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Gateway Cities
Traffic Signal Synchronization and
Bus Speed Improvement Project
I-5/Telegraph Road Corridor

Presentation to: Gateway Cities' Public Works Director's Meeting

Project Status Update

Siemens Energy & Automation, Inc.

Gardner Transportation Systems

October 17, 2002

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Today's Agenda

- Review of Overall Project
- Project Status
- VDS High Level Design
- LCC Recommendations
- Expanded Project Area
- Next Steps

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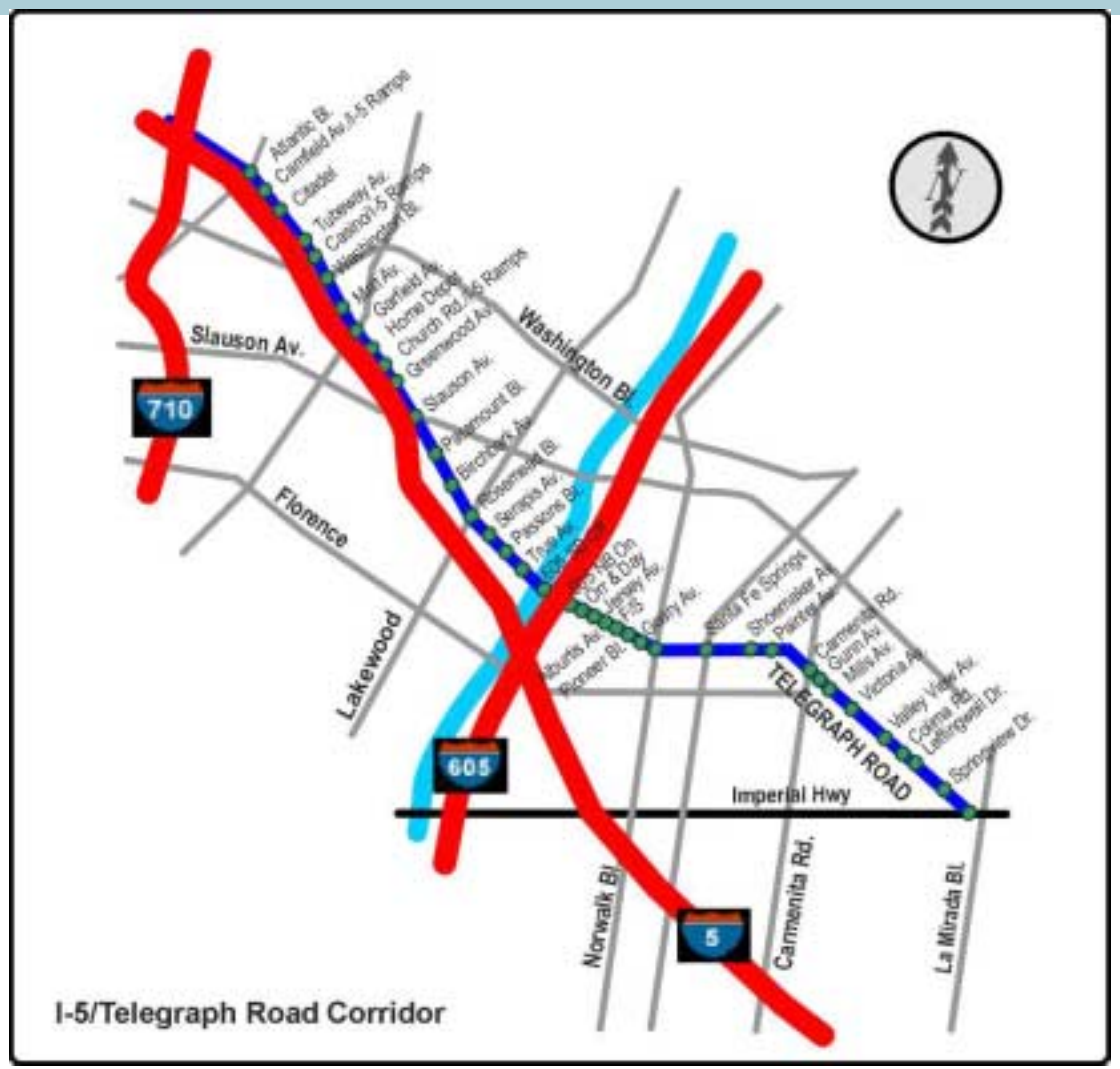
Project Area



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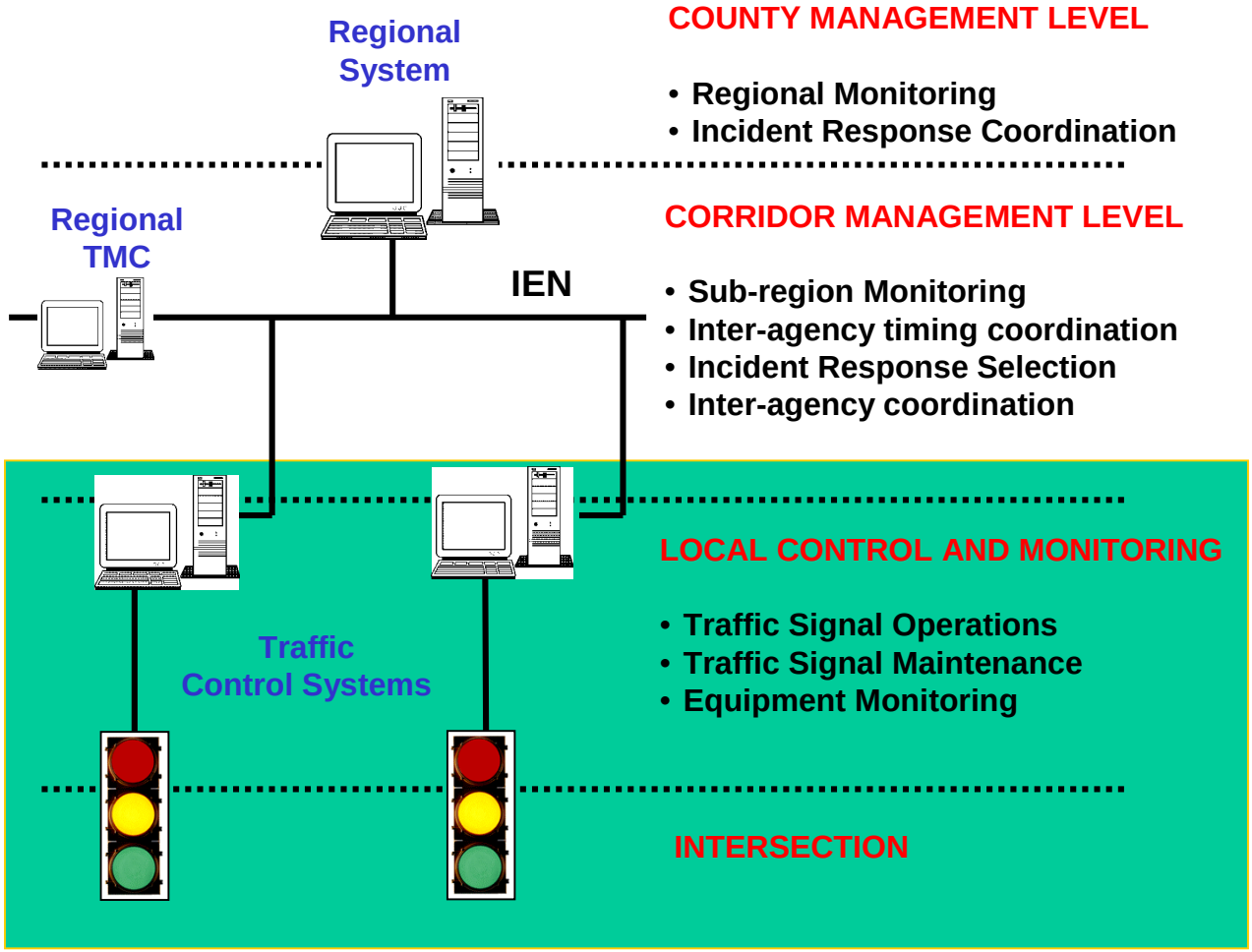
Project Focus – Implementing the IEN at the Local Level



