postmile[32] | Average Cross-Hazard Prioritization Score[33] |
|---|---|---|---|---|
| 4 | 99 | P | SJ 99 27.401 / SJ 99 28.479 | 15.53 |
| 4 | 99 | P | SJ 99 31.579 / SJ 99 32.602 | 15.53 |
| 4 | 99 | P | STA 99 R0.523 / STA 99 R1.644 | 15.53 |
| 4 | 99 | P | MER 99 R30.382 / MER 99 R35.565 | 15.36 |
| 4 | 99 | P | SJ 99 18.88 / SJ 99 19.287 | 15.36 |
| 4 | 99 | P | SJ 99 27.5 / SJ 99 28.479 | 15.36 |
| 4 | 99 | P | SJ 99 31.58 / SJ 99 32.573 | 15.36 |
| 4 | 99 | P | STA 99 R0.518 / STA 99 R1.639 | 15.36 |
| 4 | 580 | S | SJ 580 1.398 / SJ 580 L0.045 | 15.22 |
| 4 | 580 | S | SJ 580 8.344 / SJ 580 7.972 | 15.22 |
| 4 | 580 | P | SJ 580 1.413 / SJ 580 L0.249 | 15.17 |
| 4 | 580 | P | SJ 580 8.299 / SJ 580 8.153 | 15.17 |
| 4 | 152 | P | MER 152 R10.931 / MER 152 11.277 | 14.63 |
| 4 | 152 | P | MER 152 R35.145 / MER 152 R9.799 | 14.63 |
| 4 | 4 | P | SJ 4 15.905 / SJ 4 15.912 | 14.59 |
| 4 | 4 | P | SJ 4 19.751 / SJ 4 19.845 | 14.59 |
| 4 | 4 | P | SJ 4 19.902 / SJ 4 21.629 | 14.59 |
| 4 | 4 | P | SJ 4 R16.267 / SJ 4 R16.995 | 14.59 |
| 4 | 152 | P | MER 152 R0 / MER 152 R7.909 | 14.53 |
| 4 | 152 | P | MER 152 R10.928 / MER 152 11.281 | 14.53 |
| 4 | 26 | P | SJ 26 1.11 / SJ 26 1.359 | 13.53 |
| 4 | 120 | P | SJ 120 6.585 / STA 120 6.901 | 13.49 |
| 4 | 120 | P | TUO 120 30.357 / TUO 120 R33.393 | 13.49 |
| 4 | 108 | P | STA 108 R22.973 / STA 108 27.623 | 13.47 |
| 4 | 108 | P | STA 108 31.142 / STA 108 31.3 | 13.23 |
| 4 | 108 | P | STA 108 32.146 / STA 108 36.787 | 13.23 |
| 4 | 108 | P | STA 108 R22.973 / STA 108 30.743 | 13.23 |
| 4 | 108 | P | TUO 108 5.986 / TUO 108 6.779 | 13.23 |
| 4 | 108 | P | TUO 108 R4.843 / TUO 108 5.798 | 13.23 |
| 4 | 88 | P | AMA 88 19.32 / AMA 88 R23.63 | 13.19 |
| 4 | 88 | P | AMA 88 29.628 / AMA 88 R31.828 | 13.19 |
| 4 | 88 | P | AMA 88 R24.145 / AMA 88 R25.605 | 13.19 |
| 4 | 88 | P | AMA 88 R26.051 / AMA 88 R26.558 | 13.19 |
| 4 | 88 | P | AMA 88 R27.001 / AMA 88 29.479 | 13.19 |
| 4 | 88 | P | SJ 88 1.57 / SJ 88 14.775 | 13.19 |
| 4 | 26 | P | AMA 26 3.842 / AMA 26 4.644 | 13.08 |
| 4 | 26 | P | SJ 26 1.11 / SJ 26 1.381 | 13.08 |
| 4 | 26 | P | SJ 26 2.383 / SJ 26 2.623 | 13.08 |
| 4 | 26 | P | SJ 26 2.829 / SJ 26 4.082 | 13.08 |
| 4 | 219 | P | STA 219 4.458 / STA 219 4.858 | 13.04 |

| Priority | Route | Carriageway[31] | From County & Postmile / To County & Postmile[32] | Average Cross-Hazard Prioritization Score[33] |
|---|---|---|---|---|
