

# **ACTION ELEMENT – INTELLIGENT TRANSPORTATION SYSTEMS (ITS)**

## **Background**

In the fall of 2003, BCAG initiated the development of an ITS Regional Architecture and Strategic Deployment Plan (SDP) conforming to the requirements of 23 CFR Parts 655 and 940 for Butte, Glenn and Colusa counties.

BCAG took the lead in developing a multi-county ITS-SDP in partnership with Glenn County, Colusa County, Caltrans and FHWA, with the assistance of a qualified consultant to serve as the ITS Coordinator. Butte, Glenn and Colusa Counties, as well as Caltrans and FHWA, did not have the resources to develop the required regional ITS-SDP individually.

In the fall of 2003, the three counties, FHWA and Caltrans met to establish the beginning of a working group and made an informal commitment to work together as a 3-county partnership. The working group served as the basis for forming the Project Development Team (PDT) which guided the development of the ITS-SDP.

In January 2004, BCAG applied for and received a State Planning and Research (SP&R) Grant through Caltrans for funding participation in the development of the proposed ITS plan. Along with the grant amount of \$80,000, BCAG contributed \$70,000 and Colusa and Glenn County each contributed \$15,000 for a project amount of \$180,000.

ITS involves the application of electronics, computers, and technology to more efficiently manage transportation systems and assets. The main purpose of an ITS architecture is to ensure that the involved transportation agencies plan, develop, and deploy their systems in a coordinated and consistent manner. Other equally important purposes are to eliminate duplication of efforts, to stretch funding dollars, and to ensure that ITS deployed in the North Valley is coordinated with ITS in adjacent regions within California.

A minimal amount of ITS is already in place in the three county region but more is planned over the horizon of the RTP/SCS. This project conducted an inventory of the systems already in place, as well as those planned for the future. Additionally, the transportation system needs for the three county region and North Valley Stakeholders were collected and used to formulate ITS architecture and integration recommendations.

The ITS Plan shows in detail how various systems (transportation and emergency agencies, such as fire and police) and agencies connect and interconnect, both within three counties and with external entities. This Plan also assists in developing agency roles and responsibilities, systems functional requirements, a list of required interagency agreements, and project sequencing.

Within the next 10 years, it is expected that integration of the strategies identified will be one of BCAG's primary goals in developing transportation projects. The Butte County region has significant transportation issues developing and recognizes the limited amount of funds available to accomplish those needs.

It is expected that within the horizon of the RTP/SCS, ITS strategies will become commonplace in project development together with increased application efficiencies of developing technologies. BCAG will make every effort to seek out and apply these technologies that will make sense and provide an overall cost efficiency to the increased development of our local transportation needs.

## **Purpose and Need**

The purpose is to maintain and develop the required regional architecture compliance and implementation of a *North Valley ITS Strategic Deployment Plan - SDP*. The project benefits are expected to be a more expeditious and consistent integration of ITS into the state and regional transportation planning and programming process in the North Valley area.

The project goals are: a) a more cohesive approach to ITS implementation in the three North Valley counties leading to multi-region support to the statewide ITS framework; b) implementation of ITS technologies in the multi-region, including improvements in data collection, distribution, system operation, and other areas; and c) better integrated development and implementation of state and regional transportation plans, projects and services.

BCAG recognizes the significant role of ITS in the transportation planning and programming process. As such, as the regional architecture is developed and potential projects or project components are identified, the RTP/SCS will be included to ensure consistency between the Architecture and the long range plan.

## **ITS Development**

On August 19, 2004, BCAG hosted a training session at the City of Chico Council Chambers for owners/operators of ITS systems. The workshop was intended to give participants an overview of ITS and the types of projects that may be considered in the development of a more efficient and useful transportation system for both the more urbanized areas and those that are rural in the region.

As the population increases, so will traffic congestion. Funding availability to address the increase in congestion has not kept pace with infrastructure needs and is expected to fall farther behind as time goes on. As such, it has become more important to pursue different strategies like ITS aimed at making the existing infrastructure more efficient for all users and operators. All aspects of the ITS development have been posted at [www.iteris.com/northvalleyits](http://www.iteris.com/northvalleyits). Appendix 4 includes the Scope of Work for the North Valley ITS Strategic Deployment Plan – SDP Project led by BCAG. This information is also posted on BCAG's website.

## Northern California Super-Region ITS Master Plan Development

During the 2016/17 Caltrans will be taking the lead in developing the Northern California Super-Region ITS Master Plan. The Regional Intelligent Transportation System (ITS) Master Plan (Plan) is a roadmap for integration of ITS strategies into the North State Super Region's (Super Region) transportation system over the next ten (10) years. A map of the Super Region can be viewed at [www.superregion.org](http://www.superregion.org). The Regional ITS Master Plan will be developed through a cooperative effort by the California Department of Transportation (Caltrans), the Federal Highway Administration (FHWA), and the Super Region's transportation planning and operating agencies in the following counties: Butte County, Colusa County, Del Norte County, Glenn County, Humboldt County, Lake County, Lassen County, Mendocino County, Modoc County, Nevada County, Plumas County, Shasta County, Sierra County, Siskiyou County, Tehama County, and Trinity County.

