

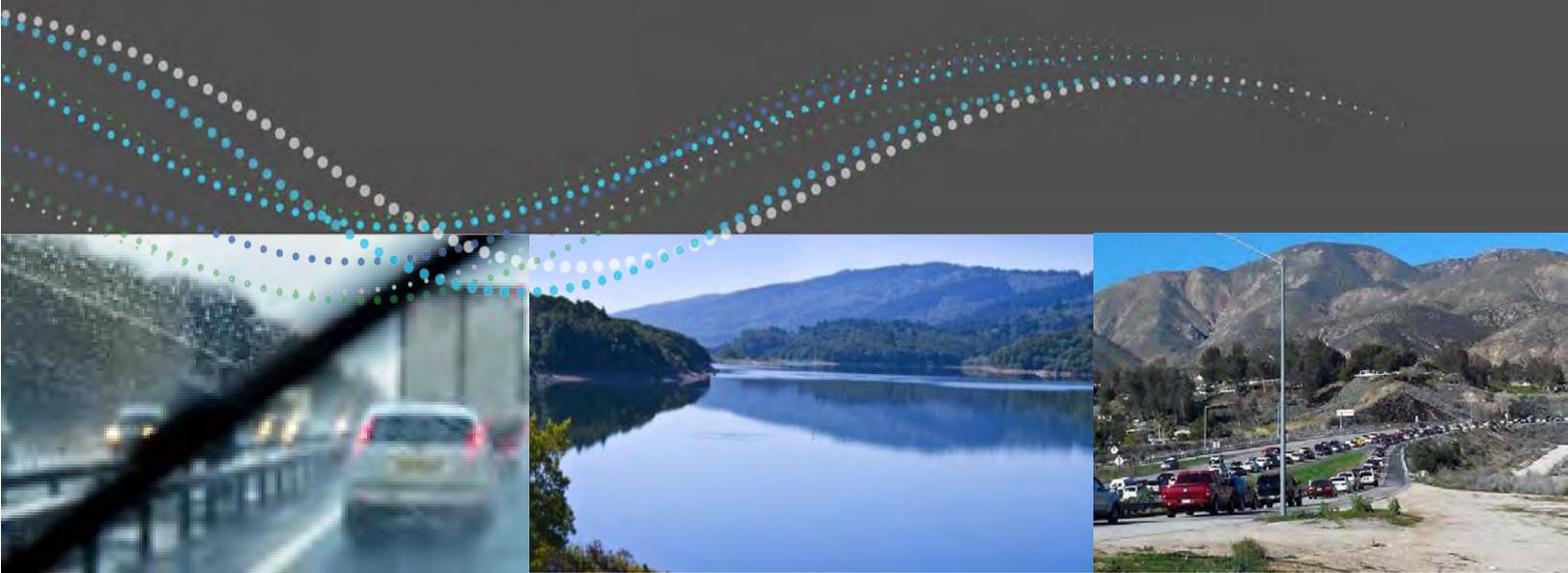
# Appendix E: MBATS and MATS





# Mountain Area Transportation Study

Mobility Issue Identification, Solution, and Implementation Plan | Draft



June 8, 2017

Submitted to:

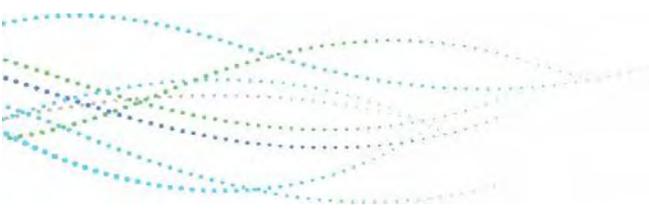


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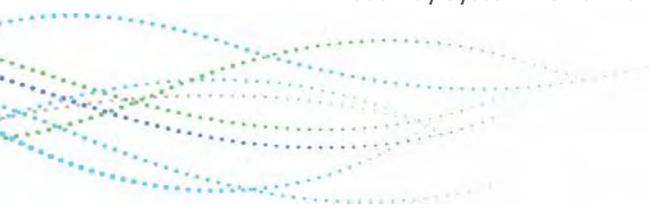
## DOCUMENT VERSION CONTROL

Document Name	Submittal Date	Version Number
Needs Assessment   Draft	August 1, 2016	1.0
Mobility Issue Identification, Solution, and Implementing Plan   Draft	March 28, 2017	2.0
Mobility Issue Identification, Solution, and Implementing Plan   Draft	April 24, 2017	3.0
Mobility Issue Identification, Solution, and Implementing Plan   Draft	May 9, 2017	4.0
Mobility Issue Identification, Solution, and Implementing Plan   Draft	May 15, 2017	5.0
Mobility Issue Identification, Solution, and Implementing Plan   Draft	June 5, 2017	6.0
Mobility Issue Identification, Solution, and Implementing Plan   Draft	June 8, 2017	7.0
Mobility Issue Identification, Solution, and Implementing Plan   Draft	June 14, 2017	8.0



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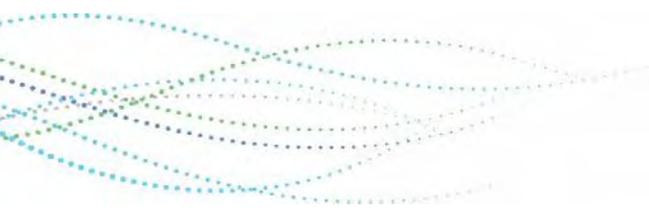
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## ABBREVIATIONS

ADT	Average Daily Traffic
App	Mobile device application
BID	Business Improvement District
Caltrans	California Department of Transportation
CFD	Community Facilities Districts
CHP	California Highway Patrol
CMAQ	Congestion Mitigation and Air Quality
CMP	Congestion Management Plan
CMS	Changeable Message Sign
CRF	Crash Reduction Factor
CTP	Countywide Transportation Plan
DLA	Division of Local Assistance
DOT	Department of Transportation
FAST ACT	US DOT Fixing America's Surface Transportation Act
FTA	Federal Transit Authority
HAR	Highway Advisory AM Radio
HBO	Home-Based Other
HBW	Home-Based Work
HSIP	Highway Safety Improvement Program
ITS	Information Technology Services
JPA	Joint Power Authority
MATS	San Bernardino County Mountain Area Transportation Study
MPH	Miles per Hour
NAAQS	National Ambient Air Quality Standards
NHB	Non-Home Based
NVUM	National Visitor Use Monitoring
OHV	Off-Highway Vehicles
PM	Post Mile
PMS	Permanent Message Sign
SANBAG	San Bernardino Association of Governments
SB1	Senate Bill 1
SBCTA	San Bernardino County Transportation Authority
SBTAM	San Bernardino Transportation Analysis Model
SCAG	Southern California Association of Governments
SED	Socioeconomic Data
SR	State Route
STBG	Surface Transportation Block Grant
SWITRS	Statewide Integrated Traffic Records System
TAZ	Transportation Analysis Zone
TIMS	Transportation Injury Mapping System
TWLTL	Two-Way Left Turn Lane



US  
USFS

United States  
United States Forest Service



## 1.0 EXECUTIVE SUMMARY

Understanding existing conditions is the basis of developing future forecasts and developing recommended projects and approaches to solving existing problems. This document summarizes the existing conditions, data collection, identified issues, and future conditions needs assessment for the Mountain Area Transportation Study (MATS).

Stakeholders were involved throughout the existing conditions data collection and needs assessment process. Stakeholders include the County of San Bernardino, the City of Big Bear Lake, Caltrans, San Bernardino County Transportation Authority (SBCTA), Southern California Association of Governments (SCAG), the California Highway Patrol (CHP), and the United States (US) Forest Service.

### 1.1 Purpose and Need

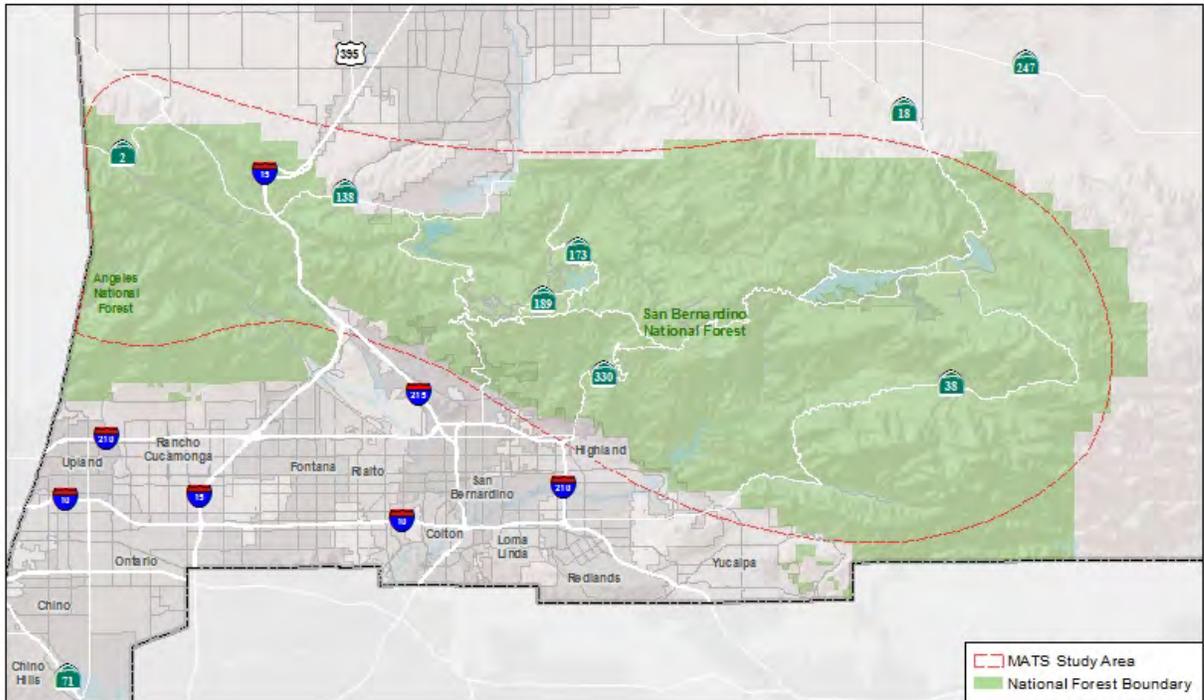
Visitors to the mountain area make up a large portion of the needs assessment, as the full-time population and associated employment are relatively low. Peak winter and summer months experience a substantial increase in traffic congestion for extended periods of time as visitors and associated additional employees access the mountain communities. In addition, the traffic congestion caused by visitors has the potential to discourage would-be visitors, hindering the local economy.

As an example of the larger study area, recent studies show that in 2012, the City of Big Bear Lake had a full-time population of 5,100 in approximately 2,200 households with a year-long employment of 3,800. In 2012, the City of Big Bear Lake served approximately 10,000 visitors on a typical day. However, during a peak season weekday for 2012, the City of Big Bear Lake had employment of approximately 5,800 while serving nearly 60,000 visitors. In 2040, visitors are expected to increase to over 76,000 (an increase of over 25 percent).

The geographic study area for the MATS is shown in **Figure E-1**.



Figure E-1: Study Area



## 1.2 Existing Conditions

The existing conditions within the MATS area show that during typical roadway conditions, and during average weekday travel, that the system operates adequately in a majority of locations. The status of the system identifies that during peak periods, or peak season travel periods, there are multiple intersections and segments of roadway operating at less than ideal levels of service.

This area has been studied previously, including the Big Bear 1996 Highway Transit Improvement Alternative, the recent Big Bear Modal Study, and the 2015 San Bernardino Countywide Transportation Plan. All previous studies have shown that there are existing transportation system needs within the MATS area. Solutions include implementing additional modes of transportation, realignment of existing facilities, adequate signage, and various other congestion relief measures.

### 1.2.1 Transportation System

The primary access roadways within the MATS area are State Route (SR)-2, SR-18, SR-38, SR-138, and SR-330. Each of these roadways experience unique traffic patterns associated with visitors to the area. All of the state highways within the MATS area were included, as well as some key local facilities. Secondary roads include major facilities within the mountain area that are heavily used by residents and visitors.

The existing transit system consists primarily of Mountain Transit and Victor Valley Transit Authority. Mountain Transit runs six fixed-routes and various other services for MATS residents and visitors, and

Victor Valley Transit Authority runs one fixed-route to the Community of Wrightwood. Supplemental service within the MATS area consists of Dial-a-Ride Service for seniors and persons with disabilities, weekend trolley service in and around the Community of Big Bear and the City of Big Bear Lake on Saturdays and Sundays, and the occasional Rally Bus ride-sharing which is a crowd-powered service.

In the existing transportation setting, non-motorized transportation (including bicycles and pedestrian activity) is encouraged, but the system lacks infrastructure, which can be a problem for mobility. The City of Big Bear Lake has an Active Transportation Plan, and the Lake Arrowhead community is currently preparing on an Active Transportation Plan. In addition, there has been recent coordination between the City of Big Bear Lake, the County of San Bernardino, and the Big Bear Valley Trails Foundation in obtaining a Caltrans grant to assist in the development and planning for future road and trail resources with connections to lakes and other mountain amenities.

### 1.2.2 Data Collection

The existing conditions analysis was completed using information from multiple sources:

- Average Daily Traffic (ADT) traffic information from peak season data collection for Fridays, Saturdays, and Sundays.
- Transportation system speed data from iPeMS, the web-based tool developed for the SBCTA Congestion Management Plan (CMP).
- Existing turnout location and geometric information from aerial investigation and site visits.
- Chain-up area information.

#### Data

The primary direction of travel on Friday and Saturday is eastbound/northbound while the primary direction of travel on Sunday is westbound/southbound. This indicates a higher influx of vehicles into the mountain area on Friday and Saturday with an outflow of traffic on Sundays. **Figure E-2** presents the average daily traffic counts for Friday, Saturday, and Sunday travel on state routes within the mountain area.

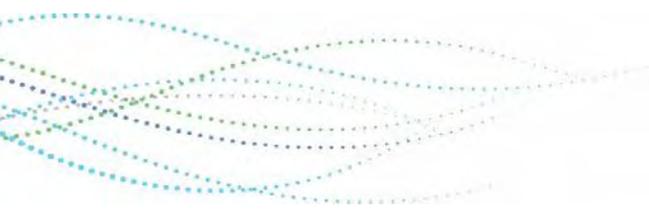
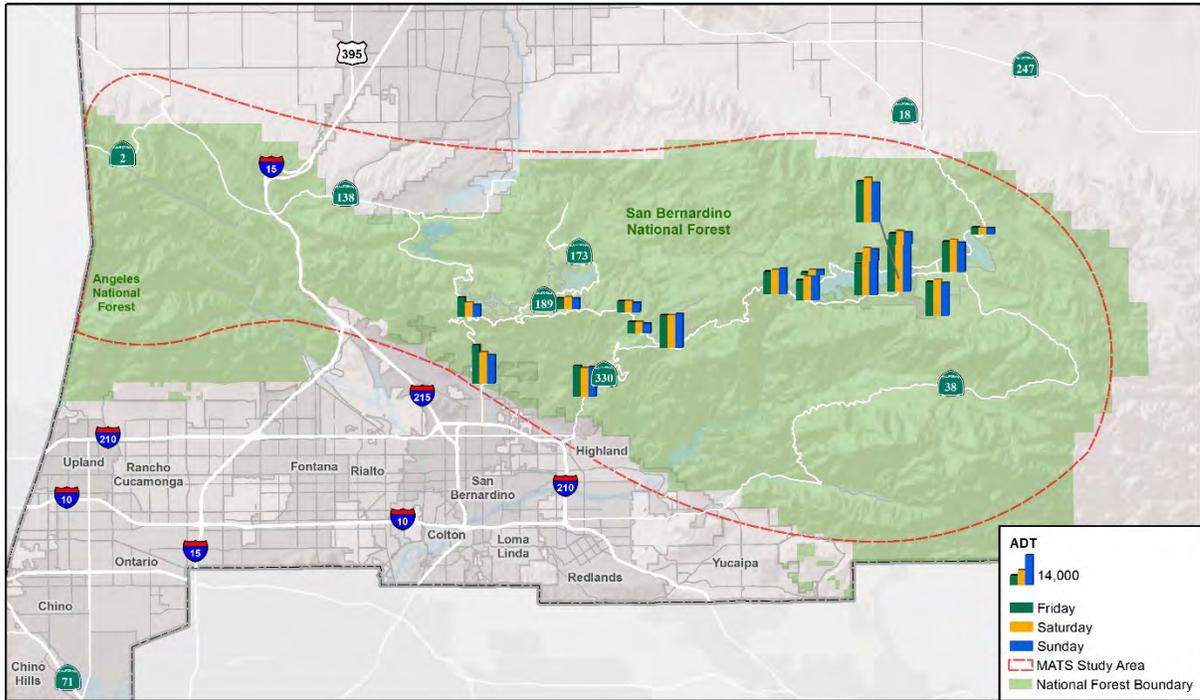


Figure E-2: Average Daily Traffic Count Locations



### 1.3 Identification of Mobility Issues

Mobility issues within the MATS area were identified primarily using Stakeholder outreach via in-person meetings and by using the project web tool developed by SBCTA for this project. Mobility issues were also identified by reviewing the travel model tool results.

Stakeholders include the County of San Bernardino, the City of Big Bear Lake, Caltrans, SBCTA, SCAG, the CHP, and the US Forest Service. From the stakeholder meetings, many of the mobility problems that were identified can be summarized into the following need categories:

- **Traffic Control:** Bottleneck due to existing, non-existent, or poor location of traffic control device. (Example is a stop sign located on a high-volume road).
- **Signage:** Bottleneck due to non-existent or lack of signage, often resulting in poor circulation patterns, or confused drivers.
- **Traffic Volume:** Congestion and slow-moving traffic due to peak traffic volumes in excess of existing roadway capacity.
- **Cut-through Traffic:** Peak conditions (related to traffic congestion and weather) often result in cut-through traffic on local roads.



- **Roadway Geometry:** Bottleneck due to curves and topography (which result in a lack of sight distance), often caused by slow-moving vehicles. Other roadway design issues, including lack of center turn lanes or left turn pockets, also creates driver confusion and congestion.
- **Chain Installation and Control:** Bottleneck due to operations and procedures for chain installation. Additionally, chain control locations often encourage visitors to travel on local arterials to avoid chain installation.
- **Roadway Maintenance:** There are existing issues with roadway maintenance, including maintaining striping and snow removal.
- **Illegal Parking:** Traffic congestion and friction on state routes due to vehicles parked in “No Parking” zones. This is often the case in winter and summer peak months near popular snow play and hiking locations.
- **Pedestrian or Bicycle Conflicts:** Conflicts between vehicles and non-motorized person trips due to pedestrians walking along side of road, heavy pedestrian crossing volumes, or narrow road with no shoulder or lane for bicycles. These conflicts often result in traffic congestion, and can be unsafe for pedestrians and bicycles.
- **Alternate Modes:** The increase in residents and visitors allows for the potential for increasing use of transit services, including shuttle and trolley service along with improving the existing fixed-route services.
- **Information Technology Services (ITS) Opportunity:** Information for drivers is beneficial to the overall transportation circulation, and could be better improved with real-time Changeable Message Signs (CMS) at key locations throughout the mountain area.
- **Coordination between Jurisdictional Agencies:** There are multiple agencies and jurisdictions involved related to maintenance and control during major events. Agencies include Caltrans, County, City, Sheriff, and CHP. Lack of coordination can result in conflicting information, making it unclear what road conditions are, or what traffic congestion is currently occurring.
- **Existing Right-Of-Way:** It appears that many of the existing roadways are overlaid, or repaved, to existing roadway width, or even narrower in locations. In some locations, it appears or is known, that there is additional right-of-way that could be paved for better utilization.
- **Regional and Local Economic Impacts:** The location of the mountain area, as a desirable destination for visitors from the Southern California region, and beyond. According to the Big Bear Housing Element, there are over 30,000 “second homes” in the mountain area, resulting in vacationers spending property tax money, as well as money on goods and entertainment, within the mountain area. As a part of San Bernardino County, the traffic and transportation within the mountain area could be a deterrent to visitors, resulting in a regional and local economic loss.

In addition to stakeholder data gathering related known mobility issues, the project team used travel demand model tool results, to identify five locations along state routes that result in the highest areas of congestion and bottlenecks. **Figure E-4** identifies the five locations that were identified as locations considered with an opportunity to improve mobility and reduce congestion. All five locations are located on SR-18 (and briefly SR-38 in the City of Big Bear Lake), but these locations may serve as indicators to other areas along State Routes within the mountain area with similar characteristics.



## 1.5 Implementation

Transportation plays an important role in the mountain area. The efficient movement of people and goods is the foundation upon which a healthy economy and high quality of life is built. Yet, the entire transportation system and the role municipal government plays in its maintenance, operations, and development over time are not always well understood. The goal of the MATS implementation plan is to set a course for future decision-making. The purpose of the MATS implementation plan is to serve as a tool in the decision-making process regarding which projects should be advanced given the limitations of funding sources.

The implementation plan lays forth low, medium, and high priority projects, as well as agency responsibilities and funding resources.

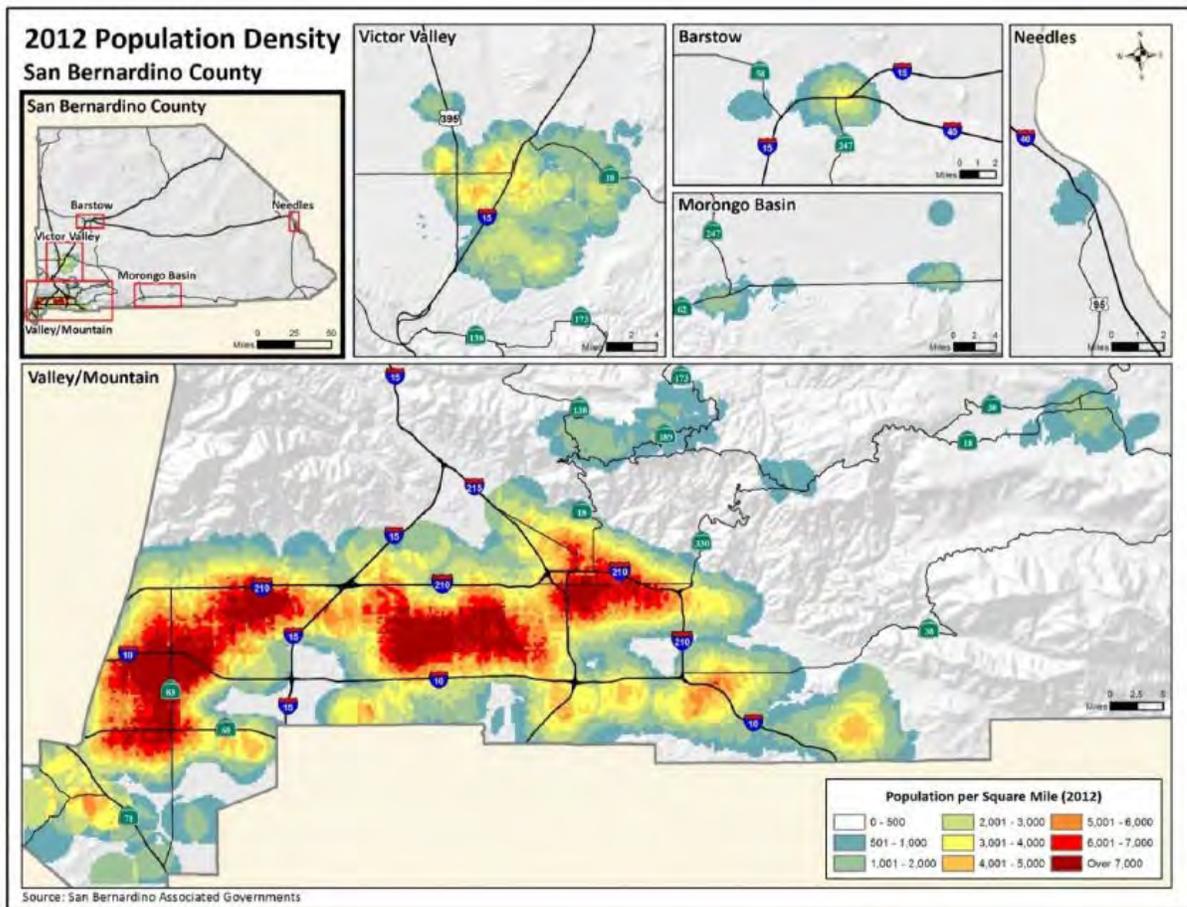


## 2.0 INTRODUCTION

The Mountain Area Transportation Study (MATS) is located solely within San Bernardino County, and is comprised of many communities. The mountain area of San Bernardino stretches from the Los Angeles County Line on the west to the Lucerne Valley on the east. The Communities within the MATS area include: Mount Baldy, Lytle Creek, Wrightwood, Crestline, Blue Jay, Lake Arrowhead, Running Springs, Green Valley Lake, Arrowbear, Big Bear, and the City of Big Bear Lake.

The mountain area of San Bernardino County is traditionally a recreation and tourist area for Southern California (and beyond). The permanent residents of the mountain area make up less than five percent (5%) of the population of San Bernardino County. **Figure 2-1** illustrates the population densities for San Bernardino County, documented in the 2015 San Bernardino Countywide Transportation Plan. This difference in demand (visitors) and available service (residents) creates a unique challenge for providing adequate transportation services to meet the needs of both visitors and residents, not to mention that the visitor needs are seasonal and resident needs are year-round.

**Figure 2-1: San Bernardino County Population Density**



## 2.1 Project Objective and Tasks

The primary objective of the MATS project is to conduct a transportation needs study for the San Bernardino mountain area that identifies key projects that address both existing and forecast transportation deficiencies during peak summer and winter seasons. Based on an analysis of potential improvements, an implementation plan will be developed for future improvements considering implementation timeframe, prioritization, and potential funding sources. The key tasks of the project include:

- **Assessment of Existing Conditions.** Define the existing transportation setting in terms of infrastructure and performance.
- **Development of Refined Traffic Forecasts.** Develop a modelling tool to ensure reasonable future traffic volume forecasts throughout the mountain area.
- **Identification and Costing of Transportation Projects.** Identify improvement projects to address existing and future problem locations throughout the mountain area.
- **Analysis of Transportation Projects.** Evaluate future transportation conditions under peak weekday and weekend seasonal traffic volumes.
- **Recommendations and Implementation Plan.** Generate recommended future infrastructure improvements based on the needs assessment.

## 2.2 Study Purpose and Need

Visitors to the area make up a large portion of the needs assessment, as the full-time population and associated employment are relatively low. Peak winter and summer months experience a substantial increase in traffic congestion for extended periods of time as visitors and associated additional employees access the MATS communities. In addition, the traffic congestion caused by visitors has the potential to discourage would-be visitors, hindering the local economy.

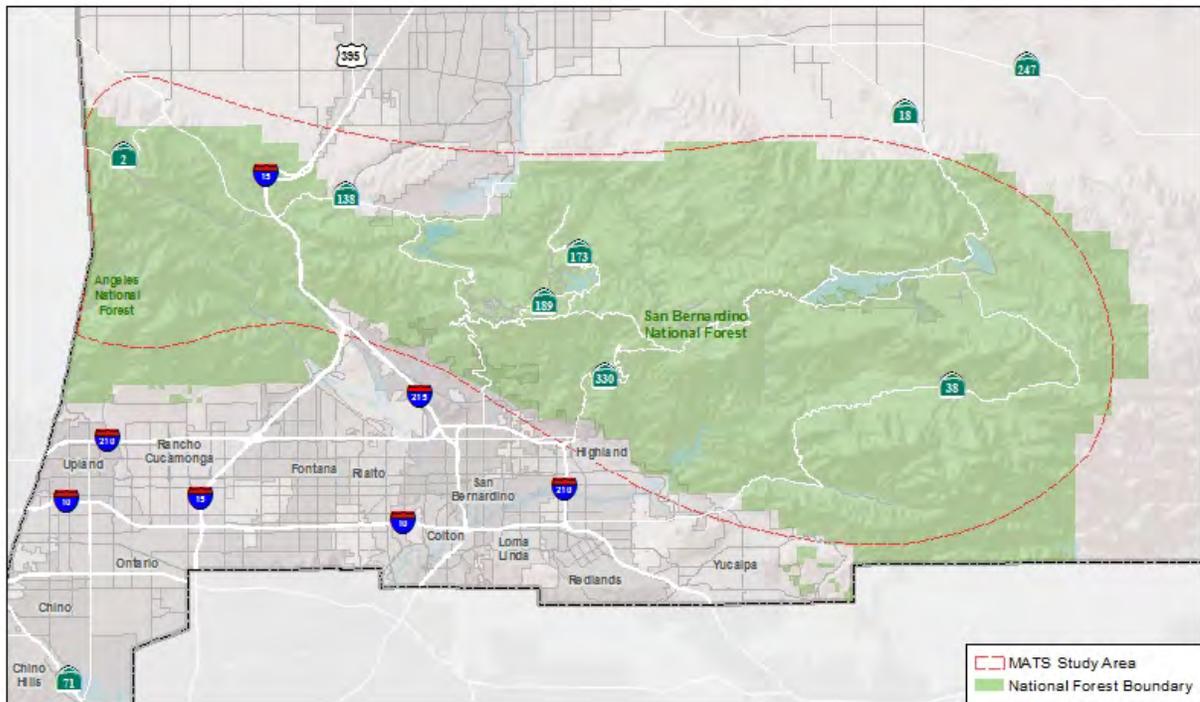
As an example of the larger study area, recent studies show that in 2012, the City of Big Bear Lake had a full-time population of 5,100 in approximately 2,200 households with a year-long employment of 3,800. In 2012, the City of Big Bear Lake served approximately 10,000 visitors on a typical day. However, during a peak season weekday for 2012, the City of Big Bear Lake had employment of approximately 5,800 while serving nearly 60,000 visitors. In 2040, visitors are expected to increase to over 76,000 (an increase of over 25 percent).

## 2.3 Study Area

The geographic study area for the MATS is presented in **Figure 2-2**. In general, the mountain area encompasses the entire populated area of the San Bernardino National Forest, including the communities of Mount Baldy, Lytle Creek, Wrightwood, Crestline, Blue Jay, Lake Arrowhead, Running Springs, Green Valley Lake, Arrowbear, Big Bear, and the City of Big Bear Lake.



Figure 2-2: Study Area



## 2.4 Stakeholders

Stakeholders were involved throughout the existing conditions data collection and needs assessment process. Stakeholders include the County of San Bernardino, the City of Big Bear Lake, Caltrans, SBCTA, SCAG, the California Highway Patrol (CHP), and the United States (US) Forest Service. There were six meetings held at various locations and with various stakeholders:

- **December 1, 2015:** The first stakeholder meeting included representatives from all stakeholder groups, and provided an introduction to the project team, the project, and also included a working session to identify needs.
- **January 21, 2016:** The second stakeholder meeting was held with representatives from the City of Big Bear Lake, and included a working session discussing needs of the City.
- **January 28, 2016:** The third stakeholder meeting was held with County of San Bernardino staff and included a working session/discussion of known mobility problems and hot spots. Solutions and known projects were also discussed.
- **February 22, 2016:** The fourth stakeholder meeting was held at Caltrans offices with Caltrans staff and included a working session/discussion of known mobility problems and hot spots. Solutions and known projects were also discussed.
- **May 12, 2016:** The fifth stakeholder meeting was held at SBCTA offices and included a review of the assessment needs collected to date, as well as a summary of the existing traffic data and trends, and an update on the status of the travel demand model.

## 2.5 Organization of Report

This report is organized to first briefly discuss the previous studies and historical planning documents that have been completed. A thorough discussion of stakeholder input will follow the previous studies. An existing conditions analysis, including an identification of mobility issues (as identified through the stakeholder process) will follow, as well as future conditions based on the travel demand model tool. The report concludes with a discussion about study recommendations and solutions to mobility issues.



## 3.0 BACKGROUND INFORMATION

The MATS area is unique in regards to travel. There are several traditional reasons why residents and visitors travel to the MATS area, primarily ski areas, lake recreational areas, and resorts, as well as US Forest Service areas.

### 3.1 Ski Areas/Resorts

The ski areas and resorts within the MATS study area are major visitor attractions, and help to build the local economies. These resorts are opened all year long, with both winter and summer activities. It is important to identify these locations in this existing conditions report, because their attractiveness to visitors has the potential for negatively impacting the level of service of the transportation facilities within the study area. The following ski areas and resorts are located within the study area:

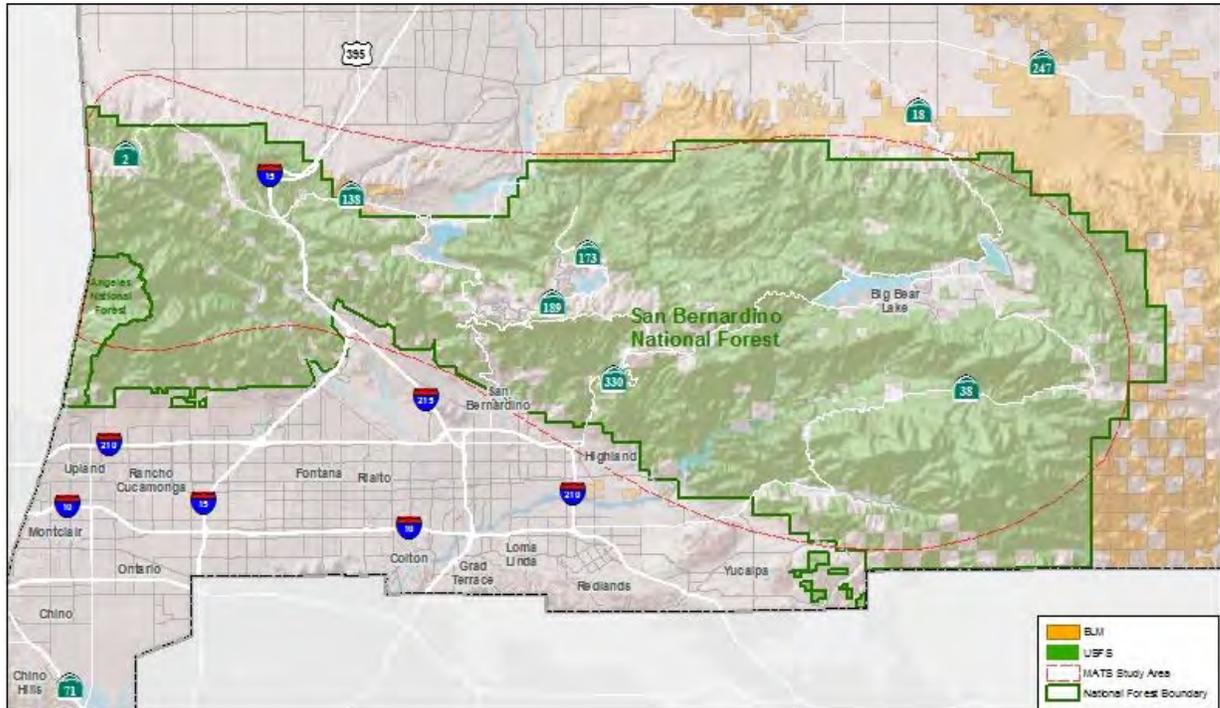
- **Bear Mountain Resort:** The resort is home to Southern California's highest-lifted peak at 8,805 feet and only half-pipes. The resort also consists of terrain parks and in the summer visitors can to golf at the resort's 7,200 feet Bear Mountain golf course. Located southeast of SR-18, south of Moonridge Road, bordered by Moonridge Road, Goldmine Drive, and Club View Drive in the City of Big Bear Lake.
- **Snow Summit Ski Resort:** Opened year round, the ski resort is located in the San Bernardino Mountains. Ski and snowboarding activities in the winter and hiking and mountain biking during the summer. The resort is home to Southern California's only lift-served hiking and mountain biking. Located south of the SR-18 between Thrush Drive and Summit Boulevard in the City of Big Bear Lake.
- **Snow Valley Mountain Resort:** The ski resort's highest elevation is at 7,841 feet. Located south of SR-18 and between Green Valley Trail and Siberia Creek Trail in Running Springs.
- **Rim Nordic Ski Area:** Rim Nordic Ski Area is the only cross country ski area in Southern California. Other activities include mountain biking on the Rim Nordic Bike park trail system, mountain bike racing and trail runs events and annual Pine Cone Festival. Located north of SR-1 and between Green Valley Trail and Siberia Creek Trail in Running Springs.
- **Mountain High Resort:** Located in Wrightwood, CA, Mountain High Resort is one of Southern California's closest winter resorts with no mountain driving. Located just an hour and a half from Los Angeles and Orange County, Mountain High Resort is located in the Los Angeles National Forest under special use permit from the US Forest Service.

### 3.2 US Forest Service

The MATS study area falls within the San Bernardino National Forest, which is a part of the US Forest Service. The San Bernardino National Forest is made up with the wild lands of the San Bernardino and San Jacinto Mountain Ranges that spans to approximately 679,380 acres. **Figure 3-1** identifies the location of the San Bernardino National Forest, and **Figure 3-2** identifies the two ranger districts, Mountaintop Ranger District and part of the Front Country Ranger District, that is within our study area. There are three visitor centers; the Big Bear Discovery Center, the Grassy Hollow Visitor Center in Wrightwood, and the Barton Flats Visitor Center. There are two wilderness areas; one northeast of the

Community of Big Bear and the other south of SR-38 that occupies the east portion of the Front Country Ranger District.

Figure 3-1: San Bernardino National Forest Locality Map



The San Bernardino National Forest has many “special places”. Special places include a National Monument, designated Wilderness Areas, Wild & Scenic Rivers, and other locales. The wilderness areas in San Bernardino County are San Gorgonio, Cucamonga, Bighorn Mountain, and Sheep Mountain. A few of the special places are described below:

- **Rim of the World Snow Play Area:** A location where visitors can participate in various types of snow play. There are three primary areas identified for snow play, including: SR-18 between Crest Park Picnic Area and Switzer Picnic Area, SR-18 east of SkyPark at Santa’s Village to east of Heaps Peak/Allison Ranch Road, and SR-18 between Green Valley Lake Road and Lakeview Point.
- **Heaps Peak Arboretum Day Use Area:** Open year-round and free to the public but requiring an Adventure Pass for parking, the arboretum is located on SR-18 west of Skyforest. Attractions include gardens, "animal tracks trail," a mini-gift booth, and other educational programs. Located at 6,000 feet, the arboretum and botanical gardens include a diversity of native plants.
- **Rim of the World Scenic Byway:** The year round route passes through the rim of the San Bernardino Mountains from Cajon Pass to San Gorgonio Pass that includes SR-138, SR-18, and SR-38. The Byway offers vistas and panoramas with some areas with snowfall in the winter and views of the Sand and Snow National Monument near the route between Mill Creek and Onyx Summit.
- **Sand to Snow National Monument:** The 154,000-acre monument is managed by the US Forest Service and the Bureau of Land Management. The area offers a variety of recreational activities to explore the diversity of land and wildlife.

**Appendix A** includes the 2014-2015 and 2016-2017 Visitors’ Guides to the San Bernardino Mountains. The National Forest offers a wide range of outdoor activities which includes hiking and backpacking, trail horseback riding, biking, off-highway vehicles, camping, picnicking, fishing, and winter activities such as skiing, snowboarding, and snowshoeing. Some of the recreational areas within the MATS study area are:

- **1N09 Recreational Shooting Sites:** Located in the Mill Creek Area on Old City Creek Road, these shooting sites are designated for target shooting and are only opened during certain times of year.
- **Applewhite Campground:** Located north of the Lytle Creek Ranger Station, northeast of Lytle Creek Road, and southeast of Applewhite Road. The campground is surrounded by trees and stretches across the street at Applewhite Picnic Area.
- **Applewhite Picnic Area:** Located south of Lytle Creek Road and between Sheep Canyon Road and Applewhite Road. The area is a family-friendly picnic area that provides parking spaces to up to 184 vehicles and closes once the site is full, usually on busy summer weekends.
- **Arrastre Recreational Shooting Site 1:** Located southeast of SR-18, along Burns Canyon Road, and west of the Arrastre Creek near the Community of Big Bear. The site is a designated target shooting site and is only open during certain times of year.
- **Arrastre Recreational Shooting Site 2:** Located southeast of SR-18, along Burns Canyon Road, and east of the Arrastre Creek near Community of Big Bear. The site is a designated target shooting site and is only opened during certain times of year.

- **Aspen Grove Trail:** Located south of SR-38, east of the Barton Flats Visitor Center. The trail passes through a grove of Quaking Aspens which is only found in one other location in California.
- **Baldy Mesa (Trestles) Off-Highway Vehicle (OHV) Staging Area:** Located north of SR-138 and east of I-15 on Santa Fe Road. The staging area with toilets and picnic areas is for Red/Green sticker OHV's and High-clearance 4WD vehicles with license plates.
- **Baldy Mesa OHV Road 3N21:** The road runs from the Baldy Mesa (Trestles) OHV Staging Area to the Desert Front OHV Road 3N24 which heads west to Baldy Mesa in the west Cajon valley.
- **Barton Flats Campground:** Located north of SR-38 and east Barton Flats Road. The campground is bordered by the Rio Monte hiking trail with Jenks Lake and Santa Ana River nearby.
- **Big Bear Valley Sportsman's Club - Shooting Range:** Located north of SR-38 and west of the intersection Division Drive and SR-38. The shooting range is open to the public and is only open on the weekends.
- **Big Bear Yellow Post Sites:** These thirteen yellow post sites are individual camping site on dirt roads, nine sites located north and four south of Big Bear Lake.
- **Big Pine Flat Family Campground:** The campground is located south of Coxey Road and west of 3N16 which is northwest of Big Bear Lake and northeast of Redonda Ridge.
- **Big Pine Flat Recreational Shooting Site #1, #2, and #3:** The shooting sites are located along Coxey Road southeast of Big Pine Flat Family Campground. The designated shooting sites are only opened during certain times of year.
- **Butler Peak Fire Lookout:** Located in the San Bernardino Mountains between the towns of Green Valley Lake and Fawnskin. The lookout offers views of the San Gorgonio Peak, the Big Bear Valley, Lake Arrowhead, Apple Valley, and the Inland Empire.
- **Buttercup Group Campground:** Located on the south side of Big Bear Lake near Pineknott Family Campground and Snow Summit Ski Resort.
- **Cleghorn Ridge OHV Road 2N47:** Located east of I-15 on Cajon Boulevard. The route is open to OHV vehicles runs from the Cleghorn off-ramp on Interstate 15 in Cajon Pass over Cleghorn Ridge to State Highway 138 at Lake Silverwood.
- **Coon Creek Cabin Group Campground:** Located southeast of SR-38 and east of the Coon Creek. The campground can accommodate up to 25 people and 10 vehicles.
- **Coon Creek Yellow Post Sites:** These nineteen yellow post sites are individual camping site on dirt roads, nine sites are located near the Pacific Crest Trail and the Coon Creek.
- **Crab Flats Family Campground:** Located north of SR-18 and northeast of the Green Valley Lake.
- **Desert Front OHV Road 3N24:** Located north of I-15 where Baldy Mesa Road and Forest Route 3N21 meets. The route is commonly called "Baldy Mesa" and runs from the junction of Baldy Mesa OHV Road 3N21 to State Highway 138 in west Cajon valley.
- **Dogwood Family Campground:** Located north of SR-18 and east of Daley Canyon Road. The campground has 87 sites.
- **Falls Picnic Area:** Located southeast of SR-38 and north of the Forest Falls community. Vivian Creek Trail to the San Gorgonio Wilderness starts here and the Momyer Trailhead is nearby.
- **Fish Creek Trail 1W07:** Located south of SR-38 and east of Fish Creek. The trail runs along the Fish Creek Trail Camp, Fish Creek Saddle, Mineshaft Saddle, Sky High Trail, summit of San Gorgonio, and the site of the wreckage from a C-47 airplane that crashed in 1953.

- **Forsee Creek Trail 1E06:** Located southeast of SR-38, south of Jenks Lake Road West, and along Forsee Creek Road. The trail runs along the Cut-off for John's Meadow, Jackstraw Camp, Trail Fork Springs Camp, Peak Divide Trail, Anderson Flat, Shields Flat, Trail Fork, High Meadow Spring, Jackstraw Spring Camp, and Trail Fork Spring Camp.
- **Gray's Peak Group Campground:** Located northwest of SR-38 and Big Bear Lake off 2N13. The campground can accommodate up to 40 people and 8 vehicles.
- **Gray's Peak Trail 1W06:** Located west of SR-38, north of Big Bear Lake, and south of Fawnskin across the Grout Bay Picnic Area. The trailhead is in the center of a bald eagle wintering habitat area and is closed to all public use from December 1 to April 1 and runs along Forest Road 2N04X, US Forest Service Road 2N70, and Gray's Peak.
- **Green Spot Equestrian Group:** Located south of Sugarloaf and SR-38, and the east end of Big Bear Valley. There are five horse corrals with a capacity of 10 horses. The campground can accommodate up to 25 people and 8 vehicles.
- **Green Valley Family Campground:** Located in the mountains north of Arrowbear, the midway point between the communities of Lake Arrowhead and Big Bear. The campground has 37 sites.
- **Grout Bay Picnic Area:** Located on the scenic north shore of Big Bear Lake. The Gray's Peak trailhead is across the highway from the picnic area.
- **Hanna Flat Family Campground:** Located north of SR-38 and north of the community of Fawnskin and the City of Big Bear Lake. The campground has 80 sites.
- **Heart Bar Equestrian Group Campground:** Located in the Heart Bar Campground Complex just outside the Sand to Snow National Monument south of SR-38. There are 46 corrals and 11 wood tables and only campers with horses are permitted to camp at Heart Bar Equestrian Campground.
- **Heart Bar Family Campground:** Located south of SR-38 and north of Heart Bar Equestrian Group Campground. The campground has 26 sites.
- **Holcomb Valley Campground:** Located north of SR-38 and Big Bear Lake and off 3N16. The campground has 19 sites.
- **Jenks Lake Day Use Area:** Located north of SR-38, east Barton Flats Road, and west of Jenks Lake. There is a picnic area for day use only.
- **Juniper Springs Group Campground:** Located east of SR-38 and north of Onyx Peak. The campground can accommodate up to 40 people and 8 vehicles.
- **Keller Peak Yellow Post Sites:** These nine yellow post sites are individual camping site located south of SR-18 and southeast of Arrowbear Lake. Each campground can accommodate up to 8 people and 2 vehicles.
- **Lobo Group Campground:** Located north of SR-38 and south of the Santa Ana River and Rattlesnake Creek. The campground can accommodate up to 75 people and 15 vehicles.
- **Lost Creek Trail 1E09:** Located north of SR-38 and south of the Santa Ana River along Seven Oaks Road. The trail runs along Santa Ana River Trail, Grinnell Ridge Camp, South Fork Meadows, and South Fork Trail with views of Santa Ana Canyon and Sugarloaf Peak.
- **Lost Lake Day Use Area:** Located north of Cajon Boulevard and Lone Pine Canyon along Swarthout Canyon Road. There is a picnic area for day use only.

- **Mission Springs PCT Trail Camp:** Located south of SR-38 along Pacific Crest Trail and north of Mission Springs Campground. The site has four horse corrals for equestrian use and 2 camp sites.
- **Momyer Creek Trail 1E06:** Located east of SR-38 and Forest Falls along Valley of the Falls Drive. The trail starts at the Mill Creek and runs across the creek and near Alger Creek Camp, Dobbs Camp, Saxon Camp, and Dollar Lake Saddle.
- **North Shore Campground:** Located east of SR-173 and Lake Arrowhead and north of the Mountain Community Hospital off Sawmill Road. The campground has 28 sites.
- **Oso Group Campground:** Located north of SR-38, south of the Santa Ana River and Rattlesnake Creek, and southwest of Lobo Group Campground. The campground can accommodate up to 100 people and 20 vehicles.
- **Pacific Crest Trail:** The trail enters the San Bernardino National Forest in its southern end in the Santa Rosa Mountains. It exits in the northwest part of the forest at Boundary Ridge near Wrightwood.
- **Pineknott Family Campground:** Located south of SR-18 off US Forest Service Road and east of Snow Summit Ski Resort. The campground has 47 sites.
- **San Bernardino Peak Trail 1W07:** Located east of SR-38 from Angelus Oaks along Manzanita. The trail is near Columbine Camp, Manzanita Flats, Columbine Springs Junction, Limber Pine Bench Camp, San Bernardino Peak Divine Trail, San Bernardino East Peaks, and Trail Fork Springs.
- **San Gorgonio Family Campground:** Located north of SR-38 and between Barton Flats Campground and Oso Group Campground. The campground has 54 sites.
- **Santa Ana River Trail 2E03:** Located south of SR-38 and north of Coon Creek and Heart Bar State Park. The trail begins in the Sand to Snow National Monument, at the Pacific Crest Trail near Heart Bar, crossing the National Forest towards Morton Peak.
- **Serrano Campground:** Located south of SR-38 just north of Big Bear Lake. The campsite has 93 sites.
- **South Fork Family Campground:** Located south of SR-38 between Seven Oaks Road and Front Line Road. The campsite has 24 sites that can accommodate up to 8 people per a site.
- **South Fork Trail 1E04:** Located south of SR-38 and Frog Creek, east of Jenks Lake, and north of Jenks Lake Road West. The trail passes through Horse Meadow, San Gorgonio Wilderness boundary South Fork Meadows, and the trail forks to Dry Lake and Dollar Lake.
- **Summit OHV Staging Area:** Located south of SR-138 and west of where Cleghorn Road and Forest Route 3N66. The staging area is for Red/Green sticker OHV's and High-clearance 4WD vehicles with license plates.
- **Thurman Flats Picnic Area:** Located along SR-38 and west of Kilcare Road and Mountain Home Village. This is one of the best bird watching areas on the Forest with a picnic area.
- **Vivian Creek Trail 1E08:** Located east of SR-38 and Forest Falls, northeast of Falls Picnic Area, west of Camp Creek, and along Falls Road. The trail passes through Vivian Creek Camp, Halfway Camp, High Creek Camp, the summit of San Gorgonio, High Creek, and ends with views of Yucaipa Ridge, Galena Peak and Mt. San Gorgonio.

- **Wild Horse Equestrian Campground:** Located south of SR-38 and the Heart Bar Campground and northwest of Coon Creek. The campground has 8 single and 3 double sites, thirty horse corrals, and only campers with horses are permitted to camp at this location.

The National Visitor Use Monitoring (NVUM) program (sourced by the US Forest Service at the website: <http://www.fs.fed.us/recreation/programs/nvum/>) is a tool that the US Forest Service uses to manage its recreational facilities. There are nine regions within the National Forest Systems; Northern, Rocky Mountain, Southwest, Intermountain, Pacific Southwest, Pacific Northwest, Southern, Eastern, and Alaska Region. For our study area, the San Bernardino National Forest is within the National Forest Pacific Southwest region. According to the NVUM 2012 National Report, the regional annual visitation estimates for the Pacific Southwest region is 24,601,000.

## 4.0 PREVIOUS STUDIES

The challenges related to transportation in the mountain area are not new, thus there have been multiple studies of transportation in the mountain area over the past twenty years. This section is not fully conclusive of all studies, and does not include small traffic studies. However, it does include several larger and more recent studies that have resulted in transportation recommendations that are relevant to this study.

### 4.1 Big Bear 1996 Highway Transit Improvement Alternative

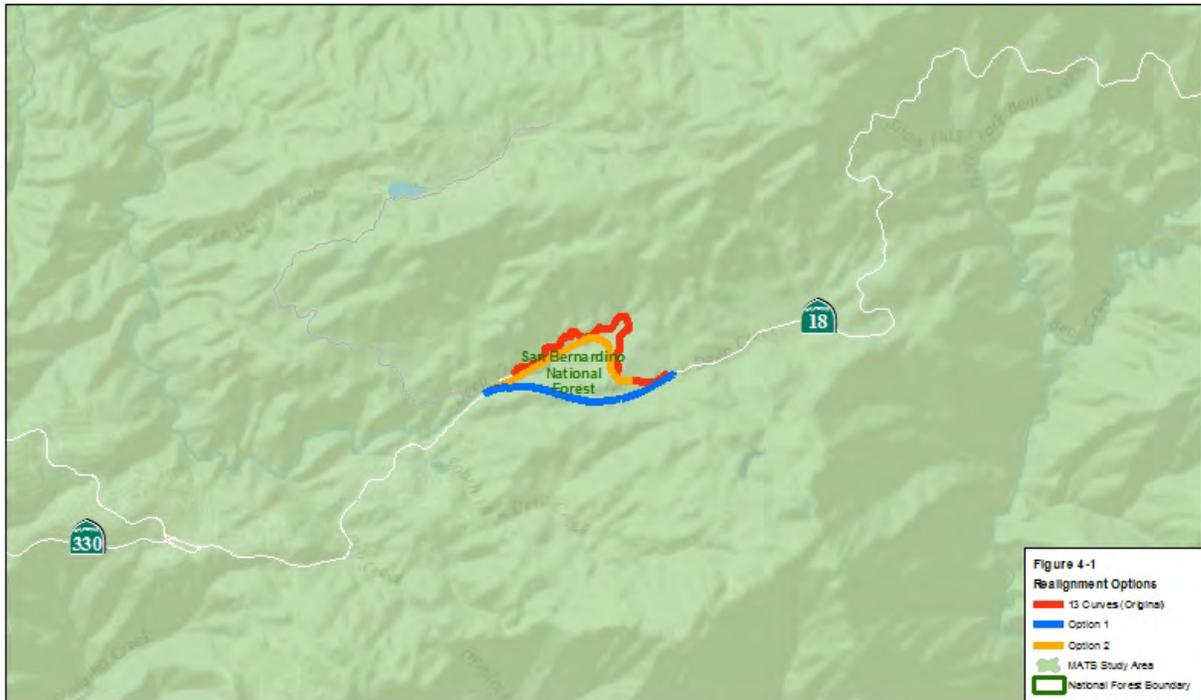
In 1994, a highway transit improvement alternatives study was completed for the San Bernardino mountain area. Recommendations from this study include a new alignment bypassing “13 Curves”, a parking facility along SR-18 near Snow Valley, park and ride lots, as well as other improvements that serve as potential solutions to issues identified in the needs assessment for this project.

#### 4.1.1 “13 Curves” Realignment

A notable location on SR-18 is the “13 Curves” area located near snow valley. Due to the non-conforming geometric alignment of the roadway, this location frequently experiences congestion. Several options were identified and shown in **Figure 4-1**.



Figure 4-1: “13 Curves” Realignment Alternatives



#### 4.1.2 Parking Facility along SR-18 East of Snow Valley

Many visitors are attracted to the segment of SR-18 east of the Snow Valley ski area. This is a highly popular snow play area, with no dedicated parking. Currently sight distance and roadway grades exacerbate the problem, because visitors tend to park on the highway shoulder despite “No Parking” signs. The recommendation from this study was to provide a dedicated parking area for 100 vehicles at this location.

#### 4.1.3 Park and Ride Lots

This study recommended two new park-and-ride lots; one in Highland and one in Running Springs. The purpose for these park-and-ride lots was to provide sheltered areas that are served by the existing Mountain Transit fixed-route service. The location of the park-and-ride lot in Running Springs was recommended due to the elevation of Running Springs, and the knowledge that chains are often required to access SR-18 east of Running Springs in winter months. It was also recommended that MARTA service be modified in peak winter and summer months to accommodate recreational demands.

#### 4.1.4 Signage and Flashers

Advisory signs and flashers were identified as a way to allow for better operations on the roadway system. The recommendations included additional signage and flashers throughout the SR-330/SR-18 corridor, with particular attention to areas of heavy traffic.



## 4.2 Big Bear Modal Study

The Big Bear Model Alternatives Analysis, commissioned by SCAG, SANBAG (now referred to as SBCTA), and the Inland Valley Development Agency and completed in 2011, explored the feasibility of non-roadway alternatives for future transportation of people and goods between the San Bernardino and Big Bear Valleys. The study documented the traffic congestion and road closure problems that indicate a clear need for additional transportation capacity to accommodate future growth in travel to and from the mountains. An alternative transportation system offers several benefits when compared to roadway improvements – the ability to transport people and goods in all types of weather, an alternative way of moving people during emergencies, a smaller environmental “footprint” than road improvements, and improved access to mountain recreation areas without proportional expansion of roadway and parking capacity.

The key transportation system constraints were summarized as follows:

- The mountain highway routes that provide access to the Big Bear Valley experience traffic congestion on weekends throughout the year, and experience high levels of congestion for extended periods of time on holiday weekends and winter weekends with good snow conditions.
- The mountain access roads are increasingly vulnerable to closure or restriction because of adverse weather, traffic accidents, rock fall, landslides, or wildfire.
- These impediments to mountain access act as constraints to growth and development in the Big Bear Valley, and to the Southern California Region’s ability to take advantage of the mountain area’s four-season recreational assets.
- The feasibility of adding significant capacity to existing highways or constructing a new road facility is doubtful because of both environmental and financial constraints.

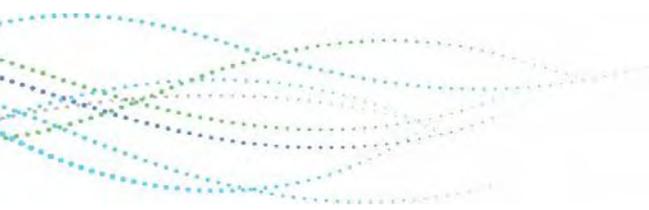
The study identified and evaluated a range of technological options for an alternative mode, as well as several alternative routes for it between San Bernardino and the City of Big Bear Lake. The new system was estimated to cost between \$2.8-9.6 billion to build, with an annual operating cost of \$11.8-13.8 million. Estimated revenues from passengers and freight, combined with other plausible revenue sources, would not be sufficient to pay for the capital and operating costs without a substantial (estimated at \$3.8 billion) grant of public funds.

The constraints identified above still represent key challenges to circulation through the mountain areas of San Bernardino County, and the low likelihood of significantly increasing roadway capacity is the main reason that this MATS focuses on identifying and improving key bottleneck locations.

## 4.3 2015 San Bernardino Countywide Transportation Plan

In September of 2015, SANBAG (now referred to as SBCTA) published a Countywide Transportation Plan (CTP) with a purpose of laying out a strategy for long-term investment in and management of San Bernardino County’s transportation assets. Key Issues for the CTP included the following:

- Transportation Funding
- Congestion Relief and Economic Competitiveness
- System Preservation and Operations



- Land Use
- Transit System Interconnectivity
- Attainment of Air Quality Standards
- Sustainability and Greenhouse Gas Reduction

The CTP proposed many strategies for the County for modal, functional, and geographic improvements. **Table 4-1** summarizes the proposed strategies related to the mountain area.

**Table 4-1: 2015 SANBAG CTP Proposed Strategies**

Category	Challenge	Strategy
Arterials	Arterial project construction has lagged original expectations.	Encourage jurisdictions to accelerate arterial improvement projects and continue policy flexibility for funding development shares. SANBAG will identify arterial improvements that are particularly important to route continuity.
Active Transportation	Large funding needs for building out the cycling/walking network.	Continue to submit competitive grant applications to support implementation of the Non-Motorized Transportation Plan (NMTP) Maintain and update the NMTP Identify and pursue grant funding opportunities to expand cycling and walking infrastructure
Transit Integration and Inter-Connectivity	Transit services could be better coordinated across systems in terms of ease of transfers, fare media, and first/last mile connections. This will be even more important as the system grows.	Take a more integrated, customer-focused approach to the provision of transit services. Facilitate seamless ticketing and better connection at existing transit centers and connection points.
Highway Maintenance and Operations	Highways are facing serious future maintenance funding shortfalls. Local jurisdictions are responsible for arterial maintenance while Caltrans is responsible for freeway and state highway maintenance.	Conduct a strategic planning study with Caltrans and regional agencies to assess maintenance/operations funding needs and approaches to managing costs.
Rural Highway Needs	Rural areas require unique maintenance/safety/funding consideration.	Focus on cost effective maintenance and support for funding streams that the County and Caltrans can utilize to maintain these rural highways.
Transit System Maintenance and Operations	Existing transit systems are facing potentially serious future operations funding shortfalls.	Optimize transit operations and identify mechanisms to fund future system operations and expansion.
Air Quality	Although air quality has dramatically improved over the last several decades, attainment of the next set of ozone standards will be extraordinarily challenging and costly.	Work with regional and state agencies and the private sector to meet attainment standards on an achievable timeline that does not adversely impact the economy. Advocate for state/federal investment that facilitates this progress. Focus on market-based mobile source technology improvements and fleet turnover as a win-win approach.
Health	Public health is being integrated into policy frameworks throughout state, regional, and local governments. The challenge in the transportation arena is to determine how to incorporate health considerations into decision-making frameworks.	Continue to build on health partnerships already established. Continue focus on transit mobility and developing the active transportation network to promote cycling and walking.

Category	Challenge	Strategy
<b>Mountain/Desert Strategies</b>		
Mountain/Desert Fixed Route Transit	Funds are limited for route expansion and adjustment as the Victor Valley grows.	Study the challenges of the trajectory of transit operations funding, and jointly develop solutions between SANBAG and the Mountain/Desert transit agencies.
Mountain/Desert demand-responsive bus service	Demand-responsive service is the highest cost form of transit, but important in serving certain senior and disabled transit riders.	Continue assistance programs, such as helping demand-responsive riders use fixed-route systems and coordination with non-profit entities while also maintaining demand-responsive service.
Mountain Subarea	Though baseline population is small, major congestion occurs on weekends, particularly winter weekends, limiting economic growth.	Conduct a study of bottleneck locations and lower-cost improvements that could reduce weekend congestion levels and prioritize funding for those projects.



## 5.0 EXISTING CONDITIONS

This section focuses on the existing conditions of the facilities within the mountain area. Iteris worked with SBCTA staff and the stakeholders group to identify the transportation system that forms the basic network for this study.

### 5.1 Roadway

The primary access roadways within the MATS area are State Route (SR)-2, SR-18, SR-38, SR-138, and SR-330, and each experience unique traffic patterns associated with visitors to the area. All of the state highways within the MATS area were included, as well as some key local facilities. Secondary roads include major facilities within the Mountain area that are heavily used by residents and visitors. **Table 5-1** summarizes the primary roadway network within the MATS area. **Table 5-2** summarizes the secondary roadway network within the MATS area.

**Table 5-1: Primary Roadway Network**

Segment	Typical Lane Configuration	Intersection Control Type	Passing Lane
<b>SR-2 (State Route)</b>			
From SR-138 through Wrightwood	2-lane, Undivided	Two-way stop controlled intersections for local streets. Four way stop controlled intersection at Willow Road.	Not Applicable
<b>SR-18 (State Route)</b>			
Smarts Ranch Road to SR-38/Greenway Drive/North Shore Drive	2-lane, Undivided	Two-way stop controlled intersections for local streets.	Not Applicable
SR-38/Greenway Drive/North Shore Drive to SR-38/Big Bear Boulevard	2-lane, Undivided	Two-way stop controlled intersections for local streets.  Signalized Intersection: • Greenway Drive at Big Bear Boulevard	Not Applicable
SR-38/Big Bear Boulevard to Stanfield Cut-off/Starvation Flats Road	2-lane, Undivided	Two-way stop controlled intersections for local streets.  Signalized Intersections: • Greenway Drive at Big Bear Boulevard • Big Bear Boulevard at Division Drive • Big Bear Boulevard at Stanfield Cut-off	Not Applicable



Segment	Typical Lane Configuration	Intersection Control Type	Passing Lane
Stanfield Cut-off to Pine Knot Ave	4-lane, Undivided With Two-Way Left Turn Lane	Two-way stop controlled intersections for local streets.  Signalized Intersections: <ul style="list-style-type: none"> <li>• Big Bear Boulevard at Interlaken Shopping Center</li> <li>• Big Bear Boulevard at Fox Farm Road</li> <li>• Big Bear Boulevard at Moon Ridge Road/Garstin Drive</li> <li>• Big Bear Boulevard at Summit Boulevard</li> <li>• Big Bear Boulevard at Georgia Street</li> <li>• Big Bear Boulevard at Pine Knot Avenue</li> </ul>	Not Applicable
Pine Knot Avenue to Village Drive	2-lane, Undivided With Two-Way Left Turn Lane	Two-way stop controlled intersections for local streets.  Signalized Intersections: <ul style="list-style-type: none"> <li>• Big Bear Boulevard at Pine Knot Avenue</li> <li>• Big Bear Boulevard at Village Drive</li> </ul>	Not Applicable
Village Drive to SR-38 (at Bear Creek)	2-lane, Undivided	Two-way stop controlled intersections for local streets.  Signalized Intersections: <ul style="list-style-type: none"> <li>• Big Bear Boulevard at Village Drive</li> <li>• SR-18/Big Bear Boulevard at SR-38/North Shore Drive</li> </ul>	Not Applicable
SR-38 (at Bear Creek) to SR-330	2-lane, Undivided	Two-way stop controlled intersections for local streets. No stop control at pull-outs and view-points.	Passing lanes exists both eastbound and westbound for approximately 1.5-mile segments.
SR-330 to SR-138	2-lane, Undivided	Two-way stop controlled intersections for local streets. No stop control at pull-outs and view-points.  Signalized Intersections: <ul style="list-style-type: none"> <li>• SR-18 at Lake Gregory Drive</li> </ul>	Not Applicable
SR-138 to Arrowhead Springs Road/Old Waterman Canyon Road	4-lane, Undivided	Two-way stop controlled intersections for local streets. No stop control at pull-outs and view-points.	Not Applicable
<b>SR-38 (State Route)</b>			
South of Sugarloaf to SR-18/Greenway Drive/Big Bear Boulevard	2-lane, Undivided	Two-way stop controlled intersections for local streets.  Signalized Intersections: <ul style="list-style-type: none"> <li>• Big Bear Boulevard at Maple Lane</li> <li>• Big Bear Boulevard at Greenway Drive</li> </ul>	Passing lanes exists both eastbound and westbound for approximately 0.25-mile segments



Segment	Typical Lane Configuration	Intersection Control Type	Passing Lane
SR-18/Greenway Drive/Big Bear Boulevard to SR-18/SR-38 (at Big Bear Creek)	2-lane, Undivided	Two-way stop controlled intersections for local streets.  Signalized Intersections: <ul style="list-style-type: none"> <li>• Big Bear Boulevard at Greenway Drive</li> <li>• SR-18/Big Bear Boulevard at SR-38/North Shore Drive</li> </ul>	Not Applicable
<b>SR-330 (State Route)</b>			
SR-18/SR-330 to City Creek near Highland Avenue	2-lane, Undivided	Two-way stop controlled intersections for local streets. No stop control at pull-outs and view-points.	Passing lanes exists both northbound and southbound for approximately 0.5-mile segments.
<b>SR-138 (State Route)</b>			
SR-18 to SR-173	2-lane, Undivided	Two-way stop controlled intersections for local streets.  All-way stop control: <ul style="list-style-type: none"> <li>• SR-138 at Crest Forest Drive</li> <li>• SR-138 at Knapps Cut-off</li> <li>• SR-138 at Waters Drive</li> </ul>	Not Applicable
SR-173 to I-15	2-lane, Undivided	Two-way stop controlled intersections for local streets.	Passing lanes exists both northbound and southbound for approximately 1.0-mile segments before I-15.
West of I-15 to North of SR-2	2-lane, Undivided	Two-way stop controlled intersections for local streets.	Passing lanes exists both northbound and southbound for approximately 0.3-mile segments after I-15, and from Lisa Lane to SR-2.
<b>I-15 (Interstate)</b>			
Through MATS Area	8-lane, Divided	Not applicable	Not applicable
<b>I-215 (Interstate)</b>			
Through MATS Area	4-lane, Divided	Not applicable	Not applicable

**Table 5-2: Secondary Roadway Network**

Roadway	Segment	Typical Lane Configuration	Intersection Control Type
Arosa Drive	Between Lake Drive and N Road in the community of Lake Gregory	1 lane each direction	<ul style="list-style-type: none"> <li>• Stop control at 5-way intersection with Lake Drive/Delle Drive/Dart Canyon Road/Arosa Drive/San Moritz Drive</li> <li>• 1-way stop control at intersection with N Road</li> </ul>



Roadway	Segment	Typical Lane Configuration	Intersection Control Type
Daley Canyon Road	Between SR-18 and SR-189 west of Rim of the World High School	1 lane each direction	<ul style="list-style-type: none"> <li>• 1-way stop controlled at both ends</li> <li>• Daley Canyon is stop controlled</li> </ul>
Division Drive	Between SR-38 and SR-18 in the community of Big Bear	1 lane each direction	<ul style="list-style-type: none"> <li>• 1-way stop controlled on the south end with SR-18</li> <li>• 2-way stop controlled on the north end with SR-38</li> </ul>
Stanfield Cut-off	Between SR-38 and SR-18 in the community of Big Bear	1 lane each direction	<ul style="list-style-type: none"> <li>• Signalized on the south end with SR-18</li> <li>• 1-way stop controlled on the north end with SR-38</li> </ul>
Greenway Drive	Between SR-38 and SR-18 in the community of Big Bear	1 lane each direction	<ul style="list-style-type: none"> <li>• 1-way stop controlled on the south end with SR-18</li> <li>• 2-way stop controlled on the north end with SR-38</li> </ul>
Lake Drive	Between SR-138 and Lake Gregory in the community of Crestline	1 lane each direction	<ul style="list-style-type: none"> <li>• No control at intersection with SR-138</li> <li>• 2-way stop controlled intersection at Lake Gregory Drive</li> <li>• Stop control at 5-way intersection with Lake Drive/Delle Drive/Dart Canyon Road/Arosa Drive/San Moritz Drive</li> </ul>
Lake Gregory Drive	Between Lake Drive and SR-18 in the communities of Crestline/Skyland	1 lane each direction	<ul style="list-style-type: none"> <li>• Signalized intersection with SR-18</li> <li>• 2-way stop controlled intersection with Lake Drive</li> </ul>
Old Mill Road	Between Lake Drive and SR-138 in the community of Crestline	1 lane each direction	<ul style="list-style-type: none"> <li>• 1-way stop controlled intersection at Lake Drive</li> <li>• 1-way stop controlled intersection at SR-138</li> </ul>
N Road	Between Lake Gregory Drive in the community of Crestline and Grandview Road in the community of Twin Peaks	1 lane each direction	<ul style="list-style-type: none"> <li>• 1-way stop controlled intersection at Lake Gregory Drive</li> <li>• No stop at Arosa Drive</li> <li>• 1-way stop controlled intersection at Grandview Road</li> </ul>
Grass Valley Road	Between SR-189 and SR-173 in the community of Lake Arrowhead	1 lane each direction	<ul style="list-style-type: none"> <li>• 1-way stop controlled intersection at SR-189</li> <li>• 1-way stop controlled intersection at SR-173</li> </ul>
Lone Pine Canyon Road	Between SR-138 and SR-2 entering the community of Wrightwood	1 lane each direction	<ul style="list-style-type: none"> <li>• 1-way stop controlled intersection at SR-138</li> <li>• No control at the intersection with Sheep Creek Drive</li> </ul>

## 5.2 Transit

Two transit agencies serve the MATS area: Mountain Transit and Victor Valley Transit Authority.

Mountain Transit currently runs six fixed-routes and various other services to MATS residents and visitors.

- **Big Bear Route 1:** Routed on SR-18 and SR-38 between Boulder Bay, Moonridge, Lake Erwin, and Sugarloaf. Route 1 runs Monday through Sunday with 60 minute headways.



- **RIM Route 2:** Routed on SR-138, SR-189, and SR-18 between Cedar Pines, Valley of Enchantment, Crestline, Twin Peaks, Blue Jay, and Lake Arrowhead. Route 2 runs Monday through Friday with approximately 60 minute headways.
- **Big Bear Route 3:** Routed on SR-18 and SR-38 between Mountain Meadows and Gold Mountain. Route 3 runs Monday through Friday with 60 minute headways.
- **RIM Route 4:** Routed on SR-173 and SR-18 between Cedar Glen, Lake Arrowhead, Crest Park, and Running Springs. Route 4 runs on Monday through Friday with approximately 90 minute headways.
- **Big Bear Off the Mountain:** Routed from downtown Big Bear to San Bernardino, with a connection in Running Springs. The Big Bear off-the-mountain route operates Monday through Sunday at approximately 4.5 hour headways.
- **RIM Off the Mountain:** Routed on SR-18 between Blue Jay, Crestline, and San Bernardino. The RIM off-the-mountain route operates Monday through Saturday at approximately 3 hour headways.

Victor Valley Transit Authority currently runs one fixed-route service to MATS residents and visitors, with a destination in Wrightwood at the Wrightwood Community Center.

- **Route 20:** Routed primarily on SR-2 and SR-138 within the study area, between Phelan and Pinon Hills and Wrightwood. Route 20 runs Monday through Saturday with 90 minute headways.

### 5.2.1 Dial-A-Ride Service

Mountain Transit provides Dial-a-Ride service for seniors and persons with disabilities, as well as anyone who lives more than ¼ mile from a Mountain Area Transit fixed-route stop who is also within the Dial-a-Ride service area.

### 5.2.2 Weekend Trolley

Mountain Transit provides service for a Big Bear Weekend Trolley. The weekend trolley has service to the Alpine Slide, Village, Moonridge Zoo/Bear Mountain, Interlaken Shopping Center, and many of the local hotels and restaurants. The weekend trolley is only available on Saturday and Sunday, and operates at 60 minute headways.