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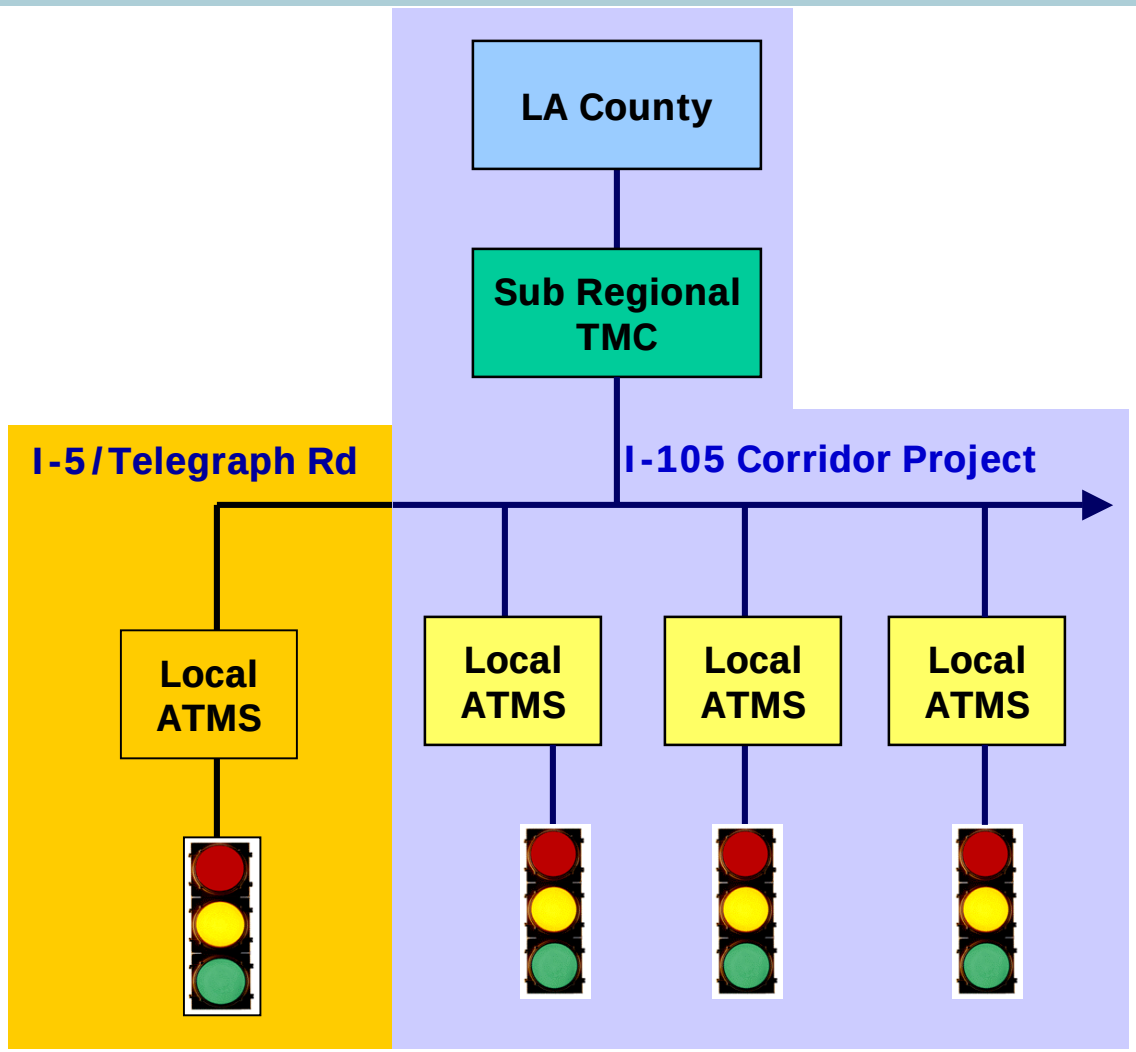
Relationship with Other Projects



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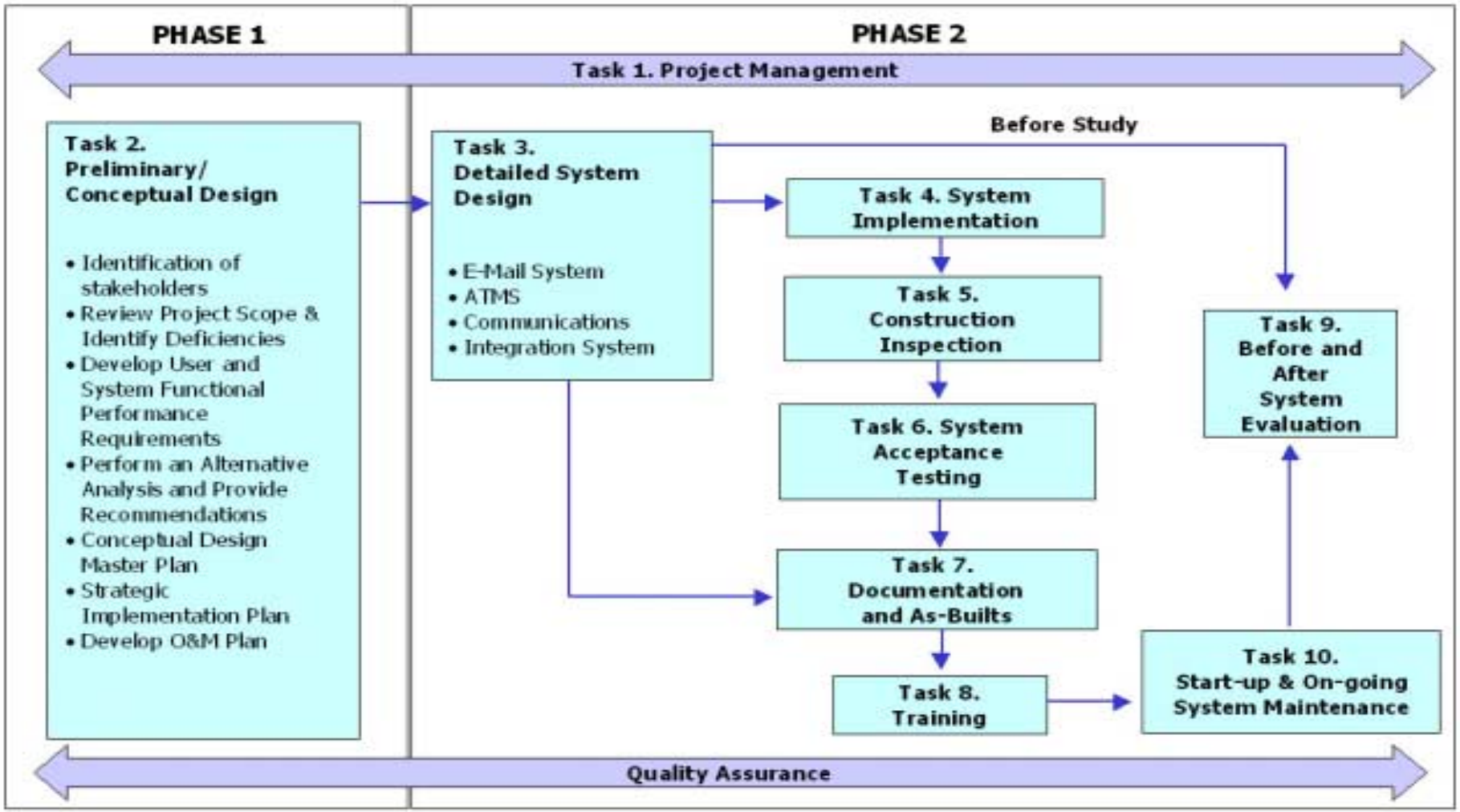
Work Flow Plan



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Project Status

• Web Page	On-Going
• Agency Interviews	Complete
• Field Surveys	Complete
• Operational Objectives and	
• City Reports	Complete
• ATMS User Requirements	Complete
• ATMS Functional Requirements	Complete
• System Integration Requirements	Final Complete/In Review
• Communication System Requirements	Complete
• Final System Requirements	Final Complete/In Review
• High Level Design (ATMS and LCC's)	Final Complete/In Review
• High Level Design (VDS)	Draft Complete/In Review
• LCC Recommendations	Draft Complete/In Review
• Communications Analysis	On-Going
• ATMS Analysis	On-Going

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VDS High Level Design Process

- Define Requirements
- Derive Functionality
- Narrow Detection Technologies
- Analyze Implementation Considerations
- Compare Costs
- Develop Recommendations

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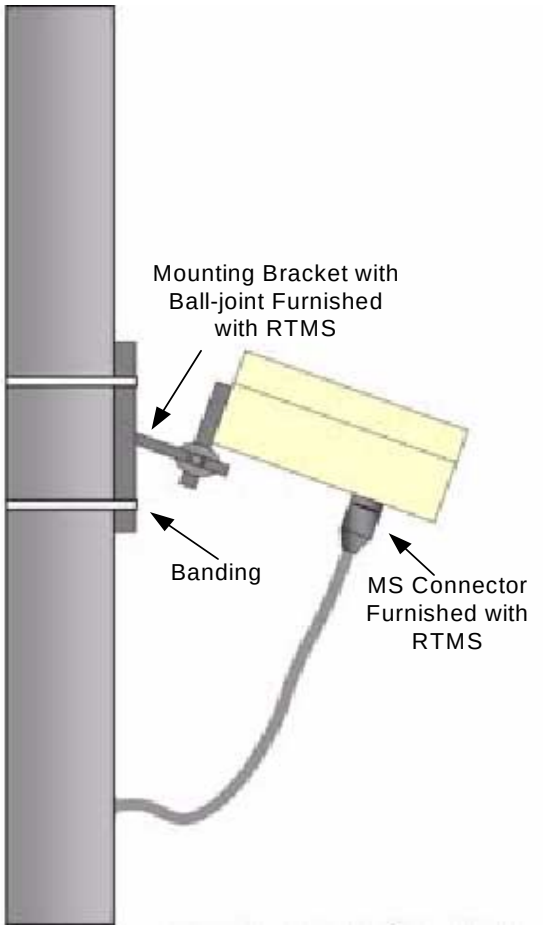
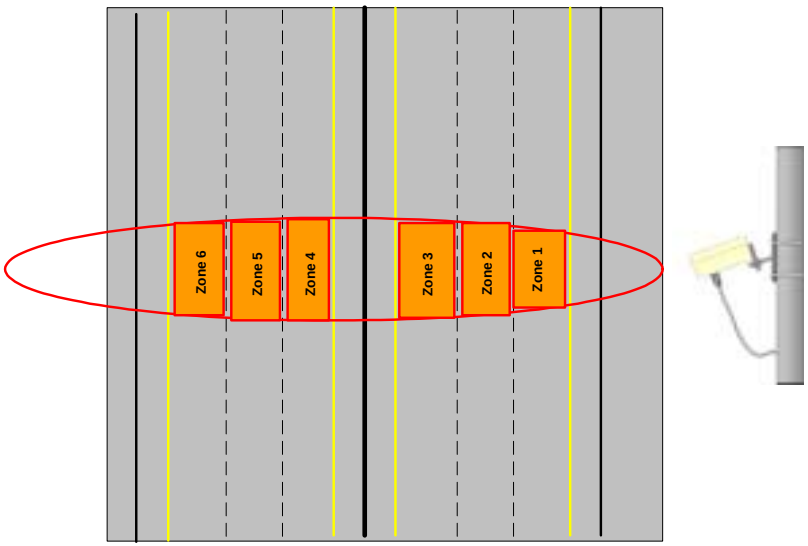
Candidate Detection Technologies