The Plan addresses ITS subsystems, as well as those planned for development over the next ten (10) years and provides a framework that includes the entire transportation network down to individual transportation projects. Each ITS project can be viewed as an element of the overall ITS network that will be implemented over time. The expectation is to achieve a shared vision of how each agency's systems will work together in the future, sharing information and resources to provide a safer, more efficient, and more effective transportation system for travelers utilizing the transportation system network.

The Regional ITS Master Plan is viewed as a living document that will require regular updates by Caltrans staff to ensure that it maintains accurate representation of the Region's ITS elements. The key is to plan for technology deployment in a cooperative environment among stakeholders in a sensible manner to promote the efficiency of project deployment and stakeholder resources. Based on the vision for the Regional ITS Master Plan and the specific needs of Caltrans Districts and our partners, this effort will identify all applicable ITS concepts that could be applied to each corridor based on their unique characteristics. It will also identify quantitative and qualitative performance criteria for the strategies consistent with FHWA's guidance on regional ITS architecture plans.

The Plan will cover services across a broad range of ITS, including:

- Traffic management,
- Incident management,
- Emergency service,
- Transit management,
- Traveler information,
- Archived data management,
- Maintenance and construction operations,
- Commercial vehicle operations, and

- Autonomous and Semi-autonomous vehicles

The Regional ITS Master Plan is an important tool that will be used by:

- Transportation agencies to recognize and plan for transportation integration opportunities, not only in Caltrans Districts, but the whole Region with applicability on a statewide basis.
- Caltrans to better reflect integration opportunities and operational needs into the transportation planning process, and
- Other organizations (private sector) and individuals that use the transportation system in the Region.

The Plan provides a framework that includes the entire transportation network down to individual transportation projects. Each ITS project can be viewed as an element of the overall ITS network that will be implemented over time. By identifying problems as well as prioritized needs of the transportation network, a workgroup of Caltrans staff, Metropolitan Planning Organizations (MPO) and Regional Transportation Planning Agencies (RTPA) will establish a set of goals and measurable objectives for the Regional ITS Master Plan. These goals and objectives will then help us define a clear and concise vision which in turn will help to shape the Regional ITS Master Plan through consensus building.

Based on the vision for the Regional ITS Master Plan and the specific needs of Caltrans Districts and our partners, this effort will identify all applicable ITS concepts that could be applied to each corridor based on their unique characteristics. It will also identify quantitative and qualitative performance criteria for the strategies. This would be consistent with FHWA's guidance on regional ITS architecture plans.

### **Transportation Systems Management (TSM)**

The phrase Transportation Systems Management (TSM) is often used interchangeably with Transportation Control Measures (TCMs) and Travel Demand Management (TDM) to describe a series of techniques designed to maximize the efficiency of the existing transportation system by reducing dependence on single occupant vehicles. The common goal of TSM, TCMs, and TDM are to reduce traffic congestion, improve air quality, and reduce or eliminate the need for new and expensive transportation infrastructure. Techniques are generally low-cost measures to reduce travel demand or improve the utilization of existing transportation facilities.

The differences between the three concepts are subtle. Each contains alternative transportation measures, such as carpooling, transit, bicycle, walking, vanpooling, compressed workweeks, and telecommuting. Transportation Systems Management (TSM) places emphasis on reducing traffic congestion by increasing the person-trip capacity of existing transportation systems. As such, TSM techniques also include restriping roadways for channelization, ramp metering, and establishment of freeway

auxiliary lanes. Travel Demand Management (TDM) emphasizes reducing the demand for single occupant vehicle travel through techniques such as teleconferencing and advanced communication technology. Transportation Control Measures (TCMs) focus on reducing air pollution through techniques such as alternative fuel vehicles.

Since 1981, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) have required that Transportation Systems Management (TSM) be part of the regional transportation planning and programming process. Specifically, the Regional Transportation Plan must have a TSM element that describes how the region intends to deal with the movement of people and goods by improving the efficiency and effectiveness of the total transportation system.

## **Purpose and Need**

The purpose of identifying TSM Strategies is to document techniques for the local jurisdictions to consider in efforts to encourage TSM strategies as part of the project implementation process. Documentation of TSM strategies is necessary in order to assist in reducing congestion, improving traffic flow, and providing alternatives to traditionally designed projects.