### 5.2.3 Rally Bus

Both Snow Summit and Bear Mountain (the two major ski/snowboarding resorts) utilize Rally Bus services, which is an example of ride-sharing. Rally Bus is a crowd-powered shared-ride service that is often developed for event travel. Information about the Rally Bus is shared through social media, and is not booked or billed until the number of seats occupied is over 25. For more information on Rally Bus, please see <http://rallybus.net/> or <http://rallybus.net/FAQ>.

## 5.3 Non-Motorized Transportation

In the existing transportation system, non-motorized transportation (including bicycles and pedestrian activity) is encouraged, but the system lacks infrastructure, which can be a problem for mobility. The City of Big Bear Lake has an Active Transportation Plan, and the Lake Arrowhead community is currently

preparing an Active Transportation Plan. In addition, there has been recent coordination between the City of Big Bear Lake, the County of San Bernardino, and the Big Bear Valley Trails Foundation in obtaining a Caltrans grant to assist in the development and planning for future development of road and trail resources with connections to lakes and mountain amenities. The goal of the plan is to use community involvement to identify valley-wide needs by integrating land use with transportation and economic development goals. The end result of the plan will be to construct new bicycle lanes, sidewalks, and non-motorized trails inclusive of trail heads and other trail amenities.

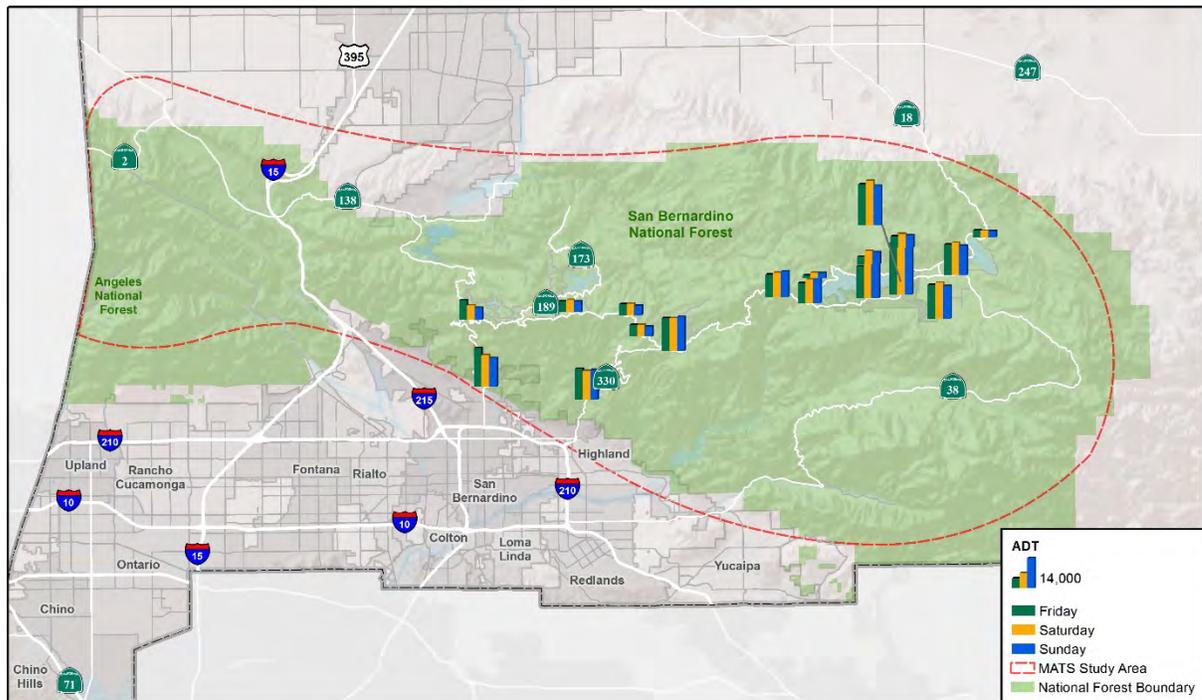
## 5.4 Data Collection

Data collection for MATS study was extensive, and included traffic count data, speed collection, and visitor attractions.

### 5.4.1 Average Daily Traffic – ADT Count Data

Average Daily Traffic (ADT) count data was obtained at 29 locations throughout the MATS study area for Friday through Sunday travel. **Figure 5-1** illustrates the locations of ADT count data, and **Table 5-3** summarizes the collected ADT for Friday, Saturday, and Sunday travel. The primary direction of travel on Friday and Saturday is EB/NB while the primary direction of travel on Sunday is WB/SB. This indicates a higher influx of vehicles into the mountain area on Friday and Saturday with an outflow of traffic on Sundays.

**Figure 5-1: Average Daily Traffic Count Locations**



**Table 5-3: Average Daily Traffic**

Route	Location	Friday		Saturday		Sunday	
		EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB
SR-138	West of SR-173	883	1,384	1,150	938	1,109	955
SR-18	North of Sierra Way / Arrowhead Road	10,602	7,026	8,042	6,429	5,818	7,237
SR-18	East of Soutar Drive	9,956	4,853	8,729	6,112	6,315	9,098
SR-18	West of Nob Hill Drive	2,610	2,599	2,663	2,654	2,279	2,276
SR-330	North of Highland Avenue Ramps	9,737	4,254	7,904	5,076	5,380	7,957
SR-38	East of Bryant Street	3,837	2,291	3,608	2,841	2,559	3,723
SR-18	West of SR-38	7,437	2,646	6,755	4,315	4,557	7,070
SR-38	North of SR-18	1,023	526	1,564	1,052	986	1,499
SR-18	East of SR-38	6,776	2,489	6,329	4,428	4,588	6,611
SR-18	East of Delta Avenue	1,390	1,821	1,388	1,660	1,527	1,295
Big Bear Boulevard	East of Bonanza Trail	8,305	6,254	6,728	8,699	6,622	9,586
Big Bear Boulevard (SR-18)	East of Moon Ridge Road	12,048	11,670	14,110	13,556	12,145	12,009
Big Bear Boulevard (SR-18)	East of Moon Ridge Way	-	-	14,834	13,989	13,900	13,748
Big Bear Boulevard (SR-18)	East of Stanfield Cut-off	9,725	9,026	10,827	9,556	9,595	8,536
Big Bear Boulevard (SR-18)	West of Greenway Drive	7,318	8,037	8,007	8,271	7,605	7,112
East Big Bear Boulevard	East of Shore Drive	6,660	7,160	7,278	7,347	6,974	6,423
SR-38	West of Stanfield Cut-off	1,820	1,539	3,185	2,886	2,567	2,813
SR-38	East of Stanfield Cut-off	2,387	2,818	2,697	3,422	2,405	3,273
East Arrowbear Drive	South of SR-18	329	273	300	308	317	254
West Arrowbear Drive	South of SR-18	162	296	149	253	161	251
Running Springs School Road	South of SR-18	622	634	317	324	325	323
Live Oak Annex	South of SR-18	913	901	809	754	599	623
Rim of the World Highway (SR-18)	West of Ongo Camp Drive	2,518	2,473	2,597	2,590	2,209	2,224
Kuffel Canyon Road	North of Rim of the World Highway (SR-18)	1,441	1,324	1,427	1,271	1,120	1,201
SR-173	North of Holly Lane	2,793	2,264	3,036	2,578	2,347	2,539
Rim of the World Drive	North of Rim of the World Highway (SR-18)	618	636	561	521	527	561
SR-189	East of Lake Gregory Drive	2,109	1,950	1,724	1,636	1,435	1,636
Lake Gregory Drive	North of N Road	3,032	3,115	2,682	2,742	3,819	529
SR-138	North of Rim of the World Highway (SR-18)	5,304	3,710	3,482	3,192	2,698	2,975
<b>Directional Percentage</b>		<b>56.6%</b>	<b>43.4%</b>	<b>52.7%</b>	<b>47.3%</b>	<b>47.5%</b>	<b>52.5%</b>

### 5.4.2 Speeds – iPeMS

iPeMS software is a tool designed to measure performance of the transportation network. Information provided by iPeMS software provides a user with reliable measurement of the transportation network, a benefit/cost analysis of delay and congestion, ability to complete before and after analytics, and bottleneck reporting and visualization. The iPeMS instalment at SBCTA, which is used for the Congestion



Management Plan, provides the user with historical and real-time speed information on San Bernardino County state routes and freeways.

Speed data obtained from iPeMS was useful in identifying travel trends and patterns in different geographies. Average speed data were obtained for the months of May 2015 to April 2016. **Figure 5-2** illustrates the nine locations where roadway segment average speeds were identified:

- Location 1: SR-18 Between SR-138 and SR-189
- Location 2: SR-18 Between SR-173 and SR-330
- Location 3: SR-330 Between SR-210 and SR-38
- Location 4: SR-18 Between SR-330 and SR-38
- Location 5: SR-18 Between SR-210 and SR-138
- Location 6: SR-38 Between Yucaipa and City of Big Bear Lake
- Location 7: SR-18 Between SR-38 and Stanfield Cut-off
- Location 8: SR-2 West of SR-138
- Location 9: SR-138 Between SR-2 and I-15

Location data is summarized by season:

- Spring = March 20 through June 20
- Summer = June 21 through September 24
- Fall = September 22 through December 20
- Winter = December 21 through March 19

Location data is also summarized for a combined “Holiday”, which is a combination of the following holiday dates:

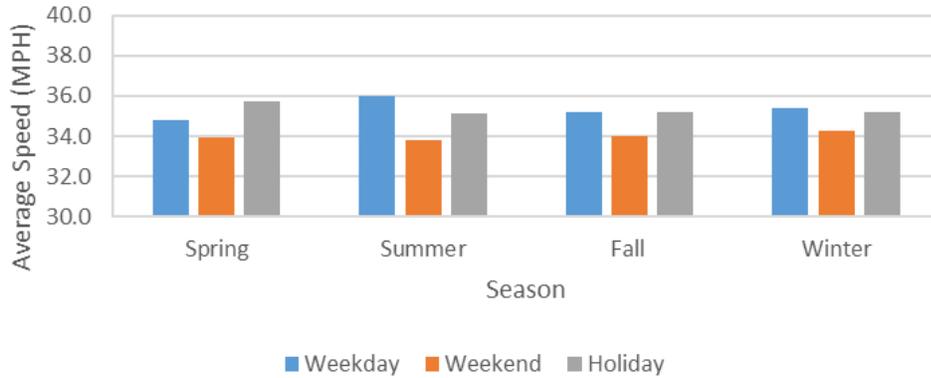
- Memorial Day (5/25/2015)
- Fourth of July (7/4/2015)
- Labor Day (9/7/2015)
- Thanksgiving (11/26/2015-11/27/2015)
- Christmas (12/25/2015)
- New Year’s Day (1/1/2016)
- President’s Day (2/15/2016)

In addition to looking at the seven identified locations, an in-depth investigation into the speeds on the SR-18/SR-38 couplet around Big Bear Lake. Additional speed and iPeMS data is included in **Appendix B**.



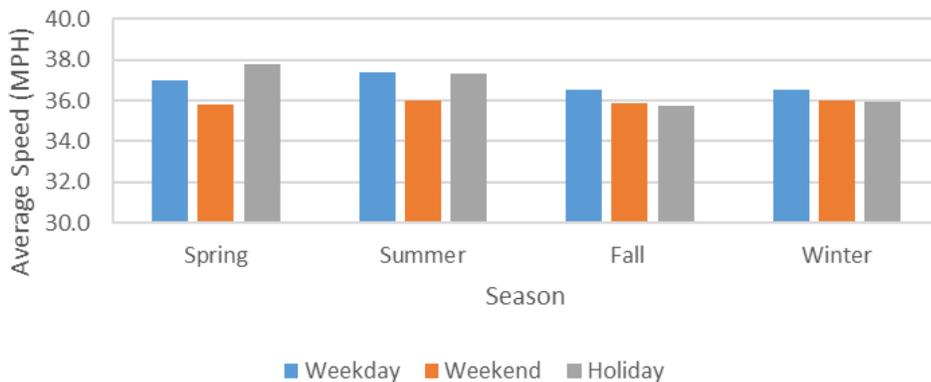


**Figure 5-3: SR-18 between SR-138 to SR-189 Average Speeds**



**Figure 5-4** illustrates the average speeds for the segment of SR-18 between SR-173 to SR-330. In the spring and summer months there is a clear difference between weekday and weekend travel, with weekend speeds being slightly lower. In the fall and winter, however, the weekend and holiday speeds are nearly the same, with the weekday speeds only slightly higher. The lower spring and summer weekend average speeds is likely attributed to higher visitor travel. The segment is between the community of Skyforest and Running Springs. In general, speeds on this segment range between 35 and 38 MPH.

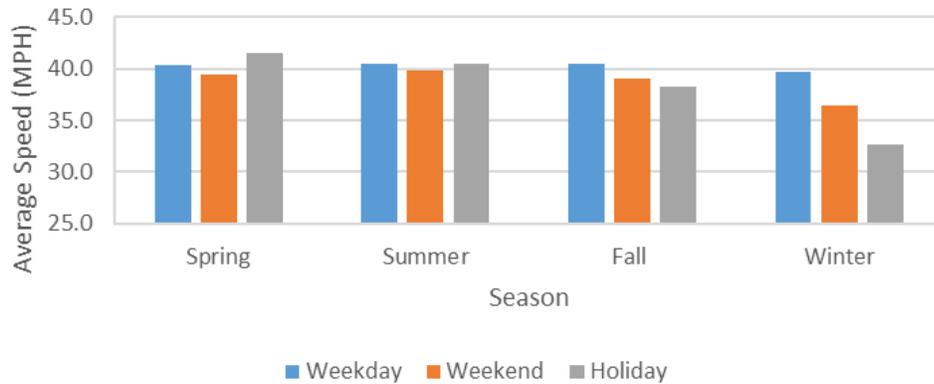
**Figure 5-4: SR-18 between SR-173 to SR-330 Average Speeds**



**Figure 5-5** illustrates the average speeds for the segment of SR-330 between SR-210 and SR-18. The spring and summer seasons have similar average speeds for weekday, weekend, and holiday travel, with the weekends being slightly slower. The fall and winter seasons have a higher average speed during the weekday, with a slightly lower speed during the weekend, and an even lower speed during holidays. The fall and winter seasons have slightly lower speeds than the spring and summer seasons, which can be attributed to visitor travel as well as weather and roadway geometry. The segment is located north of the City of Highland and south of the community of Running Springs. In general, speeds on this segment range between 32 and 42 MPH.

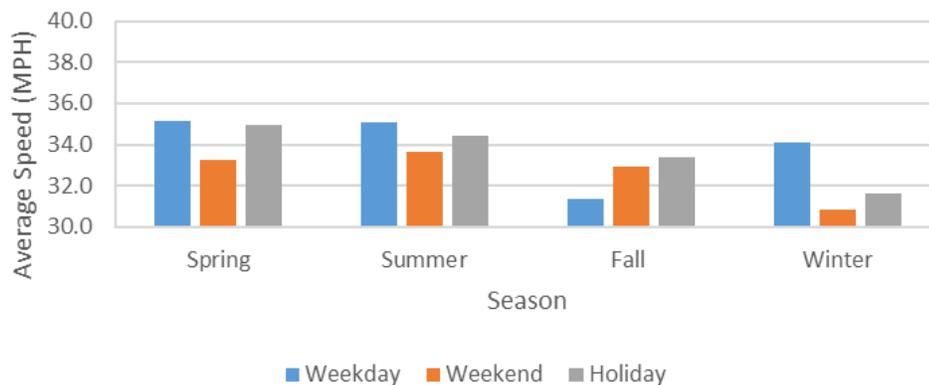


**Figure 5-5: SR-330 between SR-210 to SR-18 Average Speeds**



**Figure 5-6** illustrates the average speeds for the segment of SR-18 between SR-330 to SR-38. In general, the fall and winter seasons have lower speeds than the spring and summer seasons. The winter season has a large difference in weekday and weekend speed, with the weekend speeds being the lowest. This can be attributed to snow play and ski resort visitors in this location. This segment of roadway is located south of Green Valley Lake, between the community of Running Springs and the City of Big Bear Lake, with access to Snow Valley Mountain Resort. In general, speeds on this segment range between 30 and 35 MPH.

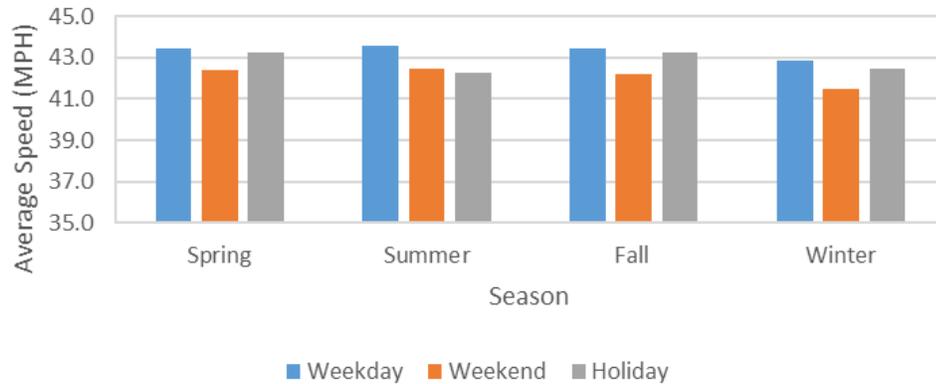
**Figure 5-6: SR-18 between SR-330 to SR-38 Average Speeds**



**Figure 5-7** illustrates the average speeds for the segment of SR-18 between SR-210 to SR-138. In general, all seasons have similar average speeds, and show the weekend travel at a slower speed than weekday travel. This segment of roadway begins in the City of San Bernardino, with access to Crestline, Lake Gregory, and Lake Arrowhead. In general, speeds on this segment range between 41 and 44 MPH.

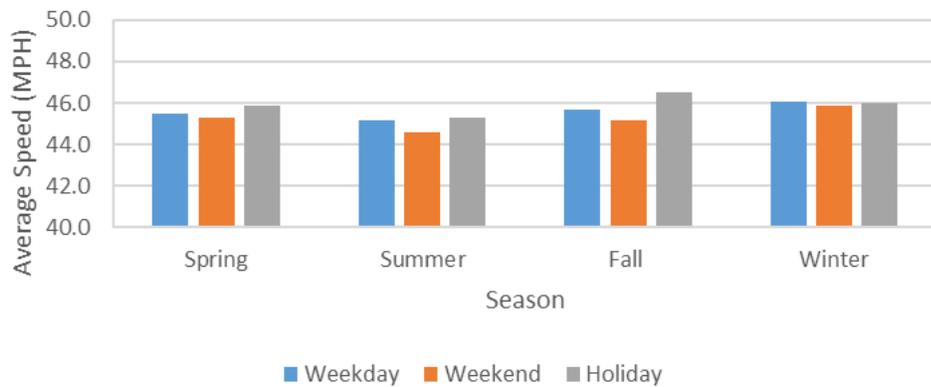


**Figure 5-7: SR-18 between SR-210 to SR-138 Average Speeds**



**Figure 5-8** illustrates the average speeds for the segment of SR-38 between Yucaipa and the City of Big Bear Lake. In general, all seasons have similar speeds, with weekend speeds being the same or slightly lower than weekday speeds. This segment of roadway has access to several campgrounds and trails. In general, speeds on this segment range between 44 and 47 MPH.

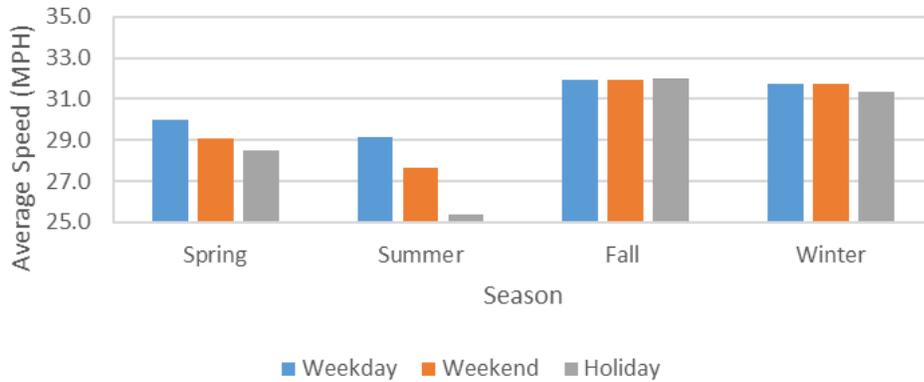
**Figure 5-8: SR-38 between Yucaipa and City of Big Bear Lake Average Speeds**



**Figure 5-9** illustrates the average speeds for the segment of SR-18 between SR-38 and Stanfield Cut-off. The spring and summer months show significantly lower speeds than the fall and winter months. This is primarily due to visitor influx during the summer months. This segment of roadway is essentially Big Bear Boulevard through the City of Big Bear Lake and Community of Big Bear. In general, speeds on this segment range between 25 and 32 MPH.

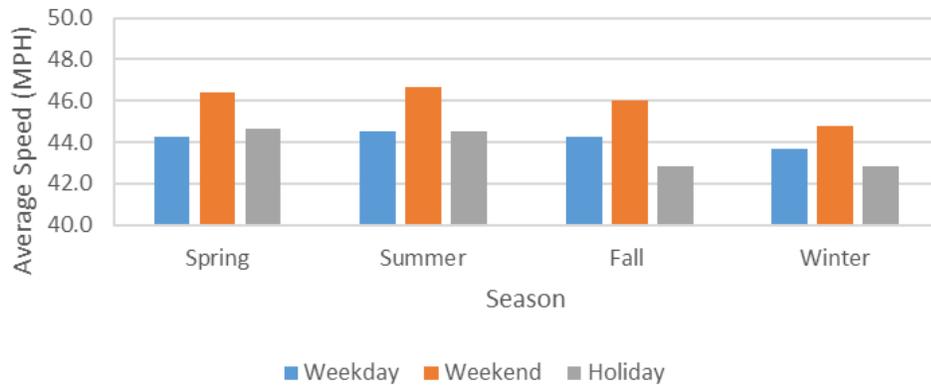


**Figure 5-9: SR-18 between SR-38 and Stanfield Cut-off Average Speeds**



**Figure 5-10** illustrates the average speeds for the segment of SR-2 west of SR-138 in Wrightwood. Most notably, the weekend speeds are higher than the weekday and holiday speeds. The fall and winter holiday speeds result in the lowest speeds overall, attributed to weather and visitor influx. In general, speeds on this segment range between 42 and 48 MPH.

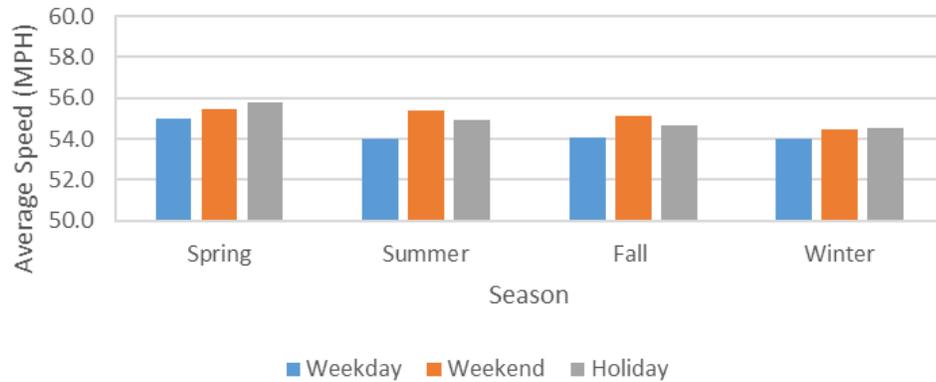
**Figure 5-10: SR-2 West of SR-138**



**Figure 5-11** illustrates the average speeds for the segment of SR-138 between SR-2 and I-15 east of Wrightwood. Speeds during all seasonal time periods range above 50 mph, with the weekday speeds lower than the weekend and holiday speeds.



Figure 5-11: SR-138 between SR-2 and I-15



#### 5.4.4 iPeMS Average Speeds Around Big Bear Lake Couplet (SR-18/SR-38)

The couplet of SR-18 and SR-38 around Big Bear Lake is a location that attracts a significant number of both summer and winter visitors. On the south side of the lake, there are two ski-resorts which are used year-round, and on the north side of the lake there is a boat launch that is used extensively in summer months. Surrounding the entire lake are campsites and trailheads. **Figure 5-12** and **Figure 5-13** illustrate the average speeds by time of day for an entire year. For the northbound/eastbound direction, the south side, SR-18, presents lower average speeds compared to the north side, SR-38. The figures illustrate that the lowest average speeds occur around the winter seasons for both routes which is consistent with stakeholder comments pertaining to high seasonal activity and congestion. Similarly, for the southbound/westbound direction, the south side, SR-18, experiences lower average speeds compared to the north side, SR-38. The lowest average speeds occurred in the months of January and February which is during the area’s snow season. Overall, the northbound/eastbound direction average speeds are than southbound/westbound.



Figure 5-12: Northbound/Eastbound Average Speeds

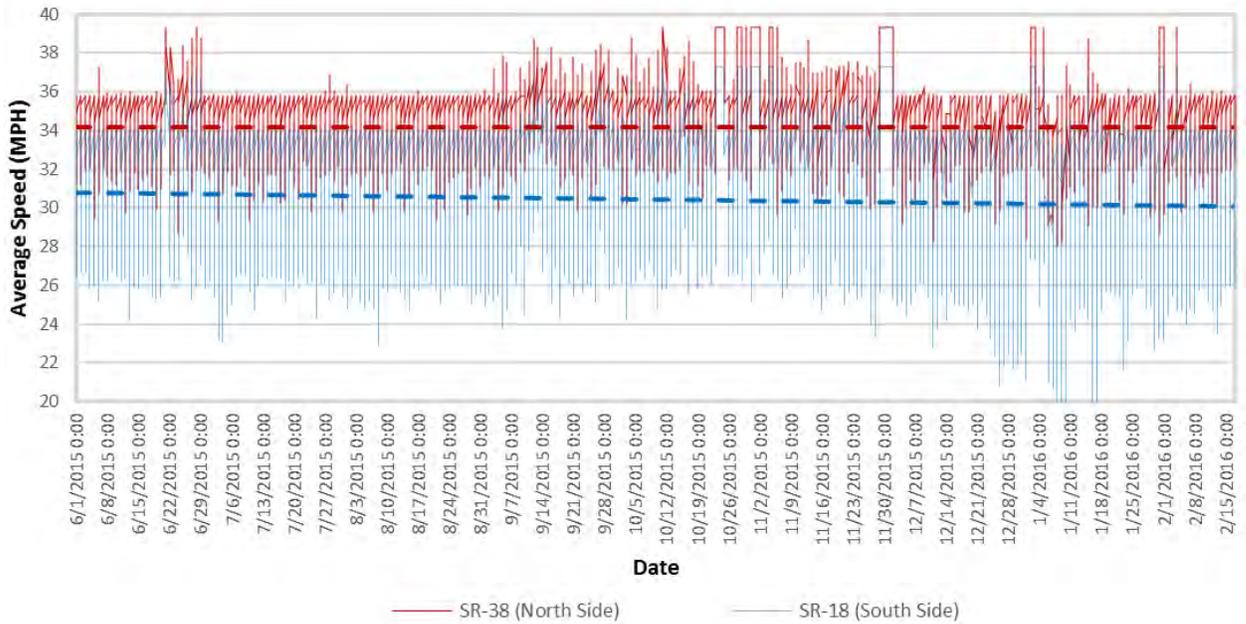
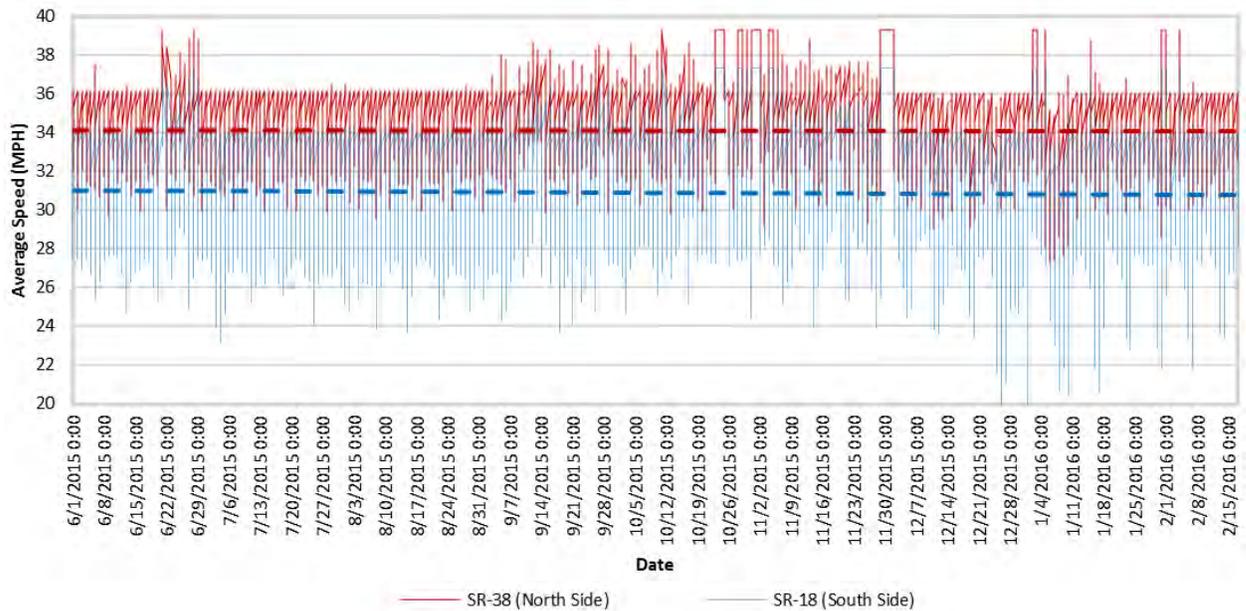
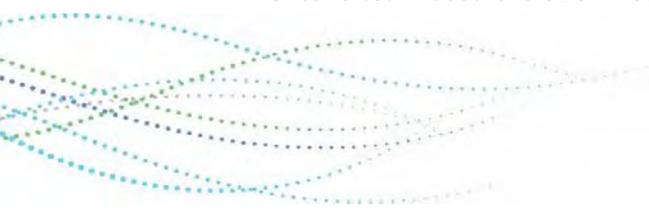


Figure 5-13: Southbound/Westbound Average Speeds



#### 5.4.5 Peak Period Identification

Peak period travel within the MATS area is important due to seasonal visitor travel. In 2014, Iteris was contracted by SBCTA to develop a web based Congestion Monitoring Tool using third-party HERE data. The Iteris team used the SBCTA Congestion Monitoring Tool to review general trends on SR-330, SR-18



and SR-38 to identify the peak periods. **Table 5-4** summarizes the weekday and weekend peak periods. In addition, Iteris identified days during winter months when traffic performance was poor due to inclement winter conditions. During the winter months, there were a few days that experienced traffic congestion that may have been attributed to winter conditions which are listed in **Table 5-5**. **Table 5-6** and **Table 5-7** summarize the summer season and Thanksgiving arrival and departure peak periods.

Therefore, in addition to normal weekends, the team considered the impacts of special weekends. Special weekends were identified as those occurring during public holidays and school holiday periods which attract large numbers of tourists to the mountain area. **Table 5-8** presents the peak periods for 4<sup>th</sup> of July and Christmas holiday.

**Table 5-4: Weekday and Weekend Peak Hours**

Segment	Weekday			Weekend Peak
	AM Peak Period	Mid-Day Period	PM Peak Period	
SR-330 Between SR-210 to SR-18	7-8AM	11AM-1PM	5-6PM	7-9AM
SR-38 (North Big Bear)	9AM-2PM		5-11PM	11AM-2PM
SR-18 (South Big Bear)	8-9AM	12-7PM		12-3PM

**Table 5-5: Traffic Congestion Due to Winter Conditions**

Segment	Traffic Congestion
SR-330 Between SR-210 to SR-18	Saturday, 1/9/2016
SR-38 (North Big Bear)	Wednesday, 1/6/2016
SR-18 (South Big Bear)	Sunday, 1/17/2016

**Table 5-6: Summer Season Arrival/Departure Peak Periods**

Segment	Summer Season		
	Friday Arrivals	Saturday Arrivals	Sunday Departures
SR-330 Between SR-210 to SR-18	5-6PM	11AM-1PM	11AM-1PM
SR-38 (North Big Bear)	2-2PM	1-2PM	12-2PM
SR-18 (South Big Bear)	3-4PM	2-3PM	11AM-12PM

**Table 5-7: Thanksgiving Holiday Arrival/Departure Peak Periods**

Segment	Holiday (Thanksgiving)	
	Wednesday Arrivals	Friday Departures
SR-330 Between SR-210 to SR-18	5-6PM	7-8AM
SR-38 (North Big Bear)	2-3PM	2-4PM
SR-18 (South Big Bear)	2-6PM	2-4PM



**Table 5-8: Holiday Peak Periods**

Segment	Holiday (Fourth of July)	Holiday (Christmas)
SR-330 Between SR-210 to SR-18	12-1PM	7-9AM
SR-38 (North Big Bear)	12-2PM	2-3PM
SR-18 (South Big Bear)	12-1PM	4-6PM

### 5.4.6 Turnouts

Throughout the MATS area, there are a number of locations which could be interpreted as “turnouts”. The purpose of useable turnouts along the State Routes in the MATS area is to provide a safe area for trucks and slow vehicles to pull over and allow for faster vehicles to pass. The importance of turnouts along State Routes is in the location and usability of turnouts, and not the frequency. In the existing conditions, there are a significant number of places which could behave as a turnout, but are not signed as such. The lack of signage and typical designs for turnouts results in trucks and slower vehicles bypassing turnouts and not using them.

In addition to true vehicle turnouts, there are Vista Points located along many of the State Routes. Vista points are informal turnouts (or “pullouts”) where motorists can safely view scenery, or park and relax.

### 5.4.7 Chain-up Areas

The MATS area includes State Routes that traverse mountains. Chain up locations are typically dependent on elevation. Up-to-date information can be found on the Caltrans District 8 webpage, which has a live link to chain required locations.

**Figure 5-19** was created during a peak snow event using the Caltrans Website (<http://www.dot.ca.gov/dist8/tmc/#>).





## 6.0 IDENTIFICATION OF MOBILITY ISSUES

Mobility issues (whether operational, geometric, or informational) were identified by receiving stakeholder comments and by reviewing the travel model results.

### 6.1 Stakeholder Input

Stakeholder input was extensive and instrumental in capturing all of the transportation related system needs within the mountain area. Stakeholders include the County of San Bernardino, the City of Big Bear Lake, Caltrans, SBCTA, SCAG, the CHP, and the US Forest Service. From the stakeholder meetings, many of the problems identified can be summarized into the following need categories:

- **Traffic Control:** Bottleneck due to existing, non-existent, or poor location of traffic control device. (Example is a stop sign located on a high-volume road).
- **Signage:** Bottleneck due to non-existent or lack of signage, often resulting in poor circulation patterns, or confused drivers.
- **Traffic Volume:** Congestion and slow-moving traffic due to peak traffic volumes in excess of existing roadway capacity.
- **Cut-through Traffic:** Peak conditions (related to traffic congestion and weather) often result in traffic traveling on local roads rather than on major arterials and state routes.
- **Roadway Geometry:** Bottleneck due to curves and topography (which result in a lack of sight distance), often caused by slow-moving vehicles. Other roadway design issues, including lack of center turn lanes or left turn pockets, also creates driver confusion and congestion.
- **Chain Installation and Control:** Bottleneck due to operations and procedures for chain installation. Additionally, chain control locations often encourage visitors to travel on local arterials to avoid chain installation.
- **Roadway Maintenance:** There are existing issues with roadway maintenance, including maintaining striping and snow removal.
- **Illegal Parking:** Traffic congestion and friction on state routes due to vehicles parked in “No Parking” zones. This is often the case in winter and summer peak months near popular snow play and hiking locations.
- **Pedestrian or Bicycle Conflicts:** Conflicts between vehicles and non-motorized person trips due to pedestrians walking along side of road, heavy pedestrian crossing volumes, or narrow road with no shoulder or lane for bicycles. These conflicts often result in traffic congestion, and can be unsafe for pedestrians and bicycles.
- **Alternate Modes:** The increase in residents and visitors allows for the potential for increasing use of transit services, including shuttle and trolley service along with improving the existing fixed-route services.
- **Information Technology Services (ITS) Opportunity:** Information for drivers is beneficial to the overall transportation circulation, and could be better improved with real-time Changeable Message Signs (CMS) at key locations throughout the mountain area.
- **Coordination between Jurisdictional Agencies:** There are multiple agencies and jurisdictions involved related to maintenance and control during major events. Agencies include Caltrans,

County, City, Sheriff, and CHP. Lack of coordination can result in conflicting information, making it unclear what road conditions are, or what traffic congestion is currently occurring.

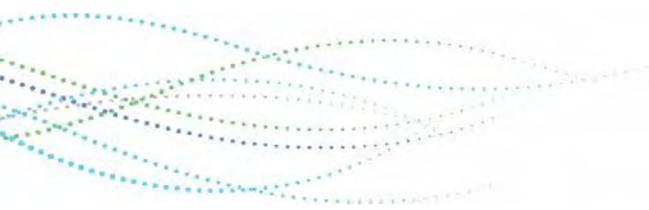
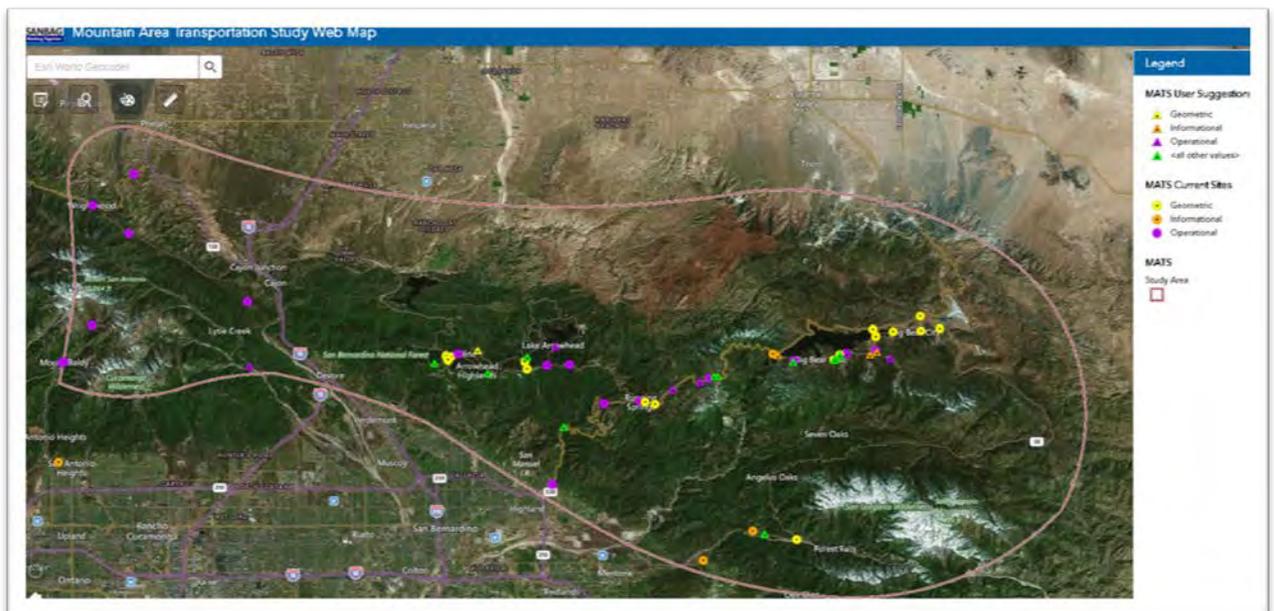
- **Existing Right-Of-Way:** It appears that many of the existing roadways are overlaid, or repaved, to existing roadway width, or even narrower in locations. In some locations, it appears or is known, that there is additional right-of-way that could be paved for better utilization.
- **Regional and Local Economic Impacts:** The location of the mountain area is a desirable destination for visitors from the Southern California region, and beyond. According to the Big Bear Housing Element, there are over 30,000 “second homes” in the mountain area, resulting in vacationers spending property tax money, as well as money on goods and entertainment, within the mountain area. As a part of San Bernardino County, the traffic and transportation within the mountain area could be a deterrent to visitors, resulting in a regional and local economic loss.

### 6.1.1 Project Web Tool

To assist in collecting information from the stakeholders, a web tool was developed. The web tool is an online portal and Geographic Information System (GIS) mapping tool developed to solicit input. **Figure 6-1** identifies the project study area and location of identified project needs.

All needs identified through the Web Tool were categorized into geometric, informational, operational, and “other” categories. The information shown in **Figure 6-1** will be discussed in *Section 6.2* of this report.

Figure 6-1: MATS Web Tool



### 6.1.2 Stakeholder Meetings

During the stakeholder meetings, many issues were identified. The issues were discussed in length, and organized into two categories: general issues and location issues.

### 6.1.3 General Issues Identified

There were many issues identified that related to transportation throughout the mountain area. **Table 6-1** summarizes general MATS area issues.

**Table 6-1: General Issues**

Issue	Discussion
Bike Riders on State Routes up Mountains	Bicycle riders often travel along SR-18 and SR-330. Although these bicycle riders typically have escorts, bottlenecks occur with and without escorts.
Count Data Collection	The current methodology for collecting count data is to collect when data is needed, as a reaction.
US Forest Service Campsites	A comment was raised that US Forest Service camping locations are closed during winter months.
Chain Installation and Control	Several issues were identified related to chain-up areas, installation, and control. It is a known problem that people often do not stop and obey required chain-up locations. It is also noted that there are no chain-up areas on SR-2 in Wrightwood.
Changeable Message Signs (CMS)	There are several existing changeable message signs at the base of the mountain (one located at Baseline and SR-210). Portable message signs have been used in the past, and the concern of power issues (e.g., solar batteries often run out when a panel is covered with snow). Another issue with portable message signs is that drivers believe them to be construction related, and have a tendency to ignore them.
Portable Message Signs (PMS)	While not desirable for permanent locations, the availability of portable message signs is low, and they could be useful during special events.
Park and Ride	Mass transit in the mountain area is underutilized, leaving the potential for park and rides or shuttle services.
Parking on State Routes	A common traffic congestion problem on state routes is related to people parking in “no parking” locations, at turnouts, and within the travelled way. People often park at these locations for snow play or hiking, and create problems throughout the mountain area.
Passing Lanes on State Routes	The existing passing lanes on state routes are helpful in easing congestion following slow vehicles. The addition of passing lanes, where possible, would be beneficial.
Roadway Capacity	On an average day, roadway capacity is not a problem in the mountain area. Roadway capacity is only an issue during select events during both winter and summer peak season.
Roadway Design Elements	There are many locations on the State Routes within the MATS area that have slope changes or significant curvature of the roadway, which result in bottlenecks.
Trucks	Trucks can be restricted on Caltrans facilities if the roadway conditions are poor. The current method for sending out this information is either on Facebook or Twitter, so companies would need to be connected to the Caltrans informational sources to obtain information about truck restrictions.
Mount Baldy Community Coordination	Major coordination issues between LA County and San Bernardino County, with recent snow clearing issues. Community is located in both San Bernardino and Los Angeles Counties. Can agreements be reached to have SB maintain access road?



#### 6.1.4 Location Issues Identified

There were many issues identified that related to transportation throughout the mountain area. **Table 6-2** summarizes general MATS area issues.

**Table 6-2: Location Issues**

Location ID	Facility Name	Location	Issue(s)
<b>Wrightwood/Mount Baldy/Lytle Creek</b>			
1	SR-2 (Big Pines Highway)	Willow Road	<ul style="list-style-type: none"> <li>The stop sign at Willow Road presents a huge bottleneck in town during peak seasons</li> <li>The businesses in town hire an officer for traffic control during peak seasons</li> </ul>
2	SR-2 (Big Pines Highway)	Wrightwood	<ul style="list-style-type: none"> <li>No chain-up areas on SR-2 and there are no lights. In the winter, there are many times when chains are not required, but probably should be</li> <li>CHP does not enforce chains on SR-2</li> </ul>
3	Glendora Ridge Road	Entire Route Through Los Angeles County	<ul style="list-style-type: none"> <li>Typically closed in winter months</li> </ul>
4	Lone Pine Canyon Road	Between SR-138 and SR-2 in Wrightwood	<ul style="list-style-type: none"> <li>County Road that CHP controls</li> <li>Chain control is not enforced, even though Lone Pine Canyon acts as a cut-through to the Wrightwood</li> </ul>
5	Lytle Creek Road	North of I-15	<ul style="list-style-type: none"> <li>Popular road for cyclists, but there is no shoulder or bike lane</li> </ul>
6	Swarthout Canyon Road	South of Lone Pine Canyon Road	<ul style="list-style-type: none"> <li>Used as a cut-through when I-15 is congested</li> <li>There are some unpassable areas on this facility for certain autos, including some stream crossings</li> </ul>
<b>Crestline/Lake Arrowhead</b>			
7	SR-138	Seeley Way	<ul style="list-style-type: none"> <li>Sight distance issues</li> <li>Seeley used as a cut-through route</li> </ul>
8	SR-138	Crest Forest Drive/Lake Drive "Top Town"	<ul style="list-style-type: none"> <li>Confusing, off-set 5-legged intersection, with grade issues</li> <li>Inadequate sight distance for turning</li> </ul>
9	SR-173	SR-18	<ul style="list-style-type: none"> <li>Poor traffic control, and confusing intersection</li> <li>There is potential for more of an issue with additional planned development</li> </ul>
10	SR-18	SR-138	<ul style="list-style-type: none"> <li>SR-18 drops from 4 lanes to 2 lanes, resulting in vehicles speeding up to pass</li> </ul>
11	SR-18	Daley Canyon Road	<ul style="list-style-type: none"> <li>Strange and confusing existing geometric</li> <li>There is no room for a right turn</li> <li>The land is owned by the US Forest Service</li> <li>Steep grade on Daley Canyon Road approaching SR-189</li> </ul>
12	SR-18	SR-330	<ul style="list-style-type: none"> <li>Southbound Arrowhead traffic to SR-330 west is a year-long issue with major back-up of traffic during peak periods</li> </ul>
13	SR-18	Running Springs to Big Bear Lake	<ul style="list-style-type: none"> <li>Cars pull over for snow play, picnics, etc.</li> <li>There is no regard to the many signs that indicate no parking along the narrow stretches of the road</li> </ul>
14	SR-18	Running Springs School Road	<ul style="list-style-type: none"> <li>Northbound west turn is difficult during peak and off-peak periods</li> </ul>

Location ID	Facility Name	Location	Issue(s)
15	SR-18	Snow Valley and Snow Valley Snow Play Area (approximately 1 mile west of Snow Valley parking lot entrance)	<ul style="list-style-type: none"> <li>Limited parking stalls open to the public at snow play location</li> <li>Coordination with Snow Valley resort needed for parking for snow play</li> <li>People entering and leaving the snow play area block eastbound traffic</li> </ul>
16	SR-18	Entire State Route	<ul style="list-style-type: none"> <li>Truck issue due to curves and topography</li> </ul>
17	SR-189	Daley Canyon Road	<ul style="list-style-type: none"> <li>Inadequate sight distances for right turn from SR-189 to Daley Canyon Road</li> <li>Northbound SR-189 has a stop on a downhill profile that is difficult to make in winter conditions</li> </ul>
18	SR-189	Blue Jay Cut-off	<ul style="list-style-type: none"> <li>Left turn from northbound SR-189 onto Blue Jay cut-off is skewed</li> <li>It is unclear that access to Twin Peaks (Golf Course, Conference Centers, etc.) needs to be made from the intersection of Daley Canyon Road with SR-189</li> </ul>
19	SR-330	City Creek US Forest Service Station	<ul style="list-style-type: none"> <li>No left turn pocket for vehicles turning into US Forest Service Station parking lot</li> </ul>
20	SR-330	Live Oak	<ul style="list-style-type: none"> <li>People tend to use Live Oak as a cut-through to avoid chain control</li> </ul>
21	SR-18	Hilltop Boulevard	<ul style="list-style-type: none"> <li>Southbound SR-18 (Lake Arrowhead) traffic turning left onto SR-330 is a year-long issue with major queuing of traffic during peak periods</li> <li>Poor local Running Springs traffic circulation along SR-18 between SR-330 and Soutar Drive</li> </ul>
22	Crest Forest Drive	Valley View Drive	<ul style="list-style-type: none"> <li>Poor visibility and skewed approach at intersection</li> </ul>
23	Lake Arrowhead Village Area		<ul style="list-style-type: none"> <li>Weekend traffic issues in peak months related to visitors</li> <li>Inadequate parking areas where visitors can park and ride public transportation</li> </ul>
24	Lake Drive	Fern Drive	<ul style="list-style-type: none"> <li>Sight distance issues, partially due to steep grade on Fern Drive</li> <li>Queuing at stop sign in winter months</li> <li>Cannot include stop sign on north leg due to grade constraints</li> </ul>
25	Lake Drive	Wild Rose Lane	<ul style="list-style-type: none"> <li>Issue with traffic control devices during peak seasons</li> <li>There is a monthly meeting at this location which creates traffic congestion</li> </ul>
26	SR-330	Highland Ave	<ul style="list-style-type: none"> <li>Potential for Park and Ride Facility</li> </ul>
<b>Big Bear/Angeles Oaks</b>			
27	SR-18	SR-38	<ul style="list-style-type: none"> <li>Need to encourage traffic to take SR-38 off of the mountain instead of SR-330</li> </ul>
28	SR-18 (Big Bear Boulevard)	Castle Rock Trail Head	<ul style="list-style-type: none"> <li>Heavily used trail with limited street parking on Big Bear Boulevard and no parking on adjoining streets</li> </ul>



Location ID	Facility Name	Location	Issue(s)
29	SR-18 (Big Bear Boulevard)	Mill Creek Road	<ul style="list-style-type: none"> <li>• Secondary arterial with access to the Aspen Glen Picnic area, a heavily used US Forest Service day facility</li> <li>• This is a skewed intersection on a fairly steep incline at a nearly blind corner, with no left turn lane onto Mill Creek Road going westbound on SR-18</li> <li>• Problem in winter and summer peak months</li> <li>• Ice and snow make the left turn from SR-18 onto Mill Creek Road difficult</li> </ul>
30	SR-18 (Big Bear Boulevard)	Wild Rose Lane	<ul style="list-style-type: none"> <li>• Major congestion in winter months caused by cars entering and exiting snow play area</li> <li>• Westbound left turn pocket is too short for queued vehicles</li> </ul>
31	SR-18 (Big Bear Boulevard)	Lakeview Drive/Paine Court	<ul style="list-style-type: none"> <li>• Lakeview Drive is a secondary arterial serving most of the residential homes and businesses on the west side of the City of Big Bear Lake. The left turn at SR-18 is often difficult</li> <li>• A boat launching ramp is located off of Paine Court which complicates turning movements at the intersection for boat trailers</li> <li>• This is a problem in both winter and summer peak months</li> <li>• Lakeview Drive and Paine Court meet at an acute angle at SR-18 which causes confusion as to right of way movement</li> </ul>
32	SR-18 (Big Bear Boulevard)	Village Drive	<ul style="list-style-type: none"> <li>• The westbound right turn is a sharp right angle, resulting in vehicles slowing down or stopping to make the right hand turn</li> <li>• Narrow and/or tight turning radius for vehicles traveling eastbound on SR-18 to make a smooth transition going northbound</li> </ul>
33	SR-18 (Big Bear Boulevard)	Pine Knot Avenue	<ul style="list-style-type: none"> <li>• Through movement on Big Bear Boulevard difficult during winter and summer months</li> </ul>
34	SR-18 (Big Bear Boulevard)	Knickerbocker Creek	<ul style="list-style-type: none"> <li>• There is a public walkway called Knickerbocker Trail running north and south from Village Drive to SR-18 approximately 100 feet east of Pine Knot Drive</li> <li>• Pedestrian traffic on this facility use the signalized intersection at Pine Knot and SR-18 to travel between the retail shopping area and the lake, which often causes delay and congestion during the summer months</li> </ul>
35	SR-18 (Big Bear Boulevard)	Moonridge Road	<ul style="list-style-type: none"> <li>• Traffic congestion and circulation problems in winter and summer</li> </ul>
36	SR-18 (Big Bear Boulevard)	Stanfield Cut-off	<ul style="list-style-type: none"> <li>• Travel lanes going eastbound are forced to merge into a single lane</li> <li>• There are two receiving westbound lanes for travel, but only one westbound approach lane</li> <li>• Queue and delay at this intersection during all months of the year, often resulting in a three or four traffic signal cycle wait</li> </ul>
37	SR-18 (Big Bear Boulevard)	Division Drive to Paradise Way	<ul style="list-style-type: none"> <li>• There is no shoulder, no drainage control, or center turn lanes the bulk of this segment</li> <li>• There are numerous businesses along this section that do not have defined driveways, making entering and exiting driveways difficult</li> <li>• Vehicles going both directions experience long delays when making left-turns</li> </ul>
38	SR-38	Mountain Home Village	<ul style="list-style-type: none"> <li>• Visitor traffic often cuts through Mountain Home Village during peak congestion</li> </ul>
39	SR-38	Valley of the Falls Drive	<ul style="list-style-type: none"> <li>• Geometric issue</li> </ul>



Location ID	Facility Name	Location	Issue(s)
40	SR-38	Forest Falls Turnoff	<ul style="list-style-type: none"> <li>• Difficult uphill travel for trucks and heavy vehicles</li> </ul>
41	SR-38 (Big Bear Boulevard)	Greenspot Boulevard/Shay Road "Square Turn"	<ul style="list-style-type: none"> <li>• Confusing intersection</li> <li>• Eastbound traffic staying on SR-38 has a separate lane/channel and drivers often miss the channel and turn right at the 4-way intersection</li> <li>• Westbound traffic staying on SR-38 must make a left turn at the 4-way intersection but is not required to stop; the other three approaches are stop sign controlled</li> </ul>
42	SR-38 (Big Bear Boulevard)	Stanfield Cut-off	<ul style="list-style-type: none"> <li>• Stop controlled on north/south legs, resulting in difficult northbound left due to the boat launch during the summer months</li> <li>• The north/south legs of the intersection are offset, creating confusion</li> <li>• Inadequate queue storage length for northbound Stanfield cut-off vehicles</li> <li>• There is a crosswalk from the school to the bike path, and neither side is ADA compliant</li> </ul>
43	Moonridge Road	Club View Drive "Moonridge Y"	<ul style="list-style-type: none"> <li>• Congestion due to winter ski-area traffic, often due to stuck vehicles, collisions, or chain installation</li> <li>• Decision point location for drivers determining how to exit the mountain</li> </ul>
44	Stanfield Cut-off	Eagle Nest Road	<ul style="list-style-type: none"> <li>• There is an existing driveway to Eagles Nest Road (an RV Park) that has conflicting movements with Stanfield Drive and impedes the intersection operation</li> </ul>

## 6.2 Geometric Issues

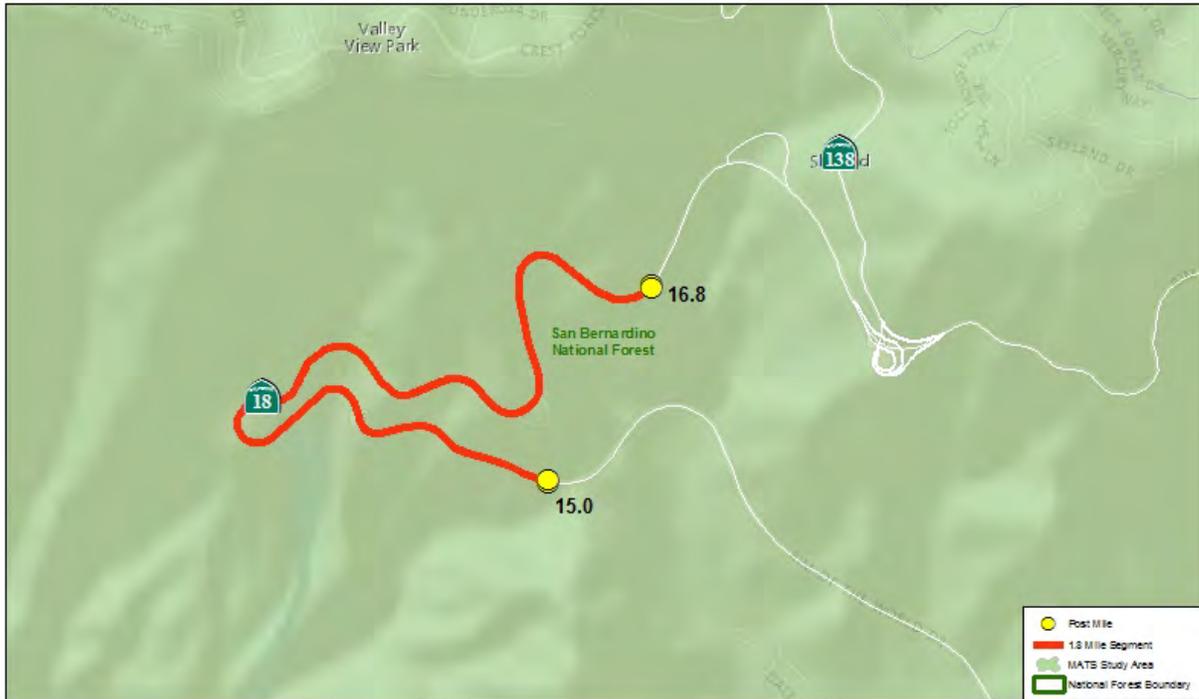
It is known that the State Routes in the MATS area are winding and designed differently than interstates and freeways throughout the remainder of San Bernardino County. The data that was used for the speed and congestion analysis was also used to identify areas of geometric concern on the state routes in the mountain area. The locations discussed in this section were identified using the assumption that locations of slow speed and traffic congestion could be related to poor geometric design (due to poor sight distance and need to reduce speed due to roadway geometry). **Figure 6-2** identifies five locations that were identified as locations considered with an opportunity to improve mobility and reduce congestion. All five locations are located on SR-18 (and briefly SR-38 in the City of Big Bear Lake), but these locations may serve as indicators to other areas along State Routes within the mountain area with similar characteristics.





*continues to incrementally improve uphill/downhill separation throughout the mountain area, by installing permanent positive barriers along centerline sections of roadway.*

**Figure 6-3: SR-18 – Post Mile 15.0 to 16.8**



### 6.2.2 Location B: SR-18 – Post Mile 22.15 to 25.15

**Location B** was selected due to the congestion) in the 3-mile segment. The existing roadway section is a two-lane section (1-lane in each direction) with a centerline buffer separating the opposing directions of travel. The centerline delineation includes the use of double yellow pavement markings (no passing), recessed reflectors, and a ground in rumble strip. This segment is generally a linear segment with minor curves meandering through the communities of Rimforest and Crest Park. The roadway section has limited shoulder widths. There is an increased concentration of access points primarily due to the number of residential and business properties with local street connections and driveways. Within Rimforest, the use of left turn pockets has been leveraged over a very short length of approximately 500 linear feet to serve cross traffic turns into Pine Avenue and at the intersection of Bear Springs Road and Blackfoot Trail. One major intersection occurs within the east portion of this segment at SR-173 which is destined to Lake Arrowhead, where an eastbound left turn pocket is provided. The general elevation for this segment is 5,600 feet. Posted speed limits range from 55 MPH outside community limits and decreases to 45 MPH within the business district within Rimforest. No turnout locations are identified along this segment of roadway. **Figure 6-4** illustrates the segment of SR-18 from PM 22.15 to 25.15.

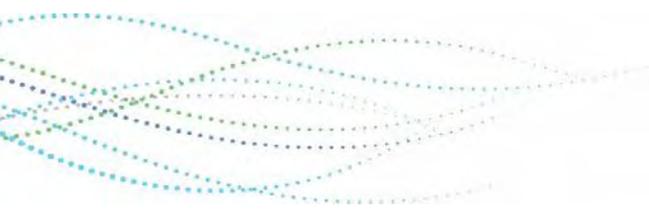
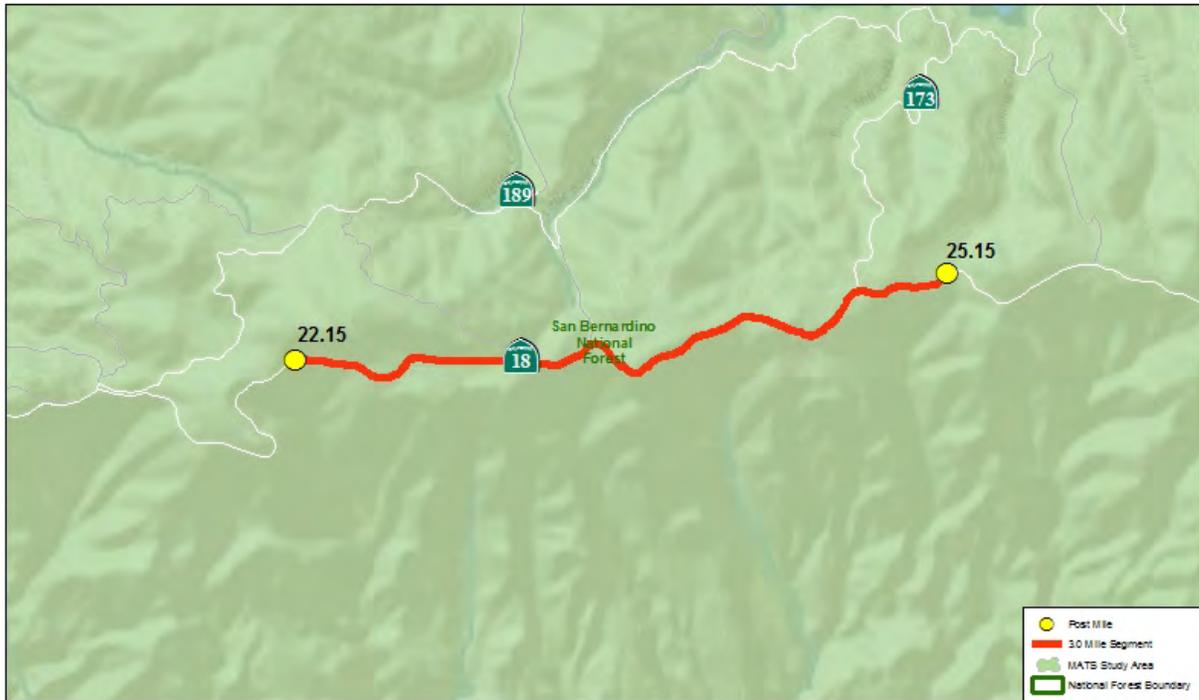


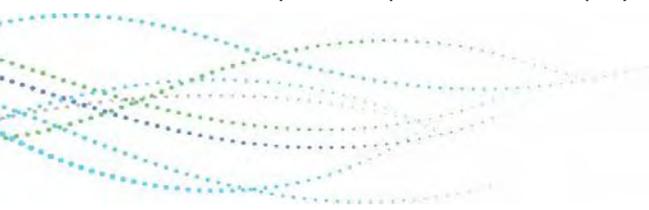
Figure 6-4: SR-18 – Post Mile 22.15 to 25.15



### 6.2.3 Location C: SR-18 – Post Mile 34.5 to 36.5

**Location C** was selected due to the congestion in the 2.0-mile segment. The existing roadway section is a two-lane section (1-lane in each direction) with a painted centerline that includes the use of double yellow pavement markings (no passing) and recessed reflectors. This segment is generally a linear segment with a large reverse curve section known as “13-curves” between Green Valley Lake Road and Green Valley Trail. The “13-curves” segment is located between Arrowbear and Snow Valley. Near the Snow Valley snow play park on the east end of this location, the roadway widens to a 4-lane section (2-lanes in each direction). The roadway has limited shoulder widths, with one bridge at Deep Creek, and no local access roadways or driveways. No guardrail is used in this segment of roadway, as slopes are more gradual when compared to other segments of SR-18. The posted speed limit is 40 MPH with some recommended speed reductions for sharper corners. In some locations with sharp corners, additional guidance consisting of roadway signs with arrows exist. One chain requirement sign is located in the segment. The elevation of this segment of roadway is approximately 6,500 feet. Call Boxes exist at two of the three eastbound (uphill) turnout locations. One signed turnout exists in the westbound (downhill) direction of travel.

Some areas along this segment of SR-18 have frequently been used for public snow play areas. There is confusion in roadside signage, stemming from signs denoting “No Parking Any Time” quickly followed by “Forest Adventure Pass Required” with an overlay adding the following statement; “when snow is present”. Unclear signage gives the understanding to drivers and snow play enthusiasts that parking may be acceptable for snow play, if a Forest Adventure Pass is displayed. Signage related to no parking



is inconsistent when compared to other areas of state routes within the mountain area. **Figure 6-5** illustrates the segment of SR-18 from PM 34.5 to 36.5.

**Figure 6-5: SR-18 – Post Mile 34.5 to 36.5**



#### 6.2.4 Location D: SR-18 – Post Mile 52.7 to 53.8 and SR-38 Post Mile 49.5 to 48.3

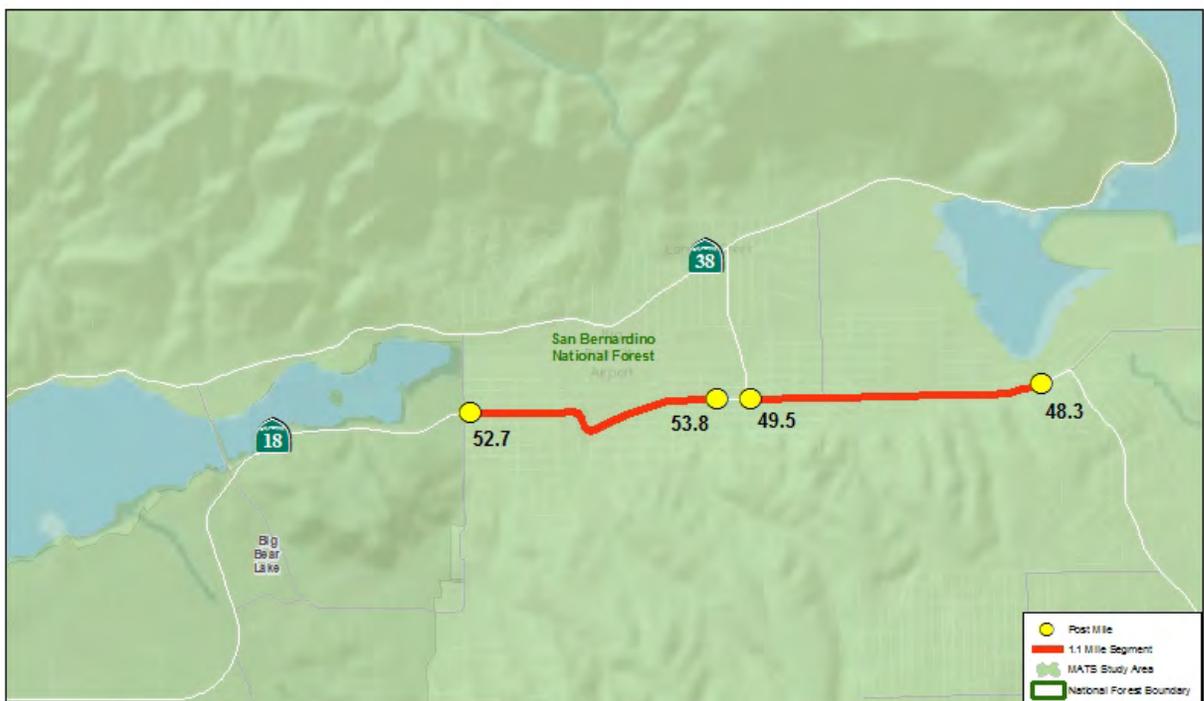
**Location D** was selected due to the congestion in the 1.1-mile segment. The existing roadway section is a four-lane section (2-lanes in each direction) with a striped median, providing a two-way left turn lane (TWLTL), and recessed reflectors in the median. This segment is in an urban district with two large sweeping curve sections through the downtown area of Big Bear Lake between Summit Road and Stanfield Cut-off. The roadway has curb, gutter, and sidewalk, with no dedicated bike lane. Right-turn lanes are provided at some intersections and driveways. A bus stop is provided east of Summit Road with turnouts to accommodate stopped buses beyond the outer travel lane while other transit stops in this segment are within the outer travel way. There is one bridge at Rathbone Creek, providing the same width as the existing roadway including dual sidewalks.

Throughout most of the section, only 24 feet of the existing 40-foot ROW is paved, with inadequate drainage control. Businesses within this segment typically use the entire property frontage for access and parking which results in vehicles queuing into travel lanes due to confusion. With no defined center-turn lane, vehicles slow to find open parking spaces and cause bottlenecks on SR-18. The lack of adequate drainage also has potential to cause localized flooding and continuous pavement damage. In addition, several residential streets intersect this segment of roadway at acute angles, causing traffic to slow excessively to make required turning movements.



This segment of SR-18 has significant local access points to multiple local streets, roadways, and driveways connecting businesses. There are three signalized intersections as well as the signalized intersections at each end for a total of five signalized intersections. There are approximately 25 eastbound and 25 westbound commercial driveways. These defined driveways are in addition to the local street connections with traffic signals and several stop sign controlled local street intersection. The posted speed limit is 40 MPH for the entire segment. **Figure 6-6** illustrates the segment of SR-18 from PM 52.7 to 53.8 and SR-38 from PM 49.5 to 48.3.

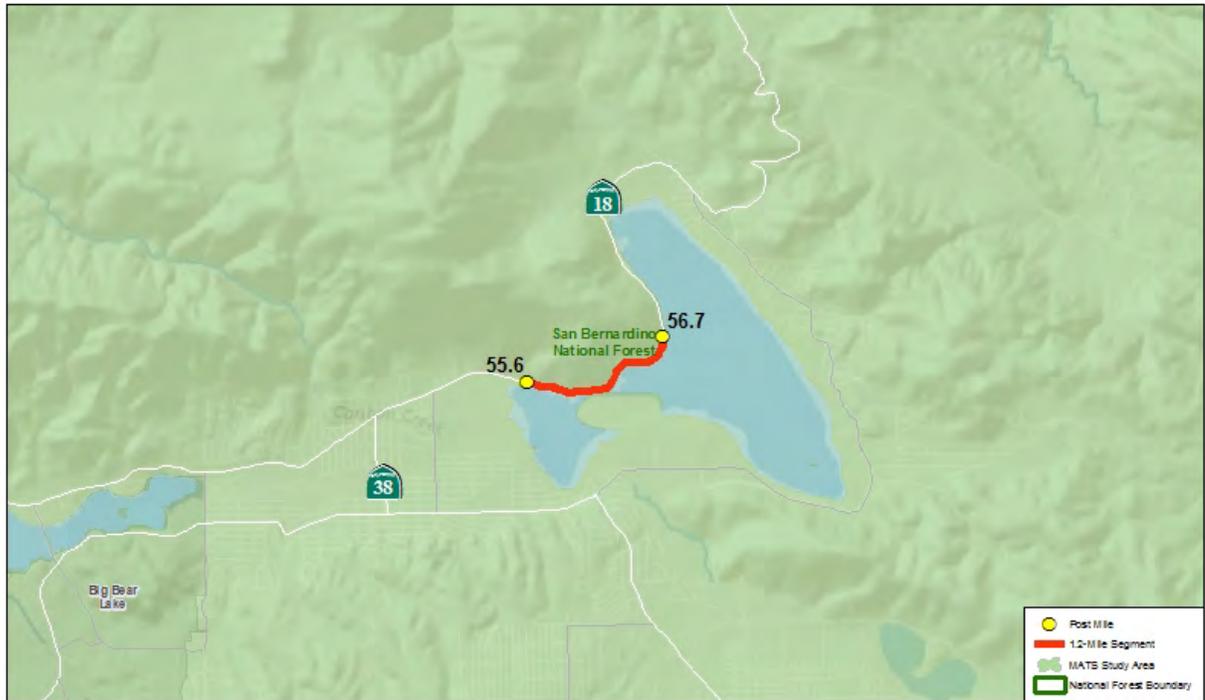
**Figure 6-6: SR-18 – Post Mile 52.7 to 53.8 and SR-38 – Post Mile 49.5 to 48.3**



### 6.2.5 Location E: SR-18 – Post Mile 55.5 to 56.7

**Location E** was selected due to the congestion in the 1.2-mile segment. The existing roadway section is a two-lane section (1-lane in each direction) with a painted centerline that includes double yellow pavement markings (no passing) and recessed reflectors. This segment is generally a linear segment with a large sweeping curve section with a recommended speed of 30 MPH as posted on the existing warning sign. The roadway section has no shoulders and does not serve any local access from the route, with the exception of Gold Mountain Road. Two long guardrail runs exist along the eastbound edge of travel way adjacent to Baldwin Lake. **Figure 6-7** illustrates the segment of SR-18 from PM 55.5 to 56.7.

Figure 6-7: SR-18 – Post Mile 55.5 to 56.7



## 7.0 TRAVEL DEMAND MODELING TOOL

The purpose of the travel model spreadsheet tool is to provide the ability to forecast areas of hot spot congestion with a known number of visitors. Visitors to the area make up a large portion of the needs assessment, as the full-time population and associated employment are relatively low. Peak winter and summer months experience a substantial increase in traffic congestion for extended periods of time as visitors and associated additional employees access the MATS communities. In addition, the traffic congestion caused by visitors has the potential to discourage would-be visitors, hindering the local economy.

The entire travel demand model documentation is included in **Appendix C**.