- Inductive Loop
- Microwave (RTMS)
- Video Image Detection (AutoScope)

Microwave Installation





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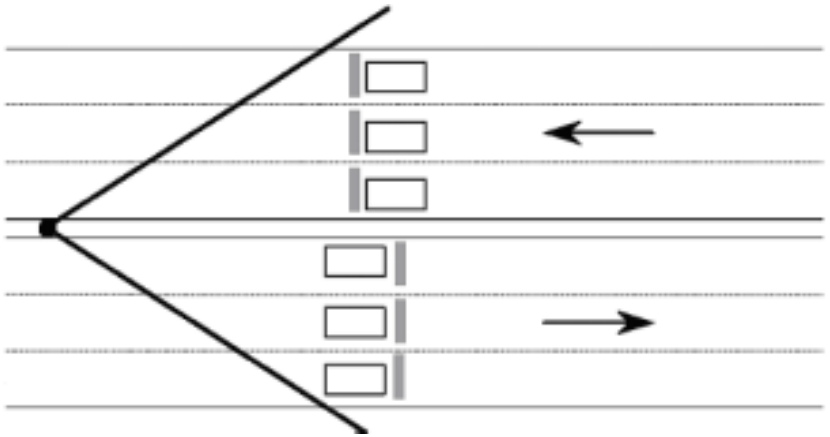
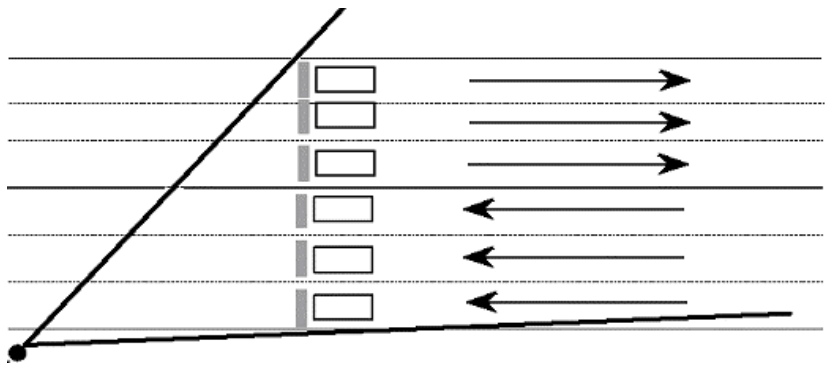
VIDS Configurations



Video Image Detection System - Median Mounted

Video Image Detection System - Side-Fire Mounted



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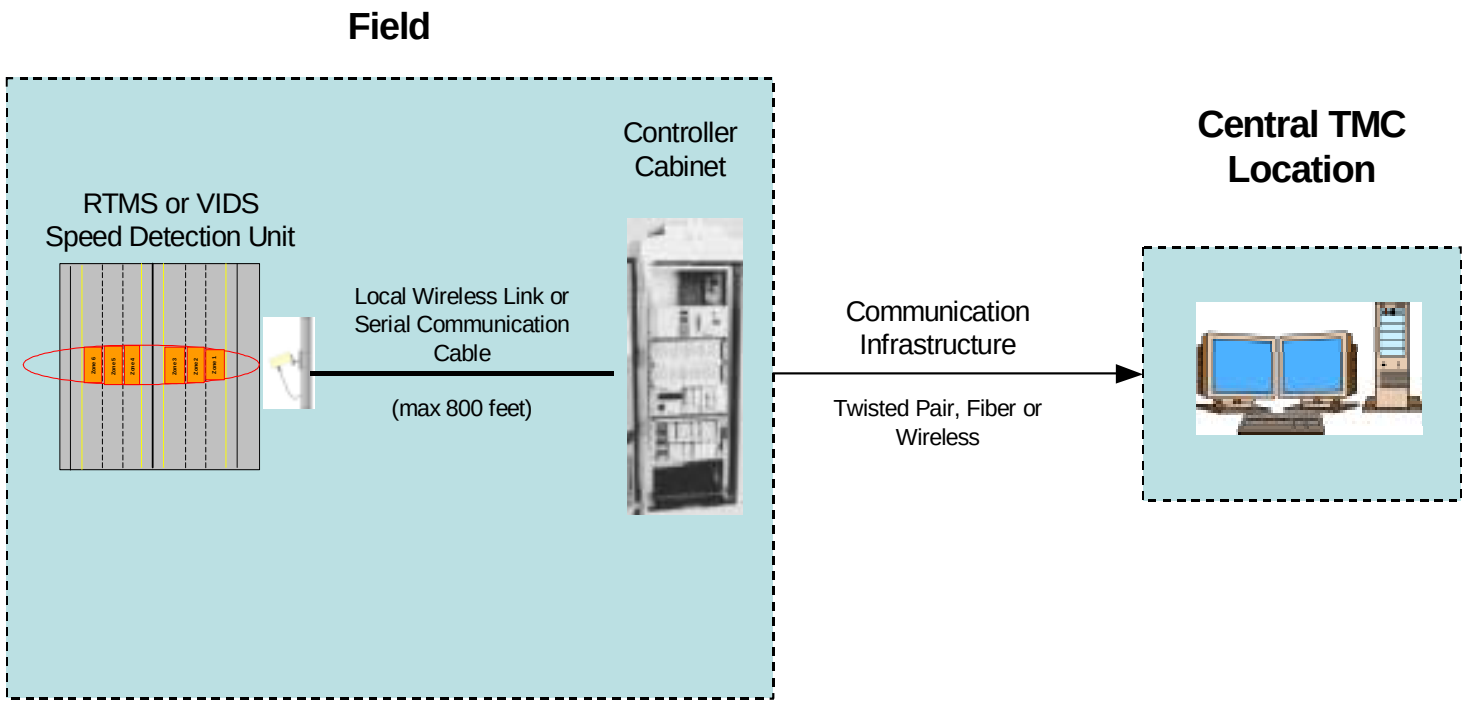
Field to Central Communication Via Traffic Signal Controller



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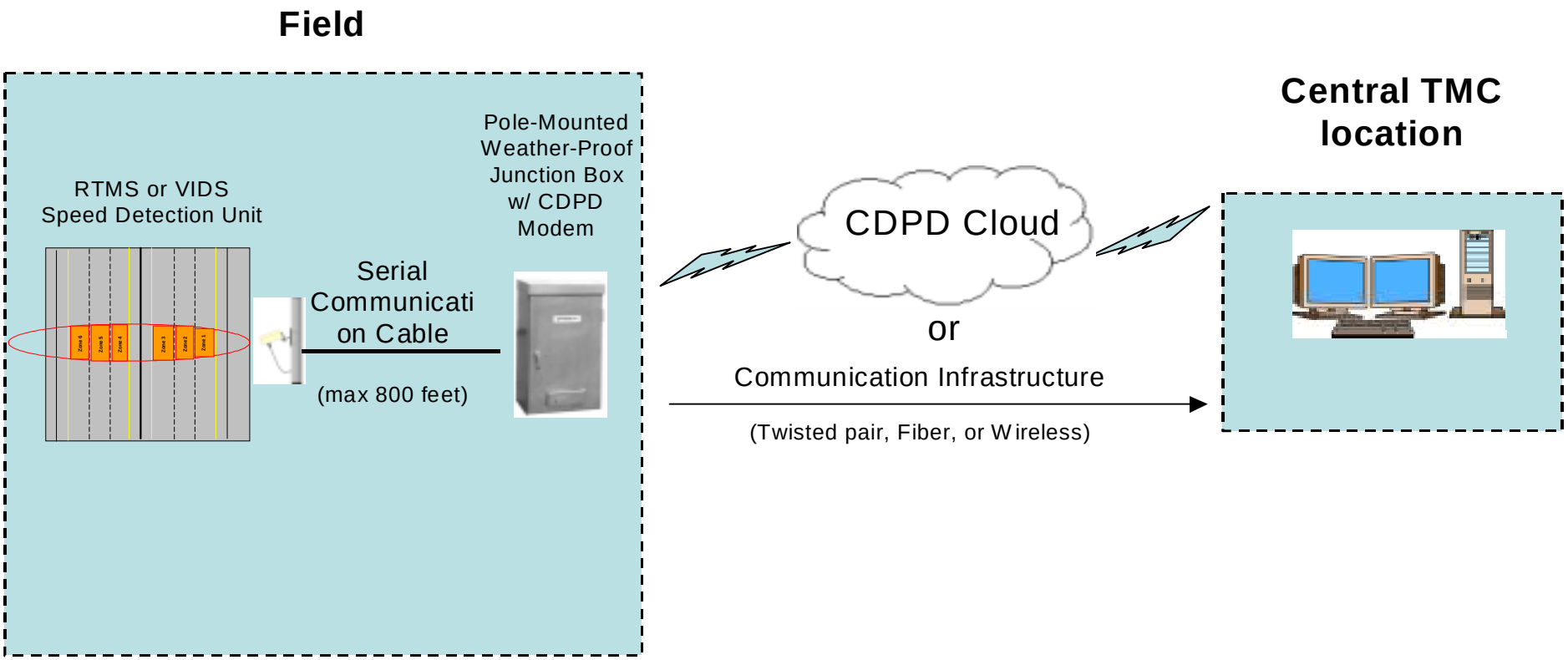
Direct Detection Unit to Central Communication



