CALTRANS
Adaptation Priorities
REPORT





DISTRICT 7

JANUARY

2021

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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 climate hazard and climate stressor 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. District 7 is already experiencing the impacts of climate change as higher than anticipated sea levels and extreme flood events damage bridges and flood roadways, rapidly moving wildfires present profound challenges to timely evacuations, and higher than anticipated temperatures cause pavement damage over a broad area like US Route 101 and State Route 105. The district has recently experienced erosion and flooding along State Route 1 because of sea level rise and is currently facing adaptation needs within the coastal zone. 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 7, 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 7 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 7. 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 7 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 SUMMARY REPORT FOR DISTRICT 7

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 7. 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).

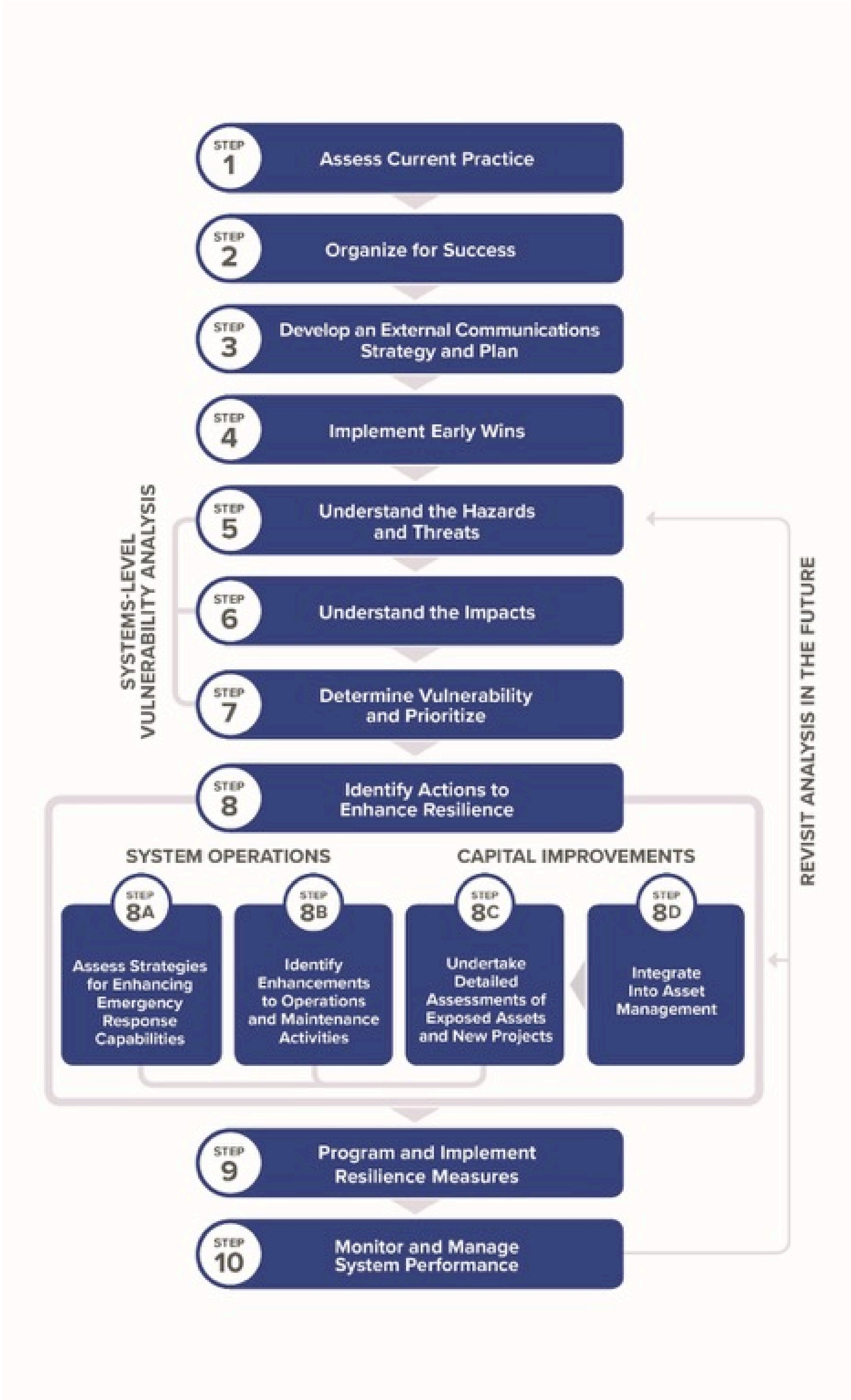

FIGURE 1: CALTRANS' CLIMATE ADAPTATION FRAMEWORK

The work undertaken for this study, the District 7 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 that are determined 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

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 7 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.

ROADWAY HAZARD ON SR-2

The subset of asset types and hazards included in this study generally mirror those that were included in the District 7 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 7 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	Coastal Cliff Retreat	Wildfire	Temperature	Riverine Flooding
Pavement Binder Grade					X	
At-Grade Roadways	X	X	X			
Bridges	X	X	X			X
Large Culverts[6]	X	X	X			X
Small Culverts[7]	X	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 potentially exposed.

- **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 7 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 7 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 7, 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

[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.

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 coastal areas, at-grade roads (defined here as those portions of the road network that are not elevated on a bridge) may become subject to regular inundation at high tides as sea levels rise. This can lead to frequent road closures that disrupt travel and accessibility. In some locations with regular inundation, premature degradation of the pavement 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 impeding travel. It is important to recognize, however, that serious impacts to bridges can still occur from sea level rise even if water does not overtop the deck. For example, on some bridge designs, if sea levels rise just enough to result in waves contacting the bottom of the deck, the uplifting forces may be enough to separate the deck from the rest of the structure. Even bridges whose decks are well above projected water levels may be impacted by sea level rise. For example, waves may contact piers at a higher elevation than they were designed for leading to more rapid corrosion of bridge components and unexpected strain being put on the bridge structure. The bridge abutments may also be adversely impacted by waves regularly hitting higher than initially designed and eroding the approach embankments. Furthermore, the navigability of shipping channels may become impeded by bridges as sea levels rise and ship clearances are reduced.

- **Large and small culvert exposure to sea level rise:** Culverts are primarily used to convey streams and stormwater underneath roadways (some are also used in tidally influenced environments). If sea levels rise enough for sea water to reach the culvert, this can change the hydraulic performance of the culvert leading to more frequent overtopping of the 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 of inundation. Inundation of at-grade roadways from storm surge may require the road to be closed, disrupting travel. Also, the surge and associated 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 the 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 around the 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 other roadways or railroads (as opposed to over water) because scour may not have been considered during their initial designs.

TRANCAS CREEK BRIDGE

- **Large and small culvert exposure to storm surge:** Storm surge can overtop culverts impeding travel. If the velocity of the surge is great enough, then a culvert can also be damaged by the hydraulic forcing of excessive water through too small an opening. Water overtopping the roadway embankment on top of the culvert may also cause erosion resulting in damages to the roadway and the culvert itself.

- **At-grade roadway exposure to coastal cliff retreat:** Cliff retreat refers to the erosion of coastal cliff faces. This process can be accelerated by sea level rise since higher water levels may mean more frequent instances of wave action reaching the base of the cliff and causing erosion. At-grade roadways that are immediately along the coast can be a total loss if erosion encroaches upon them. Caltrans has had to relocate several roads already, often at significant expense, to avoid retreating coastal cliff faces.

- **Bridge exposure to coastal cliff retreat:** Any bridges in the vicinity of coastal cliff faces are at risk of a total loss should the cliff retreat towards the bridge abutment. Should the abutment of the bridge be compromised by erosion, the structural stability of the bridge will be lost and the bridge no longer usable.

- **Large and small culvert exposure to coastal cliff retreat:** As with bridges and at-grade roadways, any culverts along a segment of road exposed to coastal cliff retreat are at risk of becoming a total loss. The erosion might compromise their stability causing them, and the roadway above them, to tumble into the sea.

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

	Sea Level Rise				Storm Surge				Coastal Cliff Retreat				Wildfire	Tempera-ture	Riverine Flooding		
Metrics	**At-Grade Roadways**	**Bridges**	**Large Culverts**	**Small Culverts**	**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	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 6.6 ft. of SLR					X												
Lowest SLR increment that results in damage from coastal cliff retreat									X	X	X	X					
Percent of road segment exposed to coastal cliff retreat at 6.6 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	X	X	X	X
Average annual daily truck traffic (AADTT)	X	X	X	X	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	X	X	X	X					
Incremental travel distance to detour around the asset with 6.6 ft. of SLR	X	X	X	X	X	X	X	X	X	X	X	X					

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 7:

- **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 7 maintenance staff were surveyed and asked to identify any at-grade roadways, bridges, large culverts, or small culverts that had experienced sea level rise, storm surge, or coastal cliff retreat issues in the past. Staff were 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 were 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 cliff retreat, flooding, or fire was flagged, and that asset was given a higher priority for adaptation.

SR-1 ALONG THE COASTLINE

- **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[9] to potentially impact each at-grade roadway, bridge[10], large culvert, and small culvert. This metric made use of the sea level rise data used on the District 7 Climate Change Vulnerability

[9] 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.

[10] 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 coastal 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 sea level rise before water touches the deck (i.e., enhanced corrosion and structural stability, erosion, and navigability concerns).

Assessment Report. This data was sourced from the United States Geological Survey's (USGS) Coastal Storm Modeling System (CoSMoS) dataset for an annual flooding event and utilized sea level rise increments of 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 will receive.

- **Percent of road segment exposed to 6.6 ft. of sea level rise:** For at-grade roadway segments[11], not only is the timing of sea level rise impacts an important factor in prioritization, 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 proportion. The 6.6 feet sea level rise increment from the data sources mentioned above was used for this metric in order to provide an indicator of potential impacts at the end of the century under a somewhat 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[12] could potentially impact each at-grade roadway, bridge[13], large culvert, and small culvert. USGS CoSMoS storm surge data at increments of 0.0, 0.8, 1.6, 2.5, 3.3, 4.1, 4.9, 5.7, and 6.6 feet was used for the analysis on the Pacific coast. The lower the sea level rise increment that first impacts the asset, the higher priority it will receive.

- **Percent of road segment exposed to a 100-year storm surge with 6.6 feet of sea level rise:** This metric measures the proportion of each at-grade roadway segment exposed to a 100-year storm surge. As with the sea level rise length metric, 6.6 feet of sea level rise was used in order to provide an indicator of potential impacts at the end of the century under a somewhat pessimistic greenhouse gas emissions scenario. The greater the proportion of roadway length exposed to storm surge, the higher the priority of that segment.

- **Lowest sea level rise increment that results in damage from coastal cliff retreat:** At-grade roadways, bridges, large culverts, and small culverts that are exposed to coastal cliff retreat sooner should receive higher priority for facility level adaptation assessments. Thus, this metric was included to capture the timing of impacts. The greatest threat from coastal cliff retreat is along the open Pacific coastline where the erosive effects of waves are highest, so the analysis focused on these areas. USGS CoSMoS data was used for sea level rise increments of 0.0, 0.8, 1.6, 2.5, 3.3, 4.1, 4.9, 5.7, and 6.6 feet

- **Percent of road segment exposed to coastal cliff retreat at 6.6 ft. of sea level rise:** This metric captures the proportion of each at-grade roadway segment that is exposed to coastal cliff retreat. As with sea level rise and storm surge, 6.6 feet of sea level rise was used in order to

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

[12] Storm surge areas hydrologically connected to the sea and hydrologically disconnected low-lying areas potentially vulnerable to storm surge inundation were both used for this assessment.

[13] 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 coastal 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).

provide an indicator of potential impacts at the end of the century under a somewhat pessimistic greenhouse gas emissions scenario. The greater the proportion of roadway length exposed to coastal cliff retreat, 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 7 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. The most recent timeframe across the range of available climate scenarios was chosen. Assets that were impacted sooner were given a higher priority for adaptation.

WILDFIRE IN LOS ANGELES COUNTY

- **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 7 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. 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.

- **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.

- **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.

ROADWAY REPAIR CAUSES DETOURS

- **Incremental travel distance to detour around the asset:** This metric measures the degree of network redundancy around each asset. A detour routing tool was developed for this project that can find the shortest path detour around a segment of road, bridge, large culvert, or small culvert and calculate the additional travel distance that would be required to take that detour.[14] A simplified version of the tool that did not consider whether the detour routes would be passible during a flood event was run for each of the bridge and

[14] The detour routes for this and other related metrics in this study did not allow unpaved roads to be used as detours. That said, there are some errors in the database regarding paving status such that it is possible that unpaved roads may be shown as detour routes in some cases.

culvert assets studied that were exposed to riverine flooding.[15] 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 path detour for the lowest impactful sea level rise increment that would result in sea level rise, storm surge, and coastal cliff retreat affecting each asset. This provides an indication of the initial network redundancy issues that may be created by climate change in coastal areas. For these hazards, the detour tool considered the inundation/erosion throughout the roadway network for the increment of sea level rise to be 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.[16] When being run for assets exposed to sea level rise or coastal cliff retreat, the detour routing algorithm ensured that no road affected by either sea level rise or coastal cliff retreat at the same increment of sea level rise that was being evaluated could be considered as a detour route. When being run for assets exposed to storm surge, the detour routing algorithm ensured that no road affected by either sea level rise, coastal cliff retreat, or storm surge at the same increment of sea level rise could be considered as 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 with 6.6 feet of SLR:** This metric captures the level of network redundancy around exposed at-grade roadways, bridges, large culverts, and small culverts at 6.6 feet of sea level rise. As with the coastal hazard exposure metrics, 6.6 feet was chosen sea level rise increment representative of end of the century conditions under a somewhat pessimistic greenhouse gas emissions scenario. 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 this sea level rise 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.

[15] The exposure of detour routes to flooding was not able to be determined within the resources of this project since no future riverine flooding floodplains with climate change were available at the time of publication.

[16] An exception was made for Caltrans bridges impacted by sea level rise or storm surge within District 7. These assets were assumed to remain passible for such hazards. This assumption was made because, as noted above, exposure for bridges was assumed to occur for sea level rise and storm surge even if the deck was never touched by water (to reflect concerns over corrosion, navigability, etc.). If the deck was not touched by water, it is likely that the bridge would remain open as a detour route and adaptation/repair work could be done while the asset was still in service. Since most Caltrans bridges shown as exposed in the analysis would not actually be touched by water, it was assumed all would remain passible under these hazards lest excessively long and inaccurate detours be generated. That said, the detour metrics will be inaccurate for the few cases where detour routes traverse a Caltrans bridge whose deck would be touched by water and the bridge shut down. In these cases, the detour algorithm will have incorrectly assumed that the bridge would remain open and return a shorter detour length than would be the case. Note that this exception does not apply to non-Caltrans owned bridges. All non-Caltrans bridges were assumed to be impassible as a detour route if inundation was shown to be underneath them for any of the sea level rise or storm surge scenarios.

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 districtwide 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 7. 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 to be 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				Cliff Retreat				Wildfire	Tempera-ture	Riverine Flooding		
	At-Grade Roadways	Bridges	Large Culverts	Small Culverts	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%	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 6.6 ft. of SLR	-	-	-	-	22.5%	-	-	-	-	-	-	-	-	-	-	-	-
Lowest SLR increment that results in damage from coastal cliff retreat	-	-	-	-	-	-	-	-	22.5%	45%	45%	45%	-	-	-	-	-
Percent of road segment exposed to coastal cliff retreat at 6.6 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%	10%	10%	10%	10%	7%	13%	7%	10%	10%
Average annual daily truck traffic	5%	5%	5%	3%	5%	3%	3%	3%	5%	5%	5%	5%	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%	10%	10%	10%	10%	-	-	-	-	-
Incremental travel distance to detour around the asset with 6.6 ft. of SLR	10%	10%	10%	7.5%	10%	7.5%	10%	10%	10%	10%	10%	10%	-	-	-	-	-
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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.[17] 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.[18]

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 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

[17] 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.