### 7.1 Traffic Forecast Methodology and Tool Development

The geographic study area for MATS is shown in **Figure 2-2**, and is located solely within San Bernardino County, and is comprised of many communities. The MATS area stretches from the Los Angeles County Line on the west to the Lucerne Valley on the east. The communities within the MATS area include: Mount Baldy, Lytle Creek, Wrightwood, Crestline, Blue Jay, Lake Arrowhead, Running Springs, Green Valley Lake, Arrowbear, Big Bear, and the City of Big Bear Lake.

The MATS area is traditionally a vacation area for all residents of Southern California (and beyond), yet the residents of the MATS area make up less than five percent (5%) of the population of San Bernardino County. **Figure 2-1** illustrates the population densities for San Bernardino County, as shown in the 2015 San Bernardino Countywide Transportation Plan. This difference in demand (visitors) and available service (residents) creates a unique challenge for providing adequate transportation services to meet the needs of both visitors and residents, not to mention that the visitor needs are seasonal and resident needs are year-round.

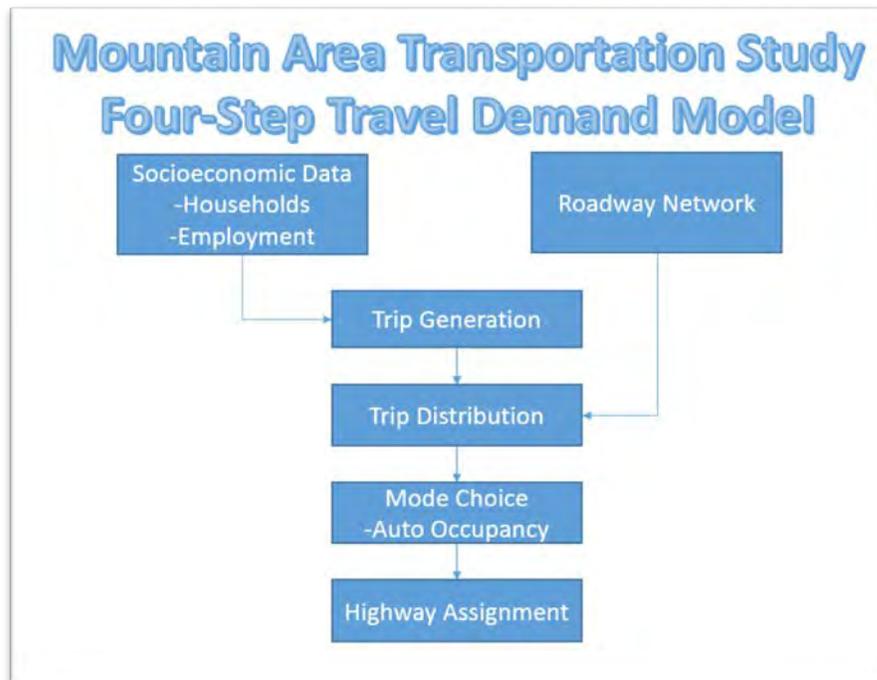
SBCTA maintains a regional model; however, it does not have the ability to accurately forecast peak season conditions, or weekend conditions. This report documents the development of MATS Travel Model Tool (MATS Model). The MATS Model is a focused model which takes a simplistic approach to a traditional four-step travel demand model, and includes only major facilities. The MATS Model is validated to a base year of 2015, and includes a forecast year of 2040. The MATS Model does not include a feedback loop, and takes approximately 5 minutes to complete a full model run. The MATS Model is fully developed within an excel spreadsheet with visual basic macros, and provides a user-friendly interface.

The following list, organized in the traditional four-step modeling process, highlights the various components and sub-components of the MATS Model. Various components are also identified as to their role, type and function (e.g. inputs, process and outputs, etc.).

- Trip Generation
  - Socioeconomic (SED) data (input)
  - Trip production models for Residents, Visitors, and External-Internal/Internal-External Trips
  - Regression trip attraction models based on household and employment data
  - Total person trips stratified into 3 trip purposes
    - Home-Based Work (HBW)
    - Home-Based Other (HBO)
    - Non-Home Based (NHB)
- Trip Distribution
  - Friction factors by trip purpose
  - Gravity model trip distribution by trip purpose
- Trip Assignment
  - External trips from external model (input)

A summary flow chart of the key components of the MATS Model process is presented in **Figure 7-1**.

Figure 7-1: MATS Model Structure Flow Chart



The MATS Model structure is prepared to present daily forecasts for peak and off-peak seasons. The days that are forecast are an average weekday, as well as a typical Friday, Saturday, and Sunday.

The Transportation Analysis Zones (TAZs) within the MATS Model were developed by aggregating San Bernardino Transportation Analysis Model (SBTAM) model TAZs into homogenous TAZs that represent the MATS area with as few TAZs as possible. The MATS Model TAZs were developed to accurately reflect existing and future development patterns, while at the same time reflect different land use levels and type of trip generation and distribution patterns.

Capacity assumptions for the roadway network were obtained from the City of Big Bear Lake General Plan, and are shown in **Table 7-1**. As a note, it is assumed that winter conditions result in a 10 percent reduction in daily capacity when compared to summer months.

**Table 7-1: Daily Roadway Capacities**

Roadway Type	Travel Lanes	Summer Capacity	Winter Capacity
2-lane Undivided	2U	13,000	11,700
2-lane Undivided (with passing lane)	2U-P	18,000	16,200
2-lane Divided	2D	18,000	16,200
3-lane Divided	3D	21,000	18,900
4-lane Undivided	4U	25,000	22,500
4-lane Divided	4D	37,500	33,800

**Figure 7-2** identifies the MATS Model TAZ boundaries. In the MATS Model, there are 8 external stations and 15 internal TAZs.

**Figure 7-3** identifies the MATS area highway network.



Figure 7-2: Transportation Analysis Zones

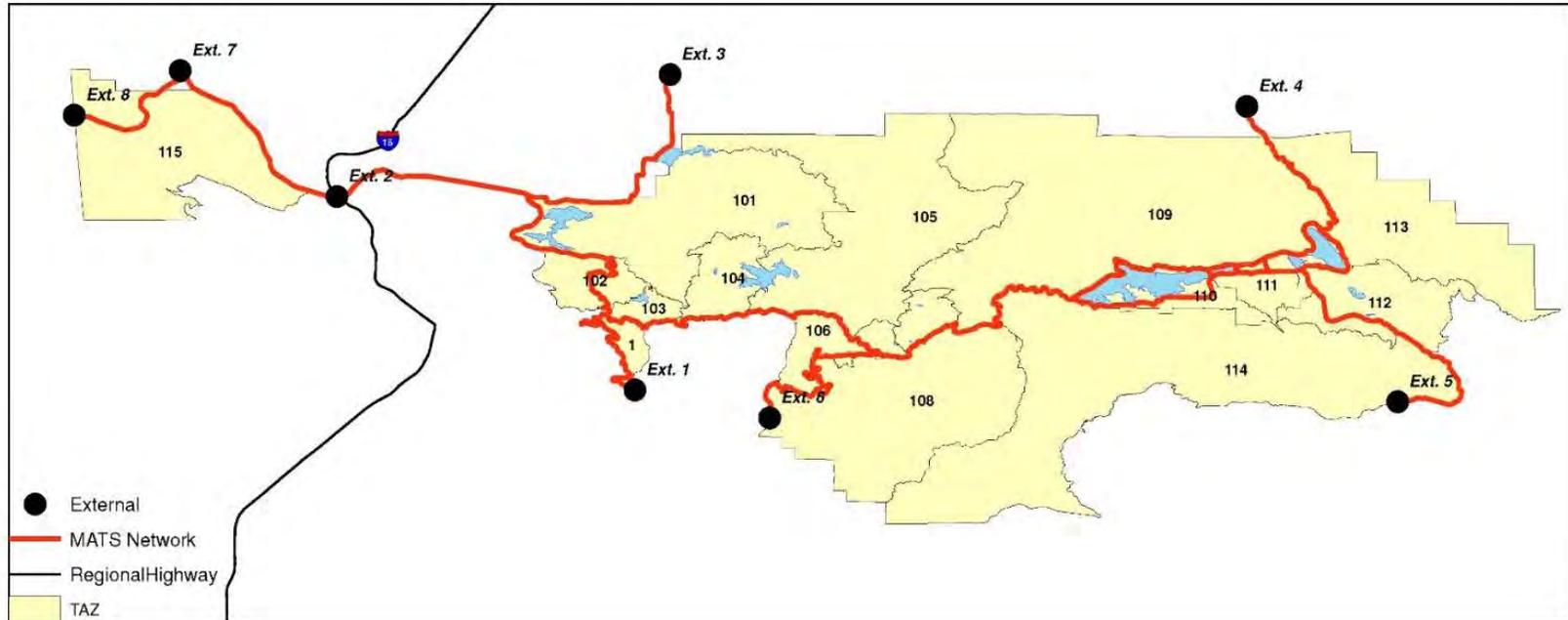
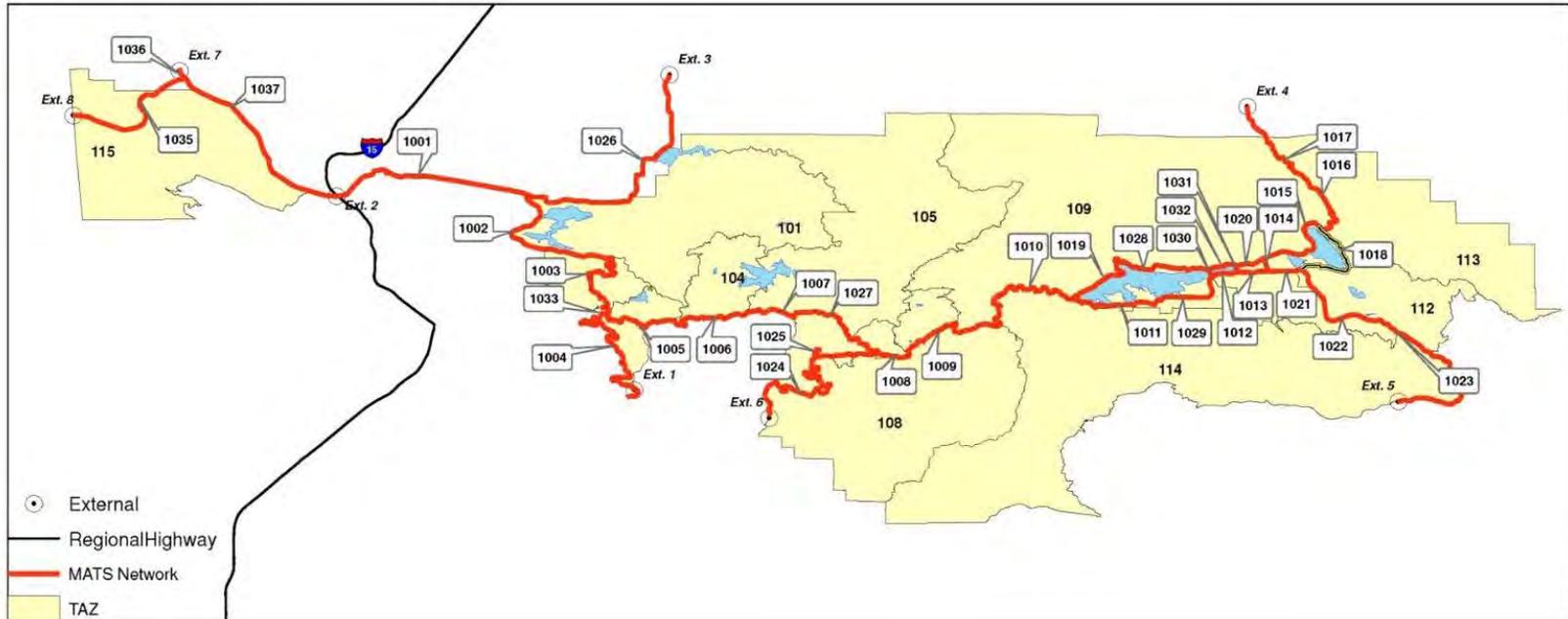


Figure 7-3: MATS Area Highway Network



## 7.2 Roadway System Performance

The main purpose of the MATS Model is to forecast average daily weekend traffic. The MATS model process primarily follows an average daily weekday model, but has a post-processing component that factors average daily weekday traffic to average weekend (Friday, Saturday, and Sunday) daily traffic. This is completed by using count data that was collected during peak periods, and using a ratio of the peak period traffic to average weekday traffic.

The outputs from the assignment process includes:

- Average Weekday Daily Volume (eastbound or northbound)
- Average Weekday Daily Volume (westbound or southbound)
- Average Weekday Daily Volume (total of both directions)
- Average Weekday Daily Volume/Capacity Ratio (calculated based on total volume)
- Average Friday Daily Volume (eastbound or northbound)
- Average Friday Daily Volume (westbound or southbound)
- Average Friday Daily Volume (total of both directions)
- Average Friday Daily Volume/Capacity Ratio (calculated based on total volume)
- Average Saturday Daily Volume (eastbound or northbound)
- Average Saturday Daily Volume (westbound or southbound)
- Average Saturday Daily Volume (total of both directions)
- Average Saturday Daily Volume/Capacity Ratio (calculated based on total volume)
- Average Sunday Daily Volume (eastbound or northbound)
- Average Sunday Daily Volume (westbound or southbound)
- Average Sunday Daily Volume (total of both directions)
- Average Sunday Daily Volume/Capacity Ratio (calculated based on total volume)

The output model Volume/Capacity ratios are used to define LOS for the arterial network. **Table 7-2** identifies the assumed LOS correlating with roadway segment V/C ratio.

**Table 7-2: Volume/Capacity Ratio and Corresponding LOS**

V/C Ratio	LOS
>1.0	F
0.91-1.0	E
0.81-0.90	D
0.71-0.80	C
0.61-0.70	B
0-0.60	A

The worst case scenario for traffic within the MATS area is on a peak season winter time period, on an average weekend (Friday, Saturday, and Sunday). For the purposes of this report, the average weekday



for off-peak will be used to identify roadway segments with anticipated changes in condition, thus identifying future mobility issues.

Sections 7.2.1 and 7.2.2 summarize the travel model tool results for off-peak summer season average weekday volume to capacity ratios within the MATS area. Section 7.2.3 identifies future locations with traffic congestion beyond the existing conditions.

### 7.2.1 Existing (2015) Roadway System Performance

**Table 7-3** summarizes the existing conditions for the average weekday system within the MATS area. In the average off-peak day in 2015, it is assumed that there are 10,000 visitors to the MATS area. These conditions are for summer conditions. As shown in **Table 7-3**, the locations with the highest V/C Ratio are at the following locations:

- SR-18 between SR-330 and Confer Camp Road
- SR-18 Between Stanfield Cut-off and Division Drive
- SR-18 Between Division Drive and Greenway Drive / SR-38
- SR-38 Between Greenway Drive and Shay Road
- SR-138 Between I-15 and SR-2
- SR-138 Between SR-2 and North of SR-2

**Table 7-3: Existing Average Weekday Off-Peak Summer Traffic**

Link ID	Location	Capacity	Volume	V/C Ratio
1001	SR-138 Between I-15 and SR-173	13,000	4,362	0.34
1002	SR-138 Between SR-173 and Cleghorn Road	13,000	5,396	0.42
1003	SR-138 Between Cleghorn Road and Knapps Cut-off/Lake Drive	13,000	7,200	0.55
1033	SR-138 Between Knapps Cut-off/Lake Drive and SR-18	13,000	9,168	0.71
1004	SR-18 Between Old Waterman Canyon Road and SR-138	25,000	16,162	0.65
1005	SR-18 Between SR-138 and Lake Gregory Drive / SR-189	13,000	8,094	0.62
1006	SR-18 Between Lake Gregory Drive / SR-189 and SR-173	13,000	11,736	0.90
1007	SR-18 Between SR-173 and Live Oak Drive (Running Springs)	13,000	11,702	0.90
1027	SR-18 Between Live Oak Drive (Running Springs) and SR-330	13,000	11,822	0.91
1008	SR-18 Between SR-330 and Conifer Camp Road	13,000	13,688	1.05
1009	SR-18 Between Conifer Camp Road and Snow Valley Driveway	13,000	6,772	0.52
1010	SR-18 Between Snow Valley Driveway and SR-38	18,000	2,982	0.17
1011	SR-18 Between SR-38 and Village Drive	19,000	2,646	0.40
1029	SR-18 Between Village Drive and Stanfield Cut-off	37,500	34,980	0.93
1030	Stanfield Cut-off Between SR-18 and SR-38	13,000	2,640	0.20
1012	SR-18 Between Stanfield Cut-off and Division Drive	13,000	32,342	2.49
1031	Division Drive Between Big Bear Boulevard / SR-18 and North Shore Drive / SR-38	13,000	1,212	0.09
1013	SR-18 Between Division Drive and Greenway Drive / SR-38	13,000	23,236	1.79
1014	SR-18/Greenway Drive Between Big Bear Boulevard / SR-38 and North Shore Drive / SR-38	13,000	3,548	0.27
1015	SR-18/North Shore Drive Between Greenway Drive and Baldwin Lake Road	13,000	3,396	0.26
1016	SR-18/North Shore Drive Between Baldwin Lake Road and Marble Canyon Road	13,000	2,680	0.21
1017	SR-18/North Shore Drive Between Marble Canyon Road and SR-247	13,000	2,680	0.21
1018	Baldwin Lake Road Between SR-38 and SR-18	12,000	2,376	0.20
1019	SR-38 Between SR-18 and Fawnskin	13,000	336	0.03

Link ID	Location	Capacity	Volume	V/C Ratio
1028	SR-38 Between Fawnskin and Stanfield Cut-off	13,000	4,878	0.38
1032	SR-38 Between Stanfield Cut-off and Division Drive	13,000	2,240	0.17
1020	SR-38 Between Division Drive and Greenway Drive	13,000	1,030	0.08
1021	SR-38 Between Greenway Drive and Shay Road	13,000	21,258	1.64
1022	SR-38 Between Shay Road and Bally Horse Canyon Road	13,000	4,918	0.38
1023	SR-38 Between Bally Horse Canyon Road and Santa Ana River	13,000	4,918	0.38
1024	SR-330 Between SR-210 and East Fork City Creek	13,000	10,072	0.77
1025	SR-330 Between East Fork City Creek and SR-18	13,000	10,072	0.77
1026	SR-173 Between SR-138 and Arrowhead Lake Road	13,000	1,124	0.09
1035	SR-2 Between SR-138 and West of Wrightwood	13,000	8,474	0.65
1036	SR-138 Between I-15 and SR-2	13,000	18,022	1.39
1037	SR-138 Between SR-2 and North of SR-2	13,000	14,454	1.11

### 7.2.2 Future (2040) Roadway System Performance

**Table 7-4** summarizes the future conditions for the average weekday system within the MATS area. In the average off-peak day in 2040, it is assumed that there will be 14,000 visitors to the MATS area. These conditions are for summer conditions. As shown in **Table 7-4**, the locations with the highest V/C Ratio are at the following locations:

- SR-138 Between Knapps Cut-off/Lake Drive and SR-18
- SR-18 Between Old Waterman Canyon Road and SR-138
- SR-18 Between SR-138 and Lake Gregory Drive / SR-189
- SR-18 Between Lake Gregory Drive / SR-189 and SR-173
- SR-18 Between SR-173 and Live Oak Drive (Running Springs)
- SR-18 Between Live Oak Drive (Running Springs) and SR-330
- SR-18 Between SR-330 and Conifer Camp Road
- SR-18 Between Village Drive and Stanfield Cut-off
- SR-18 Between Stanfield Cut-off and Division Drive
- SR-18 Between Division Drive and Greenway Drive / SR-38
- SR-38 Between Greenway Drive and Shay Road
- SR-330 Between SR-210 and East Fork City Creek
- SR-330 Between East Fork City Creek and SR-18
- SR-138 Between I-15 and SR-2
- SR-138 Between SR-2 and North of SR-2

**Table 7-4: Future Average Weekday Off-Peak Summer Traffic**

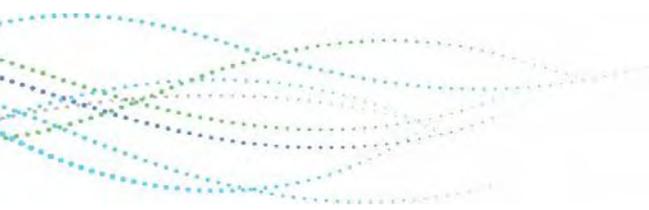
Link ID	Location	Capacity	Volume	V/C Ratio
1001	SR-138 Between I-15 and SR-173	13,000	6,222	0.48
1002	SR-138 Between SR-173 and Cleghorn Road	13,000	7,682	0.59
1003	SR-138 Between Cleghorn Road and Knapps Cut-off/Lake Drive	13,000	9,468	0.73
1033	SR-138 Between Knapps Cut-off/Lake Drive and SR-18	13,000	18,632	1.43
1004	SR-18 Between Old Waterman Canyon Road and SR-138	25,000	34,170	1.37
1005	SR-18 Between SR-138 and Lake Gregory Drive / SR-189	13,000	17,134	1.32
1006	SR-18 Between Lake Gregory Drive / SR-189 and SR-173	13,000	14,236	1.10

Link ID	Location	Capacity	Volume	V/C Ratio
1007	SR-18 Between SR-173 and Live Oak Drive (Running Springs)	13,000	13,298	1.02
1027	SR-18 Between Live Oak Drive (Running Springs) and SR-330	13,000	13,348	1.03
1008	SR-18 Between SR-330 and Conifer Camp Road	13,000	16,166	1.24
1009	SR-18 Between Conifer Camp Road and Snow Valley Driveway	13,000	8,988	0.69
1010	SR-18 Between Snow Valley Driveway and SR-38	18,000	3,934	0.22
1011	SR-18 Between SR-38 and Village Drive	19,000	3,522	0.40
1029	SR-18 Between Village Drive and Stanfield Cut-off	19,000	42,684	2.25
1030	Stanfield Cut-off Between SR-18 and SR-38	19,000	2,938	0.15
1012	SR-18 Between Stanfield Cut-off and Division Drive	13,000	39,746	3.06
1031	Division Drive Between Big Bear Boulevard / SR-18 and North Shore Drive / SR-38	13,000	1,180	0.09
1013	SR-18 Between Division Drive and Greenway Drive / SR-38	13,000	30,106	2.32
1014	SR-18/Greenway Drive Between Big Bear Boulevard / SR-38 and North Shore Drive / SR-38	13,000	5,620	0.43
1015	SR-18/North Shore Drive Between Greenway Drive and Baldwin Lake Road	13,000	5,550	0.43
1016	SR-18/North Shore Drive Between Baldwin Lake Road and Marble Canyon Road	13,000	4,768	0.37
1017	SR-18/North Shore Drive Between Marble Canyon Road and SR-247	13,000	4,768	0.37
1018	Baldwin Lake Road Between SR-38 and SR-18	12,000	4,898	0.41
1019	SR-38 Between SR-18 and Fawnskin	13,000	414	0.03
1028	SR-38 Between Fawnskin and Stanfield Cut-off	13,000	5,492	0.42
1032	SR-38 Between Stanfield Cut-off and Division Drive	13,000	2,556	0.20
1020	SR-38 Between Division Drive and Greenway Drive	13,000	1,376	0.11
1021	SR-38 Between Greenway Drive and Shay Road	13,000	26,438	2.03
1022	SR-38 Between Shay Road and Bally Horse Canyon Road	13,000	8,186	0.63
1023	SR-38 Between Bally Horse Canyon Road and Santa Ana River	13,000	8,186	0.63
1024	SR-330 Between SR-210 and East Fork City Creek	13,000	15,158	1.17
1025	SR-330 Between East Fork City Creek and SR-18	13,000	15,158	1.17
1026	SR-173 Between SR-138 and Arrowhead Lake Road	13,000	1,624	0.12
1035	SR-2 Between SR-138 and West of Wrightwood	13,000	12,062	0.93
1036	SR-138 Between I-15 and SR-2	13,000	27,902	2.15
1037	SR-138 Between SR-2 and North of SR-2	13,000	23,132	1.78

### 7.2.3 Identification of Additional Locations with Mobility Issues

**Table 7-5** summarizes in the existing and future conditions that are forecast to have a V/C ratio greater than 1.0 (meaning that there is more volume than available capacity). This table assists in identifying future locations with mobility issues. As shown in **Table 7-5**, there are fifteen (15) locations identified with less than adequate V/C ratios in the future scenario. Of these 15 locations, six (6) are operating at a V/C ratio greater than 1.0 in the existing conditions, and another four (4) of these locations are approaching a V/C ratio of 1.0 in the existing conditions. The remaining five (5) locations that operate at adequate V/C ratios in existing but not in the future are:

- SR-138 Between Knapps Cut-off/Lake Drive and SR-18
- SR-18 Between Old Waterman Canyon Road and SR-138
- SR-18 Between SR-138 and Lake Gregory Drive / SR-189
- SR-330 Between SR-210 and East Fork City Creek
- SR-330 Between East Fork City Creek and SR-18



These five roadway segments are forecast to operate at less than ideal conditions in the future, and may require capacity or geometric modifications. **Figure 7-4** and **Figure 7-5** illustrate the over-capacity roadway segments for 2015 and 2040.

**Table 7-5: Comparison of Existing and Future Average Weekday Off-Peak Summer Traffic**

Link ID	Location	2015 V/C Ratio	2040 V/C Ratio
1033	SR-138 Between Knapps Cut-off/Lake Drive and SR-18	0.71	1.43
1004	SR-18 Between Old Waterman Canyon Road and SR-138	0.65	1.37
1005	SR-18 Between SR-138 and Lake Gregory Drive / SR-189	0.62	1.32
1006	SR-18 Between Lake Gregory Drive / SR-189 and SR-173	0.90	1.10
1007	SR-18 Between SR-173 and Live Oak Drive (Running Springs)	0.90	1.02
1027	SR-18 Between Live Oak Drive (Running Springs) and SR-330	0.91	1.03
1008	SR-18 Between SR-330 and Conifer Camp Road	1.05	1.24
1029	SR-18 Between Village Drive and Stanfield Cut-off	0.93	2.25
1012	SR-18 Between Stanfield Cut-off and Division Drive	2.49	3.06
1013	SR-18 Between Division Drive and Greenway Drive / SR-38	1.79	2.32
1021	SR-38 Between Greenway Drive and Shay Road	1.64	2.03
1024	SR-330 Between SR-210 and East Fork City Creek	0.77	1.17
1025	SR-330 Between East Fork City Creek and SR-18	0.77	1.17
1036	SR-138 Between I-15 and SR-2	1.39	2.15
1037	SR-138 Between SR-2 and North of SR-2	1.11	1.78



Figure 7-4: Existing Over-Capacity Roadway Segments

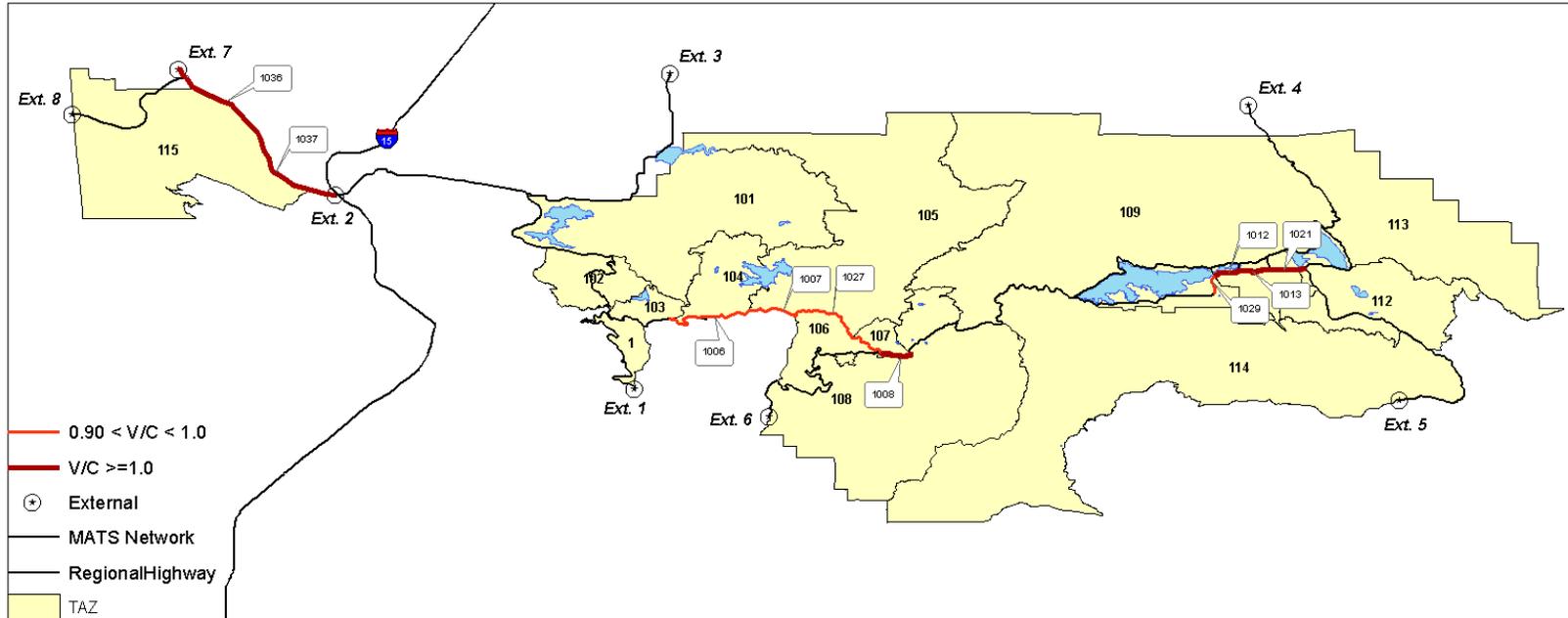
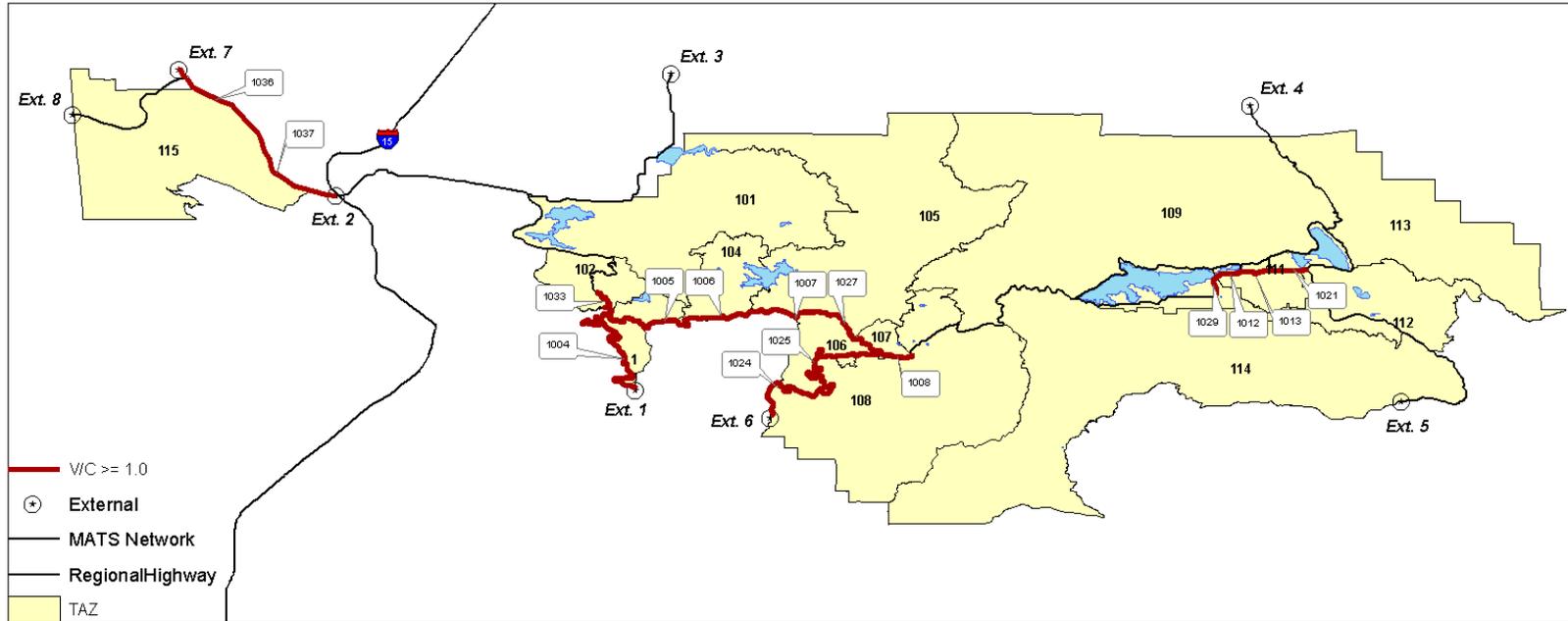


Figure 7-5: Future Year Over-Capacity Roadway Segments



## 8.0 RECOMMENDATIONS

The identification of mobility issues was completed using stakeholder input, a geometric location analysis using available crash data, and through a review of travel model tool forecast results. Mobility issues identified included operational, geometric, and informational issues.

### 8.1 Location Issues Recommendations

Following the stakeholder meetings, location issues were reviewed and solutions were identified by the project team. **Table 8-1** summarizes the locations, identified issues, and preferred solution. In several locations, no feasible solution is recommended, due to various reasons, as described in **Table 8-1**.

**Table 8-1: Location Issues and Solutions**

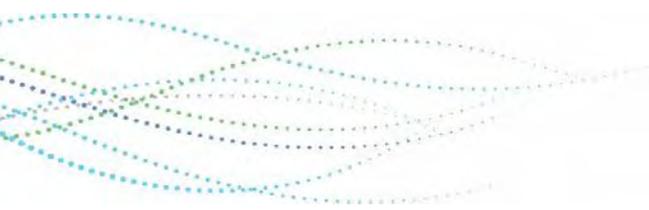
Location ID	Location	Issue(s)	Solution
<b>Wrightwood/Mount Baldy/Lytle Creek</b>			
1	SR-2 (Big Pines Highway) at Willow Road	<ul style="list-style-type: none"> <li>The stop sign at Willow Road presents a huge bottleneck in town during peak seasons</li> <li>The businesses in town hire an officer for traffic control during peak seasons</li> </ul>	<ul style="list-style-type: none"> <li>No solution recommended as the stop sign was put in place due to local complaints of high speeds.</li> </ul>
2	SR-2 (Big Pines Highway) at Wrightwood	<ul style="list-style-type: none"> <li>No chain-up areas on SR-2 and there are no lights. In the winter, there are many times when chains are not required, but probably should be</li> <li>CHP does not enforce chains on SR-2</li> </ul>	<ul style="list-style-type: none"> <li>Develop chain-up area<sup>1</sup> on SR-2</li> </ul>
3	Glendora Ridge Road at Mount Baldy Rd.	<ul style="list-style-type: none"> <li>Typically closed in winter months</li> </ul>	<ul style="list-style-type: none"> <li>No solution recommended</li> <li>There is no significant demand to open Glendora Ridge Road during winter months</li> <li>Additionally, the cost for maintaining and enforcing law on Glendora Ridge Road during winter months would be exceedingly high</li> </ul>
4	Lone Pine Canyon Road at Between SR-138 and SR-2 in Wrightwood	<ul style="list-style-type: none"> <li>County Road that CHP controls</li> <li>Chain control is not enforced, even though Lone Pine Canyon acts as a cut-through to the Wrightwood</li> </ul>	<ul style="list-style-type: none"> <li>Provide a chain-up area<sup>1</sup> and enhance CHP enforcement of chain control on Lone Pine Canyon Road</li> </ul>
5	Lytle Creek Road at North of I-15	<ul style="list-style-type: none"> <li>Popular road for cyclists, but there is no shoulder or bike lane</li> </ul>	<ul style="list-style-type: none"> <li>Install "Share the Road" signage<sup>2</sup></li> </ul>

Location ID	Location	Issue(s)	Solution
6	Swarthout Canyon Road at South of Lone Pine Canyon Road	<ul style="list-style-type: none"> <li>Used as a cut-through when I-15 is congested</li> <li>There are some unpassable areas on this facility for certain autos, including some stream crossings</li> </ul>	<ul style="list-style-type: none"> <li>No solution recommended</li> <li>The existing signage on Swarthout Canyon Road was installed to discourage use as a through route</li> </ul>
<b>Crestline/Lake Arrowhead</b>			
7	SR-138 at Seeley Way	<ul style="list-style-type: none"> <li>Sight distance issues</li> <li>Seeley used as a cut-through route</li> </ul>	<ul style="list-style-type: none"> <li>No long-term solution recommended</li> <li>Positive improvement with maintenance and reduced vegetation on the curve of SR-138 to greatly improve sight distance</li> </ul>
8	SR-138 at Crest Forest Drive/Lake Drive "Top Town"	<ul style="list-style-type: none"> <li>Confusing, off-set 5-legged intersection, with grade issues</li> <li>Inadequate sight distance for turning</li> </ul>	<ul style="list-style-type: none"> <li>No solution recommended</li> <li>Realigning the intersection would require extensive ROW impacting Top Town businesses and would be cost prohibitive</li> </ul>
9	SR-173 at SR-18	<ul style="list-style-type: none"> <li>Poor traffic control, and confusing intersection</li> <li>There is potential for more of an issue with additional planned development</li> </ul>	<ul style="list-style-type: none"> <li>Revise intersection configuration</li> <li>Use adjacent paved area to increase curve radius and improve turn pocket</li> <li>Increase local street separation from SR-18</li> </ul>
10	SR-18 at SR-138	<ul style="list-style-type: none"> <li>SR-18 drops from 4 lanes to 2 lanes, resulting in vehicles speeding up to pass</li> </ul>	<ul style="list-style-type: none"> <li>No solution recommended</li> <li>SR-18 south of this junction has recently been improved to have physical barriers separating the two directions of travel</li> </ul>
11	SR-18 at Daley Canyon Road	<ul style="list-style-type: none"> <li>Strange and confusing existing geometric</li> <li>There is no room for a right turn</li> <li>The land is owned by the US Forest Service</li> <li>Grade on Daley Canyon Road approaching SR-189</li> </ul>	<ul style="list-style-type: none"> <li>Improve route guidance signage in advance of intersection</li> </ul>
12	SR-18 at SR-330	<ul style="list-style-type: none"> <li>Southbound Arrowhead traffic to SR-330 west is a year-long issue with major back-up of traffic during peak periods</li> </ul>	<ul style="list-style-type: none"> <li>Include an acceleration lane and left turn pocket west of Hilltop</li> </ul>
13	SR-18 at Running Springs to Big Bear Lake	<ul style="list-style-type: none"> <li>Cars pull over for snow play, picnics, etc.</li> <li>There is no regard to the many signs that indicate no parking along the narrow stretches of the road</li> </ul>	<ul style="list-style-type: none"> <li>Update and make turnout signage<sup>3</sup> consistent</li> <li>Separate turnout areas<sup>3</sup> for slow moving vehicles from sightseer parking areas</li> </ul>
14	SR-18 at Running Springs School Road	<ul style="list-style-type: none"> <li>Northbound west turn is difficult during peak and off-peak periods</li> </ul>	<ul style="list-style-type: none"> <li>Widen intersection to provide westbound left-turn lane and westbound acceleration lane to receive left turns on SR-18</li> </ul>

Location ID	Location	Issue(s)	Solution
15	SR-18 at Snow Valley and SR-18 at Snow Valley Snow Play Area (approximately 1 mile west of Snow Valley parking lot entrance)	<p>At Snow Valley:</p> <ul style="list-style-type: none"> <li>Traffic control at the intersection of SR-18 and the main parking lot stops westbound SR-18 traffic on peak weekends to allow for a left turn onto SR-18 from the parking lot.</li> </ul> <p>At Snow Play Area:</p> <ul style="list-style-type: none"> <li>Coordination with Snow Valley resort needed for parking for snow play</li> <li>Limited parking stalls open to the public at snow play location</li> <li>People entering and leaving the snow play area block eastbound traffic</li> </ul>	<p>At Snow Valley<sup>4</sup>:</p> <ul style="list-style-type: none"> <li>Re-stripe Snow Valley parking lot intersection with SR-18 to provide one westbound through lane plus an acceleration lane for left-turning traffic going west on SR-18</li> </ul> <p>At Snow Play Area<sup>5</sup>:</p> <ul style="list-style-type: none"> <li>Install adequate signage to direct visitors to parking locations</li> </ul>
16	SR-18 at Entire State Route	<ul style="list-style-type: none"> <li>Truck issue due to curves and topography</li> </ul>	<ul style="list-style-type: none"> <li>Study the existing right-of-way to determine areas where paving can be extended and where turnouts may be implemented</li> </ul>
17	SR-189 at Daley Canyon Road	<ul style="list-style-type: none"> <li>Inadequate sight distances for eastbound right turn from SR-189 to Daley Canyon Road</li> <li>Northbound Daley Canyon has a stop on a downhill profile that is difficult to make in winter conditions</li> </ul>	<ul style="list-style-type: none"> <li>Stripe edge of travelled way going around curve on southwest corner</li> <li>Consider better signage, including a flashing signal approaching the intersection for northbound Daley Canyon Road</li> <li>No solution for sight distance, as it appears to be not a significant issue since it's a three-way stop T-intersection</li> </ul>
18	SR-189 at Blue Jay Cut-off	<ul style="list-style-type: none"> <li>Left turn from northbound SR-189 onto Blue Jay cut-off is skewed</li> <li>It is unclear that access to Twin Peaks (Golf Course, Conference Centers, etc.) needs to be made from the intersection of Daley Canyon Road with SR-189</li> </ul>	<ul style="list-style-type: none"> <li>Revise profile of Blue Jay Cut-off for approximately 200 feet and improve the grade and connection with SR-189</li> </ul>
19	SR-330 at City Creek US Forest Service Station	<ul style="list-style-type: none"> <li>No left turn pocket for vehicles turning into US Forest Service Station parking lot</li> </ul>	<ul style="list-style-type: none"> <li>Restripe existing roadway to include left-turn pocket on SR-330</li> <li>Potential need for minor widening within existing ROW north of the parking lot</li> </ul>
20	SR-330 at Live Oak	<ul style="list-style-type: none"> <li>People tend to use Live Oak as a cut-through to avoid chain control</li> </ul>	<ul style="list-style-type: none"> <li>Install "Local Traffic Only" sign<sup>6</sup> on Live Oak</li> <li>Install "Steep Grade" sign<sup>7</sup> on steep slope section of Live Oak to deter cut-through traffic</li> </ul>



Location ID	Location	Issue(s)	Solution
21	SR-18 at Hilltop Boulevard	<ul style="list-style-type: none"> <li>• Southbound SR-18 (Lake Arrowhead) traffic turning left onto SR-330 is a year-long issue with major queuing of traffic during peak periods</li> <li>• Poor local Running Springs traffic circulation along SR-18 between SR-330 and Soutar Drive</li> </ul>	<ul style="list-style-type: none"> <li>• Study installation of westbound SR-330 receiving lane for traffic turning left from SR-18</li> <li>• Install left turn pockets on SR-18 at Soutar Drive and Hunsaker Way</li> </ul>
22	Crest Forest Drive at Valley View Drive	<ul style="list-style-type: none"> <li>• Poor visibility and skewed approach at intersection</li> </ul>	<ul style="list-style-type: none"> <li>• No solution recommended</li> <li>• All identified solutions are estimated to be infeasible and exceedingly costly</li> <li>• Sight distance seems passable for first car behind stop line on Valley View Drive</li> </ul>
23	Lake Arrowhead Village Area	<ul style="list-style-type: none"> <li>• Weekend traffic issues in peak months related to visitors</li> <li>• Inadequate parking areas where visitors can park and ride public transportation</li> </ul>	<ul style="list-style-type: none"> <li>• Develop a smart parking system with signage and an app to communicate parking occupancy</li> <li>• Preclude cars from entering full parking lots</li> </ul>
24	Lake Drive at Fern Drive	<ul style="list-style-type: none"> <li>• Sight distance issues, partially due to steep grade on Fern Drive</li> <li>• Queuing at stop sign in winter months</li> <li>• Cannot include stop sign on north leg due to grade constraints</li> </ul>	<ul style="list-style-type: none"> <li>• No solution recommended</li> <li>• Due to geographies, there is no feasible way to add stop signs to the southbound approach on Lake drive or on the northbound approach on Fern Drive</li> </ul>
25	Lake Drive at Wild Rose Lane	<ul style="list-style-type: none"> <li>• There is a monthly meeting at this location which creates traffic congestion</li> </ul>	<ul style="list-style-type: none"> <li>• Recommend the Community of Crestline and San Bernardino County continue to study traffic circulation for large events at this location</li> <li>• Potential for stop signs to be located on Lake Drive at Wild Rose Lane</li> <li>• Potential for two-lane exit driveway from USPS parking lot</li> <li>• Recommendation to remove pilaster with no parking sign from middle of USPS entry driveway</li> </ul>
26	SR-330 at Highland Ave	<ul style="list-style-type: none"> <li>• Potential for Park and Ride facility</li> </ul>	<ul style="list-style-type: none"> <li>• Implement a Park and Ride Facility<sup>8</sup></li> </ul>
<b>Big Bear/Angeles Oaks</b>			
27	SR-18 at SR-38	<ul style="list-style-type: none"> <li>• Need to encourage traffic to take SR-38 off of the mountain instead of SR-330</li> </ul>	<ul style="list-style-type: none"> <li>• Install a "real time traffic management" sign<sup>9</sup> at this location, approximately 100 yards east of Big Bear Dam</li> </ul>



Location ID	Location	Issue(s)	Solution
28	SR-18 (Big Bear Boulevard) at Castle Rock Trail Head	<ul style="list-style-type: none"> <li>• Heavily used trail with limited street parking on Big Bear Boulevard and no parking on adjoining streets</li> </ul>	<ul style="list-style-type: none"> <li>• Raise SR-18 through the bend and gain area to include parking spots for trailhead; retaining wall. Provide pedestrian path to Boulder Bay Park.<sup>10</sup></li> </ul>
29	SR-18 (Big Bear Boulevard) at Mill Creek Road	<ul style="list-style-type: none"> <li>• This is a skewed intersection on a fairly steep incline at a nearly blind corner</li> <li>• There is no westbound left turn lane onto Mill Creek Road from SR-18</li> <li>• Problem in winter and summer peak months</li> <li>• Ice and snow make the left turn from SR-18 onto Mill Creek Road difficult</li> </ul>	<ul style="list-style-type: none"> <li>• Widen Big Bear Boulevard to provide westbound left turn lane between Wild Rose Lane and Mill Creek Road</li> </ul> <p><i>(Related to location issue #30)</i></p>
30	SR-18 (Big Bear Boulevard) at Wild Rose Lane	<ul style="list-style-type: none"> <li>• Major congestion in winter months caused by cars entering and exiting snow play area</li> <li>• Westbound left turn pocket is too short for queued vehicles</li> </ul>	<ul style="list-style-type: none"> <li>• Widen Big Bear Boulevard to provide westbound left turn lane between Wild Rose Lane and Mill Creek Road</li> </ul> <p><i>(Related to location issue #29)</i></p>
31	SR-18 (Big Bear Boulevard) at Lakeview Drive/Paine Court	<ul style="list-style-type: none"> <li>• Lakeview Drive is a secondary arterial serving most of the residential homes and businesses on the west side of the City of Big Bear Lake. The left turn at SR-18 is often difficult</li> <li>• A boat launching ramp is located off of Paine Court which complicates turning movements at the intersection for boat trailers</li> <li>• This is a problem in both winter and summer peak months</li> <li>• Lakeview Drive and Paine Court meet at an acute angle at SR-18 which causes confusion as to right of way movement</li> </ul>	<ul style="list-style-type: none"> <li>• Convert the intersection into a roundabout</li> </ul>



Location ID	Location	Issue(s)	Solution
32	SR-18 (Big Bear Boulevard) at Village Drive	<ul style="list-style-type: none"> <li>The westbound right turn is a sharp right angle, resulting in vehicles slowing down or stopping to make the right hand turn</li> <li>Narrow and/or tight turning radius for vehicles traveling eastbound on SR-18 to make a smooth transition going northbound</li> </ul>	<ul style="list-style-type: none"> <li>Reconfigure intersection, including moving eastbound through stop bar further east</li> <li>Obtain ROW from NW corner lot to modify intersection</li> </ul>
33	SR-18 (Big Bear Boulevard) at Pine Knot Avenue	<ul style="list-style-type: none"> <li>Through movement on Big Bear Boulevard difficult during winter and summer months</li> </ul>	<ul style="list-style-type: none"> <li>Extend WB merge further west to Simonds Road</li> <li>Study workable alternatives</li> <li>Rework/Modify parking lot to allow easier entrance and exit</li> </ul>
34	SR-18 (Big Bear Boulevard) at Knickerbocker Creek	<ul style="list-style-type: none"> <li>There is a public walkway called Knickerbocker Trail running north and south from Village Drive to SR-18 approximately 100 feet east of Pine Knot Drive</li> <li>Pedestrian traffic on this facility use the signalized intersection at Pine Knot and SR-18 to travel between the retail shopping area and the lake, which often causes delay and congestion during the summer months</li> </ul>	<ul style="list-style-type: none"> <li>Implement undercrossing for bicycles and pedestrians</li> </ul>
35	SR-18 (Big Bear Boulevard) at Moonridge Road	<ul style="list-style-type: none"> <li>Traffic congestion and circulation problems in winter and summer</li> </ul>	<ul style="list-style-type: none"> <li>Improve signal timing along SR-18</li> </ul>
36	SR-18 (Big Bear Boulevard) at Stanfield Cut-off	<ul style="list-style-type: none"> <li>Travel lanes going eastbound are forced to merge into a single lane</li> <li>There are two receiving westbound lanes for travel, but only one westbound approach lane</li> <li>Queue and delay at this intersection during all months of the year, often resulting in a three or four traffic signal cycle wait</li> </ul>	<ul style="list-style-type: none"> <li>No solution recommended</li> <li>Widen the westbound approach to have two through lanes. <i>(Note: During the development of this report a grant was awarded to the City of Big Bear Lake to widen the westbound approach to include two through lanes. Therefore, no solution is required to be implemented as a part of this report.)</i></li> <li>No solution was identified to address the eastbound merge into a single lane, because it is better to merge into a single lane prior to the intersection rather than immediately following the intersection. Additionally, widening the roadway eastbound beyond Stanfield Cut-off was determined to be infeasible due to existing right-of-way.</li> </ul>



Location ID	Location	Issue(s)	Solution
37	SR-18 (Big Bear Boulevard) at Division Drive to Paradise Way	<ul style="list-style-type: none"> <li>• There is no shoulder, no drainage control, or center turn lanes the bulk of this segment</li> <li>• There are numerous businesses along this section that do not have defined driveways, making entering and exiting driveways difficult</li> <li>• Vehicles going both directions experience long delays when making left-turns</li> </ul>	<ul style="list-style-type: none"> <li>• Develop a center turn lane and adequate drainage</li> </ul>
38	SR-38 at Mountain Home Village	<ul style="list-style-type: none"> <li>• Visitor traffic often cuts through Mountain Home Village during peak congestion</li> </ul>	<ul style="list-style-type: none"> <li>• Install "Local Access Only" sign<sup>6</sup> on access road on north side of SR-38</li> </ul>
39	SR-38 at Valley of the Falls Drive	<ul style="list-style-type: none"> <li>• Geometric issue</li> </ul>	<ul style="list-style-type: none"> <li>• Restripe or widen SR-38 to accommodate a left turn lane from SR-38 to Valley of the Falls Drive</li> <li>• Add receiving lane for left turns from Valley of the Falls Drive onto SR-38</li> </ul>
40	SR-38 at Forest Falls Turn-off	<ul style="list-style-type: none"> <li>• Difficult uphill travel for trucks and heavy vehicles</li> </ul>	<ul style="list-style-type: none"> <li>• Widen SR-38 to add uphill truck climbing lane or passing lane</li> <li>• Note that the addition of a truck climbing lane will involve widening SR-38, as restriping would eliminate existing shoulders</li> </ul>
41	SR-38 (Big Bear Boulevard) at Greenspot Boulevard/Shay Road "Square Turn"	<ul style="list-style-type: none"> <li>• Confusing intersection</li> <li>• Eastbound traffic staying on SR-38 has a separate lane/channel and drivers often miss the channel and turn right at the 4-way intersection</li> <li>• Westbound traffic staying on SR-38 must make a left turn at the 4-way intersection but is not required to stop; the other three approaches are stop sign controlled</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain continuity for vehicles on SR-38 by realigning to make SR-38 a continuous curve through the intersection</li> <li>• Close off access to Greenspot Road north of Shay Road, and bring Shay Road into SR-38 as a T-intersection</li> </ul>



Location ID	Location	Issue(s)	Solution
42	SR-38 (Big Bear Boulevard) at Stanfield Cut-off	<ul style="list-style-type: none"> <li>• Stop controlled on north/south legs, resulting in difficult northbound left due to the boat launch during the summer months</li> <li>• The north/south legs of the intersection are offset, creating confusion</li> <li>• Inadequate queue storage length for northbound Stanfield cut-off vehicles</li> <li>• There is a crosswalk from the school to the bike path, and neither side is ADA compliant</li> </ul>	<ul style="list-style-type: none"> <li>• Convert the intersection into a roundabout</li> </ul>
43	Moonridge Road at Club View Drive "Moonridge Y"	<ul style="list-style-type: none"> <li>• Congestion due to winter ski-area traffic, often due to stuck vehicles, collisions, or chain installation</li> <li>• Decision point location for drivers determining how to exit the mountain</li> </ul>	<ul style="list-style-type: none"> <li>• Create a roundabout at Rathbun Drive/ Club View Drive at Moonridge Road</li> </ul>
44	Stanfield Cut-off at Eagle Nest Road	<ul style="list-style-type: none"> <li>• There is an existing driveway to Eagles Nest Road (an RV Park) that has conflicting movements with Stanfield Drive and impedes the intersection operation</li> </ul>	<ul style="list-style-type: none"> <li>• Stripe the portion of Stanfield Cut-off in front of Eagles Nest with KEEP CLEAR</li> </ul>

<sup>1</sup> See additional discussion on chain-up areas and enforcement in Section 8.2.1 of this report

<sup>2</sup> See an example of Share the Road signage in Figure 8-1

<sup>3</sup> See additional discussion on turnout signage and design in Section 8.2.4 of this report

<sup>4</sup> See discussion on Snow Valley Resort Main Entrance in Section 8.2.1 of this report

<sup>5</sup> See additional recommendation for parking and snow play on SR-18 between Running Springs and Big Bear Lake in Section 8.2.1 of this report

<sup>6</sup> See discussion on cut-through traffic in Section 8.2.1 of this report

<sup>7</sup> See an example of "Steep Grade" signage in Figure 8-2

<sup>8</sup> See discussion on transportation modes and park and ride facilities in Section 8.2.3 of this report

<sup>9</sup> See discussion on Permanent Changeable Message Signs for permanent signs at this location as identified by Caltrans District 8 in Section 8.4.1 of this report

<sup>10</sup> See Geometric recommendation in Section 8.3 of this report

Figure 8-1: Share the Road Signage Examples



Figure 8-2: Steep Grade Signage Examples



## 8.2 Operational Recommendations

Operational mobility issue recommendations consist of alleviating mobility issues by improving the operational aspects of the issues. Operational issues are related to traffic control, roadway maintenance, and availability of multiple transportation modes.

### 8.2.1 Traffic Control

Traffic control can refer to multiple solutions, including traffic signals or control devices, where traffic routes during peak periods, or even how traffic is managed during peak events. For example, stakeholder meetings consistently mentioned that bottlenecks occur in the existing transportation system due to non-existent or poorly located traffic control devices, and several locations discussed cut-through traffic on local only roads during peak periods.

Recommendations for improved traffic control within the MATS area include:

- Cut-through Traffic:** It is recommended that the effect of cut-through traffic on local facilities throughout the MATS area be studied further. Cut-through traffic can occur for several reasons: first, because the travel time is shorter than using a primary route, and second, because a traveler is attempting to avoid chain control or other requirement. In addition to local traffic taking cut-throughs for trips, new apps are directing people into areas that should only be used

for local traffic, when they would have otherwise stayed on state routes. One potential solution for reducing cut-through traffic on local roads is to install “Local Traffic Only” or “No Thru Traffic” signs, examples of which are shown in **Figure 8-3**.

Figure 8-3: Local Access Signage Examples



- **Right-turn Only Event Management:** The City of Big Bear Lake has developed an event traffic plan for the Fourth of July which results in disallowing left turns at non-signalized intersections during peak events. This type of event management requires locations to be controlled by a CHP officer. Right-turn only event management has proven to be an effective tool for residents and visitors, and it is recommended to continue to implement this type of management during peak events.
- **Chain Installation and Control:** Many issues related to chain installation create bottlenecks. The bottlenecks at chain installation locations are often due to operations and procedures for chain installation, resulting in perceived excessive delays. It is recommended to coordinate with CHP in developing more standardized chain control operations, inclusive of adequate resources available for mandating conformance with requirements and managing chain control installation. In addition, it is recommended to study allowing cars to proceed under R-1 conditions (requiring snow tires without chains during some conditions). It is also recommended to identify an adequate location for chain control along SR-2 near Wrightwood.
- **Parking and Snow Play on SR-18 between Running Springs and Big Bear Lake:** In the general area of Snow Valley on SR-18, there is a seasonal mobility issue related to vehicles parking along the edge of roadway and encroaching into the lanes of travel in order to access desired snow play locations. Illegal parking occurs at turnouts, and in no-parking zones, with little repercussion. While there are several stalls open to the public at Snow Valley and at the neighboring Nordic track parking lot, parking illegally remains an issue. It is recommended that there be one identified parking location which is clearly signed and enforced for Snow Valley snow play and coordination with Snow Valley Ski Hill to investigate allowing snow players to pay for parking. Additionally, the east end of the passing lane should be re-striped so that cars making a left out of the Snow Valley parking lot can turn into an acceleration lane and not interfere with westbound traffic. An example showing potential restriping for SR-18 at the main entrance to Snow Valley Resort is shown in **Figure 8-4**.

Figure 8-4: SR-18 Restriping at Snow Valley Resort Main Entrance



### 8.2.2 Roadway Maintenance

Roadway maintenance within the MATS area was mentioned multiple times during stakeholder meetings, highlighting an existing issue with roadway maintenance related to striping and snow removal. The primary recommendation related to roadway maintenance is increased coordination between jurisdictional agencies. Currently, there are multiple agencies and jurisdictions involved related to maintenance and control during major events (whether weather or event related). In addition, when roads are re-paved or overlaid, they do not routinely pave existing paved shoulder areas, resulting in smaller paved roadway widths after an overlay.

Recommendations for improved traffic control within the MATS area include:

- **Conflicting Information:** With various agencies involved in relaying traffic congestion information or roadway conditions information (including Caltrans, San Bernardino County, City of Big Bear Lake, Sheriff, US Forest Service, and CHP), it is often unclear as to actual road conditions. It is recommended to study and develop a clearinghouse location for traffic and transportation related information for the MATS area.
- **Mount Baldy Road Coordination:** The only winter access into Mount Baldy is maintained by both San Bernardino and Los Angeles Counties. Winter maintenance for this facility is often overlooked by Los Angeles County, and it recommended that the County of San Bernardino coordinate with Los Angeles County maintenance and develop agreements to Mount Baldy Road during snow events.

### 8.2.3 Transportation Modes

Within the MATS area, the personal automobile is the primary mode of travel. However, a recurring theme among stakeholders was related to alternative modes of travel and their availability.

Recommendations for improved availability of transportation modes within the MATS area include:

- **Pedestrian or Bicycle Conflicts:** The facilities within the MATS area are traditionally designed for automobiles, without adjacent facilities for non-motorized person trips. It is recommended to install signage at locations with known conflicts between non-motorized persons with vehicles, and to include these locations into currently on-going bicycle and pedestrian plans. Examples of signage encouraging sharing the roadway is shown in **Figure 8-1**.
- **Park and Ride Facilities:** With few dense attraction destinations, and multiple locations for visitors to reside, it is difficult to fully utilize mass transit within the MATS area. However, there is a potential for shuttle service coordination with the San Manuel Indian Casino for MARTA to pick up visitors on weekends. It is recommended to investigate demand for park and ride or shuttle services for visitors entering the MATS area which are destined to several of the large ski resorts during peak winter months.
- **Alternate Modes:** The increase in residents and visitors allows for the potential for increasing use of transit services, including shuttle and trolley service along with improving the existing fixed-route services. It is recommended to continue to investigate non-fixed route services within resort destinations and during events within MATS communities, to improve the visitor experience and to alleviate traffic congestion.

### 8.2.4 Turnouts

In addition to traffic operational deficiencies within MATS communities, there is potential for improving the uphill turnout usage by slow-moving vehicles. Turnouts located in the uphill direction of travel appear to be underutilized by slow-moving vehicles, adding to the delay and frustration for vehicles traveling at a rate consistent with posted speed limits.

Current California Motor Vehicle Code 21656 states that “on a two-lane highway where passing is unsafe because of traffic in the opposite direction or other conditions, a slow-moving vehicle, including a passenger vehicle, behind which five or more vehicles are formed in a line, shall turn off the roadway at the nearest place designated as a turnout...” The California Motor Vehicle Code states that acceptable turnouts are typically indicated by a sign that states “Slower Traffic Use Turnouts”.

Recommendations for improved usage of turnouts within the MATS area include:

- **Signage:** Early advance warning for turnouts, including “Slower Traffic Use Turnouts” or “Turnout ¼ Mile”. Without adequate signage, there is a perception to the driver of the slow moving vehicle that they will not be able to easily transition back into moving traffic, resulting in resistance to use unsigned turnouts. Examples of turnout signage are illustrated in **Figure 8-5**. An example of a useable slow-vehicle turnout design including adequate signage is shown in **Figure 8-6**.



Figure 8-5: Examples of Turnout Signage

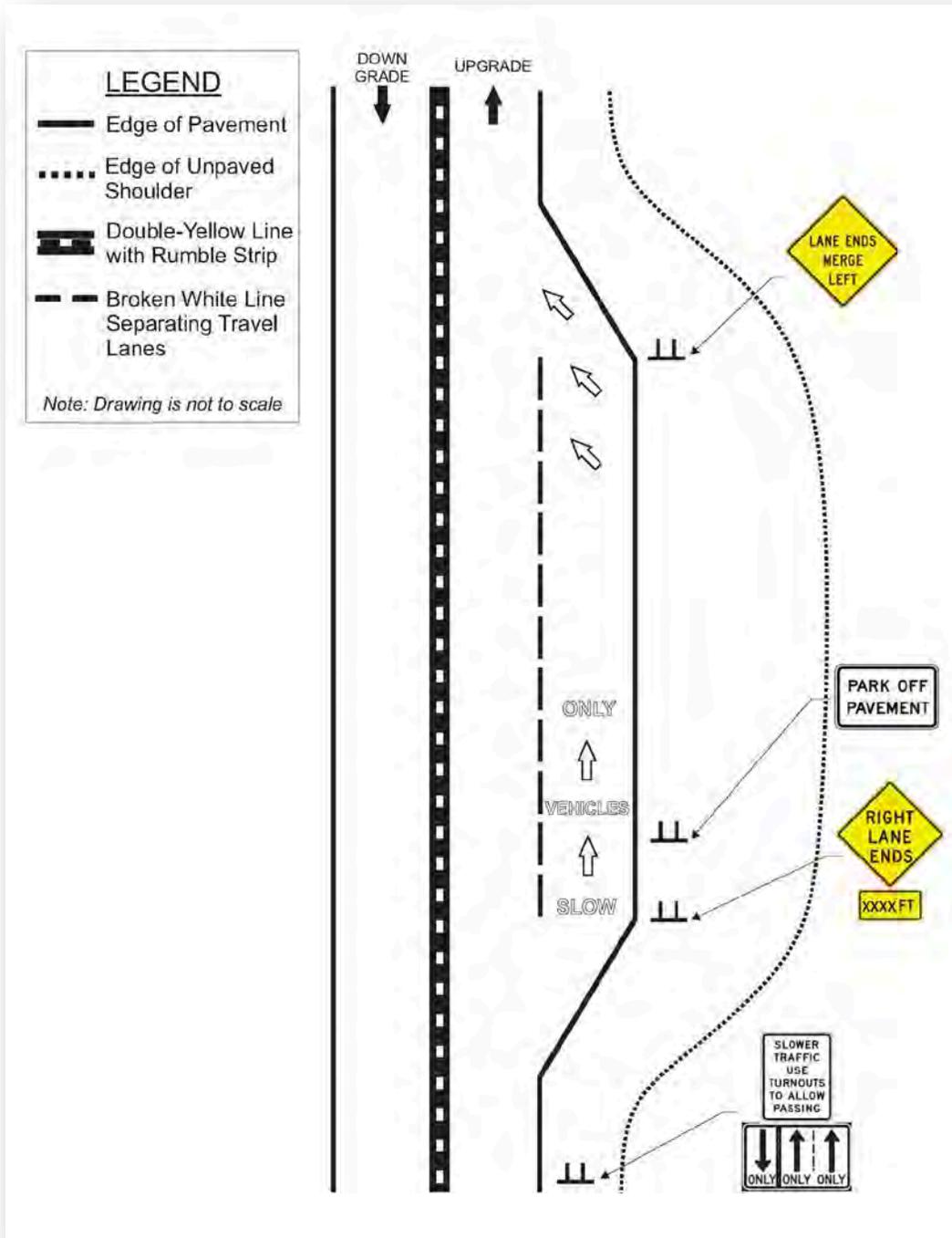


- **Lane Configuration Diagram (Signage):** Signage at turnouts is imperative to inform vehicles of the true use of the turnout. Upon initiation of a turnout that is designed for both stopping vehicles and slow-moving vehicle lanes, a lane configuration diagram should be presented for a visual reference. Turnouts designed primarily for slow-moving vehicles should include a sign that defines the length of the lane for slow-moving vehicles, so drivers of slow-moving vehicles can determine acceptable speed prior to re-entering the single uphill lane of traffic. An example of a useable slow-vehicle turnout design including a lane configuration diagram is shown in **Figure 8-6**.
- **Lane Markings:** Lane markings are important to be included in the design of turnouts designed for slow-moving vehicles. Enhanced lane and edge of travel way stripes should be placed to define a drivable slow vehicle lane that will not be obstructed by stopped vehicles. Enhanced delineation will provide clear definition of paved areas to be used as “rolling turnouts” allowing slow-moving vehicles to maintain momentum. An example of a useable slow-vehicle turnout design including lane markings denoting the slow moving vehicle lane is shown in **Figure 8-6**.

The recommendation is to focus on the usability of existing turnouts, and not the frequency of them. There are ample locations that could behave as a turnout for vehicles to stop, but are not turnouts for trucks and slower vehicles to use in order to let faster vehicles pass.



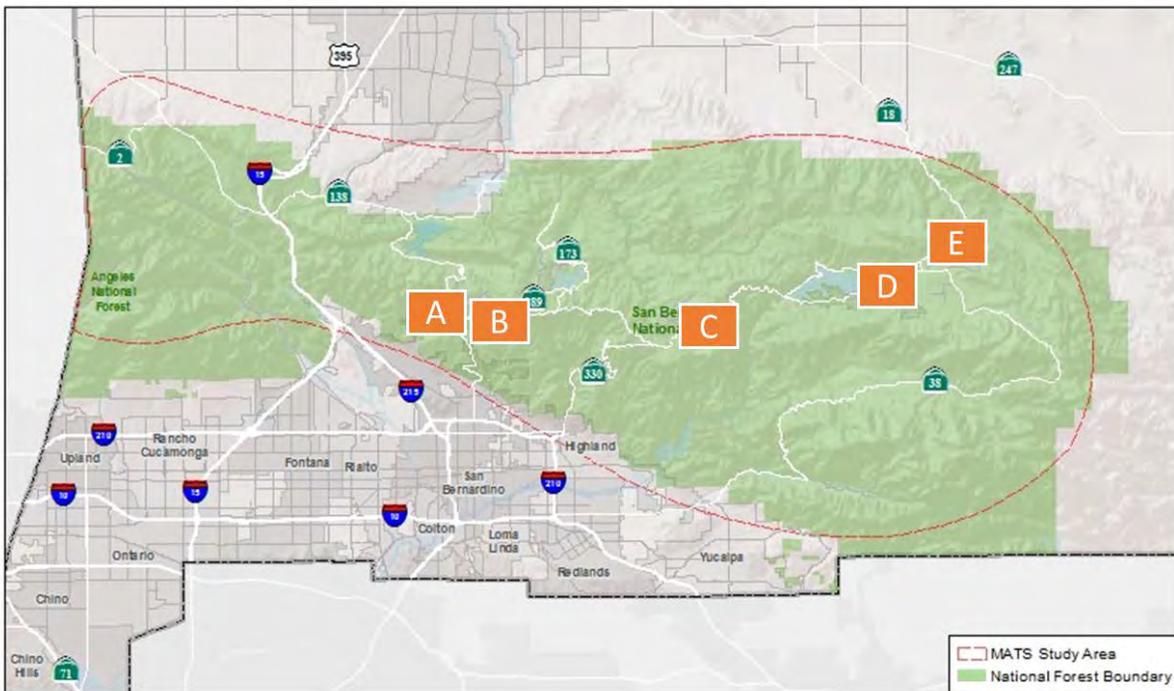
Figure 8-6: Example of Useable Slow-Vehicle Turnout Design



### 8.3 Geometric Recommendations

While the purpose of this study was not to focus on increasing capacity on the primary access routes to the MATS area, a recurring theme during stakeholder meetings and the needs assessment data collection phase was the limitation of the MATS area infrastructure due to insufficient capacity. There are many locations with congestion related to inadequate roadway capacities, poor roadway geometries, and inadequate use of existing right-of-way. However, it is infeasible to significantly increase capacity on primary access routes. **Figure 8-7** identifies five locations that were identified as locations considered with an opportunity to improve mobility. A more extensive discussion of roadway geometry and section description is included in *Section 6.2* of this report.

**Figure 8-7: State Route Bottlenecks and Congestion**



Recommendations for improved roadway geometry within the MATS area include:

- **SR-18 – Post Mile 15.0 to 16.8 (Location A):** The existing roadway section is a four-lane section (2-lanes in each direction) with a thrie beam guardrail separating the opposing directions of travel. There are isolated turnouts along this segment with paved shoulders and occasional guardrail systems where steep fill slopes are located. **Figure 6-3** illustrates the segment of SR-18 from PM 15.0 to 16.8.
  - It is recommended that a review of existing turnouts be considered to improve separation distance between stopped vehicles and the outside edge of travel way. If possible, it is recommended to design existing turnouts to include capability for stopped vehicles in addition to a slow-moving vehicle through lane. This added shoulder

- delineation or guidance could be employed at locations where turnouts or scenic overlooks attract sightseers to increased separation between stopped and moving vehicles.
- Additionally, a review of signing is recommended to be accomplished at turnouts for consistency with traffic flow direction.
  - **SR-18 – Post Mile 22.15 to 25.15 (Location B):** The existing roadway section is a two-lane section (1-lane in each direction) with a buffer separating the opposing directions of travel. The roadway section has limited shoulder widths and experiences an increased number of local roadway access points (residences and small businesses) compared to adjacent segments of SR-18. **Figure 6-4** illustrates the segment of SR-18 from PM 22.15 to 25.15.
    - It is recommended that a comprehensive review of turnout design be completed to improve uphill movements and relieve queuing behind slow moving vehicles.
    - It is also recommended to study the benefit of intersection improvements at the junction of SR-18 with SR-173. If excess State right-of-way is available for minor roadway improvements, it could potentially serve as a cost effective improvement to reduce congestion during peak periods and improve intersection efficiency, while limiting impacts to the area.
  - **SR-18 – Post Mile 34.5 to 36.5 (Location C):** The existing roadway section is a two-lane section (1-lane in each direction) with a painted centerline and recessed reflectors. The segment of roadway known as “13-curves” is located within this location. One signed turnout exists in the downhill (westbound) direction of travel. Signage related to no parking is inconsistent when compared to other mountain areas within a very short distance. **Figure 6-5** illustrates the segment of SR-18 from PM 34.5 to 36.5.
    - It is recommended that a review of the signage be completed to implement consistency in the signing of no parking areas. The clarity new signs bring would be beneficial for all users, including parking enforcement officers. Increased separation would likely improve the flow of vehicles with fewer potential obstacles lining the roadway.
  - **SR-18 – Post Mile 52.7 to 53.8 and SR-38 Post Mile 49.5 to 48.3 (Location D):** The existing roadway section is a four-lane asphalt section (2-lanes in each direction). This segment is located in the downtown area of Big Bear Lake between Summit Road and Stanfield Cut-off. **Figure 6-6** illustrates the segment of SR-18 from PM 52.7 to 53.8 and SR-38 from PM 49.5 to 48.3.
    - It is recommended that site-specific improvements traffic operations improvements be developed and studied within this section of roadway to enhance traffic operations.
  - **SR-18 – Post Mile 55.5 to 56.7 (Location E):** The existing roadway section is a two-lane section (1-lane in each direction). **Figure 6-7** illustrates the segment of SR-18 from PM 55.5 to 56.7.
    - It is recommended to make improvements within this section of roadway to more efficiently utilize the 40-foot ROW to allow for a continuous center-turn lane the entire segment. This geometric recommendation is in addition to the operational recommendation in *Section 8.2* of this report.
    - It is also recommended to improve drainage within this section of roadway.
  - **SR-18 at Castle Rock Trail:** The Castle Rock Trailhead is popular amongst residents and visitors, and is located along Big Bear Boulevard. At this location, Big Bear Boulevard dips down into the

canyon to the trailhead and then rises again. There is potential for straightening out this segment of SR-18 to no longer include the vertical or horizontal curves at this location, allowing for a direct connection of Big Bear Boulevard, avoiding the Castle Rock trailhead. The property owner for the required right-of-way is the National Forest, as well as private ownership. While this project would take significant resources to study and build, it is a recommendation of this report to continue discussions amongst property owners to further study and evaluate an alternative alignment of SR-18 through this section. This geometric recommendation is in addition to the operational recommendation in *Section 8.2* of this report.

