SUMMARY

Introduction/Overview

The California Department of Transportation (Department or Caltrans) and the Federal Highway Administration (FHWA), in cooperation with the Metropolitan Transportation Commission (MTC), the Alameda County Congestion Management Agency (ACCMA), and the Contra Costa Transportation Authority (CCTA), propose to address traffic congestion along State Route 24 in the vicinity of the Caldecott tunnels by constructing a fourth bore of the Caldecott Tunnel between Alameda and Contra Costa Counties, California. The Caldecott Tunnel is located in the San Francisco Bay Area (Figure 1.1.2-1) and is part of the State Route 24 corridor. The State Route 24 corridor extends from Interstate 980/Interstate 580 in Oakland, Alameda County to Interstate 680 in Walnut Creek, Contra Costa County. It is a principal connector route for people and goods moving between the San Francisco Bay Area and the Central Valley.

The growth in population and decentralization of employment centers in Contra Costa County and the Bay Area during the 1980s and 1990s have resulted in a substantial increase in traffic accidents and reverse commute congestion on State Route 24 and surrounding areas, both on weekdays and weekends. In addition, the peak and the off-peak commute direction volumes are becoming more balanced. To maximize the capacity of the tunnels, the traffic direction in the center bore is reversed twice each weekday to provide four lanes in the peak commute direction and two lanes in the off-peak commute direction. During weekends, the Department has had to change the number of peak direction lanes up to five times daily to accommodate changing demands and reduce queuing. The off-peak commute capacity reduction results in congestion and queuing upstream of the tunnel portals.

In September 1998, the MTC initiated a study of the entire State Route 24 corridor. That study, the *Route 24/Caldecott Tunnel Corridor Study (2001),* considered three broad transportation strategies for reducing congestion: Street and Highway Operations; Transit (Bus and Bay Area Rapid Transit [BART]); and the construction of a new fourth bore. The Corridor Study found that operational and transit improvements could be only modestly effective when implemented in combination with a fourth bore and could not provide the additional capacity that a fourth bore would.

The Department began the formal environmental review process for this project in December 2002. This process of determining the scope, focus, and content of environmental review is commonly referred to as "scoping." Scoping ensures that issues most important to Contra Costa and Alameda County residents, public agencies, and other interested parties are addressed in the review. Three public scoping meetings were held in Orinda and Oakland. These meetings were an open-house format where individuals had the opportunity to review information and talk with Department staff regarding the Caldecott Improvement Project. Scoping comments were accepted through the end of January 2003. The final scoping summary report was completed in February 2003. Two additional open house public information meetings were held to inform the public of the current status of the project in June 2005.

The Draft Environmental Assessment/Environmental Impact Report (DEA/EIR) for the Caldecott Improvement Project on State Route 24 was circulated during May, June and July of 2006. A 60-day[1] public review period was provided, during which two public hearings were held: on June 7 in Contra Costa County and on June 15 in Alameda County. The public hearings were conducted to present the results of the environmental studies and receive public input on the DEA/EIR. Public comments were recorded at the meeting. Additionally, comment cards were distributed and collected and contact information and the deadline for submitting formal written comments were announced. This is discussed in further detail in Chapter 4.

Purpose of and Need for the Proposed Action

Purpose

Recognizing the importance of the State Route 24 Caldecott Tunnel (Figure 1.1.2-1) as a connector for the movement of people and goods between Contra Costa County, Alameda County, and the Central Valley, the Department and the FHWA propose a project that:

- Reduces delays within the vicinity of the tunnels, through the year 2032;
- Improves mobility for the traveling public and emergency crews;
- Reduces the potential for congestion-related accidents at the queues that form at the tunnels' approaches, thus increasing safety for the public and Caltrans maintenance personnel;
- Eliminates the need for daily tunnel reversals and thus reduces the amount of time Caltrans maintenance personnel are exposed to live traffic;
- Responds to Regional Measure 2 (RM2) passed by the San Francisco Bay Area voters, which raised tolls on the Bay Area's seven state-owned bridges from $2 to $4. The $125 million in annual revenue from that toll increase funds a wide variety of transportation projects across the region including $50 million for a fourth bore at the Caldecott Tunnel; and
- Responds to Contra Costa County Measure J, a half-cent transportation sales tax passed in November 2004 which funds a $2 billion spending plan. The Caldecott Tunnel project is programmed to receive $110 million of these funds.

Need

The Caldecott Tunnel on State Route 24 in the East Bay Hills of the San Francisco Bay Area is the primary bottleneck on this major freeway. Freeway capacity at the tunnels is reduced from eight to six lanes. Congestion related delays caused by the lane reduction have increased travel times and transportation costs. The configuration of the three existing tunnel bores, in which the middle two-lane bore reverses depending on demand (providing only two lanes in one direction), results in delay throughout the peak periods, early evenings, and on Saturdays. Maintenance workers need to reverse traffic flow up to five times each day during a busy weekend.

[1] Due to e-mail technical difficulties from June 29 to July 5, 2006, the comment period was extended to July 31, 2006.

The diminished freeway capacity at the Caldecott Tunnel is different from other Bay Area freeway bottlenecks in that the bottleneck at the tunnel is bi-directional and persists even during off-peak periods and on weekends. This constant, all-day congestion causes dramatic, unpredictable delays similar to those caused by major freeway incidents or accidents. The existing recurrent congestion during off-peak periods and in the reverse-commute directions during weekday peak periods, as well as throughout Saturdays, demonstrates the need to provide at least a full eight-lane freeway through the tunnel. Congestion occurs daily at variable levels.

During the eastbound evening commute, the first and second bores are open to the eastbound traffic. With demand exceeding capacity, the traffic congestion begins as early as 3 p.m. and a bottleneck usually develops near the west-end portal of the tunnel. By 5 p.m., the congestion often extends as far back as the I-580 Interchange. Traffic is also congested near the northbound I-680 connector.

For the off-peak direction, only the first bore is opened to the eastbound traffic in the morning while the third bore is opened to the westbound traffic in the evening. The traffic that approaches the bores is merged from four lanes into two lanes. A bottleneck develops near the tunnel approach and the congestion extends from the tunnel to near the State Route 13 on-ramp in the off-peak eastbound morning commute. During the evening westbound commute, the congestion begins between Fish Ranch Road and the Gateway Interchanges to near the Camino Pablo on-ramp.

The traffic volumes in each direction on the weekends are roughly equal and less predictable. Traffic congestion occurs during the midday hours in the direction being served by only one bore. Congestion is particularly heavy during major weekend events in the surrounding area. The travel direction in the second bore may be switched several times during the day to relieve congestion in either direction.

Within the limits of the project, 649 total accidents occurred during the three-year period between January 1, 2003 and December 31, 2005, of which 168 were injury accidents. This represents an actual accident rate of 1.66 per million vehicle-miles that is higher than the statewide average accident rate of 1.04 per million vehicle miles for a comparable facility over the same period.

The construction of either build alternative would reduce delay, eliminate the need for daily tunnel reversals and relieve congestion. Eliminating the daily tunnel reversals would increase safety for Caltrans personnel and the public. To the extent that traffic congestion relief is achieved, the construction of either build alternative would have a beneficial effect on the potential for congestion related accidents and the response time of emergency vehicles.

Voter support is indicative of a perceived need. This has been demonstrated by the passage of RM2 and Contra Costa Measure J. On March 2, 2004, voters passed RM2, raising the toll for all vehicles on the seven State-owned bridges in the San Francisco Bay Area by $1.00. This extra dollar funds various transportation projects within the region that have been determined to reduce congestion or to make improvements to travel in the toll bridge corridors. On November 2, 2004, voters of Contra Costa County passed Measure J by over 71% which funds a $2 billion spending plan including $113 million for the Caldecott Tunnel to "…significantly reduce delays and improve the predictability of travel in the non-peak direction."

Project Alternatives

The alternatives considered include:

1. Two-lane tunnel north of the existing bores (Alternative 2N);
2. Three-lane tunnel north of the existing bores (Alternative 3N); and
3. No-Build.

Alternative 2N north of the existing facility would include the construction of a new tunnel with two westbound through lanes and one standard and one non-standard shoulder on an alignment north of the existing tunnels. On the Oakland side of the tunnel, traffic exiting the new fourth bore of the tunnel would pass underneath the existing maintenance access bridge and conform to the existing freeway west of the tunnel portal. At the time the existing third (northern) bore was completed in 1964, the right-of-way for the portal areas for a proposed two-lane northern fourth bore was secured, therefore additional right-of-way acquisition will not be necessary for this alternative. Easement rights were also secured for the alignment. However, 14 additional easements will be necessary for this alternative.

Alternative 3N north of the existing facility would include the construction of a new tunnel with three westbound through lanes and standard shoulders on an alignment north of the existing tunnels. On the West side of the tunnel, the existing maintenance access bridge would be replaced in order to provide horizontal clearance for the three lane roadway exiting the fourth bore. The construction of a three-lane bore would provide a continuous auxiliary lane from Camino Pablo Road to State Route 13. Seventeen right-of-way easements would be required for this alternative.