[18] Within the traffic volume related metrics, note that slightly more weight is given to AADT as opposed to truck AADT given that most 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.

were then re-scaled yet again to a zero to 100 scale since different asset types have different 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 7 staff. Five priority levels were developed (Priority 1, 2, 3, 4, and 5) and assets were assigned to those groups on a districtwide 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 preliminary set of prioritization scores has been calculated for District 7 bridges, culverts, and roadways following this methodology. A workshop will be held with the district to explain the scoring methodology and go over the preliminary results. District 7 staff will then be given the opportunity to make recommendations on adjusting asset priorities. The district staff will then have a chance to review and adjust the prioritization scores or accept the prioritization as-is with no changes to the rankings. The district will be given guidance on how to provide comments and adjustments at the workshop.

4. DISTRICT ADAPTATION PRIORITIES

This chapter presents Caltrans' priorities for undertaking detailed adaptation assessments of assets exposed to climate change in District 7. The material presented in this chapter reflects the results of the technical analysis and the coordination with District 7 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 201 bridges were assessed for vulnerability to sea level rise, storm surge, coastal cliff retreat, 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.

TRANCAS CREEK BRIDGE

Figure 2 provides a map of all the bridges assessed for 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. District 7 has 40 Priority 1 bridges, located along State Routes (SR) 1, 90, 47, 22, and 33, Interstate 405 (I) , and US Highway (US) 101. Many of these high priority bridges are along the coastline making them subject to sea-level rise and other coastal hazards. Calleguas Creek Bridge on SR-1 is the highest priority bridge as it also has a high riverine flooding score and long detour route to get around if out of service. The Ballona Creek Bridge on SR-90, Vincent Thomas and Schuyler Heim Lift Bridges on SR-47, Union Pacific Bridge on SR-103, and Los Angeles River on SR-1 are also high priority as no detours were found around the assets under the lowest sea level rise increment.

Table 4 presents a summary of all the Priority 1 bridges in District 7 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 [19]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
1	52 0010R	VEN	SR 1 NB	CALLEGUAS CREEK	9.87	100.00
1	53 1185	LA	INTERSTATE 405	SAN GABRIEL RIVER	0.03	98.17
1	53 2315	LA	STATE ROUTE 90	BALLONA CREEK	R1.04	95.86
1	53 1471	LA	STATE ROUTE 47	SAN PEDRO TERMINAL ISL	0.86	95.70
1	53 2618	LA	STATE ROUTE 47	CERRITOS CHANNEL	3.58	93.39
1	53 2626	LA	STATE ROUTE 103	UP RR & N103-FORD AV OFF	0.07	91.98
1	53 0341	LA	STATE ROUTE 1	LOS ANGELES RIVER	7.11	88.79
1	53 1209	LA	INTERSTATE 405	LOS ANGELES RIVER	7.4	87.55
1	53 0026	LA	STATE ROUTE 1	ARROYO SEQUIT	62.26	85.96
1	52 0241R	VEN	U.S. HIGHWAY 101	VENTURA RIVER	30.94	83.85
1	52 0241L	VEN	U.S. HIGHWAY 101	VENTURA RIVER	30.94	83.46
1	52 0232R	VEN	ROUTE 101 NB	S101-VENTURA AV OFF-RAMP	30.59	82.52
1	53 0060	LA	STATE ROUTE 1	SAN GABRIEL RIVER	0.04	82.48
1	53 1256	LA	INTERSTATE 405	BALLONA CREEK	26.49	80.91
1	52 0421L	VEN	STATE ROUTE 1	REVOLON CHANNEL	10	78.32
1	53 0302L	LA	STATE ROUTE 22	SAN GABRIEL RIVER	1.42	77.82
1	52 0010L	VEN	SR 1 SB	CALLEGUAS CREEK	9.87	76.25
1	53 2818	LA	STATE ROUTE 1	MALIBU LAGOON	46.88	76.19
1	53 0302R	LA	STATE ROUTE 22	SAN GABRIEL RIVER	1.42	75.98
1	52 0235R	VEN	US 101 NB	UP,AMTRAK,S101-N33,OLIVE	30.71	75.62
1	53 2627	LA	RTE 103	ANAHEIM STREET OH	0.9	75.24
1	52 0235L	VEN	US 101 SB	UP,AMTRAK,S101-N33,OLIVE	30.71	74.60
1	52 0421R	VEN	STATE ROUTE 1	REVOLON CHANNEL	10	74.55
1	53 1166	LA	INTERSTATE 405	DOMINGUEZ CHANNEL	9.76	72.96
1	53 0064	LA	STATE ROUTE 1	ALAMITOS BAY	0.98	72.54
1	53 0719	LA	STATE ROUTE 1	DOMINGUEZ CHANNEL	8.62	69.17
1	53 2906	LA	ROUTE 90	CULVER BLVD	R1.6	66.71
1	53 0215L	LA	STATE ROUTE 22	LOS CERRITOS CHANNEL	1.09	65.69
1	53 0118	LA	STATE ROUTE 1	BALLONA CREEK	30.36	64.65
1	53 0215R	LA	STATE ROUTE 22	LOS CERRITOS CHANNEL	1.09	64.34
1	53 0027	LA	STATE ROUTE 1	TRANCAS CREEK	56.71	63.14
1	52 0011	VEN	SR 1	BIG SYCAMORE CREEK	4.54	61.47
1	52 0152L	VEN	U.S. HIGHWAY 101	VISTA DEL MAR UC	29.45	59.67
1	52 0080	VEN	STATE ROUTE 33	POTRERO CREEK	32.1	51.05
1	52 0163L	VEN	ROUTE 101 SB	SAN JON CRK & SAN JON RD	29.55	50.93
1	52 0231R	VEN	U.S. HIGHWAY 101	FIGUEROA STREET	30.4	45.81

[19] LA = Los Angeles; VEN = Ventura

Priority	Bridge Number	County [19]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
1	53 0725	LA	STATE ROUTE 1	INTERSTATE 710	7.29	44.60
1	52 0084	VEN	STATE ROUTE 33	ADOBE CANYON	39.03	41.97
1	52 0066	VEN	STATE ROUTE 33	NORTH FORK MATILIJA CRK	17.41	41.75
1	52 0152R	VEN	U.S. HIGHWAY 101	VISTA DEL MAR UC	29.45	39.86

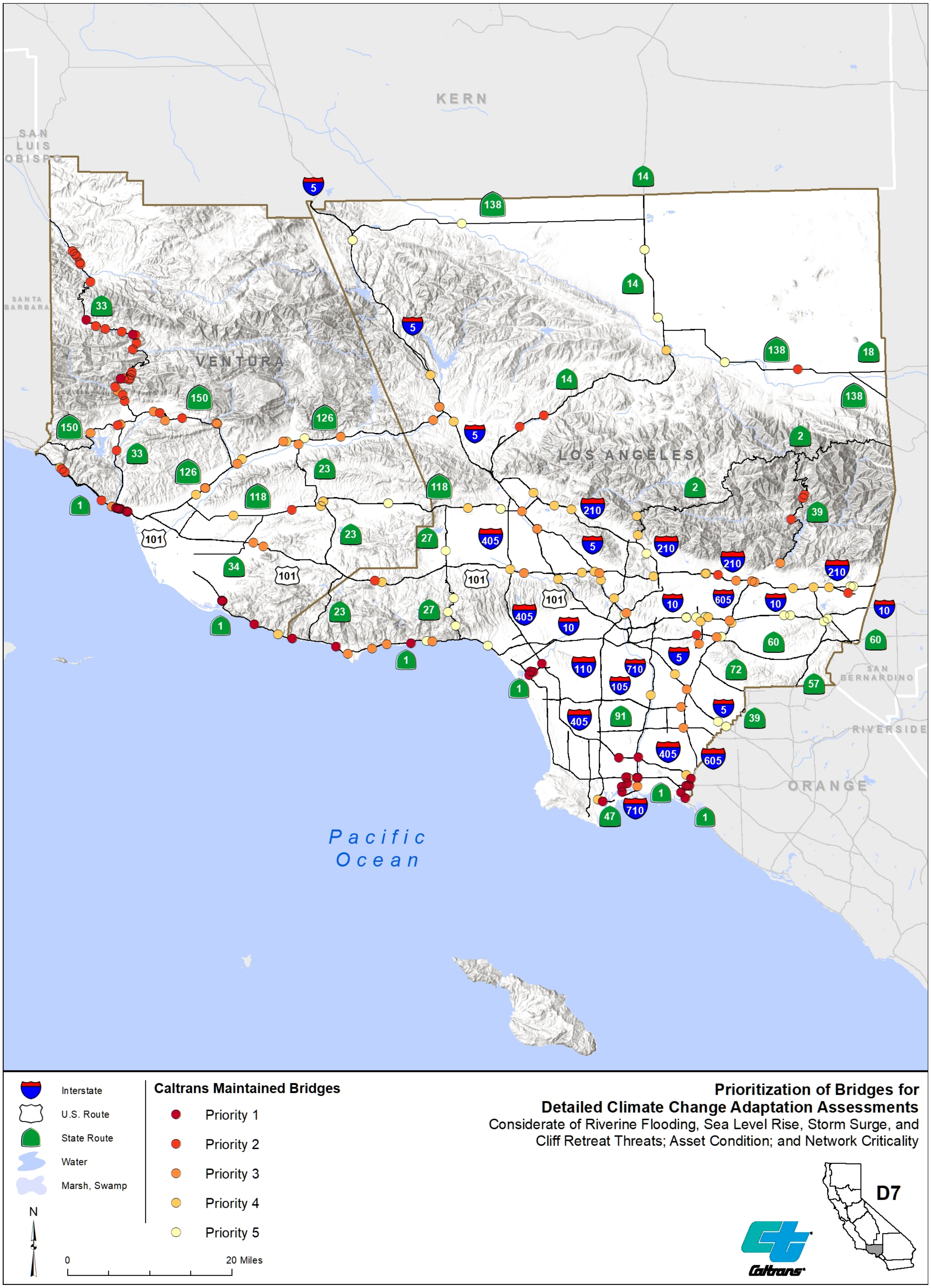

FIGURE 2: PRIORITIZATION OF BRIDGES FOR DETAILED ADAPTATION ASSESSMENTS

4.2. Large Culverts

A total of 57 large culverts were assessed for vulnerability to sea level rise, storm surge, coastal cliff retreat, and more severe riverine flooding associated with climate change. Figure 3 provides a map of all the large culverts potentially exposed to enhanced riverine flooding in the district and colored by their priority level. Large culverts with the highest priority are scattered throughout District 7 and it is difficult to draw spatial patterns to the vulnerabilities. That said, it is worth noting that five of the top 11 highest priority large culverts are located along SR-23 in Ventura County in Grimes Canyon, an area subject to flooding. The highest priority culvert is on US 101 over Mandranio Canyon Creek, where it is exposed to storm surge and riverine flooding. This culvert also received a higher score due to high AADT on this route.

Table 5 presents a summary of all the Priority 1 large culverts in District 7 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	Bridge Number	County[20]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
1	52 0351	VEN	U.S. HIGHWAY 101	MADRANIO CANYON CRK	R39.18	100.00
1	52 0114	VEN	STATE ROUTE 23	GRIMES CANYON CHANNEL	20.75	73.65
1	52 0115	VEN	STATE ROUTE 23	GRIMES CANYON CHANNEL	20.92	73.65
1	52 0113	VEN	STATE ROUTE 23	GRIMES CANYON CHANNEL	19.82	72.90
1	52 0424	VEN	STATE ROUTE 23	GRIMES CANYON CHANNEL	R21.02	72.17
1	52 0425	VEN	STATE ROUTE 23	GRIMES CANYON CHANNEL	R21.41	72.17
1	52 0076	VEN	STATE ROUTE 33	CANON CREEK	20.76	68.08
1	52 0170	VEN	STATE ROUTE 33	CANON CREEK	20.48	68.08
1	53 2608	LA	STATE ROUTE 14	WHITNEY CREEK	R27.1	58.61
1	53 1793	LA	STATE ROUTE 14	WARD WASH	46.6	54.50
1	53 2397	LA	INTERSTATE 210	EATON WASH	R28.86	54.39

[20] LA = Los Angeles; VEN = Ventura

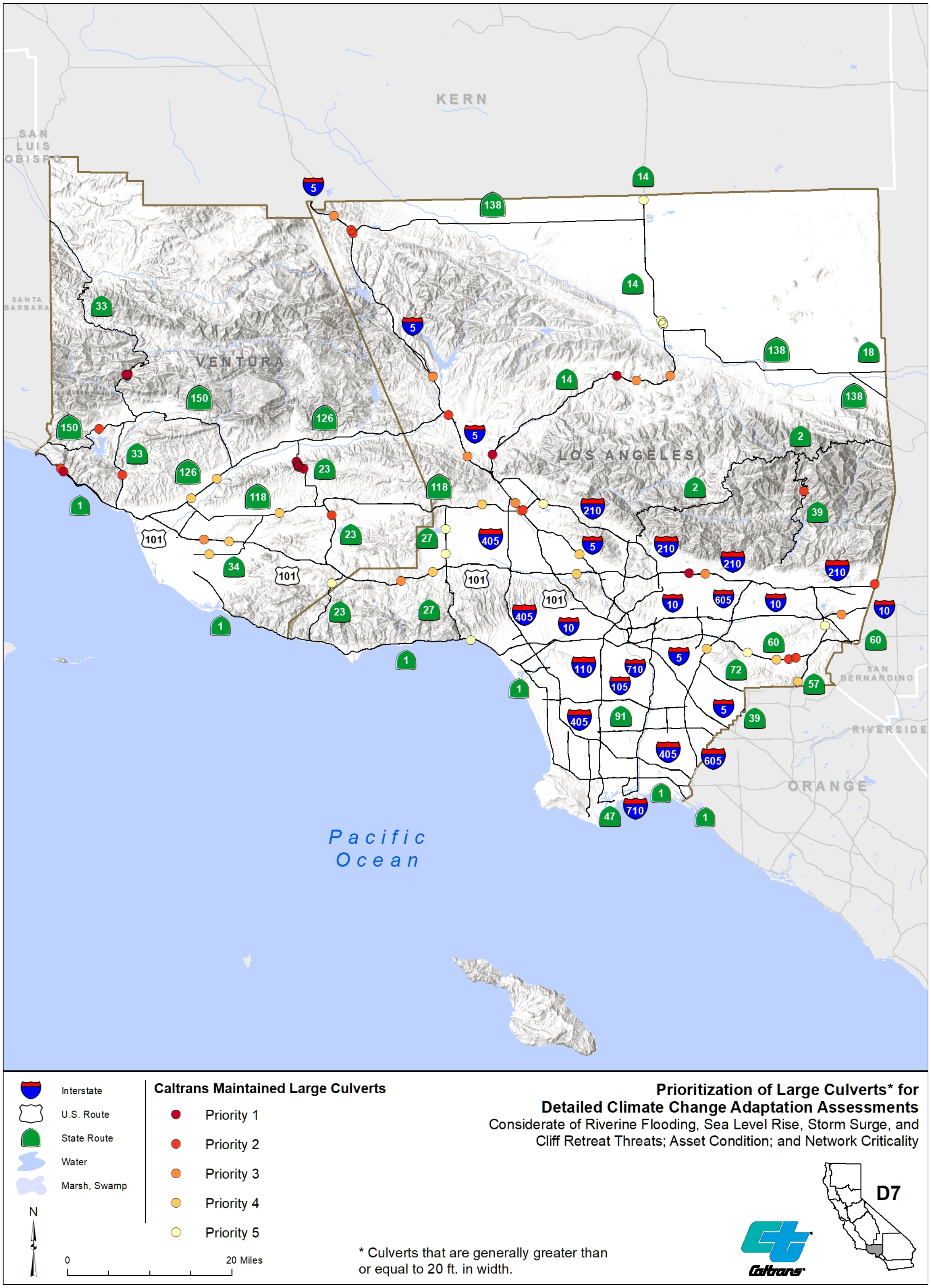

FIGURE 3: PRIORITIZATION OF LARGE CULVERTS FOR DETAILED ADAPTATION ASSESSMENTS

4.3. Small Culverts

A total of 117 small culverts were assessed for vulnerability to sea level rise, storm surge, coastal cliff retreat, 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 according to their priority level.