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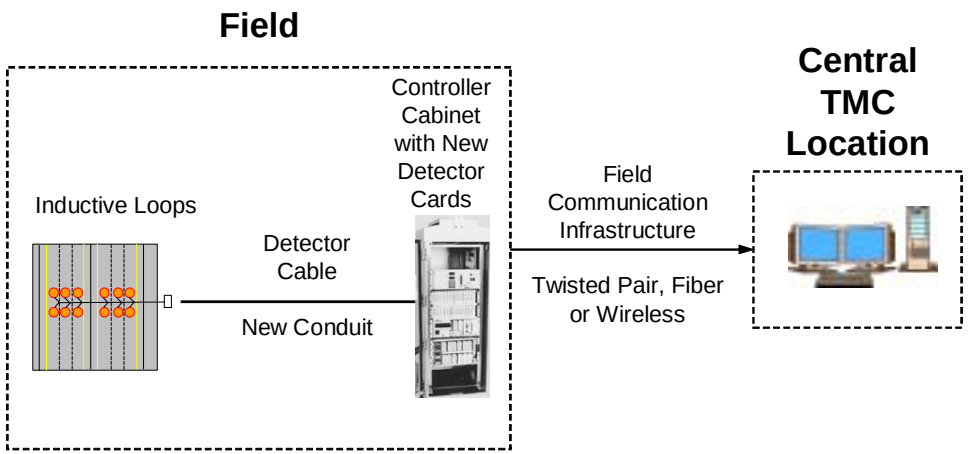
Inductive Loop Equipment Configuration



- The detector data is brought to a Central TMC via a controller using field communication infrastructure.
- Inductive loops cut in the roadway about 250 ft upstream of the stop bar.
- New conduit installation between the pull box adjacent to the loops and the controller.
- It is assumed that there is enough space in the existing detector rack to accommodate new detector cards.
- New detector cards will be installed.
- Detection processing is performed in the controller.

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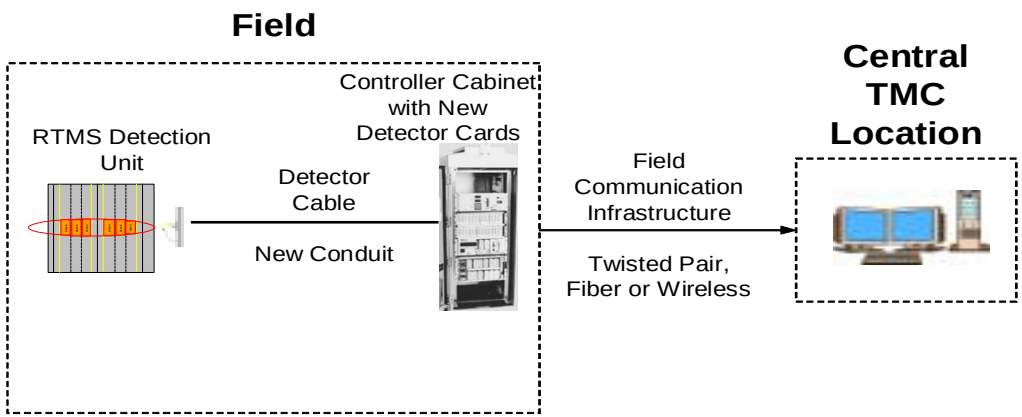
RTMS Equipment Configuration – OPTION A



- The detector data is brought to a Central TMC via a controller using the field communication infrastructure.
- RTMS units installed on an existing pole on the side of the roadway about 250 ft upstream of the stop bar.
- New conduit installation between the pull box adjacent to the pole and the controller.
- It is assumed that there is enough space in the existing detector rack to accommodate new detector cards.
- New detector cards will be installed.
- Detection processing is performed in the controller.

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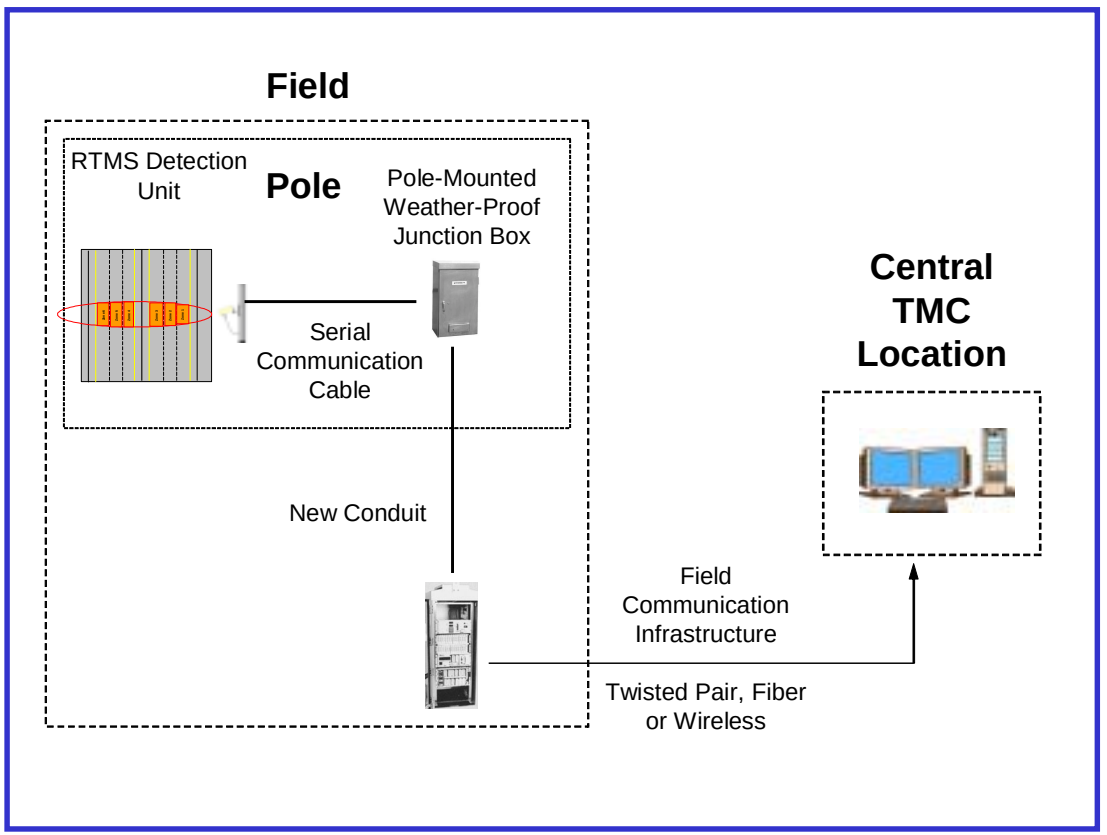
RTMS Equipment Configuration – OPTION B



- Assumes field communication infrastructure is not available at the pole.
- New conduit installation between the pull box adjacent to the pole and the controller.
- The detector data is brought directly to the Central TMC using field communications.infrastructure.
- RTMS units installed on an existing pole on the side of the road about 250 ft upstream of the stop bar.
- A junction box in installed on the pole to house communications equipment.
- Detector processing is performed at the RTMS Unit in the field.

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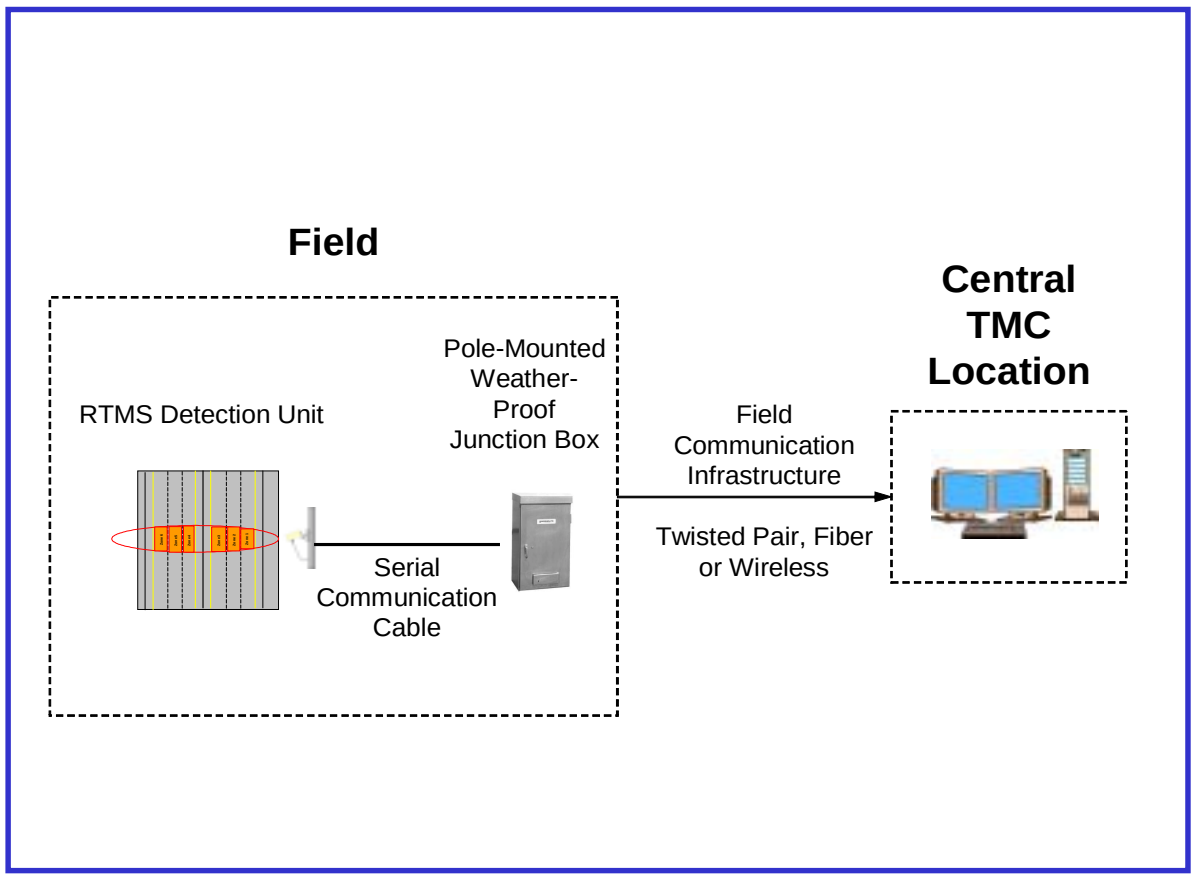
RTMS Equipment Configuration – OPTION C