Both tunnel alternatives would include approximately 22 meters (72 feet) of cut and cover type tunnel at the west portal (Oakland side) and at the east portal (Orinda side), electrical substations and jet fan ventilation systems. Both alternatives include a new Operations Maintenance and Control (OMC) building, which would replace the existing OMC building, which does not meet seismic building code. Noise barriers (which could include soundwalls, earth berms, a combination of a berm and wall and a combination soundwall/retaining wall) may also be required on the Oakland side of the tunnel for each alternative. Existing utilities along the corridor, such as electrical and water lines, will have to be relocated. Both build alternatives will also include improvements at the Caldecott Lane on and off-ramps and the westbound State Route 24 to northbound State Route 13 connector. The Kay/Caldecott Lane intersection will also be improved by providing a right turn lane.

Emergency cross passages or emergency exits as required by the National Fire Protection Association (NFPA 502) will be included in both build alternatives. It is proposed to provide seven cross passages between the new bore and the existing northern bore. This would also upgrade emergency egress facilities for the third bore. Connections of the cross passages into the third bore will require lane closures.

The existing on and off-ramps at Caldecott Lane would have an asphalt concrete overlay. Additionally, the connector from westbound State Route 24 to northbound State Route 13 would be re-aligned to provide an increased westbound State Route 24 weaving distance between the Caldecott Lane on-ramp and the northbound State Route 13 connector.

On the Orinda side of the tunnel, the ramps on the north side of State Route 24 at Fish Ranch Road would be slightly re-aligned to accommodate the proposed fourth bore. The build alternatives would require the construction of at least six retaining walls (up to a maximum of 12.7 meters [42 feet] high) within the project area.

The **No-Build** Alternative is the existing condition with no project-related activities. It would not provide any improvements to the existing State Route 24 nor would it provide any relief to congestion and traffic delays, which are expected to substantially increase during the next 25 years.

Preferred Alternative

Alternative 2N, the construction of a new tunnel with two westbound through lanes and one standard and one non-standard shoulder on an alignment north of the existing tunnels, has been identified as the **Preferred Alternative**. See Section 1.2.6 of Volume I for a complete description of the Preferred

Alternative including refinements in design as a result of additional information since the circulation of the DEA/EIR and comments from the public on the DEA/EIR.

Alternatives Considered but Eliminated from Further Discussion

The following alternatives were evaluated and eliminated from further consideration based on feasibility, costs, environmental and engineering considerations and failure to meet the Purpose and Need of the project:

- Southern Alignment Tunnels;
  a. Two-lane tunnel south of the existing bores (Alternative 2S);
  b. Three-lane tunnel south of the existing bores (Alternative 3S);
- Four Lane Tunnel Alternatives;
- Street and Highway Operations Alternative;
- Mass Transit; and
- Bikeway Tunnel Alternative.

Southern Alignment

The addition of a two-lane tunnel south of the existing facility would include the construction of a new tunnel with two eastbound through lanes on an alignment south of the existing tunnels with standard shoulders. A new interchange would be constructed between the West Portal and the Kay Overcrossing including a new overcrossing, a new frontage road to the south, and a substantial retaining wall south of State Route 24. The State Route 24/Fish Ranch Road Interchange would be reconstructed including elimination of the eastbound on and off-ramps, construction of a new frontage road south of State Route 24, a new overcrossing, and large retaining walls.

The addition of a three-lane tunnel south of the existing facility would include the construction of a new tunnel with three eastbound through lanes on an alignment south of the existing tunnels with standard shoulders. A new interchange would be constructed between the West Portal and the Kay Overcrossing including a new overcrossing, a new frontage road to the south, and a large retaining wall south of State Route 24 and at each newly constructed portal. The Gateway Boulevard/State Route 24 Interchange would be modified on the north side of the freeway and the Fish Ranch Road to westbound State Route 24 on-ramp and the westbound State Route 24 to Fish Ranch Road off-ramp would be removed. A frontage road connecting Gateway Boulevard and Fish Ranch Road would be constructed on the north side of State Route 24.

These alternatives are very similar. Right-of-way would be required for both including the purchase of new right-of-way and permanent easements. Both would also require the use of Section 4(f) property (See Appendix B). Both would have substantial visual impacts including retaining walls diminishing the visual quality and character of the area especially for motorists. Both would have substantial water quality issues probably requiring storm water treatment controls.

Four-Lane Tunnel Alternatives

The four-lane tunnel alternatives, Alternative 4N north of the northernmost tunnel and Alternative 4S south of the southernmost tunnel were considered to provide an even number of lanes for both the eastbound and westbound direction at all times. Traffic studies indicated that these alternatives would provide more capacity than warranted. The Department rejected both the northern and southern four lane tunnel alternatives because the four-lane alternatives provided no operational benefits beyond the three lane tunnel alternatives and because of extremely high right-of-way and construction costs. Alternative 4S would also use Section 4(f) parkland and recreational facilities.

Street and Highway Operations Alternative

The *Route 24/Caldecott Tunnel Corridor Study* examined this alternative and found that the proposed State Route 24 highway/operational improvements would only have a marginal impact on corridor congestion. The study found that carpool lanes would limit capacity, increase congestion, and create weaving concerns with traffic entering and exiting across the lanes. The relocation of the Tunnel Road on-ramp from the tunnel entrance would not provide any measurable reduction to State Route 24 congestion and would likely result in increased delays/queues for vehicles from State Route 13 southbound accessing State Route 24 eastbound, and also may affect access on State Route 13 southbound destined to State Route 24 westbound. Ramp metering was found not to be effective because queues at the tunnel extend past adjacent on-ramps and would extend ramp queues onto local roads. A State Route 13 auxiliary lane between Broadway Terrace and the eastbound on-ramp to State Route 24 could be constructed to store tunnel queues off mainline State Route 13 and allow northbound traffic to flow unimpeded. Although this would allow traffic to flow unimpeded on State Route 13, it does not meet the Purpose and Need of the Caldecott Improvement Project.

Mass Transit

The *Route 24/Caldecott Tunnel Corridor Study* found that with the transit improvements only a modest increase in transit patronage and minor congestion relief would be achieved and thus transit improvements would not meet the Purpose and Need of this project. Many of the proposed improvements detailed in the *Route 24/Caldecott Tunnel Corridor Study* will be undertaken by the Department and its partner agencies including but not limited to CCTA, ACCMA, and BART.

Regional Measure 2 (RM2) mandated that, "The County Connection shall study all feasible alternatives to increase transit capacity in the westbound corridor of State Route 24 between State Route 680 and the Caldecott Tunnel, including the study of an express lane, high-occupancy vehicle lane, and an auxiliary lane…" The Contra Costa Transportation Authority has retained *DKS Associates,* to conduct this study. The study is currently underway and is examining three "Strategy Packages": Strategy Package A - New BART Service from Eastern Contra Costa County to the Coliseum Station; Strategy Package B- Corridor-wide HOV/ Express Bus lane using the left shoulder on SR 24 in the a.m. peak; and Strategy Package C - HOV/ Express Bus Queue Jump Lanes.

Bikeway Tunnel Alternative

The Bikeway Tunnel alternatives were not project alternatives as such, but were options considered to be added to the preferred alternative. By themselves, they would not meet the Purpose and Need of the project. Providing bicycle access through a new bore would be very costly, and there are more cost-effective ways to improve bicycle travel between both sides of the tunnel. In addition, the Bikeway Tunnel alternative is not practicable nor was there any substantial community support for a separate Bikeway Tunnel Alternative during the scoping process.

Funding

Funding for the Caldecott Improvement Project includes $20 million allocated from the State Transportation Congestion Relief Program (TCRP), $18 million from the State Transportation Improvement Plan-Inter-regional Improvement Program (STIP-IIP) and $31 million from the State Transportation Improvement Plan-Regional Improvement Program (STIP-RIP) and $175 million from the Corridor Mobility Improvement Account (CMIA). Regional Measure 2 allocates $50 million to "plan and construct a fourth bore at the Caldecott Tunnel between Contra Costa and Alameda Counties." Contra Costa County's Measure J identifies the Caldecott Tunnel as a regional transportation priority for Contra Costa County. The Caldecott Tunnel is programmed to receive $125 million (2004 dollars) to construct a fourth bore. The *Safe, Accountable, Flexible, Efficient*

Transportation Equity Act: A Legacy for Users (SAFETEA-LU), enacted in August 2004 as the reauthorization of the *Transportation Equity Act for the 21st Century* (TEA-21), provided the proposed project with $1million.

Based on a risk-based cost estimate prepared in August 2006, the mid-point construction year (2009-2013) total cost for the Preferred Alternative will be $420 million. This amount is based on an 80th percentile (80% chance of under-running and 20% chance of over-running) risk. Since there are $420 million committed to the project, the project is considered fully funded.