The map indicates many clusters of high priority small culverts. Notable clusters can be found along SR-1 north of Ventura, where the highway travels along cliffs exposed to sea level rise, storm surge, and coastal cliff retreat. In addition, significant clusters of small culverts are located along SR-33 and SR-39, roadway that cross winding terrain through high wildfire and flooding exposure areas, with limited detour routes.

presents a summary of all the Priority 1 small culverts in District 7 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[21]	Route	Postmile	Cross-Hazard Prioritization Score
1	520010000371	VEN	1	3.71	100.00
1	520010002181	VEN	1	21.81	94.18
1	520334001678	VEN	33	16.78	84.61
1	520334002118	VEN	33	21.18	79.37
1	520334001792	VEN	33	17.92	79.12
1	520334004143	VEN	33	41.43	78.75
1	520330004218	VEN	33	42.18	78.70
1	520330003450	VEN	33	34.5	77.19
1	520334001638	VEN	33	16.38	73.88
1	520334002417	VEN	33	24.17	73.36
1	530390004121	LA	39	41.21	68.45
1	520010002656	VEN	1	26.56	67.99
1	520010002258	VEN	1	22.58	67.16
1	530390003477	LA	39	34.77	65.70
1	520010002388	VEN	1	23.88	65.32
1	520010002699	VEN	1	26.99	61.85
1	530390004348	LA	39	43.48	61.76
1	520330005126	VEN	33	51.26	61.38
1	530394003025	LA	39	30.25	61.34
1	530390003814	LA	39	38.14	61.31
1	530394002835	LA	39	28.35	60.82
1	520010002540	VEN	1	25.4	58.80
1	520010002443	VEN	1	24.43	58.09

[21] LA = Los Angeles; VEN = Ventura

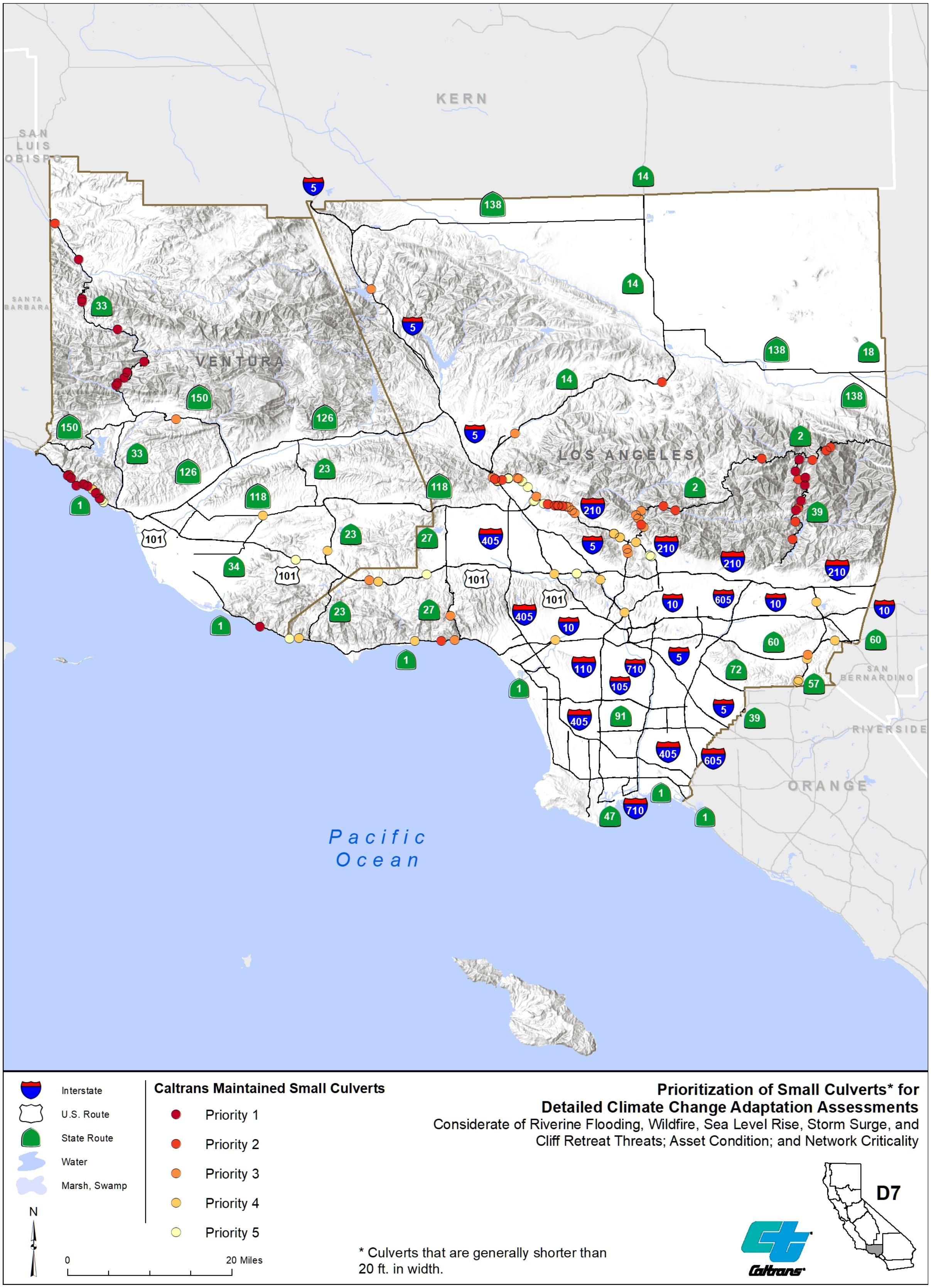

FIGURE 4: PRIORITIZATION OF SMALL CULVERTS FOR DETAILED ADAPTATION ASSESSMENTS

4.4. Roadways

GLENOAKS BLVD, ADJACENT TO INTERSTATE 5 IN BURBANK

A total of 7,255 roadway segments were assessed for vulnerability to sea level rise, storm surge, coastal cliff retreat, 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 580 roadways sections, the priorities for which are presented here.

Figure 5 provides a map of all 580- prioritized roadway segments assessed in District 7. Each segment of roadway is colored by priority level. The map shows that roadways in the vicinity of the Ports of Los Angeles and Long Beach have the highest cross-hazard prioritization scores. Specifically, segments of I-710, SR-47, and SR-70, which serve both Ports, receive high cross-hazard prioritization scores due to exposure to coastal hazards , having high volumes of freight traffic, and limited detour options.

SR-1 off the coast of Point Mugu has the highest priority roadway segment and several other high scoring segments due to proximity to coastal hazards. The highest priority section on SR-1 (VEN 1 4.726 / VEN 1 6.04) receives the highest score because the area has experienced past coastal flooding impacts. Additionally, there are a number of high priority roadways along I-10, I-210, and I-5, which are high traffic routes that are subject to wildfires and flooding.

Table 7 presents a summary of all the Priority 1 roadways in District 7 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[22]	From County & Postmile / To County & Postmile[23]	Average Cross-Hazard Prioritization Score[24]
1	47	P	LA 47 3.504 / LA 47 3.701	78.53
1	47	P	LA 47 3.886 / LA 47 4.565	78.53
1	47	S	LA 47 2.26 / LA 47 2.302	69.32
1	47	S	LA 47 3.504 / LA 47 3.566	69.32
1	47	S	LA 47 3.701 / LA 47 4.565	69.32
1	710	S	LA 710 3.422 / LA 710 4.589	67.75
1	710	S	LA 710 5.366 / LA 710 5.609	67.75
1	710	S	LA 710 6.208 / LA 710 7.062	67.75
1	103	P	LA 103 0 / LA 103 0.05	64.78
1	103	P	LA 103 0.065 / LA 103 0.9	64.78
1	103	P	LA 103 1.402 / LA 103 1.575	64.78
1	710	P	LA 710 3.422 / LA 710 4.023	64.69
1	710	P	LA 710 6.065 / LA 710 7.083	64.69
1	103	S	LA 103 0 / LA 103 0.05	56.30
1	103	S	LA 103 0.065 / LA 103 0.896	56.30
1	103	S	LA 103 1.264 / LA 103 1.572	56.30
1	90	P	LA 90 1.202 / LA 90 1.734	47.27
1	1	P	LA 1 0.211 / LA 1 1.741	44.98
1	1	P	LA 1 29.812 / LA 1 31.105	44.98
1	1	P	LA 1 49.31 / LA 1 50.204	44.98
1	1	P	LA 1 50.385 / LA 1 51.072	44.98
1	1	P	LA 1 55.38 / LA 1 55.445	44.98
1	1	P	LA 1 55.794 / LA 1 56.514	44.98
1	1	P	LA 1 7.447 / LA 1 8.201	44.98
1	1	P	VEN 1 1.236 / VEN 1 4.12	44.98
1	1	P	VEN 1 11.592 / VEN 1 11.659	44.98
1	1	P	VEN 1 21.806 / VEN 1 23.262	44.98
1	1	P	VEN 1 23.277 / VEN 1 25.098	44.98
1	1	P	VEN 1 27.581 / VEN 1 28.092	44.98
1	1	P	VEN 1 28.349 / VEN 1 28.417	44.98
1	1	P	VEN 1 4.726 / VEN 1 11.441	44.98
1	1	S	LA 1 29.814 / LA 1 30.256	44.92
1	1	S	LA 1 30.476 / LA 1 31.108	44.92
1	1	S	LA 1 49.73 / LA 1 50.204	44.92
1	1	S	LA 1 50.384 / LA 1 50.815	44.92

[22] 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".
[23] LA = Los Angeles; VEN = Ventura
[24] 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[22]	From County & Postmile / To County & Postmile[23]	Average Cross-Hazard Prioritization Score[24]
1	1	S	LA 1 55.494 / LA 1 56.666	44.92
1	1	S	LA 1 7.449 / LA 1 8.202	44.92
1	1	S	ORA 1 33.715 / LA 1 1.742	44.92
1	1	S	VEN 1 24.138 / VEN 1 25.096	44.92
1	1	S	VEN 1 27.581 / VEN 1 28.349	44.92
1	1	S	VEN 1 9.693 / VEN 1 11.594	44.92
1	18	P	LA 18 2.983 / LA 18 0.001	42.29
1	138	P	LA 138 71.746 / LA 138 74.971	42.25
1	33	P	VEN 33 56.678 / VEN 33 57.504	42.06
1	101	P	LA 101 18.617 / LA 101 26.811	31.82
1	101	P	VEN 101 28.452 / VEN 101 28.62	31.82
1	60	S	LA 60 9.512 / LA 60 17.968	31.77
1	60	S	LA 60 R22.708 / SBD 60 R0.004	31.77
1	101	S	LA 101 18.614 / LA 101 27.341	31.75
1	60	P	LA 60 9.553 / LA 60 17.743	31.73
1	60	P	LA 60 R22.735 / SBD 60 R0.001	31.73
1	210	P	LA 210 R11.123 / LA 210 R13.871	31.41
1	210	P	LA 210 R26.671 / LA 210 R49.54	31.41
1	210	P	LA 210 R4.111 / LA 210 R6.084	31.41
1	210	P	LA 210 R7.175 / LA 210 R8.566	31.41
1	210	S	LA 210 R11.453 / LA 210 R13.931	31.40
1	210	S	LA 210 R26.572 / LA 210 R49.542	31.40
1	210	S	LA 210 R4.113 / LA 210 R6.107	31.40
1	210	S	LA 210 R7.191 / LA 210 R8.565	31.40
1	10	P	LA 10 21.475 / LA 10 26.854	31.11
1	10	P	LA 10 26.863 / LA 10 48.264	31.11
1	10	S	LA 10 21.456 / LA 10 26.855	31.01
1	10	S	LA 10 26.863 / SBD 10 0.005	31.01
1	5	P	LA 5 29.776 / LA 5 R43.807	30.85
1	5	P	LA 5 R49.983 / LA 5 R56.601	30.85
1	5	S	LA 5 30.057 / LA 5 R43.843	30.78
1	5	S	LA 5 R49.266 / LA 5 R56.601	30.78
1	605	P	LA 605 R14.403 / LA 605 25.773	30.55
1	605	S	LA 605 R14.401 / LA 605 25.805	30.52
1	118	S	LA 118 R11.311L / LA 118 R11.448L	30.13
1	118	S	LA 118 R11.588L / LA 118 R12.4	30.13
1	118	S	LA 118 R12.696 / LA 118 R13.193	30.13
1	118	S	LA 118 R2.674 / LA 118 R11.061L	30.13
1	118	P	LA 118 R11.325R / LA 118 R11.449R	30.11
1	118	P	LA 118 R11.604R / LA 118 R12.403	30.11

Priority	Route	Carriageway[22]	From County & Postmile / To County & Postmile[23]	Average Cross-Hazard Prioritization Score[24]
1	118	P	LA 118 R12.698 / LA 118 R13.196	30.11
1	118	P	LA 118 R2.682 / LA 118 R11.074R	30.11
1	405	S	LA 405 41.378 / LA 405 48.643	29.99
1	405	P	LA 405 41.376 / LA 405 48.643	29.97
1	27	P	LA 27 12.427 / LA 27 12.518	29.70
1	27	P	LA 27 20.033 / LA 27 20.062	29.70
1	010S	S	LA 10S 21.156 / LA 10S 21.376	29.29
1	010S	S	LA 10S 23.653 / LA 10S 25.328	29.29
1	010S	P	LA 10S 21.156 / LA 10S 21.367	29.27
1	010S	P	LA 10S 23.653 / LA 10S 25.328	29.27
1	27	S	LA 27 12.428 / LA 27 12.518	29.27
1	57	S	LA 57 5.609 / LA 57 R11.333L	28.99
1	57	S	LA 57 R11.587L / LA 57 R11.991L	28.99
1	57	S	LA 57 R4.335L / LA 57 R4.499L	28.99
1	57	P	LA 57 5.726 / LA 57 R11.284R	28.99
1	57	P	LA 57 R11.657R / LA 57 R11.851R	28.99
1	57	P	LA 57 R4.312R / LA 57 R4.508R	28.99
1	170	P	LA 170 R17.264 / LA 170 R18.273	28.91
1	170	P	LA 170 R18.649 / LA 170 R20.117	28.91
1	170	S	LA 170 R17.27 / LA 170 R18.279	28.90
1	170	S	LA 170 R18.633 / LA 170 R20.123	28.90
1	110	S	LA 110 28.764 / LA 110 29.138	28.88
1	110	P	LA 110 28.764 / LA 110 29.2	28.88
1	71	P	LA 71 1.617 / LA 71 1.36	28.83
1	71	P	LA 71 R4.319 / LA 71 R4.263	28.83
1	14	S	LA 14 R27.584 / LA 14 R31.413	28.81
1	14	P	LA 14 R27.839 / LA 14 R31.404	28.81
1	71	S	LA 71 1.622 / LA 71 1.332	28.77

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 7 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.