- Assumes field communication infrastructure is available at the pole.
- The detector data is brought directly to the Central TMC using field communication infrastructure.
- RTMS units installed on an existing pole on the side of the road about 250 ft upstream of the stop bar.
- A junction box is installed on the pole to house communications equipment.
- Detector processing is performed at the RTMS Unit in the field.

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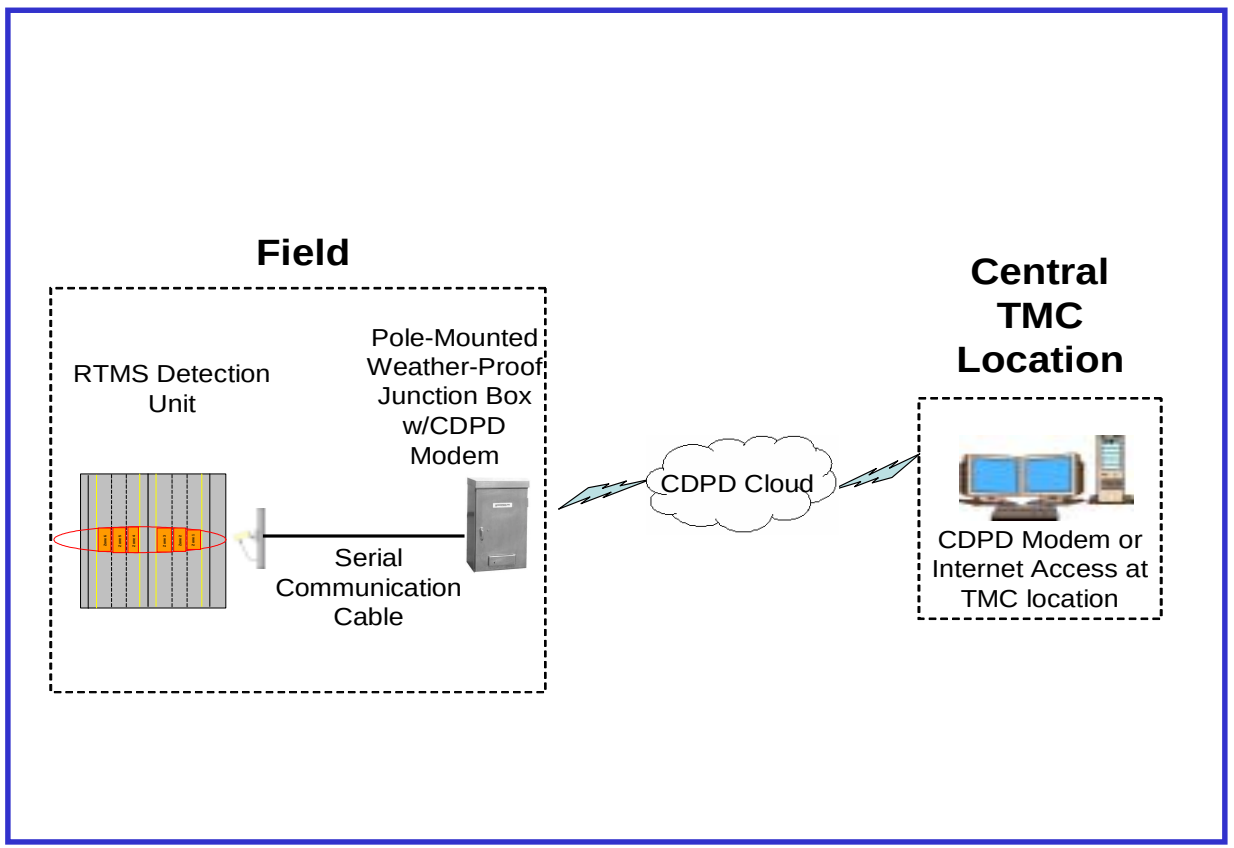
RTMS Equipment Configuration – OPTION D



- The detector data is brought directly to the Central TMC using wireless CDPD communication.
- RTMS units installed on an existing pole on the side of the road.
- A junction box is installed on the pole to house communications equipment.
- CDPD Wireless modem with unlimited wireless access plan installed in junction box.
- Communications needs to be established between the pull box on the side of the road and the junction box on the pole.
- Recurring cost of $50/month for CDPD unlimited access plan.
- Assumes that electrical supply exists on the mounting pole.
- Detector processing is performed at the RTMS Unit in the field.

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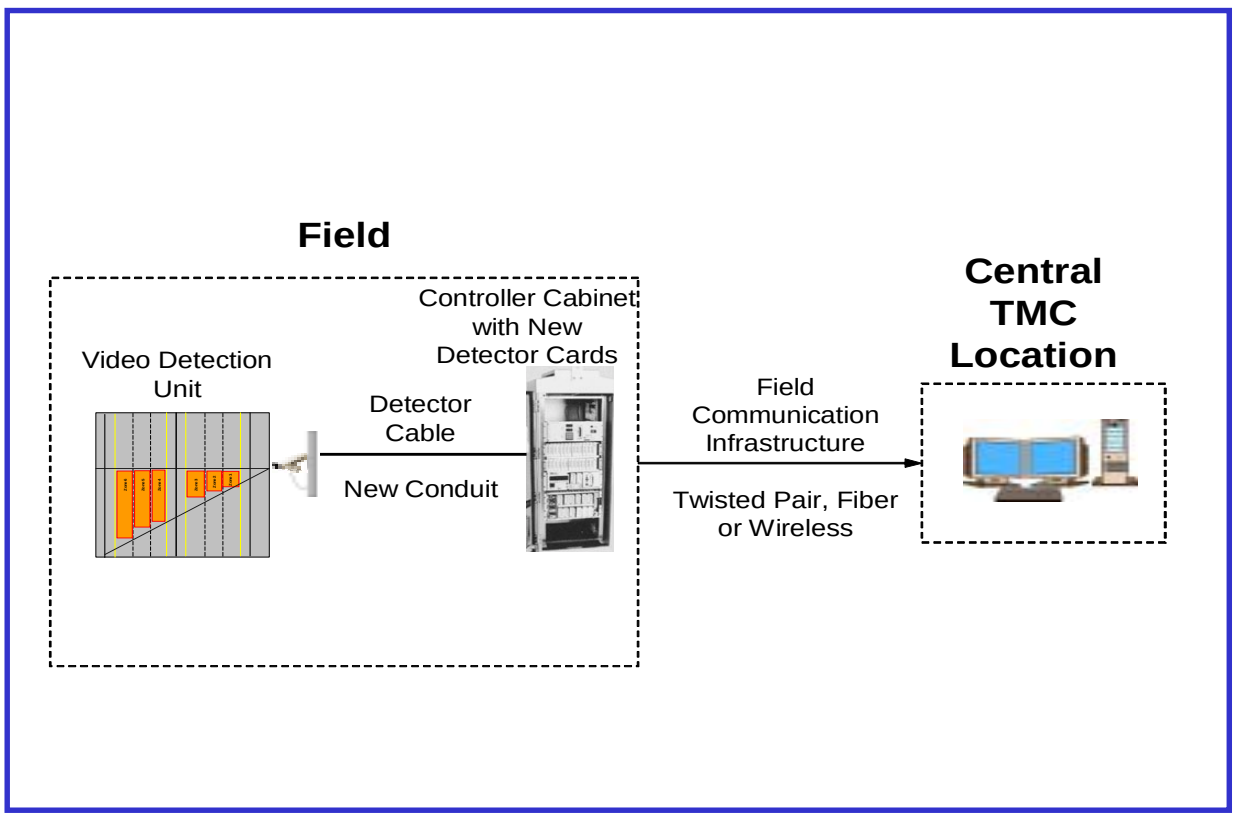
VIDS Equipment Configuration – OPTION A



- The detector data is brought to a Central TMC via a controller using field communications infrastructure.
- VIDS units installed on an existing pole on the side of the roadway about 250 ft upstream of the stop bar.
- New conduit installation between the pull box adjacent to the pole and the controller.
- It is assumed that there is enough space in the existing detector rack to accommodate new detector cards.
- New detector cards will be installed.
- Detector processing is performed in the controller.