Costs

The project cost estimate for the 2N Alternative, the Preferred Alternative, including construction, right-of-way easements and support is estimated to be approximately:

Facility	**Construction Cost (value of $ in 2006)**
Construction	
Tunnel and Structures	$ 202[2]-231[3] million
Roadway	$ 35[2]-40[3]million
Right-of-way	$ 142,000
Support	$ 67 million
Design Allowance & Construction Contract Contingency	$34 million
Total Costs	$ 340[2]-375[3] million

The project cost estimate for Alternative 3N including construction, right-of-way easements, and support is estimated to be approximately:

Facility	**Construction Cost (value of $ in 2006)**
Construction	
Tunnel and Structures	$ 249[2]-284[3]million
Roadway	$ 37[2]-42[3]million
Right-of-way	$ 163,000
Support	$ 67 million
Design Allowance &Construction Contract Contingency	$53 million
Total Costs (rounded to the nearest $5 million)	$ 405[2]-445[3]million

[2] Contingency is based on risk analysis. This is based on the 50% confidence level representing the probability of one chance in two that costs will be equal or less than this amount.

[3] Contingency is based on risk analysis. This is based on the 80% confidence level representing the probability of four chances in five that costs will be equal or less than this amount.

The escalated costs using 2009-2013 dollars when construction for the proposed project is anticipated would be $385 –$420 million for Alternative 2N and $470-$510 million for Alternative 3N. These costs are calculated at an escalation rate of 3.5% per year. These estimates do not include previously purchased right-of-way currently valued at approximately $1 million.

The total project cost for the Caldecott Improvement Project has increased over the 2005 estimates ($350 million to $390 million for the Preferred Alternative). The current cost estimate, for the Preferred Alternative (Alternative 2N) is $420 million. The revised cost estimate is based on more detailed information and is expected to be the final estimate for programming purposes. The $30 million increase includes the following:

- Construction Costs have increased by approximately $11 million due to additional roadway and tunnel design features not identified in 2005, the discovery of more difficult ground conditions that impact tunneling productivity, and unforeseen escalation in key materials costs; and
- Cost allowances were also adjusted, resulting in an increase in the construction budget of about $19 million.

These adjustments were made in several key areas, including Risk Contingency for uncertainties in cost escalation and cost impacts due to the recognition of the current bid environment for tunneling work in the United States. Also added to the cost allowance was a construction contract contingency to account for unanticipated construction change orders.

Environmental Impacts and Mitigation Measures

The Summary of Impacts Table (Table S-2, shown on page xxv) summarizes the impacts of the alternatives considered for the proposed project. The impacts include the following:

Air Quality/Ventilation

Air Quality

The design concept and scope of the project have not changed from the design scope and concept in the 2005 Regional Transportation Plan (RTP) and 2007 Transportation Improvement Program (TIP) listings. Therefore Alternative 2N, the preferred alternative, conforms to the State Implementation Plan (SIP); Alternative 3N does not have regional conformity. If Alternative 3N were selected as the preferred alternative, a regional analysis would need to be performed by the MTC to determine regional conformity.

The Bay Area was designated an attainment area for Carbon Monoxide (CO) on June 1, 1998. For areas in attainment for CO, the relevant air quality protocol states that the analysis of CO at intersections should be undertaken by comparing the impacts of the proposed alternatives with the impacts of existing similar facilities within the air district. Based on this analysis, CO concentrations will be below those of similar facilities in the Bay Area and will not exceed state or federal CO standards.

The Bay Area has either attainment or unclassified status for federal Particulate Matter 2.5 (PM2.5) and is undesignated for federal Particulate Matter 10 (PM10). PM2.5 describes the “fine” particles that are less than or equal to 2.5 micrometers or less. PM10 is the term used to describe small particles, of any composition and origin, with a size of 10 micrometers or less. The Bay Area is non-attainment for the State PM10 and PM2.5 standards. While the U.S. Environmental Protection Agency Transportation Conformity Regulations require a quantitative microscale analysis for PM10, no approved methodologies are available yet to address the microscale impacts of PM10.

Qualitatively, we expect that this project will not have adverse effects on microscale particulate levels since actual non-truck vehicle emissions of particulates are believed to be small, and the number of heavy-duty diesel trucks using the facility will not be increased by the project.

The proposed project would generate air pollutants during construction and is discussed further below under Construction Impacts.

Ventilation

Unlike the existing tunnels, the new portal structures will not require ventilation equipment outside of the tunnel because the ventilation system for the new bore will consist of jet fans[4] located within the tunnel with the control and monitoring systems connected to a new control room. Tunnel ventilation is required for emergency evacuation, and to support firefighter access in the tunnel. Emergency operation generally results from a vehicle accident or a vehicle fire. The most serious is the vehicle fire requiring passenger evacuation. Ventilation will also be required for maintaining air quality during congested traffic conditions. Because of the tunnel profile, there would be significant natural ventilation during normal traffic conditions, and continuous mechanical ventilation will not be required.

Construction

Construction activities such as phased clearing, grubbing, grading, and the construction of the tunnel in general will typically result in increased levels of truck traffic, noise, dust, and visual impacts. Tunnel excavation from both ends would occur at the same time. Impacts from construction activities would be temporary and can be reasonably minimized by implementing various mitigation measures.

Standard industry practices will be implemented to minimize the impacts related to equipment noise, material deliveries, and transport of tunnel spoils offsite. These measures will include the construction of enclosures for compressors, and constructing a temporary soundwall between the west portal staging area and nearby residences to the north. Standard industry practices of wetting down stockpiles, providing wheel washes and street-sweeping services, and sealing aggregate and cement silos is expected to mitigate the generation of dust and dirt. The project's Special Provisions and Standard Specifications will also include requirements to minimize or eliminate dust by applying water or dust palliatives.

Groundwater will be encountered during tunnel excavation. Early discussion will be initiated regarding the handling and disposal of this water during the design phase. Excess groundwater will be treated and discharged into an existing sanitary sewer inlet. Dewatering BMPs and temporary holding devices such as Baker Tanks will be included in the contract documents to meet the dewatering requirements.

Stormwater will be handled in accordance with the Department's National Pollutant Discharge Elimination System (NPDES) permit and the Construction General Permit, and Best Management

[4] Jet fans are axial-flow fans specially developed to produce the highest possible air flow from the power installed. They are predominantly used for the longitudinal ventilation of road tunnels.

Practices (BMPs) would be incorporated into this project to reduce the discharge of pollutants during construction.

Trucks and construction equipment emit hydrocarbons, oxides of nitrogen, carbon monoxide, and particulates. Most pollution will consist of wind-blown dust generated by excavation, grading, hauling and various activities. The Plans, Specifications, and Estimates package will include requirements to minimize or eliminate dust by applying water or dust palliatives during construction. The California Air Resources Board, through its Diesel Risk Program, contains a number of control measures that will be implemented during the construction phase of this project. This program is anticipated to reduce the risks to public health by reducing construction emissions. The impact from construction activities would be temporary and can be reasonably minimized by implementing the following measures: constructing noise barriers as first items of work; keep the community informed of upcoming especially noisy construction activities; and establish a field office to handle construction related complaints. With the implementation of these measures it is expected that tunnel construction noise will be no louder than existing ambient noise.

Blasting is the only activity that will result in peak particle vibrations (PPV) high enough to warrant special consideration. During blasting, homes that are directly over the alignment of the new bore will be monitored for vibrations. The project specifications will include limits on blast vibrations to prevent damage to nearby structures.

Cultural Resources

One property within the project area, the original two bores of the Caldecott Tunnel, was previously determined eligible for listing in the National Register of Historic Places (NRHP). This property will not be adversely affected by either the two-lane or three-lane north alignment alternatives.

The project area has low potential for buried archaeological resources. There is also low potential for the discovery of new archaeological resources. If buried cultural materials are encountered during construction, it is the Department's policy to stop work in the area of discovery until a qualified archaeologist can evaluate the nature and significance of the finding.

Geology/Seismicity

The geology of the Berkeley Hills near the Caldecott Tunnel consists of Upper Cretaceous to Late Miocene age sedimentary and volcanic rocks.

Soils within the western part of the project limits have moderate permeabilities and high erosion potential. Soils within the eastern part of the project area have low permeabilities and moderate erosion potential. Mitigation measures to prevent soil erosion would be implemented during construction.

The project area lies within the seismically active San Francisco Bay region and is crossed by mapped traces of the Hayward Fault on the westernmost edge. The Hayward Fault does not cross within the proposed tunnel limits. The three major active faults in the region, the San Andreas, the Calaveras, and the Hayward, all have the potential for magnitude 7.5 or greater earthquakes. Earthquakes are prime considerations in the design and retrofit of structures. The Department's Office of Earthquake Engineering is responsible for assessing the seismic hazard for Department projects.

There are two methods of estimating the greatest rock motion that a particular structure will experience. In the past, Caltrans considered the motions from the Maximum Credible Event (MCE). The MCE is the largest reasonable earthquake at a fault without regard or consideration of how often the earthquake might occur (the return period). It also does not provide a consistent or rational

assessment of the probability that a structure will experience the design criteria. For the Caldecott Improvement Project, Caltrans estimated the greatest rock motions from the Safety Evaluation Event (SEE).

The current Caltrans policy is generally to use the anticipated MCE from young faults in and near California. However, because the Caldecott Tunnels are located along a lifeline route of the State highway system and to be consistent with other important facilities along the same route it was decided to design for a 1,500 year return period earthquake for the tunnel design. The walls outside the tunnels slopes will be designed for a 500-year return period earthquake. Other structures proposed for the project will be designed to withstand the anticipated Maximum Credible Earthquake for the area.