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. Additionally, long-term maintenance plays an important part in managing and protecting these assets. When conducting facility level assessments, the district should consider any potential changes to long-term scheduled

ERODING COASTLINE ON THE PACIFIC COAST HIGHWAY maintenance needed to preserve chosen adaptation strategies. Operations and maintenance strategies can also be evaluated instead, or in addition to, design changes. When evaluating the cost effectiveness of different adaptation strategies, operations and maintenance responses may be more cost-effective for assets with shorter useful lives.

In addition, district staff can use the results of this study as a tool to facilitate discussions with various important stakeholders in the district about addressing climate change and its impacts. This may include state and federal environmental agencies regional transportation authorities, universities or academic partners, and others. Multi-agency stakeholder coordination and involvement of the private sector is also 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 and key stakeholders 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[25]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
1	52 0010R	VEN	SR 1 NB	CALLEGUAS CREEK	9.87	100.00
1	53 1185	LA	INTERSTATE 405	SAN GABRIEL RIVER	0.03	98.17
1	53 2315	LA	STATE ROUTE 90	BALLONA CREEK	R1.04	95.86
1	53 1471	LA	STATE ROUTE 47	SAN PEDRO TERMINAL ISL	0.86	95.70
1	53 2618	LA	STATE ROUTE 47	CERRITOS CHANNEL	3.58	93.39
1	53 2626	LA	STATE ROUTE 103	UP RR & N103-FORD AV OFF	0.07	91.98
1	53 0341	LA	STATE ROUTE 1	LOS ANGELES RIVER	7.11	88.79
1	53 1209	LA	INTERSTATE 405	LOS ANGELES RIVER	7.4	87.55
1	53 0026	LA	STATE ROUTE 1	ARROYO SEQUIT	62.26	85.96
1	52 0241R	VEN	U.S. HIGHWAY 101	VENTURA RIVER	30.94	83.85
1	52 0241L	VEN	U.S. HIGHWAY 101	VENTURA RIVER	30.94	83.46
1	52 0232R	VEN	ROUTE 101 NB	S101-VENTURA AV OFF-RAMP	30.59	82.52
1	53 0060	LA	STATE ROUTE 1	SAN GABRIEL RIVER	0.04	82.48
1	53 1256	LA	INTERSTATE 405	BALLONA CREEK	26.49	80.91
1	52 0421L	VEN	STATE ROUTE 1	REVOLON CHANNEL	10	78.32
1	53 0302L	LA	STATE ROUTE 22	SAN GABRIEL RIVER	1.42	77.82
1	52 0010L	VEN	SR 1 SB	CALLEGUAS CREEK	9.87	76.25
1	53 2818	LA	STATE ROUTE 1	MALIBU LAGOON	46.88	76.19
1	53 0302R	LA	STATE ROUTE 22	SAN GABRIEL RIVER	1.42	75.98
1	52 0235R	VEN	US 101 NB	UP,AMTRAK,S101-N33,OLIVE	30.71	75.62
1	53 2627	LA	RTE 103	ANAHEIM STREET OH	0.9	75.24
1	52 0235L	VEN	US 101 SB	UP,AMTRAK,S101-N33,OLIVE	30.71	74.60
1	52 0421R	VEN	STATE ROUTE 1	REVOLON CHANNEL	10	74.55
1	53 1166	LA	INTERSTATE 405	DOMINGUEZ CHANNEL	9.76	72.96
1	53 0064	LA	STATE ROUTE 1	ALAMITOS BAY	0.98	72.54
1	53 0719	LA	STATE ROUTE 1	DOMINGUEZ CHANNEL	8.62	69.17
1	53 2906	LA	ROUTE 90	CULVER BLVD	R1.6	66.71
1	53 0215L	LA	STATE ROUTE 22	LOS CERRITOS CHANNEL	1.09	65.69
1	53 0118	LA	STATE ROUTE 1	BALLONA CREEK	30.36	64.65
1	53 0215R	LA	STATE ROUTE 22	LOS CERRITOS CHANNEL	1.09	64.34
1	53 0027	LA	STATE ROUTE 1	TRANCAS CREEK	56.71	63.14
1	52 0011	VEN	SR 1	BIG SYCAMORE CREEK	4.54	61.47
1	52 0152L	VEN	U.S. HIGHWAY 101	VISTA DEL MAR UC	29.45	59.67
1	52 0080	VEN	STATE ROUTE 33	POTRERO CREEK	32.1	51.05

[25] LA = Los Angeles; VEN = Ventura

Priority	Bridge Number	County[25]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
1	52 0163L	VEN	ROUTE 101 SB	SAN JON CRK & SAN JON RD	29.55	50.93
1	52 0231R	VEN	U.S. HIGHWAY 101	FIGUEROA STREET	30.4	45.81
1	53 0725	LA	STATE ROUTE 1	INTERSTATE 710	7.29	44.60
1	52 0084	VEN	STATE ROUTE 33	ADOBE CANYON	39.03	41.97
1	52 0066	VEN	STATE ROUTE 33	NORTH FORK MATILIJA CRK	17.41	41.75
1	52 0152R	VEN	U.S. HIGHWAY 101	VISTA DEL MAR UC	29.45	39.86
2	52 0163R	VEN	ROUTE 101 NB	SAN JON CRK & SAN JON RD	29.55	38.95
2	52 0079	VEN	STATE ROUTE 33	DERRY DALE CREEK	31.72	38.49
2	53 0049	LA	SR 66 (FOOTHILL)	THOMPSON CREEK	2.4	38.12
2	53 2980	LA	SR 138 (PEARBLSSM)	BIG ROCK WASH	61.7	37.45
2	52 0231L	VEN	U.S. HIGHWAY 101	FIGUEROA STREET	30.4	37.11
2	52 0078	VEN	STATE ROUTE 33	SESPE CREEK	30.52	36.12
2	52 0042	VEN	STATE ROUTE 33	SHELDON CANYON	14.58	35.76
2	52 0409	VEN	STATE ROUTE 118	MEJICO CREEK	14.53	35.21
2	52 0087	VEN	STATE ROUTE 33	ROUND SPRINGS CREEK	50.91	35.17
2	52 0041	VEN	STATE ROUTE 33	COZY DELL CREEK	13.73	32.90
2	52 0088	VEN	STATE ROUTE 33	CORRAL CANYON CREEK	51.78	31.48
2	52 0442	VEN	STATE ROUTE 33	TULE CREEK	29.65	29.10
2	52 0082	VEN	STATE ROUTE 33	CHORRO GRANDE CREEK	36.13	27.40
2	52 0102	VEN	STATE ROUTE 150	LION CANYON CREEK	23.93	27.40
2	52 0085	VEN	STATE ROUTE 33	BILLY CREEK	47.91	27.39
2	52 0083	VEN	STATE ROUTE 33	GODWIN CANYON	R37.52	26.99
2	52 0081	VEN	STATE ROUTE 33	MUNSON CANYON CREEK	33.8	26.72
2	52 0067	VEN	STATE ROUTE 33	NORTH FORK MATILIJA CRK	17.84	26.20
2	52 0440	VEN	STATE ROUTE 033	NORTH FORK MATILIJA CRK	18.67	25.92
2	52 0453	VEN	STATE ROUTE 33	NORTH FORK MATILIJA CRK	19.72	25.58
2	52 0074	VEN	STATE ROUTE 33	BEAR CREEK	19.36	25.56
2	53 2027	LA	U.S. HIGHWAY 14	SANTA CLARA RIVER	R31.88	25.31
2	52 0173	VEN	STATE ROUTE 33	NORTH FORK MATILIJA CRK	16.13	25.08
2	53 2245	LA	STATE ROUTE 39	N FORK SAN GABRIEL RIVER	R31.25	24.69
2	52 0092	VEN	STATE ROUTE 33	CASTLE CREEK	50.7	23.39
2	53 0342	LA	STATE ROUTE 39	W FORK SAN GABRIEL RIVER	26.96	22.64
2	52 0098	VEN	STATE ROUTE 150	THACHER CREEK	19.56	22.33
2	52 0441	VEN	STATE ROUTE 33	N FORK MATILIJA CREEK	18.84	21.94
2	53 2244	LA	STATE ROUTE 39	N FORK SAN GABRIEL RIVER	R30.63	21.04
2	52 0065	VEN	STATE ROUTE 33	SAN ANTONIO CREEK	7.58	20.17
2	52 0120	VEN	STATE ROUTE 33	OAK CREEK	52.09	19.91
2	52 0121	VEN	STATE ROUTE 33	TIMBA CREEK	52.59	19.88

Priority	Bridge Number	County[25]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
2	52 0040	VEN	STATE ROUTE 1	UP RR & AMTRAK	21.54	19.48
2	52 0207R	VEN	US 101 NB	UP RR, AMTRAK, & SR 1	R38.95	17.83
2	52 0358	VEN	STATE ROUTE 150	VENTURA RIVER	R13.42	17.24
2	52 0003	VEN	STATE ROUTE 1	WILLOW CREEK	28.15	16.48
2	53 0002	LA	U.S. HIGHWAY 101	MEDEA CREEK	34.82	16.20
2	53 1547	LA	STATE ROUTE 14	TICK CANYON WASH	35.34	15.94
2	53 1736	LA	STATE ROUTE 60	RIO HONDO	8.89	15.94
2	53 1889	LA	I 210	COLORADO,2ND,SANTA ANITA	R32.2	15.85
3	52 0099	VEN	STATE ROUTE 150	LION CANYON CREEK	21.7	15.56
3	53 0031	LA	STATE ROUTE 1	CORRAL CREEK	49.89	15.42
3	52 0345	VEN	STATE ROUTE 150	HAPPY VALLEY DRAIN	R13.84	15.10
3	52 0183	VEN	STATE ROUTE 126	SESPE CREEK	19.26	15.00
3	53 1767	LA	STATE ROUTE 60	SAN GABRIEL RIVER	11.3	14.91
3	53 2934	LA	HARBOR SCENIC DR	VACANT LAND	5.95	14.89
3	53 0109R	LA	INTERSTATE 10 EB	SAN GABRIEL RIVER	30.84	14.75
3	53 0034	LA	STATE ROUTE 1	LAS FLORES CREEK	44.15	14.38
3	52 0436	VEN	STATE ROUTE 23	SANTA CLARA RIVER	R23.6	14.34
3	53 1874	LA	INTERSTATE 210	SAWPIT WASH	R34.6	14.08
3	53 1867	LA	INTERSTATE 210	SAN GABRIEL RIVER	R36.82	14.03
3	52 0207L	VEN	US 101 SB	UP RR, AMTRAK, & SR 1	R38.95	13.90
3	53 0534	LA	SR 164 (ROSEMEAD)	FLOOD FLOW CHANNEL	2.06	13.44
3	52 0267L	VEN	STATE ROUTE 126	SANTA PAULA CREEK	R12.71	13.17
3	53 0113	LA	STATE ROUTE 39	SAN GABRIEL RIVER	17.82	12.94
3	52 0043	VEN	STATE ROUTE 33	N FORK MATILIJA CREEK	15.52	12.89
3	53 1698	LA	STATE ROUTE 91	SAN GABRIEL RIVER	R16.62	12.59
3	52 0215	VEN	STATE ROUTE 150	COYOTE CREEK OVERFLOW	9.6	12.54
3	53 0009R	LA	INTERSTATE 5	CASTAIC CREEK	R56.26	12.35
3	53 0009L	LA	INTERSTATE 5	CASTAIC CREEK	R56.26	12.32
3	53 0029	LA	STATE ROUTE 1	ESCONDIDO CREEK	51.79	12.17
3	53 1128	LA	INTERSTATE 5	PACOIMA WASH	39.19	11.95
3	52 0250L	VEN	STATE ROUTE 126	TODD BARRANCA	R7.81	11.81
3	52 0250R	VEN	STATE ROUTE 126	TODD BARRANCA	R7.81	11.74
3	53 1955	LA	INTERSTATE 210	BRADBURY FLOOD CTRL CH	R36.51	11.66
3	52 0103	VEN	STATE ROUTE 150	SISAR CREEK	28.48	11.63
3	53 0213	LA	INTERSTATE 5	SAN GABRIEL RIVER	7.06	11.50
3	53 0028	LA	STATE ROUTE 1	ZUMA CREEK	54.95	11.44
3	52 0009	VEN	U.S. HIGHWAY 101	ARROYO CALLEGUAS	12.76	11.20

Priority	Bridge Number	County[25]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
3	52 0105	VEN	STATE ROUTE 150	SANTA PAULA CREEK	28.61	11.09
3	53 2576	LA	I 105 HOV & LRT	SAN GABRIEL RIVER	R17.49	10.99
3	53 1790	LA	STATE ROUTE 134	LA RIV,UPRR,METRO,AMTRAK	R5.67	10.92
3	53 1121L	LA	INTERSTATE 5	TUJUNGA WASH CHANNEL	36.35	10.92
3	52 0008	VEN	U.S. HIGHWAY 101	ARROYO CONEJO	11.44	10.92
3	53 1121R	LA	INTERSTATE 5	TUJUNGA WASH CHANNEL	36.35	10.77
3	53 0093	LA	STATE ROUTE 126	CASTAIC CREEK	R4.09	10.60
3	52 0036	VEN	ROUTE 126	HOPPER CREEK	R26.48	10.49
3	53 1371	LA	U.S. HIGHWAY 101	LOS ANGELES RI,HAZELTINE	15.38	10.40
3	52 0245R	VEN	U.S. HIGHWAY 101	WEST MAIN STREET	31.5	10.40
3	52 0464	VEN	STATE ROUTE 150	SAN ANTONIO CREEK	18.75	10.39
3	53 1424	LA	INTERSTATE 5	SR 110 CON,ST,UP RR,RIV	20.31	10.27
4	53 1343	LA	INTERSTATE 605	WALNUT CREEK	R19.85	10.25
4	53 1224	LA	U.S. HIGHWAY 101	LOS ANGELES RIVER	10.83	10.23
4	53 0828	LA	INTERSTATE 710	LOS ANGELES RIVER	17.34	10.15
4	52 0104	VEN	STATE ROUTE 150	SANTA PAULA CREEK	28.53	10.13
4	52 0182	VEN	STATE ROUTE 126	SESPE CREEK OVERFLOW	19.73	10.03
4	53 1285	LA	STATE ROUTE 134	LOS ANGELES RIVER	3.47	9.97
4	53 0166	LA	SR 134	ARROYO SECO & STREETS	R12.57	9.95
4	53 0235	LA	SR 164 (ROSEMEAD)	RIO HONDO	4.91	9.89
4	52 0341	VEN	STATE ROUTE 23	ARROYO SIMI	T12.04	9.87
4	53 2060	LA	INTERSTATE 210	BIG DALTON WASH	R41.87	9.71
4	53 0065R	LA	INTERSTATE 5	PALOMAS WASH	R60.52R	9.44
4	52 0029	VEN	STATE ROUTE 126	HAUN CREEK	R13.57	9.35
4	53 2113	LA	INTERSTATE 210	PACOIMA WASH	R5.14	9.27
4	53 0061	LA	STATE ROUTE 2	LA CANADA CANYON	R25.51	8.66
4	53 1996	LA	STATE ROUTE 210	SAN DIMAS CHANNEL	R44.43	8.63
4	53 1075L	LA	INTERSTATE 5 SB	LOS ANGELES RI,SR 134 WB	27.07	8.63
4	53 0255	LA	STATE ROUTE 2	LOS ANGELES RIVER	15.52	8.62
4	53 0755	LA	U.S. HIGHWAY 101	CHESEBRO CRK	33.91	8.54
4	53 0086	LA	STATE ROUTE 2	FERN CANYON	29.55	8.51
4	53 1188	LA	INTERSTATE 405	LOS CERRITOS CHANNEL	0.78	8.47
4	53 2502	LA	SR 118	LIMEKILN CANYON	R4.54	8.00
4	53 0657	LA	INTERSTATE 10	RIO HONDO	28.18	7.91
4	53 2073L	LA	INTERSTATE 210	ARCADIA WASH	R30.6	7.88
4	52 0331L	VEN	STATE ROUTE 118	UP RR,AMTRAK,METROLINK,	T18.68	7.66
4	52 0331R	VEN	STATE ROUTE 118	UP RR,AMTRAK,METROLINK,	T18.44	7.66
4	53 2562	LA	INTERSTATE 210	S BR BIG TUJUNGA WASH	R10.53	7.62