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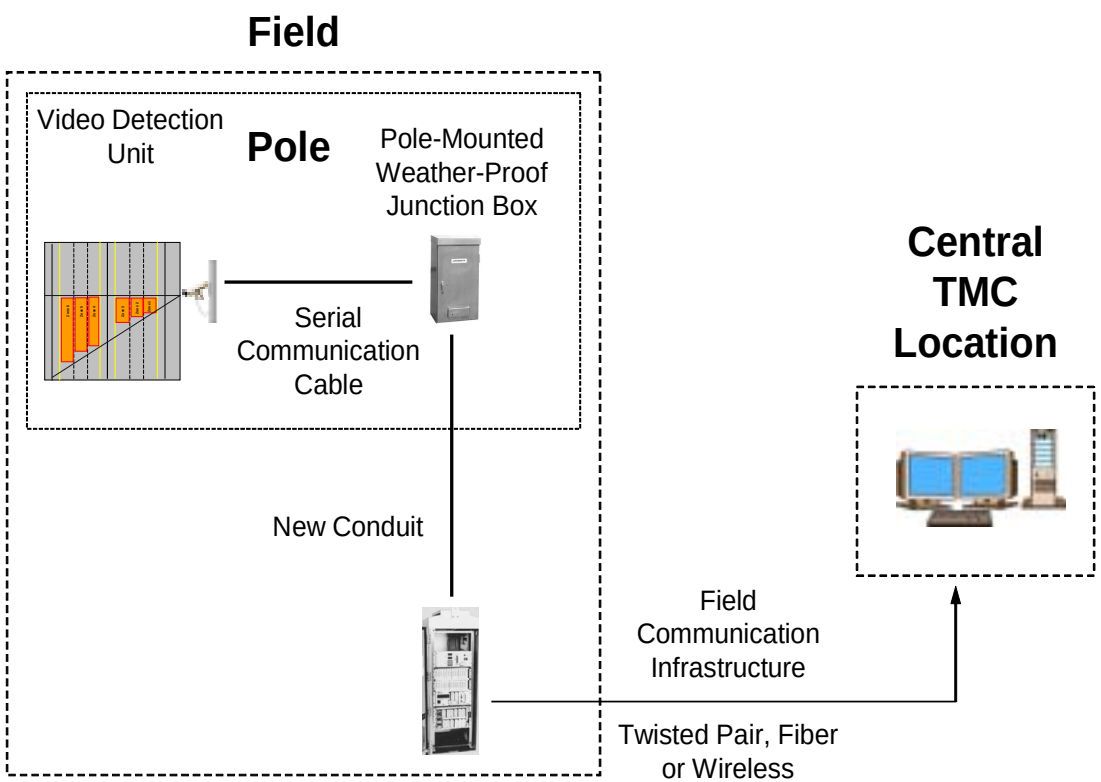
VIDS Equipment Configuration – OPTION B



- Assumes field communication infrastructure is not available at the pole.
- New conduit installation between the pull box adjacent to the pole and the controller.
- The detector data is brought directly to the Central TMC using field communication infrastructure.
- VIDS units installed on an existing pole on the side of the road about 250 ft upstream of the stop bar.
- A junction box in installed on the pole to house communications equipment.
- Streaming video can be brought back using fiber or snapshot images can be brought back using twisted pair.
- Detector processing is performed at the VIDS Unit in the field.

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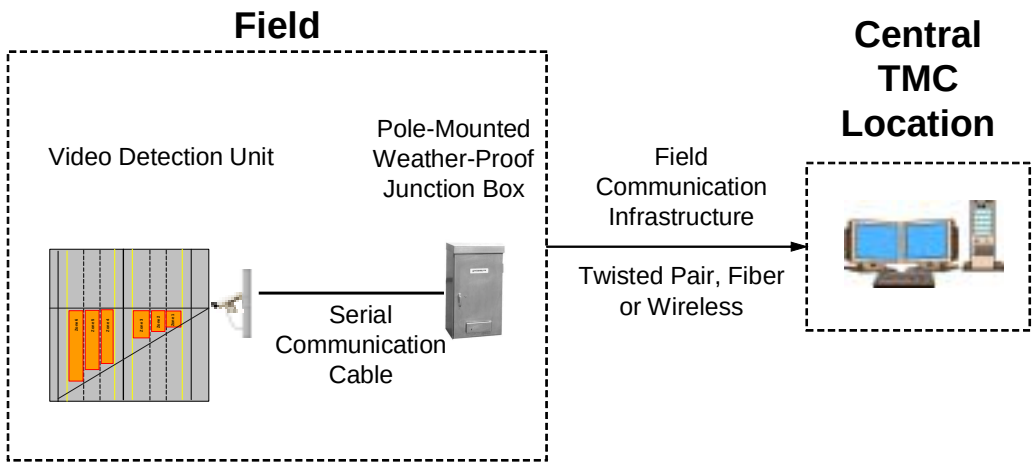
VIDS Equipment Configuration – OPTION C



- Assumes field communication infrastructure is available at the pole.
- The detector data is brought directly to the Central TMC using field communication infrastructure.
- VIDS units installed on an existing pole on the side of the road about 250 ft upstream of the stop bar.
- A junction box is installed on the pole to house communications equipment.
- Streaming video can be brought back using fiber or snapshot images can be brought back using twisted pair.
- Detector processing is performed at the VIDS Unit in the field.

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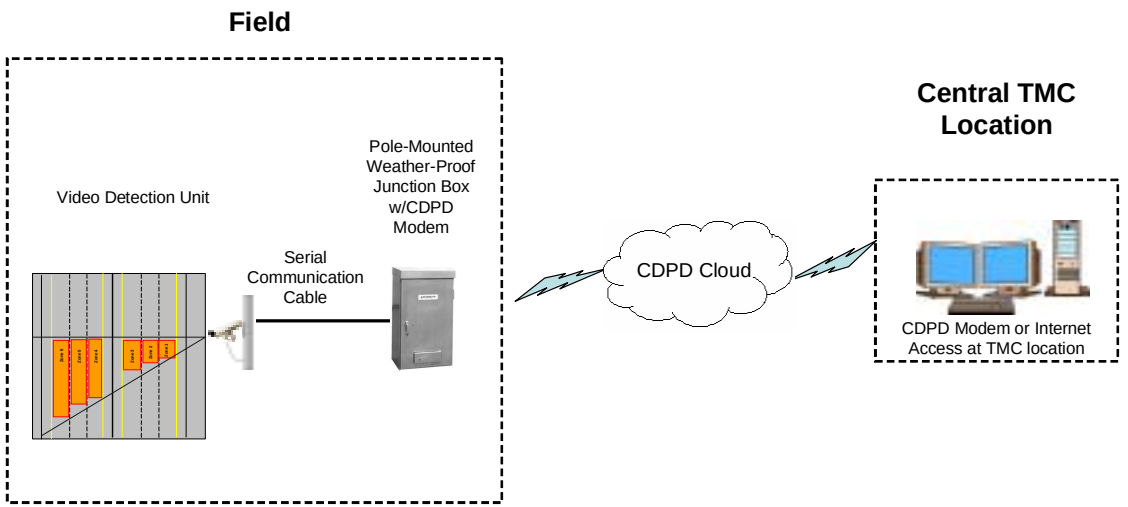
VIDS Equipment Configuration – OPTION D



- The detector data is brought directly to the Central TMC using wireless CDPD communication.
- VIDS units installed on an existing pole on the side of the road.
- A junction box is installed on the pole to house communications equipment.
- CDPD Wireless modem with unlimited wireless access plan installed in junction box.
- Recurring cost of $50/month for CDPD unlimited access plan.
- Assumes that electrical supply exists on the mounting pole.
- Snapshot (2-3 minutes) video from the VIDS unit.
- Detector processing is performed at the VIDS Unit in the field.

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10-Year Cost Analysis Summary Table

	LOOPS Option *	RTMS Option A	RTMS Option B	RTMS Option C	RTMS Option D	VIDS Option A	VIDS Option B	VIDS Option C	VIDS Option D
Capital Cost	$15,350	$15,970	$14,490	$5,740	$5,740	$16,580	$16,880	$8,130	$8,130
10-year Operational Cost	$1,535/Year $15,350	2 year warranty + maintenance ($200 / year for 8 years)= $1,600	2 year warranty + maintenance ($200 / year for 8 years)= $1,600	2 year warranty + maintenance ($200 / year for 8 years)= $1,600	2 year warranty + maintenance ($200 / year for 8 years) + CDPD Fees ($50*120)= $7,600	2 year warranty + maintenance ($250 / year for 8 years)= $2,000	2 year warranty + maintenance ($250 / year for 8 years)= $2,000	2 year warranty + maintenance ($250 / year for 8 years)= $2,000	2 year warranty + maintenance ($250 / year for 8 years) + CDPD Fees ($50*120)= $8,000
Total Cost for 10 years	$30,700	$17,570	$16,090	$7,340	$13,340	$18,580	$18,880	$10,130	$16,130
Cost Per Year	**$3,070**	**$1,757**	**$1,609**	**$734**	**$1,334**	**$1,858**	**$1,888**	**$1,013**	**$1,613**
Provision of Pole		$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000
Provision of Power				$8,750	$8,750			$8,750	$8,750
Capital Cost With Provision of Power and Pole	$15,350	$21,970	$20,490	$11,740	$11,740	$22,580	$22,880	$14,130	$14,130
Cost Per Year With Provision of Power and Pole	**$3,070**	**$2,357**	**$2,209**	**$1,334**	**$1,934**	**$2,458**	**$2,488**	**$1,613**	**$3,026**

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Summary of Recommended Choices