Lifeline routes must be open to emergency vehicle traffic within 72 hours following the seismic event. Typically Caltrans designs to prevent the collapse of a structure, not to maintain serviceability. To meet the lifeline criteria a much stricter standard is required. To achieve this, a probabilistic approach is a more complicated earthquake analysis that considers all possible earthquake scenarios, all possible ground motions, probability levels, and associated probabilities. The probability of these scenarios occurring is computed and those exceeding a specified value are used. The MCE approach is a more straightforward analysis that takes the perpendicular distance from a fault and a projected maximum fault magnitude to calculate ground motions. This approach can lead to extremely conservative designs.

Growth Inducement/Community Impact

The Caldecott Improvement Project is consistent with local planning goals and policies to improve traffic circulation along State Route 24. However, the No-Build Alternative would not support achievement of these goals and policies. The proposed project would support planned growth but not induce unplanned growth in the area. Because the proposed project will increase mobility and reduce delays, access to parks and other public facilities within the project vicinity would be enhanced.

The Caldecott Improvement Project would not constitute any new physical or psychological barriers that would divide, disrupt, or isolate neighborhoods, individuals, or community focal points in the corridor. Because the proposed fourth bore will be alongside the existing configuration, the communities and neighborhoods adjacent to State Route 24 would not experience a disruption in cohesion.

Economic activity generated by the proposed project is anticipated to benefit the San Francisco Bay Area region.

Hazardous Waste

An Initial Site Assessment (ISA) was prepared to identify potential contaminant sources within the project area. The preliminary evaluation of the project area indicated that no known sources of potential environmental concern are present. There is a potential for lead contamination in the unpaved areas because of aerially deposited lead (ADL) from historic motor vehicle exhaust. Testing will be performed by the Department for ADL, asbestos and groundwater contamination during the project's Plans, Specification and Estimates (PS&E) stage prior to construction of the project. Remediation of any hazardous waste will be done in accordance with the appropriate laws, regulations, and policies.

An investigation was conducted for the Geologic and Geotechnical Data Report, prepared by Geomatrix, dated September 2005, for this project and found no evidence of naturally occurring asbestos (NOA). In addition, there were no reported incidents involving NOA during the

construction of the three previous bores. Based on the geology of the location, only the Orinda Formation has the potential for NOA. The physical weathering process which the Franciscan Formation goes through to form the Orinda Formation would disperse the serpentine asbestos to such an extent that it would be extremely unlikely that significant quantities would be found to cause a health risk. If Serpentine asbestos were found in significant quantities during the project, best management practices would be implemented.

Geologic studies from the construction of the first and second tunnels indicate that infrequent, isolated pockets of naturally occurring hydrocarbons, e.g. tar, are present in the geologic formations of the Oakland-Berkeley hills. Because of this, the excavation spoils from the tunnel advancement will be systematically screened for hydrocarbons and managed accordingly during the construction phase of the project.

Hydrology/Floodplains

The project is not located within a Federal Emergency Management Agency (FEMA) designated 100-year floodplain. The Alameda County portion of the project lies within the Tunnel Branch sub-shed of the Temescal Creek Watershed. The State Route 24 pavement runoff has been diverted from Lake Temescal to a discharge point just downstream of Lake Temescal. Tunnel wash water has also been diverted via a drainage-gate connected to a sanitary sewer system near the eastbound Broadway off-ramp just prior to the west portal entrance. The portion that lies within Contra Costa County is within the upper reaches of the San Pablo Creek Watershed. Storm runoff from that portion of the watershed including the highway, is collected within a median drainage trunk line and conveyed to San Pablo Creek in the vicinity of the State Route 24 Interchange in Orinda. These concepts would be perpetuated in the storm drain design for the proposed project.

Water Quality

Stormwater

Because of continuing congestion, the No-Build alternative would lead to a greater deposition of particulates from exhaust and heavy metals from braking and thus would have an increase to existing water quality impacts. Alternative 2N will have fewer water quality impacts than Alternative 3N due to less disturbed soil area and lesser amount of impervious area added to the approaches just outside of the tunnel portals. The added impervious surface may increase the quantity of surface water run-off, both during construction and permanently. However, the amount is negligible for either the two-lane or three-lane tunnel alternatives. The net impact of these changes on water quality and pollutant loading will be minimized with the proposed facility improvements, use of temporary Construction Site, Permanent Design Pollution Prevention, and Permanent Treatment Best Management Practices (BMP)s if required.

Groundwater

The handling and disposal of groundwater will be determined during the design phase. Groundwater will be tested for potential contamination as part of the Hazardous Waste Site Investigation. Proper handling and disposal of groundwater will be based on the levels of contaminants reported in the Site Investigation Report. The main pollutant will be sediment. Temporary containment systems are proposed in combination with other sediment removal measures to reduce sediment loads to acceptable thresholds that allow for discharge into the existing sanitary sewer system.

Groundwater may be encountered during tunnel excavation. On-site containment/treatment devices will be used to temporarily hold and treat the groundwater prior to discharging the water into the City of Oakland's existing sanitary sewer system, near the eastbound Broadway off-ramp just prior to the

west portal entrance. Such discharges ultimately flow to an East Bay Municipal District (EBMUD) wastewater treatment facility. This existing sanitary inlet currently receives the tunnel wash water.

Natural Environment

A literature review and a comprehensive background search were performed for the proposed right-of-way and vicinity. A reconnaissance survey of the entire corridor was conducted, during which vegetation communities and incidental wildlife sightings were recorded. Jurisdictional wetlands and other waters of the United States (U.S.) were delineated according to the U.S. Army Corps of Engineers (USACE) 1987 manual.

Biotic Communities

Eight biotic communities occur in the vicinity of the proposed project: Coast live oak/California bay forest, annual grassland, native perennial bunch grasses, coyote brush scrub, urban scrub, urban forest, wetland, and riparian habitat. The proposed project would affect annual grassland, perennial bunch grasses, and urban forest. With the implementation of avoidance and minimization measures, the proposed project will have no impacts on Coast live oak/California bay forest communities. Both alternatives would have permanent effects on annual grassland, and perennial bunch grasses.

Jurisdictional Waters

Delineation of wetlands and other waters of the U.S. were conducted on May 6, July 12, and July 15, 2004, and May 31, 2005 in accordance with the Routine On-site Determination Method as defined by the USACE. This delineation was submitted to the USACE for its jurisdictional determination. The USACE has final authority over the identification of wetlands and other waters of the U.S., including their jurisdiction, determination of area affected by the proposed improvements, and type of permits and conditions required; therefore, the delineation of wetlands and other waters of the U.S. is not final until the USACE returns its jurisdictional determination.

Jurisdictional waters in the project vicinity include six slope wetlands, one depressional wetland and five unvegetated drainages. A total of 0.166 hectare (0.41 acre) of wetland and other waters of the U.S. occur within the proposed project vicinity. Given the close proximity of these areas to construction activities, avoidance measures would be implemented to minimize impacts to wetlands and other waters of the U.S. Construction of either of the proposed alternatives would permanently affect approximately 0.008 hectare (0.02 acre) of wetlands and 0.0008 hectare (0.002) acre of other waters of the U.S. at the intermittent/ephemeral stream located adjacent to and south of Broadway.

Mitigation requirements for impacts to wetlands and other waters will be determined through consultation with the USACE, and may include restoration of wetlands at a ratio of 2:1 or purchase of wetland creation/enhancement credits at an USACE-approved mitigation bank. Mitigation measures will be identified for both permanent and temporary (construction phase) impacts of the project to ensure no net loss of wetlands and other waters.

Special-status Species

Special-status wildlife species that have any potential to occur within the project area include the San Francisco lacewing (*Nothochrysa californica*), California red-legged frog (*Rana aurora draytonii*), western spadefoot toad (*Sacphiopus hammondii*), California tiger salamander (*Ambystoma californiense*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), California horned lizard (*Phrynosoma coronatum frontale*), western burrowing owl (*Athene cunicularia hypugea*), and white-tailed kite (*Elanus leucurus*). None of the species were observed during the field surveys. Preconstruction surveys will be conducted for San Francisco lacewing, California red-legged frog,

western spadefoot toad, Alameda whipsnake (AW), western burrowing owl, and white-tailed kite and avoidance and minimization measures will be implemented as necessary to prevent impacts to these species.

Areas containing all major features of preferred AW habitat are present north of the Gateway Boulevard and Fish Ranch Road off-ramps on the north side of State Route 24. Some of these areas are within the foraging range of known AW locations, with observation dates ranging from 1940 to 2005. It is therefore possible that during the spring and summer, one or more AW could enter the proposed project through these sites (McGinnis 2006). Locations west of the Caldecott Tunnel within Alameda County do not contain AW habitat, and are not expected to support the species.

Avoidance and minimization measures have been incorporated into the Caldecott Improvement Project. Consultation with the U.S. Fish and Wildlife Service was completed on August 8, 2007. Their determination is that with the included measures, the Caldecott Improvement Project may affect, is likely to adversely affect, but not jeopardize the continued existence of the AW and the CRLF.