Priority	Bridge Number	County[25]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
4	53 2152	LA	STATE ROUTE 1	TEXACO OH	8.69	7.30
4	53 1938	LA	INTERSTATE 110	CHANNEL ST & UP RR SPUR	R1.25	6.99
4	52 0012	VEN	SR 1	LITTLE SYCAMORE CREEK	1.23	6.93
4	53 1072	LA	I-5 SUP ROUTE	LOS ANGELES RIVER	25.7	6.88
4	53 2247	LA	I 210	LITTLE TUJUNGA WASH	R8.28	6.88
4	53 1833	LA	STATE ROUTE 14	CALIFORNIA AQUEDUCT	R57.14	6.83
4	52 0269L	VEN	STATE ROUTE 126	ELLSWORTH BARRANCA	R6.43	6.77
4	53 2925	LA	INTERSTATE 5	SANTA CLARA RIVER	R53.7	6.71
4	53 1159	LA	INTERSTATE 405	LOS ANGELES RIVER	39.62	6.69
4	53 0639	LA	INTERSTATE 5	RIO HONDO	9.47	6.48
4	53 2074L	LA	INTERSTATE 210	ARCADIA WASH	R30.61	6.34
4	52 0328R	VEN	ROUTE 101 NB	MOBIL PIER ACCESS	R39.78	6.08
4	53 2077	LA	INTERSTATE 210	PUDDINGSTONE CHANNEL	R46.35	5.94
4	52 0050	VEN	STATE ROUTE 118	HONDO BARRANCA	7.32	5.92
5	52 0245L	VEN	U.S. HIGHWAY 101	WEST MAIN STREET	31.55	5.70
5	53 0033	LA	STATE ROUTE 1	COAL CREEK	44.89	5.67
5	53 2868	LA	ROUTE 210	LIVE OAK CANYON WASH	R49.02	5.37
5	53 0720	LA	STATE ROUTE 27	BELL CREEK	14.27	5.36
5	53 2377L	LA	STATE ROUTE 14	S AMARGOSA CREEK	R61.53	4.67
5	53 0085R	LA	INTERSTATE 5	GORMAN CREEK	R80.79	4.65
5	53 0085L	LA	INTERSTATE 5	GORMAN CREEK	R80.79	4.63
5	53 1998	LA	STATE ROUTE 57	SAN JOSE FLD CNTRL CHNNL	R7.3	4.62
5	53 2377R	LA	STATE ROUTE 14	S AMARGOSA CREEK	R61.53	4.59
5	53 0105	LA	INTERSTATE 10	WALNUT CREEK CHANNEL	38.32	4.56
5	53 2047	LA	STATE ROUTE 138	CALIFORNIA AQUEDUCT	14.6	4.50
5	53 0145	LA	STATE ROUTE 1	STATE ROUTE 103	8.27	4.06
5	53 0399	LA	STATE ROUTE 1	CLASSIFICATION RD	8.43	3.81
5	53 1416	LA	INTERSTATE 605	SAN JOSE DIVERSION CHAN	R17.69	3.64
5	53 0144	LA	STATE ROUTE 27	TOPANGA CREEK	4.2	3.52
5	53 0104M	LA	INTERSTATE 10	CHARTER OAK WASH	37.61	3.40
5	53 2794L	LA	SR 118 WB	BULL CREEK CANYON CHAN	R8.84	3.38
5	53 2794R	LA	SR 118 EB	BULL CREEK CANYON CHAN	R8.84	3.38
5	53 0303R	LA	STATE ROUTE 138	LITTLE ROCK CREEK	53.55	3.37
5	53 0303L	LA	SR 138 (PEARBLSSM)	LITTLE ROCK CREEK	53.55	3.37
5	53 2051	LA	STATE ROUTE 71	SAN JOSE FC CHNL	R1.04	3.34
5	53 0571L	LA	INTERSTATE 10 WB	RUBIO WASH	26.73	3.08
5	53 0656R	LA	INTERSTATE 10 EB	EATON WASH	27.85	2.33
5	53 0656L	LA	INTERSTATE 10	EATON WASH	27.85	2.07

Priority	Bridge Number	County[25]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
5	53 2028L	LA	STATE ROUTE 14	AMARGOSA CREEK	R70.27	2.07
5	53 2028R	LA	STATE ROUTE 14	AMARGOSA CREEK	R70.27	2.07
5	53 0279	LA	INTERSTATE 5	COYOTE CREEK	0.34	1.96
5	52 0321R	VEN	STATE ROUTE 118	ARROYO DEL TAPO CHANNEL	R26.8	1.94
5	52 0321L	VEN	STATE ROUTE 118	ARROYO DEL TAPO CHANNEL	R26.8	1.81
5	53 1363	LA	INTERSTATE 5	NORTH FORK COYOTE CREEK	1.47	1.67
5	53 0143	LA	STATE ROUTE 27	TOPANGA CREEK	2.02	1.46
5	53 0653R	LA	ROUTE 10 EB	ALHAMBRA WASH	25.5	0.94
5	52 0033	VEN	STATE ROUTE 126	POLE CREEK	21.97	0.93
5	53 0653L	LA	ROUTE 10 WB	ALHAMBRA WASH	25.5	0.69
5	53 0042L	LA	STATE ROUTE 110 WB	LA RIV,SCRRA,UPRR,AMTRAK	25.43L	0.66
5	53 0042R	LA	STATE ROUTE 110 NB	LA RIV,SCRRA,UPRR,AMTRAK	25.48R	0.66
5	53 2870	LA	INTERSTATE 210	THOMPSON CREEK	R49.37	0.23
5	53 0579	LA	INTERSTATE 210	FLINT CANYON WASH	R21.84	0.13
5	53 0138	LA	ST RTE 1 (PCH)	SANTA MONICA STORM DRAIN	37.01	0.00
5	53 0407	LA	STATE ROUTE 27	GARAPITO CREEK	6.56	0.00

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

Priority	Bridge Number	County[26]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
1	52 0351	VEN	U.S. HIGHWAY 101	MADRANIO CANYON CRK	R39.18	100.00
1	52 0114	VEN	STATE ROUTE 23	GRIMES CANYON CHANNEL	20.75	73.65
1	52 0115	VEN	STATE ROUTE 23	GRIMES CANYON CHANNEL	20.92	73.65
1	52 0113	VEN	STATE ROUTE 23	GRIMES CANYON CHANNEL	19.82	72.90
1	52 0424	VEN	STATE ROUTE 23	GRIMES CANYON CHANNEL	R21.02	72.17
1	52 0425	VEN	STATE ROUTE 23	GRIMES CANYON CHANNEL	R21.41	72.17
1	52 0076	VEN	STATE ROUTE 33	CANON CREEK	20.76	68.08
1	52 0170	VEN	STATE ROUTE 33	CANON CREEK	20.48	68.08
1	53 2608	LA	STATE ROUTE 14	WHITNEY CREEK	R27.1	58.61
1	53 1793	LA	STATE ROUTE 14	WARD WASH	46.6	54.50
1	53 2397	LA	INTERSTATE 210	EATON WASH	R28.86	54.39
2	53 2184	LA	STATE ROUTE 138	GORMAN CREEK CHANNEL	.06L	49.80
2	52 0244	VEN	STATE ROUTE 150	SANTA ANA CREEK	10.98	49.47
2	53 2183	LA	W138-S5 & N5-E138	GORMAN CREEK CHANNEL	.18R	49.13
2	53 0515	LA	STATE ROUTE 39	N FORK SAN GABRIEL RIVER	32.5	48.89
2	53 1871M	LA	INTERSTATE 5	NEWHALL RANCH DRAIN	R55.28	43.96
2	53 2461	LA	STATE ROUTE 60	WALNUT DRAIN	20.91	37.57
2	53 2462	LA	STATE ROUTE 60	WATER ST DRAIN	R21.78	37.12
2	53 2880	LA	INTERSTATE 210	SAN ANTONIO WASH	R52.14	36.91
2	52 0352	VEN	U.S. HIGHWAY 101	LAS SAUCES CRK	R39.52	35.85
2	53 2186	LA	STATE ROUTE 118	PACOIMA WASH	R11.65L	35.21
2	52 0368	VEN	STATE ROUTE 23	TIERRA REJADA CHANNEL	R9.84	34.86
2	52 0344	VEN	STATE ROUTE 33	CANADA LARGA	R4.3	34.56
3	53 1519M	LA	INTERSTATE 5	EAST CANYON CHANNEL	40.53	32.73
3	53 2185M	LA	I 5	GORMAN CREEK CHANNEL	R84.9	31.60
3	52 0164	VEN	U.S. HIGHWAY 101	REVOLON SLOUGH	18.78	30.11
3	53 0991	LA	INTERSTATE 10	SAN JOSE WASH	44.89	29.42
3	53 1979	LA	STATE ROUTE 14	MOUNTAIN SPRINGS WASH	R53.61	28.93
3	53 2073R	LA	INTERSTATE 210	ARCADIA WASH	R30.6	28.84
3	53 2014L	LA	INTERSTATE 5	VIOLIN & MARPLE CANYONS	R60.2L	28.61
3	53 2139M	LA	INTERSTATE 5	WILEY CANYON CHANNEL	R49.2	28.36
3	53 1912	LA	STATE ROUTE 14	ACTON CANYON WASH	R49	28.08
3	53 0003	LA	U.S. HIGHWAY 101	LAS VIRGENES CREEK	31.37	28.05
3	53 2196	LA	STATE ROUTE 118	EAST CANYON CHANNEL	R11.4R	27.47
4	52 0262	VEN	STATE ROUTE 126	ADAMS BARRANCA	R9.65	27.04
4	53 2634	LA	STATE ROUTE 118	ALISO CREEK CULVERT	R6.38	26.76

[26] LA = Los Angeles; VEN = Ventura

Priority	Bridge Number	County[26]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
4	52 0370	VEN	U.S. HIGHWAY 101	CAMARILLO HILLS DRAIN	15.69	26.37
4	53 1673M	LA	ROUTE 5	BURBANK WEST CHANNEL	30	26.29
4	52 0290	VEN	STATE ROUTE 126	WASON BARRANCA	R5.71	24.61
4	53 1830	LA	INTERSTATE 605	ROSE HILLS CHANNEL	R15.37	24.44
4	53 2193	LA	STATE ROUTE 60	FULLERTON CHANNEL	19.33	23.83
4	53 2348	LA	STATE ROUTE 57	BREA CANYON CHANNEL	R.72	23.52
4	53 0074	LA	U.S. HIGHWAY 101	DRY CANYON CREEK	27.14	22.30
4	52 0051	VEN	STATE ROUTE 118	LONG CANYON CREEK	12.98	21.47
4	52 0410	VEN	STATE ROUTE 34	REVOLON SLOUGH	8.15	21.04
4	53 3072	LA	SR 134,RIVERSID DR	BUENA VISTA PARK CHANNEL	2.82	19.90
5	53 2188	LA	SR 60	HACIENDA CREEK	15.69	19.60
5	53 0146	LA	STATE ROUTE 27	SANTA SUSANA CREEK	17.01	17.82
5	52 0046	VEN	STATE ROUTE 23	LAKE ELEANOR CREEK	T1.53	17.72
5	53 2597	LA	STATE ROUTE 57	POMONA BOULEVARD DRAIN	R6.75	15.16
5	53 0455	LA	STATE ROUTE 27	CALABASAS CREEK	13.93	11.44
5	53 2604	LA	STATE ROUTE 14	AVENUE P DRAIN	R61	11.17
5	53 2603	LA	STATE ROUTE 14	AVENUE "P-8" DRAIN	R60.6	11.16
5	53 2110	LA	STATE ROUTE 14	AVENUE Q DRAIN	R60.5	11.16
5	53 2303	LA	STATE ROUTE 14	AVE B DRAIN 1	R76.41	10.48
5	53 0993M	LA	STATE ROUTE 1	SUNSET BLVD STORM DRAIN	39.33	1.09
5	53 2369	LA	INTERSTATE 210	LOPEZ CYN CHANEL CULVERT	R6.94	0.00

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

Priority	Culvert System Number	County[27]	Route	Postmile	Cross-Hazard Prioritization Score
1	520010000371	VEN	1	3.71	100.00
1	520010002181	VEN	1	21.81	94.18
1	520334001678	VEN	33	16.78	84.61
1	520334002118	VEN	33	21.18	79.37
1	520334001792	VEN	33	17.92	79.12
1	520334004143	VEN	33	41.43	78.75
1	520330004218	VEN	33	42.18	78.70
1	520330003450	VEN	33	34.5	77.19
1	520334001638	VEN	33	16.38	73.88
1	520334002417	VEN	33	24.17	73.36
1	530390004121	LA	39	41.21	68.45
1	520010002656	VEN	1	26.56	67.99
1	520010002258	VEN	1	22.58	67.16
1	530390003477	LA	39	34.77	65.70
1	520010002388	VEN	1	23.88	65.32
1	520010002699	VEN	1	26.99	61.85
1	530390004348	LA	39	43.48	61.76
1	520330005126	VEN	33	51.26	61.38
1	530394003025	LA	39	30.25	61.34
1	530390003814	LA	39	38.14	61.31
1	530394002835	LA	39	28.35	60.82
1	520010002540	VEN	1	25.4	58.80
1	520010002443	VEN	1	24.43	58.09
2	530394002876	LA	39	28.76	56.87
2	530390003911	LA	39	39.11	55.95
2	530020007181	LA	2	71.81	54.81
2	530020005747	LA	2	57.47	54.29
2	530020007091	LA	2	70.91	50.47
2	530020006670	LA	2	66.7	48.99
2	530394002639	LA	39	26.39	47.48
2	530024003463	LA	2	34.63	46.95
2	520010002651	VEN	1	26.51	46.03
2	530010004317	LA	1	43.17	44.50
2	530144005224	LA	14	52.24	42.51
2	530020003628	LA	2	36.28	41.59
2	530050004465	LA	5	44.65	41.45