Communication at Site

	Technology	Communication Medium
Accuracy	Loops	Twisted Pair or Fiber
Stopped Vehicle	VIDS	Twisted Pair or Fiber
Video (Still)	VIDS	Twisted Pair or Fiber
Video (Motion)	VIDS	Fiber
Cost	RTMS	Twisted Pair or Fiber

No Communication at Site

	Technology	Communication Medium
Stopped vehicle	VIDS	CDPD
Video (Still)	VIDS	CDPD
Cost	RTMS	CDPD

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LCC Sites Recommendations

Methodology

- Visit the Cities
  - Confirm Corridor Architecture
  - Discuss use and Functions to be Carried out
  - Identify Locations and Size of LCC Site
- Conduct LCC Site Analysis and Make Recommendations for LCC Layout

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Summary of Meeting Minutes

- All cities except City of Santa Fe Springs agreed with the corridor architecture as defined in the High Level Design.
- City of Santa Fe Springs stated that they are carrying out the maintenance for the City of Pico Rivera signals.
- The High Level Design currently recommends connecting the City of Pico Rivera signal to the City of Downey.
- This recommendation was based on the Project area consisting of only Telegraph Road where all signals within the City of Pico Rivera in the Project area are shared between the City of Pico Rivera and City of Downey.
- Now that the Project area has been expanded to include more North-South and East-West street, it may be possible to connect Pico Rivera signals to the City of Santa Fe Springs system.
- At the meeting it was decided to keep this as an option for further consideration during communications analysis task.

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Summary of Meeting Minutes

- All cities, except City of Pico Rivera, were able to identify the potential location of their LCC.
- The City of Pico Rivera stated that they may be able to allocate space in the City Hall or City Yard in the future but did not want to commit to a location just yet.
- Cities do not have resources to staff the LCC's for a long period of time during the day.
- Most cities will monitor the system on an exception basis, in response to an alarm from the system or during a traffic emergency situation.
- All cities identified a place for the LCC site within existing buildings. The buildings have existing air conditioning and service. It is anticipated that in most cases no upgrade to these in-place systems will be needed.
- Most cities identified at least two locations for ATMS workstations – the City Hall and City Yard.

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Alternate LCC Location Requirements

City	ATMS Server	ATMS Client	IEN Server	IEN Client	CCTV Monitoring	CCTV Display Equipment
Downey						
Primary LCC Site						
City Hall	X	X	X	X	X	X
Remote LCC Sites						
Maintenance Yard		X		X	X	
EOC		X		X	X	
Police Department		X			X	
Santa Fe Springs						
Primary LCC Site						
Maintenance Yard	X	X	X	X	X	
Remote LCC Sites						
City Hall		X		X	X	
La Mirada						
Primary LCC Site						
Department of Public Works		X		X	X	
Remote LCC Sites						
City Hall (Resource Center)		X			X	
Montebello						
Primary LCC Site						
City Hall		X		X	X	
Commerce						
Primary LCC Site						
City Hall	X	X	X	X	X	
Pico Rivera						
Primary LCC Site						
City Hall		X		X	X	

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Potential LCC Location – Commerce

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Potential LCC Location – Downey

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Potential LCC Location – Downey Equipment Room

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Potential LCC Location – La Mirada DPW

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Potential LCC Location – La Mirada City Hall

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Potential LCC Location – Montebello

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Potential LCC Location – Santa Fe Springs

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LCC Site Recommendations – Variations From HLD

STAND ALONE LCC

- The LCC site will be a space within a facility (an engineer's office in the case of City of Commerce and a signal maintenance laboratory in the case of City of Santa Fe Springs) and not a stand alone room.
- The requirement for a separate equipment room is deleted.
- Space needs to be provided only for one operator – only one ATMS client workstation needs to be provided.
- A monitor, keyboard and mouse could be shared between two ATMS servers.
- Separate storage will not be required. Instead, the storage for manuals and reference materials shall be accommodated within City's existing furniture.
- No fax equipment is recommended at this time since the staff can utilize their existing machines for this purpose.

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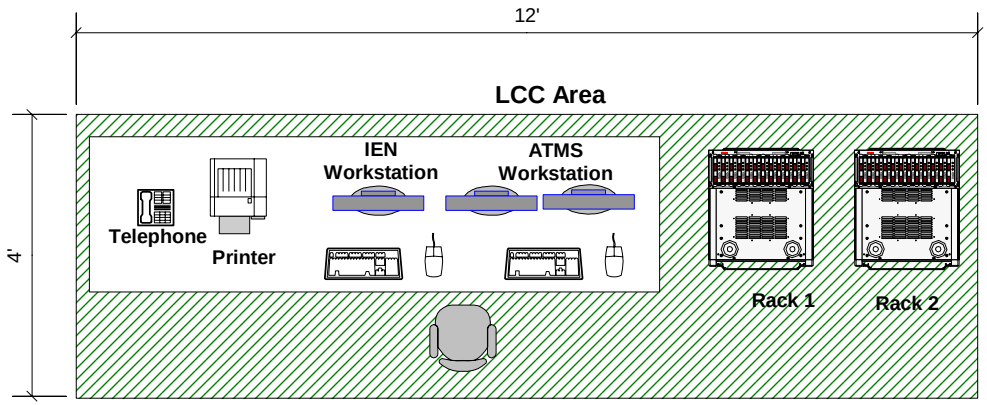
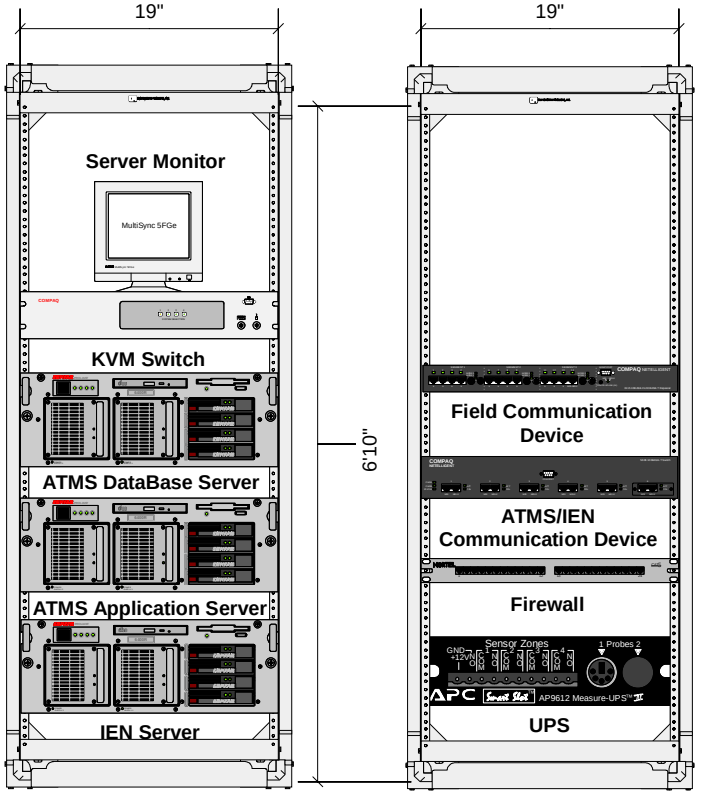
LCC Recommendations – Commerce and Santa Fe Springs





Rack 1 FrontView **Rack 2 FrontView**

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LCC Site Recommendations – Variations From HLD

LCC Hosting Other Cities Signals

- LCC Hosting Additional City's Signal Equipment room is located on a different floor instead next to LCC
- Accommodation are provided for two operators – thus Two ATMS client workstations are provided instead of three

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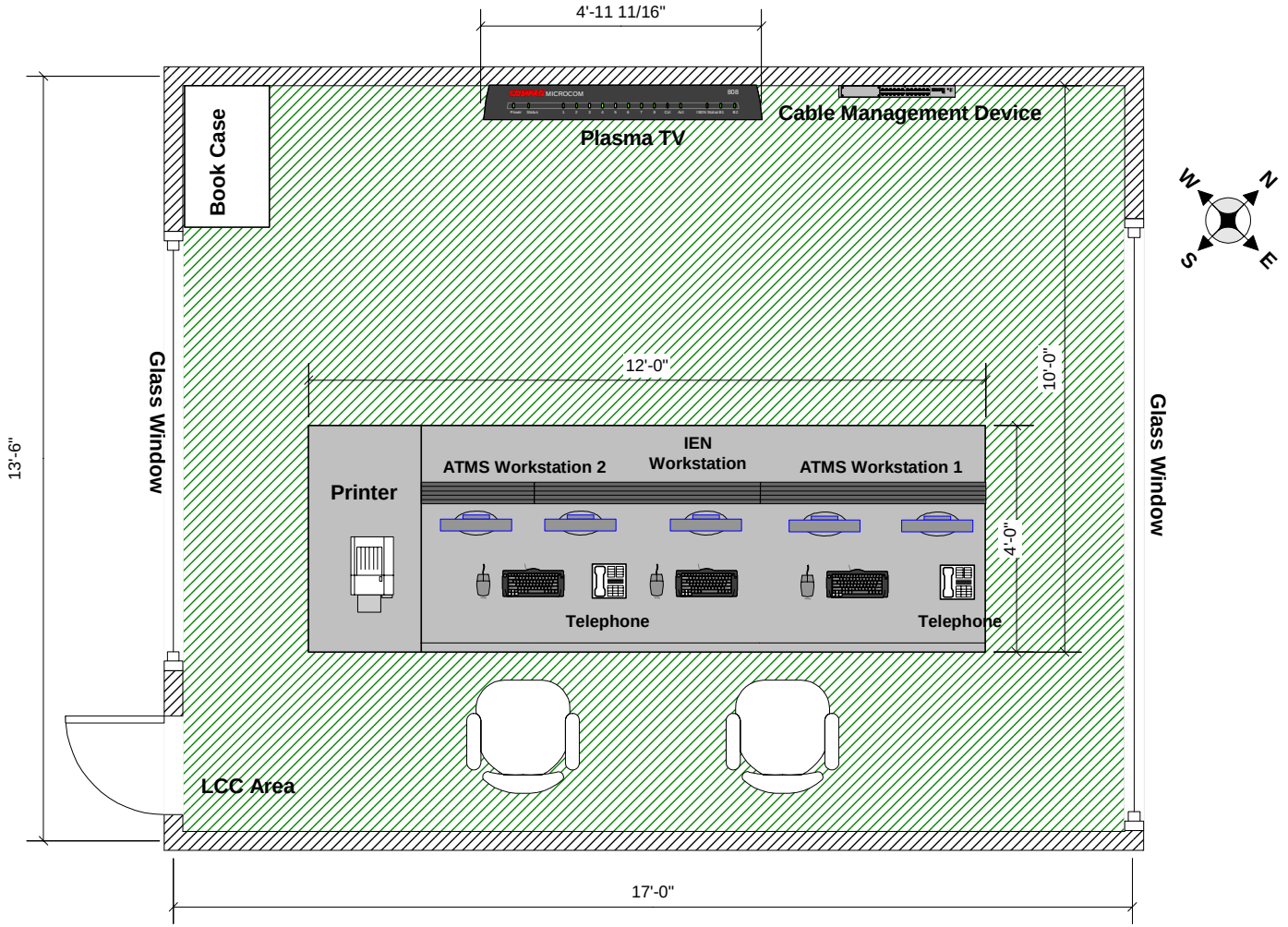
LCC Recommendations – Downey 2nd Floor