| 4 | 219 | P | STA 219 4.565 / STA 219 4.858 | 13.04 |
| 4 | 165 | P | MER 165 32.367 / MER 165 33.083 | 13.02 |
| 4 | 165 | P | MER 165 34.362 / STA 165 1.545 | 13.02 |
| 4 | 132 | P | STA 132 14.52 / STA 132 14.651 | 12.96 |
| 4 | 132 | P | STA 132 14.983 / STA 132 15.128 | 12.96 |
| 4 | 132 | P | STA 132 15.34 / STA 132 15.617 | 12.96 |
| 4 | 132 | P | STA 132 15.903 / STA 132 20.209 | 12.96 |
| 4 | 132 | P | STA 132 8.328 / STA 132 14.442 | 12.96 |
| 4 | 12 | P | SJ 12 10.16 / SJ 12 10.178 | 12.95 |
| 4 | 12 | P | SJ 12 10.213 / SJ 12 10.455 | 12.95 |
| 4 | 12 | P | SJ 12 10.821 / SJ 12 18.068 | 12.95 |
| 4 | 12 | P | SJ 12 18.08 / SJ 12 18.096 | 12.95 |
| 4 | 12 | P | SJ 12 18.424 / SJ 12 L23.17 | 12.95 |
| 4 | 140 | P | MPA 140 19.74 / MPA 140 21.47 | 12.93 |
| 4 | 140 | P | MPA 140 21.915 / MPA 140 22.08 | 12.93 |
| 4 | 12 | P | SJ 12 10.211 / SJ 12 10.454 | 12.87 |
| 4 | 12 | P | SJ 12 12.42 / SJ 12 12.863 | 12.87 |
| 4 | 12 | P | SJ 12 15.2 / SJ 12 18.068 | 12.87 |
| 4 | 120 | P | SJ 120 10.595 / SJ 120 11.294 | 12.80 |
| 4 | 120 | P | SJ 120 11.644 / SJ 120 13.024 | 12.80 |
| 4 | 120 | P | SJ 120 13.553 / SJ 120 14.014 | 12.80 |
| 4 | 120 | P | SJ 120 14.571 / SJ 120 15.03 | 12.80 |
| 4 | 120 | P | SJ 120 16.157 / SJ 120 18.176 | 12.80 |
| 4 | 120 | P | SJ 120 6.823 / SJ 120 6.44 | 12.80 |
| 4 | 120 | P | SJ 120 8.354 / SJ 120 9.217 | 12.80 |
| 4 | 120 | P | SJ 120 9.581 / SJ 120 9.911 | 12.80 |
| 4 | 120 | P | STA 120 4.3 / STA 120 4.736 | 12.80 |
| 4 | 120 | P | STA 120 5.248 / STA 120 6.86 | 12.80 |
| 4 | 33 | P | MER 33 R13.238 / MER 33 R13.597 | 12.78 |
| 4 | 88 | P | AMA 88 20.658 / AMA 88 20.979 | 12.64 |
| 4 | 88 | P | AMA 88 22.692 / AMA 88 23.358 | 12.64 |
| 4 | 88 | P | SJ 88 13.194 / SJ 88 14.457 | 12.64 |
| 4 | 88 | P | SJ 88 2.217 / SJ 88 2.458 | 12.64 |
| 4 | 132 | P | STA 132 11.187 / STA 132 11.579 | 12.62 |
| 4 | 132 | P | STA 132 13.336 / STA 132 14.144 | 12.62 |
| 4 | 132 | P | STA 132 14.319 / STA 132 14.442 | 12.62 |
| 4 | 132 | P | STA 132 14.983 / STA 132 15.127 | 12.62 |
| 4 | 132 | P | STA 132 15.34 / STA 132 15.617 | 12.62 |
| 4 | 132 | P | STA 132 15.838 / STA 132 19.757 | 12.62 |
| 4 | 132 | P | STA 132 20.036 / STA 132 20.209 | 12.62 |

| Priority | Route | Carriageway[31] | From County & Postmile / To County & Postmile[32] | Average Cross-Hazard Prioritization Score[33] |
|---|---|---|---|---|
| 4 | 132 | P | STA 132 8.328 / STA 132 8.485 | 12.62 |