[27] LA = Los Angeles; VEN = Ventura

Priority	Culvert System Number	County[27]	Route	Postmile	Cross-Hazard Prioritization Score
2	530394002236	LA	39	22.36	41.42
2	532104000869	LA	210	8.69	40.97
2	520330005664	VEN	33	56.64	40.61
2	530024002815	LA	2	28.15	40.39
2	532104000043	LA	210	0.43	40.35
2	521010003839	VEN	101	38.39	37.49
2	532100000836	LA	210	8.36	37.12
2	532104000930	LA	210	9.3	36.87
2	532104000881	LA	210	8.81	36.65
2	530050004465	LA	5	44.65	36.42
2	532104000751	LA	210	7.51	36.25
3	530020002182	LA	2	21.82	35.91
3	530050007399	LA	5	73.99	35.44
3	532100000270	LA	210	2.7	34.98
3	532104000570	LA	210	5.7	34.64
3	532100001054	LA	210	10.54	34.51
3	521500002318	VEN	150	23.18	34.08
3	532100001054	LA	210	10.54	33.35
3	532104000972	LA	210	9.72	33.15
3	530024002227	LA	2	22.27	32.62
3	532104000930	LA	210	9.3	32.55
3	530024002755	LA	2	27.55	32.48
3	530052004486	LA	5	44.86	32.09
3	530024002913	LA	2	29.13	31.87
3	530024002976	LA	2	29.76	31.43
3	530140003090	LA	14	30.9	30.67
3	532104000751	LA	210	7.51	29.85
3	530024003099	LA	2	30.99	28.96
3	532100000270	LA	210	2.7	28.50
3	532100001015	LA	210	10.15	28.22
3	530010004136	LA	1	41.36	26.22
3	530274000350	LA	27	3.5	25.70
3	530604002327	LA	60	23.27	24.72
3	531010003546	LA	101	35.46	24.45
4	530010004638	LA	1	46.38	23.86
4	530574000064	LA	57	0.64	23.30
4	521010003839	VEN	101	38.39	22.06
4	531010003440	LA	101	34.4	21.54
4	531010003440	LA	101	34.4	21.50
4	530054002582	LA	5	25.82	21.40

Priority	Culvert System Number	County[27]	Route	Postmile	Cross-Hazard Prioritization Score
4	530010006150	LA	1	61.5	20.55
4	530600002742	LA	60	27.42	19.04
4	530570000091	LA	57	0.91	16.74
4	530054002077	LA	5	20.77	16.11
4	530570000400	LA	57	4	14.32
4	520230000502	VEN	23	5.02	13.62
4	530574001000	LA	57	10	13.61
4	521010003465	VEN	101	34.65	13.41
4	532104002010	LA	210	20.1	12.39
4	521180001094	VEN	118	10.94	9.96
4	530050004415	LA	5	44.15	9.38
4	531344000007	LA	134	0.07	9.33
4	530104000906	LA	10	9.06	9.28
4	532104001691	LA	210	16.91	9.26
4	532104001773	LA	210	17.73	9.18
4	521010003401	VEN	101	34.01	9.14
4	530050004415	LA	5	44.15	8.96
4	532104001691	LA	210	16.91	8.89
5	531184001345	LA	118	13.45	8.83
5	531184001332	LA	118	13.32	8.75
5	532104002229	LA	210	22.29	8.47
5	521010003465	VEN	101	34.65	8.40
5	531014002788	LA	101	27.88	7.68
5	521014000699	VEN	101	6.99	7.36
5	521014000699	VEN	101	6.99	7.36
5	521010003298	VEN	101	32.98	7.31
5	532104002248	LA	210	22.48	5.63
5	532104001773	LA	210	17.73	5.16
5	532104000419	LA	210	4.19	4.53
5	532104000140	LA	210	1.4	4.35
5	532104000140	LA	210	1.4	4.33
5	521010003256	VEN	101	32.56	4.33
5	532104000140	LA	210	1.4	3.70
5	532104000325	LA	210	3.25	3.60
5	521010003330	VEN	101	33.3	3.14
5	532104002010	LA	210	20.1	2.94
5	521010003330	VEN	101	33.3	2.93
5	532100000699	LA	210	6.99	2.90
5	531344000295	LA	134	2.95	2.59
5	531344000295	LA	134	2.95	2.59

Priority	Culvert System Number	County[27]	Route	Postmile	Cross-Hazard Prioritization Score
5	530010006260	LA	1	62.6	0.00
5	532100000699	LA	210	6.99	2.90
5	531344000295	LA	134	2.95	2.59
5	531344000295	LA	134	2.95	2.59
5	530010006260	LA	1	62.6	0.00

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

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
11	47	P	LA 47 3.504 / LA 47 3.701	78.53
1	47	P	LA 47 3.886 / LA 47 4.565	78.53
1	47	S	LA 47 2.26 / LA 47 2.302	69.32
1	47	S	LA 47 3.504 / LA 47 3.566	69.32
1	47	S	LA 47 3.701 / LA 47 4.565	69.32
1	710	S	LA 710 3.422 / LA 710 4.589	67.75
1	710	S	LA 710 5.366 / LA 710 5.609	67.75
1	710	S	LA 710 6.208 / LA 710 7.062	67.75
1	103	P	LA 103 0 / LA 103 0.05	64.78
1	103	P	LA 103 0.065 / LA 103 0.9	64.78
1	103	P	LA 103 1.402 / LA 103 1.575	64.78
1	710	P	LA 710 3.422 / LA 710 4.023	64.69
1	710	P	LA 710 6.065 / LA 710 7.083	64.69
1	103	S	LA 103 0 / LA 103 0.05	56.30
1	103	S	LA 103 0.065 / LA 103 0.896	56.30
1	103	S	LA 103 1.264 / LA 103 1.572	56.30
1	90	P	LA 90 1.202 / LA 90 1.734	47.27
1	1	P	LA 1 0.211 / LA 1 1.741	44.98
1	1	P	LA 1 29.812 / LA 1 31.105	44.98
1	1	P	LA 1 49.31 / LA 1 50.204	44.98
1	1	P	LA 1 50.385 / LA 1 51.072	44.98
1	1	P	LA 1 55.38 / LA 1 55.445	44.98
1	1	P	LA 1 55.794 / LA 1 56.514	44.98
1	1	P	LA 1 7.447 / LA 1 8.201	44.98
1	1	P	VEN 1 1.236 / VEN 1 4.12	44.98
1	1	P	VEN 1 11.592 / VEN 1 11.659	44.98
1	1	P	VEN 1 21.806 / VEN 1 23.262	44.98
1	1	P	VEN 1 23.277 / VEN 1 25.098	44.98
1	1	P	VEN 1 27.581 / VEN 1 28.092	44.98
1	1	P	VEN 1 28.349 / VEN 1 28.417	44.98
1	1	P	VEN 1 4.726 / VEN 1 11.441	44.98
1	1	S	LA 1 29.814 / LA 1 30.256	44.92

[28] 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".

[29] LA = Los Angeles; VEN = Ventura

[30] 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[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
1	1	S	LA 1 30.476 / LA 1 31.108	44.92
1	1	S	LA 1 49.73 / LA 1 50.204	44.92
1	1	S	LA 1 50.384 / LA 1 50.815	44.92
1	1	S	LA 1 55.494 / LA 1 56.666	44.92
1	1	S	LA 1 7.449 / LA 1 8.202	44.92
1	1	S	ORA 1 33.715 / LA 1 1.742	44.92
1	1	S	VEN 1 24.138 / VEN 1 25.096	44.92
1	1	S	VEN 1 27.581 / VEN 1 28.349	44.92
1	1	S	VEN 1 9.693 / VEN 1 11.594	44.92
1	18	P	LA 18 2.983 / LA 18 0.001	42.29
1	138	P	LA 138 71.746 / LA 138 74.971	42.25
1	33	P	VEN 33 56.678 / VEN 33 57.504	42.06
1	101	P	LA 101 18.617 / LA 101 26.811	31.82
1	101	P	VEN 101 28.452 / VEN 101 28.62	31.82
1	60	S	LA 60 9.512 / LA 60 17.968	31.77
1	60	S	LA 60 R22.708 / SBD 60 R0.004	31.77
1	101	S	LA 101 18.614 / LA 101 27.341	31.75
1	60	P	LA 60 9.553 / LA 60 17.743	31.73
1	60	P	LA 60 R22.735 / SBD 60 R0.001	31.73
1	210	P	LA 210 R11.123 / LA 210 R13.871	31.41
1	210	P	LA 210 R26.671 / LA 210 R49.54	31.41
1	210	P	LA 210 R4.111 / LA 210 R6.084	31.41
1	210	P	LA 210 R7.175 / LA 210 R8.566	31.41
1	210	S	LA 210 R11.453 / LA 210 R13.931	31.40
1	210	S	LA 210 R26.572 / LA 210 R49.542	31.40
1	210	S	LA 210 R4.113 / LA 210 R6.107	31.40
1	210	S	LA 210 R7.191 / LA 210 R8.565	31.40
1	10	P	LA 10 21.475 / LA 10 26.854	31.11
1	10	P	LA 10 26.863 / LA 10 48.264	31.11
1	10	S	LA 10 21.456 / LA 10 26.855	31.01
1	10	S	LA 10 26.863 / SBD 10 0.005	31.01
1	5	P	LA 5 29.776 / LA 5 R43.807	30.85
1	5	P	LA 5 R49.983 / LA 5 R56.601	30.85
1	5	S	LA 5 30.057 / LA 5 R43.843	30.78
1	5	S	LA 5 R49.266 / LA 5 R56.601	30.78
1	605	P	LA 605 R14.403 / LA 605 25.773	30.55
1	605	S	LA 605 R14.401 / LA 605 25.805	30.52
1	118	S	LA 118 R11.311L / LA 118 R11.448L	30.13

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
1	118	S	LA 118 R11.588L / LA 118 R12.4	30.13
1	118	S	LA 118 R12.696 / LA 118 R13.193	30.13
1	118	S	LA 118 R2.674 / LA 118 R11.061L	30.13
1	118	P	LA 118 R11.325R / LA 118 R11.449R	30.11
1	118	P	LA 118 R11.604R / LA 118 R12.403	30.11
1	118	P	LA 118 R12.698 / LA 118 R13.196	30.11
1	118	P	LA 118 R2.682 / LA 118 R11.074R	30.11
1	405	S	LA 405 41.378 / LA 405 48.643	29.99
1	405	P	LA 405 41.376 / LA 405 48.643	29.97
1	27	P	LA 27 12.427 / LA 27 12.518	29.70
1	27	P	LA 27 20.033 / LA 27 20.062	29.70
1	010S	S	LA 10S 21.156 / LA 10S 21.376	29.29
1	010S	S	LA 10S 23.653 / LA 10S 25.328	29.29
1	010S	P	LA 10S 21.156 / LA 10S 21.367	29.27
1	010S	P	LA 10S 23.653 / LA 10S 25.328	29.27
1	27	S	LA 27 12.428 / LA 27 12.518	29.27
1	57	S	LA 57 5.609 / LA 57 R11.333L	28.99
1	57	S	LA 57 R11.587L / LA 57 R11.991L	28.99
1	57	S	LA 57 R4.335L / LA 57 R4.499L	28.99
1	57	P	LA 57 5.726 / LA 57 R11.284R	28.99
1	57	P	LA 57 R11.657R / LA 57 R11.851R	28.99
1	57	P	LA 57 R4.312R / LA 57 R4.508R	28.99
1	170	P	LA 170 R17.264 / LA 170 R18.273	28.91
1	170	P	LA 170 R18.649 / LA 170 R20.117	28.91
1	170	S	LA 170 R17.27 / LA 170 R18.279	28.90
1	170	S	LA 170 R18.633 / LA 170 R20.123	28.90
1	110	S	LA 110 28.764 / LA 110 29.138	28.88
1	110	P	LA 110 28.764 / LA 110 29.2	28.88
1	71	P	LA 71 1.617 / LA 71 1.36	28.83
1	71	P	LA 71 R4.319 / LA 71 R4.263	28.83
1	14	S	LA 14 R27.584 / LA 14 R31.413	28.81
1	14	P	LA 14 R27.839 / LA 14 R31.404	28.81
1	71	S	LA 71 1.622 / LA 71 1.332	28.77
2	170	S	LA 170 R18.279 / LA 170 R18.633	28.65
2	170	S	LA 170 R20.123 / LA 170 R20.551	28.65
2	170	P	LA 170 R18.273 / LA 170 R18.649	28.64
2	170	P	LA 170 R20.117 / LA 170 R20.551	28.64
2	118	S	LA 118 R0.015 / LA 118 R2.674	28.36

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
2	118	S	LA 118 R11.061L / LA 118 R11.311L	28.36
2	118	S	LA 118 R11.448L / LA 118 R11.588L	28.36
2	118	S	LA 118 R12.4 / LA 118 R12.696	28.36
2	118	S	LA 118 R13.193 / LA 118 R14.34	28.36
2	118	S	VEN 118 R25.087 / VEN 118 R29.138	28.36
2	118	P	LA 118 R11.074R / LA 118 R11.325R	28.34
2	118	P	LA 118 R11.449R / LA 118 R11.604R	28.34
2	118	P	LA 118 R12.403 / LA 118 R12.698	28.34
2	118	P	LA 118 R13.196 / LA 118 R14.369	28.34
2	118	P	VEN 118 R24.839 / VEN 118 R29.323	28.34
2	118	P	VEN 118 R32.593 / LA 118 R2.682	28.34
2	71	P	LA 71 1.36 / LA 71 R0.335R	28.33
2	71	P	LA 71 R4.263 / LA 71 1.617	28.33
2	71	P	LA 71 R4.693 / LA 71 R4.319	28.33
2	71	S	LA 71 1.332 / LA 71 R0.335L	28.31
2	71	S	SBD 71 R0.023 / LA 71 1.622	28.31
2	110	S	LA 110 28.365 / LA 110 28.764	28.17
2	110	S	LA 110 29.138 / LA 110 31.782	28.17
2	57	P	LA 57 R0.002 / LA 57 R0.923	27.98
2	57	P	LA 57 R11.284R / LA 57 R11.657R	27.98
2	57	P	LA 57 R11.851R / LA 57 R12.303R	27.98
2	57	P	LA 57 R4.508R / LA 57 R4.518R	27.98
2	57	P	LA 57 R4.518 / LA 57 5.726	27.98
2	014U	S	LA 14U T27.001 / LA 14U 29.848	27.95
2	014U	P	LA 14U T27.061 / LA 14U 29.848	27.95
2	110	P	LA 110 23.35 / LA 110 23.621	27.69
2	110	P	LA 110 28.374 / LA 110 28.764	27.69
2	110	P	LA 110 29.2 / LA 110 31.913	27.69
2	14	P	LA 14 R31.404 / LA 14 R59.154	27.53
2	14	P	LA 14 R67.514 / LA 14 R72.999	27.53
2	14	S	LA 14 R31.413 / LA 14 R59.155	27.47
2	14	S	LA 14 R67.495 / LA 14 R72.999	27.47
2	57	S	LA 57 R11.333L / LA 57 R11.587L	27.11
2	57	S	LA 57 R11.991L / LA 57 R12.212L	27.11
2	57	S	LA 57 R4.518 / LA 57 5.609	27.11
2	57	S	ORA 57 R22.533 / LA 57 R0.891	27.11
2	164	S	LA 164 4.75 / LA 164 6.9	26.57
2	164	P	LA 164 4.704 / LA 164 6.9	26.55