## 8.4 Informational Recommendations

Informational recommendations, including signage and real-time messages, were identified as having the potential to alleviate many of the mobility issues identified in *Section 6.0* of this report. Many of the mobility issues identified noted poor circulation patterns or confusion to drivers, which can be remedied efficiently by providing better information to drivers.

Recommendations for improved roadway operations within the MATS area include:

- **Chain Installation and Control:** Issues related to chain installation and control are due to multiple factors, including; bottlenecks, spacing of chain control locations, chain enforcement, and information related to chain requirements. Information related to chain control is available on the Caltrans website, but is not readily available to drivers. It is recommended that permanent locations for chain installation and removal be identified and adequately designated. There was a potential solution developed by stakeholders to work with the CHP and chain-exempt vehicles to shorten queue at chain control locations. It is recommended to initiate discussions with CHP on the potential for pre-approving vehicles through chain control stations.
- **Illegal Parking:** Traffic congestion and friction exist on state routes due to vehicles parked in “No Parking” zones. This is often the case in winter and summer peak months near popular snow play and hiking locations. It is recommended that standardized signage for off-street (off State Route) parking and no-parking zones be developed. It is also recommended to develop a more efficient and effective method for parking enforcement (perhaps utilizing newer technology and standardized ticketing), as procedures are time prohibitive and not a beneficial use of time for the enforcement officer.
- **Information Technology Services (ITS):** Information for drivers is beneficial to the overall transportation circulation, and could be better improved with real-time Changeable Message Signs (CMS) at key locations throughout the MATS area. It is recommended to continue supporting discussions for CMS signs with Caltrans District 8, who have already initiated the process. A discussion on the recommendation for CMS signs is included in *Section 8.4.1* of this report. Alternatively, portable message signs (PMS) and other portable traffic control devices could prove to be helpful for special events, and it is the recommendation of this report for agencies to come to agreement for shared-use of PMS signs when available.

One of the most efficient methods in providing information to a driver is by use of real-time information. Access to real-time information can help travelers choose their travel route, especially when the mountain roads get congested during peak visiting periods. Access to real-time information could also help travelers make choices that help improve the efficiency of the mountain area circulation system. For example, if travelers could be provided with information about parking occupancy at key resort locations and information about remote parking opportunities or alternate mode options, they could choose one of the options rather than driving directly to (and further congesting) a highly-congested resort destination. Different technologies may be appropriate for putting out information.

#### 8.4.1 Permanent Changeable Message Signs

A permanent CMS should be strategically located to present information related to travel time, known detours, and other valuable topics. One of the benefits of installing permanent CMS signs, rather than relying on portable signs, is that drivers are more likely to believe a permanent sign, and often mistake portable signs as “construction related” or assume the signs are out-of-date and not current.

Caltrans District 8 maintains a website with real-time information with message signs (<http://www.dot.ca.gov/dist8/tmc/>). **Figure 8-9** identifies the location of “Message Signs” within the MATS area as identified by Caltrans on March 27<sup>th</sup>, 2017. At the time this figure was obtained, there were message signs located on SR-2 outside of Wrightwood, in San Bernardino at the south end of SR-18, in Running Springs, and at the junction of SR-18 and SR-38 in Big Bear Lake.

To make CMS signs as efficient as possible, CMS signs should be located in place to allow drivers time to make a decision. For example, CMS signs at the bottom of the mountain need to be located before the last exit. The importance of early signage is evident when chains are required. For example, if a vehicle had a need to buy chains, they need to know before their last opportunity to turn around.

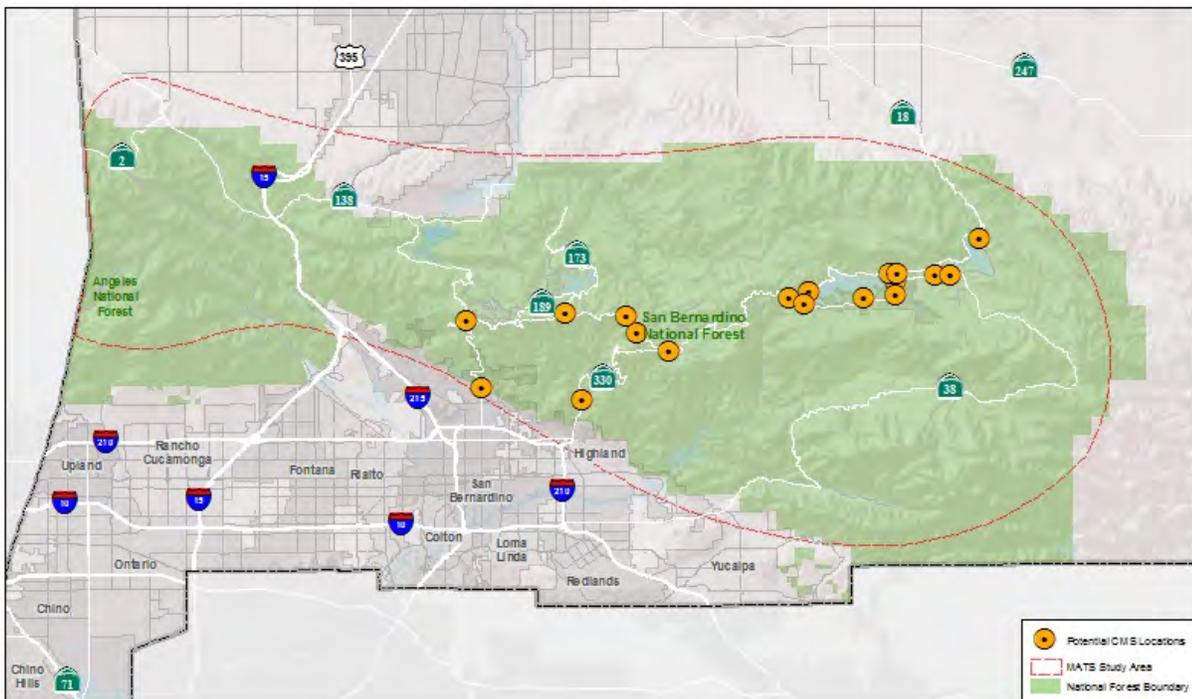




- Stanfield Cut-off at North Shore Drive
- Mt. Baldy Road at Mountain Avenue

It is also recommended that all mountain area CMS signs show chain requirements prior to drivers beginning their trip up the mountain, and real-time parking occupancy at key resort locations on CMS signs at key junctions leading to the resorts. **Figure 8-10** illustrates the location of the 11 CMS signs identified by Caltrans District 8, as well as the 5 additional locations for CMS signs identified by stakeholders.

**Figure 8-9: Caltrans District 8 Potential CMS Locations**



### 8.4.2 Wide-Area Dissemination of Information

Changeable message signs (CMS) can be helpful for drivers at key decision points (entry points to the mountains or key roadway junctions), but wide-area dissemination of information can reach a broader audience of travelers. A mountain area traveler app could provide information for many traveling through the mountains, but in some areas (for example, the canyon leading up to Mt. Baldy) online information may not be accessible and an AM radio transmission could be used where effective considering placement of the transmitter relative to terrain and existing roadways.

Recommendations for improved dissemination of information within the MATS area include:

- Development of a mountain traveler information app; include real-time traffic and travel time information, chain requirements, parking occupancy at key resorts, alternate modes information, etc.
- Provide AM radio transmission of traveler information for key mountain travel corridors where web access is not available (for example, Mt. Baldy area). With AM radio transmission, it is imperative that there is signage at entry points into the mountain area. Examples of signage for AM radio transmission are illustrated in **Figure 8-11**.

Figure 8-10: AM Radio Traveler Information Signage Example



## 9.0 IMPLEMENTATION STRATEGY

Transportation plays an important role in the San Bernardino County’s mountain area. The efficient movement of people and goods is the foundation upon which a healthy economy and high quality of life are built. Yet, the entire transportation system and the role municipal government plays in its maintenance, operations, and development over time are not always well understood. The overall goal of the MATS implementation plan is to set a course for future decision-making regarding the transportation and circulation system in the area. The purpose of the MATS implementation plan is to serve as a tool in the decision-making process regarding which projects should be advanced given the limitations of funding sources and identify agency roles.

### 9.1 Project Implementation Methodology

For the purposes of the MATS study, a set of evaluation or performance criteria were developed as follows:

1. **Project benefits:** Expected effectiveness of a project in reducing congestion, improving mobility or elimination of bottlenecks.
2. **Ease of project implementation:** Expected ease of institutional or administrative implementation of the project.
3. **Project cost:** Expected expense to implement the project.

For each of the above categories a “scoring” methodology was developed where a higher score translates into a greater improvement value at the regional level. The scoring is intended as a general guide for technical staff and policy-makers. The actual selection of projects for funding and implementation occurs through the policy committee structure established by the SBCTA Board of Directors. The Measure I 2010-2040 Mountain/Desert Expenditure Plan states under the Major Local Highway Projects program that:

*“Expenditure of Major Local Highway Projects funds shall be approved by the Authority Board of Directors, based upon a recommendation of subarea representatives and the Mountain/Desert Committee.”*

**Figure 9-1** illustrates the San Bernardino County subareas, which are commonly referred to as the Mountain/Desert subareas. The MATS study is included within two of the Measure I subareas: The Mountain Subregion and the Victor Valley subarea. Each subarea has its own set of representatives. The majority of the MATS area is included within the Mountain Subregion, and the representatives include the Second and Third District Supervisors along with the Board member from the City of Big Bear Lake. The Wrightwood area is part of the Victor Valley subarea, represented by the First District Supervisor, plus representatives of the City of Adelanto, Town of Apple Valley, City of Hesperia, and City of Victorville.

Figure 9-1: San Bernardino County Subareas



Although each subarea has flexibility in how the representatives designate projects, generally an overall project list is developed and projects are identified for implementation as funds become available. Recommendations are made by the subarea representatives for consideration by the Mountain/Desert Committee and on to adoption by the full SBCTA Board. Funding can involve not only Measure I funds, but funds from a variety of state sources as well. The project scoring is one input to this decision-making process for the allocation of these funds.

### 9.1.1 Criteria Score Definitions

Evaluation criteria for **project benefits** are summarized in **Table 9-1**, and ranges from a low score of 1 (resulting in little effect on bottlenecks) to a high score of 5 (resulting in substantial improvement of a regional bottleneck).

Table 9-1: Benefits Criteria and Evaluation Score

Score	Description
5	Substantial improvement of a regional route bottleneck
4	Moderate improvement of a regional route bottleneck; or Opportunity for substantial diversion of people to alternate routes
3	Modest improvement of a regional route bottleneck Substantial improvement of a localized bottleneck
2	Little improvement of a regional route bottleneck Modest improvement of a localized bottleneck
1	Little effect on bottleneck / congestion



Evaluation criteria for ***ease of project implementation*** are summarized in **Table 9-2**, and ranges from a low score of 1 (requiring in a major acquisition of ROW and coordination between multiple agencies) to a high score of 5 (represented by a project that is anticipated to be easy to implement, such as a signing or striping project).

**Table 9-2: Ease of Implementation Criteria and Evaluation Score**

Score	Description
5	Easy to implement; signing and striping
4	No ROW required; little or no agency coordination
3	Minimal ROW required
2	Moderate ROW required
1	Major ROW required; multiple agency coordination required

For the purposes of the MATS study, order-of-magnitude cost estimate for identified types of improvements have been developed. Evaluation criteria for ***project cost*** are summarized in **Table 9-3**, as well as a description of the types of improvements that fall within each category. Cost categories range from a low score of 1 (representing an investment greater than \$5,000,000) to a high score of 5 (representing an investment typically less than \$50,000).

**Table 9-3: Cost Criteria and Evaluation Score**

Score	Cost Range	Description of Improvements
5	Very Low – Low (\$0 - \$50,000)	minor signing and striping revisions
4	Low (\$50,000 – \$250,000)	traffic signal upgrade or installation at an existing intersection (no roadway work involved)
3	Medium (\$250,000 - \$800,000)	minor roadway or intersection work including traffic signals, signage, turn pockets
2	Medium/High – High (\$800,000 - \$5,000,000)	minor roadway or intersection work and traffic signals improvements with limited partial ROW takes required
1	Very High – Major Investment (>\$5,000,000)	major roadway or intersection improvements requiring full ROW takes due to grading limits and utility work

### 9.1.2 Project Scoring Methodology

A scoring scale was developed that would yield a maximum of 100 points for each project. However, since each of three evaluation criteria has a different level of significance to the overall project implementation process, it was decided that each criterion would be weighted differently, as shown below:

- Project Benefits weighted at 60% of the overall score
- Ease of Project Implementation weighed at 30% of the overall score
- Project Cost weighted at 10% of the overall score

Each project would receive a score between 1 and 5 based on how they are expected to perform under each criterion. The scores for each criterion were combined by the corresponding criteria weight according to the formula depicted in **Figure 9-1**.

**Figure 9-2: Evaluation Score Calculation**

$$\text{Total Evaluation Score} = \frac{((0.6 * \text{Benefit Score}) + (0.3 * \text{Ease of Implementation Score}) + (0.1 * \text{Cost Score}))}{5} \times 100$$

An example of the scoring is a project that has a **project benefit** score of 3 (modest improvement of a regional bottleneck, or a substantial improvement of a localized bottleneck), an **ease of project implementation** score of 4 (no ROW required, with little or no agency coordination), and a **project cost** score of 2 (medium to high cost ranging between \$800,000 to \$5,000,000). In this example, the **total** evaluation score is calculated as 64, and is shown in **Figure 9-2**.

**Figure 9-3: Evaluation Score Example Calculation**

$$\frac{(0.6 * 3) + (0.3 * 4) + (0.1 * 2)}{5} \times 100 = 64$$

### 9.1.3 Priority Methodology

In the next step, a generalized prioritization process was completed to determine if a project would be of relatively “low,” “medium,” or “high” priority for implementation. Using the scoring methodology established in *Section 9.1.2* of this report, an equal distribution of projects based on scores was used to determine scoring ranges for relative priorities. The project priority scoring is ranked as follows:

- “Low Priority”: projects with score less than 55 points
- “Medium Priority”: projects with score between 55 points and 65 points
- “High Priority”: projects with score 65 points and higher

## 9.2 Scoring and Ranking for Project Recommendations

This section of the report summarizes the project recommendations from *Section 8.0* based on the methodologies defined in *Section 9.1*.

### 9.2.1 Location Issue Implementation Plan

The methodologies and scoring values identified in this section of the report were applied directly to the location issues and recommendations identified in **Table 8-1**. **Table 9-4** summarizes the locations, preferred solution, evaluation criteria, and resulting total score. It should be noted that locations with no recommended improvement are not included in **Table 9-4**.

Of the location issues identified in *Section 6.0* of this report, 37 projects were evaluated and prioritized. Weighted scores range between 40 and 94 points, out of a possible range of 20 to 100 points for each

project. As detailed in **Table 9-4**, based on the three ranges discussed above, there are 12 “High Priority” projects, 10 “Medium Priority” projects, and 14 “Low Priority” projects.

**Table 9-4: Location Issues, Evaluation Criteria, and Associated Score**

Location ID	Location	Solution	Political Jurisdiction	Location	Evaluation				Priority
					Benefit	Implementation	Cost	Weighted Score	
<b>Wrightwood/Mount Baldy/Lytle Creek</b>									
1	SR-2 (Big Pines Highway) at Willow Road	<ul style="list-style-type: none"> <li>No solution recommended (See Table 8-1 for discussion on recommendation)</li> </ul>	Caltrans	San Bernardino County	5	4	5	94	
2	SR-2 (Big Pines Highway) at Wrightwood	<ul style="list-style-type: none"> <li>Develop chain-up area<sup>1</sup> on SR-2</li> </ul>	Caltrans	San Bernardino County	3	3	4	62	
3	Glendora Ridge Road at Entire Route Through San Bernardino County	<ul style="list-style-type: none"> <li>No solution recommended (See Table 8-1 for discussion on recommendation)</li> </ul>	San Bernardino County	San Bernardino County					
4	Lone Pine Canyon Road at Between SR-138 and SR-2 in Wrightwood	<ul style="list-style-type: none"> <li>Provide a chain-up area<sup>1</sup> and enhance CHP enforcement of chain control on Lone Pine Canyon Road</li> </ul>	San Bernardino County	San Bernardino County	2	3	4	50	
5	Lytle Creek Road at North of I-15	<ul style="list-style-type: none"> <li>Install "Share the Road" signage<sup>2</sup></li> </ul>	San Bernardino County	San Bernardino County	1	5	5	52	
6	Swarthout Canyon Road at South of Lone Pine Canyon Road	<ul style="list-style-type: none"> <li>No solution recommended (See Table 8-1 for discussion on recommendation)</li> </ul>	San Bernardino County	San Bernardino County					
<b>Crestline/Lake Arrowhead</b>									



Location ID	Location	Solution	Political Jurisdiction	Location	Evaluation				Priority
					Benefit	Implementation	Cost	Weighted Score	
7	SR-138 at Seeley Way	<ul style="list-style-type: none"> <li>No long-term solution recommended</li> <li>Positive improvement with maintenance and reduced vegetation on the curve of SR-138 to greatly improve sight distance</li> </ul>	Caltrans	San Bernardino County	1	5	5	52	
8	SR-138 at Crest Forest Drive/Lake Drive "Top Town"	<ul style="list-style-type: none"> <li>No solution recommended (See Table 8-1 for discussion on recommendation)</li> </ul>	Caltrans	San Bernardino County					
9	SR-173 at SR-18	<ul style="list-style-type: none"> <li>Revise intersection configuration</li> <li>Use adjacent paved area to increase curve radius and improve turn pocket</li> <li>Increase local street separation from SR-18</li> </ul>	Caltrans	San Bernardino County	2	3	2.5	47	
10	SR-18 at SR-138	<ul style="list-style-type: none"> <li>No solution recommended (See Table 8-1 for discussion on recommendation)</li> </ul>	Caltrans	San Bernardino County					
11	SR-18 at Daley Canyon Road	<ul style="list-style-type: none"> <li>Improve route guidance signage in advance of intersection</li> </ul>	Caltrans	San Bernardino County	1	5	5	52	
12	SR-18 at SR-330	<ul style="list-style-type: none"> <li>Include an acceleration lane from west of Hilltop, including a left turn pocket west of Hilltop</li> </ul>	Caltrans	San Bernardino County	4	3	2	70	



Location ID	Location	Solution	Political Jurisdiction	Location	Evaluation				Priority
					Benefit	Implementation	Cost	Weighted Score	
13	SR-18 at Running Springs to Big Bear Lake	<ul style="list-style-type: none"> <li>Update and make turnout<sup>3</sup> signage consistent</li> <li>Separate turnout<sup>3</sup> areas for slow moving vehicles from sightseer parking areas</li> </ul>	Caltrans	San Bernardino County	4	1	3	60	
14	SR-18 at Running Springs School Road	<ul style="list-style-type: none"> <li>Widen intersection to provide westbound left-turn lane and westbound acceleration lane to receive left turns on SR-18</li> </ul>	Caltrans	San Bernardino County	2	3	3	48	
15	SR-18 at Snow Valley and SR-18 at Snow Valley Snow Play Area (approximately 1 mile west of Snow Valley parking lot entrance)	<p>At Snow Valley<sup>4</sup>:</p> <ul style="list-style-type: none"> <li>Re-stripe Snow Valley parking lot intersection with SR-18 to provide one westbound through lane plus an acceleration lane for left-turning traffic going west on SR-18</li> </ul> <p>At Snow Play Area<sup>5</sup>:</p> <ul style="list-style-type: none"> <li>Install adequate signage to direct visitors to parking locations</li> </ul>	Caltrans	San Bernardino County *	3	5	4	74	
16	SR-18 at Entire State Route	<ul style="list-style-type: none"> <li>Study and develop turnout facilities<sup>3</sup> where needed</li> </ul>	Caltrans	San Bernardino County	5	1	1	68	

Location ID	Location	Solution	Political Jurisdiction	Location	Evaluation				Priority
					Benefit	Implementation	Cost	Weighted Score	
17	SR-189 at Daley Canyon Road	<ul style="list-style-type: none"> <li>Stripe edge of travelled way going around curve on southwest corner</li> <li>Consider better signage, including a flashing signal approaching the intersection for northbound Daley Canyon Road</li> <li>No solution for sight distance, as it appears to be not a significant issue since it's a three-way stop T-intersection</li> </ul>	Caltrans	San Bernardino County	2	5	5	64	
18	SR-189 at Blue Jay Cut-off	<ul style="list-style-type: none"> <li>Revise profile of Blue Jay Cut-off for approximately 200 feet and improve the grade and connection with SR-189</li> </ul>	Caltrans	San Bernardino County	2	4	3	54	
19	SR-330 at City Creek US Forest Service Station	<ul style="list-style-type: none"> <li>Restripe existing roadway to include left-turn pocket on SR-330</li> <li>Potential need for minor widening within existing ROW north of the parking lot</li> </ul>	Caltrans	San Bernardino County	3	4	4	68	
20	SR-330 at Live Oak	<ul style="list-style-type: none"> <li>Install "Local Traffic Only" sign<sup>6</sup> on Live Oak</li> <li>Install "Steep Grade" sign<sup>7</sup> on steep slope section of Live Oak to deter cut-through traffic</li> </ul>	Caltrans	San Bernardino County	1	5	5	52	



Location ID	Location	Solution	Political Jurisdiction	Location	Evaluation				Priority
					Benefit	Implementation	Cost	Weighted Score	
21	SR-18 at Hilltop Boulevard	<ul style="list-style-type: none"> <li>• Study installation of westbound SR-330 receiving lane for traffic turning left from SR-18</li> <li>• Install left turn pockets on SR-18 at Soutar Drive and Hunsaker Way</li> </ul>	Caltrans	San Bernardino County	4	5	5	88	
22	Crest Forest Drive at Valley View Drive	<ul style="list-style-type: none"> <li>• <i>No solution recommended (See Table 8-1 for discussion on recommendation)</i></li> </ul>	San Bernardino County	San Bernardino County					
23	Lake Arrowhead Village Area	<ul style="list-style-type: none"> <li>• Develop a smart parking system with signage and an app to communicate parking occupancy</li> <li>• Preclude cars from entering full parking lots</li> </ul>	San Bernardino County	San Bernardino County	2	4	2	52	
24	Lake Drive at Fern Drive	<ul style="list-style-type: none"> <li>• <i>No solution recommended (See Table 8-1 for discussion on recommendation)</i></li> </ul>	San Bernardino County	San Bernardino County					



Location ID	Location	Solution	Political Jurisdiction	Location	Evaluation				Priority
					Benefit	Implementation	Cost	Weighted Score	
25	Lake Drive at Wild Rose Lane	<ul style="list-style-type: none"> <li>Recommend the Community of Crestline and San Bernardino County continue to study traffic circulation for large events at this location</li> <li>Potential for stop signs to be located on Lake Drive at Wild Rose Lane</li> <li>Potential for two-lane exit driveway from USPS parking lot</li> <li>Recommendation to remove pilaster with no parking sign from middle of USPS entry driveway</li> </ul>	San Bernardino County	San Bernardino County	2	4	1	50	
26	SR-330 at Highland Ave	<ul style="list-style-type: none"> <li>Implement a Park and Ride Facility<sup>8</sup></li> </ul>	Caltrans	San Bernardino County	2	3	4	50	
<b>Big Bear/Angeles Oaks</b>									
27	SR-18 at SR-38	<ul style="list-style-type: none"> <li>Install a "real time traffic management" sign<sup>9</sup> at this location, approximately 100 yards east of Big Bear Dam</li> </ul>	Caltrans	San Bernardino County	4	4	3	78	
28	SR-18 (Big Bear Boulevard) at Castle Rock Trail Head	<ul style="list-style-type: none"> <li>Raise SR-18 through the bend and gain area to include parking spots for trailhead; retaining wall.</li> <li>Provide pedestrian path along SR-18</li> </ul>	Caltrans	City of Big Bear Lake	3	3	2	58	



Location ID	Location	Solution	Political Jurisdiction	Location	Evaluation				Priority
					Benefit	Implementation	Cost	Weighted Score	
29	SR-18 (Big Bear Boulevard) at Mill Creek Road	<ul style="list-style-type: none"> <li>Widen Big Bear Boulevard to provide westbound left turn lane between Wild Rose Lane and Mill Creek Road</li> </ul> <p><i>Related to location issue #30</i></p>	Caltrans	City of Big Bear Lake	3	3	3	60	
30	SR-18 (Big Bear Boulevard) at Wild Rose Lane	<ul style="list-style-type: none"> <li>Widen Big Bear Boulevard to provide westbound left turn lane between Wild Rose Lane and Mill Creek Road</li> </ul> <p><i>Related to location issue #29</i></p>	Caltrans	City of Big Bear Lake	3	3	2	58	
31	SR-18 (Big Bear Boulevard) at Lakeview Drive/Paine Court	<ul style="list-style-type: none"> <li>Convert the intersection into a roundabout</li> </ul>	Caltrans	City of Big Bear Lake	5	2	2	76	
32	SR-18 (Big Bear Boulevard) at Village Drive	<ul style="list-style-type: none"> <li>Reconfigure intersection, including moving eastbound through stop bar further east</li> <li>Obtain ROW from NW corner lot to modify intersection</li> </ul>	Caltrans	City of Big Bear Lake	4	3	2	70	
33	SR-18 (Big Bear Boulevard) at Pine Knot Avenue	<ul style="list-style-type: none"> <li>Extend WB merge further west to Simondss Road</li> <li>Study workable alternatives</li> <li>Rework/Modify parking lot to allow easier entrance and exit</li> </ul>	Caltrans	City of Big Bear Lake	4	3	2	70	



Location ID	Location	Solution	Political Jurisdiction	Location	Evaluation				Priority
					Benefit	Implementation	Cost	Weighted Score	
34	SR-18 (Big Bear Boulevard) at Knickerbocker Creek	<ul style="list-style-type: none"> <li>Implement undercrossing for bicycles and pedestrians</li> </ul>	Caltrans	City of Big Bear Lake	2	3	2	46	
35	SR-18 (Big Bear Boulevard) at Moonridge Road	<ul style="list-style-type: none"> <li>Improve signal timing along SR-18</li> </ul>	Caltrans	City of Big Bear Lake	3	5	5	76	
36	SR-18 (Big Bear Boulevard) at Stanfield Cut-off	<ul style="list-style-type: none"> <li>(See Table 8-1 for discussion on recommendation)</li> </ul>	Caltrans	City of Big Bear Lake					
37	SR-18 (Big Bear Boulevard) at Division Drive to Paradise Way	<ul style="list-style-type: none"> <li>Develop a center turn lane and adequate drainage</li> </ul>	Caltrans	San Bernardino County *	5	3	2	82	
38	SR-38 at Mountain Home Village	<ul style="list-style-type: none"> <li>Install "Local Access Only" sign<sup>6</sup> on access road on north side of SR-38</li> </ul>	Caltrans	San Bernardino County	1	5	5	52	
39	SR-38 at Valley of the Falls Drive	<ul style="list-style-type: none"> <li>Restripe or widen SR-38 to accommodate a left turn lane from SR-38 to Valley of the Falls Drive</li> <li>Add receiving lane for left turns from Valley of the Falls Drive onto SR-38</li> </ul>	Caltrans	San Bernardino County	3	3	2	58	
40	SR-38 at Forest Falls Turn-off	<ul style="list-style-type: none"> <li>Widen SR-38 to add uphill truck climbing lane or passing lane</li> <li>Note that the addition of a truck climbing lane will involve widening SR-38, as restriping would eliminate existing shoulders</li> </ul>	Caltrans	San Bernardino County	3	3	1	56	



Location ID	Location	Solution	Political Jurisdiction	Location	Evaluation				Priority
					Benefit	Implementation	Cost	Weighted Score	
41	SR-38 (Big Bear Boulevard) at Greenspot Boulevard/Shay Road "Square Turn"	<ul style="list-style-type: none"> <li>Maintain continuity for vehicles on SR-38 by realigning to make SR-38 a continuous curve through the intersection</li> <li>Close off access to Greenspot Road north of Shay Road, and bring Shay Road into SR-38 as a T-intersection</li> </ul>	Caltrans	San Bernardino County	3	3	3	60	
42	SR-38 (Big Bear Boulevard) at Stanfield Cut-off	<ul style="list-style-type: none"> <li>Convert the intersection into a roundabout</li> </ul>	Caltrans	San Bernardino County *	5	2	2	76	
43	Moonridge Road at Club View Drive "Moonridge Y"	<ul style="list-style-type: none"> <li>Create a roundabout at Rathbun Drive/ Club View Drive at Moonridge Road</li> </ul>	City of Big Bear Lake	City of Big Bear Lake	2	2	2	40	
44	Stanfield Cut-off at Eagle Nest Road	<ul style="list-style-type: none"> <li>Stripe the portion of Stanfield Cut-off in front of Eagles Nest with KEEP CLEAR</li> </ul>	City of Big Bear Lake	City of Big Bear Lake	2	5	5	64	

<sup>1</sup> See additional discussion on chain-up areas and enforcement in Section 8.2.1 of this report.

<sup>2</sup> See an example of Share the Road signage in Figure 8-1

<sup>3</sup> See additional discussion on turnout signage and design in Section 8.2.4 of this report

<sup>4</sup> See discussion on Snow Valley Resort Main Entrance in Section 8.2.1 of this report

<sup>5</sup> See additional recommendation for parking and snow play on SR-18 between Running Springs and Big Bear Lake in Section 8.2.1

<sup>6</sup> See discussion on cut-through traffic in Section 8.2.1 of this report

<sup>7</sup> See an example of "Steep Grade" signage in Figure 8-2

<sup>8</sup> See discussion on transportation modes and park and ride facilities in Section 8.2.3 of this report

<sup>9</sup> See discussion on Permanent Changeable Message Signs for permanent signs at this location as identified by Caltrans District 8 in Section 8.4.1 of this report

\* Though these projects are located within the unincorporated area of San Bernardino County the City of Big Bear Lake will be the project proponent

### 9.2.2 Operational Implementation Plan

Operational mobility recommendations consist primarily of alleviating mobility issues by improving the operational aspects of traffic flow. All of the operational recommendations are considered to be  to  priority issues, and should be implemented in accordance with, and in coordination with, the location-specific recommendations in this plan.

Recommendations for operational issues are as follows:

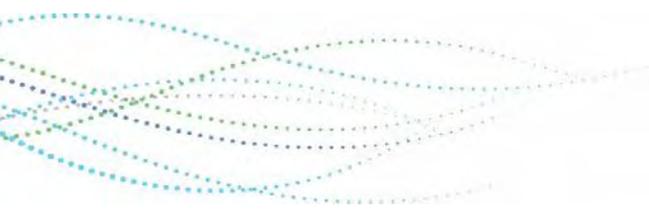
- **Traffic Control** (see Section 8.2.1)
  - Study the effect of cut-through traffic on local facilities throughout the MATS area. Examples of signage aimed to reduce cut-through traffic are illustrated in **Figure 8-3**.
  - Continue to implement right-turn only event management during peak events.
  - Coordinate with CHP in developing more standardized chain control operations.
  - Identify parking location for Snow Valley snow play, and restripe east end of passing lane for cars making a left turn out of Snow Valley parking lot. An example of restriping of SR-18 at the Snow Valley snow play parking lot is illustrated in **Figure 8-4**.
- **Roadway Maintenance** (see Section 8.2.2)
  - Study and develop a clearinghouse location for traffic and transportation related information.
  - County of San Bernardino to coordinate with Los Angeles County maintenance and to develop agreements for Mount Baldy Road during snow events.
- **Transportation Modes** (see Section 8.2.3)
  - Install signage at locations with known conflicts between non-motorized persons and vehicles and include these locations into currently on-going bicycle and pedestrian plans.
  - Investigate demand for park and ride or shuttle services for visitors entering the MATS area which are destined to several of the large ski resorts during peak winter months.
  - Continue to investigate non-fixed route (transit or shuttle) services within resort destinations and during special events.
- **Turnouts** (see Section 8.2.4)
  - Install early advance warning signs for turnouts. Examples of advanced turnout warning signs are illustrated in **Figure 8-5**.
  - Design and install lane configuration diagram upon initiation of a turnout. An example of a lane configuration diagram is included in **Figure 8-6**.
  - Paint lane markings and enhanced lane and edge of travel way strips at existing turnouts. An example of lane markings is included in **Figure 8-6**.

### 9.2.3 Geometric Implementation Plan

Geometric mobility issue recommendations consist primarily of realigning existing roadways in order to improve the operational aspects of traffic flow. All of the geometric recommendations are considered to be  to  priority issues, and should be implemented along with other recommendations in this plan.

Recommendations for geometric issues are as follows:

- **Location A: SR-18 – Post Mile 15.0 to 16.8** (see **Figure 6-3**)
  - Review the existing turnouts, including consideration for enhanced delineation with definition of shoulder areas. Vehicles stopping for pleasure should be guided away from the defined shoulder and outside edge of travel way to preserve a shoulder area. The



- preservation of the shoulder should also provide a recovery area beyond the defined travel way on curves.
- Review of existing signing is recommended to be accomplished at turnouts.
- **Location B: SR-18 – Post Mile 22.15 to 25.15 (see Figure 6-4)**
  - Complete a comprehensive review of turnout development to improve uphill movements and relieve queuing behind slow moving vehicles.
  - Study the benefit of intersection improvements at the junction of SR-18 with SR-173.
- **Location C: SR-18 – Post Mile 34.5 to 36.5 (see Figure 6-5)**
  - Complete a review of the signage to implement consistency in the signing of no parking areas.
- **Location D: SR-18 – Post Mile 52.7 to 53.8 and SR-38 Post Mile 49.5 to 48.3 (see Figure 6-6)**
  - Develop and study site-specific traffic operations improvements within this section of roadway to enhance traffic operations.
- **Location E: SR-18 – Post Mile 55.5 to 56.7 (see Figure 6-7)**
  - Make improvements to more efficiently utilize the 40-foot ROW to allow for a continuous center-turn lane through the entire segment. This geometric recommendation is in addition to the operational recommendation in Section 8.2 of this report.
  - Improve drainage within this section of roadway.
- **SR-18 at Castle Rock Trail (see Figure 8-8)**
  - Continue discussions amongst property owners to further study and evaluate an alternative alignment of SR-18 through this section. This geometric recommendation is in addition to the operational recommendation in Section 8.2 of this report.

#### 9.2.4 Informational Implementation Plan

Informational recommendations consist primarily of relaying accurate and timely local and regional traveler information to users of the transportation system, with the goal of alleviating mobility difficulties related to dissemination of real-time traffic information. All of the informational recommendations are considered to be  **MEDIUM** to  **HIGH** priority, and should be implemented along with other recommendations in this plan.

Recommendations to address informational issues are as follows:

- **General Informational Issues:**
  - **Chain Installation and Control:** Identify and designate permanent locations for chain installation.
  - **Illegal Parking:** Standardized signage for off-street (off State Route) parking and develop “no-parking” zones. Develop a more efficient and effective method for parking enforcement (perhaps utilizing newer technology and standardized ticketing methods).
  - **Information Technology Services (ITS):** Continue supporting discussions for CMS signs with Caltrans District 8. Create agreement between agencies for shared-use of PMS signs when available and appropriate.
- **Implement CMS Signs at the following locations\* (see Figure 8-10):**

- SR-2, Westbound, West of SR-138
- SR-2, Eastbound, East of Lone Pine Canyon Road
- SR-18, Northbound/Eastbound, West of SR-38 (at Dam)
- SR-18, Southbound/Westbound, East of SR-38 (at Dam)
- SR-18, Northbound, North of E. 40<sup>th</sup> Street
- SR-18, Southbound, at Bear Valley Road
- SR-18, Northbound, South of Snow Valley
- SR-138, Eastbound, West of SR-173
- SR-210, Eastbound, West of H Street
- SR-259, Northbound, at Highland Avenue
- SR-38, Eastbound, West of Bryant Street (in Yucaipa)
- SR-330 approaching Highland Avenue
- Summit Boulevard approaching SR-18
- Moonridge Road approaching SR-18
- Stanfield Cut-off at North Shore Drive
- Mt. Baldy Road at Mountain Avenue

*\*Note: The implementation of CMS signs should be considered as funds become available, and in coordination with the Caltrans CMS plan. Prior to implementation, it must be ensured that plans are in place for specific uses of the signs and the conditions under which specific messages are displayed.*

- **Wide-Area Dissemination of Information**

- Development of a mountain traveler information mobile device application (App); include real-time traffic and travel time information, chain requirements, parking occupancy at key resorts, alternate modes information, etc.
- Provide Highway Advisory (AM) Radio (HAR) transmission of traveler information for key mountain travel corridors where web access is not available (for example, Mt. Baldy area).

### 9.3 Agency Responsibilities

The transportation network throughout the MATS study area in the San Bernardino National Forest is unique in that most of the major facilities are state routes under the jurisdiction of the California Department of Transportation (Caltrans). In addition, the majority of lane miles in the roadway system are constructed on United States Forest Service (USFS) land or right of way. Conversely, the primary users of this transportation network are visitors from throughout the entire Southern California region and outside, while local residents, due to their smaller numbers and familiarity with the system, minimally impact the system on a daily basis. This creates a paradox in which the other two main agencies with local presence, the County of San Bernardino and the City of Big Bear Lake, are often called upon by residents to solve local traffic congestion problems. However, the ability for these two jurisdictions to facilitate capital improvements on the State highway system is limited.



It is important for the responsible agencies identified above to continue to collaborate on each of the projects identified in the MATS Implementation Plan, as guided by SBCTA subarea representatives as discussed earlier.

All of the state routes within the San Bernardino National Forest should be viewed as one integral transportation network, operating as a system. A bottleneck in one location can result in traffic congestion extending miles downstream. The proposed improvements within this plan are largely focused on attempting to eliminate or mitigate traffic bottlenecks. It is noted that while making these bottleneck improvements, additional traffic stresses may occur in other locations within the system.

As reported in the San Bernardino County Transportation Authority's *Countywide Transportation Plan* (2015), regional traffic volumes are anticipated to increase by nearly 50% in the Inland Empire. Although growth is slower in the MATS area, traffic flow on the transportation network within the San Bernardino National Forest is further complicated by the unique issues related to seasonal, visitor, part time and recreational travel to this region.

It is recommended that a Memorandum of Understanding (MOU) be considered for execution. The MOU would clarify roles and responsibilities for implementation of the Plan. The MOU is a way to communicate the intent of the agencies to collaborate and to coordinate project implementation schedules and funding at the local, state, and federal levels. The MOU would not contain specific commitments to funding, permitting, or scheduling. However, it could be a vehicle for providing continuity as personnel changes occur. An intent to meet on a quarterly basis to discuss progress could be an element reflected in the MOU. However, this type of coordination could occur even prior to drafting an MOU.

## 9.4 Funding

The projects, strategies, and policies identified in this plan can be supported by a wide variety of available funding sources. Federal and State transportation funding sources provide grant funding available to support a variety of transit, streetscape, mobility, multi-modal, and active transportation projects.

This section summarizes several Federal, State, and County funding sources. Following the brief description of funding sources, **Table 9-5** through **Table 9-7** identifies the general applicability of each of the above funding sources to the various improvement categories identified in this study. It should be noted that this is a preliminary assessment and the eligibility of projects in each case should be investigated in more detail as the specific project is refined and designed for implementation.

### 9.4.1 Federal Funding Sources

Several potential federal funding sources are available through the Federal Transit Authority (FTA) and the United States Department of Transportation (US DOT). **Table 9-5** identifies two potential funding sources, and which improvements from the implementation plan the funding sources may apply to. A brief discussion of the funding sources follows the table.

**Table 9-5: Potential Federal Funding Sources**

Improvements (Projects, Strategies, and Policies)	FTA - Section 5310 Mobility for Seniors & Disabled	Regional Surface Transportation Program	Federal Lands Access Program
Location Implementations		X	X
Operational Implementations	X		X
Geometric Implementations		X	X
Informational Implementations			

**9.4.1.1 FTA Section 5310 – Enhanced Mobility of Seniors & Individuals with Disabilities**

The goal of the Federal Transit Authority’s (FTAs) Section 5310 program is to improve mobility for seniors and individuals with disabilities. Eligible projects include the following examples:

- buses and vans
- wheelchair lifts, ramps, and securement devices
- transit-related information technology systems, including scheduling/routing/one-call systems
- mobility management programs
- acquisition of transportation services under a contract, lease, or other arrangement
- travel training
- volunteer driver programs
- building an accessible path to a bus stop, including curb-cuts, sidewalks, accessible pedestrian signals or other accessible features
- improving signage, or way-finding technology
- incremental cost of providing same day service or door-to-door service
- purchasing vehicles to support new accessible taxi, rides sharing and/or vanpooling programs
- mobility management program

Source: <https://www.transit.dot.gov/funding/grants/enhanced-mobility-seniors-individuals-disabilities-section-5310>

**9.4.1.2 US DOT Fixing America’s Surface Transportation Act**

The US DOT Fixing America’s Surface Transportation Act (FAST ACT) aims to provide states and communities with funding for building roads, bridges, and transit systems.

Source: <https://www.fhwa.dot.gov/fastact/>

The Surface Transportation Block Grant (STBG) program under the FAST ACT promotes flexibility in state and local transportation decisions, and aims to provide flexible funding to address identified transportation needs. The State’s STBG apportionment is obligated to proportion a relative share of funds to areas with population of 5,000 or less, as well as areas with population greater than 5,000 but no more than 200,000.



Source: [http://www.dot.ca.gov/hq/transprog/federal/rstp/Official\\_RSTP\\_Web\\_Page.htm](http://www.dot.ca.gov/hq/transprog/federal/rstp/Official_RSTP_Web_Page.htm)

The Congestion Mitigation and Air Quality (CMAQ) program under the FACT ACT is to fund transportation projects or programs that will contribute to attainment or maintenance of the National Ambient Air Quality Standards (NAAQS) for ozone, carbon monoxide, and particulate matter.

Source: [http://www.dot.ca.gov/hq/transprog/federal/cmaq/Official\\_CMAQ\\_Web\\_Page.htm](http://www.dot.ca.gov/hq/transprog/federal/cmaq/Official_CMAQ_Web_Page.htm)

The Highway Safety Improvement Program (HSIP), under the FAST ACT is a core federal-aid program to States for the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads. The Division of Local Assistance (DLA) manages California's local agency share of HSIP funds. California's Local HSIP focuses on infrastructure projects with nationally recognized crash reduction factors (CRFs). Local HSIP projects must be identified on the basis of crash experience, crash potential, crash rate, or other data-supported means.

Source: <http://www.dot.ca.gov/hq/LocalPrograms/hsip.html>

#### 9.4.1.3 Federal Lands Access Program (FLAP)

The Federal Lands Access Program (Access Program) was established to improve transportation facilities that provide access to, are adjacent to, or are located within Federal lands. The Access Program supplements State and local resources for public roads, transit systems, and other transportation facilities, with an emphasis on high-use recreation sites and economic generators. The Program is designed to provide flexibility for a wide range of transportation projects and is funded by contract authority from the Highway Trust Fund and subject to obligation limitation. Funds will be allocated among the States using a statutory formula based on road mileage, number of bridges, land area, and visitation.

Source: <https://flh.fhwa.dot.gov/programs/flap/>

#### 9.4.2 State Funding Sources

Several potential state funding sources are available. **Table 9-6** identifies three potential funding sources, and which improvements from the implementation plan the funding sources may apply to. A brief discussion of the funding sources follows the table.

**Table 9-6: Potential State Funding Sources**

Improvements (Projects, Strategies, and Policies)	Cap-and-Trade Program	State Transportation Improvement Program	State Highway Operation and Protection Program	Active Transportation Program
<b>Location Implementations</b>		X	X	X
<b>Operational Implementations</b>	X	X	X	X
<b>Geometric Implementations</b>	X	X	X	
<b>Informational Implementations</b>	X		X	

#### 9.4.2.1 Cap-and-Trade Program

The California Environmental Protection Agency (EPA) Air Resources Board (ARB) cap-and-trade program should be researched for usability for projects, strategies, and policies identified in this plan. The cap-and-trade program is market based regulation designed to reduce greenhouse gases (GHGs) by creating incentives to reduce GHGs below allowable levels through investments in clean technologies. With a carbon market, a price on carbon is established for GHGs. These funds could potentially be available for identified multi-modal strategies and projects.

Source: <https://www.arb.ca.gov/cc/capandtrade/capandtrade.htm>

#### 9.4.2.2 State Transportation Improvement Program

The State Transportation Improvement Program (STIP) includes transportation projects on and off the State Highway System. The STIP includes the Regional Transportation Improvement Program (RTIP) where projects are nominated by the RTPA and the Interregional Transportation Improvement Program (ITIP) where projects are nominated by Caltrans. Proposed projects are adopted by the California Transportation Commission (CTC). To be eligible for STIP funds, local agencies are required to work through their Regional Transportation Planning Agency (RTPA) to nominate projects for inclusion in the STIP.

Source: <http://dot.ca.gov/hq/LocalPrograms/STIP.htm>

#### 9.4.2.3 State Highway Operation and Protection Program (SHOPP)

Caltrans develops and manages the State Highway Operation and Protection Program (SHOPP). The purpose of the SHOPP is to maintain and preserve the State Highway System and its supporting infrastructure. Projects in the SHOPP are limited to capital improvements relative to maintenance, safety and rehabilitation of State highway and bridges, capital improvements that do not add capacity to the system

Source: <http://www.catc.ca.gov/programs/shopp.htm>

#### 9.4.2.4 Active Transportation Program (Federal and State funded)

The California Department of Transportation created the Active Transportation (ATP), which consolidates the following previous programs:

- Transportation Alternatives Program
- Bicycle Transportation Account
- State Safe Routes to School

This program intends to increase active non-motorized trips, increase mobility and safety, and enhance public health.

Source: <https://www.arb.ca.gov/cc/capandtrade/capandtrade.htm>



#### 9.4.2.5 The Road Repair and Accountability Act of 2017 (SB1)

Senate Bill 1 (SB1) creates the Road Maintenance and Rehabilitation Account and the Road Maintenance and Rehabilitation Program. Programs funded by this account include the Local Partnership Program, the Active Transportation Program, the State Highway Operation and Protection Program (SHOPP), and Local Streets and Roads apportionments. Specific guidelines for each program is being developed and the California Transportation Commission (CTC) plays a significant role in SB1 program including guideline development, evaluating projects and program funding.

Source: [http://www.catc.ca.gov/meetings/agenda/2017Agenda/2017-05/Yellows/Tab\\_15\\_4.6.pdf](http://www.catc.ca.gov/meetings/agenda/2017Agenda/2017-05/Yellows/Tab_15_4.6.pdf)

SB1 identifies a Local Partnership Program, which is available “for counties that have sought and received voter approval of taxes or that have imposed fees, including uniform developer fees.”

- “Eligible projects... include but are not limited to, sound walls for a freeway that was built prior to 1987 without sound walls and with or without high occupancy vehicle lanes if the completion of the sound walls has been deferred to lack of available funding for at least twenty years and a noise barrier scope summary report has been completed within the last twenty years.”
- Funds are appropriated “for allocation to each eligible county and city in the county for road maintenance, rehabilitation, and other roadway improvement purposes.”

SB1 identifies a Local Streets and Roads Program, which provides an increase of \$1.5 billion annually, beginning in November 2017. Prior to SB 1, the Commission had no role in the Local Streets and Roads apportionment program. SB 1 creates new responsibilities for the Commission relative to this funding, including development of guidelines, review of project lists submitted by cities and counties, reporting to the State Controller, and receiving reports on completed projects.

SB1 identifies a Solutions for Congested Corridors Program, which creates this new \$250 million per year program beginning 2017-18. Commission responsibilities include developing guidelines, holding public hearings, reviewing corridor plans, scoring project nominations, programming projects, allocating funds to projects, monitoring program delivery, and reporting to the Legislature.

SB1 identifies a Trade Corridor Enhancement, which allows for \$300 million per year account to fund corridor based freight projects nominated by local agencies and the state. Trailer bill language was recently released to incorporate this funding and federal freight funding into a single program. Because these changes would significantly impact the guidelines for the California Freight Investment Program (CFIP) that are being presented under a separate agenda item, staff will withdraw the CFIP guidelines and initiate additional workshops to revise the guidelines before bringing them to the Commission for approval.

### 9.4.3 Local Funding Sources (County and City)

Several potential local funding sources are available. **Table 9-7** identifies four potential funding sources, and which improvements from the implementation plan the funding sources may apply to. A brief discussion of the funding sources follows the table.

**Table 9-7: Potential Local (County and City) Funding Sources**

Improvements (Projects, Strategies, and Policies)	Measure I	Community Facilities Districts	Benefit Assessment Districts	Business Improvement District
<b>Location Implementations</b>	X	X	X	X
<b>Operational Implementations</b>	X	X		
<b>Geometric Implementations</b>	X			
<b>Informational Implementations</b>				

#### 9.4.3.1 Measure I Funds

Measure I is the half-cent sales tax collected throughout San Bernardino County for transportation improvements. San Bernardino County voters first approved the measure in November 1989 to ensure that needed transportation projects were implemented countywide through 2010. In 2004, San Bernardino County voters overwhelmingly approved the extension of the Measure I sales tax, with 80.03% voting to extend the measure through 2040.

SBCTA administers Measure I revenue and is responsible for determining which projects receive Measure I funding, and ensuring that transportation projects are implemented. Measure I funds are allocated based on a strategic plan. Fiscal and institutional issues associated with administering Measure I are different between the San Bernardino Valley, Mountain and Desert areas, the County was divided into five distinct “subareas”.

Source: <http://www.gosbcta.com/sbcta/plans-projects/funding-measure1.html>

#### 9.4.3.2 COMMUNITY FACILITIES DISTRICTS (CFD)

CFD's may be a possible financial tool to help finance the infrastructure improvements in the MATS area. This potential funding source would require development, and should be investigated. CFD's are often used for greenfield development that is in the hands of only a few owners, with the 2/3-majority vote requirement, a benefit assessment may be a more expedient funding tool than the CFD.

The Mello-Roos Community Facilities Act of 1982 allows any county, city, special district or joint powers authority to establish a Mello-Roos Community Facilities District (CFD). A CFD can be used for the financing of public improvements and services. The CFD requires 2/3-majority vote of residents living within the boundaries of the district. If there are fewer than 12 residents, the vote is conducted of current landowners. Special taxes are charged based on a formula that cannot be directly based on the value of property.



Special taxes are charged annually until initial bonded indebtedness is repaid and, after bonds are paid off, a CFD may continue to charge a fee to maintain improvements and services.

#### 9.4.3.3 Benefit Assessment Districts

Municipalities, counties, and special districts can levy benefit assessments on properties directly benefiting from financed services or improvements, above and beyond citywide general benefits. Benefit assessment districts must be approved by a majority of property owners (weighted by their share of the assessment) and each district includes a benefit formula in which each parcel in the service area is assessed according to the benefit it receives. Parking authorities and parking benefits districts are similarly able to levy assessments to support improvements with similar requirements as those noted above.

#### 9.4.3.4 Business Improvement District (BID)

Supported with a stable income, business improvement districts (BIDs) can better help to focus marketing, branding, programming and public realm maintenance efforts than other organizations that must also focus on fundraising. A BID can be a useful collaborative public and private forum for property owners and the City to work together. In the long term, studies within the MATS area may want to establish individual BIDs to further revitalization efforts in their downtowns and station areas.

A property owner BID is a public/private entity that is directed by businesses and property owners to provide improvements within a specific district. The BID is funded through special assessments paid by property owners within the district, often based on the size of the property and location. The purpose of the BID is to provide special services beyond standard municipal services within their district boundaries. BIDs typically provide services such as maintenance and cleaning for sidewalks, parks and open space as well as private security and can provide improvements such as parking facilities, parks, fountains, benches, trash cans, street lighting and decorations.





# APPENDIX A

San Bernardino National Forest Visitors Guide





## APPENDIX B

iPeMS Speed Data



## APPENDIX C

### Mountain Area Transportation Study Model Methodology and Assumptions Memo



# Morongo Basin Area Transportation Study (MBATS)

Prepared for:



December 2014

OC13-0281

FEHR  PEERS

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## **Appendices**

Appendix A: Traffic Counts

Appendix B: MBATS Model Roadway Network Revisions

Appendix C: MBATS Model SED Growth by TAZ

Appendix D: MBATS Model Validation Summary

Appendix E: MBATS Model Forecasts & LOS

Appendix F: Cost Estimates

## EXECUTIVE SUMMARY

Fehr & Peers has completed a transportation assessment for the Morongo Basin Area in San Bernardino County, California. The assessment analyzes the future transportation demands within the Morongo Basin to assist in planning and programming for future transportation needs. This report summarizes the results of our findings and is separated into three main sections: Existing Conditions, Model Development and Forecasts, and Transportation Project Recommendations.

The existing transportation setting in the Morongo Basin consists of the backbone access roadways along State Route 62 (SR-62) and State Route 247 (SR-247). These regional facilities provide access to developed areas in the basin, including Yucca Valley, Joshua Tree and Twentynine Palms. The existing traffic volumes are relatively low on facilities throughout the study area and all analyzed roadway segments currently operate below capacity.

The SCAG 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016-2040 RTP/SCS) socioeconomic forecasts predict growth in population and employment throughout the region. These regional forecasts, as provided by San Bernardino Association of Governments (SANBAG), were used to update the base year and future year San Bernardino Transportation Analysis Model (SBTAM). The base year model was modified and validated to existing conditions for use in the study. The future year roadway network was modified to replicate the base year roadway network in terms of roadways, number of lanes, roadway classifications and speeds. Future model runs were completed on this constrained network to determine which facilities were most likely to become deficient as growth occurs.

Fehr & Peers identified nine roadway segments and 19 intersections to be improved in order to handle the forecast future traffic demand. The three corridors that require improvements are SR-62, SR-247 and Yucca Mesa Road. Cost estimates were produced based on roadway widening and traffic signal installations or modifications. The total estimated cost to widen the necessary roadways and improve the signalized intersections is approximately \$124 million. An implementation schedule was also identified which recommends segment prioritization and recommended implementation dates in order to provide sufficient capacity for the future traffic demand.



## EXISTING CONDITIONS

Fehr & Peers completed an existing conditions analysis of roadways throughout the Morongo Basin as a starting point for identifying future infrastructure needs in the area. This section defines the existing Morongo Basin transportation setting in terms of infrastructure and performance.

## STUDY AREA

The Morongo Basin generally consists of the California High Desert region between Interstate 10 and Interstate 40 east of the San Gorgonio Mountain Range. The Basin lies in San Bernardino County and includes the City of Twentynine Palms, Town of Yucca Valley and communities of Joshua Tree, Pioneer Town, Landers and Wonder Valley. For this study, Fehr & Peers analyzed the facilities north of the San Bernardino/Riverside County line, south of the Bullion Mountains, east of Big Morongo Canyon and west of Wonder Valley. As shown in Figure 1, the extents of the study area cover multiple jurisdictions including San Bernardino County, the Town of Yucca Valley and the City of Twentynine Palms.

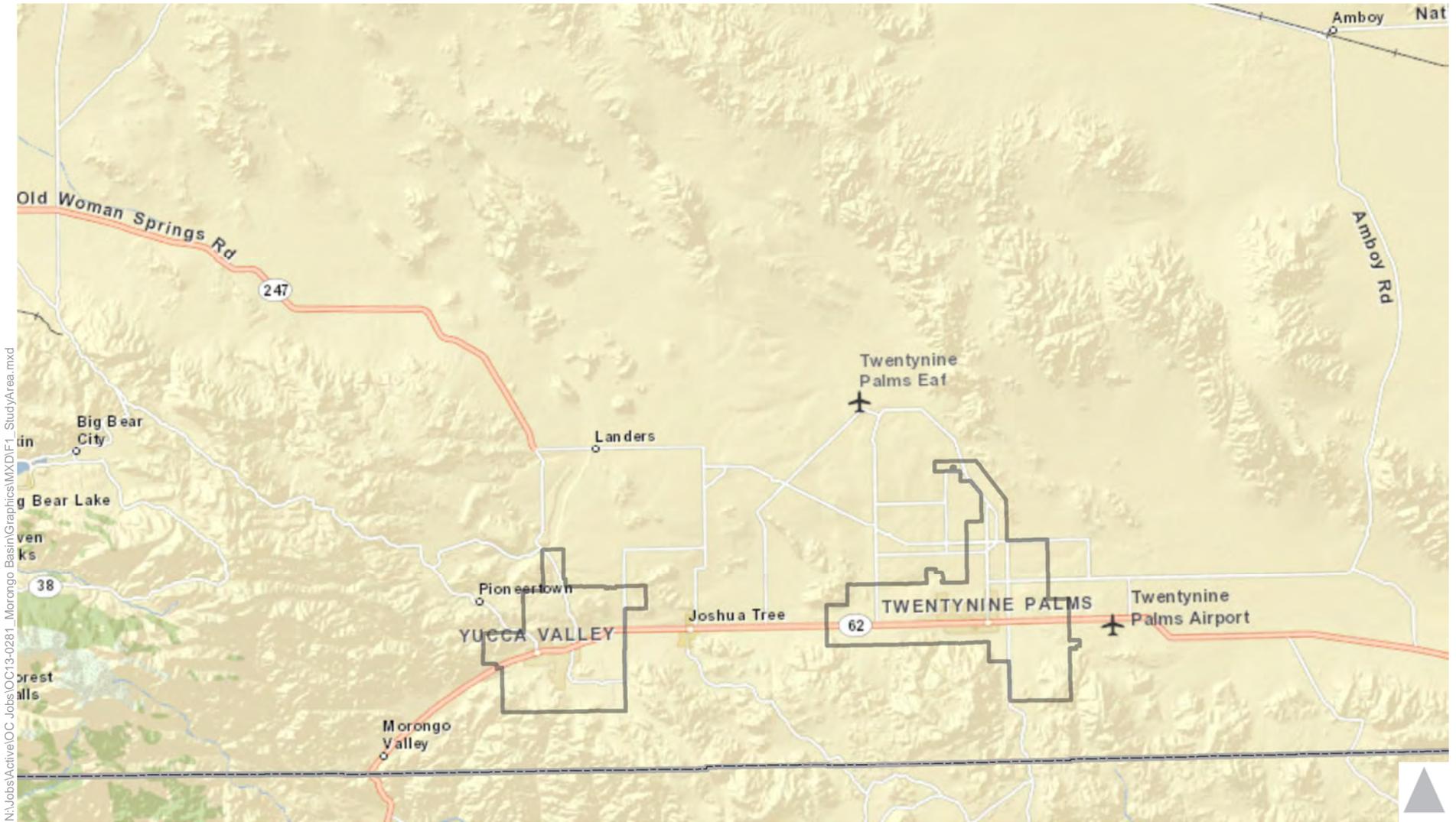
Two roadways provide regional access to the area including State Route 62 to the east/west and State Route 247 to and from the north.

## DATA COLLECTION

Fehr & Peers utilized existing counts from the Caltrans Performance Measurement System (PeMS), SANBAG database, San Bernardino County Arterials database, and the San Bernardino Count Database along with new counts collected by National Data and Surveying Services (NDS).

Based on the data available, the 52 roadway segments shown in Table 1 were selected for existing conditions analysis. As shown in Figure 2, the segments used for this study span the Morongo Basin. Traffic count data is provided in Appendix A.





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Figure 1  
Study Area

**TABLE 1  
STUDY ROADWAY SEGMENTS**

<b>Roadway</b>	<b>Extents</b>	<b>Jurisdiction</b>
1. Aberdeen Dr	W/o Yucca Mesa Dr	Yucca Valley
2. Adobe Rd	S/o Indian Trail	Twentynine Palms
3. Adobe Rd	N/o SR-62	Twentynine Palms
4. Alta Loma Dr	W/o Sunny Vista Rd	Joshua Tree (San Bernardino County)
5. Amboy Rd	S/o Amboy Cutoff	Twentynine Palms
6. Bella Vista Dr	S/o SR-62	Morongo (San Bernardino County)
7. Buena Vista Dr	W/o Juniper Ave	Morongo (San Bernardino County)
8. Camp Rock Rd	S/o SR-247	Lucerne Valley (San Bernardino County)
9. Camp Rock Rd	N/o SR-247	Lucerne Valley (San Bernardino County)
10. Canyon House Rd	S/o Hess Blvd	Morongo (San Bernardino County)
11. El Reposo St	N/o SR-62	Joshua Tree (San Bernardino County)
12. Hess Blvd	S/o Senilis Ave	Morongo (San Bernardino County)
13. Hess Blvd	S/o Adeline Way	Morongo (San Bernardino County)
14. Hess Blvd	N/o Sensilis Ave	Morongo (San Bernardino County)
15. Hess Blvd	S/o Pioneer Dr	Morongo (San Bernardino County)
16. Hess Blvd	N/o Mojave Dr	Morongo (San Bernardino County)
17. Hill View Rd	S/o SR-62	Joshua Tree (San Bernardino County)
18. Juniper Ave	N/o Sensilis Ave	Morongo (San Bernardino County)
19. Juniper Ave	N/o Pioneer Dr	Morongo (San Bernardino County)
20. Mocking Bird Lane	W/o Paradise Ave	Morongo (San Bernardino County)
21. Morongo Rd	N/o Indian Trail	Twentynine Palms
22. Morongo Rd	S/o Pole Line Rd	Twentynine Palms
23. Paradise Ave	W/o Juniper Ave	Morongo (San Bernardino County)
24. Park Blvd	S/o SR-62	Joshua Tree (San Bernardino County)
25. Pioneer Dr	W/ West Dr	Morongo (San Bernardino County)
26. Pole Line Rd	E/o Lear Ave	Twentynine Palms
27. Reche Rd	E/o SR-247	Landers (San Bernardino County)
28. Senilis Ave	W/o Hess Blvd	Morongo (San Bernardino County)
29. Senilis Ave	E/o Juniper Ave	Morongo (San Bernardino County)
30. Senilis Ave	W/o SR-62	Morongo (San Bernardino County)
31. Senilis Ave	E/ Hess Blvd	Morongo (San Bernardino County)
32. SR-247	N/o SR-62	Yucca Valley
33. SR-247	Between Daransatte Rd and Joshua Rd / PeachTree Rd	Landers
34. SR-247	S/o Pipes Canyon Rd	Yucca Valley
35. SR-62	N/o Indian Canyon Dr	Morongo (San Bernardino County)

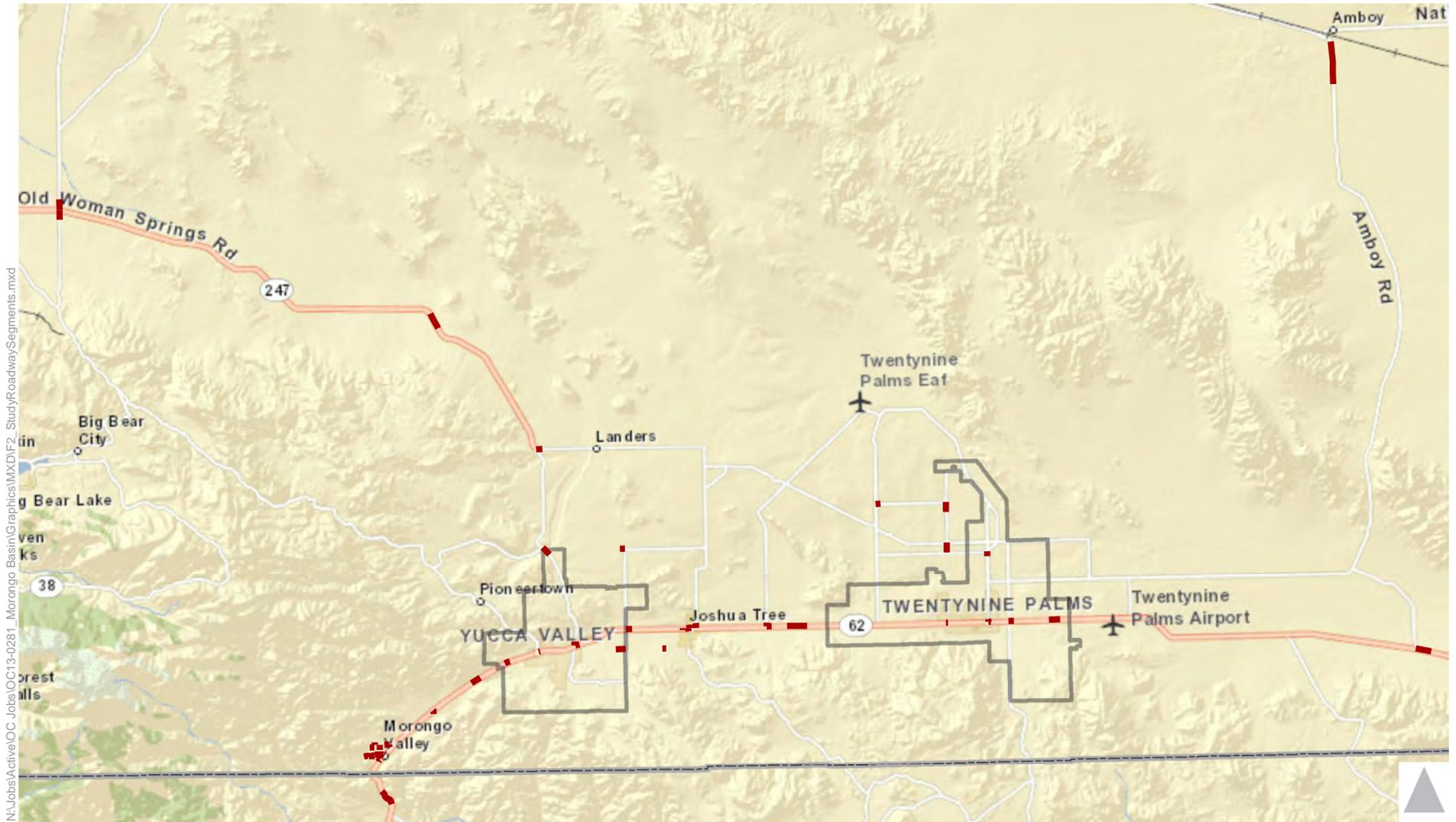


**TABLE 1, CONTINUED  
STUDY ROADWAY SEGMENTS**

<b>Roadway</b>	<b>Extents</b>	<b>Jurisdiction</b>
36. SR-62	W/o Hoopa Trail	Yucca Valley
37. SR-62	Fairway Drive - Pinon Drive	Yucca Valley
38. SR-62	W/o Pioneer Town Rd	Yucca Valley
39. SR-62	W/o SR-247	Yucca Valley
40. SR-62	W/o Yucca Mesa Rd	Yucca Valley
41. SR-62	W/o Park Blvd	Joshua Tree (San Bernardino County)
42. SR-62	W/o Sunfair Road	Joshua Tree (San Bernardino County)
43. SR-62	Cascade Road - Rotary way	Joshua Tree (San Bernardino County)
44. SR-62	E/o Hatch Rd	Twentynine Palms
45. SR-62	E/o Adobe Road	Twentynine Palms
46. SR-62	E/o Utah Trail	Twentynine Palms
47. SR-62	E/o Bullion Mountain Rd	Twentynine Palms
48. SR-62	E/o Ironage Road	Twentynine Palms
49. Sunburst Ave	N/o SR-62	Joshua Tree (San Bernardino County)
50. Sunfair Rd	N/o SR-62	Joshua Tree (San Bernardino County)
51. West Dr	S/o Pioneer Dr	Morongo (San Bernardino County)
52. Yucca Trail/Alta Loma	E/o La Contenta Rd	Yucca Valley

*Source: Fehr & Peers, 2014*





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— Study Roadway Segments



Figure 2  
Study Roadway Segments

## ANALYSIS METHODOLOGIES

Fehr & Peers analyzed the operation of the roadway system throughout the Morongo Basin study area. Operations for these facilities are expressed in terms of level of service. Level of service is a general measure of traffic operating conditions whereby a letter grade, from Level of Service (LOS) A (no congestion) to F (high levels of congestion), is assigned. LOS E represents "at capacity" operations. The flow of vehicles without significant impediments is considered "stable" whereas when traffic encounters interference that limits the capacity acutely, the flow becomes "unstable". These grades represent the perspective of drivers only and are an indication of the comfort and convenience associated with driving, as well as speed, travel time, traffic interruptions, and freedom to maneuver.

A roadway operations analysis was performed at the study roadway segments to provide an evaluation of how the roadway network is currently performing and is forecast to perform. It also provides an idea of the amount of traffic that will utilize each roadway and if the existing or proposed lane configurations can adequately handle the traffic volumes. Daily capacity thresholds in accordance with the *Highway Capacity Manual (Transportation Research Board, 2000)*, *FHWA Guidelines for Roadway Paving* and the *Town of Yucca Valley General Plan Circulation Element* are presented in Table 2. This table establishes the maximum daily roadway capacities by street classifications.

<b>TABLE 2 MAXIMUM DAILY ROADWAY CAPACITIES</b>						
<b>Classification</b>	<b>Typical Lane Configuration</b>	<b>Daily Volume Thresholds</b>				
		<b>LOS A</b>	<b>LOS B</b>	<b>LOS C</b>	<b>LOS D</b>	<b>LOS E</b>
Local Road	2 Lanes Undivided	--	--	--	1,500	2,000
Collector	2 Lanes Undivided	900	2,000	6,800	14,100	17,400
Industrial	2 Lanes Undivided	900	2,000	6,800	14,100	17,400
Arterial	2 Lanes Undivided	--	--	9,700	17,600	18,700
Arterial / Highway	4 Lanes Undivided	--	--	17,500	27,400	28,900
Arterial / Highway	4 Lanes Divided	--	--	19,200	35,400	37,400
Arterial / Highway	6 Lanes Divided	--	--	27,100	53,200	56,000

*Source: Highway Capacity Manual (Transportation Research Board, 2000), FHWA Guidelines for Roadway Paving*



## ROADWAY SEGMENT OPERATIONS

Table 3 presents the daily traffic volume and LOS operations on study roadway segments. Relatively low traffic volumes were observed throughout the study area with the majority of traffic on SR-62 and SR-247. As shown below, all of the existing roadway segments, including regional facilities SR-62 and SR-247, are currently operating at acceptable daily levels of service.

<b>Roadway</b>	<b>Extents</b>	<b>Classification</b>	<b>ADT</b>	<b>LOS</b>
1. Aberdeen Dr	W/o Yucca Messa Dr	Collector - Undivided	1,420	C or Better
2. Adobe Trail	S/o Indian Trail	Arterial - 2 Lanes	5,450	C or Better
3. Adobe Trail	N/o SR-62	Arterial - 2 Lanes	8,940	C or Better
4. Alta Loma Dr	W/o Sunny Vista Rd	Collector - Undivided	4,150	C or Better
5. Amboy Rd	S/o Amboy Cutoff	Collector - Undivided	790	C or Better
6. Bella Vista Dr	S/o SR-62	Local Road	240	C or Better
7. Buena Vista Dr	W/o Juniper Ave	Local Road	490	C or Better
8. Camp Rock Rd	S/o SR-247	Collector - Undivided	510	C or Better
9. Camp Rock Rd	N/o SR-247	Collector - Undivided	1,270	C or Better
10. Canyon House Rd	S/o Hess Blvd	Local Road	450	C or Better
11. El Reposo St	N/o SR-62	Local Road	980	C or Better
12. Hess Blvd	S/o Senilis Ave	Collector - Undivided	2,990	C or Better
13. Hess Blvd	S/o Adeline Way	Collector - Undivided	1,240	C or Better
14. Hess Blvd	N/o Sensilis Ave	Collector - Undivided	790	C or Better
15. Hess Blvd	S/o Pioneer Dr	Collector - Undivided	580	C or Better
16. Hess Blvd	N/o Mojave Dr	Collector - Undivided	410	C or Better
17. Hill View Rd	S/o SR-62	Collector - Undivided	1,530	C or Better
18. Juniper Ave	N/o Sensilis Ave	Collector - Undivided	1,600	C or Better
19. Juniper Ave	N/o Pioneer Dr	Collector - Undivided	600	C or Better
20. Mocking Bird Lane	W/o Paradise Ave	Local Road	380	C or Better
21. Morongo Rd	N/o Indian Trail	Collector - Undivided	3,250	C or Better
22. Morongo Rd	S/o Pole Line Rd	Collector - Undivided	1,890	C or Better
23. Paradise Ave	W/o Juniper Ave	Collector - Undivided	790	C or Better
24. Park Blvd	S/o SR-62	Collector - Undivided	4,740	C or Better
25. Pioneer Dr	W/ West Dr	Collector - Undivided	980	C or Better
26. Pole Line Rd	E/o Lear Ave	Collector - Undivided	1,270	C or Better



**TABLE 3, CONTINUED**  
**EXISTING STUDY ROADWAY SEGMENT OPERATIONS**

<b>Roadway</b>	<b>Extents</b>	<b>Classification</b>	<b>ADT</b>	<b>LOS</b>
27. Reche Rd	E/o SR-247	Collector - Undivided	1,530	C or Better
28. Senilis Ave	W/o Hess Blvd	Collector - Undivided	1,930	C or Better
29. Senilis Ave	E/o Juniper Ave	Collector - Undivided	1,660	C or Better
30. Senilis Ave	W/o SR-62	Collector - Undivided	1,420	C or Better
31. Senilis Ave	E/ Hess Blvd	Collector - Undivided	990	C or Better
32. SR-247	N/o SR-62	Arterial - 2 Lanes, Undivided	11,000	C or Better
33. SR-247	Between Daransatte Rd and Joshua Rd / PeachTree Rd	Arterial - 2 Lanes, Undivided	1,860	C or Better
34. SR-247	S/o Pipes Canyon Rd	Arterial - 2 Lanes, Undivided	2,610	C or Better
35. SR-62	N/o Indian Canyon Dr	Arterial / Highway - 4 Lanes, Divided	11,590	C or Better
36. SR-62	W/o Hoopa Trail	Arterial / Highway - 4 Lanes, Divided	14,080	C or Better
37. SR-62	Fairway Drive - Pinon Drive	Arterial / Highway - 4 Lanes, Divided	12,320	C or Better
38. SR-62	E/o Pioneer Town Rd	Arterial / Highway - 4 Lanes, Divided	26,500	C or Better
39. SR-62	E/o SR-247	Arterial / Highway - 4 Lanes, Divided	26,500	C or Better
40. SR-62	E/o Yucca Mesa Rd	Arterial / Highway - 4 Lanes, Undivided	19,500	C or Better
41. SR-62	W/o Park Blvd	Arterial / Highway - 4 Lanes, Divided	17,000	C or Better
42. SR-62	E/o Sunfair Road	Arterial / Highway - 4 Lanes, Undivided	14,000	C or Better
43. SR-62	Cascade Road - Rotary way	Arterial / Highway - 4 Lanes, Undivided	7,100	C or Better
44. SR-62	E/o Hatch Rd	Arterial / Highway - 4 Lanes, Divided	15,000	C or Better
45. SR-62	E/o Adobe Road	Arterial / Highway - 4 Lanes, Undivided	9,500	C or Better
46. SR-62	W/o Utah Trail	Arterial - 2 Lanes, Undivided	2,800	C or Better
47. SR-62	E/o Bullion Mountain Rd	Arterial - 2 Lanes	9,330	C or Better
48. SR-62	E/o Ironage Road	Arterial - 2 Lanes	340	C or Better
49. Sunburst Ave	N/o SR-62	Collector - Undivided	4,390	C or Better
50. Sunfair Rd	N/o SR-62	Collector - Undivided	1,200	C or Better
51. West Dr	S/o Pioneer Dr	Collector - Undivided	650	C or Better
52. Yucca Trail/Alta Loma	E/o La Contenta Rd	Collector - Undivided	5,490	C or Better

Source: Fehr & Peers, 2014



## MODEL DEVELOPMENT AND FORECASTS

Fehr & Peers completed development of a detailed travel demand model as part of this assessment, which is referred to as the Morongo Basin Area Transportation Study (MBATS) travel demand forecasting model. This model initially began as the San Bernardino Traffic Analysis Model (SBTAM), which was then calibrated for use in the Yucca Valley General Plan Update (that model is referred to as YVTAM). As part of this study, SANBAG commissioned Fehr & Peers to further refine the YVTAM model for the entire Morongo Basin area, which is now referred to as the MBATS model.