| 5 | 219 | P | STA 219 0.152 / STA 219 4.458 | 12.15 |
| 5 | 219 | P | STA 219 0.157 / STA 219 4.565 | 12.15 |
| 5 | 120 | P | TUO 120 R23.9 / TUO 120 30.357 | 12.15 |
| 5 | 120 | P | TUO 120 R33.393 / TUO 120 50.084 | 12.15 |
| 5 | 12 | P | SJ 12 10.156 / SJ 12 10.16 | 12.01 |
| 5 | 12 | P | SJ 12 18.096 / SJ 12 18.424 | 12.01 |
| 5 | 12 | P | SJ 12 L23.17 / SJ 12 L23.286 | 12.01 |
| 5 | 12 | P | SJ 12 18.096 / SJ 12 18.424 | 12.00 |
| 5 | 12 | P | SJ 12 L23.17 / SJ 12 L23.286 | 12.00 |
| 5 | 132 | P | STA 132 14.442 / STA 132 14.52 | 11.96 |
| 5 | 132 | P | STA 132 14.651 / STA 132 14.983 | 11.96 |
| 5 | 132 | P | STA 132 15.128 / STA 132 15.34 | 11.96 |
| 5 | 132 | P | STA 132 15.617 / STA 132 15.903 | 11.96 |
| 5 | 132 | P | STA 132 20.209 / STA 132 R31.683 | 11.96 |
| 5 | 140 | P | MPA 140 14.364 / MPA 140 15.4 | 11.90 |
| 5 | 140 | P | MPA 140 21.47 / MPA 140 21.915 | 11.90 |
| 5 | 140 | P | MPA 140 25.107 / MPA 140 25.538 | 11.90 |
| 5 | 132 | P | STA 132 14.442 / STA 132 14.52 | 11.88 |
| 5 | 132 | P | STA 132 14.651 / STA 132 14.983 | 11.88 |
| 5 | 132 | P | STA 132 15.127 / STA 132 15.34 | 11.88 |
| 5 | 132 | P | STA 132 15.617 / STA 132 15.838 | 11.88 |
| 5 | 132 | P | STA 132 20.209 / STA 132 20.438 | 11.88 |
| 5 | 132 | P | STA 132 22.838 / STA 132 23.404 | 11.88 |
| 5 | 132 | P | STA 132 27.042 / STA 132 27.755 | 11.88 |
| 5 | 132 | P | STA 132 27.9 / STA 132 28.095 | 11.88 |
| 5 | 165 | P | MER 165 31.868 / MER 165 32.367 | 11.83 |
| 5 | 165 | P | MER 165 33.083 / MER 165 34.362 | 11.83 |
| 5 | 26 | P | SJ 26 1.359 / SJ 26 2.383 | 11.81 |
| 5 | 26 | P | SJ 26 2.623 / SJ 26 2.829 | 11.81 |
| 5 | 26 | P | SJ 26 4.082 / SJ 26 4.709 | 11.81 |
| 5 | 26 | P | SJ 26 5.125 / SJ 26 5.851 | 11.81 |
| 5 | 26 | P | SJ 26 9.795 / SJ 26 10.838 | 11.81 |
| 5 | 165 | P | MER 165 33.083 / MER 165 34.362 | 11.79 |
| 5 | 33 | P | STA 33 18.9 / STA 33 19.92 | 11.69 |
| 5 | 33 | P | STA 33 6.468 / STA 33 15.196 | 11.69 |
| 5 | 26 | P | CAL 26 24.78 / AMA 26 3.842 | 11.64 |
| 5 | 26 | P | SJ 26 1.381 / SJ 26 2.383 | 11.64 |
| 5 | 26 | P | SJ 26 2.623 / SJ 26 2.829 | 11.64 |
| 5 | 26 | P | SJ 26 4.082 / SJ 26 11.376 | 11.64 |

| Priority | Route | Carriageway[31] | From County & Postmile / To County & Postmile[32] | Average Cross-Hazard Prioritization Score[33] |
|---|---|---|---|---|
| 5 | 49 | P | MPA 49 13.352 / MPA 49 13.778 | 11.63 |
| 5 | 49 | P | MPA 49 15.53 / MPA 49 16.738 | 11.63 |