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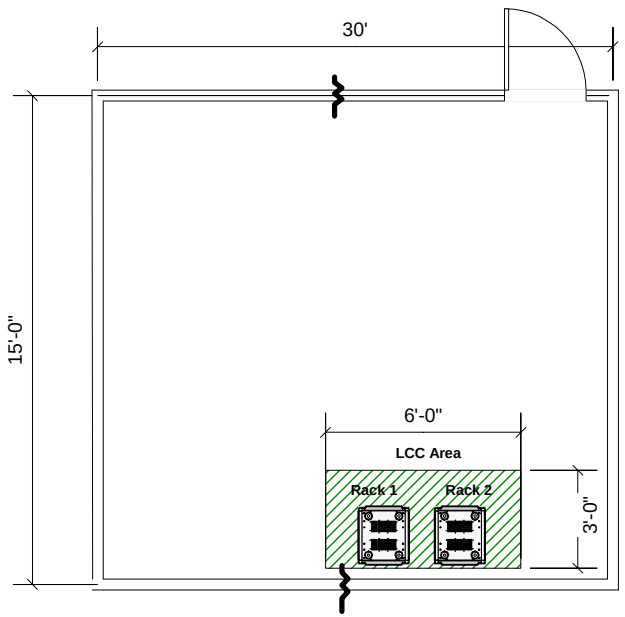
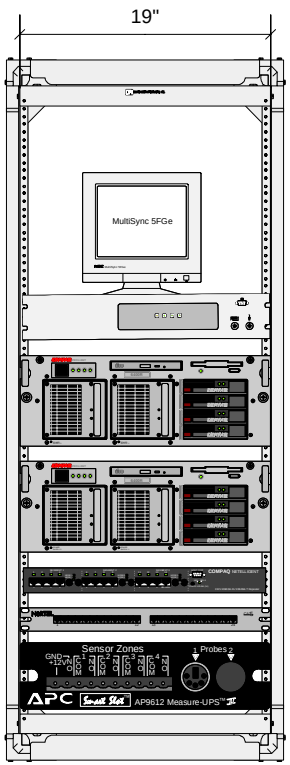
LCC Recommendations – Downey 3rd Floor





Server Monitor

KVM Switch

ATMS DataBase Server

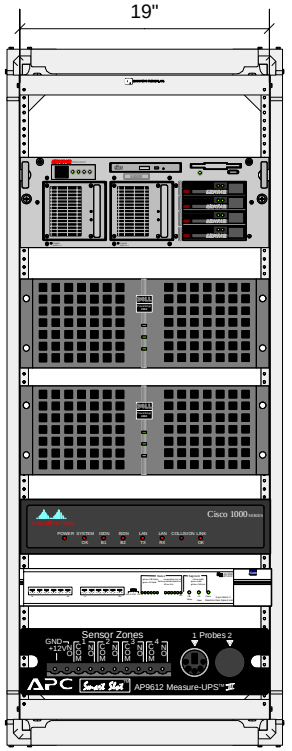
ATMS Application Server

Field Communication Device

Firewall

UPS

Rack 1(Downey ATMS) FrontView



IEN Server

Communication Server for Montebello

Communication Server for Pico Rivera

ATMS/IEN Communication Device

LAN/WAN Switch

UPS

Rack 2(Hosting Cities) FrontView

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Project Area Expansion

- The original scope of work for I-5/Telegraph included only one arterial- I-5/Telegraph Road and involved following six cities:
  - City of Commerce
  - City of Montebello
  - City of Pico Rivera
  - City of Downey
  - City of Santa Fe Springs
  - City of La Mirada
- County expand the coverage area to include more north south and east west streets and covered two more cities: Whittier and Norwalk
- Siemens GTS interviewed with each individual cities to make cities aware of the project area change and obtain comments from cities.

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Project Area Expansion

- City of Downey requested that the boundary for Paramount Blvd. and Lakewood Blvd. be extended to Rosecrans Ave. (for I-5/Telegraph Road Corridor Project)
- City of Santa Fe Spring requested the following additional segments to be added in this project:
  - Pioneer Blvd. between Slauson Ave. and Telegraph Road,
  - Shoemaker Ave. between Los Nietos Rd. and Imperial Hwy.,
  - Los Nietos Rd. between 605 Frwy. and Telegrah Rd.
- The county accepted Santa Fe Spring's request but rejected Downey's request and County recommended that the project area for I-5/Telegraph Road be limited to north of I-105 Corridor Project area boundary (Firestone Blvd.)
- Siemens GTS staff conducted a field survey to collect lane-configuration and land-use information of the project arterial streets

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Up-coming Work

- Finalize High Level Design Report (November)
- Finalize Local City Control Sites Recommendations (November)
- Alternatives Analysis (Draft – November)
  - ATMS
  - Communications
- Recommendations (Draft – November)
  - ATMS/Detection/Communications
- Conceptual Design (Draft – January)

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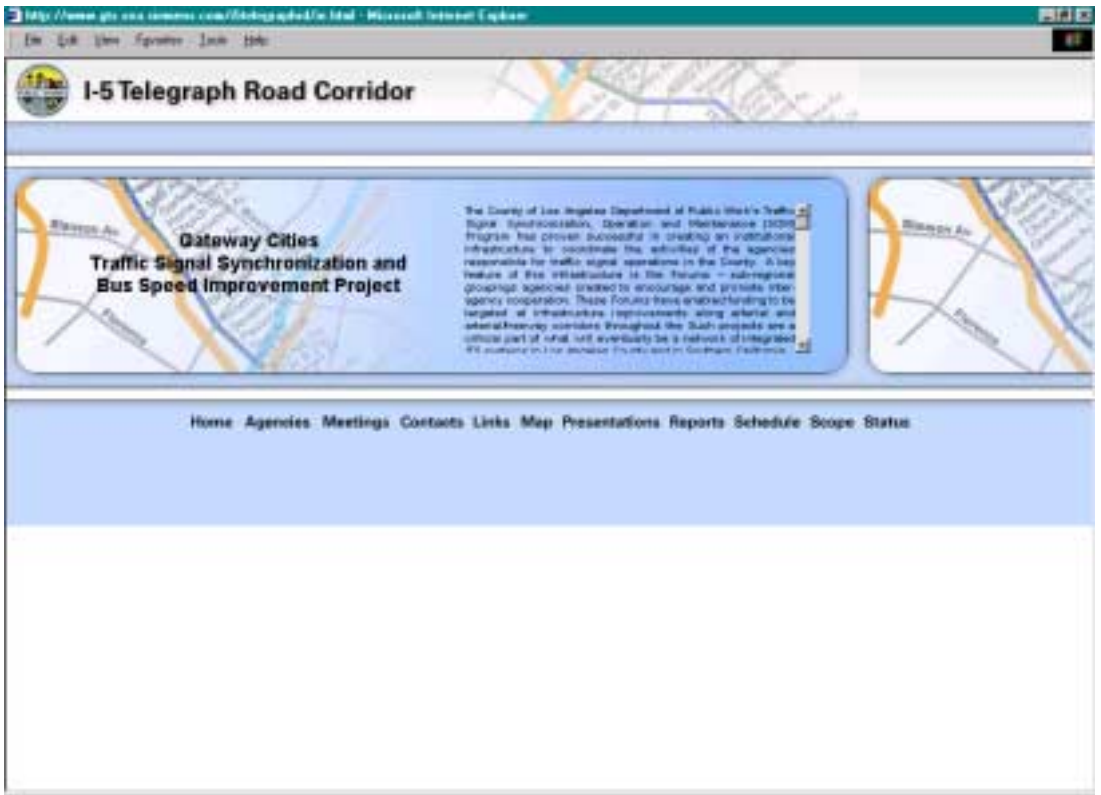
Project Web page



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