

December 7th, 2007

ITS Implementation Plan

Task D3 – ITS Project Logs & Update Methodology

Task D4 – Collaborative Projects Protocol

Final

Central Coast ITS Implementation Plan

Association of Monterey Bay Area Governments

TRANSCORE[®]

CENTRAL COAST ITS IMPLEMENTATION PLAN



Task D3 – ITS Project Logs & Update Methodology

Task D4 – Collaborative Projects Protocol

FINAL

Prepared for:

**Association of Monterey Bay Area Governments
&
CCITS Coordinating Group**

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1. INTRODUCTION

1.1 Document Purpose

Within the Central Coast ITS Implementation Plan, ITS Projects were identified for each of the five (5) Counties in the Region (Santa Cruz, San Benito, Monterey, San Luis Obispo, and Santa Barbara), as well as for Regionally-significant ITS Projects (Caltrans District 5). However, the entire Central Coast ITS Implementation Plan cannot be implemented at one time. Similarly, the Implementation Plan document itself cannot be constantly updated to keep pace with every ITS Project implementation or change in project prioritization/status.

Recognizing this, the Central Coast ITS Coordinating Group and TransCore worked together to develop a “maintenance plan” of the essential elements (or ITS Projects) of the CCITS Implementation Plan. That is, tools and processes were developed to better “track” those prioritized ITS Projects that will realistically be implemented within the short- term timeframe (less than 5-years) (2008 – 2012). Developing this “maintenance plan” is the purpose of this document and reflects the parallel performance of the following CCITS project tasks (due to the close nature of the work activities involved within each):

- Task D3 – ITS Project Logs & Update Methodology
- Task D4 – Collaborative Projects Protocol

Maintaining a centralized log of ITS Projects that appear in individual Agency transportation programs (e.g., RTP, STIP, STP, etc.) will foster coordination among projects and provide a type of “status report” on progress when the CCITS Coordinating Group meets.

1.2 Document Overview

Building on the efforts within the CCITS Implementation Plan, system inventory, and ITS Project sequencing, TransCore updates/enhances the ITS Project Logs “template” that was originally provided as “Exhibit 6.1 – Sample Format for Maintaining Regional Project Status List” within the CCITS Implementation Plan to better reflect the reality of today’s ITS environment in the Central Coast. Within this document, the ITS Project Logs is expanded to reflect the details/information necessary for the CCITS Coordinating Group to better track ITS Project status, as well as incorporate new/additional ITS Project and future projects in Regional, Caltrans, and Local Agency transportation programs. TransCore also identifies/pulls-out those ITS Projects that are of high-priority within the ITS Project sequencing and that also involve the inter-Agency coordination needed to implement a collaborative project.

In addition, TransCore described the Regional methodology to follow in order to update the ITS Project Logs to ensure that all revisions are made in a coordinated and compatible manner. With all of these ITS Project and changes in status, a process needs to be established to conduct a periodic review and update of information in the ITS Project Logs. The CCITS Coordinating Group will be responsible for overseeing updates to the ITS Project Logs and ensuring that the “maintenance plan” is followed. In this manner, a strategy that allows Agencies to make the necessary adjustments to foster continued coordination is promoted, and staging, phasing, and eventual implementation occurs among potential ITS Projects in a systematic manner.



2. ITS PROJECT LOGS & COLLABORATIVE PROJECTS PROTOCOL

2.1 ITS Project Logs & Collaborative Projects Protocol

Within Section 2, the steps taken to develop the Central Coast's ITS Project "maintenance plan" is described in detail. Initially, TransCore determined that, due to the close nature of the work activities involved within each, the ITS Project Logs and Collaborative Projects Protocol should be combined. Then, TransCore reviewed the original ITS Project Logs and developed an approach/ideas to enhance/update its contents. Such was then forwarded to the CCITS Coordinating Group for review/comment. At the next CCITS project meeting, attendees discussed/tailored the ITS Project Logs' content to include the following:

- Project Title
- Project Description
- Project Location
- Inter-Agency Project
- County-Specific Project
- Lead Agency Roles & Responsibilities
- Other Agencies Roles & Responsibilities
- Applicable Cooperative Agreements
- Operations & Maintenance (O&M) Considerations
- Implementation Timeframe
- Cost
- Funding Sources
- Applicable ITS Standards
- Architecture Conformance Status
- Comments

Then, for those ITS Projects that will be realistically implemented within the short-term (2008 - 2012), TransCore completed/filled-out the information/details for each category per the instructions found in Section 2.2 below. These completed ITS Project Logs can be found in the subsequent Appendices.

2.2 ITS Project Logs Form & Instructions

Exhibit 2.1 describes each of the ITS Project Log's contents in more detail, presents instructions re: completing the form, and provides ideas/sources re: where to obtain potential input.



