AT-GRADE RAILROAD CROSSINGS

Lessons Learned on the Design and Operations of a New Commuter Rail System into Downtown San Rafael

May 17, 2017
Today’s outline

- Background
  - Project Elements
  - Stakeholders
- Process
  - Design
  - Operations
  - Testing
- Lessons Learned
Project Background

• Traffic Engineering
  • VISSIM Analysis
  • Alternatives Analysis
  • Traffic Signal Timing/Preemption

• Traffic Signal Modifications
  • Controller & Cabinet Upgrades
  • Electrical Service Upgrades
  • Pedestrian Countdown retrofits
  • Railroad Preemption

• Traveler Information
  • DMS and CCTV cameras

• Traffic Signal Interconnect
  • Fiber optic and wireless interconnect
  • New traffic signal system

• Civil Design
  • Curb Ramps
  • Sidewalk Widening
  • Drainage Improvements

• Environmental Services
  • PES Form and APE Map
  • CEQA/NEPA Technical Studies
  • Extended Phase I
  • Local Assistance Coordination
  • CEQA/NEPA Approvals

• Approvals/Permits
  • Caltrans Encroachment Permit
  • CPUC GO 88-B (two sets)

Kimley-Horn
Process

PRELIMINARY ENGINEERING
- TRAFFIC ENGINEERING AND ANALYSIS
- ENVIRONMENTAL CLEARANCE (CEQA/NEPA)

DETAILED DESIGN
- CITY COORDINATION
- CALTRANS PERMIT
- CPUC APPROVALS

CONSTRUCTION
- INTEGRATION TESTING
- FIELD TESTING
- ACCEPTANCE TESTING
- ECONOLITE COORDINATION

SMART COORDINATION
Project Elements

- 17 traffic signals (11 City, 6 Caltrans)
- 3 queue cutter signals
- Fiber optic and copper interconnect
- Wireless backhaul (with repeater site)
- Econolite Centracs System
- Econolite Cobalt controllers
- Econolite Type OL cabinets
- 7 CCTV cameras
- 4 DMS
US 101

Existing City signal

Existing Caltrans signal (operated by City)

New City signal – Queue Cutter
Queue Cutter Design Issues

- Pole placement – conflicts with railroad signals
- Near side head placement
- Trees/Foliage
- Closely spaced signals
- Utilize peer-to-peer communications for preemption
- Video detection for queue cutting – use loops instead
Queue Cutting
Railroad Preemption

- Quad gates (for quiet zone)
- 12-wire interconnect for queue cutters
- Four circuits total:
  - Advanced preemption
  - Simultaneous preemption
  - Gate Down (cancels track clearance)
  - Health circuit
- Preempt circuits are supervised
- Peer-to-Peer for preempt calls to adjacent signals (controller logic)
CPUC Approval

• Preemption calculations (LADOT method)
• Nine different sets of calculations
• CPUC required the most stringent values

• Field and office review meetings
• Two sets of GO 88-B applications – SMART and City
Communications System Design Issues

- Fiber optic to wireless backhaul
- Radio repeater installations
- Fiber to copper interfaces
- All IP network
- Testbed
Bench Testing

- All controllers, switches and radios
- Central-to-Field
- Peer-to-Peer
- Redundancy/Failover
Lessons Learned

- Determine what permits, agreement and approvals will be required from the beginning - Caltrans, CPUC, railroad operator, etc.
- Streamline the procurement and minimize the number of contracts if possible
- Plan out the entire system – communications, traffic signals, preemption (operations and circuits), service
- Conduct bench testing of the controllers and cabinets with the preemption circuits – don’t want to be re-wiring in the field
- Plan up front to be behind. Delays are typical - environmental clearance, construction, approvals, testing and re-testing
Lessons Learned

• Determine sharing of infrastructure early in the process – conduits, railroad cantilevers

• Work very closely with regulatory agencies like CPUC. Meet with them in person if need be

• Be prepared to conduct a lot of testing during several different stages

• Pay attention to stage construction – night construction, business impacts

• Use proven technologies

• Document, document, document!

Kimley-Horn
Thank You!