## **TSM and TDM Strategies**

### **Traffic Flow Improvements**

As traffic on highways and primary arterials increases, so will congestion and air quality problems. Traffic flow improvements, such as ramp metering, changeable message signs, and closed-circuit traffic surveillance, may be considered for use to maximize the capacity of existing roadways. All of these techniques are currently in use in major urban areas of California.

Ramp metering is a technique that spaces the entrance of vehicles onto the freeway. Cars are stopped on the on-ramp by a traffic light, which then allows one vehicle to enter the freeway each cycle. This technique makes merging smoother and reduces traffic backups due to platoons of cars trying to merge onto the freeway at the same time.

Changeable message signs advise drivers of traffic problems ahead. This technique allows motorists to anticipate traffic slowdowns and weather conditions, leading to fewer accidents, or to take alternative routes. Changeable message signs have been used for many years on Interstate 80 to advise travelers of road conditions and closures to prevent travelers from being caught unprepared for snowy weather over the summit of the Sierra.

Roadway restriping, channelization, elimination of on-street parking, and computerized signalization are techniques currently used to improve the flow of traffic without new

road construction as well. Roadway restriping seeks to increase the number of lanes by reducing lane width, thus increasing traffic capacity. Channelization, which is often done in conjunction with restriping, adds turn lanes to busy roadways to eliminate traffic backups behind cars trying to make turns. Elimination of on-street parking is done to add lanes, and thus capacity, to heavily traveled roadways. In addition, traffic backups caused by vehicles entering or exiting on-street parking spaces is eliminated. Computerized signalization seeks to coordinate signal timing to smooth traffic flow. A local example of such traffic flow characterization would be the Esplanade in Chico.

## Transit

Public transit service is provided by Butte County, and the cities of Biggs, Gridley, Oroville, Paradise, and Chico. Public transit service is the most widely used TSM measure in Butte County serving residents who depend upon transit for commuting to work, school, shopping, medical, and leisure. The Transit chapter provides a comprehensive overview of transit in Butte County. ITS types of projects include real time bus arrival utilizing text messaging at a bus stop. Each transit bus is equipped with AVL/GPS technology. During the 2016/17 fiscal year, BCAG will be developing a mobile app for smartphones to provide bus route location based on where the user is located and provide directions to find it.

## Ridesharing

The purpose of Ridesharing is to encourage the use of alternative transportation modes for traveling to work, school, personal trips, and recreation. The benefits of ridesharing are reduced single occupancy travel and improved air quality. Rideshare promotes all forms of alternative transportation including carpooling, vanpooling, transit, biking, and walking. Butte County residents can enter their commute information in a regional database to try to find carpooling partners.

## Transit Incentive Programs

Under agreement with CSU, Chico's Associated Students, Butte Regional Transit (B-Line) provides free transit trips to the students, faculty, and staff of CSU, Chico. The University, at a rate of \$265,000 based on estimated annual ridership at 325,000 trips. This program has been successful.

## Student Shuttle

During the academic year, B-Line has continued the operations of a Student Shuttle for students, faculty, and staff of CSU, Chico. The Shuttle has two routes that connect the university with the largest student housing areas.

## Pedestrian and Bikeway Facilities

By making these methods safer and more convenient, pedestrian and bikeway facilities make bicycling and walking more attractive as alternatives to the automobile. Most schools and many shopping areas and employers provide racks for bicycle parking. A complete description of existing and future pedestrian and bikeway facilities within Butte County is included in Chapter 7.

### Park and Ride Lots

The purpose of park-and-ride lots is to provide a central meeting place adjacent to major travel routes where commuters can congregate and form carpools or catch buses for the remainder of the commute trip. Caltrans presently operates two park-and-ride lots in Butte County, with a total of 154 paved spaces available. The largest lot, located at the intersection of SR 99 and SR 32 in Chico, has 124 parking spaces. A B-Line bus stop located on Fir Street serves these riders. During the 2016/17 fiscal year, the City of Chico is reconstructing the operations at SR 99 and SR 32. Improvements include signal synchronization, increased bike and ped improvements and increased parking spaces for commuters. The other park-and-ride lot is located at the intersection of Nelson Avenue and SR 70 in Oroville and has 30 spaces. As gas prices have increased significantly, so has the demand for increased capacity at park and ride lots.

The City of Oroville developed an additional park-and-ride facility with Proposition 116 funds. The new Oroville facility at the corner of Montgomery and Oak Streets has space for 34 vehicles. In addition, the Town of Paradise opened a park-and-ride lot on the Skyway in August 1999. Funded mainly with Proposition 116 funds, the lot has space for 36 vehicles. A second park-and-ride lot is scheduled to be constructed in the 2012/13 fiscal year on Pearson Rd.