Raptor species and other migratory birds protected under the federal Migratory Bird Treaty Act, including white-tailed kite, northern harrier (*Circus cyaneus*), greater horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), and American kestrel (*Falco sparver*ius), red-winged blackbird (*Agelaius phoe*niceus), mourning dove, (*Zenaida macroura)* and American crow (*Corvus brachyrhynchos*) may use the project area for nesting. Active nesting stands will be identified prior to project construction. Activities such as removal of nests during the non-breeding season and avoidance of nest disturbance during construction activities will reduce potential effects.

Habitat for special-status plant species in the project vicinity is present primarily at the tunnel portals. Plant surveys were conducted during the spring and summer when the majority of the special-status plant species were in bloom. No special-status plant species would be affected by Alternatives 2N or 3N; therefore, no avoidance and/or minimization measures are required.

Tree Removal

California State Senate Concurrent Resolution No. 17 was filed with the Secretary of State on September 1, 1989. This resolution addresses the protection of native Valley/Coast live oak woodlands with respect to land use/transportation planning projects. The resolution specifically calls for State agencies to “preserve and protect native oak woodlands to the maximum extent feasible,” or “provide for replacement plantings where designated oak species are removed from oak woodlands.” Various sections of the California Fish and Game Code, including Sections 3503, 3503.5, 3511, and 3513, apply to nesting birds or birds otherwise fully-protected. Tree removal activities could alter nesting behavior, jeopardize eggs or young in nests, or reduce parental care and would result in violation.

The Department conferred with the California Department of Fish and Game (CDFG) proposed replacement ratios. The proposed replacement ratio for oak trees is 5:1. It is proposed all other native trees with a diameter breast height (DBH) of 6 inches will be replaced at a ratio of 3:1. It is recommended that a portion if not all of the tree replacement for trees removed by the project would occur on-site insofar as it is practicable. Impacts not feasibly mitigated on-site would be replaced by off-site planting and by measures intended to enhance existing off-site forests.

Noxious Weeds

Construction activities associated with the proposed project have the potential to introduce noxious weeds from the project area into uninfested areas. Uninfested areas that are potentially at risk include neighboring wildland areas and other areas where machinery used on the project may subsequently be

used. Under California state regulations, degradation of sensitive plant communities, which could result from the introduction of noxious weeds, must be avoided or mitigated.

Measures such as worker training, avoidance of sensitive communities, and cleaning construction machinery before use on subsequent projects in sensitive communities would reduce the likelihood that noxious weeds would be spread by the proposed project. In addition, it is recommended that disturbed areas be restored and revegetated with native species after construction is complete to prevent noxious weeds from colonizing new areas.

Resource Management Plan for the Caldecott Wildlife Corridor

A *Resource Management Plan for the Caldecott Wildlife Corridor* (September 2001) was developed by the Caldecott Corridor Committee, formed in April 1995, to identify approaches to protect the long-term viability of an important biological resource and reduce the threat of wildfire to a fire-prone area while maintaining the interests and rights of public and private landowners. The wildlife corridor includes land above the Caldecott Tunnel. The Resource Management Plan identifies management goals and supportive actions to develop a vegetation/habitat management strategy, protect and enhance the biological value of the resource, and control and reduce the threat of fire in the Caldecott Corridor, while providing benefits to all interested parties and to the general public. The proposed project would be generally consistent with the management goals and mitigation that will be implemented for the project will render the project consistent with those goals.

Noise/ Vibrations

Noise

The noise analysis indicated that there are between 88-90 residences that have predicted future noise levels higher than 66dBA Leq(h), which qualifies them for consideration of noise abatement (this is discussed further in Section 2.2.8). These residences, in most cases, are affected under future conditions in the No-Build and in the two build alternatives.

No-Build

Current traffic on State Route 24 regularly operates at Level of Service (LOS) “D”, a condition that generates the highest noise level. Future noise levels at 88 residences north of State Route 24 would be affected by traffic noise. The picnic area in the northwest corner of the Temescal Regional Park would also be affected, as the future noise level would reach 68dBA Leq (h). Twenty-two residential units within three planned but not yet constructed buildings on Caldecott Lane would be affected as well.

Alternative 2N and 3N

Under both alternatives, there would be four lanes of traffic in the eastbound direction at all hours. In the westbound direction, under Alternative 2N, there would be four lanes of traffic and five lanes of traffic under Alternative 3N. There are a total of 88 residences under Alternative 2N and 90 residences under Alternative 3N that would be affected by traffic noise when the predicted future noise levels exceed 66dBA Leq(h). Also affected are 22 residential units within three currently planned but not yet constructed buildings on Caldecott Lane, where the predicted future noise levels would range from 69 to 76dBA. The picnic area in the northwest corner of the Temescal Regional Park would also be affected, as the future noise level would reach 68dBA Leq(h) under both build alternatives.

There would be no substantial noise increases (12dBA or more) for any receptors in the project area for the No-Build or build alternatives.

Noise abatements, in the form of soundwalls, earth berms or a combination berm/wall, have been investigated for all affected receptors. Only those abatements that are determined reasonable will be considered further for construction. Since the circulation of the DEA/EIR further refinements of design and cost estimates for the sound barriers considered for the Preferred Alternative were performed. When predicted future exterior noise levels for residences are 66dBA Leq(h) or higher, noise abatements are considered. For the proposed project, three barriers have been proposed. The first barrier (Barrier No. 1), a soundwall, would be located along the shoulder of eastbound State Route 24 in combination with a soundwall along the shoulder of the connector ramp to southbound State Route 13. These soundwalls would reduce noise level by 7dBA for the picnic area in the northeastern corner of Temescal Regional Park (see Figures 2.2.8 [2-4]). There are two options for the second barrier (Barrier No. 2) located north of the roadway east of the proposed westbound off-ramp to Caldecott Lane, Option A – a soundwall only and Option B – a combination earth berm/soundwall. Under Option A the soundwall would be located along Caldecott Lane (see Figure 2.2.8-3) of the proposed westbound lanes with a distance varying between 4.5 and 23 meters (15 and 75 feet) from the edge of the traveled way of the off-ramp and would reduce the future predicted noise levels for 25 condominium units (R9 through R14). The second option would be a combination earth berm/soundwall. This noise barrier would reduce the predicted future noise levels for the same 25 condominium units. The final noise barrier proposed (Barrier No. 3) would reduce noise levels for seven planned but not yet constructed residential units (R23 and R24). This noise barrier would be an earth berm between Caldecott Lane and the westbound on-ramp to State Route 24. Since the circulation of the DEA/EIR Caltrans explored a modified berm/sound wall alternative that would potentially save some of the redwood trees adjacent to the Parkwoods complex. This alternative (Option C) is a variant of sound barrier Option B, and was developed in response to comments on the DEA/DEIR to save approximately 16 trees located adjacent to the Parkwoods Condominiums entrance. Option C has a soundwall of varying height from 3.6 to 4.9 meters (12 to 16 feet), constructed on an earthberm, which will taper down in front of the entrance to the Parkwoods Condominiums. However, in order to save the trees the smaller berm for this option would only be on the west end of the wall and there would be no berm in front of the Parkwoods condominiums.

The cost estimate for Barrier No. 1 exceeds the reasonable allowance (see Appendix J) and is determined not to be cost effective. The cost estimates for Barriers No. 2, Option A, B, and Option C are within the reasonable allowances and are determined to be cost effective. Due to the changes in the design of the westbound on/off-ramp to Caldecott Lane, Noise Barrier No. 3 is no longer feasible and has been removed from further consideration.

After considering public input including comments as a result of a presentation to the Parkwoods Condominium Board meeting, Option B has been selected to be included in the project for the following reasons: 1) the sound wall would be 2.4-meter (8-foot) in height and less of a visual encroachment than the 4.9-meter (16-feet) high sound wall options; 2) for adjacent residents, a fully landscaped berm would provide an attractive and pleasant buffer from the visual influence of freeway traffic. Caldecott Lane would appear more secluded and private while the visual influence of the freeway traffic would be immediately screened from much of the ground-plane and to some extent second story views; and 3) while not considered noise abatement, proposed landscaping would provide immediate benefits under Option B. The exact dimensions and locations of the selected sound barrier will be determined in the final design stage.

Vibrations

Blasting is the only activity that will result in peak particle vibrations (PPV) high enough to warrant special consideration. Other construction methods should not cause problems due to vibrations and no special measures are recommended.

The houses on Tunnel Road, Bay Forest Road, Grizzly Terrace Drive, and Woodmont Way are directly over the alignment of the new bore and residents may be aware of blasting activities but structural damage is not expected. Before any blasting takes place, conditions of the structures that have the potential to be damaged by vibrations will be documented, subject to the permission of the owners. The owners would also be informed during this time of the schedule for blasting. During blasting these areas will be monitored for vibration. If PPV exceed 0.5 inches/second, measures will be taken to abate vibrations. Houses on Caldecott Lane located 122 meters (400 feet) from the west portal may be aware of blasting activities but again the structures, should not be affected by construction vibration.

