

# INTELLIGENT TRANSPORTATION SYSTEMS



Bicycle & Pedestrian Planning  
*Intelligent Transportation Systems*  
 Land Use & Transportation Planning  
 Parking  
 Smart Growth  
 Traffic Calming  
 Traffic Engineering Design  
 Traffic Operations & Simulation  
 Transit Planning & Simulation  
 Transportation Systems Planning  
 Travel Demand Forecasting

As the level of funding for transportation infrastructure fails to keep pace with the need, communities are seeking new ways to maximize the efficiency of their existing transportation systems. Intelligent Transportation Systems (ITS) have become vital to agencies as they employ the latest innovative technologies to address the problems of today and tomorrow.

Fehr & Peers has extensive experience in various forms of ITS planning, design and implementation for small and large agencies throughout the western United States. Our senior staff possess vast expertise in many specialized areas of ITS including:

- Strategic/deployment plans
- Design and procurement services
- Traffic signal system optimization
- Closed circuit television (CCTV) systems
- Ramp meters
- Weather stations
- Transit signal priority systems
- Electronic payment systems
- Parking advisory and monitoring systems

We have also developed communications for ITS devices utilizing a variety of media, including twisted-pair copper wire, coax cable, fiber-optic cable, wireless radio, and microwave systems.

## OUR UNIQUE CAPABILITIES IN KEY INTELLIGENT TRANSPORTATION SYSTEMS SPECIALTIES:

- **Visual Simulation** – using the latest traffic operations software to help clients visualize the expected outcomes using 3D animation.
- **Benefit Assessment** – measuring ITS benefits to the traveling public, transportation agencies, and the communities.
- **Traffic Management during Construction** – applying innovative techniques to reduce construction-related delays and congestion.
- **New Applications for Smart Card Technology** – designing and developing systems using Smart Card technology for such applications as security monitoring, access control, paratransit operations, and dynamic ridesharing.



### **SMART CORRIDORS SIGNAL COORDINATION PROJECT - ALAMEDA COUNTY, CA**

Fehr & Peers was retained by the Alameda County Congestion Management Agency (ACCMA) to provide on-call ITS services to the Agency as a part of its SMART Corridors Program. The first task under this contract was to develop coordinated signal timing plans for 85 intersections along a 14-mile segment of San Pablo Avenue through nine jurisdictions in the East Bay. An extensive data collection effort was undertaken to obtain traffic counts, critical queue lengths, and travel speeds during weekday morning, midday, and evening peak periods. A variety of analytical techniques, such as Synchro and VISSIM, were employed to develop traffic operations models of the corridor. The models were then used to derive improved signal timings for the system during each peak period. One of the most challenging aspects of the project was to balance the needs of the various users of the corridor including local traffic, through traffic, bicyclists and pedestrians, as well as public transit patrons in conjunction with the recently implemented Rapid Bus and Transit Signal Priority (TSP) systems. Fehr & Peers also provided staff support during field implementation, and performed after studies to confirm the effectiveness of the improvements.



### **INTERSTATE 5/STATE ROUTE 56 INTERCHANGE IMPROVEMENTS - SAN DIEGO, CA**

The expansion of SR-56/I-5 interchange is a critical component of the SR-56 connecting I-5 and I-15 in San Diego, CA. Fehr & Peers is developing the ITS plan for congestion mitigation during and after the construction phase of this project. Applications of traffic sensors, DMSs, CCTVs and traveler information system will be considered to help manage multiple modes of traffic and mitigate congestions during peak hours. VISSIM micro-simulation models are being used to develop consensus and to promote project objectives.

### **STATE ROUTE 99 WIDENING - STOCKTON, CA**

This project expanded the State Route 99 freeway from four to six lanes between Hammer Lane and the State Route 4 freeway (4.3 miles through four interchanges). Fehr & Peers prepared plans, specifications, and cost estimates for four weather stations, three changeable message signs, three CCTV systems, and interconnect between the new ramp traffic signals at four interchanges. Mainline travel speeds will be monitored through a series of detector loops placed at quarter mile intervals. Visibility limitations (e.g. fog) will be measured by the weather stations. Vehicle speed and visibility limitation information will be transmitted to the traffic operations center and used as the basis for displaying information on the changeable message signs.