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
2	27	P	LA 27 12.518 / LA 27 20.033	26.49
2	27	P	LA 27 8.014 / LA 27 12.427	26.49
2	27	S	LA 27 10.348 / LA 27 10.586	26.31
2	27	S	LA 27 10.741 / LA 27 10.852	26.31
2	27	S	LA 27 12.074 / LA 27 12.428	26.31
2	27	S	LA 27 12.518 / LA 27 19.428	26.31
2	27	S	LA 27 8.88 / LA 27 9.007	26.31
2	27	S	LA 27 9.09 / LA 27 10.217	26.31
2	66	S	LA 66 0 / LA 66 3.22	26.25
2	126	S	LA 126 R5.842 / LA 126 6.036	26.22
2	126	S	VEN 126 R27.224 / LA 126 R5.816	26.22
2	126	P	LA 126 R5.84 / LA 126 6.036	26.19
2	126	P	VEN 126 R27.224 / LA 126 R5.83	26.19
2	66	P	LA 66 0.001 / LA 66 3.22	26.18
2	1	P	LA 1 31.105 / LA 1 31.227	26.00
2	1	P	LA 1 55.445 / LA 1 55.794	26.00
2	1	P	LA 1 7.368 / LA 1 7.447	26.00
2	1	P	ORA 1 33.719 / LA 1 0.211	26.00
2	1	P	VEN 1 11.659 / VEN 1 12.324	26.00
2	1	P	VEN 1 25.098 / VEN 1 27.581	26.00
2	1	P	VEN 1 28.092 / VEN 1 28.349	26.00
2	1	P	VEN 1 28.48 / VEN 1 28.411	26.00
2	1	P	VEN 1 4.12 / VEN 1 4.376	26.00
2	010S	P	LA 10S 21.048 / LA 10S 21.156	25.86
2	010S	P	LA 10S 21.367 / LA 10S 23.653	25.86
2	010S	P	LA 10S 25.328 / LA 10S 28.613	25.86
2	010S	S	LA 10S 21.047 / LA 10S 21.156	25.81
2	010S	S	LA 10S 21.376 / LA 10S 23.653	25.81
2	010S	S	LA 10S 25.328 / LA 10S 28.333	25.81
2	138	P	LA 138 14.535 / LA 138 14.658	25.73
2	710	S	LA 710 5.609 / LA 710 5.813	25.56
2	710	S	LA 710 6.086 / LA 710 6.205	25.56
2	710	S	LA 710 R26.57 / LA 710 T27.312	25.56
2	710	P	LA 710 5.339 / LA 710 5.822	25.48
2	710	P	LA 710 7.671 / LA 710 7.856	25.48
2	710	P	LA 710 R26.561 / LA 710 T27.338	25.48
2	710	P	LA 710 T30.953 / LA 710 T31.075	25.48
2	39	P	LA 39 17.812 / LA 39 21.704	25.29

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
2	22	S	LA 22 1.139 / LA 22 1.351	25.20
2	210	S	LA 210 R24.938 / LA 210 R24.979	24.35
2	210	S	LA 210 R24.968 / LA 210 R24.979	24.35
2	210	S	LA 210 R24.979 / LA 210 R24.979	24.35
2	210	S	LA 210 R24.979 / LA 210 R26.572	24.35
2	210	S	LA 210 R3.487 / LA 210 R4.113	24.35
2	210	S	LA 210 R49.542 / SBD 210 0.022	24.35
2	210	S	LA 210 R6.107 / LA 210 R7.191	24.35
2	210	P	LA 210 R24.951 / LA 210 R24.979	23.60
2	210	P	LA 210 R24.979 / LA 210 R26.671	23.60
2	210	P	LA 210 R3.29 / LA 210 R4.111	23.60
2	210	P	LA 210 R49.54 / LA 210 R52.149	23.60
2	210	P	LA 210 R6.084 / LA 210 R7.175	23.60
2	1	S	LA 1 31.108 / LA 1 31.281	23.56
2	1	S	LA 1 7.365 / LA 1 7.449	23.56
2	1	S	VEN 1 11.594 / VEN 1 12.623	23.56
2	1	S	VEN 1 25.096 / VEN 1 25.388	23.56
2	1	S	VEN 1 4.12 / VEN 1 4.726	23.56
2	103	P	LA 103 1.284 / LA 103 1.402	22.56
2	103	P	LA 103 1.579 / LA 103 1.659	22.56
2	60	S	LA 60 17.968 / LA 60 R22.708	20.66
2	60	S	LA 60 9.502 / LA 60 9.512	20.66
2	60	S	LA 60 R1.844 / LA 60 R3.065	20.66
2	60	S	LA 60 R3.269 / LA 60 R5.908	20.66
2	60	P	LA 60 17.743 / LA 60 R22.735	20.64
2	60	P	LA 60 9.502 / LA 60 9.553	20.64
2	60	P	LA 60 R1.719 / LA 60 R3.063	20.64
2	60	P	LA 60 R3.267 / LA 60 R5.908	20.64
2	5	S	LA 5 14.175 / LA 5 16.901	20.59
2	5	S	LA 5 20.436 / LA 5 22.269	20.59
2	5	S	LA 5 22.533 / LA 5 22.552	20.59
2	5	S	LA 5 24.326 / LA 5 26.586	20.59
2	5	S	LA 5 27.05 / LA 5 27.54	20.59
2	5	S	LA 5 R44.038 / LA 5 R45.564	20.59
2	5	S	LA 5 R45.712 / LA 5 R49.039	20.59
2	5	S	LA 5 R56.601 / LA 5 R65.983	20.59
2	5	P	LA 5 14.158 / LA 5 16.901	20.57
2	5	P	LA 5 20.438 / LA 5 22.268	20.57

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
2	5	P	LA 5 22.539 / LA 5 22.558	20.57
2	5	P	LA 5 24.376 / LA 5 26.607	20.57
2	5	P	LA 5 26.996 / LA 5 27.543	20.57
2	5	P	LA 5 R44.011 / LA 5 R45.59	20.57
2	5	P	LA 5 R45.692 / LA 5 R49.05	20.57
2	5	P	LA 5 R56.601 / LA 5 R65.983	20.57
2	22	P	LA 22 1.139 / LA 22 1.165	20.55
2	72	P	LA 72 6.668 / LA 72 6.54	20.09
2	10	S	LA 10 16.366 / LA 10 18.394	19.79
2	10	S	LA 10 26.855 / LA 10 26.863	19.79
2	10	P	LA 10 16.438 / LA 10 18.394	19.75
2	10	P	LA 10 26.854 / LA 10 26.863	19.75
2	605	S	LA 605 R13.98 / LA 605 R14.401	19.42
2	605	S	LA 605 R4.803 / LA 605 R7.373	19.42
2	605	S	LA 605 R7.644 / LA 605 R9.612	19.42
2	101	S	LA 101 13.391 / LA 101 15.923	19.42
2	101	S	LA 101 17.508L / LA 101 18.614	19.42
2	101	S	LA 101 2.502 / LA 101 4.374	19.42
2	101	S	LA 101 8.748 / LA 101 11.564L	19.42
2	101	S	VEN 101 30.106 / VEN 101 30.415	19.42
2	605	P	LA 605 R13.982 / LA 605 R14.403	19.40
2	605	P	LA 605 R4.797 / LA 605 R7.41	19.40
2	605	P	LA 605 R7.647 / LA 605 R9.615	19.40
2	91	S	LA 91 R15.627 / LA 91 R20.736	19.26
2	91	P	LA 91 R15.626 / LA 91 R20.741	19.23
2	101	P	LA 101 13.391 / LA 101 15.926	19.22
2	101	P	LA 101 17.505R / LA 101 18.617	19.22
2	101	P	LA 101 2.508 / LA 101 4.397	19.22
2	101	P	LA 101 8.745 / LA 101 11.603R	19.22
2	101	P	VEN 101 30.105 / VEN 101 30.147	19.22
2	405	P	LA 405 36.709 / LA 405 39.446	19.22
2	405	S	LA 405 36.726 / LA 405 39.438	19.17
2	134	S	LA 134 R5.496L / LA 134 R7.872	18.53
2	134	P	LA 134 R5.563R / LA 134 R7.869	18.53
3	60	P	LA 60 L0.123 / LA 60 R1.719	18.30
3	60	P	LA 60 R3.063 / LA 60 R3.267	18.30
3	60	P	LA 60 R5.908 / LA 60 9.502	18.30
3	60	S	LA 60 L0 / LA 60 R1.844	18.26

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
3	60	S	LA 60 R3.065 / LA 60 R3.269	18.26
3	60	S	LA 60 R5.908 / LA 60 9.502	18.26
3	57	P	LA 57 R0.923 / LA 57 R4.312R	18.25
3	57	S	LA 57 R0.891 / LA 57 R4.335L	18.25
3	605	S	LA 605 R0.286 / LA 605 R4.803	18.19
3	605	S	LA 605 R7.373 / LA 605 R7.644	18.19
3	605	S	LA 605 R9.612 / LA 605 R13.98	18.19
3	134	S	LA 134 0 / LA 134 R5.496L	18.19
3	134	S	LA 134 R7.872 / LA 134 R13.261	18.19
3	605	P	LA 605 R0.312 / LA 605 R4.797	18.17
3	605	P	LA 605 R7.41 / LA 605 R7.647	18.17
3	605	P	LA 605 R9.615 / LA 605 R13.982	18.17
3	405	S	LA 405 39.438 / LA 405 41.378	18.09
3	405	P	LA 405 39.446 / LA 405 41.376	18.09
3	134	P	LA 134 0 / LA 134 R5.563R	18.07
3	134	P	LA 134 R7.869 / LA 134 R13.26	18.07
3	5	S	LA 5 16.901 / LA 5 16.905	17.98
3	5	S	LA 5 16.936 / LA 5 20.436	17.98
3	5	S	LA 5 22.269 / LA 5 22.533	17.98
3	5	S	LA 5 22.552 / LA 5 24.326	17.98
3	5	S	LA 5 26.586 / LA 5 27.05	17.98
3	5	S	LA 5 27.54 / LA 5 30.057	17.98
3	5	S	LA 5 R43.843 / LA 5 R44.038	17.98
3	5	S	LA 5 R45.564 / LA 5 R45.712	17.98
3	5	S	LA 5 R49.039 / LA 5 R49.266	17.98
3	5	S	LA 5 R77.979 / LA 5 R87.336	17.98
3	5	S	ORA 5 44.376 / LA 5 14.175	17.98
3	5	P	LA 5 0 / LA 5 14.158	17.95
3	5	P	LA 5 16.91 / LA 5 20.438	17.95
3	5	P	LA 5 22.268 / LA 5 22.539	17.95
3	5	P	LA 5 22.558 / LA 5 24.376	17.95
3	5	P	LA 5 26.607 / LA 5 26.996	17.95
3	5	P	LA 5 27.543 / LA 5 29.776	17.95
3	5	P	LA 5 R43.807 / LA 5 R44.011	17.95
3	5	P	LA 5 R45.59 / LA 5 R45.692	17.95
3	5	P	LA 5 R49.05 / LA 5 R49.983	17.95
3	5	P	LA 5 R77.709 / LA 5 R87.438	17.95
3	105	P	LA 105 R16.639 / LA 105 R17.834	17.86

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
3	105	S	LA 105 R16.639 / LA 105 R17.836	17.86
3	170	S	LA 170 R14.512 / LA 170 R17.27	17.85
3	170	P	LA 170 R14.5 / LA 170 R17.264	17.84
3	90	P	LA 90 1.014 / LA 90 1.202	17.83
3	10	S	LA 10 S0 / LA 10 21.456	17.51
3	101	S	LA 101 11.564L / LA 101 13.391	17.48
3	101	S	LA 101 15.923 / LA 101 17.508L	17.48
3	101	S	LA 101 27.341 / LA 101 35.036	17.48
3	101	S	LA 101 4.374 / LA 101 6.135	17.48
3	101	S	LA 101 S0.911 / LA 101 2.502	17.48
3	101	S	VEN 101 28.461 / VEN 101 29.461	17.48
3	10	P	LA 10 S0 / LA 10 21.475	17.48
3	1	P	LA 1 42.483 / LA 1 42.771	17.46
3	1	P	LA 1 56.514 / LA 1 56.768	17.46
3	1	P	VEN 1 11.441 / VEN 1 11.592	17.46
3	1	P	VEN 1 23.262 / VEN 1 23.277	17.46
3	710	S	LA 710 17.267 / LA 710 26.472	17.41
3	710	S	LA 710 T32.113 / LA 710 R32.717	17.41
3	710	P	LA 710 17.235 / LA 710 26.474	17.39
3	710	P	LA 710 T31.935 / LA 710 R32.72	17.39
3	101	P	LA 101 11.603R / LA 101 13.391	17.38
3	101	P	LA 101 15.926 / LA 101 17.505R	17.38
3	101	P	LA 101 26.811 / LA 101 35.035	17.38
3	101	P	LA 101 4.397 / LA 101 6.149	17.38
3	101	P	LA 101 S0.908 / LA 101 2.508	17.38
3	101	P	VEN 101 28.161 / VEN 101 28.452	17.38
3	101	P	VEN 101 30.147 / VEN 101 30.405	17.38
3	101	P	VEN 101 30.903 / VEN 101 31.527	17.38
3	1	S	LA 1 55.092 / LA 1 55.494	17.36
3	1	S	VEN 1 13.046 / VEN 1 13.669	17.36
3	210	P	LA 210 R0.597 / LA 210 R0.857	16.65
3	210	P	LA 210 R13.871 / LA 210 R24.951	16.65
3	210	P	LA 210 R2.744 / LA 210 R3.29	16.65
3	210	P	LA 210 R8.566 / LA 210 R11.123	16.65
3	210	S	LA 210 R0.456 / LA 210 R0.856	16.63
3	210	S	LA 210 R13.931 / LA 210 R24.938	16.63
3	210	S	LA 210 R2.748 / LA 210 R3.487	16.63
3	210	S	LA 210 R8.565 / LA 210 R11.453	16.63

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
3	110	S	LA 110 23.622 / LA 110 28.365	16.48
3	110	P	LA 110 23.621 / LA 110 28.374	16.33
3	2	S	LA 2 14.023 / LA 2 14.208	16.29
3	2	S	LA 2 14.183 / LA 2 14.85	16.29
3	2	S	LA 2 15.139 / LA 2 R19.223	16.29
3	2	P	LA 2 12.329 / LA 2 12.74	16.25
3	2	P	LA 2 13.413 / LA 2 13.62	16.25
3	2	P	LA 2 14.021 / LA 2 14.161	16.25
3	2	P	LA 2 14.161 / LA 2 14.208	16.25
3	2	P	LA 2 14.161 / LA 2 14.853	16.25
3	2	P	LA 2 15.143 / LA 2 R19.241	16.25
3	010S	P	LA 10S 18.407 / LA 10S 19.075	16.08
3	010S	S	LA 10S 18.407 / LA 10S 19.079	16.08
3	010S	P	LA 10S 19.273 / LA 10S 20.26	16.08
3	010S	S	LA 10S 19.282 / LA 10S 20.26	16.08
3	103	S	LA 103 1.579 / LA 103 1.747	16.05
3	118	P	VEN 118 R23.837 / VEN 118 R24.839	15.94
3	118	P	VEN 118 R29.323 / VEN 118 R32.593	15.94
3	118	P	VEN 118 T18.261 / VEN 118 T20.083	15.94
3	118	S	VEN 118 R23.821 / VEN 118 R25.087	15.93
3	118	S	VEN 118 R29.138 / LA 118 R0.015	15.93
3	118	S	VEN 118 T18.214 / VEN 118 T19.99	15.93
3	14	P	LA 14 R24.788 / LA 14 R26.753	15.78
3	14	P	LA 14 R27.048 / LA 14 R27.839	15.78
3	14	S	LA 14 R24.799 / LA 14 R26.826	15.74
3	14	S	LA 14 R27.044 / LA 14 R27.584	15.74
4	14	P	LA 14 R26.753 / LA 14 R27.048	15.33
4	14	S	LA 14 R26.826 / LA 14 R27.044	15.33
4	210	P	LA 210 R0 / LA 210 R0.597	14.88
4	210	P	LA 210 R0.857 / LA 210 R2.744	14.88
4	210	S	LA 210 R0.02 / LA 210 R0.456	14.78
4	210	S	LA 210 R0.856 / LA 210 R2.748	14.78
4	005S	S	LA 5S 25.778 / LA 5S 25.148	14.66
4	005S	S	LA 5S C46.239 / LA 5S C43.939L	14.66
4	118	S	VEN 118 R17.891 / VEN 118 R17.906	14.56
4	118	S	VEN 118 T18.211 / VEN 118 T18.214	14.56
4	118	S	VEN 118 T19.99 / VEN 118 R23.821	14.56
4	118	P	VEN 118 R17.794 / VEN 118 R17.906	14.53