In the event that Caltrans receives notification of damage to a nearby structure, the structure will be inspected and results compared to the preconstruction survey. In the event that damage is attributed to construction activities, the construction procedures will be modified to prevent further damage and additional evaluations of the structure will be performed to determine the appropriate remedial measures.

Paleontology

During the construction of the third bore in 1964, remains of an ancient rhinoceros and the jaw of a prehistoric three-toed dwarf horse were found. These findings indicate potential for finding additional fossils during the construction of a fourth bore. Potential paleontological resource impacts would be the same for both alternatives. Monitoring will occur at sensitive areas. Additional paleontological monitoring of tunnel spoils is now proposed. If paleontological resources are found during construction, it is the Department's policy to stop work in the area of discovery until a qualified paleontologist can evaluate the nature and significance of the finding.

Section 4(f) Involvement

Section 4(f) of the U.S. Department of Transportation Act of 1996 requires that special effort be made to preserve the natural beauty of the countryside and public park and recreation lands and that the Secretary of Transportation may approve a transportation program or project requiring the use of publicly owned land of a public park or recreation area only if there is no feasible and prudent alternative to using that land, and that the program or project includes all possible planning to minimize harm to the park or recreation area resulting from the use.

Both build alternatives, like the current most northerly bore and the Bay Area Rapid Transit (BART) tunnel would pass underneath Grizzly Peak Open Space and the Sibley Volcanic Regional Preserve both owned by the East Bay Regional Park District. However there would be no use of the overhead land and thus no Section 4(f) involvement.

Traffic and Transportation/Pedestrian and Bicycle Facilities

Although the project will not modify any pedestrian or bicycle facilities, the Alameda County Congestion Management Agency has developed a feasibility study to address various ways to improve bicycle and pedestrian circulation in the vicinity of the Caldecott Tunnel. The Department and the Contra Costa County Transportation Authority worked closely with the ACCMA to ensure that various options were considered. Emergency walkways will be built between the new fourth bore and the existing third bore.

State Route 24 is expected to experience high growth in demand even if no improvement is made to increase the corridor's capacity. Based on the traffic forecasts, Alternative 2N shows an incremental demand increase when compared to the No-Build Alternative. Likewise, Alternative 3N also shows a

marginal demand increase compared to Alternative 2N. The operational analysis reflected this demand growth trend.

The operational analysis results showed that either build alternative would eliminate the existing directional capacity gap of State Route 24 at the Caldecott Tunnel by adding a new fourth bore. The new bore would allow the tunnel to maintain the same level of capacity as the rest of the corridor.

The new bore would bring substantial relief to motorists traveling in the off-peak directions (eastbound a.m. and westbound p.m.). Alternative 2N would provide two additional lanes in the off-peak directions, eastbound and westbound. Alternative 3N would also provide two additional lanes in the off-peak directions plus an additional auxiliary lane through the tunnel in the westbound direction. By removing the directional capacity gap, the primary bottleneck at the Caldecott Tunnel would essentially be eliminated for traveling in the off-peak directions. Moreover, the capacity would be maintained without resorting to multiple bore reversal operations each day thus reducing exposure of the Department's maintenance staff and conflicts with live traffic. Motorists can expect to be traveling at free flow speed with no delay in the off-peak directions during weekdays and weekend travelers could also expect to experience similar benefits. Furthermore, with both build alternatives expected to provide free flow travel in the weekday off-peak directions, northbound State Route 13 could experience improved traffic operations as a result.

The new bore is not expected to bring peak direction relief since the corridor capacity would remain unchanged in the peak direction. Even Alternative 3N, with the additional auxiliary lane is not expected to substantially improve corridor capacity without other corridor improvements. In general, the analysis results are consistent with the forecast demand differences reflecting incremental differences between the alternatives in the peak directions. For the peak directions, the increase in forecast demand would contribute to congestion for the westbound a.m. and eastbound p.m. commute. When comparing Alternative 3N to the other two alternatives, it is noted that the mainline delays are the highest on Alternative 3N as this alternative draws higher demand to the region.

Based on future demand forecasts, a number of intersections within the study area would experience high growth in demand even in the No-Build Alternative. Compared to the No-Build Alternative, Alternative 2N would experience incremental demand growth. Alternative 3N would cause only marginal demand increase compared to Alternative 2N. Both build alternatives would lead to changes of Level of Service (LOS) at individual intersections compared to the No-Build Alternative, reflecting the incremental demand changes in the forecast network. However, from an overall project level, the results indicate that neither build alternative would cause significant negative impact compared to the No-Build Alternative.

The primary benefit of the project during weekdays, in terms of congestion and delay reduction, would be experienced in the off-peak directions. Notwithstanding the slight increase of congestion in the peak directions due to demand increase, the overall benefit of the project is substantial. The combined summaries of the project's overall benefit are tabulated in Table S-1.

Table S-1 State Route 24 Overall Operation Summary- 8 Hour Total

Alternatives	**Total Travel Distance (veh-mile)**	**Total Mainline Delay (veh-hour)**	**Ramp Delay (veh-hr)**
No Build	1,179,000	31,000	51,000
2-Lane	1,272,000	17,000	58,000
3-Lane	1,297,000	17,000	55,000

Visual/Aesthetics

The visual analysis characterized the project area in terms of "landscape units." Selected viewpoints where the project could affect existing visual quality that would cause changes to views currently experienced by residents, motorists, and other users of the area were evaluated.

Motorists traveling within the corridor have a variety of visual experiences. When traveling eastbound the viewer leaves an urban environment and enters a more suburban and rural setting. This view transition is gradual; the corridor provides a progression of visual character from developed, urban areas to more densely vegetated and sparsely developed areas. Conversely, westbound motorists travel through suburban and rural landscape characterized by dense vegetation and steep hillsides. Upon exiting the tunnel the motorist enters a more urbanized and developed area.

The project vicinity was divided into two landscape units. Visual quality with and without the build alternatives was evaluated using visual simulations of the project features from key viewpoints. Effects on visual quality before and after mitigation were evaluated.

West of the Tunnel Landscape Unit

Motorists, residents, and recreational users would be affected by changes in the visual setting.

Motorists traveling east would have limited visual access to the new portal structure because it would be across the freeway, and westbound motorists would not have direct sight of the portal structure. The most substantial visual change for motorists would occur as they exited the new tunnel in the westbound direction. Immediately adjacent to the new tunnel portal, two retaining walls would be constructed. These retaining walls would appear to the motorists as logical extensions of the tunnel they have just emerged from. Both of the noise barrier options would require most of the existing vegetation in the area between State Route 24 and Caldecott Lane to be removed. The earth berm/soundwall combination would replace most of the landscaping that is currently visible to motorists. The soundwall option would preclude the ability to replant on the freeway side of the wall. Mitigation proposed includes measures to include architectural and color treatments to soundwalls and retaining walls to reduce their visual prominence and allow them to blend in with existing human-made elements. Measures also include planting vines to grow over soundwalls to soften their aesthetic appearance and blend with surrounding vegetation and landscaping. Areas affected by construction will be re-vegetated. Upper- and mid-slope residents would see visual changes (new tunnel portal, retaining walls and soundwalls). However, due to their distance, their sensitivity to these changes would be low to moderate. With the re-vegetation of areas affected during construction, the visual effects of the project for these residents would be minimal. Seeing traffic backed up on State Route 24 is an existing adverse visual effect. Alternatives 2N and 3N would reduce back-ups on the freeway during the off-peak direction, which would result in a beneficial visual effect on residents.

Lower-slope residents would be the most directly affected. For these residents, changes occurring along the westbound lanes of State Route 24 between the new tunnel portal and the Caldecott Lane exit have the most potential to create adverse visual effects because substantial amounts of vegetation would be removed during construction. The proposed soundwall or wall/earth berm combination would also introduce new visual elements into the landscape. The soundwall would result in the most change from existing conditions. As a result of construction staging, most of the existing landscaping in this area would be removed. A concrete soundwall would be constructed along the roadway shoulder from the tunnel portal to the Caldecott Lane off-ramp. While the soundwall would provide some view obstruction and visual privacy for ground-level residents, the change would be considered adverse without mitigation. The earth berm/soundwall combination would provide better visual

screening and privacy because of its increased height. However, without mitigation the change from existing conditions would be considered adverse.

Substantial re-vegetation of areas affected by construction and the replanting of larger native trees in the area along Caldecott Lane will be implemented as mitigation measures. The re-vegetation would also soften the appearance of the proposed soundwall. The soundwall/earth berm combination mitigation would provide better privacy and improved visual character over existing conditions. The soundwall/earth berm with mitigation over time would result in a consistent visual screen for area residents, and because of the height of the earth berm, replacement vegetation will provide visual screening for third and fourth floor residents over time.

Bicyclists typically ride on mid- and upper-slope access roads and trails, which, given the distance, would reduce their sensitivity to visual changes. Recreational cyclists also use Broadway, which parallels State Route 24 near Lake Temescal Park. Park users would also be potentially affected. The build alternatives could include construction of new soundwalls along State Route 24 and the off-ramp to State Route 13. The effect of the new soundwalls on bicyclists could be adverse because the soundwall would be on top of existing large retaining walls. Park users would have some visual exposure to the new soundwall on State Route 24, which would minimally obstruct views across the highway but would also obstruct views of vehicular traffic, which would be a beneficial effect for park users. To reduce visual effect on bicyclists using Broadway, the soundwalls in this area would have architectural treatments designed to break up the scale and mass of these walls.