The purpose of this section is to document the process and calibration efforts of MBATS for base and future conditions and to present future forecasting results.

### YVTAM BACKGROUND INFORMATION

The original SBTAM model had 51 TAZs within the Town of Yucca Valley, and Fehr & Peers provided an additional 75 zones, for a total of 126 TAZs. The roadway network and TAZ loadings were also refined with further detail. The Base Year Model was validated to 2011 conditions from which a 2035 Future Year model was developed. This validation process adds additional detail to the study area and ensured that the regional model is providing appropriate forecasts throughout the study area. This process is consistent with guidance related to applying travel demand forecasting models by ensuring that they have sufficient detail and assumptions to forecast traffic volumes in the study area to the best of their ability. This process is considered state-of-the-practice for developing traffic forecasts for this project and tiers off of the available models to ensure consistency with countywide and regional (SCAG) land use and transportation planning assumptions.

### MBATS MODEL

Fehr & Peers began the MBATS model development with the YVTAM. YVTAM was further refined and detailed to include the Morongo Basin study area. The TAZ structure was examined and ultimately six new TAZs were added to the model. The number of TAZs before and after the modifications is shown by jurisdiction in Table 4. The roadway network was examined and refined to include any roadway classified in a jurisdictional general plan and TAZ centroid loadings were adjusted to reflect existing conditions. The revisions to the SBTAM roadway network and TAZ structure are presented in Appendix B.



<b>City</b>	<b>Number of TAZ's in SBTAM</b>	<b>Number of TAZ's in MBATS</b>
Morongo Valley	2	6
Yucca Valley	51	126
Joshua Tree	7	7
Twentynine Palms	49	51
Unincorporated County	134	134
<b>Total</b>	<b>243</b>	<b>324</b>

## MODEL LAND USE UPDATES

Fehr & Peers reviewed the socioeconomic data (SED) for the base year model and future year model and compared that data to the most recent SED projections provided by the Southern California Association of Governments (SCAG). SCAG is currently updating their regional model as part of the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), including developing base year 2012 SED throughout the region which was ultimately used for the MBATS base year. Summaries of the datasets and of the comparison are presented in Table 5 through Table 7 and SED growth used in modeling is presented by TAZ in Appendix C. SANBAG also developed updated future year 2040 SED forecasts as part of the 2016-2040 RTP/SCS development process and this updated SANBAG dataset was used as the future year SED in MBATS. The differences between the original SBTAM 2035 future year SED based on the 2012-2035 RTP and the SANBAG 2040 future year SED are presented in Table 8 through Table 10.

<b>Jurisdiction</b>	<b>Population</b>	<b>Households</b>	<b>Employment</b>	<b>K-12</b>
Joshua Tree	5,786	2,352	1,471	742
Morongo	2,028	905	134	226
Twentynine Palms	29,398	8,721	2,673	3,470
Yucca Valley	20,262	8,353	4,626	4,050
Unincorporated County	24,099	8,217	1,477	553
<b>Total</b>	<b>81,573</b>	<b>28,548</b>	<b>10,381</b>	<b>9,041</b>



<b>TABLE 6</b>				
<b>SCAG 2016-2040 RTP (2012) SED</b>				
<b>Jurisdiction</b>	<b>Population</b>	<b>Households</b>	<b>Employment</b>	<b>K-12</b>
Joshua Tree	5,648	2,347	1,465	819
Morongo	2,098	962	153	0
Twentynine Palms	32,690	10,578	3,366	4,906
Yucca Valley	25,535	11,542	5,981	2,738
Unincorporated County	26,288	9,660	2,919	3,632
<b>Total</b>	<b>92,259</b>	<b>35,089</b>	<b>13,883</b>	<b>12,095</b>

<b>TABLE 7</b>				
<b>SBTAM 2008 BASE YEAR AND SCAG 2016-2040 RTP (2012) SED DIFFERENCE</b>				
<b>Jurisdiction</b>	<b>Population</b>	<b>Households</b>	<b>Employment</b>	<b>K-12</b>
Joshua Tree	-138	-5	-6	77
Morongo	70	57	19	-226
Twentynine Palms	3,292	1,857	693	1,436
Yucca Valley	5,273	3,189	1,355	-1,312
Unincorporated County	2,189	1,443	1,442	3,079
<b>Total</b>	<b>10,686</b>	<b>6,541</b>	<b>3,502</b>	<b>3,054</b>

<b>TABLE 8</b>				
<b>SBTAM FUTURE YEAR (2035) SED</b>				
<b>Jurisdiction</b>	<b>Population</b>	<b>Households</b>	<b>Employment</b>	<b>K-12</b>
Joshua Tree	8,050	3,411	1,779	1,023
Morongo	2,331	1,086	152	226
Twentynine Palms	29,591	10,651	3,768	5,598
Yucca Valley	59,733	25,122	31,519	5,169
Unincorporated County	30,502	12,318	3,926	1,960
<b>Total</b>	<b>130,207</b>	<b>52,588</b>	<b>41,144</b>	<b>13,976</b>



<b>TABLE 9 SANBAG FUTURE YEAR (2040) SED</b>				
<b>Jurisdiction</b>	<b>Population</b>	<b>Households</b>	<b>Employment</b>	<b>K-12</b>
Joshua Tree	9,253	3,000	2,706	1,021
Morongo	3,172	1,030	298	226
Twentynine Palms	25,505	9,532	6,894	5,639
Yucca Valley	28,481	11,487	10,017	5,236
Unincorporated County	31,669	10,601	3,003	1,659
<b>Total</b>	<b>98,080</b>	<b>35,650</b>	<b>22,918</b>	<b>13,781</b>

<b>TABLE 10 SBTAM FUTURE YEAR AND SANBAG FUTURE YEAR SED DIFFERENCE</b>				
<b>Jurisdiction</b>	<b>Population</b>	<b>Households</b>	<b>Employment</b>	<b>K-12</b>
Joshua Tree	1,203	-411	927	-2
Morongo	841	-56	146	0
Twentynine Palms	-4,086	-1,119	3,126	41
Yucca Valley	-31,252	-13,635	-21,502	67
Unincorporated County	1,167	-1,717	-923	-301
<b>Total</b>	<b>-32,127</b>	<b>-16,938</b>	<b>-18,226</b>	<b>-195</b>

## BASE YEAR MODEL VALIDATION

### Static Validation

A key task within any Travel Demand Model effort is the validation of the base year model. In this process, the model is compared against validation criteria identified by Caltrans, the Federal Highway Administration (FHWA), and the California Transportation Commission (CTC). These criteria were developed to ensure that a model can accurately forecast existing conditions based on land use and roadway network information, which improves the model's ability to accurately forecast future conditions. Valid base-year models are the starting point for developing defensible forecasts for changes in the roadway network and/or changes in proposed land use.

The first step of any model validation is to ensure that the model generally produces similar results to existing counts. Key metrics for model validation are described below:



- The volume-to-count ratio is computed by dividing the volume assigned by the model and the actual traffic count for individual roadways model-wide. The volume-to-count ratio should be within 10% of 1.0.
- The deviation is the difference between the model volume and the actual count divided by the actual count. Caltrans provides guidance on the maximum allowable deviation by facility type (e.g. lower-volume roadways can have a higher deviation than higher-volume roadways). At least 75% of the study facilities must be within the maximum allowable deviation.
- The correlation coefficient estimates the correlation between the actual traffic counts and the estimated traffic volumes from the model. The correlation coefficient should be greater than 0.88.
- The percent Root Mean Square Error (RMSE) is the square root of the model volume minus the actual count squared divided by the number of counts. It is a measure similar to standard deviation in that it assesses the accuracy of the entire model. The RMSE should be less than 40%.

The model validation statistics are summarized in Table 11 and the full validation summary is in Appendix D. As shown in Table 11, the model meets or exceeds the identified model validation statistics in the study area.

<b>TABLE 11 MBATS TRAVEL DEMAND FORECASTING MODEL STATIC VALIDATION</b>		
<b>Metric</b>	<b>Model Validation</b>	<b>Maximum Allowable Deviation</b>
<b><i>Daily – 34 Count Locations</i></b>		
Model/Count Ratio	0.94	between 0.90 and 1.10
Percent Within Caltrans Maximum Deviation	85%	> 75%
Percent Root Mean Square Error	32%	< 40%
Correlation Coefficient	0.97	> 0.88
Source: Fehr & Peers, 2014		

### Dynamic Validation

The traditional approach to the validation of travel demand models is to compare the roadway segment volumes for the model's base year to actual traffic counts collected in the same year. This approach provides information on a model's ability to reproduce a static condition. However, models are seldom used for static applications; by far the most common use of models is to forecast how a change in inputs would result in a change in traffic conditions. Therefore, another test of a model's accuracy is to focus on the model's ability to predict realistic differences in outputs as inputs are changed; in other words, "dynamic" validation rather than static validation.



Dynamic validation determines a model's sensitivity to changes in land uses and/or the transportation system. These tests are recommended in Model Validation and Reasonableness Checking Manual (Travel Model Improvement Program, FHWA, 1997). The results of dynamic validation tests are inspected for reasonableness in the direction and magnitude of the changes.

Fehr & Peers made adjustments to the model roadway networks and SED data to determine if the model results would shift in the expected direction. Model runs were completed and traffic volumes were compared to the validated base year to verify whether the volumes changed in the appropriate direction and magnitude. Several tests and their results are summarized below. Since the results of the sensitivity testing returned reasonable shifts in traffic volumes according to the modifications, the model was confirmed as appropriate for use in this assessment.

- Major roadways in the study area, such as Adobe Road and Yucca Mesa Road, were modified by increasing and decreasing the number of lanes or speeds. As expected, the roadways with higher number of lanes or speeds attracted more traffic volumes with all else equal.
- Parallel roadways adjacent to SR-62 were modified, added and deleted to test shifts in traffic volumes. As expected, when parallel facilities were modified to increase capacity, traffic shifted off of SR-62 and on to the parallel facilities. When parallel facilities were deleted, the volumes that were on that facility shifted in expected magnitudes to SR-62.
- Land use modifications were made by increasing the population or employment totals and were tested for reasonable trip generation. When jobs and households are added to the model the increase in vehicle trips is reasonable and the average per unit vehicle trip increase for jobs and households remains relatively constant across time periods and at various magnitudes.

## FUTURE (YEAR 2040) MODELING ASSUMPTIONS

Year 2040 provides a long range planning horizon (consistent with many planning applications) and it is consistent with the future year of the next regional transportation plan (2016-2040 RTP/SCS). For the MBATS modeling effort, all modifications incorporated into the validated base year model were incorporated into the Future Year (2040) Travel Demand Forecasting Model. The future year model roadway network was then stripped down to identically mimic the base year model roadway network in terms of existing roadways, speeds, and number of lanes. This was done to model the future roadway volumes on a constrained existing network in order to identify the facilities that should be prioritized to be improved.



## FUTURE (YEAR 2040) FORECASTING AND OPERATIONS ASSESSMENT

Future baseline model forecasts were developed from the validated MBATS model. The results were then analyzed with roadway segment methodology thresholds listed in Table 2. The forecast volumes and LOS results for all model roadway segments are provided in Appendix E, and an operations summary is provided in Figure 3. The analysis was used to identify where future traffic congestion is likely to occur. Table 12 below provides a summary of the facilities that are forecast to be over capacity.

<b>TABLE 12 FORECAST DAILY 2040 ROADWAY SEGMENT OPERATIONS</b>					
<b>Facility</b>	<b>Extents</b>	<b>Jurisdiction</b>	<b>Existing Number of Lanes &amp; Capacity</b>	<b>Forecast ADT</b>	<b>V/C &amp; Forecast LOS</b>
SR-62	San Bernardino County Line to Western Yucca Valley Town Limits	San Bernardino County, Morongo Valley	4 lanes at 37,400 vehicles per day	47,300	1.26 (F)
SR-62	Western Yucca Valley Limits to SR-247	Yucca Valley	4 lanes at 37,400 vehicles per day	42,800	1.14 (F)
SR-247	Northern Morongo Basin Boundary Limits to Northern Yucca Valley Town Limits	San Bernardino County	2 lanes at 18,000 vehicles per day	18,800	1.04 (F)
SR-247	Northern Yucca Valley Town Limits to SR-62	Yucca Valley	2 lanes at 18,000 vehicles per day	21,200	1.18 (F)
Yucca Mesa Rd	Buena Vista Drive to SR-62	Yucca Valley	2 lanes at 13,000 vehicles per day	13,300	1.02 (F)
<i>Source: Fehr &amp; Peers, 2014</i>					



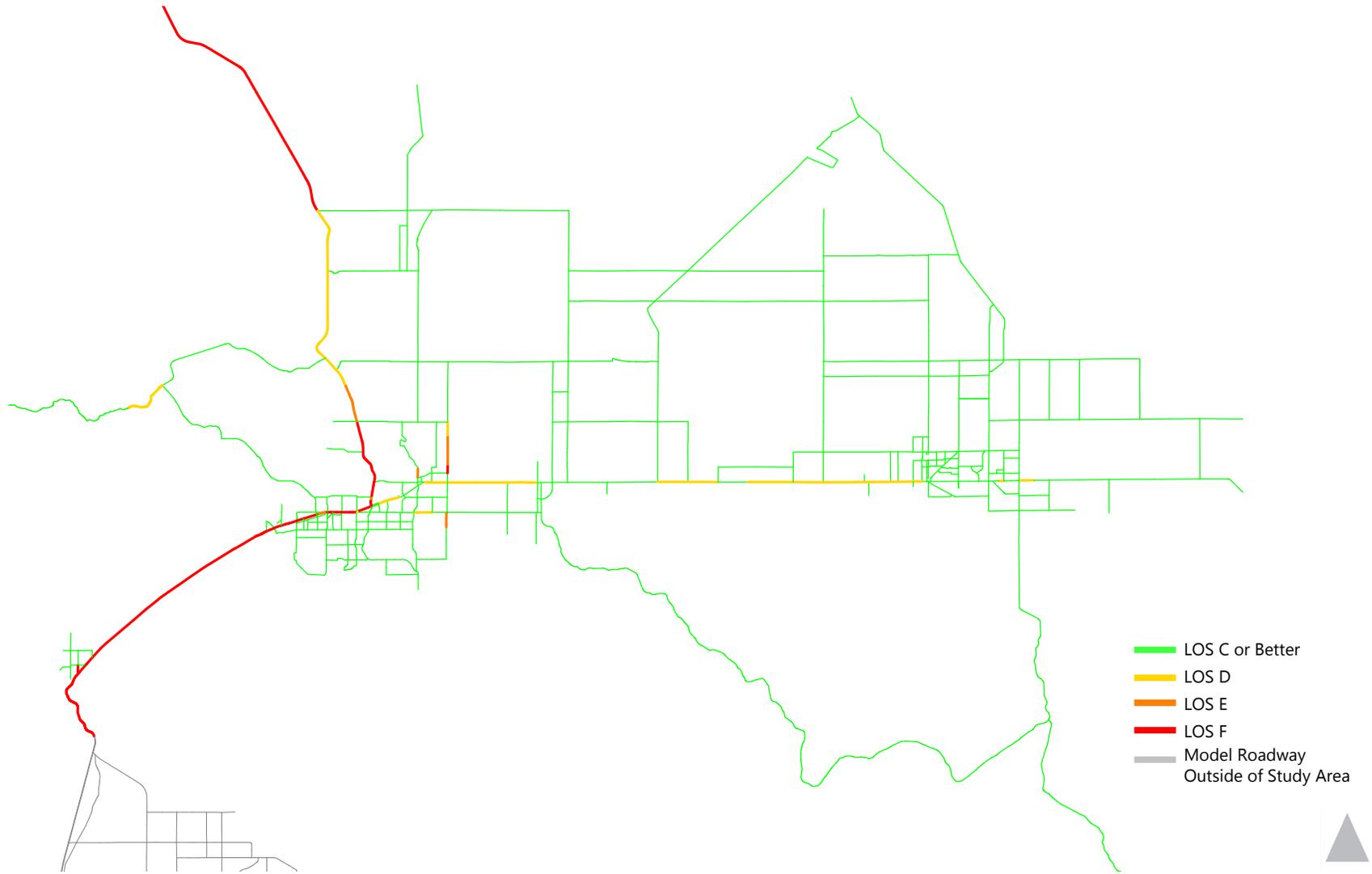


Figure 3  
2040 Forecast Daily LOS

## IMPROVEMENT PROJECT RECOMMENDATIONS

The analysis was utilized to assist in identifying future required roadway network improvements in the MBATS area. Based on those results, several roadways and intersections were identified to be improved to satisfy the needs of future traffic volumes.

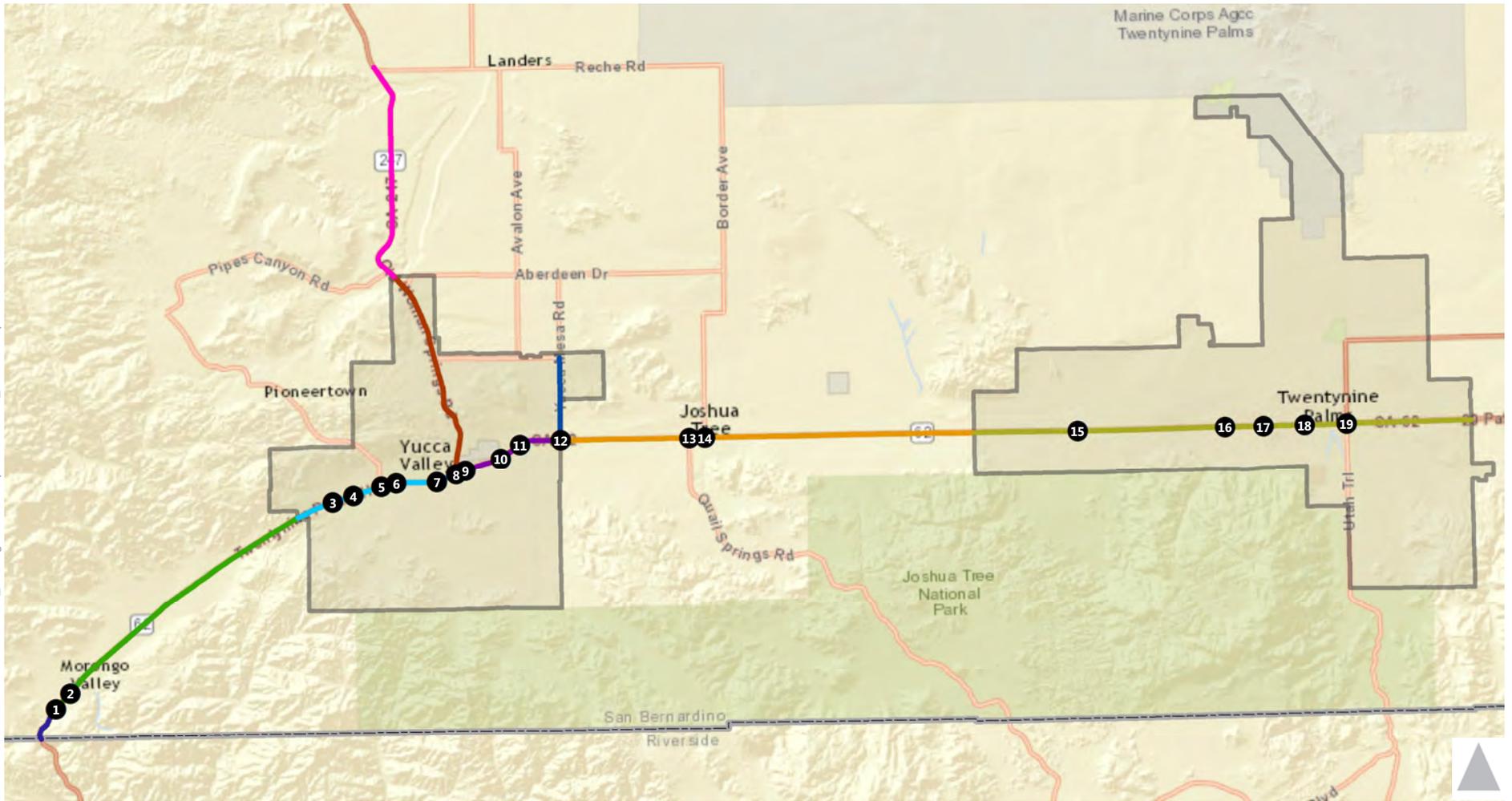
### RECOMMENDED IMPROVEMENT LOCATIONS

Increased capacity will be needed along SR-62, SR-247 and Yucca Mesa Road in the form of additional lanes and operational improvements at intersections along SR-62. The widening of SR-247 and Yucca Mesa Road within Yucca Valley is consistent with the Yucca Valley General Plan Circulation Element. Table 13 presents the level of service along each of these roadways with the proposed improvements. Figure 4 identifies the locations of the roadway segment improvements.

<b>Facility</b>	<b>Extents</b>	<b>V/C &amp; LOS Prior to Improvements</b>	<b>Proposed Improvement &amp; New Capacity</b>	<b>V/C &amp; LOS After Improvements</b>
SR-62	San Bernardino County Line to Western Yucca Valley Town Limits	1.26 (F)	Widen by 1 lane in each direction providing for 56,000 vehicles per day	0.84 (D)
SR-62	Western Yucca Valley Limits to SR-247	1.14 (F)	Widen by 1 lane in each direction providing for 56,000 vehicles per day	0.76 (C or better)
SR-247	Northern Morongo Basin Boundary Limits to Northern Yucca Valley Town Limits	1.04 (F)	Widen by 1 lane in each direction providing for 34,100 vehicles per day	0.55 (C or better)
SR-247	Northern Yucca Valley Town Limits to SR-62	1.18 (F)	Widen by 1 lane in each direction providing for 34,100 vehicles per day	0.62 (C or better)
Yucca Mesa Rd	Buena Vista Drive to SR-62	1.02 (F)	Widen by 1 lane in each direction providing for 25,900 vehicles per day	0.51 (C or better)

*Source: Fehr & Peers, 2014*





● Intersection

**Improvement Locations**

- [1] — SR-62 (San Bernardino County Line to Hess Boulevard)
- [2] — SR-62 (Hess Boulevard to Western Yucca Valley Town Limits)
- [3] — SR-62 (Western Yucca Valley Limits to SR-247)
- [4] — SR-62 (SR-247 - Eastern Yucca Valley Town Limits)
- [5] — SR-62 (Yucca Valley Town Limits - Twentynine Palms City Limits)
- [6] — SR-62 (Twentynine Palms: Western City Limits to Eastern City Limits)
- [7] — SR-247 (Northern Morongo Basin Boundary Limits to Northern Yucca Valley Town Limits)
- [8] — SR-247 (Northern Yucca Valley Town Limits to SR-62)
- [9] — Yucca Mesa Drive (Buena Vista Drive to SR-62)



Figure 4  
MBATS Recommended Improvement Locations

Intersections were also identified along SR-62 that would require signalization or signal modifications in order to meet the future traffic demands. These signal modifications could include additional through lanes and turn lanes, signal pole replacement and upgrades, or other intersection improvements. These locations are listed below in Table 14 and shown on Figure 4.

<b>Intersection</b>	<b>Jurisdiction</b>	<b>Improvement</b>
1. SR-62 & Hess Blvd	San Bernardino County, Morongo Valley	Signalization
2. SR-62 & Senilis Ave	San Bernardino County, Morongo Valley	Signal Modification
3. SR-62 & Camino Del Cielo	Yucca Valley	Signal Modification
4. SR-62 & Kickapoo Trail	Yucca Valley	Signal Modification
5. SR-62 & Pioneertown Rd	Yucca Valley	Signal Modification
6. SR-62 & Acoma Trail	Yucca Valley	Signal Modification
7. SR-62 & Sage Ave	Yucca Valley	Signal Modification
8. SR-62 & SR-247	Yucca Valley	Signal Modification
9. SR-62 & Airway Ave	Yucca Valley	Signal Modification
10. SR-62 & Balsa Ave	Yucca Valley	Signal Modification
11. SR-62 & Avalon Ave	Yucca Valley	Signal Modification
12. SR-62 & Yucca Mesa Rd	Yucca Valley	Signal Modification
13. SR-62 & Sunburst Ave	San Bernardino County, Joshua Tree	Signal Modification
14. SR-62 & Park Blvd	San Bernardino County, Joshua Tree	Signal Modification
15. SR-62 & Lear Ave	Twentynine Palms	Signalization
16. SR-62 & Larrea Ave	Twentynine Palms	Signal Modification
17. SR-62 & Mesquite Springs Rd	Twentynine Palms	Signalization
18. SR-62 & Adobe Rd	Twentynine Palms	Signal Modification
19. SR-62 & Utah Trail	Twentynine Palms	Signalization

## COST ESTIMATES

Michael Baker International provided planning-level cost estimates for the recommended improvements at each location. The cost estimates are separated into roadway segments by jurisdiction and paired with the intersection improvements to determine a final cost estimate. The segment numbers are shown graphically in Figure 4. For simplicity purposes, the cost estimate was broken into three tiers of detail, a summary, an estimate with major cost items, and then cost templates with item breakdowns.



The line item cost estimates are the key component of the costing process. Essentially, the line items provide a lump sum fee for some items, such as signal modifications; but for linear roadway improvements or volume-related material estimates, a refined yet simplistic analysis was required for the scope of the estimate. For these items, the line items assume a unit cost per foot of the roadway cross section. Then, a factor is applied to the unit cost for each item. Once a desktop aerial evaluation was completed and improvements were identified, observations (i.e. percentage/length for removal of item along the segment) and assumptions were noted and calculated for the amount. The templates are then referenced into each segment's cost estimate and multiplied by the distance. Improvement Segments 1, 2, 6, 7 and 8 utilize this approach due to the recommended widening improvements.

The estimates are for planning purposes only and are based on today's fair market prices according to California Department of Transportation Construction Contract Standards. The conservative estimates represented in this report are not all inclusive and careful judgment should be used when referring to these estimates. Each segment would require a future focused assessment and adequately scoped project in order to better identify financial funding. Finally, since not incorporated into the estimate, it is recommended that an escalation analysis be conducted once planning scopes solidify.

A summary of the cost estimate of each segment is provided in Table 15 through Table 23 and the total cost estimate for the entirety of the improvements is provided in Table 24. The total estimated cost in current year dollars to implement all recommended improvements is approximately \$124 million. Detailed cost estimate templates and assumptions for material and construction costs are provided in Appendix F.

<b>TABLE 15</b>		
<b>SEGMENT 1 IMPROVEMENTS COST ESTIMATES</b>		
Segment:	SR-62 (San Bernardino County Line to Hess Boulevard)	
Improvements:	Widen SR-62 by one lane in each direction	
Jurisdiction:	San Bernardino County	
	Construction Subtotal With Contingency	\$13,226,000
	Right of Way	\$30,000
	Preliminary and Final Engineering (25%)	\$3,307,000
	Construction Support (10%)	\$1,984,000
	<b>Segment Total</b>	<b>\$18,546,000</b>



<b>TABLE 16</b>		
<b>SEGMENT 2 IMPROVEMENTS COST ESTIMATES</b>		
Segment:	SR-62 (Hess Boulevard to Western Yucca Valley Town Limits)	
Intersections:	1. At Hess Blvd, 2. At Senilis Ave	
Improvements:	Widen SR-62 by one lane in each direction, signalize intersection at Hess Boulevard	
Jurisdiction:	San Bernardino County	
	Construction Subtotal With Contingency	\$21,368,000
	Right of Way	\$220,000
	Preliminary and Final Engineering (25%)	\$5,342,000
	Construction Support (10%)	\$3,205,000
	<b>Segment Total</b>	<b>\$30,135,000</b>

<b>TABLE 17</b>		
<b>SEGMENT 3 IMPROVEMENTS COST ESTIMATES</b>		
Segment:	SR-62 (Western Yucca Valley Limits to SR-247)	
Intersections:	3. At Camino Del Cielo, 4. At Kickapoo Trail, 5. At Pioneertown Rd, 6. At Acoma Trail, 7. At Sage Ave, 8. At SR-247	
Improvements:	Widen SR-62 by one lane in each direction, signal modifications at all intersections	
Jurisdiction:	Yucca Valley	
	Construction Subtotal With Contingency	\$18,237,000
	Right of Way	\$120,000
	Preliminary and Final Engineering (25%)	\$4,559,000
	Construction Support (10%)	\$2,736,000
	<b>Segment Total</b>	<b>\$25,651,000</b>



<b>TABLE 18</b>		
<b>SEGMENT 4 IMPROVEMENTS COST ESTIMATES</b>		
Segment:	SR-62 (SR-247 to Eastern Yucca Valley Town Limits)	
Intersections:	9. At Airway Ave, 10. At Balsa Ave, 11. At Avalon Ave, 12. At Yucca Mesa Rd	
Improvements:	Signal modifications at all intersections	
Jurisdiction:	Yucca Valley	
	Construction Subtotal With Contingency	\$2,340,000
	Preliminary and Final Engineering (25%)	\$585,000
	Construction Support (10%)	\$351,000
	<b>Segment Total</b>	<b>\$3,276,000</b>

<b>TABLE 19</b>		
<b>SEGMENT 5 IMPROVEMENTS COST ESTIMATES</b>		
Segment:	SR-62 (Yucca Valley Town Limits to Twentynine Palms City Limits)	
Intersections:	13. At Sunburst Ave, 14. At Park Blvd	
Improvements:	Signal modifications at all intersections	
Jurisdiction:	San Bernardino County	
	Construction Subtotal With Contingency	\$1,170,000
	Preliminary and Final Engineering (25%)	\$292,500
	Construction Support (10%)	\$175,500
	<b>Segment Total</b>	<b>\$1,638,000</b>



<b>TABLE 20</b>		
<b>SEGMENT 6 IMPROVEMENTS COST ESTIMATES</b>		
Segment:	SR-62 (Twentynine Palms Western City Limits to Eastern City Limits)	
Intersections:	15. At Lear Ave, 16. At Larrea Ave, 17. At Mesquite Springs Rd, 18. At Adobe Rd 19. At Utah Trail	
Improvements:	Signal modifications at Larrea Ave and Adobe Rd, signalize remaining intersections	
Jurisdiction:	Twentynine Palms	
	Construction Subtotal With Contingency	\$4,095,000
	Preliminary and Final Engineering (25%)	\$1,024,000
	Construction Support (10%)	\$614,000
	<b>Segment Total</b>	<b>\$5,733,000</b>

<b>TABLE 21</b>		
<b>SEGMENT 7 IMPROVEMENTS COST ESTIMATES</b>		
Segment:	SR-247 (Northern Morongo Basin Boundary Limits to Northern Yucca Valley Town Limits)	
Improvements:	Widen SR-247 by one lane in each direction	
Jurisdiction:	San Bernardino County	
	Construction Subtotal With Contingency	\$12,086,000
	Right of Way	\$170,000
	Preliminary and Final Engineering (25%)	\$3,022,000
	Construction Support (10%)	\$1,813,000
	<b>Segment Total</b>	<b>\$17,091,000</b>



<b>TABLE 22</b>		
<b>SEGMENT 8 IMPROVEMENTS COST ESTIMATES</b>		
Segment:	SR-247 (Northern Yucca Valley Town Limits to SR-62)	
Improvements:	Widen SR-247 by one lane in each direction	
Jurisdiction:	Yucca Valley	
	Construction Subtotal With Contingency	\$11,885,000
	Right of Way	\$150,000
	Preliminary and Final Engineering (25%)	\$2,971,000
	Construction Support (10%)	\$1,783,000
	<b>Segment Total</b>	<b>\$16,789,000</b>

<b>TABLE 23</b>		
<b>SEGMENT 9 IMPROVEMENTS COST ESTIMATES</b>		
Segment:	Yucca Mesa Drive (Buena Vista Drive to SR-62)	
Improvements:	Widen Yucca Mesa Dr by one lane in each direction	
Jurisdiction:	Yucca Valley	
	Construction Subtotal With Contingency	\$4,108,000
	Right of Way	\$60,000
	Preliminary and Final Engineering (25%)	\$1,027,000
	Construction Support (10%)	\$616,000
	<b>Segment Total</b>	<b>\$5,811,000</b>



<b>TABLE 24 TOTAL IMPROVEMENTS COST ESTIMATES</b>	
Construction Subtotal With Contingency	\$88,515,000
Right of Way	\$750,000
Preliminary and Final Engineering (25%)	\$22,129,000
Construction Support (10%)	\$13,277,000
<b>Project Total</b>	<b>\$124,671,000</b>

## IMPLEMENTATION PLAN

Fehr & Peers utilized the MBATS model to identify growth at each of the locations where improvements are identified. These forecasts were linearly interpolated to identify when each of the improvements would need additional capacity. Please note that, given the broad planning nature of this assessment, our implementation plan identifies five-year increments for identifying when improvements would be required.

### IMPLEMENTATION PRIORITY 1

Segments 2 and 3 (SR-62 from Hess Boulevard to western Yucca Valley Town limits and SR-62 from western Yucca Valley limits to SR-247) are forecast to need additional traffic capacity between years 2025 and 2030.

### IMPLEMENTATION PRIORITY 2

Segment 7 (SR-247 from northern Yucca Valley Town limits to SR-62) is forecast to need additional capacity between years 2030 and 2035.

### IMPLEMENTATION PRIORITY 3

Segments 6 and 8 (SR-247 from northern Morongo Basin boundary limits to northern Yucca Valley Town limits and Yucca Mesa Road from Buena Vista Drive to SR-62) are forecast to need additional traffic capacity between years 2035 and 2040.



#### IMPLEMENTATION PRIORITY 4

Segments 3, 4 and 5 are along SR-62 from SR-247 to Twentynine Palms eastern City limits and consist of signalized intersection installations and modifications. The future forecasts indicate that these improvements will be needed between years 2035 and 2040.

#### IMPLEMENTATION PRIORITY 5

Segment 1 (SR-62 from San Bernardino County Line to Hess Boulevard) is forecast to need additional traffic capacity between years 2025 and 2030. However, this segment is adjacent to Riverside County, who has no pending plans to widen their facility. In the future, if Riverside County develops plans to widen their portion of SR-62, then this segment should be given a higher priority. Otherwise, this segment will remain Implementation Priority 5.



## **APPENDIX A: TRAFFIC COUNTS**



## Caltrans Performance Measurement System (PeMS) Counts

# Traffic Data Branch

## 2012 All Traffic Volumes on CSHS

Dist	Rte	CO	Post Mile	Description	Back Peak Hour	Back Peak Month	Back AADT	Ahead Peak Hour	Ahead Peak Month	Ahead AADT
8	62	RIV	R 3.344	PIERSON BOULEVARD	1750	18300	17500	1600	16700	16000
8	62	RIV	R 6.451	INDIAN AVENUE	1600	16700	16000	2050	21400	20500
8	62	RIV	9.237	RIVERSIDE/SAN BERNARDINO COUNTY LINE	2050	21400	20500			
8	62	SBD	0	RIVERSIDE/SAN BERNARDINO COUNTY LINE				2050	21400	20500
8	62	SBD	0.845	HESS BOULEVARD	2050	21400	20500	2000	20900	20000
8	62	SBD	1.884	MORONGO VALLEY, PIONEER/EAST	2050	21400	20500	2050	21400	20500
8	62	SBD	9.293	YUCCA VALLEY, CAMINO DEL CIELO	2000	20900	20000	2000	20900	20000
8	62	SBD	10.531	YUCCA VALLEY, PIONEER TOWN RD	2400	25000	24000	2650	27500	26500
8	62	SBD	12.404	YUCCA VALLEY, JCT. RTE. 247 NORTH	2700	28000	27000	2700	28000	26500
8	62	SBD	15.145	YUCCA MESA ROAD	2700	28000	26500	1950	20500	19500
8	62	SBD	18.267	JOSHUA TREE, PARK BOULEVARD	1700	17900	17000	1700	17900	17000
8	62	SBD	22.165	SUNFAIR ROAD	1700	17900	17000	1400	14700	14000
8	62	SBD	31.196	TWENTYNINE PALMS, NATIONAL PARK/HAT	1400	14700	14000	1500	15800	15000
8	62	SBD	33.208	TWENTYNINE PALMS, ADOBE ROAD	1100	11600	11000	960	10000	9500
8	62	SBD	34.223	29 PALMS/UTAH TRAIL	770	5300	4800	450	3050	2800
8	62	SBD	79.476	SAN BERNARDINO/RIVERSIDE COUNTY LINE	130	880	800			
8	62	RIV	79.476	SAN BERNARDINO/RIVERSIDE COUNTY LINE				130	1150	800
8	62	RIV	84.965	JCT. RTE. 177 SOUTH	220	1150	800	380	2000	1400
8	62	RIV	90.203	RIVERSIDE/SAN BERNARDINO COUNTY LINE	380	2000	1400			
8	62	SBD	90.203	RIVERSIDE/SAN BERNARDINO COUNTY LINE				380	2000	1400
8	62	SBD	102.25	CADIZ ROAD	380	2000	1400	380	2000	1400
8	62	SBD	107.24	BLYTHE RICE ROAD	380	2000	1400	380	2000	1400
8	62	SBD	125.76	JCT. RTE. 95	380	1950	1400	440	2700	2300
8	62	SBD	142.66	ARIZONA STATE LINE	1100	6700	5700			
6	63	TUL	0	TULARE JCT RTE. 137				1550	17200	16500

**Traffic Data Branch**  
**2012 All Traffic Volumes on CSHS**

Dist	Rte	CO	Post Mile	Description	Back Peak Hour	Back Peak Month	Back AADT	Ahead Peak Hour	Ahead Peak Month	Ahead AADT
8	247	SBD	0	YUCCA VALLEY, JCT. RTE. 62				1050	11400	11000
8	247	SBD	39.598	CAMP ROCK ROAD	270	2900	2800	210	2250	2200
8	247	SBD	44.85	JCT. RTE. 18	270	2900	2800	190	1900	1800
8	247	SBD	46.114	RABBIT SPRING ROAD	190	1900	1800	190	1850	1750
8	247	SBD	56.475	LUCERNE VALLEY CUTOFF ROAD	190	1850	1750	210	2100	1950
8	247	SBD	73.181	STODDARD WELLS ROAD	210	2100	1950	180	1850	1700
8	247	SBD	76.422	BARSTOW CITY LIMITS	190	1900	1750	1400	14000	13000
8	247	SBD	78.096	BARSTOW, JCT. RTE. 15	1950	19300	18000			
1	253	MEN	0	BOONVILLE, JCT. RTE. 128				210	2200	2100
1	253	MEN	17.18	UKIAH, JCT. RTE. 101	250	2900	2700			
1	254	HUM	0	JCT. RTE. 101				200	1500	800
1	254	HUM	4.837	MIRANDA BRIDGE RD	200	1400	780	450	3250	1650
1	254	HUM	12.327	JCT. RTE. 101	260	2000	1000	160	1200	650
1	254	HUM	16.84	BURLINGTON STATE PARK	150	1200	600	160	1200	600
1	254	HUM	18.8	WEOTT, NORTH	160	1200	600	150	750	550
1	254	HUM	24.21	ENGLEWOOD PARK, DYERVILLE, NORTH	130	550	450	100	550	350
1	254	HUM	46.53	JCT. RTE. 101, JORDAN RD	100	550	350			
1	255	HUM	0	EUREKA, JCT. RTE. 101				1050	10000	9500
1	255	HUM	2.028	NAVY BASE ROAD	880	8400	8000	790	7600	7200
1	255	HUM	3.657	DEAN/PACIFIC AVENUES	790	7600	7200	780	7500	7100
1	255	HUM	4.728	YOUNG LANE	780	7500	7100	770	7400	7000
1	255	HUM R	5.13	MAD RIVER SLOUGH BRIDGE	770	7400	7000	830	7900	7500
1	255	HUM	8.352	ARCATA, K STREET	830	7900	7500	930	9000	8600
1	255	HUM	8.525	ARCATA, H STREET	930	9000	8600	1100	10500	10200
1	255	HUM	8.584	ARCATA, G STREET	1100	10500	10200	1650	15900	15500

## SANBAG database Counts

# CLASSIFICATION

## SR-62 between Cascade Rd & Rotary Way

Day: Wednesday

Date: 11/6/2013

City: Joshua Tree

Project #: CA13\_6168\_042

### Summary

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	36	10	0	3	0	0	0	0	0	0	0	0	49
01:00	0	36	4	0	3	0	0	0	0	0	1	0	0	44
02:00	0	23	3	1	7	0	0	0	2	0	0	0	0	36
03:00	0	39	5	2	7	0	0	0	2	0	0	0	0	55
04:00	0	87	25	0	21	0	0	1	5	0	0	0	0	139
05:00	2	259	71	3	61	0	0	2	10	0	0	0	0	408
06:00	4	540	112	4	104	2	0	0	17	0	1	0	0	784
07:00	1	558	137	7	126	1	0	0	17	0	3	0	0	850
08:00	1	516	128	8	122	0	0	0	27	0	2	0	0	804
09:00	1	537	125	10	143	2	0	1	25	0	3	0	0	847
10:00	1	520	122	6	135	2	0	1	22	0	1	0	0	810
11:00	3	625	152	8	140	2	0	1	25	0	1	0	0	957
12:00 PM	2	621	143	7	132	2	0	0	23	0	0	0	0	930
13:00	3	625	140	8	142	2	0	0	30	0	3	0	0	953
14:00	5	678	164	6	128	3	0	2	30	0	0	0	0	1016
15:00	4	739	159	7	162	4	0	0	26	0	1	0	0	1102
16:00	2	870	189	7	171	3	0	0	17	0	0	0	0	1259
17:00	2	883	165	5	157	3	0	0	22	0	0	0	0	1237
18:00	0	518	85	3	97	3	0	0	16	0	0	0	0	722
19:00	0	374	78	5	53	0	0	0	8	0	0	0	0	518
20:00	0	309	56	2	40	0	0	0	3	0	0	0	0	410
21:00	0	226	47	1	35	0	0	0	2	0	0	0	0	311
22:00	0	144	30	0	18	0	0	0	4	0	0	0	0	196
23:00	0	78	7	1	10	0	0	0	0	0	0	0	0	96
<b>Totals</b>	<b>31</b>	<b>9841</b>	<b>2157</b>	<b>101</b>	<b>2017</b>	<b>29</b>		<b>8</b>	<b>333</b>		<b>16</b>			<b>14533</b>
% of Totals	0%	68%	15%	1%	14%	0%		0%	2%		0%			100%

AM Volumes	13	3776	894	49	872	9	0	6	152	0	12	0	0	5783
% AM	0%	26%	6%	0%	6%	0%		0%	1%		0%			40%
AM Peak Hour	06:00	11:00	11:00	09:00	09:00	06:00		05:00	08:00		07:00			11:00
Volume	4	625	152	10	143	2		2	27		3			957
PM Volumes	18	6065	1263	52	1145	20	0	2	181	0	4	0	0	8750
% PM	0%	42%	9%	0%	8%	0%		0%	1%		0%			60%
PM Peak Hour	14:00	17:00	16:00	13:00	16:00	15:00		14:00	13:00		13:00			16:00
Volume	5	883	189	8	171	4		2	30		3			1259

Directional Peak Periods All Classes	AM 7-9		NOON 12-2		PM 4-6		Off Peak Volumes	
	Volume	%	Volume	%	Volume	%	Volume	%
	1654	↔ 11%	1883	↔ 13%	2496	↔ 17%	8500	↔ 58%

Classification Definitions				
1 Motorcycles	4 Buses	7 >=4-Axle Single Units	10 >=6-Axle Single Trailers	13 >=7-Axle Multi-Trailers
2 Passenger Cars	5 2-Axle, 6-Tire Single Units	8 <=4-Axle Single Trailers	11 <=5-Axle Multi-Trailers	
3 2-Axle, 4-Tire Single Units	6 3-Axle Single Units	9 5-Axle Single Trailers	12 6-Axle Multi-Trailers	

**VOLUME**

SR-62 between Fairway Dr &amp; Pioneer Dr

Day: Wednesday

Date: 11/13/2013

City: Morongo Valley

Project #: CA13\_6168\_043

DAILY TOTALS					NB	SB	EB	WB	Total					
					0	0	6,304	6,013	12,317					
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL			
00:00			9	11	20	12:00			109	90	199			
00:15			7	3	10	12:15			120	95	215			
00:30			9	2	11	12:30			96	115	211			
00:45			6	31	4	12:45			110	435	118	418	228	853
01:00			9	3	12	13:00			97	110	207			
01:15			3	0	3	13:15			85	99	184			
01:30			1	3	4	13:30			104	90	194			
01:45			2	15	1	13:45			91	377	96	395	187	772
02:00			2	4	6	14:00			105	131	236			
02:15			8	0	8	14:15			99	123	222			
02:30			9	0	9	14:30			92	118	210			
02:45			2	21	1	14:45			103	399	120	492	223	891
03:00			0	2	2	15:00			107	115	222			
03:15			8	4	12	15:15			108	132	240			
03:30			4	8	12	15:30			113	113	226			
03:45			8	20	2	15:45			114	442	146	506	260	948
04:00			9	6	15	16:00			100	133	233			
04:15			15	4	19	16:15			106	147	253			
04:30			20	3	23	16:30			98	169	267			
04:45			23	67	8	16:45			117	421	129	578	246	999
05:00			25	12	37	17:00			88	166	254			
05:15			44	19	63	17:15			129	148	277			
05:30			73	11	84	17:30			127	113	240			
05:45			79	221	23	17:45			142	486	126	553	268	1039
06:00			74	24	98	18:00			96	96	192			
06:15			74	33	107	18:15			84	93	177			
06:30			89	37	126	18:30			101	74	175			
06:45			116	353	72	18:45			74	355	55	318	129	673
07:00			102	92	194	19:00			70	54	124			
07:15			101	77	178	19:15			69	54	123			
07:30			117	69	186	19:30			50	50	100			
07:45			114	434	92	19:45			62	251	39	197	101	448
08:00			98	104	202	20:00			54	38	92			
08:15			100	110	210	20:15			64	26	90			
08:30			93	109	202	20:30			49	26	75			
08:45			92	383	80	20:45			54	221	23	113	77	334
09:00			85	89	174	21:00			37	33	70			
09:15			81	97	178	21:15			33	34	67			
09:30			100	94	194	21:30			28	24	52			
09:45			100	366	84	21:45			29	127	27	118	56	245
10:00			99	106	205	22:00			22	13	35			
10:15			73	117	190	22:15			16	26	42			
10:30			86	86	172	22:30			19	22	41			
10:45			93	351	92	22:45			15	72	10	71	25	143
11:00			91	96	187	23:00			23	13	36			
11:15			104	113	217	23:15			15	18	33			
11:30			102	95	197	23:30			7	10	17			
11:45			103	400	107	23:45			11	56	4	45	15	101
<b>TOTALS</b>			2662	2209	<b>4871</b>	<b>TOTALS</b>			3642	3804	<b>7446</b>			
<b>SPLIT %</b>			54.6%	45.4%	<b>39.5%</b>	<b>SPLIT %</b>			48.9%	51.1%	<b>60.5%</b>			

DAILY TOTALS					NB	SB	EB	WB	Total
					0	0	6,304	6,013	12,317

AM Peak Hour	06:45	07:45	11:45	PM Peak Hour	17:15	16:30	16:30				
AM Pk Volume	436	415	835	PM Pk Volume	494	612	1044				
Pk Hr Factor	0.932	0.943	0.971	Pk Hr Factor	0.870	0.905	0.942				
7 - 9 Volume	0	0	817	733	1550	4 - 6 Volume	0	0	907	1131	2038
7 - 9 Peak Hour	07:00	07:45	07:45	4 - 6 Peak Hour	17:00	16:30	16:30				
7 - 9 Pk Volume	0	0	434	415	820	4 - 6 Pk Volume	0	0	486	612	1044
Pk Hr Factor	0.000	0.000	0.927	0.943	0.976	Pk Hr Factor	0.000	0.000	0.856	0.905	0.942

**VOLUME**

SR-62 between Ironage Rd &amp; State Hwy 177

Day: Wednesday  
Date: 11/13/2013City: Twenty Nine Palms  
Project #: CA13\_6168\_045

DAILY TOTALS					NB	SB	EB	WB	Total					
					0	0	164	174	338					
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL			
00:00			0	0	0	12:00			3	1	4			
00:15			1	0	1	12:15			5	3	8			
00:30			0	2	2	12:30			2	8	10			
00:45			0	1	0	2	12:45		7	17	3	15	10	32
01:00			0	0	0	13:00			5	2	7			
01:15			0	1	1	13:15			3	1	4			
01:30			0	0	0	13:30			3	4	7			
01:45			0	0	1	0	13:45		1	12	6	13	7	25
02:00			0	0	0	14:00			2	1	3			
02:15			0	0	0	14:15			2	6	8			
02:30			0	0	0	14:30			2	0	2			
02:45			0	0	0	14:45			0	6	2	9	2	15
03:00			0	0	0	15:00			2	1	3			
03:15			1	0	1	15:15			3	3	6			
03:30			0	1	1	15:30			1	2	3			
03:45			0	1	0	1	15:45		2	8	1	7	3	15
04:00			0	0	0	16:00			5	3	8			
04:15			3	3	6	16:15			2	2	4			
04:30			0	0	0	16:30			9	3	12			
04:45			2	5	6	9	16:45		3	19	2	10	5	29
05:00			0	2	2	17:00			1	2	3			
05:15			0	2	2	17:15			1	3	4			
05:30			0	2	2	17:30			4	0	4			
05:45			2	2	0	6	17:45		1	7	0	5	1	12
06:00			0	2	2	18:00			3	2	5			
06:15			0	0	0	18:15			2	6	8			
06:30			1	0	1	18:30			1	3	4			
06:45			1	2	1	3	18:45		0	6	3	14	3	20
07:00			0	6	6	19:00			5	2	7			
07:15			2	3	5	19:15			2	1	3			
07:30			1	1	2	19:30			0	0	0			
07:45			3	6	0	10	19:45		2	9	1	4	3	13
08:00			2	0	2	20:00			1	0	1			
08:15			3	2	5	20:15			0	0	0			
08:30			0	2	2	20:30			1	0	1			
08:45			1	6	4	8	20:45		0	2	0	0	2	
09:00			2	2	4	21:00			0	0	0			
09:15			2	5	7	21:15			0	1	1			
09:30			1	6	7	21:30			5	0	5			
09:45			2	7	1	14	21:45		0	5	0	1	0	6
10:00			4	1	5	22:00			3	0	3			
10:15			4	3	7	22:15			0	0	0			
10:30			5	5	10	22:30			1	0	1			
10:45			5	18	2	11	22:45		1	5	2	2	3	7
11:00			2	9	11	23:00			0	0	0			
11:15			8	12	20	23:15			0	0	0			
11:30			5	4	9	23:30			0	0	0			
11:45			3	18	4	29	23:45		2	2	0	2	2	
<b>TOTALS</b>			66	94	160	<b>TOTALS</b>			98	80	178			
<b>SPLIT %</b>			41.3%	58.8%	47.3%	<b>SPLIT %</b>			55.1%	44.9%	52.7%			

DAILY TOTALS					NB	SB	EB	WB	Total
					0	0	164	174	338

AM Peak Hour	10:30	11:00	10:30	PM Peak Hour	12:15	13:30	12:15				
AM Pk Volume	20	29	48	PM Pk Volume	19	17	35				
Pk Hr Factor	0.625	0.604	0.600	Pk Hr Factor	0.679	0.708	0.875				
7 - 9 Volume	0	0	12	18	30	4 - 6 Volume	0	0	26	15	41
7 - 9 Peak Hour	07:30	07:00	07:00	4 - 6 Peak Hour	16:00	16:00	16:00				
7 - 9 Pk Volume	9	10	16	4 - 6 Pk Volume	19	10	29				
Pk Hr Factor	0.000	0.000	0.750	0.417	0.667	Pk Hr Factor	0.000	0.000	0.528	0.833	0.604

## San Bernardino County Arterials database Counts

Location_ID	STREET	JURIS	CROSS_ST1	CROSS_ST2	Daily Count_2013	AM_Peak	PM_Peak
27a	S 247 (OLD WOMAN SPRINGS RD)	San Bernardino County	Daransatte Rd	Joshua Rd / PeachTree Rd	1,858	132	193

## San Bernardino Count Database Counts

### San Bernardino County Counts

Road Number	Road name	Location	Direction	Count Site	Date	ADT
894900	YUCCA TRAIL	YUCCA VALLEY	TWO-WAY	E LA CONTENTA ST	2/27/2013	5,485
640450	PARK BOULEVARD	JOSHUA TREE	TWO-WAY	S SH 62	4/20/2011	4,740
778825	SUNBURST AVENUE	JOSHUA TREE	TWO-WAY	N SH 62	4/20/2011	4,393
115750	ALTA LOMA DRIVE	JOSHUA TREE	TWO-WAY	W SUNNY VISTA RD W JCT	5/10/2011	4,147
566100	MORONGO ROAD	TWENTYNINE PALMS	TWO-WAY	N INDIAN TRAIL	6/13/2012	3,247
411150	HESS BOULEVARD	MORONGO	TWO-WAY	S SENILIS AVE	12/13/2011	2,992
740550	SENILIS AVENUE	MORONGO	TWO-WAY	W HESS BLVD	6/13/2012	1,925
566100	MORONGO ROAD	TWENTYNINE PALMS	TWO-WAY	S POLE LINE RD	8/29/2013	1,885
740550	SENILIS AVENUE	MORONGO	TWO-WAY	E JUNIPER AVENUE	1/26/2012	1,661
454250	JUNIPER AVENUE	MORONGO	TWO-WAY	N SENILIS AVE	3/21/2012	1,602
689500	RECHE ROAD	YUCCA VALLEY	TWO-WAY	E SH 247	2/27/2013	1,533
419700	HILL VIEW ROAD	JOSHUA TREE	TWO-WAY	S SH 62	6/13/2012	1,528
740550	SENILIS AVENUE	MORONGO	TWO-WAY	W SH 62	1/26/2012	1,423
101200	ABERDEEN DRIVE	YUCCA VALLEY	TWO-WAY	W YUCCA MESA DR	2/27/2013	1,415
666000	POLE LINE ROAD	TWENTYNINE PALMS	TWO-WAY	E LEAR AVE	8/29/2013	1,273
411150	HESS BOULEVARD	MORONGO	TWO-WAY	S ADELINE WAY	3/20/2012	1,242
779400	SUNFAIR ROAD	JOSHUA TREE	TWO-WAY	N SH 62	4/18/2011	1,198
740550	SENILIS AVENUE	MORONGO	TWO-WAY	E HESS BLVD	6/13/2012	985
320650	EL REPOSO STREET	JOSHUA TREE	TWO-WAY	N SH 62	6/13/2012	984
659800	PIONEER DRIVE	MORONGO	TWO-WAY	W WEST DRIVE	1/3/2012	981
119500	AMBOY ROAD	TWENTYNINE PALMS	TWO-WAY	S AMBOY CUTOFF	4/11/2011	792
411150	HESS BOULEVARD	MORONGO	TWO-WAY	N SENILIS AVE	3/20/2012	791
638350	PARADISE AVENUE	MORONGO	TWO-WAY	W JUNIPER AVENUE	3/26/2012	788
873500	WEST DRIVE	MORONGO	TWO-WAY	S PIONEER DR	7/17/2012	653
454250	JUNIPER AVENUE	MORONGO	TWO-WAY	N PIONEER DRIVE	3/21/2012	598
411150	HESS BOULEVARD	MORONGO	TWO-WAY	S PIONEER DR	3/20/2012	582
206400	CAMP ROCK ROAD	LUCERNE VALLEY	TWO-WAY	S SH 247	5/24/2011	507
206400	CAMP ROCK ROAD	LUCERNE VALLEY	TWO-WAY	N SH 247	5/31/2011	1,268
186150	BUENA VISTA DRIVE	MORONGO	TWO-WAY	W JUNIPER AVENUE	1/3/2012	491
209550	CANYON HOUSE ROAD	MORONGO	TWO-WAY	S HESS BLVD	3/20/2012	446
411150	HESS BOULEVARD	MORONGO	TWO-WAY	N MOJAVE DR	12/13/2011	412
556200	MOCKING BIRD LANE	MORONGO	TWO-WAY	W PARADISE AVE	3/26/2012	377
161700	BELLA VISTA DRIVE	MORONGO	TWO-WAY	S SH 62	12/28/2011	239

## National Data and Surveying Services (NDS) Counts

**VOLUME**

SR-62 N/o Indian Canyon Dr

Day: Wednesday

Date: 12/11/2013

City: Desert Hot Springs

Project #: CA13\_6233\_001

DAILY TOTALS					NB	SB	EB	WB	Total		
					5,635	5,953	0	0	11,588		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00	13	6			19	12:00	73	87			160
00:15	17	8			25	12:15	67	102			169
00:30	11	6			17	12:30	86	102			188
00:45	12	53	5	25	17	12:45	85	311	85	376	170
01:00	12	6			18	13:00	82	106			188
01:15	15	4			19	13:15	101	99			200
01:30	5	7			12	13:30	85	92			177
01:45	6	38	4	21	10	13:45	103	371	97	394	200
02:00	4	5			9	14:00	82	87			169
02:15	5	4			9	14:15	93	96			189
02:30	2	4			6	14:30	88	99			187
02:45	15	26	7	20	22	14:45	110	373	87	369	197
03:00	17	6			23	15:00	104	94			198
03:15	3	8			11	15:15	119	96			215
03:30	12	8			20	15:30	126	94			220
03:45	6	38	13	35	19	15:45	135	484	84	368	219
04:00	11	11			22	16:00	115	96			211
04:15	5	22			27	16:15	116	86			202
04:30	23	30			53	16:30	147	97			244
04:45	19	58	27	90	46	16:45	128	506	95	374	223
05:00	26	39			65	17:00	131	107			238
05:15	35	59			94	17:15	128	124			252
05:30	52	70			122	17:30	135	104			239
05:45	44	157	72	240	116	17:45	120	514	93	428	213
06:00	55	79			134	18:00	104	65			169
06:15	61	111			172	18:15	92	62			154
06:30	59	119			178	18:30	82	52			134
06:45	46	221	136	445	182	18:45	50	328	39	218	89
07:00	62	115			177	19:00	59	47			106
07:15	69	170			239	19:15	67	43			110
07:30	74	158			232	19:30	45	34			79
07:45	72	277	125	568	197	19:45	53	224	22	146	75
08:00	66	120			186	20:00	49	34			83
08:15	64	107			171	20:15	38	24			62
08:30	64	110			174	20:30	50	19			69
08:45	65	259	106	443	171	20:45	47	184	17	94	64
09:00	66	111			177	21:00	43	24			67
09:15	64	98			162	21:15	31	18			49
09:30	77	120			197	21:30	42	23			65
09:45	60	267	81	410	141	21:45	41	157	11	76	52
10:00	64	99			163	22:00	30	23			53
10:15	55	88			143	22:15	35	12			47
10:30	70	92			162	22:30	27	13			40
10:45	78	267	87	366	165	22:45	27	119	9	57	36
11:00	78	100			178	23:00	20	10			30
11:15	77	88			165	23:15	30	8			38
11:30	84	86			170	23:30	19	9			28
11:45	81	320	84	358	165	23:45	14	83	5	32	19
<b>TOTALS</b>	1981	3021			<b>5002</b>	<b>TOTALS</b>	3654	2932			<b>6586</b>
<b>SPLIT %</b>	39.6%	60.4%			<b>43.2%</b>	<b>SPLIT %</b>	55.5%	44.5%			<b>56.8%</b>

DAILY TOTALS					NB	SB	EB	WB	Total
					5,635	5,953	0	0	11,588

AM Peak Hour	11:00	06:45			07:15	PM Peak Hour	16:30	16:45			16:30
AM Pk Volume	320	579			854	PM Pk Volume	534	430			957
Pk Hr Factor	0.952	0.851			0.893	Pk Hr Factor	0.908	0.867			0.949
7 - 9 Volume	536	1011	0	0	1547	4 - 6 Volume	1020	802	0	0	1822
7 - 9 Peak Hour	07:15	07:15			07:15	4 - 6 Peak Hour	16:30	16:45			16:30
7 - 9 Pk Volume	281	573	0	0	854	4 - 6 Pk Volume	534	430	0	0	957
Pk Hr Factor	0.949	0.843	0.000	0.000	0.893	Pk Hr Factor	0.908	0.867	0.000	0.000	0.949

**VOLUME**

SR-62 E/o Bullion Rd

Day: Wednesday

Date: 12/11/2013

City: Twenty-Nine Palms

Project #: CA13\_6233\_006

DAILY TOTALS					NB	SB						Total		
					0	0						9,326		
							4,820			4,506				
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL			
00:00			3	8	11	12:00			85	77	162			
00:15			4	2	6	12:15			91	89	180			
00:30			5	7	12	12:30			76	69	145			
00:45			0	12	4	12:45			74	326	71	306	145	632
01:00			1	0	1	13:00			80	71	151			
01:15			5	1	6	13:15			80	84	164			
01:30			2	9	11	13:30			81	80	161			
01:45			2	10	2	13:45			61	302	108	343	169	645
02:00			0	4	4	14:00			92	89	181			
02:15			1	1	2	14:15			96	85	181			
02:30			2	1	3	14:30			101	100	201			
02:45			0	3	1	14:45			94	383	93	367	187	750
03:00			1	2	3	15:00			103	94	197			
03:15			0	4	4	15:15			111	90	201			
03:30			2	3	5	15:30			126	100	226			
03:45			2	5	3	15:45			132	472	83	367	215	839
04:00			2	6	8	16:00			179	84	263			
04:15			13	9	22	16:15			195	84	279			
04:30			4	6	10	16:30			228	126	354			
04:45			4	23	7	16:45			195	797	120	414	315	1211
05:00			2	2	4	17:00			168	119	287			
05:15			6	19	25	17:15			167	80	247			
05:30			7	8	15	17:30			149	63	212			
05:45			15	30	17	17:45			121	605	83	345	204	950
06:00			18	22	40	18:00			90	78	168			
06:15			9	30	39	18:15			72	77	149			
06:30			12	32	44	18:30			78	79	157			
06:45			11	50	50	18:45			64	304	66	300	130	604
07:00			15	48	63	19:00			66	50	116			
07:15			17	37	54	19:15			54	55	109			
07:30			29	63	92	19:30			46	50	96			
07:45			30	91	59	19:45			31	197	42	197	73	394
08:00			23	40	63	20:00			28	35	63			
08:15			48	67	115	20:15			28	32	60			
08:30			38	63	101	20:30			30	38	68			
08:45			48	157	63	20:45			29	115	30	135	59	250
09:00			39	56	95	21:00			25	35	60			
09:15			42	50	92	21:15			24	32	56			
09:30			45	62	107	21:30			18	26	44			
09:45			55	181	63	21:45			12	79	31	124	43	203
10:00			52	64	116	22:00			21	16	37			
10:15			57	66	123	22:15			7	19	26			
10:30			61	66	127	22:30			15	15	30			
10:45			64	234	66	22:45			6	49	13	63	19	112
11:00			97	82	179	23:00			6	9	15			
11:15			85	88	173	23:15			5	11	16			
11:30			106	68	174	23:30			2	11	13			
11:45			91	379	77	23:45			3	16	6	37	9	53
<b>TOTALS</b>			1175	1508	2683	<b>TOTALS</b>			3645	2998	6643			
<b>SPLIT %</b>			43.8%	56.2%	28.8%	<b>SPLIT %</b>			54.9%	45.1%	71.2%			

DAILY TOTALS					NB	SB						Total
					0	0						9,326
							4,820			4,506		

AM Peak Hour			11:00	11:00	11:00	PM Peak Hour			16:00	16:15	16:15
AM Pk Volume			379	315	694	PM Pk Volume			797	449	1235
Pk Hr Factor			0.894	0.895	0.969	Pk Hr Factor			0.874	0.891	0.872
7 - 9 Volume	0	0	248	440	688	4 - 6 Volume	0	0	1402	759	2161
7 - 9 Peak Hour			08:00	08:00	08:00	4 - 6 Peak Hour			16:00	16:15	16:15
7 - 9 Pk Volume	0	0	157	233	390	4 - 6 Pk Volume	0	0	797	449	1235
Pk Hr Factor	0.000	0.000	0.818	0.869	0.848	Pk Hr Factor	0.000	0.000	0.874	0.891	0.872

**VOLUME**

Adobe Trail N/o SR-62

Day: Wednesday

Date: 12/11/2013

City: Twenty-Nine Palms

Project #: CA13\_6233\_005

DAILY TOTALS					NB	SB	EB	WB	Total		
					4,488	4,449	0	0	8,937		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00	1	9			10	12:00	84	90			174
00:15	3	5			8	12:15	106	81			187
00:30	6	4			10	12:30	71	71			142
00:45	0	10	6	24	6	12:45	92	353	90	332	182
01:00	3	6			9	13:00	88	84			172
01:15	2	0			2	13:15	71	69			140
01:30	6	1			7	13:30	75	76			151
01:45	3	14	2	9	5	13:45	93	327	67	296	160
02:00	2	1			3	14:00	71	69			140
02:15	2	2			4	14:15	85	82			167
02:30	0	4			4	14:30	95	75			170
02:45	3	7	5	12	8	14:45	103	354	61	287	164
03:00	1	2			3	15:00	106	73			179
03:15	1	5			6	15:15	65	83			148
03:30	0	6			6	15:30	99	74			173
03:45	2	4	9	22	11	15:45	84	354	61	291	145
04:00	9	12			21	16:00	94	74			168
04:15	8	10			18	16:15	98	54			152
04:30	3	11			14	16:30	141	70			211
04:45	4	24	19	52	23	16:45	173	506	76	274	249
05:00	6	22			28	17:00	137	58			195
05:15	10	30			40	17:15	109	66			175
05:30	5	54			59	17:30	122	83			205
05:45	17	38	50	156	67	17:45	85	453	88	295	173
06:00	9	57			66	18:00	107	46			153
06:15	12	69			81	18:15	70	58			128
06:30	25	71			96	18:30	74	77			151
06:45	20	66	94	291	114	18:45	75	326	64	245	139
07:00	23	81			104	19:00	67	57			124
07:15	16	71			87	19:15	50	53			103
07:30	24	55			79	19:30	48	70			118
07:45	32	95	53	260	85	19:45	50	215	49	229	99
08:00	25	46			71	20:00	30	41			71
08:15	45	67			112	20:15	32	33			65
08:30	45	72			117	20:30	33	41			74
08:45	53	168	62	247	115	20:45	30	125	20	135	50
09:00	62	63			125	21:00	35	27			62
09:15	49	62			111	21:15	22	33			55
09:30	55	67			122	21:30	19	30			49
09:45	54	220	63	255	117	21:45	13	89	15	105	28
10:00	63	70			133	22:00	15	24			39
10:15	85	55			140	22:15	14	17			31
10:30	63	63			126	22:30	11	12			23
10:45	84	295	68	256	152	22:45	11	51	10	63	21
11:00	63	56			119	23:00	8	14			22
11:15	109	65			174	23:15	13	10			23
11:30	91	77			168	23:30	16	5			21
11:45	90	353	78	276	168	23:45	4	41	8	37	12
<b>TOTALS</b>	1294	1860			3154	<b>TOTALS</b>	3194	2589			5783
<b>SPLIT %</b>	41.0%	59.0%			35.3%	<b>SPLIT %</b>	55.2%	44.8%			64.7%

DAILY TOTALS					NB	SB	EB	WB	Total
					4,488	4,449	0	0	8,937

AM Peak Hour	11:15	11:30			11:30	PM Peak Hour	16:30	12:00			16:30
AM Pk Volume	374	326			697	PM Pk Volume	560	332			830
Pk Hr Factor	0.858	0.906			0.932	Pk Hr Factor	0.809	0.922			0.833
7 - 9 Volume	263	507			770	4 - 6 Volume	959	569			1528
7 - 9 Peak Hour	08:00	07:00			08:00	4 - 6 Peak Hour	16:30	17:00			16:30
7 - 9 Pk Volume	168	260			415	4 - 6 Pk Volume	560	295			830
Pk Hr Factor	0.792	0.802	0.000	0.000	0.887	Pk Hr Factor	0.809	0.838	0.000	0.000	0.833

**VOLUME**

Adobe Trail S/o Indian Trail

Day: Wednesday  
Date: 12/11/2013City: Twenty-Nine Palms  
Project #: CA13\_6233\_004

DAILY TOTALS					NB	SB	EB	WB	Total		
					2,644	2,803	0	0	5,447		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00	3	5			8	12:00	42	51			93
00:15	3	5			8	12:15	68	49			117
00:30	1	2			3	12:30	67	56			123
00:45	1	8	2	14	3	12:45	57	234	52	208	109
01:00	2	0			2	13:00	43	39			82
01:15	0	3			3	13:15	37	50			87
01:30	2	4			6	13:30	33	38			71
01:45	1	5	1	8	2	13:45	43	156	45	172	88
02:00	2	0			2	14:00	30	68			98
02:15	2	2			4	14:15	35	49			84
02:30	2	1			3	14:30	26	40			66
02:45	2	8	1	4	3	14:45	21	112	49	206	70
03:00	2	4			6	15:00	19	40			59
03:15	1	1			2	15:15	28	41			69
03:30	6	0			6	15:30	32	38			70
03:45	14	23	0	5	14	15:45	29	108	59	178	88
04:00	19	2			21	16:00	34	55			89
04:15	20	3			23	16:15	31	62			93
04:30	22	7			29	16:30	36	40			76
04:45	23	84	8	20	31	16:45	26	127	42	199	68
05:00	26	7			33	17:00	36	54			90
05:15	30	15			45	17:15	34	42			76
05:30	67	16			83	17:30	34	51			85
05:45	73	196	29	67	102	17:45	27	131	49	196	76
06:00	64	24			88	18:00	18	32			50
06:15	67	39			106	18:15	22	27			49
06:30	97	33			130	18:30	28	22			50
06:45	86	314	55	151	141	18:45	24	92	39	120	63
07:00	127	41			168	19:00	26	35			61
07:15	80	48			128	19:15	19	29			48
07:30	74	49			123	19:30	22	24			46
07:45	48	329	54	192	102	19:45	23	90	27	115	50
08:00	33	55			88	20:00	20	20			40
08:15	38	34			72	20:15	21	25			46
08:30	31	32			63	20:30	17	17			34
08:45	33	135	43	164	76	20:45	15	73	19	81	34
09:00	32	36			68	21:00	11	13			24
09:15	28	47			75	21:15	13	11			24
09:30	31	36			67	21:30	14	12			26
09:45	21	112	44	163	65	21:45	11	49	12	48	23
10:00	27	52			79	22:00	8	13			21
10:15	26	48			74	22:15	6	12			18
10:30	37	47			84	22:30	4	3			7
10:45	26	116	65	212	91	22:45	4	22	6	34	10
11:00	26	49			75	23:00	5	7			12
11:15	24	59			83	23:15	2	7			9
11:30	26	47			73	23:30	1	6			7
11:45	34	110	62	217	96	23:45	2	10	9	29	11
<b>TOTALS</b>	<b>1440</b>	<b>1217</b>			<b>2657</b>	<b>TOTALS</b>	<b>1204</b>	<b>1586</b>			<b>2790</b>
<b>SPLIT %</b>	<b>54.2%</b>	<b>45.8%</b>			<b>48.8%</b>	<b>SPLIT %</b>	<b>43.2%</b>	<b>56.8%</b>			<b>51.2%</b>