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
4	118	P	VEN 118 T18.212 / VEN 118 T18.261	14.53
4	118	P	VEN 118 T20.083 / VEN 118 R23.837	14.53
4	005S	P	LA 5S 25.781 / LA 5S 25.148	14.42
4	005S	P	LA 5S C46.264 / LA 5S C43.925R	14.42
4	23	S	VEN 23 R8.476 / VEN 23 T11.566	14.38
4	23	S	VEN 23 T11.556 / VEN 23 T11.566	14.38
4	23	S	VEN 23 T11.566 / VEN 23 T11.566	14.38
4	23	S	VEN 23 T11.566 / VEN 23 T12.26	14.38
4	5	P	LA 5 16.91 / LA 5 16.912	14.20
4	5	P	LA 5 R65.983 / LA 5 R77.709	14.20
4	5	S	LA 5 16.93 / LA 5 16.936	14.17
4	5	S	LA 5 R65.983 / LA 5 R77.979	14.17
4	72	P	LA 72 6.54 / LA 72 0.001	14.10
4	72	P	LA 72 6.767 / LA 72 6.668	14.10
4	2	P	LA 2 12.75 / LA 2 13.413	13.93
4	2	P	LA 2 13.62 / LA 2 14.021	13.93
4	2	P	LA 2 14.853 / LA 2 15.143	13.93
4	2	P	LA 2 24.41 / LA 2 33.799	13.93
4	2	P	LA 2 R19.241 / LA 2 R23.438	13.93
4	39	S	ORA 39 17.264 / ORA 39 17.571	13.88
4	39	S	ORA 39 17.834 / ORA 39 18.457	13.88
4	164	P	LA 164 1.385 / LA 164 4.704	13.85
4	72	S	LA 72 4.692 / LA 72 0.001	13.82
4	2	S	LA 2 13.62 / LA 2 14.023	13.80
4	2	S	LA 2 14.85 / LA 2 15.139	13.80
4	2	S	LA 2 24.41 / LA 2 26.012	13.80
4	2	S	LA 2 R19.223 / LA 2 R23.438	13.80
4	164	S	LA 164 1.385 / LA 164 4.75	13.79
4	23	P	VEN 23 22.546 / VEN 23 24.165	13.76
4	23	P	VEN 23 R8.232 / VEN 23 R11.449	13.76
4	23	P	VEN 23 T11.556 / VEN 23 T12.26	13.76
4	105	P	LA 105 R17.834 / LA 105 R18.145	13.65
4	105	S	LA 105 R17.836 / LA 105 R18.145	13.65
4	014U	P	LA 14U 24.301 / LA 14U 24.577	13.53
4	014U	S	LA 14U 24.301 / LA 14U 24.577	13.53
4	014U	S	LA 14U T27 / LA 14U T27.001	13.53
4	014U	P	LA 14U T27 / LA 14U T27.061	13.53
4	010S	S	LA 10S 16.968 / LA 10S 18.407	13.46

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
4	010S	S	LA 10S 19.079 / LA 10S 19.282	13.46
4	010S	S	LA 10S 20.26 / LA 10S 21.047	13.46
4	126	P	VEN 126 19.738 / VEN 126 R27.224	13.41
4	33	P	VEN 33 11.21 / VEN 33 17.679	13.40
4	33	P	VEN 33 7.191 / VEN 33 11.2	13.40
4	126	S	VEN 126 19.744 / VEN 126 R27.224	13.40
4	010S	P	LA 10S 16.968 / LA 10S 18.407	13.40
4	010S	P	LA 10S 19.075 / LA 10S 19.273	13.40
4	010S	P	LA 10S 20.26 / LA 10S 21.048	13.40
4	39	P	LA 39 21.704 / LA 39 34.457	13.37
4	39	P	LA 39 D17.274 / LA 39 D17.553	13.37
4	39	P	LA 39 D17.845 / LA 39 D18.445	13.37
4	33	S	VEN 33 10.807 / VEN 33 11.2	13.31
4	33	S	VEN 33 11.947 / VEN 33 11.211	13.31
4	33	S	VEN 33 8.414 / VEN 33 9.078	13.31
4	138	P	LA 138 0.089R / LA 138 14.535	13.05
4	150	S	VEN 150 17.028 / VEN 150 18.2	13.03
4	150	S	VEN 150 R13.239 / VEN 150 R14.384	13.03
4	47	P	LA 47 2.03 / LA 47 2.302	13.00
4	150	P	VEN 150 24.864 / VEN 150 26.42	12.96
4	150	P	VEN 150 5.259 / VEN 150 24.542	12.96
4	138	S	LA 138 0.003L / LA 138 2.11	12.87
4	710	P	LA 710 10.309 / LA 710 12.93	11.55
4	710	P	LA 710 26.474 / LA 710 R26.561	11.55
4	710	P	LA 710 7.083 / LA 710 7.671	11.55
4	710	P	LA 710 7.856 / LA 710 9.073	11.55
4	710	P	LA 710 T31.075 / LA 710 T31.935	11.55
4	22	P	LA 22 0.925 / LA 22 1.139	11.27
4	22	P	LA 22 1.165 / LA 22 1.459	11.27
4	710	S	LA 710 10.326 / LA 710 12.925	11.27
4	710	S	LA 710 26.472 / LA 710 R26.57	11.27
4	710	S	LA 710 7.062 / LA 710 9.08	11.27
4	710	S	LA 710 T31.402 / LA 710 T32.113	11.27
4	101	S	LA 101 7.307 / LA 101 8.748	11.24
4	101	S	LA 101 S0.026 / LA 101 S0.911	11.24
4	101	S	VEN 101 29.544 / VEN 101 30.106	11.24
4	101	S	VEN 101 30.897 / VEN 101 31.55	11.24
4	101	S	VEN 101 R35.363 / VEN 101 R36.76	11.24

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
4	22	S	LA 22 0.821 / LA 22 1.139	10.82
4	1	S	LA 1 50.204 / LA 1 50.384	10.71
4	1	S	LA 1 61.506 / LA 1 62.127	10.71
4	1	S	VEN 1 0.777 / VEN 1 1.152	10.71
4	101	P	LA 101 7.307 / LA 101 8.745	10.05
4	101	P	LA 101 S0.026 / LA 101 S0.908	10.05
4	101	P	VEN 101 29.542 / VEN 101 30.105	10.05
4	101	P	VEN 101 R35.361 / VEN 101 R36.757	10.05
4	1	P	LA 1 45.55 / LA 1 45.966	8.96
4	1	P	LA 1 55.157 / LA 1 55.38	8.96
4	110	S	LA 110 14.399 / LA 110 23.622	7.02
4	110	S	LA 110 31.782 / LA 110 31.913	7.02
4	10	S	LA 10 R8.985 / LA 10 16.366	6.92
4	10	P	LA 10 R8.974 / LA 10 16.438	6.92
4	405	S	LA 405 26.454 / LA 405 26.775	6.89
4	405	S	ORA 405 24.178 / LA 405 10.374	6.89
4	110	P	LA 110 14.343 / LA 110 23.35	6.86
4	405	P	LA 405 0 / LA 405 10.457	6.79
4	405	P	LA 405 26.456 / LA 405 26.715	6.79
4	91	P	LA 91 R10.836 / LA 91 R15.626	6.56
4	91	P	LA 91 R8.133 / LA 91 R10.272	6.56
4	91	S	LA 91 R10.842 / LA 91 R15.627	6.55
4	91	S	LA 91 R8.117 / LA 91 R10.27	6.55
5	91	S	LA 91 R10.27 / LA 91 R10.842	5.73
5	91	P	LA 91 R10.272 / LA 91 R10.836	5.73
5	5	P	LA 5 R87.438 / LA 5 R87.613	5.49
5	5	P	LA 5 R87.676 / LA 5 R87.733	5.49
5	5	P	LA 5 R87.899 / LA 5 R87.999	5.49
5	5	P	LA 5 R88.285 / KER 5 R0.004	5.49
5	5	S	LA 5 R87.336 / LA 5 R88.175	5.48
5	5	S	LA 5 R88.204 / LA 5 R88.593	5.48
5	105	S	LA 105 R8.921 / LA 105 R16.639	5.44
5	105	P	LA 105 R8.919 / LA 105 R16.639	5.42
5	710	S	LA 710 12.925 / LA 710 17.267	5.30
5	710	S	LA 710 5.813 / LA 710 6.086	5.30
5	710	S	LA 710 6.205 / LA 710 6.208	5.30
5	710	S	LA 710 9.08 / LA 710 10.326	5.30
5	605	P	LA 605 R0.005 / LA 605 R0.312	5.22

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
5	710	P	LA 710 12.93 / LA 710 17.235	5.17
5	710	P	LA 710 4.79 / LA 710 5.215	5.17
5	710	P	LA 710 5.822 / LA 710 6.065	5.17
5	710	P	LA 710 9.073 / LA 710 10.309	5.17
5	605	S	LA 605 R0.876 / ORA 605 R1.011	4.89
5	605	S	LA 605 R1.63 / LA 605 R0.286	4.89
5	101	S	LA 101 35.036 / VEN 101 4.075	3.97
5	101	S	LA 101 6.135 / LA 101 7.307	3.97
5	101	S	VEN 101 26.745 / VEN 101 28.461	3.97
5	101	S	VEN 101 29.461 / VEN 101 29.525	3.97
5	101	S	VEN 101 30.415 / VEN 101 30.73	3.97
5	101	S	VEN 101 30.789 / VEN 101 30.897	3.97
5	101	S	VEN 101 7.365 / VEN 101 15.718	3.97
5	101	S	VEN 101 R34.687 / VEN 101 R35.363	3.97
5	101	S	VEN 101 R39.794 / VEN 101 R43.352	3.97
5	101	P	LA 101 35.035 / VEN 101 4.075	3.94
5	101	P	LA 101 6.149 / LA 101 7.307	3.94
5	101	P	VEN 101 26.96 / VEN 101 28.161	3.94
5	101	P	VEN 101 28.62 / VEN 101 29.527	3.94
5	101	P	VEN 101 30.415 / VEN 101 30.728	3.94
5	101	P	VEN 101 30.785 / VEN 101 30.903	3.94
5	101	P	VEN 101 7.323 / VEN 101 15.884	3.94
5	101	P	VEN 101 R34.685 / VEN 101 R35.361	3.94
5	22	S	LA 22 0.002 / LA 22 0.821	2.02
5	22	S	LA 22 1.351 / LA 22 1.452	2.02
5	22	P	LA 22 0.004 / LA 22 0.925	2.01
5	23	S	VEN 23 13.441 / VEN 23 13.867	1.85
5	23	S	VEN 23 R12.9 / VEN 23 R13.132	1.85
5	23	S	VEN 23 R3.32 / VEN 23 T1.535	1.85
5	23	S	VEN 23 R3.422 / VEN 23 R8.476	1.85
5	14	P	LA 14 R59.154 / LA 14 R67.514	1.77
5	14	P	LA 14 R72.999 / LA 14 R77.007	1.77
5	14	S	LA 14 R59.155 / LA 14 R67.495	1.77
5	14	S	LA 14 R72.999 / LA 14 R77.007	1.77
5	187	S	LA 187 8.806 / LA 187 8.892	1.64
5	187	P	LA 187 8.809 / LA 187 8.905	1.64
5	2	P	LA 2 10.621 / LA 2 12.329	1.41
5	2	P	LA 2 33.799 / LA 2 49.641	1.41

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
5	2	P	LA 2 64.096 / LA 2 74.748	1.41
5	2	P	LA 2 80.026 / LA 2 80.624	1.41
5	118	P	VEN 118 0.516 / VEN 118 R17.794	1.28
5	126	S	VEN 126 2.858 / VEN 126 19.744	1.28
5	2	S	LA 2 10.621 / LA 2 11.031	1.23
5	126	P	VEN 126 2.775 / VEN 126 19.738	1.21
5	1	P	LA 1 1.741 / LA 1 7.318	1.15
5	1	P	LA 1 44.141 / LA 1 44.174	1.15
5	1	P	LA 1 45.158 / LA 1 45.55	1.15
5	1	P	LA 1 47.073 / LA 1 49.31	1.15
5	1	P	LA 1 50.204 / LA 1 50.385	1.15
5	1	P	LA 1 51.072 / LA 1 54.64	1.15
5	1	P	LA 1 62.127 / LA 1 62.274	1.15
5	1	P	LA 1 7.338 / LA 1 7.368	1.15
5	1	P	LA 1 8.201 / LA 1 8.282	1.15
5	1	P	LA 1 8.293 / LA 1 9.851	1.15
5	1	P	VEN 1 13.038 / VEN 1 13.529	1.15
5	1	P	VEN 1 4.376 / VEN 1 4.726	1.15
5	1	S	LA 1 1.742 / LA 1 7.31	1.15
5	1	S	LA 1 36.12 / LA 1 38.111	1.15
5	1	S	LA 1 44.962 / LA 1 46.537	1.15
5	1	S	LA 1 47.202 / LA 1 49.73	1.15
5	1	S	LA 1 50.815 / LA 1 54.639	1.15
5	1	S	LA 1 61.11 / LA 1 61.506	1.15
5	1	S	LA 1 62.299 / VEN 1 0.575	1.15
5	1	S	LA 1 7.338 / LA 1 7.365	1.15
5	1	S	LA 1 8.202 / LA 1 8.283	1.15
5	1	S	LA 1 8.293 / LA 1 9.85	1.15
5	118	S	VEN 118 0.516 / VEN 118 2.262	1.14
5	118	S	VEN 118 16.091 / VEN 118 R17.891	1.14
5	150	P	VEN 150 24.542 / VEN 150 24.864	1.06
5	150	P	VEN 150 26.42 / VEN 150 34.398	1.06
5	33	P	VEN 33 0 / VEN 33 7.191	1.03
5	34	P	VEN 34 10.434 / VEN 34 17.663	0.93
5	23	P	LA 23 8.525 / VEN 23 R3.32	0.89
5	23	P	VEN 23 R12.9 / VEN 23 22.546	0.89
5	23	P	VEN 23 R3.363 / VEN 23 R8.232	0.89
5	232	P	VEN 232 1.84 / VEN 232 R4.11	0.75

Priority	Route	Carriageway[28]	From County & Postmile / To County & Postmile[29]	Average Cross-Hazard Prioritization Score[30]
5	33	S	VEN 33 0.015 / VEN 33 T5.924	0.73
5	232	S	VEN 232 1.839 / VEN 232 2.579	0.70
5	232	S	VEN 232 R3.37 / VEN 232 R4.11	0.70
5	27	P	LA 27 0.08 / LA 27 8.014	0.65
5	138	P	LA 138 28.565 / LA 138 36.957	0.65
5	138	P	LA 138 43.418 / LA 138 53.951	0.65
5	138	S	LA 138 43.418 / LA 138 51.518	0.59
5	138	S	LA 138 51.624 / LA 138 53.951	0.59
5	47	S	LA 47 3.566 / LA 47 3.701	0.32
5	103	S	LA 103 1.077 / LA 103 1.264	0.26
5	103	P	LA 103 1.084 / LA 103 1.284	0.26
5	103	S	LA 103 1.572 / LA 103 1.579	0.26
5	103	P	LA 103 1.575 / LA 103 1.579	0.26
5	103	P	LA 103 1.659 / LA 103 1.752	0.26
5	103	S	LA 103 1.747 / LA 103 1.752	0.26
5	39	P	LA 39 34.457 / LA 39 44.4	0.00

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