East of the Tunnel Landscape Unit

Alternatives 2N and 3N would result in similar visual changes. Both would involve the removal of vegetation to construct a new tunnel entrance structure and widen State Route 24 near the Fish Ranch Road off-ramp. Under both alternatives, two retaining walls would be constructed, one on each side of the westbound travel way near the new tunnel entrance. Another retaining wall would be constructed just east of the Fish Ranch Road on-ramp. Motorists traveling westbound would see the new tunnel entrance portal and retaining walls. They would also see the area denuded of trees and shrubs along the north side of the westbound lanes to accommodate the widening of State Route 24, modification of the Fish Ranch Road on-ramp and the new tunnel entrance. These changes would introduce substantial new manmade elements into the landscape. Mitigation measures to re-vegetate affected areas, plant vines on retaining walls, where feasible, and architecturally treat retaining walls would reduce the level of visual change.

Tunnel Portals and Retaining Walls

The tunnel portals and associated retaining walls would be substantial new visual elements within the landscape. To reduce visual effects of these elements, the portal façade will be visually consistent in character, shape and proportion to the existing portal façades. Retaining walls will be stepped down with wall-terminus treatments similar to the middle tunnel.

Joint CEQA and NEPA Document

The proposed project is a joint project by the California Department of Transportation (Department), the Federal Highway Administration (FHWA), and is subject to State and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The Department is the lead agency under CEQA and the FHWA is the lead agency under NEPA.

Some impacts determined to be significant under CEQA may not lead to a determination of significance under NEPA. Because NEPA is concerned with the significance of the project as a whole, it is quite often the case that a "lower level" document is prepared for NEPA. One of the most commonly seen joint document types is an Environmental Assessment/Environmental Impact Report (EA/EIR).

Due to the limited impacts involved in this project, the FHWA concluded that this Environmental Assessment (EA) is the appropriate level of NEPA environmental documentation for the project. Following receipt of public comments on the Draft EA/Environmental Impact Report (EIR) the lead agencies are required to take actions regarding the environmental document. The Department and the FHWA have considered all comments, selected a preferred alternative, and have made the final determination of the project's effect on the environment. The preferred alternative is identified in the Final EA/EIR. The Department has certified this Final EIR and has filed a Notice of Determination.

It should be noted that at a future date FHWA or another Federal Agency may publish a notice in the Federal Register, pursuant to 23 USC §139(l), indicating that a final action has been taken on this project by FHWA or another Federal agency. If such notice is published, a lawsuit or other legal claim will be barred unless it is filed within 180 days after the date of publication of the notice (or within such shorter time period as is specified in the Federal laws pursuant to which judicial review of the Federal agency action is allowed). If no notice is published, then the lawsuit or claim can be filed as long as the periods of time provided by other Federal laws that govern claims are met.

Table S-2: Impacts and Mitigation Issues

Affected Resource	Potential Impacts			Mitigation, Minimization, and/Or Avoidance Measures			CEQA Significance Finding After Mitigation Incorporation	
	ALTERNATIVE			ALTERNATIVE			ALTERNATIVE	
	2N (Preferred Alternative)	3N	No-Build	2N	3N	No-Build	2N	3N
AIR QUALITY	Possible less pollutant levels due to reduction in congestion in reverse commute.		The no-build alternative is likely to have negative air quality impacts due to heavy congestion in the reverse commute and is likely to result in higher pollutant levels as compared to the build alternatives	N/A			Less than significant	
CONSTRUCTION IMPACTS	Construction activities will result in increased levels of truck traffic, noise, dust, and visual impacts		No Impacts	Measures to minimize impacts include: standard practices to reduce equipment noise, material deliveries, and transport of excavated material, wetting down stockpiles, providing wheel washes and street-sweeping services, and sealing aggregate and cement silos will mitigate the generation of dust and dirt. The construction of enclosures for compressors and a temporary soundwall. Best Management Practices to reduce the discharge of pollutants. The Plans, Specifications, and Estimates (PS&E) package will include requirements to minimize or		N/A	Less than significant	

Affected Resource	Potential Impacts			Mitigation, Minimization, and/Or Avoidance Measures			CEQA Significance Finding After Mitigation Incorporation	
	ALTERNATIVE			ALTERNATIVE			ALTERNATIVE	
	2N (Preferred Alternative)	3N	No-Build	2N	3N	No-Build	2N	3N
				eliminate dust by applying water or dust palliatives, construct noise barriers as first items of work, keep the community informed of upcoming noisy construction activities and establish a field office to handle complaints, and during blasting, monitor potentially affected homes for vibrations. These measures will be addressed in the PS&E Package.				
CULTURAL RESOURCES	Low potential to impact buried or discover new archaeological resources		No impacts	If buried cultural materials are encountered during construction, work will stop in that area until a qualified archaeologist can evaluate the nature and significance of the finding.		N/A	Less than significant	
	Includes one property eligible for listing in the National Register of Historic Places (Caldecott Tunnel bores 1 and 2)			No potential to affect the historic property known as the Caldecott Tunnel (1937 structures only).			Less than significant	
GEOLOGY/ SEISMOLOGY	Groundwater levels could be lowered due to increased drainage from the new tunnel, possibly reducing potential landslide hazard		No impacts	Detailed geotechnical investigation will be conducted to assess subsurface conditions		N/A	Less than significant	

Affected Resource	Potential Impacts			Mitigation, Minimization, and/Or Avoidance Measures			CEQA Significance Finding After Mitigation Incorporation	
	ALTERNATIVE			**ALTERNATIVE**			**ALTERNATIVE**	
	2N (Preferred Alternative)	**3N**	**No-Build**	**2N**	**3N**	**No-Build**	**2N**	**3N**
	Project area lies within a seismically active region and is crossed by mapped traces of the Hayward Fault		No impacts	The tunnel and portals will be designed to withstand a 1,500-year return period seismic event. Walls and other structures outside the tunnel will be designed to withstand a 500-year return period seismic event		N/A	Less than significant	
	Increased surface erosion could negatively affect slope stability and water quality		No impacts	Standard mitigation measures will be employed during construction to ensure slope stability and will be part of the PS&E Package		N/A	Less than significant	
GROWTH INDUCEMENT/ COMMUNITY IMPACT	Supports local planning goals and policies to improve traffic circulation along State Route 24		Does not support local planning goals and policies to improve traffic circulation along State Route 24	None		N/A	Less than significant	
	Enhances access to public facilities within the project area		N/A	None		N/A	Less than significant	
	Economic activity generated by proposed project		No impact	None		N/A	Positive impact	

Affected Resource	Potential Impacts			Mitigation, Minimization, and/Or Avoidance Measures			CEQA Significance Finding After Mitigation Incorporation	
	ALTERNATIVE			ALTERNATIVE			ALTERNATIVE	
	2N (Preferred Alternative)	**3N**	**No-Build**	**2N**	**3N**	**No-Build**	**2N**	**3N**
HAZARDOUS WASTE/MATERIALS	Potential for lead contamination issues in the unpaved areas due to aerially deposited lead (ADL) from historic motor vehicle exhaust		No impacts	Testing will be performed for ADL, asbestos, and groundwater contamination at the Plans, Specification and Estimates (PS&E) stage prior to construction		N/A	Less than significant	
				Special handling would be required for ADL and asbestos that would include implementing a Department health and safety plan			Less than significant	
				The Department would extract any potential contaminated groundwater according to regulatory requirements			Less than significant	
	Potential for Naturally Occurring Asbestos		No Impacts	If found, Best Management Practices will be implemented		N/A	Less than significant	
	Potential for Naturally Occurring Hydrocarbons		No impact	If found, it will be assessed and managed during the construction phase of the tunnel construction project		N/A	Less than significant	

Affected Resource	Potential Impacts			Mitigation, Minimization, and/Or Avoidance Measures			CEQA Significance Finding After Mitigation Incorporation	
	ALTERNATIVE			ALTERNATIVE			ALTERNATIVE	
	2N (Preferred Alternative)	**3N**	**No-Build**	**2N**	**3N**	**No-Build**	**2N**	**3N**
HYDROLOGY/ FLOODPLAIN	Not located within a Federal Emergency Management Agency (FEMA) designated 100-year floodplain			N/A			Less than significant	
	No major drainage alteration		No drainage alteration	New drainage facilities would convey roadway storm water and tunnel wash water in the same manner that currently exists		N/A	Less than significant	
	Potential groundwater infiltration		No impacts	New underdrain trench at each side of the pavement inside the tunnel to protect the roadway from any groundwater infiltration		N/A	Less than significant	
NATURAL ENVIRONMENT	No impact	Permanent impacts to perennial bunch grasses	No impacts	N/A	Native grassland communities located adjacent to the construction zone that could be affected by construction activities will be temporarily fenced off and designated as Environmentally Sensitive Area (ESA) to prevent accidental intrusion of workers and equipment	N/A	Less than significant	