DAILY TOTALS					NB	SB	EB	WB	Total
					2,644	2,803	0	0	5,447

AM Peak Hour	06:30	10:30			06:30	PM Peak Hour	12:15	15:45			12:00
AM Pk Volume	390	220			567	PM Pk Volume	235	216			442
Pk Hr Factor	0.768	0.846			0.844	Pk Hr Factor	0.864	0.871			0.898
7 - 9 Volume	464	356	0	0	820	4 - 6 Volume	258	395	0	0	653
7 - 9 Peak Hour	07:00	07:15			07:00	4 - 6 Peak Hour	16:30	16:00			16:15
7 - 9 Pk Volume	329	206	0	0	521	4 - 6 Pk Volume	132	199	0	0	327
Pk Hr Factor	0.648	0.936	0.000	0.000	0.775	Pk Hr Factor	0.917	0.802	0.000	0.000	0.879

**VOLUME**

SR-247 S/o Pipes Canyon Rd

Day: Wednesday

Date: 12/11/2013

City: Yucca Valley

Project #: CA13\_6233\_003

DAILY TOTALS					NB	SB	EB	WB	Total		
					1,390	1,222	0	0	2,612		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00	2	1			3	12:00	21	24			45
00:15	2	1			3	12:15	28	26			54
00:30	4	0			4	12:30	26	24			50
00:45	5	13	1	3	6	12:45	16	91	28	102	44
01:00	1	0			1	13:00	26	26			52
01:15	1	1			2	13:15	16	29			45
01:30	3	0			3	13:30	28	27			55
01:45	3	8	1	2	4	13:45	26	96	29	111	55
02:00	2	0			2	14:00	35	19			54
02:15	0	0			0	14:15	31	20			51
02:30	1	0			1	14:30	28	21			49
02:45	0	3	1	1	1	14:45	32	126	23	83	55
03:00	0	0			0	15:00	30	15			45
03:15	5	0			5	15:15	31	28			59
03:30	7	3			10	15:30	23	22			45
03:45	2	14	2	5	4	15:45	28	112	15	80	43
04:00	0	2			2	16:00	25	15			40
04:15	3	2			5	16:15	34	20			54
04:30	3	1			4	16:30	26	21			47
04:45	5	11	4	9	9	16:45	29	114	25	81	54
05:00	2	4			6	17:00	36	23			59
05:15	3	4			7	17:15	23	18			41
05:30	5	7			12	17:30	28	14			42
05:45	6	16	3	18	9	17:45	21	108	15	70	36
06:00	6	8			14	18:00	13	13			26
06:15	4	15			19	18:15	19	13			32
06:30	10	19			29	18:30	14	7			21
06:45	9	29	16	58	25	18:45	16	62	6	39	22
07:00	10	23			33	19:00	10	12			22
07:15	8	25			33	19:15	6	5			11
07:30	22	28			50	19:30	7	4			11
07:45	18	58	20	96	38	19:45	10	33	5	26	15
08:00	37	20			57	20:00	12	6			18
08:15	24	26			50	20:15	5	2			7
08:30	25	33			58	20:30	9	5			14
08:45	13	99	24	103	37	20:45	11	37	2	15	13
09:00	17	20			37	21:00	13	2			15
09:15	14	25			39	21:15	6	3			9
09:30	13	26			39	21:30	5	4			9
09:45	19	63	30	101	49	21:45	14	38	2	11	16
10:00	24	29			53	22:00	6	2			8
10:15	23	30			53	22:15	6	3			9
10:30	27	31			58	22:30	7	1			8
10:45	18	92	24	114	42	22:45	5	24	3	9	8
11:00	37	25			62	23:00	5	2			7
11:15	22	15			37	23:15	3	0			3
11:30	35	23			58	23:30	5	2			7
11:45	34	128	18	81	52	23:45	2	15	0	4	2
<b>TOTALS</b>	534	591			1125	<b>TOTALS</b>	856	631			1487
<b>SPLIT %</b>	47.5%	52.5%			43.1%	<b>SPLIT %</b>	57.6%	42.4%			56.9%

DAILY TOTALS					NB	SB	EB	WB	Total
					1,390	1,222	0	0	2,612

AM Peak Hour	11:00	09:45			10:15	PM Peak Hour	14:00	13:00		13:30	
AM Pk Volume	128	120			215	PM Pk Volume	126	111		215	
Pk Hr Factor	0.865	0.968			0.867	Pk Hr Factor	0.900	0.957		0.977	
7 - 9 Volume	157	199	0	0	356	4 - 6 Volume	222	151	0	0	373
7 - 9 Peak Hour	07:45	08:00			07:45	4 - 6 Peak Hour	16:15	16:15			16:15
7 - 9 Pk Volume	104	103	0	0	203	4 - 6 Pk Volume	125	89	0	0	214
Pk Hr Factor	0.703	0.780	0.000	0.000	0.875	Pk Hr Factor	0.868	0.890	0.000	0.000	0.907

**VOLUME**

SR-62 W/o Hoopa Trail

Day: Wednesday  
Date: 12/11/2013

City: Morongo Valleyngo Valley  
Project #: CA13\_6233\_002

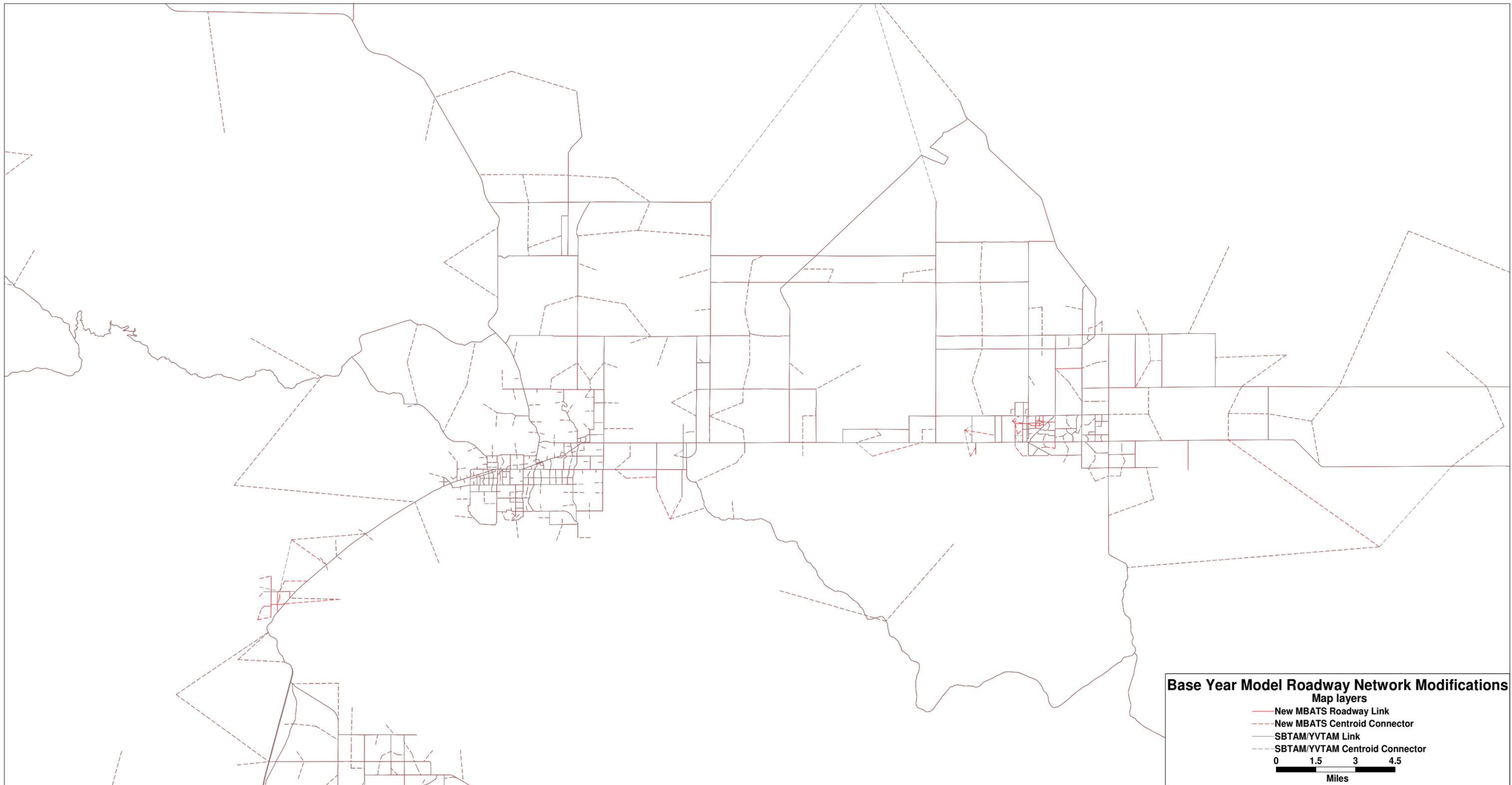
DAILY TOTALS					NB	SB	EB	WB	Total					
					0	0	7,247	6,836	14,083					
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL			
00:00			13	7	20	12:00			97	97	194			
00:15			16	6	22	12:15			86	125	211			
00:30			16	6	22	12:30			108	117	225			
00:45			11	56	4	23	12:45		113	404	122	461	235	865
01:00			9	4	13	13:00			85	118	203			
01:15			12	8	20	13:15			122	119	241			
01:30			14	6	20	13:30			124	122	246			
01:45			9	44	2	20	13:45		112	443	104	463	216	906
02:00			8	5	13	14:00			148	115	263			
02:15			4	5	9	14:15			102	110	212			
02:30			2	8	10	14:30			120	102	222			
02:45			6	20	5	23	14:45		128	498	117	444	245	942
03:00			16	9	25	15:00			126	123	249			
03:15			16	11	27	15:15			164	137	301			
03:30			7	7	14	15:30			149	137	286			
03:45			7	46	13	40	15:45		147	586	119	516	266	1102
04:00			9	9	18	16:00			138	130	268			
04:15			11	32	43	16:15			151	137	288			
04:30			13	18	31	16:30			177	129	306			
04:45			22	55	34	93	16:45		192	658	123	519	315	1177
05:00			37	55	92	17:00			161	127	288			
05:15			37	62	99	17:15			154	140	294			
05:30			42	68	110	17:30			145	115	260			
05:45			75	191	62	247	17:45		150	610	90	472	240	1082
06:00			59	102	161	18:00			137	74	211			
06:15			85	115	200	18:15			116	68	184			
06:30			94	115	209	18:30			108	55	163			
06:45			82	320	100	432	18:45		86	447	47	244	133	691
07:00			68	153	221	19:00			52	68	120			
07:15			77	175	252	19:15			62	44	106			
07:30			99	122	221	19:30			70	44	114			
07:45			101	345	123	573	19:45		61	245	39	195	100	440
08:00			98	106	204	20:00			68	36	104			
08:15			88	113	201	20:15			63	28	91			
08:30			107	102	209	20:30			48	34	82			
08:45			107	400	118	439	20:45		49	228	36	134	85	362
09:00			81	103	184	21:00			45	22	67			
09:15			97	133	230	21:15			49	22	71			
09:30			107	117	224	21:30			34	20	54			
09:45			128	413	107	460	21:45		44	172	20	84	64	256
10:00			93	114	207	22:00			31	18	49			
10:15			88	96	184	22:15			42	12	54			
10:30			92	120	212	22:30			50	14	64			
10:45			100	373	116	446	22:45		35	158	10	54	45	212
11:00			111	103	214	23:00			27	15	42			
11:15			121	97	218	23:15			19	8	27			
11:30			98	103	201	23:30			24	9	33			
11:45			119	449	112	415	23:45		16	86	7	39	23	125
<b>TOTALS</b>			2712	3211	5923	<b>TOTALS</b>			4535	3625	8160			
<b>SPLIT %</b>			45.8%	54.2%	42.1%	<b>SPLIT %</b>			55.6%	44.4%	57.9%			

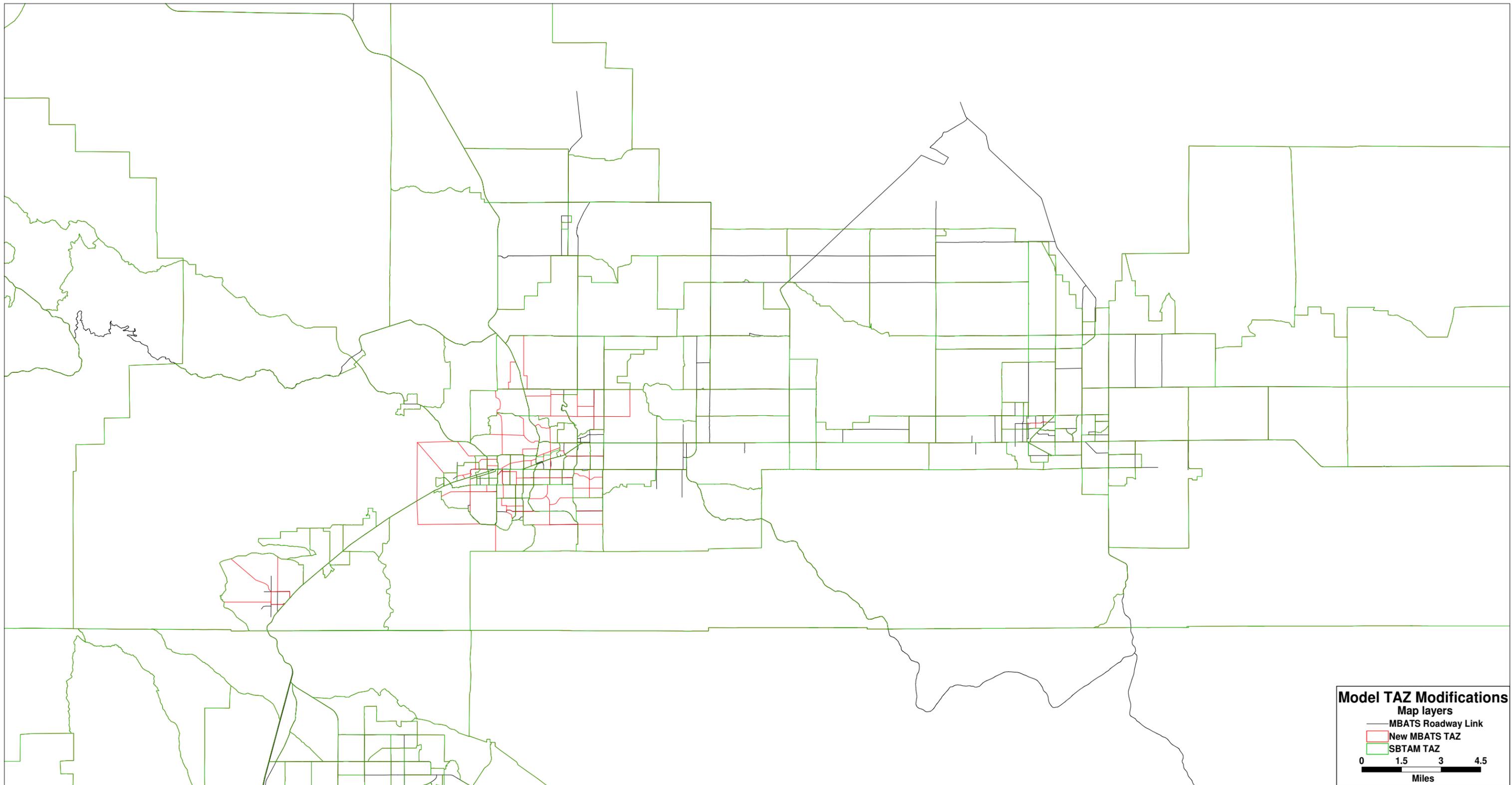
DAILY TOTALS					NB	SB	EB	WB	Total
					0	0	7,247	6,836	14,083

AM Peak Hour			11:00	07:00	07:00	PM Peak Hour			16:30	15:15	16:30
AM Pk Volume			449	573	918	PM Pk Volume			684	523	1203
Pk Hr Factor			0.928	0.819	0.911	Pk Hr Factor			0.891	0.954	0.955
7 - 9 Volume	0	0	745	1012	1757	4 - 6 Volume	0	0	1268	991	2259
7 - 9 Peak Hour			08:00	07:00	07:00	4 - 6 Peak Hour			16:30	16:00	16:30
7 - 9 Pk Volume	0	0	400	573	918	4 - 6 Pk Volume	0	0	684	519	1203
Pk Hr Factor	0.000	0.000	0.935	0.819	0.911	Pk Hr Factor	0.000	0.000	0.891	0.947	0.955

**APPENDIX B: MBATS MODEL ROADWAY NETWORK REVISIONS**









**Base Year Model Land Use Modifications & TAZ Splits**

Desc	TAZ Data			POP								
				POP	HH	SF	MF	RETEMP	NRETEMP	K12	UNIV	
<b>Morongo Valley</b>												
TAZ to Split	OG			5-3980-304	1,942	867	861	6	3	121	226	0
		P	E									
Split TAZ	New	0.15	0.8	5-3980-304	291.3	130.05	129.15	0.9	2.4	96.8	33.9	0
TAZ Split	New	0.15	0	5-3913-201	291.3	130.05	129.15	0.9	0	0	33.9	0
TAZ Split	New	0.15	0	5-3913-202	291.3	130.05	129.15	0.9	0	0	33.9	0
TAZ Split	New	0.25	0	5-3913-203	485.5	216.75	215.25	1.5	0	0	56.5	0
TAZ Split	New	0.3	0.2	5-3913-204	582.6	260.1	258.3	1.8	0.6	24.2	67.8	0
Stolen TAZ	OG			5-3913-201	2,560	671	671	0	3	83	1,059	0
Stolen TAZ	OG			5-3913-202	0	0	0	0	3	2	0	0
Stolen TAZ	OG			5-3913-203	2,104	551	551	0	3	26	8	0
Stolen TAZ	OG			5-3913-204	19	5	5	0	3	48	0	0
TAZ to Combine with Stolen SED	OG			5-3923-102	1,581	481	408	74	0	194	1,907	0
Combined TAZ	New			5-3923-102	6,264	1,708	1,635	74	12	353	2,974	0
<b>Twentynine Palms</b>												
TAZ to Split	OG			5-3991-105	1,198	445	445	0	0	7	0	0
		P	E									
Split TAZ	New	0.38	0	5-3991-105	455.24	169.1	169.1	0	0	0	0	0
TAZ Split	New	0.41	1	5-3952-201	491.18	182.45	182.45	0	0	7	0	0
TAZ Split	New	0.21	0	5-3952-202	251.58	93.45	93.45	0	0	0	0	0
Stolen TAZ	OG			5-3952-201	487	224	178	46	162	46	0	0
Stolen TAZ	OG			5-3952-202	727	334	334	0	0	98	0	0
TAZ to Combine with Stolen SED	OG			5-3952-101	769	353	353	0	1	429	35	0
Combined TAZ	New			5-3952-101	1,983	911	865	46	163	573	35	0

**Future Year Model Land Use Modifications & TAZ Splits**

Desc	TAZ Data			POP								
				POP	HH	SF	MF	RETEMP	NRETEMP	K12	UNIV	
<b>Morong Valley</b>												
TAZ to Split	OG			5-3980-304	2164	1008	839	168	8	131	226	0
		P	E									
Split TAZ	New	0.15	0.8	5-3980-304	325	151	126	25	6	105	34	0
TAZ Split	New	0.15	0	5-3913-201	325	151	126	25	0	0	34	0
TAZ Split	New	0.15	0	5-3913-202	325	151	126	25	0	0	34	0
TAZ Split	New	0.25	0	5-3913-203	541	252	210	42	0	0	57	0
TAZ Split	New	0.3	0.2	5-3913-204	649	302	252	50	2	26	68	0
Stolen TAZ	OG			5-3913-201	3630	990	832	158	8	83	1059	0
Stolen TAZ	OG			5-3913-202	16	5	5	0	0	3	0	0
Stolen TAZ	OG			5-3913-203	2902	792	662	130	2	26	8	0
Stolen TAZ	OG			5-3913-204	803	219	6	213	57	86	111	0
TAZ to Combine with Stolen SED	OG			5-3923-102	1990	629	569	60	0	209	1907	0
Combined TAZ	New			5-3923-102	9341	2635	2074	561	67	407	3085	0
<b>Twentynine Palms</b>												
TAZ to Split	OG			5-3991-105	907	407	407	0	0	9	0	0
		P	E									
Split TAZ	New	0.38	0	5-3991-105	345	155	155	0	0	0	0	0
TAZ Split	New	0.41	1	5-3952-201	372	167	167	0	0	9	0	0
TAZ Split	New	0.21	0	5-3952-202	190	85	85	0	0	0	0	0
Stolen TAZ	OG			5-3952-201	1529	602	348	254	163	95	199	0
Stolen TAZ	OG			5-3952-202	1167	460	460	0	0	139	131	0
TAZ to Combine with Stolen SED	OG			5-3952-101	586	329	329	0	19	458	35	0
Combined TAZ	New			5-3952-101	3282	1391	1137	254	182	692	365	0

**APPENDIX C: MBATS MODEL SED GROWTH BY TAZ**



TAZ ID	Original 2012-2035 RTP/SCS SBTAM Land Use (2008 Base Year)								2016-2040 RTP/SCS SANBAG Land Use (2012 Base Year)								Difference (2012 SED minus 2008 SED)							
	POPULAT	HOUSEHOL	SINGLEFAM	MULTIFAM	RETAILEMF	NRETAILEN	KINDERGAI	COLLEGEEN	POPULAT	HOUSEHOL	SINGLEFAM	MULTIFAM	RETAILEMF	NRETAILEN	KINDERGAI	COLLEGEEN	POPULAT	HOUSEHOL	SINGLEFAM	MULTIFAM	RETAILEMF	NRETAILEN	KINDERGAI	COLLEGEEN
53977102	64	31	29	1	0	13	0	0	108	35	20	15	0	1	0	0	44	4	-9	14	0	-12	0	0
53980201	1283	593	566	27	4	157	194	0	543	191	191	0	4	20	0	0	-740	-402	-375	-27	0	-137	-194	0
53981406	403	169	170	0	0	44	590	0	288	115	98	17	0	58	590	0	-115	-54	-72	17	0	14	0	0
53937201	346	145	72	74	208	0	0	0	196	78	40	38	19	367	0	0	-150	-67	-32	-36	-189	367	0	0
53945802	429	180	146	35	0	0	0	0	448	180	112	67	0	2	0	0	19	0	-34	32	0	2	0	0
53981405	1335	562	278	285	550	0	0	0	402	161	141	20	138	81	0	0	-933	-401	-137	-265	-412	81	0	0
53980403	361	166	160	6	8	111	0	0	398	129	81	47	40	102	0	0	37	-37	-79	41	32	-9	0	0
53980404	255	117	117	0	4	8	0	0	334	108	90	17	5	57	0	0	79	-9	-27	17	1	49	0	0
53981201	2436	1025	337	689	0	0	0	0	1159	401	66	335	1	2	0	0	-1277	-624	-271	-354	1	2	0	0
53948201	180	76	25	51	0	0	0	0	165	57	41	16	0	0	0	0	-15	-19	16	-35	0	0	0	0
53921202	258	108	84	24	0	0	0	0	213	85	85	0	0	5	0	0	-45	-23	1	-24	0	5	0	0
53921201	137	57	45	13	0	0	0	0	123	49	49	0	0	3	0	0	-14	-8	4	-13	0	3	0	0
53908301	1386	583	574	10	0	50	533	0	624	250	211	38	1	244	532	0	-762	-333	-363	28	1	194	-1	0
53993101	302	139	109	30	0	61	0	0	344	111	107	4	1	7	0	0	42	-28	-2	-26	1	-54	0	0
53980102	0	0	0	0	0	0	0	0	294	95	65	29	5	5	0	0	294	95	65	29	5	5	0	0
53930201	0	0	0	0	235	831	0	0	34	13	13	0	14	181	0	0	34	13	13	0	-221	-650	0	0
53922201	164	69	61	8	126	79	0	0	131	52	52	0	7	22	0	0	-33	-17	-9	-8	-119	-57	0	0
53982101	92	38	34	4	0	0	0	0	82	33	32	0	0	16	0	0	-10	-5	-2	-4	0	16	0	0
53982403	1080	454	146	308	507	188	0	0	878	352	102	250	15	100	0	0	-202	-102	-44	-58	-492	-88	0	0
53922202	423	177	157	20	476	37	0	0	117	47	26	21	29	84	0	0	-306	-130	-131	1	-447	47	0	0
53930202	398	167	56	111	625	121	0	0	100	40	2	37	36	123	0	0	-298	-127	-54	-74	-589	2	0	0
53948202	217	91	30	62	0	36	348	0	166	57	45	12	0	55	347	0	-51	-34	15	-50	0	19	-1	0
53945804	357	150	121	29	0	0	0	0	148	59	59	0	0	11	0	0	-209	-91	-62	-29	0	11	0	0
53981304	759	319	258	62	0	289	0	0	281	113	97	15	0	108	0	0	-478	-206	-161	-47	0	-181	0	0
53945801	1189	500	404	97	0	13	179	0	723	290	290	0	2	17	179	0	-466	-210	-114	-97	2	4	0	0
53933201	487	205	160	45	0	0	0	0	166	66	66	0	0	1	0	0	-321	-139	-94	-45	0	1	0	0
53981305	607	255	200	56	0	10	12	0	332	133	128	5	0	9	12	0	-275	-122	-72	-51	0	-1	0	0
53981301	336	141	112	30	0	0	0	0	268	107	107	0	0	14	0	0	-68	-34	-5	-30	0	14	0	0
53981303	364	153	127	27	0	0	0	0	394	158	147	10	0	1	0	0	30	5	20	-17	0	1	0	0
53991105	345	155	155	0	0	0	0	0	437	164	164	0	0	0	0	0	92	9	9	0	0	0	0	0
53952201	372	167	167	0	0	9	0	0	325	121	66	55	0	0	0	0	-47	-46	-101	55	0	-9	0	0
53991107	181	81	67	14	4	3	0	0	237	88	57	31	18	4	0	0	56	7	-10	17	14	1	0	0
53911202	554	233	193	40	0	0	0	0	56	22	22	0	0	24	0	0	-498	-211	-171	-40	0	24	0	0
53981302	195	82	64	18	0	0	0	0	212	85	70	14	0	4	0	0	17	3	6	-4	0	4	0	0
53987101	1214	559	553	6	0	40	0	0	1629	529	498	30	8	29	0	0	415	-30	-55	24	8	-11	0	0
53934201	588	247	245	3	0	0	0	0	407	163	150	12	0	19	74	0	-181	-84	-95	9	0	19	74	0
53988102	1	0	0	0	0	32	0	0	0	0	0	0	0	3	0	0	-1	0	0	0	0	-29	0	0
53934202	609	256	254	3	0	0	0	0	241	97	97	0	0	4	0	0	-368	-159	-157	-3	0	4	0	0
53946201	1058	445	420	26	0	43	761	0	313	126	126	0	0	119	648	0	-745	-319	-294	-26	0	76	-113	0
53946203	1024	431	406	25	0	0	0	0	791	317	317	0	0	17	113	0	-233	-114	-89	-25	0	17	113	0
53984101	522	220	217	3	0	0	75	0	191	76	76	0	0	9	0	0	-331	-144	-141	-3	0	9	-75	0
53908303	846	356	350	6	0	0	0	0	643	258	258	0	0	39	0	0	-203	-98	-92	-6	0	39	0	0
53946202	717	302	285	18	0	0	0	0	0	3	3	0	0	1	0	0	-717	-299	-282	-18	0	1	0	0
53895202	1475	621	618	3	0	0	0	0	549	220	220	0	0	3	0	0	-926	-401	-398	-3	0	3	0	0
53895204	561	236	235	1	0	0	0	0	303	121	121	0	0	4	0	0	-258	-115	-114	-1	0	4	0	0
53984601	859	361	341	21	0	0	0	0	470	189	102	86	7	14	0	0	-389	-172	-239	65	7	14	0	0
53984201	306	128	127	2	0	0	0	0	8	3	3	0	0	20	0	0	-298	-125	-124	-2	0	20	0	0
53911201	146	61	51	11	0	0	0	0	134	54	54	0	0	0	0	0	-12	-7	3	-11	0	0	0	0
53945803	297	125	101	24	0	0	0	0	181	72	72	0	0	1	0	0	-116	-53	-29	-24	0	1	0	0
53981101	904	380	190	190	347	0	0	0	216	87	85	1	123	45	0	0	-688	-293	-105	-189	-224	45	0	0
53910201	0	0	0	0	0	70	1367	0	8	3	2	1	0	204	1367	0	8	3	2	1	0	134	0	0
53927201	249	105	60	46	0	0	0	0	229	92	92	0	0	31	0	0	-20	-13	32	-46	0	31	0	0
53982301	454	191	127	64	0	0	0	0	346	139	118	20	3	32	0	0	-108	-52	-9	-44	3	32	0	0

	Original 2012-2035 RTP/SCS SBTAM Land Use (2008 Base Year)								2016-2040 RTP/SCS SANBAG Land Use (2012 Base Year)								Difference (2012 SED minus 2008 SED)							
53982201	107	45	31	14	156	425	0	0	34	13	5	7	46	263	0	0	-73	-32	-26	-7	-110	-162	0	0
53984302	1474	620	317	304	666	377	0	0	661	265	16	248	47	191	0	0	-813	-355	-301	-56	-619	-186	0	0
53918302	138	58	58	0	335	281	0	0	0	0	0	0	148	26	0	0	-138	-58	-58	0	-187	-255	0	0
53982402	112	47	47	0	276	227	0	0	218	87	34	53	69	139	0	0	106	40	-13	53	-207	-88	0	0
53912204	328	138	138	1	0	0	0	0	125	50	50	0	0	1	0	0	-203	-88	-88	-1	0	1	0	0
53940201	428	180	180	0	0	0	0	0	458	184	150	33	1	4	0	0	30	4	-30	33	1	4	0	0
53912202	525	221	220	1	0	0	0	0	374	150	150	0	0	11	0	0	-151	-71	-70	-1	0	11	0	0
53982303	140	59	59	0	0	0	0	0	64	25	25	0	0	1	0	0	-76	-34	-34	0	0	1	0	0
53982401	157	66	58	9	0	0	0	0	374	150	98	51	69	78	0	0	217	84	40	42	69	78	0	0
53912205	188	79	79	0	50	52	45	0	206	83	38	44	0	20	45	0	18	4	-41	44	-50	-32	0	0
53912201	211	89	89	0	0	0	0	0	74	29	29	0	0	5	0	0	-137	-60	-60	0	0	5	0	0
53982503	113	47	48	0	0	0	0	0	34	13	13	0	0	0	0	0	-79	-34	-35	0	0	0	0	0
53912203	68	29	29	0	0	0	0	0	177	71	26	44	0	23	0	0	109	42	-3	44	0	23	0	0
53987402	898	376	318	58	2	10	0	0	1057	343	255	87	4	3	0	0	159	-33	-63	29	2	-7	0	0
53895201	609	256	255	1	211	133	0	0	324	130	108	21	23	25	357	0	-285	-126	-147	20	-188	-108	357	0
53895203	1234	519	517	3	0	0	0	0	471	189	189	0	0	0	0	0	-763	-330	-328	-3	0	0	0	0
53941201	72	30	20	10	0	269	0	0	0	9	9	0	0	65	0	0	-72	-21	-11	-10	0	-204	0	0
53899202	454	191	133	58	308	223	0	0	60	24	16	7	89	51	0	0	-394	-167	-117	-51	-219	-172	0	0
53982202	789	332	332	0	500	128	0	0	208	83	64	19	72	81	0	0	-581	-249	-268	19	-428	-47	0	0
53916201	494	208	208	0	420	0	0	0	0	0	0	0	409	2	0	0	-494	-208	-208	0	-11	2	0	0
53923301	1210	509	260	250	3915	0	0	0	352	141	141	0	54	183	0	0	-858	-368	-119	-250	-3861	183	0	0
53899201	460	193	135	59	331	0	0	0	31	12	12	0	135	53	0	0	-429	-181	-123	-59	-196	53	0	0
53984501	423	178	101	77	159	131	0	0	511	205	100	105	6	43	0	0	88	27	-1	28	-153	-88	0	0
53910202	1690	711	356	356	0	0	0	0	467	187	10	177	0	7	0	0	-1223	-524	-346	-179	0	7	0	0
53939203	119	50	36	14	309	0	0	0	0	0	0	0	36	0	0	0	-119	-50	-36	-14	-273	0	0	0
53931302	1059	447	73	374	208	272	0	0	130	52	2	49	16	45	71	0	-929	-395	-71	-325	-192	-227	71	0
53931301	265	112	18	94	0	135	0	0	188	75	7	68	0	15	0	0	-77	-37	-11	-26	0	-120	0	0
53898304	97	41	41	0	0	0	0	0	43	17	17	0	0	7	0	0	-54	-24	-24	0	0	7	0	0
53898301	101	42	43	0	0	0	0	0	95	38	26	12	0	22	0	0	-6	-4	-17	12	0	22	0	0
53982302	120	50	51	0	532	335	0	0	95	38	38	0	29	33	0	0	-25	-12	-13	0	-503	-302	0	0
53981102	1647	693	497	197	191	120	0	0	742	298	75	222	2	474	0	0	-905	-395	-422	25	-189	354	0	0
53939201	362	152	109	43	22	14	0	0	444	178	168	10	0	32	0	0	82	26	59	-33	-22	18	0	0
53939202	27	11	8	3	217	5	0	0	33	13	7	6	9	2	0	0	6	2	-1	3	-208	-3	0	0
53984504	325	137	137	0	0	0	0	0	245	98	98	0	0	8	0	0	-80	-39	-39	0	0	8	0	0
53924201	259	109	109	0	0	0	0	0	239	96	82	14	0	6	0	0	-20	-13	-27	14	0	6	0	0
53903201	563	237	185	52	0	0	0	0	556	223	199	23	0	9	0	0	-7	-14	14	-29	0	9	0	0
53984102	300	126	126	1	0	0	0	0	190	76	76	0	0	2	0	0	-110	-50	-50	-1	0	2	0	0
53982305	423	178	178	0	0	0	0	0	319	128	102	26	2	0	0	0	-104	-50	-76	26	2	0	0	0
53900201	111	47	47	0	0	0	0	0	138	55	55	0	0	1	0	0	27	8	8	0	0	1	0	0
53985102	806	283	276	7	193	121	0	0	812	266	237	28	21	38	0	0	6	-17	-39	21	-172	-83	0	0
53986401	242	102	25	77	0	0	0	0	109	37	37	0	0	7	0	0	-133	-65	12	-77	0	7	0	0
53900202	71	30	30	0	0	0	0	0	76	30	30	0	0	0	0	0	5	0	0	0	0	0	0	0
53900204	518	218	218	0	0	0	0	0	243	97	97	0	0	0	0	0	-275	-121	-121	0	0	0	0	0
53900203	280	118	118	0	0	0	0	0	93	37	37	0	0	0	0	0	-187	-81	-81	0	0	0	0	0
53954201	243	121	30	92	0	0	98	0	411	142	31	111	2	62	98	0	168	21	1	19	2	62	0	0
53982602	1691	712	615	97	152	96	63	0	549	220	220	0	6	9	63	0	-1142	-492	-395	-97	-146	-87	0	0
53950201	159	67	22	46	268	0	0	0	70	28	28	0	14	1	0	0	-89	-39	6	-46	-254	1	0	0
53902201	0	0	0	0	0	1615	838	0	0	0	0	0	5	781	838	0	0	0	0	0	5	-834	0	0
53984402	29	12	11	1	1148	1600	0	0	15	6	5	1	187	1086	0	0	-14	-6	-6	0	-961	-514	0	0
53898302	390	164	164	0	0	0	0	0	248	99	99	0	20	83	0	0	-142	-65	-65	0	20	83	0	0
53913204	649	302	252	50	2	26	68	0	1081	351	154	196	15	29	0	0	432	49	-98	146	13	3	-68	0
53984503	372	156	157	0	0	0	0	0	239	96	85	10	0	2	0	0	-133	-60	-72	10	0	2	0	0
53925201	308	129	130	0	0	0	0	0	135	54	54	0	0	1	0	0	-173	-75	-76	0	0	1	0	0
53900205	150	63	64	0	0	0	0	0	52	21	21	0	0	1	0	0	-98	-42	-43	0	0	1	0	0

	Original 2012-2035 RTP/SCS SBTAM Land Use (2008 Base Year)								2016-2040 RTP/SCS SANBAG Land Use (2012 Base Year)								Difference (2012 SED minus 2008 SED)							
53898303	103	43	44	0	0	0	0	0	53	21	21	0	0	207	0	0	-50	-22	-23	0	0	207	0	0
53984502	448	188	144	45	66	66	0	0	425	170	112	57	3	31	0	0	-23	-18	-32	12	-63	-35	0	0
53926201	238	100	77	24	0	0	0	0	228	91	91	0	0	5	0	0	-10	-9	14	-24	0	5	0	0
53984401	601	253	198	55	323	0	0	0	112	45	45	0	46	91	0	0	-489	-208	-153	-55	-277	91	0	0
53982501	102	41	41	0	0	23	0	0	159	52	45	7	0	0	0	0	57	11	4	7	0	-23	0	0
53982504	311	131	131	0	0	0	0	0	131	52	52	0	0	0	0	0	-180	-79	-79	0	0	0	0	0
53909201	556	234	234	0	61	38	0	0	407	163	157	6	9	4	0	0	-149	-71	-77	6	-52	-34	0	0
53949201	26	11	11	0	131	2363	0	0	41	16	16	0	4	269	0	0	15	5	5	0	-127	-2094	0	0
53984403	0	0	0	0	1226	1453	0	0	0	0	0	0	135	457	0	0	0	0	0	0	-1091	-996	0	0
53987401	1196	500	207	293	15	31	625	0	1273	413	194	219	10	74	624	0	77	-87	-13	-74	-5	43	-1	0
53990101	7617	1668	143	1525	4	1278	0	0	4477	1661	0	1660	84	1384	0	0	-3140	-7	-143	135	80	106	0	0
53983101	882	515	510	5	1	139	134	0	1075	349	323	25	0	37	0	0	193	-166	-187	20	-1	-102	-134	0
53977104	69	33	32	1	0	8	0	0	146	47	40	7	0	2	0	0	77	14	8	6	0	-6	0	0
53983206	625	358	341	17	10	41	203	0	1043	338	292	46	42	80	337	0	418	-20	-49	29	32	39	134	0
53983202	479	274	263	10	7	35	0	0	966	313	267	46	6	26	0	0	487	39	4	36	-1	-9	0	0
53983201	441	252	244	9	4	88	0	0	805	261	205	55	2	84	0	0	364	9	-39	46	-2	-4	0	0
53977201	876	419	402	17	14	79	0	0	1245	404	316	88	4	66	0	0	369	-15	-86	71	-10	-13	0	0
53985202	570	253	244	9	1	50	0	0	657	213	213	0	0	9	0	0	87	-40	-31	-9	-1	-41	0	0
53913202	325	151	126	25	0	0	34	0	528	171	171	0	2	29	0	0	203	20	45	-25	2	29	-34	0
53913203	541	252	210	42	0	0	57	0	493	160	160	0	0	37	0	0	-48	-92	-50	-42	0	37	-57	0
53980101	49	23	23	1	3	1	38	0	155	50	50	0	2	4	232	0	106	27	27	-1	-1	3	194	0
53980301	224	104	104	0	2	8	0	0	422	137	110	26	14	11	0	0	198	33	6	26	12	3	0	0
53980302	84	39	39	0	1	10	0	0	155	50	46	4	3	0	0	0	71	11	7	4	2	-10	0	0
53980303	167	78	78	0	0	13	0	0	381	124	111	12	10	65	0	0	214	46	33	12	10	52	0	0
53913201	325	151	126	25	0	0	34	0	332	108	91	16	26	24	0	0	7	-43	-35	-9	26	24	-34	0
53991104	291	131	131	0	0	54	777	0	229	86	81	4	0	94	777	0	-62	-45	-50	4	0	40	0	0
53980305	65	30	30	0	0	20	0	0	90	29	25	4	0	0	0	0	25	-1	-5	4	0	-20	0	0
53980401	17	8	7	1	0	23	0	0	31	10	8	1	0	0	0	0	14	2	1	0	0	-23	0	0
53980402	88	41	24	17	6	3	0	0	259	84	27	56	18	1	0	0	171	43	3	39	12	-2	0	0
53984602	385	162	162	0	0	0	0	0	210	84	84	0	0	6	0	0	-175	-78	-78	0	0	6	0	0
53982106	265	112	37	75	0	0	0	0	21	8	8	0	0	52	0	0	-244	-104	-29	-75	0	52	0	0
53988101	11	4	4	0	0	37	0	0	5	1	1	0	0	16	0	0	-6	-3	-3	0	0	-21	0	0
53911203	93	39	33	7	0	0	0	0	85	34	34	0	0	27	0	0	-8	-5	1	-7	0	27	0	0
53981404	403	170	121	49	211	2	0	0	190	76	29	47	8	7	0	0	-213	-94	-92	-2	-203	5	0	0
53981403	398	167	167	0	625	0	0	0	71	28	11	17	20	61	0	0	-327	-139	-156	17	-605	61	0	0
53981401	265	112	112	0	417	0	0	0	0	0	0	0	9	105	0	0	-265	-112	-112	0	-408	105	0	0
53981402	625	262	221	42	208	0	0	0	402	161	40	121	17	19	0	0	-223	-101	-181	79	-191	19	0	0
53981407	345	145	145	0	0	0	0	0	256	103	93	9	0	8	0	0	-89	-42	-52	9	0	8	0	0
53985101	1503	528	517	11	183	115	548	0	1517	499	425	73	3	59	548	0	14	-29	-92	62	-180	-56	0	0
53951201	324	136	134	3	186	638	0	0	148	48	48	0	12	106	0	0	-176	-88	-86	-3	-174	-532	0	0
53943203	1145	482	461	22	0	0	0	0	1009	355	253	102	0	0	0	0	-136	-127	-208	80	0	0	0	0
53982105	1059	446	73	373	0	89	0	0	372	149	31	117	0	7	0	0	-687	-297	-42	-256	0	-82	0	0
53982102	365	153	104	49	81	51	0	0	310	124	102	22	20	4	0	0	-55	-29	-2	-27	-61	-47	0	0
53943201	417	175	168	8	0	0	0	0	314	110	110	0	0	1	0	0	-103	-65	-58	-8	0	1	0	0
53982103	105	44	44	0	0	0	0	0	94	37	37	0	0	0	0	0	-11	-7	-7	0	0	0	0	0
53982104	205	86	87	0	0	0	0	0	135	54	54	0	0	2	0	0	-70	-32	-33	0	0	2	0	0
53982304	1911	804	805	0	0	0	0	0	505	202	201	1	0	10	0	0	-1406	-602	-604	1	0	10	0	0
53982502	274	115	116	0	0	119	0	0	108	43	43	0	0	13	0	0	-166	-72	-73	0	0	-106	0	0
53985201	478	212	204	8	0	42	0	0	587	190	161	28	3	31	0	0	109	-22	-43	20	3	-11	0	0
53943202	283	119	114	5	0	0	0	0	38	13	13	0	0	0	0	0	-245	-106	-101	-5	0	0	0	0
53982601	0	0	0	0	109	69	0	0	0	0	0	0	12	0	0	0	0	0	0	0	-97	-69	0	0
53983205	685	392	372	21	2	19	0	0	952	309	255	53	22	19	0	0	267	-83	-117	32	20	0	0	0
53983203	79	45	43	2	0	14	0	0	107	34	30	4	0	0	0	0	28	-11	-13	2	0	-14	0	0
53989201	145	77	76	1	0	33	0	0	298	96	85	11	0	3	0	0	153	19	9	10	0	-30	0	0

	Original 2012-2035 RTP/SCS SBTAM Land Use (2008 Base Year)								2016-2040 RTP/SCS SANBAG Land Use (2012 Base Year)								Difference (2012 SED minus 2008 SED)								
53983204	4	2	2	0	1	34	0	0	0	1	1	0	0	0	0	0	0	-4	-1	-1	0	-1	-34	0	0
53987302	685	251	170	81	23	884	0	0	716	232	131	100	29	1352	0	0	31	-19	-39	19	6	468	0	0	
53987102	181	83	82	1	0	11	0	0	383	124	119	5	0	13	0	0	202	41	37	4	0	2	0	0	
53984301	180	75	76	0	436	366	0	0	0	2	2	0	70	209	0	0	-180	-73	-74	0	-366	-157	0	0	
53987201	1907	792	660	132	25	246	0	0	2429	788	513	274	89	184	0	0	522	-4	-147	142	64	-62	0	0	
53908302	2459	1035	1017	18	0	0	0	0	332	133	133	0	0	29	0	0	-2127	-902	-884	-18	0	29	0	0	
53986202	570	253	244	9	1	50	0	0	149	48	36	11	7	4	0	0	-421	-205	-208	2	6	-46	0	0	
53986201	1419	607	264	344	31	224	0	0	1754	569	235	333	66	250	0	0	335	-38	-29	-11	35	26	0	0	
53985203	68	30	29	1	0	5	0	0	147	47	44	3	0	0	0	0	79	17	15	2	0	-5	0	0	
53986105	500	205	189	16	3	28	0	0	516	167	141	25	4	13	0	0	16	-38	-48	9	1	-15	0	0	
53989101	336	172	170	2	0	88	69	0	416	140	131	8	2	222	68	0	80	-32	-39	6	2	134	-1	0	
53989203	219	117	115	2	0	43	0	0	418	135	121	14	0	0	0	0	199	18	6	12	0	-43	0	0	
53989202	371	198	194	4	0	45	0	0	653	212	194	17	0	5	0	0	282	14	0	13	0	-40	0	0	
53989302	67	32	32	0	2	14	0	0	141	53	50	2	7	1	0	0	74	21	18	2	5	-13	0	0	
53989303	465	227	107	120	1	43	87	2359	363	131	53	77	0	17	87	2486	-102	-96	-54	-43	-1	-26	0	127	
53986501	171	79	66	13	1	10	0	0	227	74	52	21	1	0	0	0	56	-5	-14	8	0	-10	0	0	
53986101	357	146	137	9	1	40	0	0	471	152	119	33	0	0	0	0	114	6	-18	24	-1	-40	0	0	
53986103	36	15	14	1	0	4	0	0	48	15	14	1	0	3	0	0	12	0	0	0	0	-1	0	0	
53986102	126	52	48	3	0	12	0	0	135	44	36	7	0	0	0	0	9	-8	-12	4	0	-12	0	0	
53987301	317	116	18	98	1	21	0	0	229	74	11	63	0	0	0	0	-88	-42	-7	-35	-1	-21	0	0	
53986104	616	252	232	20	0	16	180	0	893	290	249	40	0	15	180	0	277	38	17	20	0	-1	0	0	
53986502	515	237	237	0	1	56	0	0	674	218	183	35	7	110	0	0	159	-19	-54	35	6	54	0	0	
53986301	204	80	74	6	0	25	0	0	220	71	64	6	1	2	0	0	16	-9	-10	0	1	-23	0	0	
53986503	679	312	87	225	40	129	398	0	818	265	81	184	65	439	397	0	139	-47	-6	-41	25	310	-1	0	
53989401	1246	571	456	115	4	81	109	0	1404	504	364	140	9	131	109	0	158	-67	-92	25	5	50	0	0	
53989501	941	459	453	6	3	68	165	0	772	289	260	28	14	23	0	0	-169	-170	-193	22	11	-45	-165	0	
53993601	1	0	0	0	0	0	0	0	226	73	70	3	3	2	0	0	225	73	70	3	3	2	0	0	
53989301	565	275	274	1	1	37	141	0	475	178	172	5	3	16	517	0	-90	-97	-102	4	2	-21	376	0	
53991109	535	240	219	21	12	7	0	0	780	292	211	80	75	8	0	0	245	52	-8	59	63	1	0	0	
53991202	258	137	137	0	83	104	0	0	411	153	116	37	178	55	0	0	153	16	-21	37	95	-49	0	0	
53992503	620	66	66	0	12	51	0	0	306	114	100	14	57	27	0	0	-314	48	34	14	45	-24	0	0	
53989601	300	146	135	11	0	27	0	0	517	167	150	17	0	11	0	0	217	21	15	6	0	-16	0	0	
53989604	280	137	126	10	0	31	0	0	517	167	165	2	0	16	0	0	237	30	39	-8	0	-15	0	0	
53992101	111	58	58	0	0	12	0	0	151	49	39	9	0	0	0	0	40	-9	-19	9	0	-12	0	0	
53989602	111	54	50	4	0	7	0	0	280	91	85	5	0	3	0	0	169	37	35	1	0	-4	0	0	
53989603	866	422	417	5	0	57	211	0	642	212	196	15	2	8	0	0	-224	-210	-221	10	2	-49	-211	0	
53991103	550	247	247	0	0	19	0	0	729	273	226	46	0	19	0	0	179	26	-21	46	0	0	0	0	
53991106	767	344	344	0	0	10	0	0	1025	383	342	41	0	1	0	0	258	39	-2	41	0	-9	0	0	
53991101	1082	486	486	0	0	95	260	0	744	271	255	16	1	10	260	0	-338	-215	-231	16	1	-85	0	0	
53992106	88	46	46	0	0	0	0	0	50	16	15	0	0	0	0	0	-38	-30	-31	0	0	0	0	0	
53992105	1291	670	314	356	48	202	254	0	1558	583	461	122	96	102	0	0	267	-87	147	-234	48	-100	-254	0	
53992104	35	18	18	0	0	2	0	0	21	6	3	3	0	3	0	0	-14	-12	-15	3	0	1	0	0	
53992103	18	9	9	0	9	7	0	0	49	18	17	0	33	26	0	0	31	9	8	0	24	19	0	0	
53992203	858	447	138	309	24	45	169	0	690	258	134	123	91	12	365	0	-168	-189	-4	-186	67	-33	196	0	
53992205	399	208	204	4	25	148	1037	0	756	283	249	33	121	462	1037	0	357	75	45	29	96	314	0	0	
53992601	529	287	97	190	92	193	0	0	875	327	93	233	83	221	0	0	346	40	-4	43	-9	28	0	0	
53992602	1236	669	195	474	3	42	103	0	1347	504	270	234	9	26	357	0	111	-165	75	-240	6	-16	254	0	
53992603	125	68	27	41	0	190	578	0	180	67	46	21	1	241	578	0	55	-1	19	-20	1	51	0	0	
53991108	398	179	92	87	9	108	0	0	302	113	69	44	87	35	0	0	-96	-66	-23	-43	78	-73	0	0	
53991102	340	153	153	0	0	3	0	0	472	176	139	37	0	0	0	0	132	23	-14	37	0	-3	0	0	
53992502	3810	342	145	197	22	78	0	0	992	371	164	206	129	164	0	0	-2818	29	19	9	107	86	0	0	
53991201	292	155	155	0	23	68	90	0	455	170	104	66	50	90	90	0	163	15	-51	66	27	22	0	0	
53992501	4245	429	262	166	41	343	509	0	1016	380	237	142	148	93	589	0	-3229	-49	-25	-24	107	-250	80	0	
53991203	624	332	332	0	0	133	0	0	786	294	235	59	0	63	0	0	162	-38	-97	59	0	-70	0	0	

	Original 2012-2035 RTP/SCS SBTAM Land Use (2008 Base Year)								2016-2040 RTP/SCS SANBAG Land Use (2012 Base Year)								Difference (2012 SED minus 2008 SED)							
53992102	56	29	29	0	0	32	0	0	123	46	45	0	0	35	0	0	67	17	16	0	0	3	0	0
53992201	151	48	6	42	14	33	526	0	0	24	24	0	49	49	526	0	-151	-24	18	-42	35	16	0	0
53993402	594	275	275	0	5	87	107	0	1190	431	403	27	18	1	0	0	596	156	128	27	13	-86	-107	0
53993403	692	320	272	48	7	96	165	0	1034	379	355	23	25	401	0	0	342	59	83	-25	18	305	-165	0
53992302	309	167	144	23	18	103	0	0	490	183	54	128	95	149	0	0	181	16	-90	105	77	46	0	0
53992202	3	2	2	0	27	0	0	0	11	4	4	0	94	0	0	0	8	2	2	0	67	0	0	0
53993503	411	214	212	2	0	4	89	0	213	69	63	5	0	2	0	0	-198	-145	-149	3	0	-2	-89	0
53993501	93	48	47	1	0	28	0	0	97	31	31	0	0	8	0	0	4	-17	-16	-1	0	-20	0	0
53993203	234	124	117	6	0	69	0	0	409	132	126	6	6	40	0	0	175	8	9	0	6	-29	0	0
53993201	230	121	117	4	1	18	0	0	254	82	77	4	2	0	0	0	24	-39	-40	0	1	-18	0	0
53992204	4	2	2	0	2	1	0	0	10	3	3	0	7	0	0	0	6	1	1	0	5	-1	0	0
53992301	1514	821	163	657	25	191	77	0	2214	829	81	747	43	97	0	0	700	8	-82	90	18	-94	-77	0
53992401	112	61	61	0	1	15	14	0	125	47	43	3	0	176	14	0	13	-14	-18	3	-1	161	0	0
53992402	518	281	38	243	1	8	0	0	699	262	35	226	0	3	0	0	181	-19	-3	-17	-1	-5	0	0
53992403	468	254	9	245	1	3	180	0	242	90	90	0	6	0	0	0	-226	-164	81	-245	5	-3	-180	0
53992504	1406	196	196	0	0	14	80	0	203	76	58	17	0	0	0	0	-1203	-120	-138	17	0	-14	-80	0
53993401	1171	542	542	0	5	585	366	0	583	218	205	13	18	2616	529	0	-588	-324	-337	13	13	2031	163	0
53993602	331	175	166	9	2	56	0	0	468	152	140	11	0	6	0	0	137	-23	-26	2	-2	-50	0	0
53993502	25	13	12	1	0	7	0	0	55	18	18	0	0	4	0	0	30	5	6	-1	0	-3	0	0
53993202	102	54	53	1	0	31	0	0	143	46	39	7	0	0	0	0	41	-8	-14	6	0	-31	0	0
53993301	409	197	191	5	0	14	0	0	573	214	180	34	1	7	0	0	164	17	-11	29	1	-7	0	0
53993302	496	238	232	6	0	16	0	0	839	314	273	40	0	9	0	0	343	76	41	34	0	-7	0	0
53993303	759	365	352	12	0	20	0	0	872	326	241	85	1	0	0	0	113	-39	-111	73	1	-20	0	0
53931304	794	335	55	280	232	0	0	0	134	53	7	46	24	1	0	0	-660	-282	-48	-234	-208	1	0	0
53931303	794	335	55	280	212	44	0	0	264	106	0	105	12	6	0	0	-530	-229	-55	-175	-200	-38	0	0
53986302	194	76	69	7	0	11	0	0	303	99	92	6	0	14	0	0	109	23	23	-1	0	3	0	0
53980304	325	151	126	25	6	105	34	0	357	116	95	20	14	47	226	0	32	-35	-31	-5	8	-58	192	0
53952202	190	85	85	0	0	0	0	0	208	77	77	0	0	0	0	0	18	-8	-8	0	0	0	0	0
53895205	633	266	265	1	0	0	358	0	0	174	174	0	0	0	0	0	-633	-92	-91	-1	0	0	-358	0

TAZ ID	Original 2012-2035 RTP/SCS SBTAM Land Use (2035 Future Year)								2016-2040 RTP/SCS SANBAG Land Use (2040 Future Year)								Difference (2040 SED minus 2035 SED)							
	POPULAT	HOUSEHOL	SINGLEFAM	MULTIFAM	RETAILEMF	NRETAILEM	KINDERGAI	COLLEGEEN	POPULAT	HOUSEHOL	SINGLEFAM	MULTIFAM	RETAILEMF	NRETAILEM	KINDERGAI	COLLEGEEN	POPULAT	HOUSEHOL	SINGLEFAM	MULTIFAM	RETAILEMF	NRETAILEM	KINDERGAI	COLLEGEEN
53977102	64	31	29	1	0	13	0	0	109	35	20	15	0	1	0	0	45	4	-9	14	0	-12	0	0
53980201	1283	593	566	27	4	157	194	0	544	192	192	0	5	21	0	0	-739	-401	-374	-27	1	-136	-194	0
53981406	403	169	170	0	0	44	590	0	289	116	99	17	0	58	590	0	-114	-53	-71	17	0	14	0	0
53937201	346	145	72	74	208	0	0	0	196	79	41	38	20	367	0	0	-150	-66	-31	-36	-188	367	0	0
53945802	429	180	146	35	0	0	0	0	449	180	113	67	0	3	0	0	20	0	-33	32	0	3	0	0
53981405	1335	562	278	285	550	0	0	0	403	162	141	21	139	81	0	0	-932	-400	-137	-264	-411	81	0	0
53980403	361	166	160	6	8	111	0	0	399	129	82	48	41	102	0	0	38	-37	-78	42	33	-9	0	0
53980404	255	117	117	0	4	8	0	0	334	109	91	18	5	57	0	0	79	-8	-26	18	1	49	0	0
53981201	2436	1025	337	689	0	0	0	0	1159	402	66	336	1	2	0	0	-1277	-623	-271	-353	1	2	0	0
53948201	180	76	25	51	0	0	0	0	166	57	41	16	0	1	0	0	-14	-19	16	-35	0	1	0	0
53921202	258	108	84	24	0	0	0	0	214	86	86	0	0	5	0	0	-44	-22	2	-24	0	5	0	0
53921201	137	57	45	13	0	0	0	0	123	49	49	0	0	3	0	0	-14	-8	4	-13	0	3	0	0
53908301	1386	583	574	10	0	50	533	0	624	251	212	39	1	244	533	0	-762	-332	-362	29	1	194	0	0
53993101	302	139	109	30	0	61	0	0	345	112	107	5	1	7	0	0	43	-27	-2	-25	1	-54	0	0
53980102	0	0	0	0	0	0	0	0	295	96	66	30	6	6	0	0	295	96	66	30	6	6	0	0
53930201	0	0	0	0	235	831	0	0	34	14	14	0	14	182	0	0	34	14	14	0	-221	-649	0	0
53922201	164	69	61	8	126	79	0	0	131	53	53	0	8	23	0	0	-33	-16	-8	-8	-118	-56	0	0
53982101	92	38	34	4	0	0	0	0	83	33	33	0	0	16	0	0	-9	-5	-1	-4	0	16	0	0
53982403	1080	454	146	308	507	188	0	0	879	353	103	250	15	101	0	0	-201	-101	-43	-58	-492	-87	0	0
53922202	423	177	157	20	476	37	0	0	118	47	26	21	29	85	0	0	-305	-130	-131	1	-447	48	0	0
53930202	398	167	56	111	625	121	0	0	100	40	2	38	37	123	0	0	-298	-127	-54	-73	-588	2	0	0
53948202	217	91	30	62	0	36	348	0	167	58	46	12	0	56	347	0	-50	-33	16	-50	0	20	-1	0
53945804	357	150	121	29	0	0	0	0	148	60	60	0	0	11	0	0	-209	-90	-61	-29	0	11	0	0
53981304	759	319	258	62	0	289	0	0	282	113	97	16	0	109	0	0	-477	-206	-161	-46	0	-180	0	0
53945801	1189	500	404	97	0	13	179	0	723	290	290	0	2	18	179	0	-466	-210	-114	-97	2	5	0	0
53933201	487	205	160	45	0	0	0	0	166	67	67	0	0	2	0	0	-321	-138	-93	-45	0	2	0	0
53981305	607	255	200	56	0	10	12	0	333	134	128	5	0	9	12	0	-274	-121	-72	-51	0	-1	0	0
53981301	336	141	112	30	0	0	0	0	268	108	108	0	0	14	0	0	-68	-33	-4	-30	0	14	0	0
53981303	364	153	127	27	0	0	0	0	394	158	148	11	0	1	0	0	30	5	21	-16	0	1	0	0
53991105	345	155	155	0	0	0	0	0	438	164	164	0	0	1	0	0	93	9	9	0	0	1	0	0
53952201	372	167	167	0	0	9	0	0	325	122	66	56	0	0	0	0	-47	-45	-101	56	0	-9	0	0
53991107	181	81	67	14	4	3	0	0	237	89	58	31	18	4	0	0	56	8	-9	17	14	1	0	0
53911202	554	233	193	40	0	0	0	0	57	23	23	0	0	24	0	0	-497	-210	-170	-40	0	24	0	0
53981302	195	82	64	18	0	0	0	0	212	85	71	15	0	4	0	0	17	3	7	-3	0	4	0	0
53987101	1214	559	553	6	0	40	0	0	1629	529	499	30	8	29	0	0	415	-30	-54	24	8	-11	0	0
53934201	588	247	245	3	0	0	0	0	408	164	151	13	0	19	75	0	-180	-83	-94	10	0	19	75	0
53988102	1	0	0	0	0	32	0	0	0	0	0	0	0	3	0	0	-1	0	0	0	0	-29	0	0
53934202	609	256	254	3	0	0	0	0	242	97	97	0	0	5	0	0	-367	-159	-157	-3	0	5	0	0
53946201	1058	445	420	26	0	43	761	0	314	126	126	0	0	119	648	0	-744	-319	-294	-26	0	76	-113	0
53946203	1024	431	406	25	0	0	0	0	791	318	318	0	0	17	113	0	-233	-113	-88	-25	0	17	113	0
53984101	522	220	217	3	0	0	75	0	191	77	77	0	0	10	0	0	-331	-143	-140	-3	0	10	-75	0
53908303	846	356	350	6	0	0	0	0	643	258	258	0	0	39	0	0	-203	-98	-92	-6	0	39	0	0
53946202	717	302	285	18	0	0	0	0	0	4	4	0	0	1	0	0	-717	-298	-281	-18	0	1	0	0
53895202	1475	621	618	3	0	0	0	0	550	221	221	0	0	3	0	0	-925	-400	-397	-3	0	3	0	0
53895204	561	236	235	1	0	0	0	0	303	122	122	0	0	4	0	0	-258	-114	-113	-1	0	4	0	0
53984601	859	361	341	21	0	0	0	0	471	189	103	86	7	15	0	0	-388	-172	-238	65	7	15	0	0
53984201	306	128	127	2	0	0	0	0	9	3	3	0	0	21	0	0	-297	-125	-124	-2	0	21	0	0
53911201	146	61	51	11	0	0	0	0	134	54	54	0	0	1	0	0	-12	-7	3	-11	0	1	0	0
53945803	297	125	101	24	0	0	0	0	181	73	73	0	0	2	0	0	-116	-52	-28	-24	0	2	0	0
53981101	904	380	190	190	347	0	0	0	217	87	86	1	124	45	0	0	-687	-293	-104	-189	-223	45	0	0
53910201	0	0	0	0	0	70	1367	0	9	4	2	1	0	204	1367	0	9	4	2	1	0	134	0	0
53927201	249	105	60	46	0	0	0	0	229	92	92	0	0	32	0	0	-20	-13	32	-46	0	32	0	0
53982301	454	191	127	64	0	0	0	0	347	139	118	21	3	33	0	0	-107	-52	-9	-43	3	33	0	0

	Original 2012-2035 RTP/SCS SBTAM Land Use (2035 Future Year)								2016-2040 RTP/SCS SANBAG Land Use (2040 Future Year)								Difference							
53982201	107	45	31	14	156	425	0	0	34	14	6	8	46	263	0	0	-73	-31	-25	-6	-110	-162	0	0
53984302	1474	620	317	304	666	377	0	0	661	266	17	249	48	191	0	0	-813	-354	-300	-55	-618	-186	0	0
53918302	138	58	58	0	335	281	0	0	0	0	0	0	148	26	0	0	-138	-58	-58	0	-187	-255	0	0
53982402	112	47	47	0	276	227	0	0	219	88	34	54	70	140	0	0	107	41	-13	54	-206	-87	0	0
53912204	328	138	138	1	0	0	0	0	126	51	51	0	0	1	0	0	-202	-87	-87	-1	0	1	0	0
53940201	428	180	180	0	0	0	0	0	459	184	150	34	1	5	0	0	31	4	-30	34	1	5	0	0
53912202	525	221	220	1	0	0	0	0	375	150	150	0	0	12	0	0	-150	-71	-70	-1	0	12	0	0
53982303	140	59	59	0	0	0	0	0	64	26	26	0	0	1	0	0	-76	-33	-33	0	0	1	0	0
53982401	157	66	58	9	0	0	0	0	374	150	99	51	70	78	0	0	217	84	41	42	70	78	0	0
53912205	188	79	79	0	50	52	45	0	207	83	38	45	0	20	45	0	19	4	-41	45	-50	-32	0	0
53912201	211	89	89	0	0	0	0	0	74	30	30	0	0	5	0	0	-137	-59	-59	0	0	5	0	0
53982503	113	47	48	0	0	0	0	0	34	14	14	0	0	1	0	0	-79	-33	-34	0	0	1	0	0
53912203	68	29	29	0	0	0	0	0	177	71	26	45	0	23	0	0	109	42	-3	45	0	23	0	0
53987402	898	376	318	58	2	10	0	0	1057	343	256	88	4	3	0	0	159	-33	-62	30	2	-7	0	0
53895201	609	256	255	1	211	133	0	0	324	130	108	22	23	25	358	0	-285	-126	-147	21	-188	-108	358	0
53895203	1234	519	517	3	0	0	0	0	471	189	189	0	0	0	0	0	-763	-330	-328	-3	0	0	0	0
53941201	72	30	20	10	0	269	0	0	0	10	10	0	0	66	0	0	-72	-20	-10	-10	0	-203	0	0
53899202	454	191	133	58	308	223	0	0	60	24	16	8	89	51	0	0	-394	-167	-117	-50	-219	-172	0	0
53982202	789	332	332	0	500	128	0	0	209	84	64	20	73	81	0	0	-580	-248	-268	20	-427	-47	0	0
53916201	494	208	208	0	420	0	0	0	0	0	0	0	409	3	0	0	-494	-208	-208	0	-11	3	0	0
53923301	1210	509	260	250	3915	0	0	0	352	142	142	0	54	183	0	0	-858	-367	-118	-250	-3861	183	0	0
53899201	460	193	135	59	331	0	0	0	32	13	13	0	136	54	0	0	-428	-180	-122	-59	-195	54	0	0
53984501	423	178	101	77	159	131	0	0	511	205	100	105	6	43	0	0	88	27	-1	28	-153	-88	0	0
53910202	1690	711	356	356	0	0	0	0	468	188	10	178	0	7	0	0	-1222	-523	-346	-178	0	7	0	0
53939203	119	50	36	14	309	0	0	0	0	0	0	0	37	1	0	0	-119	-50	-36	-14	-272	1	0	0
53931302	1059	447	73	374	208	272	0	0	131	53	3	50	16	45	72	0	-928	-394	-70	-324	-192	-227	72	0
53931301	265	112	18	94	0	135	0	0	189	76	7	69	1	15	0	0	-76	-36	-11	-25	1	-120	0	0
53898304	97	41	41	0	0	0	0	0	43	17	17	0	0	7	0	0	-54	-24	-24	0	0	7	0	0
53898301	101	42	43	0	0	0	0	0	96	38	26	12	0	22	0	0	-5	-4	-17	12	0	22	0	0
53982302	120	50	51	0	532	335	0	0	95	38	38	0	29	33	0	0	-25	-12	-13	0	-503	-302	0	0
53981102	1647	693	497	197	191	120	0	0	743	298	76	222	2	475	0	0	-904	-395	-421	25	-189	355	0	0
53939201	362	152	109	43	22	14	0	0	445	179	168	10	0	33	0	0	83	27	59	-33	-22	19	0	0
53939202	27	11	8	3	217	5	0	0	34	13	7	6	9	3	0	0	7	2	-1	3	-208	-2	0	0
53984504	325	137	137	0	0	0	0	0	246	99	99	0	0	8	0	0	-79	-38	-38	0	0	8	0	0
53924201	259	109	109	0	0	0	0	0	239	96	82	14	0	7	0	0	-20	-13	-27	14	0	7	0	0
53903201	563	237	185	52	0	0	0	0	556	223	200	24	0	10	0	0	-7	-14	15	-28	0	10	0	0
53984102	300	126	126	1	0	0	0	0	191	77	77	0	0	3	0	0	-109	-49	-49	-1	0	3	0	0
53982305	423	178	178	0	0	0	0	0	320	128	102	26	2	1	0	0	-103	-50	-76	26	2	1	0	0
53900201	111	47	47	0	0	0	0	0	138	56	56	0	0	1	0	0	27	9	9	0	0	1	0	0
53985102	806	283	276	7	193	121	0	0	813	266	238	28	22	38	0	0	7	-17	-38	21	-171	-83	0	0
53986401	242	102	25	77	0	0	0	0	109	38	38	0	0	8	0	0	-133	-64	13	-77	0	8	0	0
53900202	71	30	30	0	0	0	0	0	77	31	31	0	0	1	0	0	6	1	1	0	0	1	0	0
53900204	518	218	218	0	0	0	0	0	244	98	98	0	0	0	0	0	-274	-120	-120	0	0	0	0	0
53900203	280	118	118	0	0	0	0	0	93	38	38	0	0	1	0	0	-187	-80	-80	0	0	1	0	0
53954201	243	121	30	92	0	0	98	0	412	143	31	111	2	62	98	0	169	22	1	19	2	62	0	0
53982602	1691	712	615	97	152	96	63	0	549	221	221	0	7	10	63	0	-1142	-491	-394	-97	-145	-86	0	0
53950201	159	67	22	46	268	0	0	0	70	28	28	0	15	2	0	0	-89	-39	6	-46	-253	2	0	0
53902201	0	0	0	0	0	1615	838	0	0	0	0	0	5	782	838	0	0	0	0	0	5	-833	0	0
53984402	29	12	11	1	1148	1600	0	0	15	6	5	1	188	1086	0	0	-14	-6	-6	0	-960	-514	0	0
53898302	390	164	164	0	0	0	0	0	248	100	100	0	20	83	0	0	-142	-64	-64	0	20	83	0	0
53913204	649	302	252	50	2	26	68	0	1081	351	155	196	16	30	0	0	432	49	-97	146	14	4	-68	0
53984503	372	156	157	0	0	0	0	0	239	96	85	11	0	2	0	0	-133	-60	-72	11	0	2	0	0
53925201	308	129	130	0	0	0	0	0	135	54	54	0	0	2	0	0	-173	-75	-76	0	0	2	0	0
53900205	150	63	64	0	0	0	0	0	53	21	21	0	0	1	0	0	-97	-42	-43	0	0	1	0	0