### Telecommuting, Compressed Work Weeks and Flexible Work Hours

Telecommuting, compressed workweeks and flexible hours are employment-based techniques to reduce the number of work trips per week, or to transfer trips to reduce peak hour congestion. Telecommuting, or alternative work locations, allows workers to perform job duties at home or other locations, communicating with the main work center by modem, fax, or telephone as necessary. This alternative is especially attractive for workers in rural areas or those commuting long distances, and studies have shown telecommuters are up to 20% more productive.

Compressed workweeks increase the number of hours worked each day to squeeze a regular workweek into fewer workdays. A typical schedule could be four 10-hour workdays each week (4/10 schedule), or eight 9-hour days and one 8-hour day in two weeks (9/80 schedule).

Flexible hours do not reduce the number of work trips per week, but seek to reduce traffic congestion by shifting some trips out of the peak period. Employers using flexible hours may allow workers to vary time of arrival and departure daily, or may require

workers to choose a specific schedule to meet the needs of the employer and employee. Many employers throughout the county use flexible hours.

#### Teleconferencing

Teleconferencing is generally defined as meetings held by telephone or via video hookup to replace the need for traveling to meet in person. It is unknown how extensively this may be used by private firms in Butte County at present, although as the technology becomes more prevalent, use can be expected to increase accordingly.

Both Butte College and CSU, Chico provide telecourses. Telecourses provided by Butte College are generally prerecorded, then broadcast at specific times on the local cable station. Students only meet at the college a few times each semester for introductory information and to take tests. Telecourses provided by CSU, Chico are broadcast live on closed circuit television to satellite locations throughout the North Valley. From the satellite classrooms, students can speak with the instructor via telephone hookup as part of the lecture. Tests are taken at the satellite locations and mailed back to the instructor.

#### Alternative Fuels

Alternative fuels are used to power motor vehicles while reducing the impacts to air quality. Some of the more common alternative fuels currently in use include methanol, propane, compressed natural gas, and electricity.

Butte Regional Transit has compressed natural gas (CNG) fueling stations in Chico, Oroville, and at the Butte County offices. Currently there are 30 CNG fueled vehicles using these stations.

#### Mixed Land Use

Land use strategies commonly used in the last forty years place single family residential uses, shopping areas, low-income housing, schools, and employment centers each in separate areas, often enclosed and distant from each other. As a result, individuals must use cars to get to the places they need to go. With mixed land use techniques, houses, shops, schools, and employers are integrated. Examples of mixed land use include apartments located over shops, shopping areas, and professional offices integrated into residential neighborhoods, and affordable "granny units" in single family residential areas. The placement origins and destinations of travel closer together allows for much more feasible alternative transportation.

Mixed land use is evident in many of the jurisdictions. The downtown areas of Chico, Gridley, Oroville, and Biggs, which include shopping and employment, are surrounded by residential areas, which include both single and multiple family housing. The Town of Paradise has many instances of residential, shopping, and professional office integration throughout the area.



## **Previously Programmed and Funded Projects**

While TSM projects are not specifically called “TSM Projects”, Butte County has implemented several projects which achieve the TSM goals. For example, the following projects have been delivered and are operational today:

- City of Chico – East Avenue @ Esplanade Signalization Project (CMAQ funded)
- City of Chico – East Avenue @ Cohasset Ave Signalization Project (CMAQ)
- City of Chico – East 1<sup>st</sup> Ave. @ Mangrove Ave Signalization Project (CMAQ)
- Town of Paradise – Pearson Rd @ Black Olive Drive Signalization (CMAQ)
- BCAG – Transit Outreach Program (CMAQ)
- BCAG – Electronic Bus Card Readers for Transit Fleet (CMAQ)
- BCAG – AVL / GPS System – Entire Fleet -Fixed Route and Paratransit System
- Biggs – Bicycle and Pedestrian Project (TE)
- Paradise - Pedestrian Project (TE)

In addition to the signalization projects, BCAG has equipped the entire B-Line fixed route fleet with electronic card readers to make the system more convenient for its riders. New electronic fareboxes have been installed on the fixed route and paratransit fleet. This allows for increased flexibility in managing the transit fleet. The reporting data from the system provides transit planners, policy boards, and the public increased data for a better understanding of the system operations. This is critical in efforts to improve the system for the public.

California State University, Chico students and faculty, as well as Far Northern Regional Center patrons, now swipe their specialized cards through a magnetic card reader to board the B-Line system. Since the last RTP was prepared, BCAG has installed the same system on the paratransit fleet, as well as equip the entire transit fleet with AVL/GPS technologies.

## **RTP/SCS Planned Improvements**

Because the nature of TSM type of projects differ greatly, it is practically impossible to specifically identify projects. TSM projects are not required in Butte County; however, BCAG encourages the jurisdictions to consider TSM strategies as part of the project implementation process.

In addition, BCAG will participating in the development of the Northern California Super-Region ITS Master Plan beginning in the 2016/2017 fiscal year.