Affected Resource	Potential Impacts			Mitigation, Minimization, and/Or Avoidance Measures			CEQA Significance Finding After Mitigation Incorporation	
	ALTERNATIVE			ALTERNATIVE			ALTERNATIVE	
	2N (Preferred Alternative)	**3N**	**No-Build**	**2N**	**3N**	**No-Build**	**2N**	**3N**
					Perennial bunch grasses temporarily impacted will be seeded with a native seed mix			
	Permanent impacts to annual grassland		No impacts	Due to location and presence of non-native species, there is no proposed mitigation for permanent impacts to this habitat type. Annual grassland temporarily impacted will be seeded with a native seed mix		N/A	Less than significant	
	358 individual coast live oaks affected	361 individual coast live oaks affected	No impacts	Environmentally Sensitive Areas will fully enclose the dripline of the oaks and any limbs that need to be removed will be pruned by an arborist in accordance with arboricultural industry standards or performed following the direction of a knowledgeable individual		N/A	Less than significant	
				Environmentally Sensitive Areas fencing to restrict vehicle and foot traffic near trees, prohibit fueling, equipment/material storage, and placement of fill or other materials over root zone				
				Oak trees removed will be mitigated at a replacement ratio of 5:1				

Affected Resource	Potential Impacts			Mitigation, Minimization, and/Or Avoidance Measures			CEQA Significance Finding After Mitigation Incorporation	
	ALTERNATIVE			ALTERNATIVE			ALTERNATIVE	
	2N (Preferred Alternative)	**3N**	**No-Build**	**2N**	**3N**	**No-Build**	**2N**	**3N**
	963 urban trees permanently impacted .	973 urban trees permanently impacted .	No impacts	Mitigation for all oak trees will be 5:1 while all other native trees with a diameter at breast height (DBH) of 6 inches or greater will be mitigated at 3:1. Caltrans will not mitigate for non-native species such as eucalyptus. Tree Replacement and Planting Plan will be prepared by District 4's Landscape Architects in accordance with local land use plans and goals for the proposed project		N/A	Less than significant	
	Potential to introduce noxious weeds from the project area into uninfested areas		No impacts	Measures such as worker training, avoidance of sensitive communities, and cleaning of construction machinery before use on subsequent projects in sensitive communities would reduce likelihood of spread Disturbed areas to be restored and revegetated after construction		N/A	Less than significant	
	California Red-Legged Frog may enter project vicinity during rainy season		No impacts	Protective measures such as pre-construction survey and limiting of construction window to be incorporated in the PS&E Package.		N/A	Less than significant	

Affected Resource	Potential Impacts			Mitigation, Minimization, and/Or Avoidance Measures			CEQA Significance Finding After Mitigation Incorporation	
	ALTERNATIVE			ALTERNATIVE			ALTERNATIVE	
	2N (Preferred Alternative)	**3N**	**No-Build**	**2N**	**3N**	**No-Build**	**2N**	**3N**
	Western spadefoot toad may enter project vicinity during rainy season		No impacts	Protective measures such as pre-construction surveys and limiting of construction window to be incorporated in the PS&E Package.		N/A	Less than significant	
	Alameda whipsnake may enter project vicinity		No impacts	Protective measures such as pre-construction surveys will be incorporated into the plans.		N/A	Less than significant	
	Project vicinity may provide roosting and nesting sites for white-tailed kite		No impacts	Protective measures such as pre-construction survey will be incorporated into the PS&E Package		N/A	Less than significant	
	Project vicinity may provide roosting and nesting sites for nesting Raptors and other migratory birds		No impacts	Protective measures such as pre-construction survey will be incorporated into the PS&E Package		N/A	Less than significant	
NOISE	88 residences with noise levels higher than 66dBA Leq(h). Noise increases would be no more than 3dBA	90 residences with noise levels higher than 66dBA Leq(h). Noise increases would be no more than 3dBA	88 residences with noise levels higher than 66dBA Leq(h). No anticipated increase in noise	A noise barrier near Caldecott Lane in the form of a combination earth berm/ soundwall has been determined reasonable and feasible and will	Noise barriers in the form of soundwalls, earth berm or combination that are determined feasible and reasonable will be considered for construction	No installation of noise barriers	Less than significant	

Affected Resource	Potential Impacts			Mitigation, Minimization, and/Or Avoidance Measures			CEQA Significance Finding After Mitigation Incorporation	
	ALTERNATIVE			ALTERNATIVE			ALTERNATIVE	
	2N (Preferred Alternative)	**3N**	**No-Build**	**2N**	**3N**	**No-Build**	**2N**	**3N**
	22 future residential units with noise levels higher than 66dBA			be constructed		No installation of noise barriers	Less than significant	
PALEONTOLOGY	Potential fossil finds		No impacts	Retain a qualified vertebrate paleontologist to monitor selected construction activities associated with tunnel boring and during excavation of eastern approach to tunnel		N/A	Less than significant	
				Stop work if vertebrate remains should be encountered in the rock walls of the tunnel or during construction and excavation			Less than significant	
RIGHT-OF-WAY	14 R/W easements will be required	17 R/W easements will be required	No impacts	R/W acquisition would take place during the design phase		N/A	Less than significant	
SECTION 4-F	No impacts			N/A			No impact	

Affected Resource	Potential Impacts			Mitigation, Minimization, and/Or Avoidance Measures			CEQA Significance Finding After Mitigation Incorporation	
	ALTERNATIVE			ALTERNATIVE			ALTERNATIVE	
	2N (Preferred Alternative)	**3N**	**No-Build**	**2N**	**3N**	**No-Build**	**2N**	**3N**
TRAFFIC	High growth in demand (2N higher than No-Build and 3N higher than 2N). Both alternatives eliminate directional capacity gap in off-peak direction. Both increase demand growth at nearby intersections. (2N incrementally higher than No-Build and 3N incrementally higher than 2N)		High growth in demand including nearby inter-sections	Both build alternatives would provide positive impacts, i.e., reduce congestion and increase safety. Neither would result in any significant impacts to the local intersections compared to the No-Build. Thus, no adverse traffic impacts are anticipated; therefore, no minimization or mitigation measures are recommended.		None	Positive impact	
VISUAL/AESTHETICS	Both alternatives would result in similar visual changes. Motorists, residents and recreational users would be affected by changes in the visual setting (new portal façades, on/off ramps, retaining walls, noise barriers, vegetation loss)		No impacts	Vines/shrubs would be planted to cover/screen views of new sound and retaining walls. Sound and retaining walls would be designed with Art Deco features to compliment the portal structures or be designed with surface texture/stain to enhance the rural character as appropriate. Areas where vegetation is removed shall be re-vegetated with similar type species. Areas of particular concern for revegetation include the hillsides surrounding the new tunnel portal and the area between State Route 24 and Caldecott Lane. This will be addressed in the PS&E Package		N/A	Less than significant	

Affected Resource	Potential Impacts			Mitigation, Minimization, and/Or Avoidance Measures			CEQA Significance Finding After Mitigation Incorporation	
	ALTERNATIVE			ALTERNATIVE			ALTERNATIVE	
	2N (Preferred Alternative)	**3N**	**No-Build**	**2N**	**3N**	**No-Build**	**2N**	**3N**
WATER QUALITY	Preliminary calculations estimate at least .72 hectares (1.7 acres) of added impervious area	Preliminary calculations estimate at least 1.06 hectares (2.6acres) of added impervious area	Greater deposition of particulates from exhaust and heavy metals from braking due to continued congestion	The Department will reduce contaminants in runoff during and after construction in accordance with the Regional Water Quality Control Board		N/A	Less than significant	
WETLANDS	.008 hectare (.02 acre) of wetland to be permanently filled at slope wetland SW-03 (See Appendix L-Wetland Delineation Mapping)		No impacts	Mitigation requirements will be determined through consultation with the USACE and a mitigation and monitoring proposal will be prepared for the project		N/A	Less than significant	
	Permanently fill .0008 hectare (.002 acre) of other waters of the U.S. at the intermittent/ephemeral stream channel IES-05 (See Appendix L-Wetland Delineation Mapping)		No impacts	Mitigation requirements will be determined through consultation with the USACE and a mitigation and monitoring proposal will be prepared for the project		N/A	Less than significant	

The following permits, reviews, and approvals would be required for project construction:

Table S-3: Permits and Approvals Needed

Agency	Permit/Approval	Status
United States Fish and Wildlife Service	Section 7 Consultation for Threatened and Endangered Species	Biological Opinion and amended Biological Opinion signed in August, 2007
California Department of Fish and Game	Streambed Alteration Agreement (1602)	To be acquired during PS&E phase
East Bay Municipal Utility District	Water Discharge Permit	New permit needed and will be acquired during PS&E phase
United States Army Corp of Engineers	Section 404-Nationwide Permit	Section 404 Nationwide Permit will be obtained prior to construction
Regional Water Quality Control Board	Section 401 Permit	To be acquired during PS&E phase
State Water Resources Control Board	National Pollutant Discharge Elimination System Statewide Storm Water Permit	Best Management Practices will be incorporated into the project to reduce discharge of pollutants

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