	Original 2012-2035 RTP/SCS SBTAM Land Use (2035 Future Year)								2016-2040 RTP/SCS SANBAG Land Use (2040 Future Year)								Difference							
53898303	103	43	44	0	0	0	0	0	54	22	22	0	0	208	0	0	-49	-21	-22	0	0	208	0	0
53984502	448	188	144	45	66	66	0	0	425	171	113	58	3	32	0	0	-23	-17	-31	13	-63	-34	0	0
53926201	238	100	77	24	0	0	0	0	228	92	92	0	0	5	0	0	-10	-8	15	-24	0	5	0	0
53984401	601	253	198	55	323	0	0	0	112	45	45	0	46	91	0	0	-489	-208	-153	-55	-277	91	0	0
53982501	102	41	41	0	0	23	0	0	160	52	45	7	0	0	0	0	58	11	4	7	0	-23	0	0
53982504	311	131	131	0	0	0	0	0	132	53	53	0	0	1	0	0	-179	-78	-78	0	0	1	0	0
53909201	556	234	234	0	61	38	0	0	408	164	158	6	9	5	0	0	-148	-70	-76	6	-52	-33	0	0
53949201	26	11	11	0	131	2363	0	0	42	17	17	0	5	270	0	0	16	6	6	0	-126	-2093	0	0
53984403	0	0	0	0	1226	1453	0	0	0	0	0	0	136	458	0	0	0	0	0	0	-1090	-995	0	0
53987401	1196	500	207	293	15	31	625	0	1273	413	194	219	11	74	625	0	77	-87	-13	-74	-4	43	0	0
53990101	7617	1668	143	1525	4	1278	0	0	4478	1661	1	1661	85	1385	0	0	-3139	-7	-142	136	81	107	0	0
53983101	882	515	510	5	1	139	134	0	1075	349	324	25	0	37	0	0	193	-166	-186	20	-1	-102	-134	0
53977104	69	33	32	1	0	8	0	0	147	48	41	7	0	2	0	0	78	15	9	6	0	-6	0	0
53983206	625	358	341	17	10	41	203	0	1043	339	292	47	43	81	337	0	418	-19	-49	30	33	40	134	0
53983202	479	274	263	10	7	35	0	0	967	314	267	47	6	27	0	0	488	40	4	37	-1	-8	0	0
53983201	441	252	244	9	4	88	0	0	805	261	206	56	2	85	0	0	364	9	-38	47	-2	-3	0	0
53977201	876	419	402	17	14	79	0	0	1245	404	316	88	4	67	0	0	369	-15	-86	71	-10	-12	0	0
53985202	570	253	244	9	1	50	0	0	657	213	213	0	0	9	0	0	87	-40	-31	-9	-1	-41	0	0
53913202	325	151	126	25	0	0	34	0	529	172	172	0	3	30	0	0	204	21	46	-25	3	30	-34	0
53913203	541	252	210	42	0	0	57	0	494	160	160	0	0	37	0	0	-47	-92	-50	-42	0	37	-57	0
53980101	49	23	23	1	3	1	38	0	156	51	51	0	2	5	232	0	107	28	28	-1	-1	4	194	0
53980301	224	104	104	0	2	8	0	0	422	137	110	27	15	11	0	0	198	33	6	27	13	3	0	0
53980302	84	39	39	0	1	10	0	0	156	51	46	4	3	0	0	0	72	12	7	4	2	-10	0	0
53980303	167	78	78	0	0	13	0	0	382	124	112	12	10	65	0	0	215	46	34	12	10	52	0	0
53913201	325	151	126	25	0	0	34	0	333	108	92	16	27	24	0	0	8	-43	-34	-9	27	24	-34	0
53991104	291	131	131	0	0	54	777	0	230	86	81	5	0	94	777	0	-61	-45	-50	5	0	40	0	0
53980305	65	30	30	0	0	20	0	0	90	29	25	4	0	0	0	0	25	-1	-5	4	0	-20	0	0
53980401	17	8	7	1	0	23	0	0	31	10	8	2	0	0	0	0	14	2	1	1	0	-23	0	0
53980402	88	41	24	17	6	3	0	0	259	84	28	56	18	1	0	0	171	43	4	39	12	-2	0	0
53984602	385	162	162	0	0	0	0	0	211	85	85	0	0	6	0	0	-174	-77	-77	0	0	6	0	0
53982106	265	112	37	75	0	0	0	0	21	9	8	0	0	53	0	0	-244	-103	-29	-75	0	53	0	0
53988101	11	4	4	0	0	37	0	0	6	2	2	0	0	16	0	0	-5	-2	-2	0	0	-21	0	0
53911203	93	39	33	7	0	0	0	0	86	34	34	0	0	28	0	0	-7	-5	1	-7	0	28	0	0
53981404	403	170	121	49	211	2	0	0	191	77	29	47	9	8	0	0	-212	-93	-92	-2	-202	6	0	0
53981403	398	167	167	0	625	0	0	0	72	29	11	18	21	62	0	0	-326	-138	-156	18	-604	62	0	0
53981401	265	112	112	0	417	0	0	0	0	1	0	1	10	106	0	0	-265	-111	-112	1	-407	106	0	0
53981402	625	262	221	42	208	0	0	0	403	162	41	121	18	19	0	0	-222	-100	-180	79	-190	19	0	0
53981407	345	145	145	0	0	0	0	0	257	103	94	9	0	8	0	0	-88	-42	-51	9	0	8	0	0
53985101	1503	528	517	11	183	115	548	0	1518	499	426	73	3	59	548	0	15	-29	-91	62	-180	-56	0	0
53951201	324	136	134	3	186	638	0	0	149	49	49	0	12	107	0	0	-175	-87	-85	-3	-174	-531	0	0
53943203	1145	482	461	22	0	0	0	0	1009	356	253	103	0	0	0	0	-136	-126	-208	81	0	0	0	0
53982105	1059	446	73	373	0	89	0	0	372	150	32	118	0	7	0	0	-687	-296	-41	-255	0	-82	0	0
53982102	365	153	104	49	81	51	0	0	311	125	102	22	20	4	0	0	-54	-28	-2	-27	-61	-47	0	0
53943201	417	175	168	8	0	0	0	0	314	111	111	0	0	1	0	0	-103	-64	-57	-8	0	1	0	0
53982103	105	44	44	0	0	0	0	0	94	38	38	0	0	0	0	0	-11	-6	-6	0	0	0	0	0
53982104	205	86	87	0	0	0	0	0	136	55	55	0	0	2	0	0	-69	-31	-32	0	0	2	0	0
53982304	1911	804	805	0	0	0	0	0	505	203	202	1	0	10	0	0	-1406	-601	-603	1	0	10	0	0
53982502	274	115	116	0	0	119	0	0	109	44	44	0	0	14	0	0	-165	-71	-72	0	0	-105	0	0
53985201	478	212	204	8	0	42	0	0	587	191	162	29	3	31	0	0	109	-21	-42	21	3	-11	0	0
53943202	283	119	114	5	0	0	0	0	39	14	14	0	0	0	0	0	-244	-105	-100	-5	0	0	0	0
53982601	0	0	0	0	109	69	0	0	0	0	0	0	12	0	0	0	0	0	0	0	-97	-69	0	0
53983205	685	392	372	21	2	19	0	0	953	309	255	54	23	19	0	0	268	-83	-117	33	21	0	0	0
53983203	79	45	43	2	0	14	0	0	108	35	31	4	0	0	0	0	29	-10	-12	2	0	-14	0	0
53989201	145	77	76	1	0	33	0	0	298	97	85	12	0	3	0	0	153	20	9	11	0	-30	0	0

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53983204	4	2	2	0	1	34	0	0	0	1	1	0	0	0	0	0	-4	-1	-1	0	-1	-34	0	0
53987302	685	251	170	81	23	884	0	0	716	232	132	101	29	1353	0	0	31	-19	-38	20	6	469	0	0
53987102	181	83	82	1	0	11	0	0	383	124	119	5	0	13	0	0	202	41	37	4	0	2	0	0
53984301	180	75	76	0	436	366	0	0	0	2	2	0	70	209	0	0	-180	-73	-74	0	-366	-157	0	0
53987201	1907	792	660	132	25	246	0	0	2429	789	514	275	89	184	0	0	522	-3	-146	143	64	-62	0	0
53908302	2459	1035	1017	18	0	0	0	0	332	133	133	0	0	29	0	0	-2127	-902	-884	-18	0	29	0	0
53986202	570	253	244	9	1	50	0	0	149	48	37	12	7	4	0	0	-421	-205	-207	3	6	-46	0	0
53986201	1419	607	264	344	31	224	0	0	1754	570	236	334	67	250	0	0	335	-37	-28	-10	36	26	0	0
53985203	68	30	29	1	0	5	0	0	147	48	45	3	0	0	0	0	79	18	16	2	0	-5	0	0
53986105	500	205	189	16	3	28	0	0	517	168	142	26	5	13	0	0	17	-37	-47	10	2	-15	0	0
53989101	336	172	170	2	0	88	69	0	416	140	132	8	2	223	69	0	80	-32	-38	6	2	135	0	0
53989203	219	117	115	2	0	43	0	0	419	136	122	14	0	0	0	0	200	19	7	12	0	-43	0	0
53989202	371	198	194	4	0	45	0	0	653	212	194	18	0	5	0	0	282	14	0	14	0	-40	0	0
53989302	67	32	32	0	2	14	0	0	142	53	51	2	7	1	0	0	75	21	19	2	5	-13	0	0
53989303	465	227	107	120	1	43	87	2359	364	131	53	78	0	17	87	2486	-101	-96	-54	-42	-1	-26	0	127
53986501	171	79	66	13	1	10	0	0	228	74	53	21	2	0	0	0	57	-5	-13	8	1	-10	0	0
53986101	357	146	137	9	1	40	0	0	471	153	120	33	0	0	0	0	114	7	-17	24	-1	-40	0	0
53986103	36	15	14	1	0	4	0	0	49	16	14	2	0	3	0	0	13	1	0	1	0	-1	0	0
53986102	126	52	48	3	0	12	0	0	136	44	37	8	0	0	0	0	10	-8	-11	5	0	-12	0	0
53987301	317	116	18	98	1	21	0	0	230	75	11	63	1	0	0	0	-87	-41	-7	-35	0	-21	0	0
53986104	616	252	232	20	0	16	180	0	893	290	250	40	0	15	180	0	277	38	18	20	0	-1	0	0
53986502	515	237	237	0	1	56	0	0	674	219	183	36	7	111	0	0	159	-18	-54	36	6	55	0	0
53986301	204	80	74	6	0	25	0	0	220	72	65	7	1	2	0	0	16	-8	-9	1	1	-23	0	0
53986503	679	312	87	225	40	129	398	0	819	266	81	185	65	440	398	0	140	-46	-6	-40	25	311	0	0
53989401	1246	571	456	115	4	81	109	0	1405	504	364	140	9	131	109	0	159	-67	-92	25	5	50	0	0
53989501	941	459	453	6	3	68	165	0	773	289	260	29	14	23	0	0	-168	-170	-193	23	11	-45	-165	0
53993601	1	0	0	0	0	0	0	0	227	74	70	3	3	3	0	0	226	74	70	3	3	3	0	0
53989301	565	275	274	1	1	37	141	0	475	178	172	6	3	16	517	0	-90	-97	-102	5	2	-21	376	0
53991109	535	240	219	21	12	7	0	0	780	292	212	81	75	8	0	0	245	52	-7	60	63	1	0	0
53991202	258	137	137	0	83	104	0	0	411	154	116	37	178	55	0	0	153	17	-21	37	95	-49	0	0
53992503	620	66	66	0	12	51	0	0	307	115	101	14	57	27	0	0	-313	49	35	14	45	-24	0	0
53989601	300	146	135	11	0	27	0	0	517	168	150	18	0	11	0	0	217	22	15	7	0	-16	0	0
53989604	280	137	126	10	0	31	0	0	517	168	166	2	0	16	0	0	237	31	40	-8	0	-15	0	0
53992101	111	58	58	0	0	12	0	0	152	49	39	10	0	0	0	0	41	-9	-19	10	0	-12	0	0
53989602	111	54	50	4	0	7	0	0	281	91	85	6	0	3	0	0	170	37	35	2	0	-4	0	0
53989603	866	422	417	5	0	57	211	0	642	212	197	16	2	8	0	0	-224	-210	-220	11	2	-49	-211	0
53991103	550	247	247	0	0	19	0	0	729	273	227	46	0	20	0	0	179	26	-20	46	0	1	0	0
53991106	767	344	344	0	0	10	0	0	1025	384	342	42	0	1	0	0	258	40	-2	42	0	-9	0	0
53991101	1082	486	486	0	0	95	260	0	744	271	255	16	1	10	260	0	-338	-215	-231	16	1	-85	0	0
53992106	88	46	46	0	0	0	0	0	50	16	16	0	0	0	0	0	-38	-30	-30	0	0	0	0	0
53992105	1291	670	314	356	48	202	254	0	1559	584	462	122	96	102	0	0	268	-86	148	-234	48	-100	-254	0
53992104	35	18	18	0	0	2	0	0	21	7	4	3	0	3	0	0	-14	-11	-14	3	0	1	0	0
53992103	18	9	9	0	9	7	0	0	49	18	18	1	33	27	0	0	31	9	9	1	24	20	0	0
53992203	858	447	138	309	24	45	169	0	691	259	135	124	91	13	365	0	-167	-188	-3	-185	67	-32	196	0
53992205	399	208	204	4	25	148	1037	0	757	283	250	34	122	462	1037	0	358	75	46	30	97	314	0	0
53992601	529	287	97	190	92	193	0	0	875	328	94	234	83	221	0	0	346	41	-3	44	-9	28	0	0
53992602	1236	669	195	474	3	42	103	0	1348	505	270	234	10	26	357	0	112	-164	75	-240	7	-16	254	0
53992603	125	68	27	41	0	190	578	0	181	68	46	21	1	242	578	0	56	0	19	-20	1	52	0	0
53991108	398	179	92	87	9	108	0	0	303	113	69	44	88	35	0	0	-95	-66	-23	-43	79	-73	0	0
53991102	340	153	153	0	0	3	0	0	472	177	140	37	0	0	0	0	132	24	-13	37	0	-3	0	0
53992502	3810	342	145	197	22	78	0	0	992	372	165	207	130	165	0	0	-2818	30	20	10	108	87	0	0
53991201	292	155	155	0	23	68	90	0	456	171	104	67	50	90	0	0	164	16	-51	67	27	22	0	0
53992501	4245	429	262	166	41	343	509	0	1016	381	238	143	148	94	590	0	-3229	-48	-24	-23	107	-249	81	0
53991203	624	332	332	0	0	133	0	0	787	295	235	60	0	63	0	0	163	-37	-97	60	0	-70	0	0

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53992102	56	29	29	0	0	32	0	0	123	46	45	1	0	35	0	0	67	17	16	1	0	3	0	0
53992201	151	48	6	42	14	33	526	0	0	25	25	0	50	49	526	0	-151	-23	19	-42	36	16	0	0
53993402	594	275	275	0	5	87	107	0	1190	431	404	28	18	2	0	0	596	156	129	28	13	-85	-107	0
53993403	692	320	272	48	7	96	165	0	1034	379	356	23	26	402	0	0	342	59	84	-25	19	306	-165	0
53992302	309	167	144	23	18	103	0	0	491	184	55	129	96	150	0	0	182	17	-89	106	78	47	0	0
53992202	3	2	2	0	27	0	0	0	11	4	4	0	94	0	0	0	8	2	2	0	67	0	0	0
53993503	411	214	212	2	0	4	89	0	213	69	64	5	0	2	0	0	-198	-145	-148	3	0	-2	-89	0
53993501	93	48	47	1	0	28	0	0	97	32	32	0	0	8	0	0	4	-16	-15	-1	0	-20	0	0
53993203	234	124	117	6	0	69	0	0	410	133	127	6	6	40	0	0	176	9	10	0	6	-29	0	0
53993201	230	121	117	4	1	18	0	0	254	83	78	5	2	0	0	0	24	-38	-39	1	1	-18	0	0
53992204	4	2	2	0	2	1	0	0	10	4	3	1	7	0	0	0	6	2	1	1	5	-1	0	0
53992301	1514	821	163	657	25	191	77	0	2214	829	82	748	43	97	0	0	700	8	-81	91	18	-94	-77	0
53992401	112	61	61	0	1	15	14	0	126	47	44	3	0	176	14	0	14	-14	-17	3	-1	161	0	0
53992402	518	281	38	243	1	8	0	0	700	262	35	227	0	3	0	0	182	-19	-3	-16	-1	-5	0	0
53992403	468	254	9	245	1	3	180	0	243	91	91	0	6	0	0	0	-225	-163	82	-245	5	-3	-180	0
53992504	1406	196	196	0	0	14	80	0	203	76	59	17	0	0	0	0	-1203	-120	-137	17	0	-14	-80	0
53993401	1171	542	542	0	5	585	366	0	584	219	205	13	18	2617	529	0	-587	-323	-337	13	13	2032	163	0
53993602	331	175	166	9	2	56	0	0	468	152	141	11	1	6	0	0	137	-23	-25	2	-1	-50	0	0
53993502	25	13	12	1	0	7	0	0	56	18	18	0	0	5	0	0	31	5	6	-1	0	-2	0	0
53993202	102	54	53	1	0	31	0	0	143	47	39	7	0	0	0	0	41	-7	-14	6	0	-31	0	0
53993301	409	197	191	5	0	14	0	0	574	215	181	34	2	7	0	0	165	18	-10	29	2	-7	0	0
53993302	496	238	232	6	0	16	0	0	840	314	274	41	0	9	0	0	344	76	42	35	0	-7	0	0
53993303	759	365	352	12	0	20	0	0	872	327	241	86	1	0	0	0	113	-38	-111	74	1	-20	0	0
53931304	794	335	55	280	232	0	0	0	134	54	8	46	24	2	0	0	-660	-281	-47	-234	-208	2	0	0
53931303	794	335	55	280	212	44	0	0	265	106	1	106	13	6	0	0	-529	-229	-54	-174	-199	-38	0	0
53986302	194	76	69	7	0	11	0	0	304	99	92	7	0	14	0	0	110	23	23	0	0	3	0	0
53980304	325	151	126	25	6	105	34	0	358	116	95	21	15	47	226	0	33	-35	-31	-4	9	-58	192	0
53952202	190	85	85	0	0	0	0	0	208	78	78	0	0	0	0	0	18	-7	-7	0	0	0	0	0
53895205	633	266	265	1	0	0	358	0	0	174	174	0	0	0	0	0	-633	-92	-91	-1	0	0	-358	0

## **APPENDIX D: MBATS MODEL VALIDATION SUMMARY**



Table 8 - SBTAM Morongo Basin Area Daily Validation

Roadway	Location			2012 Count	Base Year Model ID	Base Year Model	Deviation	Max Deviation	Result	Difference Squared
	Postmile	Extents	City							
Aberdeen Dr		W/o Yucca Mesa Dr	Yucca Valley	1,415	2741363	1,513	7%	63%	PASS	9,601
Adobe Rd		S/o Indian Trail	Twentynine Palms	5,447	2740841	3,052	-44%	48%	PASS	5,738,000
Adobe Rd		N/o SR-62	Twentynine Palms	8,937	122749	3,902	-56%	38%	FAIL	25,348,046
Alta Loma Dr		W/o Sunny Vista Rd	Joshua Tree	4,147	2740734	2,604	-37%	52%	PASS	2,380,267
Amboy Rd		S/o Amboy Cutoff	Twentynine Palms	792	2740938	1,402	77%	68%	FAIL	371,690
Camp Rock Rd		S/o SR-247	Lucerne Valley	507	133010	539	6%	68%	PASS	998
Camp Rock Rd		N/o SR-247	Lucerne Valley	1,268	122860	598	-53%	63%	PASS	448,343
Hess Blvd		S/o Senilis Ave	Morongo	2,992	2743362	2,356	-21%	58%	PASS	404,545
Juniper Ave		N/o Sensilis Ave	Morongo	1,602	2743352	973	-39%	63%	PASS	396,172
Juniper Ave		N/o Pioneer Dr	Morongo	598	2743351	629	5%	68%	PASS	945
Morongo Rd		N/o Indian Trail	Twentynine Palms	3,247	122925	3,251	0%	58%	PASS	13
Morongo Rd		S/o Pole Line Rd	Twentynine Palms	1,885	2740817	3,341	77%	63%	FAIL	2,118,593
Paradise Ave		W/o Juniper Ave	Morongo	788	2743354	1,125	43%	68%	PASS	113,677
Park Blvd		S/o SR-62	Joshua Tree	4,740	124345	2,826	-40%	52%	PASS	3,663,524
Pioneer Dr		W/ West Dr	Morongo	981	2740497	490	-50%	68%	PASS	241,567
Pole Line Rd		E/o Lear Ave	Twentynine Palms	1,273	122877	819	-36%	63%	PASS	206,141
Reche Rd		E/o SR-247	Landers	1,533	123028	2,058	34%	63%	PASS	275,265
Senilis Ave		E/o Juniper Ave	Morongo	1,661	2743361	1,814	9%	63%	PASS	23,304
Senilis Ave		E/ Hess Blvd	Morongo	985	2743363	499	-49%	68%	PASS	236,133
SR-247		Yucca Valley, Jct. Rte. 62	Yucca Valley	11,000	122967	9,625	-12%	36%	PASS	1,889,628
SR-247		Between Daransatte Rd and Joshua Rd / PeachTree Rd	Landers	1,858	2740479	6,553	253%	63%	FAIL	22,038,580
SR-247		S/o Pipes Canyon Rd	Yucca Valley	2,612	123013	5,718	119%	58%	FAIL	9,649,833
SR-62	10.5	Pioneer Town Rd	Yucca Valley	26,500	2701712	23,906	-10%	25%	PASS	6,729,653
SR-62	12.4	Jct. Rte. 247 North	Yucca Valley	26,500	2740593	22,863	-14%	25%	PASS	13,226,145
SR-62	15.1	Yucca Mesa Rd	Yucca Valley	19,500	144950	17,700	-9%	28%	PASS	3,238,644
SR-62	18.2	Park Blvd	Joshua Tree	17,000	124348	18,368	8%	29%	PASS	1,871,166
SR-62	22.1	Sunfair Road	Joshua Tree	14,000	152772	17,208	23%	31%	PASS	10,291,406
SR-62	33.2	Adobe Road	Twentynine Palms	9,500	122726	8,286	-13%	38%	PASS	1,474,151
SR-62	33.3	National Park/Hatch	Twentynine Palms	15,000	122693	12,675	-15%	30%	PASS	5,404,946
SR-62	34.2	Utah Trail	Twentynine Palms	2,800	122779	3,708	32%	58%	PASS	825,070
SR-62	55.1	Ironage Road - State Highway 177	Twentynine Palms	338	139996	554	64%	68%	PASS	46,816
Sunburst Ave		N/o SR-62	Joshua Tree	4,393	123080	3,377	-23%	52%	PASS	1,031,831
Sunfair Rd		N/o SR-62	Joshua Tree	1,198	122958	913	-24%	68%	PASS	81,042
Yucca Trail/Alta Loma		E/o La Contenta St	Yucca Valley	5,485	2743155	4,397	-20%	48%	PASS	1,183,899
<b>Sum of Links</b>				<b>202,482</b>		<b>189,641</b>	<b>Sum of Difference Squared</b>			<b>120,959,632</b>
<b>Total Link Volume Deviation</b>							<b>-6%</b>	<b>+/- 10%</b>	<b>PASS</b>	
<b>Percent Within Maximum Deviation</b>							<b>85%</b>	<b>&gt; 75%</b>	<b>PASS</b>	
<b>Percent Root Mean Square Error (RMSE)</b>							<b>32%</b>	<b>&lt; 40%</b>	<b>PASS</b>	
<b>Correlation Coefficient</b>							<b>0.97</b>	<b>&gt; 0.88</b>	<b>PASS</b>	

## **APPENDIX E: MBATS MODEL FORECASTS & LOS**



Link ID	Road name	AB_Facility	Tot Flow	Lanes	LOS C Thre	LOS D Thre	LOS E Thre	LOS	V/C
122945	OLD WOMAN SPRINGS RD	50	18866.68	2	14400	16200	18000	F	1.048149
2776961	OLD WOMAN SPRINGS RD	50	19197.48	2	14400	16200	18000	F	1.066527
2733585	OLD WOMAN SPRINGS RD	50	19197.48	2	14400	16200	18000	F	1.066527
2774652	OLD WOMAN SPRINGS RD	50	19572.85	2	14400	16200	18000	F	1.087381
2779111	HESS BLVD	60	16117.81	2	10400	11700	13000	F	1.239832
2778967	OLD WOMAN SPRINGS RD	50	20819.64	2	14400	16200	18000	F	1.156647
122967	OLD WOMAN SPRINGS RD	50	19570.43	2	14400	16200	18000	F	1.087246
2779051	OLD WOMAN SPRINGS RD	50	18905.9	2	14400	16200	18000	F	1.050328
122965	OLD WOMAN SPRINGS RD	50	22298.89	2	14400	16200	18000	F	1.238827
2778968	OLD WOMAN SPRINGS RD	50	20560.01	2	14400	16200	18000	F	1.142223
122964	OLD WOMAN SPRINGS RD	50	21207.59	2	14400	16200	18000	F	1.178199
2774747	OLD WOMAN SPRINGS RD	50	20386.86	2	14400	16200	18000	F	1.132603
100763	OLD WOMAN SPRINGS RD	50	19416.24	2	14400	16200	18000	F	1.07868
2778984	OLD WOMAN SPRINGS RD	50	19745.12	2	14400	16200	18000	F	1.096951
2774752	OLD WOMAN SPRINGS RD	50	20427.38	2	14400	16200	18000	F	1.134855
2778972	OLD WOMAN SPRINGS RD	50	19416.24	2	14400	16200	18000	F	1.07868
2776970	YUCCA MESA RD	60	13364.13	2	10400	11700	13000	F	1.02801
2777112	TWENTYNINE PALMS HIGHWAY	42	45901.15	4	28100	35400	37400	F	1.227303
1658229	STATE HIGHWAY 62	42	58471.38	4	28100	35400	37400	F	1.563406
2768067	STATE HIGHWAY 62	42	58628.83	4	28100	35400	37400	F	1.567616
123056	TWENTYNINE PALMS HIGHWAY	42	47315.7	4	28100	35400	37400	F	1.265126
1658230	STATE HIGHWAY 62	42	42511.01	4	28100	35400	37400	F	1.136658
2779110	STATE HIGHWAY 62	42	42511.01	4	28100	35400	37400	F	1.136658
2701621	STATE HIGHWAY 62	42	42859.85	4	28100	35400	37400	F	1.145985
2774677	STATE HIGHWAY 62	42	47315.7	4	28100	35400	37400	F	1.265126
2774669	TWENTYNINE PALMS HIGHWAY	42	46456.38	4	28100	35400	37400	F	1.242149
2774666	TWENTYNINE PALMS HIGHWAY	42	45738.32	4	28100	35400	37400	F	1.22295
123017	TWENTYNINE PALMS HIGHWAY	42	41704.06	4	28100	35400	37400	F	1.115082
123053	TWENTYNINE PALMS HIGHWAY	42	45298.5	4	28100	35400	37400	F	1.21119
2774664	TWENTYNINE PALMS HIGHWAY	42	46256.31	4	28100	35400	37400	F	1.2368
123049	TWENTYNINE PALMS HIGHWAY	42	47907.37	4	28100	35400	37400	F	1.280946
123050	TWENTYNINE PALMS HIGHWAY	42	46517.06	4	28100	35400	37400	F	1.243772
2774729	TWENTYNINE PALMS HIGHWAY	42	45298.5	4	28100	35400	37400	F	1.21119
2774714	TWENTYNINE PALMS HIGHWAY	42	49304.46	4	28100	35400	37400	F	1.318301
2778926	TWENTYNINE PALMS HIGHWAY	42	48313.96	4	28100	35400	37400	F	1.291817
2778927	TWENTYNINE PALMS HIGHWAY	42	49516.88	4	28100	35400	37400	F	1.323981
2732349	TWENTYNINE PALMS HIGHWAY	42	44503.46	4	28100	35400	37400	F	1.189932
123015	TWENTYNINE PALMS HIGHWAY	42	42696.12	4	28100	35400	37400	F	1.141607
2778906	TWENTYNINE PALMS HIGHWAY	42	39007.16	4	28100	35400	37400	F	1.042972
123018	TWENTYNINE PALMS HIGHWAY	42	38934.71	4	28100	35400	37400	F	1.041035
2701710	TWENTYNINE PALMS HIGHWAY	42	41704.06	4	28100	35400	37400	F	1.115082
2774734	TWENTYNINE PALMS HIGHWAY	42	41704.06	4	28100	35400	37400	F	1.115082
2778925	TWENTYNINE PALMS HIGHWAY	42	41866.14	4	28100	35400	37400	F	1.119415
2778935	TWENTYNINE PALMS HIGHWAY	42	42397.69	4	28100	35400	37400	F	1.133628
2778909	TWENTYNINE PALMS HIGHWAY	42	41211.79	4	28100	35400	37400	F	1.101919
152787	TWENTYNINE PALMS HIGHWAY	42	40770.77	4	28100	35400	37400	F	1.090127
2732350	TWENTYNINE PALMS HIGHWAY	42	42468.9	4	28100	35400	37400	F	1.135532
122992	TWENTYNINE PALMS HIGHWAY	42	42751.03	4	28100	35400	37400	F	1.143076
123006	TWENTYNINE PALMS HIGHWAY	42	44898.26	4	28100	35400	37400	F	1.200488
2774680	TWENTYNINE PALMS HIGHWAY	42	43909.68	4	28100	35400	37400	F	1.174056
2774765	TWENTYNINE PALMS HIGHWAY	40	37783.46	4	28700	32300	35900	F	1.052464
122970	TWENTYNINE PALMS HIGHWAY	40	37809.52	4	28700	32300	35900	F	1.05319
133011	STATE HIGHWAY 62	42	59317.68	4	28100	35400	37400	F	1.586034
2768072	STATE HIGHWAY 62	42	58471.38	4	28100	35400	37400	F	1.563406
2774763	OLD WOMAN SPRINGS RD	50	17919.48	2	14400	16200	18000	E	0.995527
2779052	OLD WOMAN SPRINGS RD	50	16499.29	2	14400	16200	18000	E	0.916627
2774773	OLD WOMAN SPRINGS RD	50	16499.29	2	14400	16200	18000	E	0.916627
133027	OLD WOMAN SPRINGS RD	50	17432.4	2	14400	16200	18000	E	0.968466

Link ID	Road name	AB_Facility	Tot Flow	Lanes	LOS C Thre	LOS D Thre	LOS E Thre	LOS	V/C
2778976	YUCCA MESA RD	60	12259.94	2	10400	11700	13000	E	0.943072
2774758	YUCCA MESA RD	60	11939.67	2	10400	11700	13000	E	0.918436
2778971	YUCCA MESA RD	60	11939.67	2	10400	11700	13000	E	0.918436
2779059		74	1991.874	2	1200	1500	2000	E	0.995937
2778989		74	1831.977	2	1200	1500	2000	E	0.915988
133015	TWENTYNINE PALMS HIGHWAY	42	36803.87	4	28100	35400	37400	E	0.984061
2774701	TWENTYNINE PALMS HIGHWAY	42	36988.52	4	28100	35400	37400	E	0.988998
123026	OLD WOMAN SPRINGS RD N	40	15340.37	2	15400	16000	20500	C or Better	0.748311
2774656	OLD WOMAN SPRINGS RD	40	13366.65	2	15400	16000	20500	C or Better	0.652032
2774654	OLD WOMAN SPRINGS RD N	40	15801.1	2	15400	16000	20500	D	0.770785
133022	OLD WOMAN SPRINGS RD	40	15630.83	2	15400	16000	20500	D	0.76248
122991	SAGE AVE	60	10706.42	2	10400	11700	13000	D	0.823571
123013	OLD WOMAN SPRINGS RD	40	15713.39	2	15400	16000	20500	D	0.766507
2778973	OLD WOMAN SPRINGS RD	50	16006.17	2	14400	16200	18000	D	0.889232
2777109	ALTA LOMA RD	60	10672.42	2	10400	11700	13000	D	0.820955
133327	ALTA LOMA RD	60	10889.93	2	10400	11700	13000	D	0.837687
2778895	YUCCA MESA RD	60	11315.27	2	10400	11700	13000	D	0.870405
122779	TWENTYNINE PALMS HIGHWAY	40	8412.793	2	15400	16000	20500	C or Better	0.41038
122753	TWENTYNINE PALMS HIGHWAY	40	8120.348	2	15400	16000	20500	C or Better	0.396115
2774646	PIPES CANYON RD	74	1353.857	2	1200	1500	2000	D	0.676928
2774925	TWENTYNINE PALMS HIGHWAY	42	25672.59	4	28100	35400	37400	C or Better	0.686433
122840	TWENTYNINE PALMS HIGHWAY	40	30530.28	4	28700	32300	35900	D	0.850426
122841	TWENTYNINE PALMS HIGHWAY	40	29762.68	4	28700	32300	35900	D	0.829044
2774885	TWENTYNINE PALMS HIGHWAY	40	29262.38	4	28700	32300	35900	D	0.815108
122875	TWENTYNINE PALMS HIGHWAY	42	25964.98	4	28100	35400	37400	C or Better	0.694251
2664194	TWENTYNINE PALMS HIGHWAY	42	25593.93	4	28100	35400	37400	C or Better	0.68433
122885	TWENTYNINE PALMS HIGHWAY	42	25147.76	4	28100	35400	37400	C or Better	0.6724
2774929	TWENTYNINE PALMS HIGHWAY	42	25140.4	4	28100	35400	37400	C or Better	0.672203
2779119	TWENTYNINE PALMS HIGHWAY	42	25851.83	4	28100	35400	37400	C or Better	0.691225
122904	TWENTYNINE PALMS HIGHWAY	42	25851.83	4	28100	35400	37400	C or Better	0.691225
2733629	TWENTYNINE PALMS HIGHWAY	42	25851.83	4	28100	35400	37400	C or Better	0.691225
144981	TWENTYNINE PALMS HIGHWAY	42	24896.95	4	28100	35400	37400	C or Better	0.665694
122905	TWENTYNINE PALMS HIGHWAY	42	25765.34	4	28100	35400	37400	C or Better	0.688913
123001	TWENTYNINE PALMS HIGHWAY	40	31694.92	4	28700	32300	35900	D	0.882867
122971	TWENTYNINE PALMS HIGHWAY	40	30792.05	4	28700	32300	35900	D	0.857717
2774814	TWENTYNINE PALMS HIGHWAY	40	29923.24	4	28700	32300	35900	D	0.833516
2701734	TWENTYNINE PALMS HIGHWAY	40	31331.51	4	28700	32300	35900	D	0.872744
2774739	TWENTYNINE PALMS HIGHWAY	40	31233.26	4	28700	32300	35900	D	0.870007
2779045	TWENTYNINE PALMS HIGHWAY	40	31331.51	4	28700	32300	35900	D	0.872744
2701738	TWENTYNINE PALMS HIGHWAY	40	29923.24	4	28700	32300	35900	D	0.833516
123073	TWENTYNINE PALMS HIGHWAY	40	29727.72	4	28700	32300	35900	D	0.82807
123082	TWENTYNINE PALMS HIGHWAY	40	30795.75	4	28700	32300	35900	D	0.85782
144950	TWENTYNINE PALMS HIGHWAY	40	28931.07	4	28700	32300	35900	D	0.805879
2778897	TWENTYNINE PALMS HIGHWAY	40	29053.43	4	28700	32300	35900	D	0.809288
2774783	TWENTYNINE PALMS HIGHWAY	40	29053.43	4	28700	32300	35900	D	0.809288
2702140	TWENTYNINE PALMS HIGHWAY	40	29053.43	4	28700	32300	35900	D	0.809288
2774881	TWENTYNINE PALMS HIGHWAY	40	30407.53	4	28700	32300	35900	D	0.847006
2702142	TWENTYNINE PALMS HIGHWAY	40	29727.72	4	28700	32300	35900	D	0.82807
152766	TWENTYNINE PALMS HIGHWAY	42	21065.71	4	28100	35400	37400	C or Better	0.563254
2774977	TWENTYNINE PALMS HIGHWAY	42	21065.71	4	28100	35400	37400	C or Better	0.563254
134059	RAINBOW CANYON RD	60	9917.734	2	10400	11700	13000	C or Better	0.762903
133046	TWO MILE RD	50	9305.431	2	14400	16200	18000	C or Better	0.516968
122739	ADOBE RD	50	10678.62	2	14400	16200	18000	C or Better	0.593257
2774835	YUCCA TRL	50	10552.56	2	14400	16200	18000	C or Better	0.586253
2774816	YUCCA TRL	50	9617.801	2	14400	16200	18000	C or Better	0.534322
122990	YUCCA TRL	50	9728.314	2	14400	16200	18000	C or Better	0.540462
2778999	YUCCA TRL	50	10879.45	2	14400	16200	18000	C or Better	0.604414
123011	YUCCA TRL	50	9666.62	2	14400	16200	18000	C or Better	0.537034

Link ID	Road name	AB_Facility	Tot Flow	Lanes	LOS C Thre	LOS D Thre	LOS E Thre	LOS	V/C
2778988	ALTA LOMA RD	60	9485.635	2	10400	11700	13000	C or Better	0.729664
2779007	YUCCA MESA RD	60	10184.86	2	10400	11700	13000	C or Better	0.783451
122715	TWO MILE RD	50	8459.681	2	14400	16200	18000	C or Better	0.469982
122730	TWO MILE RD	50	8982.35	2	14400	16200	18000	C or Better	0.499019
2733577	SENILIS AVE	60	8683.088	2	10400	11700	13000	C or Better	0.66793
152782	YUCCA TRL	50	9269.986	2	14400	16200	18000	C or Better	0.514999
2778894	BUENA VISTA DR	60	8527.191	2	10400	11700	13000	C or Better	0.655938
2774807	PALOMAR AVE	50	8550.394	2	14400	16200	18000	C or Better	0.475022
2777110	ALTA LOMA RD	60	8957.171	2	10400	11700	13000	C or Better	0.689013
134063	RAINBOW CANYON RD	60	7645.562	2	10400	11700	13000	C or Better	0.58812
122746	ADOBE RD	50	7382.44	2	14400	16200	18000	C or Better	0.410136
2775036	TWENTYNINE PALMS HIGHWAY	40	7359.898	2	15400	16000	20500	C or Better	0.359019
122767	TWENTYNINE PALMS HIGHWAY	40	7679.949	2	15400	16000	20500	C or Better	0.374632
144989	BASELINE RD	50	8224.076	2	14400	16200	18000	C or Better	0.456893
2775073	TWENTYNINE PALMS HIGHWAY	40	7430.982	2	15400	16000	20500	C or Better	0.362487
2775053	TWO MILE RD	50	8228.444	2	14400	16200	18000	C or Better	0.457136
2778913	SAGE AVE	60	7885.838	2	10400	11700	13000	C or Better	0.606603
2779036	SAGE AVE	60	7618.257	2	10400	11700	13000	C or Better	0.58602
2774812	YUCCA TRL	50	8340.397	2	14400	16200	18000	C or Better	0.463355
122977	YUCCA TRL	50	7871.193	2	14400	16200	18000	C or Better	0.437289
2701724	YUCCA TRL	50	7871.193	2	14400	16200	18000	C or Better	0.437289
122976	YUCCA TRL	50	8390.682	2	14400	16200	18000	C or Better	0.466149
2774828	YUCCA TRL	50	8155.837	2	14400	16200	18000	C or Better	0.453102
2779100	BUENA VISTA DR	60	8072.72	2	10400	11700	13000	C or Better	0.620978
123043	PALOMAR AVE	50	7500.928	2	14400	16200	18000	C or Better	0.416718
123041	PALOMAR AVE	50	7281.332	2	14400	16200	18000	C or Better	0.404518
2778982	BUENA VISTA DR	60	7117.897	2	10400	11700	13000	C or Better	0.547531
2774756	BUENA VISTA DR	60	7172.692	2	10400	11700	13000	C or Better	0.551746
144975	BRANT CROSSING RD	60	94.88276	2	10400	11700	13000	C or Better	0.007299
2774912	WINTERS RD	60	2179.685	2	10400	11700	13000	C or Better	0.167668
133023	N BORDER AVE	60	5586.119	2	10400	11700	13000	C or Better	0.429701
144969	WINTERS RD	60	2236.747	2	10400	11700	13000	C or Better	0.172057
2776964	N BORDER AVE	60	4726.554	2	10400	11700	13000	C or Better	0.363581
2727861	WINTERS RD	60	143.1882	2	10400	11700	13000	C or Better	0.011014
2727863	COYOTE VALLEY RD	60	2272.172	2	10400	11700	13000	C or Better	0.174782
144974	LEAR AVE	60	94.88276	2	10400	11700	13000	C or Better	0.007299
100897	LEAR AVE	60	0	2	10400	11700	13000	C or Better	0
2727864	COYOTE VALLEY RD	60	2272.172	2	10400	11700	13000	C or Better	0.174782
2727865	COYOTE VALLEY RD	60	2272.172	2	10400	11700	13000	C or Better	0.174782
123037	RECHE RD	60	4553.583	2	10400	11700	13000	C or Better	0.350276
124335	WINTERS RD	60	5569.001	2	10400	11700	13000	C or Better	0.428385
2774797	LANDERS LN	60	1157.558	2	10400	11700	13000	C or Better	0.089043
2664267	LANDERS LN	60	1934.076	2	10400	11700	13000	C or Better	0.148775
123028	RECHE RD	60	4812.392	2	10400	11700	13000	C or Better	0.370184
124336	RAINBOW DR	60	78.15109	2	10400	11700	13000	C or Better	0.006012
144997	WINTERS RD	50	4383.597	2	14400	16200	18000	C or Better	0.243533
144998	S LANDERS LN	60	1794.956	2	10400	11700	13000	C or Better	0.138074
2774792	WINTERS RD	50	4028.815	2	14400	16200	18000	C or Better	0.223823
145001	WINTERS RD	50	3950.663	2	14400	16200	18000	C or Better	0.219481
133028	LANDERS LN	60	1914.551	2	10400	11700	13000	C or Better	0.147273
2774800	RECHE RD	60	5007.921	2	10400	11700	13000	C or Better	0.385225
2774790	RAINBOW DR	60	119.5952	2	10400	11700	13000	C or Better	0.0092
133029	MARGARITA ST	60	119.5952	2	10400	11700	13000	C or Better	0.0092
122877	POLE LINE RD	60	1610.513	2	10400	11700	13000	C or Better	0.123886
2774863	BORDER AVE	60	5302.36	2	10400	11700	13000	C or Better	0.407874
2774869	SONORA RD	60	2593.893	2	10400	11700	13000	C or Better	0.19953
2774787	RECHE RD	60	4726.554	2	10400	11700	13000	C or Better	0.363581
123038	RECHE RD	60	4713.62	2	10400	11700	13000	C or Better	0.362586

Link ID	Road name	AB_Facility	Tot Flow	Lanes	LOS C Thre	LOS D Thre	LOS E Thre	LOS	V/C
133030	N GOAT MOUNTAIN RD	60	1690.82	2	10400	11700	13000	C or Better	0.130063
2774852	AVALON AVE	60	6628.646	2	10400	11700	13000	C or Better	0.509896
2777106	AVALON AVE	60	6549.663	2	10400	11700	13000	C or Better	0.50382
2777142	N GOAT MOUNTAIN RD	60	160.0365	2	10400	11700	13000	C or Better	0.012311
2664268	LANDERS LN	60	1157.558	2	10400	11700	13000	C or Better	0.089043
144958	SONORA RD	60	2770.82	2	10400	11700	13000	C or Better	0.21314
122938	BORDER AVE	60	5161.339	2	10400	11700	13000	C or Better	0.397026
2774794	BORDER AVE	60	4727.133	2	10400	11700	13000	C or Better	0.363626
2774921	SONORA RD	60	2420.519	2	10400	11700	13000	C or Better	0.186194
144959	SONORA RD	60	2565.522	2	10400	11700	13000	C or Better	0.197348
2727862	COYOTE VALLEY RD	60	235.6746	2	10400	11700	13000	C or Better	0.018129
2774919	COYOTE VALLEY RD	60	235.6746	2	10400	11700	13000	C or Better	0.018129
2774917	POLE LINE RD	60	2560.134	2	10400	11700	13000	C or Better	0.196933
144966	POLE LINE RD	60	2420.519	2	10400	11700	13000	C or Better	0.186194
144973	LEAR AVE	60	48.30548	2	10400	11700	13000	C or Better	0.003716
2774915	LEAR AVE	60	48.30548	2	10400	11700	13000	C or Better	0.003716
2727866	COYOTE VALLEY RD	60	2272.172	2	10400	11700	13000	C or Better	0.174782
2774988	MORONGO RD	60	4894.408	2	10400	11700	13000	C or Better	0.376493
2774990	ADOBE RD	60	2463.159	2	10400	11700	13000	C or Better	0.189474
133328	RAINBOW CANYON RD	60	3555.909	2	10400	11700	13000	C or Better	0.273531
122933	MORONGO RD	60	4191.571	2	10400	11700	13000	C or Better	0.322429
2774937	POLE LINE RD	60	1467.216	2	10400	11700	13000	C or Better	0.112863
2774947	BRANT CROSSING RD	60	263.8268	2	10400	11700	13000	C or Better	0.020294
2702144	POLE LINE RD	60	1467.216	2	10400	11700	13000	C or Better	0.112863
133052	BERKELEY AVE	60	4455.397	2	10400	11700	13000	C or Better	0.342723
2702136	UTAH TRL	60	1464.036	2	10400	11700	13000	C or Better	0.112618
2775068	AMBOY RD	60	2049.036	2	10400	11700	13000	C or Better	0.157618
2776972	TWENTYNINE PALMS HIGHWAY	50	830.4143	2	14400	16200	18000	C or Better	0.046134
136151	LOOP RD	60	144.9441	2	10400	11700	13000	C or Better	0.01115
2775062	UTAH TRL	60	1464.036	2	10400	11700	13000	C or Better	0.112618
1658226	UTAH TRL	60	1504.77	2	10400	11700	13000	C or Better	0.115752
122879	VALLE VISTA RD	60	268.9337	2	10400	11700	13000	C or Better	0.020687
122886	TWO MILE RD	50	4488.226	2	14400	16200	18000	C or Better	0.249346
133050	INDIAN TRL	60	737.4339	2	10400	11700	13000	C or Better	0.056726
122876	LEAR AVE	60	1401.946	2	10400	11700	13000	C or Better	0.107842
144962	COYOTE VALLEY RD	60	283.4947	2	10400	11700	13000	C or Better	0.021807
122958	SUNFAIR RD	60	4027.435	2	10400	11700	13000	C or Better	0.309803
2774927	LEAR AVE	60	362.761	2	10400	11700	13000	C or Better	0.027905
144955	SUNFAIR RD	60	2244.28	2	10400	11700	13000	C or Better	0.172637
122959	BROADWAY	60	1504.958	2	10400	11700	13000	C or Better	0.115766
122955	BROADWAY	60	3065.618	2	10400	11700	13000	C or Better	0.235817
2774865	SUNFAIR RD	60	2012.35	2	10400	11700	13000	C or Better	0.154796
122883	LEAR AVE	60	207.7216	2	10400	11700	13000	C or Better	0.015979
2664141	LEAR AVE	60	2127.017	2	10400	11700	13000	C or Better	0.163617
100753	LEAR AVE	60	2127.017	2	10400	11700	13000	C or Better	0.163617
122878	LEAR AVE	60	1594.935	2	10400	11700	13000	C or Better	0.122687
133051	VALLE VISTA RD	60	440.4364	2	10400	11700	13000	C or Better	0.03388
144994	AMBOY RD	60	1328.438	2	10400	11700	13000	C or Better	0.102188
2775092	TWENTYNINE PALMS HIGHWAY	50	3894.199	2	14400	16200	18000	C or Better	0.216344
2777143	DEL VALLE DR	60	1092.75	2	10400	11700	13000	C or Better	0.084058
122689	MORONGO RD	60	652.0373	2	10400	11700	13000	C or Better	0.050157
122705	SULLIVAN RD	60	4528.188	2	10400	11700	13000	C or Better	0.348322
122708	INDIAN TRL	60	449.9395	2	10400	11700	13000	C or Better	0.034611
122712	VALLE VISTA RD	60	966.0367	2	10400	11700	13000	C or Better	0.074311
122714	MESQUITE SPRINGS RD	50	1532.254	2	14400	16200	18000	C or Better	0.085125
122725	EL PASEO DR	60	442.7076	2	10400	11700	13000	C or Better	0.034054
122773	UTAH TRL	50	2224.693	2	14400	16200	18000	C or Better	0.123594
122917	LUPINE AVE	60	916.6539	2	10400	11700	13000	C or Better	0.070512

Link ID	Road name	AB_Facility	Tot Flow	Lanes	LOS C Thre	LOS D Thre	LOS E Thre	LOS	V/C
133045	BAGLEY AVE	60	761.3946	2	10400	11700	13000	C or Better	0.058569
144979	SUNRISE RD	50	2138.653	2	14400	16200	18000	C or Better	0.118814
2779128	ENCELIA AVE	50	3701.556	2	14400	16200	18000	C or Better	0.205642
2779123	RAYMOND WAY	60	764.0702	2	10400	11700	13000	C or Better	0.058775
2775032	DESERT KNOLL AVE	60	360.2083	2	10400	11700	13000	C or Better	0.027708
2775057	SPLIT ROCK AVE	60	1335.892	2	10400	11700	13000	C or Better	0.102761
2779139	LARREA AVE	50	6216.807	2	14400	16200	18000	C or Better	0.345378
2779141	La Buena Tierra Ave	60	231.0659	2	10400	11700	13000	C or Better	0.017774
2779144	Alpine Ave	60	2726.179	2	10400	11700	13000	C or Better	0.209706
122895	TIMOTHY AVE	60	1607.355	2	10400	11700	13000	C or Better	0.123643
2779120	Canyon Dr	60	0	2	10400	11700	13000	C or Better	0
2779121	Canyon Dr	60	0	2	10400	11700	13000	C or Better	0
122696	LARREA AVE	50	5985.741	2	14400	16200	18000	C or Better	0.332541
133044	NICHOLSON DR	50	361.1485	2	14400	16200	18000	C or Better	0.020064
2774980	HATCH RD	50	3382.638	2	14400	16200	18000	C or Better	0.187924
122685	HATCH RD	50	4168.308	2	14400	16200	18000	C or Better	0.231573
122698	LARREA AVE	50	5522.292	2	14400	16200	18000	C or Better	0.306794
122916	LUPINE AVE	60	3221.665	2	10400	11700	13000	C or Better	0.24782
122930	MARIPOSA AVE	60	2434.547	2	10400	11700	13000	C or Better	0.187273
2676538	MARIPOSA AVE	60	1844.491	2	10400	11700	13000	C or Better	0.141884
2774969	MORONGO RD	60	481.7942	2	10400	11700	13000	C or Better	0.037061
2774975	LUPINE AVE	60	3221.665	2	10400	11700	13000	C or Better	0.24782
2676539	MORONGO RD	60	590.0565	2	10400	11700	13000	C or Better	0.045389
2676537	JOSHUA DR	60	590.0565	2	10400	11700	13000	C or Better	0.045389
144987	LARREA AVE	50	5883.44	2	14400	16200	18000	C or Better	0.326858
122716	MESQUITE SPRINGS RD	50	1394.736	2	14400	16200	18000	C or Better	0.077485
2774971	NICHOLSON DR	50	713.0749	2	14400	16200	18000	C or Better	0.039615
122706	HATCH RD	50	4528.188	2	14400	16200	18000	C or Better	0.251566
2779134	MESQUITE SPRINGS RD	50	0	2	14400	16200	18000	C or Better	0
122717	MESQUITE SPRINGS RD	50	1672.659	2	14400	16200	18000	C or Better	0.092925
122722	EL PASEO DR	60	1289.945	2	10400	11700	13000	C or Better	0.099227
2775287	MESQUITE SPRINGS RD	50	1193.244	2	14400	16200	18000	C or Better	0.066291
144986	MESQUITE SPRINGS RD	50	1176.077	2	14400	16200	18000	C or Better	0.065338
2757995	TWO MILE RD	50	6016.914	2	14400	16200	18000	C or Better	0.334273
2757996	SAMARKAND DR	60	151.5424	2	10400	11700	13000	C or Better	0.011657
2774939	VALLE VISTA RD	60	528.0212	2	10400	11700	13000	C or Better	0.040617
2774942	INDIAN TRL	60	1044.556	2	10400	11700	13000	C or Better	0.08035
2774999	MESQUITE SPRINGS RD	50	1074.316	2	14400	16200	18000	C or Better	0.059684
2774945	TWO MILE RD	50	4774.88	2	14400	16200	18000	C or Better	0.265271
122898	TWO MILE RD	50	4488.226	2	14400	16200	18000	C or Better	0.249346
100779	ENCELIA AVE	60	784.7163	2	10400	11700	13000	C or Better	0.060363
144980	TWO MILE RD	50	5681.792	2	14400	16200	18000	C or Better	0.315655
122903	TWO MILE RD	50	4686.731	2	14400	16200	18000	C or Better	0.260374
2774955	TWO MILE RD	50	5317.223	2	14400	16200	18000	C or Better	0.295401
122915	TWO MILE RD	50	6016.914	2	14400	16200	18000	C or Better	0.334273
2774957	ENCELIA AVE	60	151.5424	2	10400	11700	13000	C or Better	0.011657
2658594	SAMARKAND DR	60	151.5424	2	10400	11700	13000	C or Better	0.011657
100750	MESQUITE SPRINGS RD	50	1241.451	2	14400	16200	18000	C or Better	0.06897
2774963	TWO MILE RD	50	3832.459	2	14400	16200	18000	C or Better	0.212914
122688	MORONGO RD	60	5143.447	2	10400	11700	13000	C or Better	0.39565
122703	TWO MILE RD	50	3938.725	2	14400	16200	18000	C or Better	0.218818
122920	LUPINE AVE	60	1077.569	2	10400	11700	13000	C or Better	0.08289
2779126	MORONGO RD	60	0	2	10400	11700	13000	C or Better	0
2779125	MARIPOSA AVE	60	0	2	10400	11700	13000	C or Better	0
2779129	LUPINE AVE	60	916.6539	2	10400	11700	13000	C or Better	0.070512
2774967	TWO MILE RD	50	6595.356	2	14400	16200	18000	C or Better	0.366409
2758003	MORONGO RD	60	0	2	10400	11700	13000	C or Better	0
2774953	TWO MILE RD	50	5744.602	2	14400	16200	18000	C or Better	0.319145

Link ID	Road name	AB_Facility	Tot Flow	Lanes	LOS C Thre	LOS D Thre	LOS E Thre	LOS	V/C
122923	TWO MILE RD	50	6020.069	2	14400	16200	18000	C or Better	0.334448
122687	TWO MILE RD	50	5744.602	2	14400	16200	18000	C or Better	0.319145
2774951	MORONGO RD	60	4895.737	2	10400	11700	13000	C or Better	0.376595
122921	SAMARKAND DR	60	1229.111	2	10400	11700	13000	C or Better	0.094547
2757998	SAMARKAND DR	60	1229.111	2	10400	11700	13000	C or Better	0.094547
2758000	TWO MILE RD	50	3335.685	2	14400	16200	18000	C or Better	0.185316
2758002	Alpine Ave	60	603.0407	2	10400	11700	13000	C or Better	0.046388
2779147	Alpine Ave	60	1466.149	2	10400	11700	13000	C or Better	0.112781
2779146	Alpine Ave	60	490.2842	2	10400	11700	13000	C or Better	0.037714
2774959	LARREA AVE	50	6262.302	2	14400	16200	18000	C or Better	0.347906
2779138	TWO MILE RD	50	3046.402	2	14400	16200	18000	C or Better	0.169245
2779142	La Buena Tierra Ave	60	786.0568	2	10400	11700	13000	C or Better	0.060466
2775285	LARREA AVE	50	6216.807	2	14400	16200	18000	C or Better	0.345378
2758004	MESQUITE SPRINGS RD	50	562.2867	2	14400	16200	18000	C or Better	0.031238
100749	MESQUITE SPRINGS RD	50	1241.451	2	14400	16200	18000	C or Better	0.06897
122707	MESQUITE SPRINGS RD	50	45.88012	2	14400	16200	18000	C or Better	0.002549
122709	INDIAN TRL	60	987.5309	2	10400	11700	13000	C or Better	0.075964
122713	VALLE VISTA RD	60	838.8691	2	10400	11700	13000	C or Better	0.064528
122925	MORONGO RD	60	4680.162	2	10400	11700	13000	C or Better	0.360012
122926	MORONGO RD	60	4974.12	2	10400	11700	13000	C or Better	0.382625
2774997	INDIAN TRL	60	1006.449	2	10400	11700	13000	C or Better	0.077419
2774986	VALLE VISTA RD	60	1011.917	2	10400	11700	13000	C or Better	0.07784
122787	BASELINE RD	50	4536.57	2	14400	16200	18000	C or Better	0.252032
2775084	UTAH TRL	60	1378.481	2	10400	11700	13000	C or Better	0.106037
122744	ADOBE RD	50	3773.933	2	14400	16200	18000	C or Better	0.209663
122772	NATIONAL PARK DR	60	4108.232	2	10400	11700	13000	C or Better	0.316018
122782	UTAH TRL	50	1865.659	2	14400	16200	18000	C or Better	0.103648
152763	CASITA DR	60	58.67203	2	10400	11700	13000	C or Better	0.004513
152764	BUENA VISTA DR	60	232.2959	2	10400	11700	13000	C or Better	0.017869
2775040	ADOBE RD	50	3453.855	2	14400	16200	18000	C or Better	0.191881
122749	ADOBE RD	50	5868.634	2	14400	16200	18000	C or Better	0.326035
144988	SPLIT ROCK AVE	60	3371.393	2	10400	11700	13000	C or Better	0.259338
2775044	SULLIVAN RD	60	4734.293	2	10400	11700	13000	C or Better	0.364176
122724	SPLIT ROCK AVE	60	2113.816	2	10400	11700	13000	C or Better	0.162601
144985	BAGLEY AVE	60	4257.381	2	10400	11700	13000	C or Better	0.327491
2775055	EL PASEO DR	60	1260.886	2	10400	11700	13000	C or Better	0.096991
2775051	BAGLEY AVE	60	2019.159	2	10400	11700	13000	C or Better	0.15532
122743	ADOBE RD	50	1409.524	2	14400	16200	18000	C or Better	0.078307
2734190	ADOBE RD	50	1409.524	2	14400	16200	18000	C or Better	0.078307
2775023	CASITA DR	60	290.9679	2	10400	11700	13000	C or Better	0.022382
122752	CASITA DR	60	1513.806	2	10400	11700	13000	C or Better	0.116447
2775047	UTAH TRL	50	1561.367	2	14400	16200	18000	C or Better	0.086743
122786	UTAH TRL	50	1378.481	2	14400	16200	18000	C or Better	0.076582
122765	DESERT KNOLL AVE	60	440.3991	2	10400	11700	13000	C or Better	0.033877
122774	UTAH TRL	50	2070.982	2	14400	16200	18000	C or Better	0.115055
2775038	NATIONAL PARK DR	60	2056.851	2	10400	11700	13000	C or Better	0.158219
152762	DESERT KNOLL AVE	60	614.9409	2	10400	11700	13000	C or Better	0.047303
122758	DESERT KNOLL AVE	60	847.2368	2	10400	11700	13000	C or Better	0.065172
122778	UTAH TRL	50	1491.11	2	14400	16200	18000	C or Better	0.082839
122781	UTAH TRL	50	3192.598	2	14400	16200	18000	C or Better	0.177367
122794	TWENTYNINE PALMS HIGHWAY	50	4436.369	2	14400	16200	18000	C or Better	0.246465
122795	WILSHIRE AVE	50	5213.779	2	14400	16200	18000	C or Better	0.289654
2775078	BASELINE RD	50	3749.007	2	14400	16200	18000	C or Better	0.208278
122793	WILSHIRE AVE	50	5104.731	2	14400	16200	18000	C or Better	0.283596
2775082	BASELINE RD	50	0	2	14400	16200	18000	C or Better	0
122769	AMBOY RD	60	2512.846	2	10400	11700	13000	C or Better	0.193296
122770	UTAH TRL	50	1185.225	2	14400	16200	18000	C or Better	0.065846
144990	BAGDAD HIGHWAY	60	920.1777	2	10400	11700	13000	C or Better	0.070783

Link ID	Road name	AB_Facility	Tot Flow	Lanes	LOS C Thre	LOS D Thre	LOS E Thre	LOS	V/C
144991	BULLION MOUNTAIN RD	60	21.30896	2	10400	11700	13000	C or Better	0.001639
144992	VALLE VISTA RD	60	1153.055	2	10400	11700	13000	C or Better	0.088697
2775011	ADOBE RD	50	4341.395	2	14400	16200	18000	C or Better	0.241189
122741	AMBOY RD	60	167.1927	2	10400	11700	13000	C or Better	0.012861
2775001	ADOBE RD	50	5605.307	2	14400	16200	18000	C or Better	0.311406
2775016	UTAH TRL	50	3181.302	2	14400	16200	18000	C or Better	0.176739
122747	TWO MILE RD	50	3322.92	2	14400	16200	18000	C or Better	0.184607
2775021	ADOBE RD	50	6992.573	2	14400	16200	18000	C or Better	0.388476
2758006	TWO MILE RD	50	3322.92	2	14400	16200	18000	C or Better	0.184607
122738	ADOBE RD	50	5540.217	2	14400	16200	18000	C or Better	0.30779
122768	UTAH TRL	50	3963.797	2	14400	16200	18000	C or Better	0.220211
2775027	TWO MILE RD	50	3238.274	2	14400	16200	18000	C or Better	0.179904
122757	DESERT KNOLL AVE	60	594.973	2	10400	11700	13000	C or Better	0.045767
122764	TWO MILE RD	50	3739.555	2	14400	16200	18000	C or Better	0.207753
2775019	DESERT KNOLL AVE	60	1025.067	2	10400	11700	13000	C or Better	0.078851
122775	UTAH TRL	50	2140.088	2	14400	16200	18000	C or Better	0.118894
2775007	VALLE VISTA RD	60	486.5689	2	10400	11700	13000	C or Better	0.037428
2775009	UTAH TRL	50	785.3479	2	14400	16200	18000	C or Better	0.04363
2774994	INDIAN TRL	60	410.202	2	10400	11700	13000	C or Better	0.031554
124139	ADOBE RD	60	2773.431	2	10400	11700	13000	C or Better	0.213341
2774992	VALLE VISTA RD	60	996.7362	2	10400	11700	13000	C or Better	0.076672
122728	VALLE VISTA RD	60	499.7282	2	10400	11700	13000	C or Better	0.038441
2775005	VALLE VISTA RD	60	1903.571	2	10400	11700	13000	C or Better	0.146429
122763	VALLE VISTA RD	60	1521.822	2	10400	11700	13000	C or Better	0.117063
124138	DEL VALLE DR	60	1784.45	2	10400	11700	13000	C or Better	0.137265
133048	AMBOY RD	60	1698.38	2	10400	11700	13000	C or Better	0.130645
2775090	AMBOY RD	60	1328.387	2	10400	11700	13000	C or Better	0.102184
144993	VALLE VISTA RD	60	721.3703	2	10400	11700	13000	C or Better	0.05549
2775088	BULLION MOUNTAIN RD	60	21.30896	2	10400	11700	13000	C or Better	0.001639
2775086	VALLE VISTA RD	60	440.4874	2	10400	11700	13000	C or Better	0.033884
2775064	AMBOY RD	60	787.0364	2	10400	11700	13000	C or Better	0.060541
2775066	TWENTYNINE PALMS HIGHWAY	50	2989.433	2	14400	16200	18000	C or Better	0.16608
2702148	TWENTYNINE PALMS HIGHWAY	50	3894.199	2	14400	16200	18000	C or Better	0.216344
2702146	TWENTYNINE PALMS HIGHWAY	50	3894.199	2	14400	16200	18000	C or Better	0.216344
122808	AMBOY RD	60	1350.038	2	10400	11700	13000	C or Better	0.103849
2775094	VALLE VISTA RD	60	152.8681	2	10400	11700	13000	C or Better	0.011759
133063	TWENTYNINE PALMS HIGHWAY	50	1222.521	2	14400	16200	18000	C or Better	0.067918
122810	AMBOY RD	60	2370.934	2	10400	11700	13000	C or Better	0.18238
134048	AMBOY RD	60	1733.592	2	10400	11700	13000	C or Better	0.133353
2775060	TWENTYNINE PALMS HIGHWAY	50	316.2797	2	14400	16200	18000	C or Better	0.017571
122813	AMBOY RD	60	2049.036	2	10400	11700	13000	C or Better	0.157618
2775099	AMBOY RD	60	1600.67	2	10400	11700	13000	C or Better	0.123128
152774	PAXTON RD	50	2133.777	2	14400	16200	18000	C or Better	0.118543
2701740	SUNNYSLOPE DR	50	3268.15	2	14400	16200	18000	C or Better	0.181564
2774809	JOSHUA LN	50	1412.813	2	14400	16200	18000	C or Better	0.07849
2774837	PUEBLO TRL	60	571.037	2	10400	11700	13000	C or Better	0.043926
2774846	ABERDEEN DR	60	1398.821	2	10400	11700	13000	C or Better	0.107602
2778959	ONAGA TRL	50	2616.855	2	14400	16200	18000	C or Better	0.145381
2778980	BUENA VISTA DR	60	6578.462	2	10400	11700	13000	C or Better	0.506036
2779061		74	402.8912	2	1200	1500	2000	C or Better	0.201446
2779072	SAN ANDREAS	50	1378.299	2	14400	16200	18000	C or Better	0.076572
2733575	PIONEER DR	60	2058.951	2	10400	11700	13000	C or Better	0.158381
2779104	JUNIPER AVE	60	124.3199	2	10400	11700	13000	C or Better	0.009563
2779106	PARADISE AVE	60	4141.646	2	10400	11700	13000	C or Better	0.318588
2779109	JUNIPER AVE	60	1240.167	2	10400	11700	13000	C or Better	0.095397
144942	PIONEER DR	60	5397.192	2	10400	11700	13000	C or Better	0.415169
2733576	JUNIPER AVE	60	4631.366	2	10400	11700	13000	C or Better	0.356259
2733581	JUNIPER AVE	60	4631.366	2	10400	11700	13000	C or Better	0.356259

Link ID	Road name	AB_Facility	Tot Flow	Lanes	LOS C Thre	LOS D Thre	LOS E Thre	LOS	V/C
2779105	JUNIPER AVE	60	4265.966	2	10400	11700	13000	C or Better	0.328151
2733579	SENILIS AVE	60	1839.266	2	10400	11700	13000	C or Better	0.141482
2733582	PIONEER DR	60	4246.801	2	10400	11700	13000	C or Better	0.326677
2733573	PIONEER DR	60	6777.07	2	10400	11700	13000	C or Better	0.521313
2733574	HESS BLVD	60	4718.119	2	10400	11700	13000	C or Better	0.362932
2733578	SENILIS AVE	60	1839.266	2	10400	11700	13000	C or Better	0.141482
2733580	HESS BLVD	60	4718.119	2	10400	11700	13000	C or Better	0.362932
2774671	PIONEER DR	60	4246.801	2	10400	11700	13000	C or Better	0.326677
2779108	WEST DR	60	4246.801	2	10400	11700	13000	C or Better	0.326677
123040	PIPES CANYON RD	60	786.8547	2	10400	11700	13000	C or Better	0.060527
123069	PIONEERTOWN RD	60	633.7418	2	10400	11700	13000	C or Better	0.048749
144930	PIPES CANYON RD	74	903.3798	2	1200	1500	2000	C or Better	0.45169
144946	ONAGA TRL	50	3793.338	2	14400	16200	18000	C or Better	0.210741
2774658	PIONEERTOWN RD	60	1714.983	2	10400	11700	13000	C or Better	0.131922
2774660	PIPES CANYON RD	60	989.2376	2	10400	11700	13000	C or Better	0.076095
2778923	KICKAPOO TRL	50	4125.592	2	14400	16200	18000	C or Better	0.2292
2779024		74	596.2086	2	1200	1500	2000	C or Better	0.298104
2779025	SANTA FE TRL	60	1073.557	2	10400	11700	13000	C or Better	0.082581
2779089		50	1059.024	2	14400	16200	18000	C or Better	0.058835
2779099	PIONEERTOWN RD	60	2240.598	2	10400	11700	13000	C or Better	0.172354
123052	PINON DR	50	776.9395	2	14400	16200	18000	C or Better	0.043163
133012	FAIRWAY DR	60	1304.854	2	10400	11700	13000	C or Better	0.100373
2779021	KICKAPOO TRL	50	2654.083	2	14400	16200	18000	C or Better	0.147449
2779091		50	1542.908	2	14400	16200	18000	C or Better	0.085717
2779023		50	776.9395	2	14400	16200	18000	C or Better	0.043163
2779090		50	2081.031	2	14400	16200	18000	C or Better	0.115613
2658587	PINON DR	60	1603.219	2	10400	11700	13000	C or Better	0.123325
2774727	FAIRWAY DR	60	900.4269	2	10400	11700	13000	C or Better	0.069264
2777141	PIONEERTOWN RD	60	1714.983	2	10400	11700	13000	C or Better	0.131922
2661563	CAMINO DEL CIELO TRL	60	2640.811	2	10400	11700	13000	C or Better	0.203139
123051	CAMINO DEL CIELO TRL	60	3596.65	2	10400	11700	13000	C or Better	0.276665
2774725	MARTINEZ TRL	60	1102.981	2	10400	11700	13000	C or Better	0.084845
123054	PINON DR	60	1790.467	2	10400	11700	13000	C or Better	0.137728
2778912	PINON DR	60	1790.467	2	10400	11700	13000	C or Better	0.137728
2774732	CAMINO DEL CIELO TRL	60	1315.638	2	10400	11700	13000	C or Better	0.101203
2779028	KICKAPOO TRL	50	6357.343	2	14400	16200	18000	C or Better	0.353186
2779020	KICKAPOO TRL	50	6517.391	2	14400	16200	18000	C or Better	0.362077
2733735	KICKAPOO TRL	50	4125.592	2	14400	16200	18000	C or Better	0.2292
2774687	ONAGA TRL	50	3955.895	2	14400	16200	18000	C or Better	0.219772
2774692	GOLDEN BEE DR	60	345.7695	2	10400	11700	13000	C or Better	0.026598
2776966	SAGE AVE	60	6829.267	2	10400	11700	13000	C or Better	0.525328
2778900	SAGE AVE	60	1574.667	2	10400	11700	13000	C or Better	0.121128
2778901	AMADOR AVE	60	2814.58	2	10400	11700	13000	C or Better	0.216506
2779016	JOSHUA LN	50	4733.354	2	14400	16200	18000	C or Better	0.262964
2779018	JOSHUA LN	50	4271.316	2	14400	16200	18000	C or Better	0.237295
2779043	ACOMA TRL	50	3915.137	2	14400	16200	18000	C or Better	0.217508
2779086	SAGE AVE	60	491.3973	2	10400	11700	13000	C or Better	0.0378
2778921	AMADOR AVE	60	892.7026	2	10400	11700	13000	C or Better	0.068669
2779014		74	117.8078	2	1200	1500	2000	C or Better	0.058904
2779094		74	17.05638	2	1200	1500	2000	C or Better	0.008528
2779096		74	616.4931	2	1200	1500	2000	C or Better	0.308247
2779093		74	12.51639	2	1200	1500	2000	C or Better	0.006258
123000	AMADOR AVE	60	892.7026	2	10400	11700	13000	C or Better	0.068669
2778948	SAGE AVE	60	339.9894	2	10400	11700	13000	C or Better	0.026153
122998	SAGE AVE	60	339.9894	2	10400	11700	13000	C or Better	0.026153
2778920	SAGE AVE	60	339.9894	2	10400	11700	13000	C or Better	0.026153
2774694	AMADOR AVE	60	892.7026	2	10400	11700	13000	C or Better	0.068669
2778902	AMADOR AVE	60	3194.053	2	10400	11700	13000	C or Better	0.245696

Link ID	Road name	AB_Facility	Tot Flow	Lanes	LOS C Thre	LOS D Thre	LOS E Thre	LOS	V/C
2779078	JOSHUA LN	50	3227.068	2	14400	16200	18000	C or Better	0.179282
2779088	GOLDEN BEE DR	60	49.61882	2	10400	11700	13000	C or Better	0.003817
2779092	ACOMA TRL	50	1905.859	2	14400	16200	18000	C or Better	0.105881
2779013	ACOMA TRL	50	233.725	2	14400	16200	18000	C or Better	0.012985
2779087		50	202.6393	2	14400	16200	18000	C or Better	0.011258
2778993		50	49.61882	2	14400	16200	18000	C or Better	0.002757
2779017	ACOMA TRL	50	3369.891	2	14400	16200	18000	C or Better	0.187216
122997	GOLDEN BEE DR	60	785.5104	2	10400	11700	13000	C or Better	0.060424
122999	AMADOR AVE	60	2114.089	2	10400	11700	13000	C or Better	0.162622
2779012	GOLDEN BEE DR	60	345.7695	2	10400	11700	13000	C or Better	0.026598
2779085	AMADOR AVE	60	1270.315	2	10400	11700	13000	C or Better	0.097717
2778951	AMADOR AVE	60	2406.119	2	10400	11700	13000	C or Better	0.185086
2774699	AMADOR AVE	60	2242.084	2	10400	11700	13000	C or Better	0.172468
2779019	JOSHUA LN	50	2536.568	2	14400	16200	18000	C or Better	0.14092
2733741	SUNNYSLOPE DR	60	2184.304	2	10400	11700	13000	C or Better	0.168023
2774706	PUEBLO TRL	60	4937.035	2	10400	11700	13000	C or Better	0.379772
2774720	ONAGA TRL	50	4513.674	2	14400	16200	18000	C or Better	0.25076
2774760	PALM AVE	60	499.6037	2	10400	11700	13000	C or Better	0.038431
2778910	SUNNYSLOPE DR	60	2549.897	2	10400	11700	13000	C or Better	0.196146
2778915	PIONEERTOWN RD	60	2972.506	2	10400	11700	13000	C or Better	0.228654
2779034	ACOMA TRL	50	3632.879	2	14400	16200	18000	C or Better	0.201827
123023	ONAGA TRL	50	3688.66	2	14400	16200	18000	C or Better	0.204926
123025	PUEBLO TRL	60	3579.307	2	10400	11700	13000	C or Better	0.275331
2774737	YUCCA TRL	50	4234.195	2	14400	16200	18000	C or Better	0.235233
2779027	SANTA FE TRL	60	1554.858	2	10400	11700	13000	C or Better	0.119604
2779032	PIONEERTOWN RD	50	2223.751	2	14400	16200	18000	C or Better	0.123542
123022	HOPPI TRL	50	201.0789	2	14400	16200	18000	C or Better	0.011171
123024	ONAGA TRL	50	3708.346	2	14400	16200	18000	C or Better	0.206019
144944	INCA TRL	50	952.3165	2	14400	16200	18000	C or Better	0.052906
2779030	SANTA FE TRL	60	4933.086	2	10400	11700	13000	C or Better	0.379468
2777111	ONAGA TRL	50	4545.619	2	14400	16200	18000	C or Better	0.252534
2779029	INCA TRL	50	3627.436	2	14400	16200	18000	C or Better	0.201524
2778917	ONAGA TRL	50	3889.739	2	14400	16200	18000	C or Better	0.216097
2779026	SANTA FE TRL	60	3450.517	2	10400	11700	13000	C or Better	0.265424
2661558	YUCCA TRL	50	4125.592	2	14400	16200	18000	C or Better	0.2292
2778924	YUCCA TRL	50	4234.195	2	14400	16200	18000	C or Better	0.235233
123031	DEER TRL	50	1445.447	2	14400	16200	18000	C or Better	0.080303
123032	ONAGA TRL	50	4315.625	2	14400	16200	18000	C or Better	0.239757
123034	PUEBLO TRL	60	4729.834	2	10400	11700	13000	C or Better	0.363833
133016	SANTA FE TRL	60	1710.518	2	10400	11700	13000	C or Better	0.131578
2774717	ONAGA TRL	50	3769.861	2	14400	16200	18000	C or Better	0.209437
123033	DEER TRL	50	1860.495	2	14400	16200	18000	C or Better	0.103361
2774710	SANTA FE TRL	60	1554.554	2	10400	11700	13000	C or Better	0.119581
2774712	PUEBLO TRL	60	4079.295	2	10400	11700	13000	C or Better	0.313792
123029	DEER TRL	50	2383.944	2	14400	16200	18000	C or Better	0.132441
2774703	SANTA FE TRL	60	1820.535	2	10400	11700	13000	C or Better	0.140041
2778932	PIONEERTOWN RD	50	4915.851	2	14400	16200	18000	C or Better	0.273103
2779031	YUCCA TRL	50	3887.063	2	14400	16200	18000	C or Better	0.215948
2778933	YUCCA TRL	50	4822.566	2	14400	16200	18000	C or Better	0.26792
2779033	PIONEERTOWN RD	50	6231.878	2	14400	16200	18000	C or Better	0.346215
2778930	PIONEERTOWN RD	50	5825.652	2	14400	16200	18000	C or Better	0.323647
2778931	PIONEERTOWN RD	50	4676.793	2	14400	16200	18000	C or Better	0.259822
2778911	PIONEERTOWN RD	50	4116.115	2	14400	16200	18000	C or Better	0.228673
2661560	ACOMA TRL	50	710.214	2	14400	16200	18000	C or Better	0.039456
2774697	ONAGA TRL	50	5472.086	2	14400	16200	18000	C or Better	0.304005
2778907	PIMA TR	60	2227.013	2	10400	11700	13000	C or Better	0.171309
2778939	PAPAGO TR	50	3137.809	2	14400	16200	18000	C or Better	0.174323
2779037	CHURCH ST	50	1850.308	2	14400	16200	18000	C or Better	0.102795