Although information will initially be transmitted to the traffic operations center via leased telephone lines, the project includes design of conduit in the median of the entire length of the project for future installation of fiber optic cable.

### **US HIGHWAY 95 IMPROVEMENTS - LAS VEGAS, NV**

As part of the ITS project for the segment of US 95 between North Durango Drive and I-15/I-515 (14.5 miles), Fehr & Peers prepared plans, specifications, and cost estimates for 14 ramp meters that will use video detection for the ramps as well as for mainline traffic. Other elements of the project include CCTV systems, Dynamic Message Signs (DMSs), highway advisory radio (HAR), system communications and upgrades to the existing traffic operations center. Fehr & Peers also performed the ramp meter warrant analyses at nine locations in the corridor.



### **INTERSTATE 215/INTERSTATE 515 ITS PROJECT - HENDERSON, NV**

During the development of the design to extend I-215 to I-515 and construct an interchange between the two freeways, the project team decided to investigate the opportunity to use ITS to help manage traffic during the four primary stages of construction. Fehr & Peers researched communication options for permanent, temporary and portable devices and the existing infrastructure that had been installed by Nevada Department of Transportation, the City of Henderson and Clark County in the project area. Fehr & Peers assisted the project team in identifying applicable ITS devices and candidate locations for these devices. Fehr & Peers also assisted in preparing designs for CCTV and DMS installations, which will transmit images via microwave, and for the wireless connections that will be used to communicate with each DMS.

### **US HIGHWAY 101 AUXILIARY LANES - SAN MATEO COUNTY, CA**

In conjunction with the construction of mainline auxiliary lanes on the US 101 freeway between Ralston Avenue and Marsh Road (6.2 miles through five interchanges), Fehr & Peers designed 10 ramp meters and nine traffic monitoring stations. Transmission of information from the field will be through the use of wireless radio.

### **LAYTON AREA SIGNAL COORDINATION PROJECT - LAYTON, UT**

Fehr & Peers prepared plans, specifications, and cost estimates for 11.8 miles of fiber optic cable that will be used for traffic signal interconnect on three state highways (Hill Field Road, Main Street and Antelope Drive) in the cities of Layton and Clearfield. To avoid conflicts with existing utilities, the fiber conduit will be installed by directional bore at a depth of 10 feet. The final design utilized a 48 single mode fiber backbone to allow for future expansion.

#### **FREEWAY INCIDENT/OLYMPIC VENUE SIGNAL TIMING - SALT LAKE CITY, UT**

Fehr & Peers developed traffic signal timing plans in key corridors for freeway incident management and for the 2002 Winter Olympics venue operations. Timing plans were prepared for the State Street corridor in the event the I-15 freeway were to be closed. A separate set of signal timing plans were prepared for Olympic venue sites including the entire downtown Salt Lake City grid, the E-Center, the Olympic Ice Oval and Park City.

#### **STATE ROUTE 4 WIDENING AND INTERCHANGE IMPROVEMENTS - PITTSBURG, CA**

This project will construct 2.4 miles of the State Route 4 freeway to its ultimate configuration of six mixed-flow lanes and two HOV lanes in the vicinity of the Railroad Avenue interchange. Fehr & Peers prepared plans, specifications, and cost estimates for two ramp meters, four traffic monitoring stations and an extinguishable message sign. The project included design of interconnect of four new signals on Railroad Avenue in the immediate vicinity of the State Route 4 freeway.

#### **INTERSTATE 80/US HIGHWAY 395 FREEWAY CORRIDOR STUDY - RENO, NV**

Fehr & Peers assisted the Nevada Department of Transportation in preparing a study that defines future transportation alternatives along the Interstate 80 and US 395 corridors. As part of this study, Fehr & Peers had the primary responsibility for preparing the freeway system management alternatives which analyzed the potential for high occupancy vehicle lanes, transit options, ramp meter feasibility, reversible lane options, and implementation of an ITS that includes CCTVs and DMSs.