| 5 | 49 | P | MPA 49 18.511 / MPA 49 19.497 | 11.63 |
| 5 | 88 | P | AMA 88 23.358 / AMA 88 R24.145 | 11.10 |
| 5 | 88 | P | AMA 88 29.479 / AMA 88 29.628 | 11.10 |
| 5 | 88 | P | AMA 88 R25.605 / AMA 88 R26.051 | 11.10 |
| 5 | 88 | P | AMA 88 R26.558 / AMA 88 R27.001 | 11.10 |
| 5 | 88 | P | AMA 88 R31.828 / AMA 88 R32.15 | 11.10 |
| 5 | 88 | P | SJ 88 0.157 / SJ 88 1.57 | 11.10 |
| 5 | 108 | P | STA 108 30.743 / STA 108 31.142 | 10.66 |
| 5 | 108 | P | STA 108 31.3 / STA 108 32.146 | 10.66 |
| 5 | 108 | P | STA 108 36.787 / STA 108 38.236 | 10.66 |
| 5 | 108 | P | STA 108 R22.438R / STA 108 R22.973 | 10.66 |
| 5 | 108 | P | TUO 108 5.798 / TUO 108 5.986 | 10.66 |
| 5 | 108 | P | TUO 108 6.779 / TUO 108 R9.808 | 10.66 |
| 5 | 108 | P | TUO 108 R10.257 / TUO 108 R10.852 | 10.66 |
| 5 | 108 | P | TUO 108 R11.547 / TUO 108 R11.897 | 10.66 |
| 5 | 140 | P | MPA 140 10.237 / MPA 140 19.74 | 10.20 |
| 5 | 140 | P | MPA 140 21.47 / MPA 140 21.915 | 10.20 |
| 5 | 140 | P | MPA 140 22.08 / MPA 140 51.789 | 10.20 |
| 5 | 49 | P | MAD 49 9.275 / MPA 49 18.511 | 9.89 |
| 5 | 49 | P | MPA 49 18.511 / MPA 49 43.308 | 9.89 |
| 5 | 108 | P | STA 108 30.743 / STA 108 31.142 | 8.80 |
| 5 | 108 | P | STA 108 31.3 / STA 108 32.146 | 8.80 |
| 5 | 108 | P | STA 108 36.787 / STA 108 38.236 | 8.80 |
| 5 | 108 | P | STA 108 L22.958 / STA 108 L22.836 | 8.80 |
| 5 | 108 | P | STA 108 L22.958 / STA 108 R22.973 | 8.80 |
| 5 | 108 | P | STA 108 R22.438R / STA 108 L22.958 | 8.80 |
| 5 | 108 | P | TUO 108 5.798 / TUO 108 5.986 | 8.80 |
| 5 | 108 | P | TUO 108 6.779 / TUO 108 15.379 | 8.80 |
| 5 | 4 | P | CAL 4 28.75 / CAL 4 40.92 | 8.55 |
| 5 | 4 | P | SJ 4 19.75 / SJ 4 19.751 | 8.55 |
| 5 | 4 | P | SJ 4 19.845 / SJ 4 19.902 | 8.55 |
| 5 | 4 | P | SJ 4 21.629 / SJ 4 34.143 | 8.55 |
| 5 | 88 | P | ALP 88 22.669 / ALP 88 25.283 | 6.82 |
| 5 | 88 | P | AMA 88 29.479 / AMA 88 29.628 | 6.82 |
| 5 | 88 | P | AMA 88 R23.63 / AMA 88 R24.145 | 6.82 |
| 5 | 88 | P | AMA 88 R25.605 / AMA 88 R26.051 | 6.82 |
| 5 | 88 | P | AMA 88 R26.558 / AMA 88 R27.001 | 6.82 |
| 5 | 88 | P | AMA 88 R31.828 / AMA 88 R38.315 | 6.82 |

| Priority | Route | Carriageway[31] | From County & Postmile / To County & Postmile[32] | Average Cross-Hazard Prioritization Score[33] |
|---|---|---|---|---|
| 5 | 88 | P | SJ 88 0.157 / SJ 88 1.57 | 6.82 |
| 5 | 4 | P | CAL 4 40.149 / CAL 4 40.343 | 3.06 |
| 5 | 4 | P | SJ 4 19.838 / SJ 4 19.902 | 3.06 |

This page intentionally left blank.