Link ID	Road name	AB_Facility	Tot Flow	Lanes	LOS C Thre	LOS D Thre	LOS E Thre	LOS	V/C
2779041	PALM AVE	60	2782.973	2	10400	11700	13000	C or Better	0.214075
2774684	ACOMA TRL	50	4572.813	2	14400	16200	18000	C or Better	0.254045
2778944	ONAGA TRL	50	4848.243	2	14400	16200	18000	C or Better	0.269347
2779083	CHURCH ST	50	1058.772	2	14400	16200	18000	C or Better	0.058821
123002	ONAGA TRL	50	4786.74	2	14400	16200	18000	C or Better	0.26593
123035	ACOMA TRL	50	4572.813	2	14400	16200	18000	C or Better	0.254045
100818	ACOMA TRL	50	710.214	2	14400	16200	18000	C or Better	0.039456
152785	PAPAGO TR	50	3068.772	2	14400	16200	18000	C or Better	0.170487
152783	ACOMA TRL	50	3092.444	2	14400	16200	18000	C or Better	0.171802
2733737	ACOMA TRL	50	710.214	2	14400	16200	18000	C or Better	0.039456
2779082	PAPAGO TR	50	3137.809	2	14400	16200	18000	C or Better	0.174323
2779038	ONAGA TRL	50	5472.086	2	14400	16200	18000	C or Better	0.304005
152788	PIMA TR	60	366.0661	2	10400	11700	13000	C or Better	0.028159
2779040	CHURCH ST	50	1484.242	2	14400	16200	18000	C or Better	0.082458
2779098	ACOMA TRL	50	3849.495	2	14400	16200	18000	C or Better	0.213861
2779097	ACOMA TRL	50	4478.989	2	14400	16200	18000	C or Better	0.248833
2779039	CHURCH ST	50	4693.077	2	14400	16200	18000	C or Better	0.260727
2779042	ONAGA TRL	50	5901.207	2	14400	16200	18000	C or Better	0.327845
2779084	PALM AVE	60	569.1719	2	10400	11700	13000	C or Better	0.043782
2676944	PALM AVE	60	1373.449	2	10400	11700	13000	C or Better	0.10565
122996	ONAGA TRL	50	3955.895	2	14400	16200	18000	C or Better	0.219772
2778936	PALM AVE	60	499.6037	2	10400	11700	13000	C or Better	0.038431
123005	PALM AVE	60	2148.815	2	10400	11700	13000	C or Better	0.165293
2774776	SUNNYSLOPE DR	60	5744.915	2	10400	11700	13000	C or Better	0.441917
2779081	SUNNYSLOPE DR	60	5744.915	2	10400	11700	13000	C or Better	0.441917
2661562	SUNNYSLOPE DR	60	5409.847	2	10400	11700	13000	C or Better	0.416142
133036	SAGE AVE	60	5817.922	2	10400	11700	13000	C or Better	0.447532
2778960	JOSHUA LN	50	5066.514	2	14400	16200	18000	C or Better	0.281473
2779009	WARREN VISTA	50	4740.782	2	14400	16200	18000	C or Better	0.263377
122981	JOSHUA LN	50	4961.514	2	14400	16200	18000	C or Better	0.27564
2778903	SAGE AVE	60	1189.587	2	10400	11700	13000	C or Better	0.091507
2778952	GOLDEN BEE DR	50	466.4849	2	14400	16200	18000	C or Better	0.025916
122986	GOLDEN BEE DR	50	570.6317	2	14400	16200	18000	C or Better	0.031702
133034	SAGE AVE	60	507.5974	2	10400	11700	13000	C or Better	0.039046
2778950	SAGE AVE	60	912.1759	2	10400	11700	13000	C or Better	0.070167
2774689	SAGE AVE	60	1278.304	2	10400	11700	13000	C or Better	0.098331
2779015	JOSHUA LN	50	5518.274	2	14400	16200	18000	C or Better	0.306571
2779079	JOSHUA LN	50	5526.419	2	14400	16200	18000	C or Better	0.307023
123058	JOSHUA LN	50	5184.379	2	14400	16200	18000	C or Better	0.288021
2779008	SAN ANDREAS	50	2003.505	2	14400	16200	18000	C or Better	0.111306
2779077	WARREN VISTA	50	2003.505	2	14400	16200	18000	C or Better	0.111306
2779011	JOSHUA LN	50	1412.813	2	14400	16200	18000	C or Better	0.07849
122966	PAXTON RD	50	4431.367	2	14400	16200	18000	C or Better	0.246187
2774830	PUEBLO TRL	62	639.5929	2	6800	14100	17400	C or Better	0.036758
2778899	ONAGA TRL	50	3155.978	2	14400	16200	18000	C or Better	0.175332
2778994	HILTON AVE	50	2936.49	2	14400	16200	18000	C or Better	0.163138
2778996	SUNNYSLOPE DR	50	5373.768	2	14400	16200	18000	C or Better	0.298543
2779080	SAGE AVE	60	3287.112	2	10400	11700	13000	C or Better	0.252855
122978	JOSHUA LN	50	6536.166	2	14400	16200	18000	C or Better	0.36312
122993	SAGE AVE	60	2926.47	2	10400	11700	13000	C or Better	0.225113
2774826	PUEBLO TRL	62	975.5158	2	6800	14100	17400	C or Better	0.056064
2778954	ONAGA TRL	50	3933.166	2	14400	16200	18000	C or Better	0.218509
122980	ONAGA TRL	50	4140.274	2	14400	16200	18000	C or Better	0.230015
2701716	PUEBLO TRL	62	810.6363	2	6800	14100	17400	C or Better	0.046588
2778947	SAGE AVE	60	3325.962	2	10400	11700	13000	C or Better	0.255843
122994	SAGE AVE	60	2810.883	2	10400	11700	13000	C or Better	0.216222
2779035	SAGE AVE	60	5439.376	2	10400	11700	13000	C or Better	0.418414
122972	JOSHUA LN	50	5700.527	2	14400	16200	18000	C or Better	0.316696

Link ID	Road name	AB_Facility	Tot Flow	Lanes	LOS C Thre	LOS D Thre	LOS E Thre	LOS	V/C
122979	ONAGA TRL	50	4148.418	2	14400	16200	18000	C or Better	0.230468
2701726	PUEBLO TRL	62	785.9898	2	6800	14100	17400	C or Better	0.045172
2779074	OUTER HIGHWAY	60	671.8274	2	10400	11700	13000	C or Better	0.051679
2779075	OUTER HIGHWAY	60	1907.47	2	10400	11700	13000	C or Better	0.146728
2779046	OUTER HIGHWAY	60	810.7674	2	10400	11700	13000	C or Better	0.062367
2779048	OUTER HIGHWAY	60	0	2	10400	11700	13000	C or Better	0
122989	WARREN VISTA AVE	60	526.3294	2	10400	11700	13000	C or Better	0.040487
123009	FRONTERA AVE	60	403.8888	2	10400	11700	13000	C or Better	0.031068
2774833	PUEBLO TRL	60	441.7686	2	10400	11700	13000	C or Better	0.033982
2778957	ONAGA TRL	50	2759.112	2	14400	16200	18000	C or Better	0.153284
122982	WARREN VISTA AVE	60	282.8121	2	10400	11700	13000	C or Better	0.021755
122984	PUEBLO TRL	60	457.3087	2	10400	11700	13000	C or Better	0.035178
122985	ONAGA TRL	50	2873.27	2	14400	16200	18000	C or Better	0.159626
2779044	WARREN VISTA AVE	60	830.411	2	10400	11700	13000	C or Better	0.063878
123007	FRONTERA AVE	60	6.70354	2	10400	11700	13000	C or Better	0.000516
123008	ONAGA TRL	50	2752.408	2	14400	16200	18000	C or Better	0.152912
123010	PUEBLO TRL	60	630.9025	2	10400	11700	13000	C or Better	0.048531
2778997	BALSA AVENUE	50	2135.604	2	14400	16200	18000	C or Better	0.118645
2778998	SUNNYSLOPE DR	50	3268.15	2	14400	16200	18000	C or Better	0.181564
2778975	PAXTON RD	50	4279.901	2	14400	16200	18000	C or Better	0.237772
2774745	PAXTON RD	50	4431.367	2	14400	16200	18000	C or Better	0.246187
2778966	BALSA AVE	50	2146.124	2	14400	16200	18000	C or Better	0.119229
152776	BALSA AVE	50	5344.279	2	14400	16200	18000	C or Better	0.296904
152778	SUNNYSLOPE DR	50	5966.455	2	14400	16200	18000	C or Better	0.33147
2774743	BALSA AVE	50	2146.124	2	14400	16200	18000	C or Better	0.119229
133025	ABERDEEN DR	60	1661.311	2	10400	11700	13000	C or Better	0.127793
2779065		74	1075.749	2	1200	1500	2000	C or Better	0.537875
2779102	BUENA VISTA DR	60	1816.863	2	10400	11700	13000	C or Better	0.139759
2778983		74	717.43	2	1200	1500	2000	C or Better	0.358715
2779101	BUENA VISTA DR	60	336.8515	2	10400	11700	13000	C or Better	0.025912
2774770	PIPES CANYON RD	60	1167.056	2	10400	11700	13000	C or Better	0.089774
2779064		74	507.8642	2	1200	1500	2000	C or Better	0.253932
2779063		74	212.0687	2	1200	1500	2000	C or Better	0.106034
2774749	BUENA VISTA DR	60	6867.234	2	10400	11700	13000	C or Better	0.528249
2778979		74	1095.372	2	1200	1500	2000	C or Better	0.547686
133076	NATIONAL PARK BLVD	60	144.9441	2	10400	11700	13000	C or Better	0.01115
1658228	LOOP RD	60	144.9441	2	10400	11700	13000	C or Better	0.01115
2774908	LOOP RD	60	64.28397	2	10400	11700	13000	C or Better	0.004945
123068	AVALON AVE	60	6249.686	2	10400	11700	13000	C or Better	0.480745
2774859	ABERDEEN DR	60	1871.812	2	10400	11700	13000	C or Better	0.143986
123071	ALTA LOMA DR	60	2889.68	2	10400	11700	13000	C or Better	0.222283
2774873	SUNSET RD	60	0	2	10400	11700	13000	C or Better	0
2777107	ABERDEEN DR	60	5846.444	2	10400	11700	13000	C or Better	0.449726
2777108	SUNBURST AVE	60	5653.147	2	10400	11700	13000	C or Better	0.434857
2779055		74	387.918	2	1200	1500	2000	C or Better	0.193959
2779060		74	1144.201	2	1200	1500	2000	C or Better	0.572101
2774905	ALTA LOMA RD	60	4181.556	2	10400	11700	13000	C or Better	0.321658
2779068		74	946.9269	2	1200	1500	2000	C or Better	0.473463
2779117	SUNNY VISTA RD	60	2332.031	2	10400	11700	13000	C or Better	0.179387
123057	PALOMAR AVE	50	2645.359	2	14400	16200	18000	C or Better	0.146964
2778991		50	60.55158	2	14400	16200	18000	C or Better	0.003364
2774804	JOSHUA LN	50	1497.893	2	14400	16200	18000	C or Better	0.083216
2779010	JOSHUA LN	50	2642.947	2	14400	16200	18000	C or Better	0.14683
2779070		50	1567.971	2	14400	16200	18000	C or Better	0.087109
2779071	PALOMAR AVE	50	5576.153	2	14400	16200	18000	C or Better	0.309786
2774802	PALOMAR AVE	50	3770.711	2	14400	16200	18000	C or Better	0.209484
2778992	PALOMAR AVE	50	3770.711	2	14400	16200	18000	C or Better	0.209484
123042	PALOMAR AVE	50	5576.153	2	14400	16200	18000	C or Better	0.309786

Link ID	Road name	AB_Facility	Tot Flow	Lanes	LOS C Thre	LOS D Thre	LOS E Thre	LOS	V/C
2779069		74	60.55158	2	1200	1500	2000	C or Better	0.030276
	123065 AVALON AVE	50	5925.352	2	14400	16200	18000	C or Better	0.329186
2778985		50	1172.924	2	14400	16200	18000	C or Better	0.065162
2779000	BARRON RD	60	3391.503	2	10400	11700	13000	C or Better	0.260885
2779066	LA CONTENTA AVENUE	60	4361.19	2	10400	11700	13000	C or Better	0.335476
2778987		50	921.8401	2	14400	16200	18000	C or Better	0.051213
	152779 AVALON AVE	50	3650.9	2	14400	16200	18000	C or Better	0.202828
2774818	SUNNYSLOPE DR	50	3307.348	2	14400	16200	18000	C or Better	0.183742
2774820	AVALON AVE	50	3650.9	2	14400	16200	18000	C or Better	0.202828
2779073		50	4206.255	2	14400	16200	18000	C or Better	0.233681
2778986		50	2094.764	2	14400	16200	18000	C or Better	0.116376
	144949 CAMARILLA AVE	60	1008.698	2	10400	11700	13000	C or Better	0.077592
	144951 TWENTYNINE PALMS OUTERHIGHWAY N	50	1976.541	2	14400	16200	18000	C or Better	0.109808
	144953 AVALON AVE	50	3395.023	2	14400	16200	18000	C or Better	0.188612
2779002	INDIO AVENUE	60	3762.857	2	10400	11700	13000	C or Better	0.289451
2779057	BARRON RD	60	2798.062	2	10400	11700	13000	C or Better	0.215236
2774741	PAXTON RD	50	2516.005	2	14400	16200	18000	C or Better	0.139778
2774822	AVALON AVE	50	3760.52	2	14400	16200	18000	C or Better	0.208918
	123062 AVALON AVE	50	3565.863	2	14400	16200	18000	C or Better	0.198103
2774779	TWENTYNINE PALMS OUTERHIGHWAY N	50	2985.239	2	14400	16200	18000	C or Better	0.165847
	123063 AVALON AVE	50	5408.796	2	14400	16200	18000	C or Better	0.300489
	144952 TWENTYNINE PALMS OUTERHIGHWAY N	50	2919.08	2	14400	16200	18000	C or Better	0.162171
2779058	BARRON RD	60	1789.364	2	10400	11700	13000	C or Better	0.137643
2779004	TWENTYNINE PALMS OUTERHIGHWAY N	50	5739.398	2	14400	16200	18000	C or Better	0.318855
2779003	BARRON RD	60	1930.97	2	10400	11700	13000	C or Better	0.148536
2779056		74	928.2896	2	1200	1500	2000	C or Better	0.464145
2778990	ALTA LOMA RD	60	6882.521	2	10400	11700	13000	C or Better	0.529425
2779067	LA CONTENTA AVENUE	60	3473.395	2	10400	11700	13000	C or Better	0.267184
2779006	LA CONTENTA AVENUE	60	3199.374	2	10400	11700	13000	C or Better	0.246106
2779005	LA CONTENTA AVENUE	60	6547.451	2	10400	11700	13000	C or Better	0.503665
	133040 SUNNY VISTA RD	50	953.8617	2	14400	16200	18000	C or Better	0.052992
2779114	SUNNY VISTA RD	60	2625.761	2	10400	11700	13000	C or Better	0.201982
	100759 ABERDEEN DR	60	6495.527	2	10400	11700	13000	C or Better	0.499656
	100762 YUCCA MESA RD	60	4998.599	2	10400	11700	13000	C or Better	0.384508
	123061 AVALON AVE	60	1525.106	2	10400	11700	13000	C or Better	0.117316
2778981		74	89.25163	2	1200	1500	2000	C or Better	0.044626
2779054		74	109.3642	2	1200	1500	2000	C or Better	0.054682
2779062		74	388.1666	2	1200	1500	2000	C or Better	0.194083
2779053		74	121.1841	2	1200	1500	2000	C or Better	0.060592
	100760 BUENA VISTA DR	60	5877.57	2	10400	11700	13000	C or Better	0.452121
2775533	ABERDEEN DR	60	5716.112	2	10400	11700	13000	C or Better	0.439701
	123067 ABERDEEN DR	60	5716.112	2	10400	11700	13000	C or Better	0.439701
2775279	AVALON AVE	60	2142.206	2	10400	11700	13000	C or Better	0.164785
2774849	YUCCA MESA RD	60	4812.726	2	10400	11700	13000	C or Better	0.37021
2774854	ABERDEEN DR	60	6102.847	2	10400	11700	13000	C or Better	0.46945
	124351 SUNSET RD	60	1577.175	2	10400	11700	13000	C or Better	0.121321
	124355 QUAIL SPRINGS RD	60	1114.928	2	10400	11700	13000	C or Better	0.085764
	133075 QUAIL SPRINGS RD	60	1223.993	2	10400	11700	13000	C or Better	0.094153
	124357 QUAIL SPRINGS RD	60	1223.993	2	10400	11700	13000	C or Better	0.094153
2774892	QUAIL SPRINGS RD	60	1114.928	2	10400	11700	13000	C or Better	0.085764
	124345 PARK BLVD	60	370.5575	2	10400	11700	13000	C or Better	0.028504
	124352 SUNSET RD	60	170.9837	2	10400	11700	13000	C or Better	0.013153
	133039 SUNBURST CIR	60	1970.211	2	10400	11700	13000	C or Better	0.151555
2774902	QUAIL SPRINGS RD	60	1657.77	2	10400	11700	13000	C or Better	0.127521
	124350 SUNSET RD	60	1151.787	2	10400	11700	13000	C or Better	0.088599
	133042 PARK BLVD	60	2420.794	2	10400	11700	13000	C or Better	0.186215
	123075 ALTA LOMA DR	60	3315.068	2	10400	11700	13000	C or Better	0.255005
	124349 ALTA LOMA DR	60	4466.854	2	10400	11700	13000	C or Better	0.343604

Link ID	Road name	AB_Facility	Tot Flow	Lanes	LOS C Thre	LOS D Thre	LOS E Thre	LOS	V/C
2774898	SUNBURST CIR	60	83.73733	2	10400	11700	13000	C or Better	0.006441
124346	SUNBURST CIR	60	980.803	2	10400	11700	13000	C or Better	0.075446
124353	SUNSET RD	60	3384.484	2	10400	11700	13000	C or Better	0.260345
2774896	SUNSET RD	60	6043.713	2	10400	11700	13000	C or Better	0.464901
123080	SUNBURST AVE	60	6056.479	2	10400	11700	13000	C or Better	0.465883
2774894	QUAIL SPRINGS RD	60	144.9441	2	10400	11700	13000	C or Better	0.01115
100757	SUNBURST AVE	60	5394.02	2	10400	11700	13000	C or Better	0.414925
144965	ABERDEEN DR	60	2673.781	2	10400	11700	13000	C or Better	0.205675
2774876	SUNBURST AVE	60	4835.051	2	10400	11700	13000	C or Better	0.371927
144977	BORDER AVE	60	5749.866	2	10400	11700	13000	C or Better	0.442297
100755	SUNBURST AVE	60	5141.544	2	10400	11700	13000	C or Better	0.395503
100758	ABERDEEN DR	60	3618.239	2	10400	11700	13000	C or Better	0.278326
122937	BORDER AVE	60	1546.825	2	10400	11700	13000	C or Better	0.118987
2774867	GOLDEN ST	60	1061.862	2	10400	11700	13000	C or Better	0.081682
100756	GOLDEN ST	60	1343.995	2	10400	11700	13000	C or Better	0.103384
144918	PIPES RD	74	903.3798	2	1200	1500	2000	C or Better	0.45169
1658227	LOOP RD	60	64.28397	2	10400	11700	13000	C or Better	0.004945
136137	UTAH TRL	60	1504.77	2	10400	11700	13000	C or Better	0.115752
136139	PINTO BASIN RD	60	1535.588	2	10400	11700	13000	C or Better	0.118122
2775107	AMBOY RD	60	1723.486	2	10400	11700	13000	C or Better	0.132576
139996	STATE HIGHWAY 62	50	467.0196	2	14400	16200	18000	C or Better	0.025946
2774933	TWENTYNINE PALMS HIGHWAY	40	25593.93	4	28700	32300	35900	C or Better	0.712923
152768	TWENTYNINE PALMS HIGHWAY	40	25593.93	4	28700	32300	35900	C or Better	0.712923
2778896	29TH PALMS HIGHWAY	40	28188.81	4	28700	32300	35900	C or Better	0.785203
2778995	TWENTYNINE PALMS HIGHWAY	40	26986.75	4	28700	32300	35900	C or Better	0.751172
152772	TWENTYNINE PALMS HIGHWAY	40	26634.3	4	28700	32300	35900	C or Better	0.741903
2702138	TWENTYNINE PALMS HIGHWAY	40	26457.41	4	28700	32300	35900	C or Better	0.736975
2701742	29TH PALMS HIGHWAY	40	27443.73	4	28700	32300	35900	C or Better	0.764449
123064	TWENTYNINE PALMS HIGHWAY	40	26614.52	4	28700	32300	35900	C or Better	0.741352
122947	TWENTYNINE PALMS HIGHWAY	40	28394.78	4	28700	32300	35900	C or Better	0.790941
123079	TWENTYNINE PALMS HIGHWAY	40	26932.77	4	28700	32300	35900	C or Better	0.750217
124348	TWENTYNINE PALMS HIGHWAY	40	26666.47	4	28700	32300	35900	C or Better	0.742799
122943	TWENTYNINE PALMS HIGHWAY	40	28438.92	4	28700	32300	35900	C or Better	0.792171
122919	TWENTYNINE PALMS HIGHWAY	40	18089.83	4	28700	32300	35900	C or Better	0.503895
122693	TWENTYNINE PALMS HIGHWAY	40	18007.74	4	28700	32300	35900	C or Better	0.501608
100781	TWO MILE RD	50	4559.874	4	27300	30700	34100	C or Better	0.133721
122842	CASCADE RD	60	1390.751	4	20700	23300	25900	C or Better	0.053697
152770	WHITMOORE RD	50	4936.342	4	27300	30700	34100	C or Better	0.144761
152769	ROTARY WAY	60	4936.342	4	20700	23300	25900	C or Better	0.190592
2774883	CASCADE RD	60	1266.374	4	20700	23300	25900	C or Better	0.048895
2774931	WHITMOORE RD	50	4930.919	4	27300	30700	34100	C or Better	0.144602
152771	MANTONYA RD	50	1049.654	4	27300	30700	34100	C or Better	0.030782
122902	NOELS KNOLL RD	60	89.77364	4	20700	23300	25900	C or Better	0.003466
122931	MARIPOSA AVE	60	0	4	20700	23300	25900	C or Better	0
2775042	TWENTYNINE PALMS HIGHWAY	40	11493.61	4	28700	32300	35900	C or Better	0.320156
152767	ENCHELIA AVE	60	2284.922	4	20700	23300	25900	C or Better	0.088221
122701	TWENTYNINE PALMS HIGHWAY	40	10834.67	4	28700	32300	35900	C or Better	0.301801
146793	WILDCAT WAY	50	840.5059	4	27300	30700	34100	C or Better	0.024648
2774982	DATURA AVE	60	1344.505	4	20700	23300	25900	C or Better	0.051911
122692	TWENTYNINE PALMS HIGHWAY	40	16286.05	4	28700	32300	35900	C or Better	0.45365
124334	DATURA AVE	60	1252.439	4	20700	23300	25900	C or Better	0.048357
133043	EL PASEO DR	50	3401.418	4	27300	30700	34100	C or Better	0.099748
122683	MORONGO RD	60	5364.431	4	20700	23300	25900	C or Better	0.207121
122918	EL PASEO DR	50	3743.905	4	27300	30700	34100	C or Better	0.109792
122932	EL PASEO DR	50	3846.362	4	27300	30700	34100	C or Better	0.112797
2758001	EL PASEO DR	50	0	4	27300	30700	34100	C or Better	0
2774965	EL PASEO DR	50	0	4	27300	30700	34100	C or Better	0
2779132	EL PASEO DR	50	1652.461	4	27300	30700	34100	C or Better	0.048459

Link ID	Road name	AB_Facility	Tot Flow	Lanes	LOS C Thre	LOS D Thre	LOS E Thre	LOS	V/C
122695	LARREA AVE	50	5933.532	4	27300	30700	34100	C or Better	0.174004
2774961	WILDCAT WAY	50	854.2386	4	27300	30700	34100	C or Better	0.025051
2774973	TWENTYNINE PALMS HIGHWAY	40	10968.16	4	28700	32300	35900	C or Better	0.30552
122723	TWENTYNINE PALMS HIGHWAY	40	10570.67	4	28700	32300	35900	C or Better	0.294448
2779127	Sunnyslope Dr	50	3124.827	4	27300	30700	34100	C or Better	0.091637
2777114	MORONGO RD	60	4522.189	4	20700	23300	25900	C or Better	0.174602
100751	MORONGO RD	60	6124.848	4	20700	23300	25900	C or Better	0.236481
2779153	Sunnyslope Dr	50	441.6221	4	27300	30700	34100	C or Better	0.012951
2758005	Sunnyslope Dr	50	968.3061	4	27300	30700	34100	C or Better	0.028396
2779145	Sunnyslope Dr	50	727.5289	4	27300	30700	34100	C or Better	0.021335
2733626	MORONGO RD	60	6124.848	4	20700	23300	25900	C or Better	0.236481
2779140	Sunnyslope Dr	50	996.613	4	27300	30700	34100	C or Better	0.029226
122791	SULLIVAN RD	60	1374.683	4	20700	23300	25900	C or Better	0.053077
122726	TWENTYNINE PALMS HIGHWAY	40	12160.78	4	28700	32300	35900	C or Better	0.338741
122750	TWENTYNINE PALMS HIGHWAY	40	9315.756	4	28700	32300	35900	C or Better	0.259492
122748	TWENTYNINE PALMS HIGHWAY	40	12695.65	4	28700	32300	35900	C or Better	0.353639
2775025	TWENTYNINE PALMS HIGHWAY	40	8120.348	4	28700	32300	35900	C or Better	0.226194
2775034	BUENA VISTA DR	60	154.2509	4	20700	23300	25900	C or Better	0.005956
122766	BUENA VISTA DR	60	233.2139	4	20700	23300	25900	C or Better	0.009004
2775075	SULLIVAN RD	60	326.7448	4	20700	23300	25900	C or Better	0.012616
122754	TWO MILE RD	50	3322.92	4	27300	30700	34100	C or Better	0.097446
2775029	JOE DAVIS DR	60	512.1426	4	20700	23300	25900	C or Better	0.019774
122771	JOE DAVIS DR	60	517.9119	4	20700	23300	25900	C or Better	0.019997
122727	ADOBE RD	50	3106.2	4	27300	30700	34100	C or Better	0.091091
2775014	CONDOR RD	60	934.6754	4	20700	23300	25900	C or Better	0.036088
122761	CONDOR RD	60	1097.823	4	20700	23300	25900	C or Better	0.042387
122736	ADOBE RD	50	4204.023	4	27300	30700	34100	C or Better	0.123285
122809	GODWIN RD	60	1796.15	4	20700	23300	25900	C or Better	0.069349
2779148	MOJAVE RD	60	0	4	20700	23300	25900	C or Better	0
133053	PINTO MOUNTAIN RD	60	21.59988	4	20700	23300	25900	C or Better	0.000834
2777113	PINTO MOUNTAIN RD	60	152.8681	4	20700	23300	25900	C or Better	0.005902
122816	NEW IRONAGE RD	60	141.8309	4	20700	23300	25900	C or Better	0.005476
122817	AMBOY RD	60	8.909017	4	20700	23300	25900	C or Better	0.000344
122815	AMBOY RD	60	1591.761	4	20700	23300	25900	C or Better	0.061458
133059	IRONAGE RD	60	150.7399	4	20700	23300	25900	C or Better	0.00582
133014	APACHE TRL	60	1820.535	4	20700	23300	25900	C or Better	0.070291
2779076	AIRWAY AVE	60	2449.126	4	20700	23300	25900	C or Better	0.094561
122969	JOSHUA LN	50	6129.582	4	27300	30700	34100	C or Better	0.179753
2778914	JOSHUA LN	50	6129.582	4	27300	30700	34100	C or Better	0.179753
2779050	JOSHUA LN	50	7367	4	27300	30700	34100	C or Better	0.216041
152781	AIRWAY AVE	60	1961.039	4	20700	23300	25900	C or Better	0.075716
2779047	AIRWAY AVE	60	810.7674	4	20700	23300	25900	C or Better	0.031304
2779049	AIRWAY AVE	60	2449.126	4	20700	23300	25900	C or Better	0.094561
2774861	BROADWAY	60	3065.618	4	20700	23300	25900	C or Better	0.118364
144954	BORDER AVE	60	1616.065	4	20700	23300	25900	C or Better	0.062396
152773	WHITE FEATHER RD	60	5303.691	4	20700	23300	25900	C or Better	0.204776
122936	BORDER AVE	60	1936.217	4	20700	23300	25900	C or Better	0.074757
122940	BROADWAY	60	3703.501	4	20700	23300	25900	C or Better	0.142992
2774888	BORDER AVE	60	1077.288	4	20700	23300	25900	C or Better	0.041594
122941	CALLE LOS AMIGOS	60	2607.794	4	20700	23300	25900	C or Better	0.100687
2774781	TWENTYNINE PALMS HIGHWAY	40	26457.41	6	42000	53200	56000	C or Better	0.472454

## **APPENDIX F: COST ESTIMATES**



**MBATS Recommended Improvements  
Planning Construction Cost Summary**

Project No.: 143185  
Date: 1/5/2015

CORRIDOR: State Route 62 (SR62)

Project Length (FT): 262602  
Project Length (MI): 49.74

Segment No.:	01		
		Construction Subtotal With Contingency	\$13,226,038
		Right of Way	\$30,000
		Preliminary and Final Engineering	25% \$3,306,509
		Construction and Environmental Support	15% \$1,983,906
		Segment Total	\$18,546,453
Segment No.:	02		
		Construction Subtotal With Contingency	\$21,367,808
		Right of Way	\$220,000
		Preliminary and Final Engineering	25% \$5,341,952
		Construction and Environmental Support	15% \$3,205,171
		Segment Total	\$30,134,932
Segment No.:	03		
		Construction Subtotal With Contingency	\$18,236,676
		Right of Way	\$120,000
		Preliminary and Final Engineering	25% \$4,559,169
		Construction and Environmental Support	15% \$2,735,501
		Segment Total	\$25,651,347
Segment No.:	04		
		Construction Subtotal With Contingency	\$2,340,000
		Preliminary and Final Engineering	25% \$585,000
		Construction and Environmental Support	15% \$351,000
		Segment Total	\$3,276,000
Segment No.:	05		
		Construction Subtotal With Contingency	\$1,170,000
		Preliminary and Final Engineering	25% \$292,500
		Construction and Environmental Support	15% \$175,500
		Segment Total	\$1,638,000
Segment No.:	06		
		Construction Subtotal With Contingency	\$4,095,000
		Preliminary and Final Engineering	25% \$1,023,750
		Construction and Environmental Support	15% \$614,250
		Segment Total	\$5,733,000
Segment No.:	07		
		Construction Subtotal With Contingency	\$12,086,350
		Right of Way	\$170,000
		Preliminary and Final Engineering	25% \$3,021,587
		Construction and Environmental Support	15% \$1,812,952
		Segment Total	\$17,090,889
Segment No.:	08		
		Construction Subtotal With Contingency	\$11,885,136
		Right of Way	\$150,000
		Preliminary and Final Engineering	25% \$2,971,284
		Construction and Environmental Support	15% \$1,782,770
		Segment Total	\$16,789,190
Segment No.:	09		
		Construction Subtotal With Contingency	\$4,108,104
		Right of Way	\$60,000
		Preliminary and Final Engineering	25% \$1,027,026
		Construction and Environmental Support	15% \$616,216
		Segment Total	\$5,811,346

Project Construction Subtotal With Contingency		\$88,515,112
Right of Way		\$750,000
Project Preliminary and Final Engineering	25%	\$22,128,778
Construction and Environmental Support	15%	\$13,277,267
Project Total		\$124,671,156

**MBATS Recommended Improvements  
Planning Construction Cost Estimate**

Project No.: 143185  
Date: 1/5/2015

CORRIDOR: State Route 62 (SR62)

Project Length (FT): 262602  
Project Length (MI): 49.74

Segment No.: 01  
Jurisdiction: San Bernardino County  
Improvements: SR-62 Roadway Widening  
From: San Bernardino County Line  
Status: Unbuilt  
Classification: Principal Arterial  
To: Hess Blvd

Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost
WDN1L	Widen by 1 Lane in Each Direction (W=13)	LF	Typical	\$270	3941	\$1,064,070
IT1	Miscellaneous Improvements	LF	Typical	\$15	3941	\$59,115
RET1	Retaining Wall (H=15')	LF	Typical	\$2,100	4300	\$9,030,000
SS1	Signing and Striping	LF	Typical	\$5	3941	\$20,690
				<b>Construction Subtotal</b>		<b>\$10,173,875</b>
				Contingency	30%	\$3,052,163
				<b>Construction Subtotal With Contingency</b>		<b>\$13,226,038</b>
Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost
	Right of Way Acquisition (W=24' for length of the Segment)	AC	Typical	\$10,000	3	\$30,000
				Preliminary and Final Engineering	25%	\$3,306,509
				Construction and Environmental Support	15%	\$1,983,906
				<b>Segment Total</b>		<b>\$18,546,453</b>

Segment No.: 02  
Jurisdiction: San Bernardino County  
Improvements: SR-62 Roadway Widening and Traffic Signal Installation/Modification  
From: Hess Blvd  
Status: Unbuilt  
Classification: Principal Arterial  
To: Western Yucca Valley Town Limits

Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost
WDN2L	Widen by 1 Lane in Each Direction (W=13)	LF	Typical	\$275	39883	\$10,967,825
IT2	Miscellaneous Improvements	LF	Typical	\$55	39883	\$2,193,565
RET2	Retaining Wall (H=8')	LF	Typical	\$1,120	700	\$784,000
LTG2	Highway Safety Lighting	EA	Typical	\$52,000	1	\$52,000
	Culvert Widening (W=13')	SF	Typical	\$600	1300	\$780,000
SS2	Signing and Striping	LF	Typical	\$5	39883	\$209,386
TS1	Traffic Signal Installation	EA	Typical	\$700,000	1	\$700,000
TS2	Traffic Signal Modification	EA	Typical	\$450,000	1	\$450,000
TS3	Flashing Beacon	EA	Typical	\$150,000	2	\$300,000
				<b>Construction Subtotal</b>		<b>\$16,436,776</b>
				Contingency	30%	\$4,931,033
				<b>Construction Subtotal With Contingency</b>		<b>\$21,367,809</b>
Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost
	Right of Way Acquisition (W=24' for length of the Segment)	AC	Typical	\$10,000	22	\$220,000
				Preliminary and Final Engineering	25%	\$5,341,952
				Construction and Environmental Support	15%	\$3,205,171
				<b>Segment Total</b>		<b>\$30,134,932</b>

Segment No.: 03  
Jurisdiction: Yucca Valley  
Improvements: SR-62 Roadway Widening and Traffic Signal Modifications  
From: Western Yucca Valley Town Limits  
Status: Unbuilt  
Classification: Principal Arterial  
To: SR-247

Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost
WDN3L	Widen by 1 Lane in Each Direction (W=13')	LF	Typical	\$355	21306	\$7,563,630
IT3	Miscellaneous Improvements	LF	Typical	\$68	21306	\$1,448,808
	Culvert Widening (W=13')	SF	Typical	\$450	1300	\$585,000
LTG3	Highway Safety Lighting	EA	Typical	\$1,555,000	1	\$1,555,000
SS3	Signing and Striping	LF	Typical	\$8	21306	\$175,775
TS2	Traffic Signal Modification	EA	Typical	\$450,000	6	\$2,700,000
				<b>Construction Subtotal</b>		<b>\$14,028,213</b>
				Contingency	30%	\$4,208,464
				<b>Construction Subtotal With Contingency</b>		<b>\$18,236,676</b>
Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost
	Right of Way Acquisition (W=24' for length of the Segment)	AC	Typical	\$10,000	12	\$120,000
				Preliminary and Final Engineering	25%	\$4,559,169
				Construction and Environmental Support	15%	\$2,735,501
				<b>Segment Total</b>		<b>\$25,651,347</b>

Segment No.: 04  
Jurisdiction: Yucca Valley  
Improvements: SR-62 Traffic Signal Modifications  
From: SR-247  
Status: Unbuilt  
Classification: Principal Arterial  
To: Eastern Yucca Valley Town Limits

Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost
TS2	Traffic Signal Modification	EA	Typical	\$450,000	4	\$1,800,000
				<b>Construction Subtotal</b>		<b>\$1,800,000</b>
				Contingency	30%	\$540,000
				<b>Construction Subtotal With Contingency</b>		<b>\$2,340,000</b>
				Preliminary and Final Engineering	25%	\$585,000
				Construction and Environmental Support	15%	\$351,000
				<b>Segment Total</b>		<b>\$3,276,000</b>

Segment No.: 05  
Jurisdiction: San Bernardino County  
Improvements: SR-62 Traffic Signal Modifications  
From: Eastern Yucca Valley Town Limits  
Status: Unbuilt  
Classification: Principal Arterial  
To: Twentynine Palms Western Town Limits

Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost
TS2	Traffic Signal Modification	EA	Typical	\$450,000	2	\$900,000
				<b>Construction Subtotal</b>		<b>\$900,000</b>
				Contingency	30%	\$270,000
				<b>Construction Subtotal With Contingency</b>		<b>\$1,170,000</b>
				Preliminary and Final Engineering	25%	\$292,500
				Construction and Environmental Support	15%	\$175,500
				<b>Segment Total</b>		<b>\$1,638,000</b>

**MBATS Recommended Improvements  
Planning Construction Cost Estimate**

Project No.: 143185  
Date: 1/5/2015

Segment No.: 06		Status: Unbuilt						
Jurisdiction: San Bernardino County		Classification: Principal Arterial						
Improvements: SR-62 Traffic Signal Installation/Modification								
From: Twentynine Palms Western Town Limits		To: Twentynine Palms Eastern Town Limits						
			Segment Length (FT): 63360					
Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost		
TS1	Traffic Signal Installation	EA	Typical	\$700,000	3	\$2,100,000		
TS2	Traffic Signal Modification	EA	Typical	\$450,000	2	\$900,000		
TS3	Flashing Beacon	EA	Typical	\$150,000	1	\$150,000		
	Traffic Signal Interconnect	LS	Typical	\$500,000	1	\$500,000		
						<b>Construction Subtotal</b>	<b>\$3,150,000</b>	
						Contingency	30%	\$945,000
						<b>Construction Subtotal With Contingency</b>	<b>\$4,095,000</b>	
						Preliminary and Final Engineering	25%	\$1,023,750
						Construction and Environmental Support	15%	\$614,250
						<b>Segment Total</b>	<b>\$5,733,000</b>	

Segment No.: 07		Status: Unbuilt						
Jurisdiction: San Bernardino County		Classification: Principal Arterial						
Improvements: SR-247 Roadway Widening								
From: Northern Morongo Basin Boundary Limits		To: Northern Yucca Valley Town Limits						
			Segment Length (FT): 30624					
Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost		
WDN7L	Widen by 1 Lane in Each Direction (W=13)	LF	Typical	\$270	30624	\$8,268,480		
IT7	Miscellaneous Improvements	LF	Typical	\$2	30624	\$61,248		
RET7	Retaining Wall (H=8)	LF	Typical	\$1,120	600	\$672,000		
SS7	Signing and Striping	LF	Typical	\$5	30624	\$145,464		
TS3	Flashing Beacon	EA	Typical	\$150,000	1	\$150,000		
						<b>Construction Subtotal</b>	<b>\$9,297,192</b>	
						Contingency	30%	\$2,789,158
						<b>Construction Subtotal With Contingency</b>	<b>\$12,086,350</b>	
						Preliminary and Final Engineering	25%	\$3,021,587
						Construction and Environmental Support	15%	\$1,812,952
						<b>Segment Total</b>	<b>\$17,090,889</b>	

Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost		
	Right of Way Acquisition (W=24' for length of the Segment)	AC	Typical	\$10,000	17	\$170,000		
						Preliminary and Final Engineering	25%	\$3,021,587
						Construction and Environmental Support	15%	\$1,812,952
						<b>Segment Total</b>	<b>\$17,090,889</b>	

Segment No.: 08		Status: Unbuilt						
Jurisdiction: Yucca Valley		Classification: Principal Arterial						
Improvements: SR-247 Roadway Widening and Traffic Signal Modification								
From: Northern Yucca Valley Town Limits		To: SR-62						
			Segment Length (FT): 25872					
Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost		
WDN8L	Widen by 1 Lane in Each Direction (W=13)	LF	Typical	\$270	25872	\$6,985,440		
IT8	Miscellaneous Improvements	LF	Typical	\$15	25872	\$388,080		
RET8	Retaining Wall (H=8)	LF	Typical	\$1,120	800	\$896,000		
SS8	Signing and Striping	LF	Typical	\$5	25872	\$122,892		
TS2	Traffic Signal Modification	EA	Typical	\$450,000	1	\$450,000		
TS3	Flashing Beacon	EA	Typical	\$150,000	2	\$300,000		
						<b>Construction Subtotal</b>	<b>\$9,142,412</b>	
						Contingency	30%	\$2,742,724
						<b>Construction Subtotal With Contingency</b>	<b>\$11,885,136</b>	
						Preliminary and Final Engineering	25%	\$2,971,284
						Construction and Environmental Support	15%	\$1,782,770
						<b>Segment Total</b>	<b>\$16,789,190</b>	

Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost		
	Right of Way Acquisition (W=24' for length of the Segment)	AC	Typical	\$10,000	15	\$150,000		
						Preliminary and Final Engineering	25%	\$2,971,284
						Construction and Environmental Support	15%	\$1,782,770
						<b>Segment Total</b>	<b>\$16,789,190</b>	

Segment No.: 09		Status: Unbuilt						
Jurisdiction: San Bernardino County		Classification: Principal Arterial						
Improvements: Yucca Mesa Drive Roadway Widening								
From: Buena Vista Drive		To: SR-62						
			Segment Length (FT): 10560					
Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost		
WDN9L	Widen by 1 Lane in Each Direction (W=13)	LF	Typical	\$270	10560	\$2,851,200		
IT9	Miscellaneous Improvements	LF	Typical	\$24	10560	\$253,440		
SS9	Signing and Striping	LF	Typical	\$5	10560	\$55,440		
						<b>Construction Subtotal</b>	<b>\$3,160,080</b>	
						Contingency	30%	\$948,024
						<b>Construction Subtotal With Contingency</b>	<b>\$4,108,104</b>	
						Preliminary and Final Engineering	25%	\$1,027,026
						Construction and Environmental Support	15%	\$616,216
						<b>Segment Total</b>	<b>\$5,811,346</b>	

Template	Description	Unit	Cost Level	Unit Cost	Quantity	Total Cost		
	Right of Way Acquisition (W=24' for length of the Segment)	AC	Typical	\$10,000	6	\$60,000		
						Preliminary and Final Engineering	25%	\$1,027,026
						Construction and Environmental Support	15%	\$616,216
						<b>Segment Total</b>	<b>\$5,811,346</b>	

<b>Project Construction Subtotal With Contingency</b>		<b>\$88,515,112</b>
Right of Way		\$750,000
<b>Total Preliminary and Final Engineering</b>		<b>\$22,128,778</b>
<b>Total Construction and Environmental Support</b>		<b>\$13,277,267</b>
<b>Project Total</b>		<b>\$124,671,156</b>

Date: 1/5/2015

Cost Template

TEMPLATE ID: WDN1L

DESCRIPTION: Widen by 1 Lane in Each Direction (W=13)

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
160102A	Clearing and Grubbing (W=12')	SF	\$1.00	\$0.70	\$2.00	24	1	24	\$24.00	\$16.80	\$48.00
150770	Remove Asphalt Concrete Pavement (W=1')	SF	\$7.00	\$3.00	\$12.00	2	1	2	\$14.00	\$6.00	\$24.00
260203	Class 2 Aggregate Base (8")	CY	\$35.00	\$25.00	\$60.00	0.65	1	0.65	\$22.58	\$16.13	\$38.71
390132	Hot Mix Asphalt (TYPE A) (6")	TON	\$100.00	\$85.00	\$125.00	0.96	1	0.96	\$96.20	\$81.77	\$120.25
394073	Place Hot Mix Asphalt Dike (Type A)	LF	\$2.00	\$1.00	\$3.50	1.5	1	1.5	\$3.00	\$1.50	\$5.25
190101A	Roadway Excavation (W=13')	SF	\$4.00	\$2.00	\$10.00	26	1	26	\$104.00	\$52.00	\$260.00
377501	Slurry Seal (W=100')	TON	\$165.00	\$140.00	\$190.00	0.02	1	0.02	\$3.44	\$2.92	\$3.96
<b>Subtotal</b>									<b>\$270.00</b>	<b>\$180.00</b>	<b>\$505.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 24' wide of Clearing and Grubbing along every foot.
- Observed 2' of sawcutting and removal of existing Asphalt Concrete Pavement along every foot.
- Observed 26' wide section to be excavated along every foot.
- Used 148 lbs/ft<sup>3</sup> for Hot Mix Asphalt

Date: 1/5/2015

Cost Template

TEMPLATE ID: IT1

DESCRIPTION: Miscellaneous Improvements

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
832006	Midwest Guardrail System (Steel Post)	LF	\$40.00	\$30.00	\$50.00	0.25	1	0.25	\$10.15	\$7.61	\$12.69
<b>Subtotal</b>									<b>\$15.00</b>	<b>\$10.00</b>	<b>\$15.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 1000' of Midwest Guardrail System to be replaced along length of the segment.

Date: 1/5/2015

Cost Template

TEMPLATE ID: RET1

DESCRIPTION: Retaining Wall (H=15')

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
510060A	Structure Concrete Retaining Wall	SF	\$140.00	\$100.00	\$180.00	15	1	15	\$2,100.00	\$1,500.00	\$2,700.00
<b>Subtotal</b>									<b>\$2,100.00</b>	<b>\$1,500.00</b>	<b>\$2,700.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 15' high Concrete Retaining Wall needed.

Date: 1/5/2015

Cost Template

TEMPLATE ID: SS1

DESCRIPTION: Signing and Striping

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
150711	Remove Painted Traffic Stripe	LF	\$1.00	\$0.50	\$2.00	2.00	1	2	\$2.00	\$1.00	\$4.00
150742	Remove Roadside sign	EA	\$150.00	\$125.00	\$200.00	0.0003	1	0.0003	\$0.05	\$0.04	\$0.07
566011	Roadside Sign - one post	EA	\$400.00	\$250.00	\$520.00	0.0003	1	0.0003	\$0.14	\$0.08	\$0.18
840656	Paint traffic stripe (2-coat)	LF	\$0.30	\$0.20	\$0.40	10.00	1	10	\$3.00	\$2.00	\$4.00
<b>Subtotal</b>									<b>\$5.25</b>	<b>\$3.25</b>	<b>\$8.25</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 1 stripe to be removed along every foot.
- Observed 2 Roadside signs to be removed every 5900'
- Observed 2 Roadside signs-one post to be replaced every 5900'

Date: 1/5/2015

Cost Template

TEMPLATE ID: WDN2L

DESCRIPTION: Widen by 1 Lane in Each Direction (W=13)

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
160102A	Clearing and Grubbing (W=12)	SF	\$1.00	\$0.70	\$2.00	24	1	24	\$24.00	\$16.80	\$48.00
150770	Remove Asphalt Concrete Pavement (W=1)	SF	\$7.00	\$3.00	\$12.00	2	1	2	\$14.00	\$6.00	\$24.00
153248	Remove Concrete (Misc) (W=7)	SF	\$6.50	\$5.00	\$8.00	1.02	1	1.02	\$6.62	\$5.09	\$8.14
260203	Class 2 Aggregate Base (8")	CY	\$35.00	\$25.00	\$60.00	0.65	1	0.65	\$22.58	\$16.13	\$38.71
390132	Hot Mix Asphalt (TYPE A) (6")	TON	\$100.00	\$85.00	\$125.00	0.96	1	0.96	\$96.20	\$81.77	\$120.25
394073	Place Hot Mix Asphalt Dike (Type A)	LF	\$2.00	\$1.00	\$3.50	1.5	1	1.5	\$3.00	\$1.50	\$5.25
190101A	Roadway Excavation (W=13)	SF	\$4.00	\$2.00	\$10.00	26	1	26	\$104.00	\$52.00	\$260.00
377501	Slurry Seal (W=100')	TON	\$165.00	\$140.00	\$190.00	0.02	1	0.02	\$3.44	\$2.92	\$3.96
<b>Subtotal</b>									<b>\$275.00</b>	<b>\$185.00</b>	<b>\$510.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 24' wide of Clearing and Grubbing along every foot.
- Observed 2' of sawcutting and removal of existing Asphalt Concrete Pavement along every foot.
- Observed 14' wide Curb and Gutter to be removed along 2900' span.
- Observed 26' wide section to be excavated along every foot.
- Used 148 lbs/ft<sup>3</sup> for Hot Mix Asphalt

Date: 1/5/2015

Cost Template

TEMPLATE ID: IT2

DESCRIPTION: Miscellaneous Improvements

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
832006	Midwest Guardrail System (Steel Post)	LF	\$40.00	\$30.00	\$50.00	0.05	1	0.05	\$2.01	\$1.50	\$2.51
800360	Chain Link Fence (Type CL-6)	LF	\$15.00	\$10.00	\$25.00	0.02	1	0.02	\$0.34	\$0.23	\$0.56
999999D	Relocate Utility Poles	EA	\$10,000.00	\$5,000.00	\$15,000.00	0.0026	1	0.0026	\$26.33	\$13.16	\$39.49
198010A	Imported Borrow (W=12')	SF	\$15.00	\$13.00	\$18.00	0.90	1	0.90	\$13.54	\$11.73	\$16.25
731521A	Minor Conc. (Curb & Gutter) (W=7')	SF	\$10.00	\$8.00	\$15.00	1.02	1	1.02	\$10.18	\$8.14	\$15.27
<b>Subtotal</b>									<b>\$55.00</b>	<b>\$35.00</b>	<b>\$75.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 2000' of Midwest Guardrail System to be replaced along length of the segment.
- Observed 900' of Chainlink Fence to be replaced along length of the segment.
- Observed 105 Utility Poles to be relocated along length of the segment.
- Observed 12' wide section of Imported borrow along 3000'.
- Observed 14' wide Curb and Gutter to be replaced along 2900' span.

Date: 1/5/2015

Cost Template

TEMPLATE ID: RET2

DESCRIPTION: Retaining Wall (H=8)

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
510060A	Structure Concrete Retaining Wall	SF	\$140.00	\$100.00	\$180.00	8	1	8	\$1,120.00	\$800.00	\$1,440.00
<b>Subtotal</b>									<b>\$1,120.00</b>	<b>\$800.00</b>	<b>\$1,440.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 8' high Concrete Retaining Wall needed.

Date: 1/5/2015

Cost Template

TEMPLATE ID: LTG2

DESCRIPTION: Highway Safety Lighting

UNIT: EA

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
208815A	2" Welded Steel Pipe Conduit (Trenching, Pavement)	LF	\$40.00	\$30.00	\$55.00	600	1	600	\$24,000.00	\$18,000.00	\$33,000.00
999999E	Relocate Highway Lighting	EA	\$5,500.00	\$3,500.00	\$7,500.00	4	1	4	\$22,000.00	\$14,000.00	\$30,000.00
999999F	Misc. Electrical	LF	\$10.00	\$8.00	\$12.00	600	1	600	\$6,000.00	\$4,800.00	\$7,200.00
<b>Subtotal</b>									<b>\$52,000.00</b>	<b>\$36,800.00</b>	<b>\$70,200.00</b>

NOTE: Unit cost is based on lump sum.

- Observed 600' of conduit to be replaced.

Date: 1/5/2015

Cost Template

TEMPLATE ID: BR2

DESCRIPTION: Culvert Widening (W=13')

UNIT: LF

Item No.	Description	Unit	Unit Cost			Amount	Quantity		Total Cost		
			Typical	Low	High		Length (FT)	Multiplier	Typical	Low	High
510053E	Culvert Widening (W=13')	SF	\$600.00	\$500.00	\$700.00	26	1	26	\$15,600.00	\$13,000.00	\$18,200.00
<b>Subtotal</b>									<b>\$15,600.00</b>	<b>\$13,000.00</b>	<b>\$18,200.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

Observed 26' wide section of bridge widening needed.

Date: 1/5/2015

Cost Template

TEMPLATE ID: SS2

DESCRIPTION: Signing and Striping

UNIT: LF

Item No.	Description	Unit	Unit Cost			Amount	Quantity		Total Cost		
			Typical	Low	High		Length (FT)	Multiplier	Typical	Low	High
150711	Remove Painted Traffic Stripe	LF	\$1.00	\$0.50	\$2.00	2.00	1	2	\$2.00	\$1.00	\$4.00
150742	Remove Roadside sign	EA	\$150.00	\$125.00	\$200.00	0.0003	1	0.0003	\$0.05	\$0.04	\$0.07
566011	Roadside Sign - one post	EA	\$400.00	\$250.00	\$520.00	0.0003	1	0.0003	\$0.14	\$0.08	\$0.18
840656	Paint traffic stripe (2-coat)	LF	\$0.30	\$0.20	\$0.40	10.00	1	10	\$3.00	\$2.00	\$4.00
<b>Subtotal</b>									<b>\$5.25</b>	<b>\$3.25</b>	<b>\$8.25</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

Observed 1 stripe to be removed along every foot.  
Observed 2 Roadside signs to be removed every 5900'  
Observed 2 Roadside signs-one post to be replaced every 5900'

Date: 1/5/2015

Cost Template

TEMPLATE ID: TS1

DESCRIPTION: Traffic Signal Installation

UNIT: EA

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
860201	Signal and Lighting	EA	\$225,000.00	\$200,000.00	\$250,000.00	1	1	1	\$225,000.00	\$200,000.00	\$250,000.00
<b>Subtotal</b>									<b>\$225,000.00</b>	<b>\$200,000.00</b>	<b>\$250,000.00</b>

NOTE: Unit cost is based on lump sum.

Date: 1/5/2015

Cost Template

TEMPLATE ID: TS2

DESCRIPTION: Traffic Signal Modification

UNIT: EA

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
861502	Modify Signal and Lighting	EA	\$150,000.00	\$125,000.00	\$200,000.00	1	1	1	\$150,000.00	\$125,000.00	\$200,000.00
<b>Subtotal</b>									<b>\$150,000.00</b>	<b>\$125,000.00</b>	<b>\$200,000.00</b>

NOTE: Unit cost is based on lump sum.

Date: 1/5/2015

Cost Template

TEMPLATE ID: TS3

DESCRIPTION: Flashing Beacon

UNIT: EA

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
860604	Flashing Beacon System	EA	\$50,000.00	\$40,000.00	\$75,000.00	1	1	1	\$50,000.00	\$40,000.00	\$75,000.00
<b>Subtotal</b>									<b>\$50,000.00</b>	<b>\$40,000.00</b>	<b>\$75,000.00</b>

NOTE: Unit cost is based on lump sum.

Date: 1/5/2015

## Cost Template

TEMPLATE ID: WDN3L

DESCRIPTION: Widen by 1 Lane in Each Direction (W=13')

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
160102A	Clearing and Grubbing (W=12')	SF	\$1.00	\$0.70	\$2.00	24	1	24	\$24.00	\$16.80	\$48.00
150770	Remove Asphalt Concrete Pavement (W=1')	SF	\$7.00	\$3.00	\$12.00	2	1	2	\$14.00	\$6.00	\$24.00
153248	Remove Concrete (Misc) (W=7')	SF	\$6.50	\$5.00	\$8.00	2.19	1	2.19	\$14.22	\$10.94	\$17.50
260203	Class 2 Aggregate Base (8")	CY	\$35.00	\$25.00	\$60.00	0.65	1	0.65	\$22.58	\$16.13	\$38.71
390132	Hot Mix Asphalt (TYPE A) (6")	TON	\$100.00	\$85.00	\$125.00	0.96	1	0.96	\$96.20	\$81.77	\$120.25
394073	Place Hot Mix Asphalt Dike (Type A)	LF	\$2.00	\$1.00	\$3.50	1	1	1.00	\$2.00	\$1.00	\$3.50
190101A	Roadway Excavation (W=13')	SF	\$4.00	\$2.00	\$10.00	26	1	26	\$104.00	\$52.00	\$260.00
377501	Slurry Seal (W=100')	TON	\$165.00	\$140.00	\$190.00	0.014	1	0.014	\$2.31	\$1.96	\$2.66
153103	Cold Plane Asphalt Concrete Pavement	SF	\$2.00	\$1.00	\$5.00	24.64	1	24.64	\$49.28	\$24.64	\$123.20
390132A	Hot Mix Asphalt (TYPE A) (2")	TON	\$100.00	\$85.00	\$125.00	0.26	1	0.26	\$25.94	\$22.05	\$32.42
<b>Subtotal</b>									<b>\$355.00</b>	<b>\$235.00</b>	<b>\$675.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

Observed 24' wide of Clearing and Grubbing along every foot.  
Observed 2' of sawcutting and removal of existing Asphalt Concrete Pavement along every foot.  
Observed 14' wide Curb and Gutter to be removed along 30% of 11100' span.  
Observed 26' wide section to be excavated along every foot.  
Observed 7000' pavement section to grind and overlay.  
Used 148 lbs/ft<sup>3</sup> for Hot Mix Asphalt

Date: 1/5/2015

## Cost Template

TEMPLATE ID: IT3

DESCRIPTION: Miscellaneous Improvements

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
999999D	Relocate Utility Poles	EA	\$10,000.00	\$5,000.00	\$15,000.00	0.0023	1	0.0023	\$23.47	\$11.73	\$35.20
731521A	Minor Conc. (Curb & Gutter) (W=7')	SF	\$10.00	\$8.00	\$15.00	4.38	1	4.38	\$43.76	\$35.01	\$65.64
<b>Subtotal</b>									<b>\$68.00</b>	<b>\$47.00</b>	<b>\$101.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

Observed 50 Utility Poles to be relocated along length of the segment.  
Observed 14' wide Curb and Gutter to be replaced along 60% of 11100' span.

Date: 1/5/2015

## Cost Template

TEMPLATE ID: LTG3

DESCRIPTION: Highway Safety Lighting

UNIT: EA

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
208815A	2" Welded Steel Pipe Conduit (Trenching, Pavement)	LF	\$40.00	\$30.00	\$55.00	22200	1	22200	\$888,000.00	\$666,000.00	\$1,221,000.00
999999E	Relocate Highway Lighting	EA	\$5,500.00	\$3,500.00	\$7,500.00	80	1	80	\$440,000.00	\$280,000.00	\$600,000.00
999999F	Misc. Electrical	LF	\$10.00	\$8.00	\$12.00	22700	1	22700	\$227,000.00	\$181,600.00	\$272,400.00
<b>Subtotal</b>									<b>\$1,555,000.00</b>	<b>\$1,127,600.00</b>	<b>\$2,093,400.00</b>

NOTE: Unit cost is based on lump sum.

Observed 22176' of conduit to be replaced.

Date: 1/5/2015

## Cost Template

TEMPLATE ID: SS3

DESCRIPTION: Signing and Striping

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
150711	Remove Painted Traffic Stripe	LF	\$1.00	\$0.50	\$2.00	0.63	1	0.63	\$0.63	\$0.31	\$1.26
150742	Remove Roadside sign	EA	\$150.00	\$125.00	\$200.00	0.01	1	0.01	\$1.50	\$1.25	\$2.00
566011	Roadside Sign - one post	EA	\$400.00	\$250.00	\$520.00	0.01	1	0.01	\$4.00	\$2.50	\$5.20
840656	Paint traffic stripe (2-coat)	LF	\$0.30	\$0.20	\$0.40	7	1	7	\$2.10	\$1.40	\$2.80
<b>Subtotal</b>									<b>\$8.25</b>	<b>\$5.50</b>	<b>\$11.50</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

Observed 2 stripe to be removed along every foot over 6700'.  
Observed 2 Roadside signs to be removed every 200'  
Observed 2 Roadside signs-one post to be replaced every 200'

Date: 1/5/2015

Cost Template

TEMPLATE ID: WDN7L

DESCRIPTION: Widen by 1 Lane in Each Direction (W=13)

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
160102A	Clearing and Grubbing (W=12')	SF	\$1.00	\$0.70	\$2.00	24	1	24	\$24.00	\$16.80	\$48.00
150770	Remove Asphalt Concrete Pavement (W=1')	SF	\$7.00	\$3.00	\$12.00	2	1	2	\$14.00	\$6.00	\$24.00
260203	Class 2 Aggregate Base (8")	CY	\$35.00	\$25.00	\$60.00	0.65	1	0.65	\$22.58	\$16.13	\$38.71
390132	Hot Mix Asphalt (TYPE A) (6")	TON	\$100.00	\$85.00	\$125.00	0.96	1	0.96	\$96.20	\$81.77	\$120.25
394073	Place Hot Mix Asphalt Dike (Type A)	LF	\$2.00	\$1.00	\$3.50	2	1	2	\$4.00	\$2.00	\$7.00
190101A	Roadway Excavation (W=13')	SF	\$4.00	\$2.00	\$10.00	26	1	26	\$104.00	\$52.00	\$260.00
377501	Slurry Seal (W=100')	TON	\$165.00	\$140.00	\$190.00	0.02	1	0.02	\$3.44	\$2.92	\$3.96
<b>Subtotal</b>									<b>\$270.00</b>	<b>\$180.00</b>	<b>\$505.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 24' wide of Clearing and Grubbing along every foot.
- Observed 2' of sawcutting and removal of existing Asphalt Concrete Pavement along every foot.
- Observed 26' wide section to be excavated along every foot.
- Used 148 lbs/ft<sup>3</sup> for Hot Mix Asphalt

Date: 1/5/2015

Cost Template

TEMPLATE ID: IT7

DESCRIPTION: Miscellaneous Improvements

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
999999D	Relocate Utility Poles	EA	\$10,000.00	\$5,000.00	\$15,000.00	0.0002	1	0.0002	\$1.96	\$0.98	\$2.94
<b>Subtotal</b>									<b>\$2.00</b>	<b>\$1.00</b>	<b>\$3.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 6 Utility Poles to be relocated along length of the segment.

Date: 1/5/2015

Cost Template

TEMPLATE ID: RET7

DESCRIPTION: Retaining Wall (H=8')

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
510060A	Structure Concrete Retaining Wall	SF	\$140.00	\$100.00	\$180.00	8	1	8	\$1,120.00	\$800.00	\$1,440.00
<b>Subtotal</b>									<b>\$1,120.00</b>	<b>\$800.00</b>	<b>\$1,440.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 8' high Concrete Retaining Wall needed.

Date: 1/5/2015

Cost Template

TEMPLATE ID: SS7

DESCRIPTION: Signing and Striping

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
150711	Remove Painted Traffic Stripe	LF	\$1.00	\$0.50	\$2.00	2	1	2	\$2.00	\$1.00	\$4.00
150742	Remove Roadside sign	EA	\$150.00	\$125.00	\$200.00	0.0013	1	0.0013	\$0.20	\$0.16	\$0.26
566011	Roadside Sign - one post	EA	\$400.00	\$250.00	\$520.00	0.0013	1	0.0013	\$0.52	\$0.33	\$0.68
840656	Paint traffic stripe (2-coat)	LF	\$0.30	\$0.20	\$0.40	6	1	6	\$1.80	\$1.20	\$2.40
<b>Subtotal</b>									<b>\$4.75</b>	<b>\$2.75</b>	<b>\$7.50</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 2 stripe to be removed along every foot.
- Observed 40 Roadside signs to be removed along entire segment.
- Observed 40 Roadside signs-one post to be replaced along entire segment.

Date: 1/5/2015

Cost Template

TEMPLATE ID: WDN8L

DESCRIPTION: Widen by 1 Lane in Each Direction (W=13)

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
160102A	Clearing and Grubbing (W=12')	SF	\$1.00	\$0.70	\$2.00	24	1	24	\$24.00	\$16.80	\$48.00
150770	Remove Asphalt Concrete Pavement (W=1')	SF	\$7.00	\$3.00	\$12.00	2	1	2	\$14.00	\$6.00	\$24.00
153248	Remove Concrete (Misc) (W=7')	SF	\$6.50	\$5.00	\$8.00	0.07	1	0.07	\$0.46	\$0.36	\$0.57
260203	Class 2 Aggregate Base (8")	CY	\$35.00	\$25.00	\$60.00	0.65	1	0.65	\$22.58	\$16.13	\$38.71
390132	Hot Mix Asphalt (TYPE A) (6")	TON	\$100.00	\$85.00	\$125.00	0.96	1	0.96	\$96.20	\$81.77	\$120.25
394073	Place Hot Mix Asphalt Dike (Type A)	LF	\$2.00	\$1.00	\$3.50	2	1	2	\$4.00	\$2.00	\$7.00
190101A	Roadway Excavation (W=13')	SF	\$4.00	\$2.00	\$10.00	26	1	26	\$104.00	\$52.00	\$260.00
377501	Slurry Seal (W=100')	TON	\$185.00	\$140.00	\$190.00	0.02	1	0.02	\$3.44	\$2.92	\$3.96
<b>Subtotal</b>									<b>\$270.00</b>	<b>\$180.00</b>	<b>\$505.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 24' wide of Clearing and Grubbing along every foot.
- Observed 2' of sawcutting and removal of existing Asphalt Concrete Pavement along every foot.
- Observed 7' wide Curb and Gutter to be removed along 264' span.
- Observed 26' wide section to be excavated along every foot.
- Used 148 lbs/ft<sup>3</sup> for Hot Mix Asphalt

Date: 1/5/2015

Cost Template

TEMPLATE ID: IT8

DESCRIPTION: Miscellaneous Improvements

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
832006	Midwest Guardrail System (Steel Post)	LF	\$40.00	\$30.00	\$50.00	0.010	1	0.010	\$0.39	\$0.29	\$0.48
999999D	Relocate Utility Poles	EA	\$10,000.00	\$5,000.00	\$15,000.00	0.0014	1	0.0014	\$13.53	\$6.76	\$20.29
731521A	Minor Conc. (Curb & Gutter) (W=7')	SF	\$10.00	\$8.00	\$15.00	0.07	1	0.07	\$0.68	\$0.54	\$1.01
<b>Subtotal</b>									<b>\$15.00</b>	<b>\$8.00</b>	<b>\$22.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 250' of Midwest Guardrail System to be replaced along length of the segment.
- Observed 35 Utility Poles to be relocated along length of the segment.
- Observed 7' wide Curb and Gutter to be replaced along 264' span.

Date: 1/5/2015

Cost Template

TEMPLATE ID: RET8

DESCRIPTION: Retaining Wall (H=8)

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
510060A	Structure Concrete Retaining Wall	SF	\$140.00	\$100.00	\$180.00	8	1	8	\$1,120.00	\$800.00	\$1,440.00
<b>Subtotal</b>									<b>\$1,120.00</b>	<b>\$800.00</b>	<b>\$1,440.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 8' high Concrete Retaining Wall needed.

Date: 1/5/2015

Cost Template

TEMPLATE ID: SS8

DESCRIPTION: Signing and Striping

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
150711	Remove Painted Traffic Stripe	LF	\$1.00	\$0.50	\$2.00	2	1	2	\$2.00	\$1.00	\$4.00
150742	Remove Roadside sign	EA	\$150.00	\$125.00	\$200.00	0.001	1	0.0010	\$0.14	\$0.12	\$0.19
566011	Roadside Sign - one post	EA	\$400.00	\$250.00	\$520.00	0.001	1	0.0010	\$0.39	\$0.24	\$0.50
840656	Paint traffic stripe (2-coat)	LF	\$0.30	\$0.20	\$0.40	7	1	7	\$2.10	\$1.40	\$2.80
<b>Subtotal</b>									<b>\$4.75</b>	<b>\$3.00</b>	<b>\$7.50</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 2 stripe to be removed along every foot.
- Observed 25 Roadside signs to be removed along entire segment.
- Observed 25 Roadside signs-one post to be replaced along entire segment.

Date: 1/5/2015

Cost Template

TEMPLATE ID: WDN9L

DESCRIPTION: Widen by 1 Lane in Each Direction (W=13)

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
160102A	Clearing and Grubbing (W=12')	SF	\$1.00	\$0.70	\$2.00	24	1	24	\$24.00	\$16.80	\$48.00
150770	Remove Asphalt Concrete Pavement (W=1')	SF	\$7.00	\$3.00	\$12.00	2	1	2	\$14.00	\$6.00	\$24.00
260203	Class 2 Aggregate Base (8")	CY	\$35.00	\$25.00	\$60.00	0.65	1	0.65	\$22.58	\$16.13	\$38.71
390132	Hot Mix Asphalt (TYPE A) (6")	TON	\$100.00	\$85.00	\$125.00	0.96	1	0.962	\$96.20	\$81.77	\$120.25
394073	Place Hot Mix Asphalt Dike (Type A)	LF	\$2.00	\$1.00	\$3.50	2	1	2	\$4.00	\$2.00	\$7.00
190101A	Roadway Excavation (W=13')	SF	\$4.00	\$2.00	\$10.00	26	1	26	\$104.00	\$52.00	\$260.00
377501	Slurry Seal (W=100')	TON	\$165.00	\$140.00	\$190.00	0.02	1	0.02	\$3.44	\$2.92	\$3.96
<b>Subtotal</b>									<b>\$270.00</b>	<b>\$180.00</b>	<b>\$505.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 24' wide of Clearing and Grubbing along every foot.
- Observed 2' of sawcutting and removal of existing Asphalt Concrete Pavement along every foot.
- Observed 26' wide section to be excavated along every foot.
- Used 148 lbs/ft<sup>3</sup> for Hot Mix Asphalt

Date: 1/5/2015

Cost Template

TEMPLATE ID: IT9

DESCRIPTION: Miscellaneous Improvements

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
999999D	Relocate Utility Poles	EA	\$10,000.00	\$5,000.00	\$15,000.00	0.002	1	0.002	\$23.67	\$11.84	\$35.51
<b>Subtotal</b>									<b>\$24.00</b>	<b>\$12.00</b>	<b>\$36.00</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 25 Utility Poles to be relocated along length of the segment.

Date: 1/5/2015

Cost Template

TEMPLATE ID: SS9

DESCRIPTION: Signing and Striping

UNIT: LF

Item No.	Description	Unit	Unit Cost			Quantity			Total Cost		
			Typical	Low	High	Amount	Length (FT)	Multiplier	Typical	Low	High
150711	Remove Painted Traffic Stripe	LF	\$1.00	\$0.50	\$2.00	2	1	2	\$2.00	\$1.00	\$4.00
150742	Remove Roadside sign	EA	\$150.00	\$125.00	\$200.00	0.0019	1	0.0019	\$0.28	\$0.24	\$0.38
566011	Roadside Sign - one post	EA	\$400.00	\$250.00	\$520.00	0.0019	1	0.0019	\$0.76	\$0.47	\$0.98
840656	Paint traffic stripe (2-coat)	LF	\$0.30	\$0.20	\$0.40	7	1	7	\$2.10	\$1.40	\$2.80
<b>Subtotal</b>									<b>\$5.25</b>	<b>\$3.25</b>	<b>\$6.25</b>

Assumptions: Based on aerial screening, refer to the observations below that were used to identify the "Amount"  
The "Multiplier" is the factor used to determine the unit price per foot along the entire span of the segment.

- Observed 2 stripe to be removed along every foot.
- Observed 20 Roadside signs to be removed along entire segment.
- Observed 20 Roadside signs-one post to be replaced along entire segment.