Exhibit 2.1 – Instructions for "Filling-Out" an ITS Project Log

Category	Instruction/Explanation
Project Title	<ul style="list-style-type: none"> • Provide a brief, descriptive name that reflects the general nature of the ITS Project
Project Description	<ul style="list-style-type: none"> • Provide an overall explanation of the elements to be included in the ITS Project • Include essential operational aspects • Include general types of systems/technologies to be employed (categories of technology, not Vendor-specific) • Identify communications systems needed for the systems/technologies to function • Review the CCITS Implementation Plan's "Appendix A – ITS Project Descriptions"
Project Location	<ul style="list-style-type: none"> • Identify/list specific locations for implementation (e.g., roadways, interchanges, streets, intersections, etc.) • Identify/list the potential "coverage area" (e.g., transit route, telephone call-in system range, etc.) • Review the CCITS Implementation Plan's "Appendix A – ITS Project Descriptions"
Inter-Agency Project	<ul style="list-style-type: none"> • Enter "Yes" or "No" • Review individual RTPA/County & Caltrans "ITS Project Logs"
County-Specific Project	<ul style="list-style-type: none"> • Enter "Yes" or "No" • Review individual RTPA/County & Caltrans "ITS Project Logs"
Lead Agency Roles & Responsibilities	<ul style="list-style-type: none"> • Identify/list the "lead" Agency(ies) • The lead Agency(ies) will be identified as the one to move the ITS Project forward into implementation • Define/assign applicable roles & responsibilities • Review typical roles & responsibilities from similar ITS Projects and/or previous experience • Review the CCITS Regional Architecture's "Operational Concepts" • Review the CCITS Regional Architecture's "Functional Requirements" • Review the CCITS Implementation Plan's "Appendix A – ITS Project Descriptions"
Other Agencies Roles & Responsibilities	<ul style="list-style-type: none"> • Identify/list the "other" involved Stakeholder Agency(ies) • Identify additional partnership opportunities • The other Agency(ies) will be identified to support ITS Project implementation • Within the geographical "Project Location", identify the nearby/typical transportation, transit, planning, etc., Agency(ies) normally involved • Looking at the "Project Description", think about Agencies "outside-the-box" that may want to be involved • Define/assign applicable roles & responsibilities • Review typical roles & responsibilities from similar ITS Projects and/or previous experience • Review the CCITS Regional Architecture's "Operational Concepts" • Review the CCITS Regional Architecture's "Functional Requirements" • Review the CCITS Implementation Plan's "Appendix A – ITS Project Descriptions"



Exhibit 2.1 – Instructions for "Filling-Out" an ITS Project Log

Category	Instruction/Explanation
Applicable Cooperative Agreements	<ul style="list-style-type: none"> Identify applicable Agency Cooperative Agreements that should be executed in order to implement the ITS Project Review the list/contents of existing CCITS Cooperative Agreement Templates [Center-to-Center (C2C), CCTV Data/Image Sharing, Emergency Vehicle Pre-emption, Ramp Metering, Signal Synchronization, & Transit Signal Priority] As necessary, develop additional Agency Cooperative Agreements (TBD)
O&M Considerations	<ul style="list-style-type: none"> Define how the Stakeholder Agency(ies) will be involved in operating & maintaining the ITS Project/system/technology/etc. Identify Agency(ies) responsible for identifying/securing on-going O&M funding Define/assign applicable O&M roles & responsibilities As possible, determine the frequency and/or timing that each O&M activity needs to occur As possible, identify the level of funding needed & source for each O&M Activity Review typical O&M roles & responsibilities from similar ITS Projects and/or previous experience Review the CCITS Regional Architecture's "Operational Concepts" Review the CCITS Regional Architecture's "Functional Requirements" Review the CCITS Implementation Plan's "Appendix A – ITS Project Descriptions"
Implementation Timeframe	<ul style="list-style-type: none"> Identify when the ITS Project will be implemented Specify year between 2008 to 2012 Review the CCITS Implementation Plan's "Section 3 – Central Coast ITS Projects" Review the CCITS Implementation Plan's "Appendix A – ITS Project Descriptions"
Cost	<ul style="list-style-type: none"> Develop ITS Project-specific cost estimates using the most recent real-world value available. Breakdown the project cost into various components of the project lifecycle. That is, capital investment, project administration, requirements and design, installation and integration, testing and evaluation, and operations and maintenance. Review the CCITS Implementation Plan's "Exhibit 3.2 – Central Coast ITS Project Cost Analysis" Review the CCITS Implementation Plan's "Appendix A – ITS Project Descriptions"
Funding Sources	<ul style="list-style-type: none"> Identify potential funding elements/source(s) As possible, identify the funding timelines/schedules to "track" Review typical funding sources normally used from similar ITS Projects and/or previous experience Review the CCITS Implementation Plan's "Section 5.4 – Possible Funding Sources" Review the CCITS Implementation Plan's "Appendix A – ITS Project Descriptions"
Applicable ITS Standards	<ul style="list-style-type: none"> Identify/list the applicable ITS Standards to forward ITS Project implementation As possible, identify strategies for using the ITS Standard Review the CCITS Regional Architecture's "Regional Standards" Review the CCITS Implementation Plan's "Appendix A – ITS Project Descriptions"



Exhibit 2.1 – Instructions for "Filling-Out" an ITS Project Log

Category	Instruction/Explanation
Architecture Conformance Status	<ul style="list-style-type: none"> • List/identify the ITS Project’s status within the CCITS Regional Architecture • Review the CCITS Regional Architecture’s “System Inventory” • Review the CCITS Regional Architecture’s “Operational Concepts” • Review the CCITS Regional Architecture’s “Functional Requirements” • Review the CCITS Regional Architecture’s “System Interconnects” • Review the CCITS Regional Architecture’s “Architecture/Data Flows” • Review the CCITS Implementation Plan’s “Appendix A – ITS Project Descriptions”
Comments	<ul style="list-style-type: none"> • List/identify additional information and/or assumptions about the ITS Project that is pertinent to its implementation • List/identify “Action Items” to be accomplished, responsible Agency, & timeframe for completion • Describe the subsequent step(s) that need to be taken to move the ITS Project toward implementation (e.g., resolution of specific issues ranging from technology to institutional responsibility, further conceptual design or planning needed prior to implementation, preparation of design & bid documents, etc.) • Provide cost clarifications, assumptions, etc. • More fully describe the ITS Project (e.g., information that will be gathered, how the information will be used, etc.)

2.3 CCITS Stakeholder Agencies

Since ITS Projects were identified for each of the five (5) Counties, as well as those of Regional significance, the CCITS Coordinating Group determined that Caltrans and the individual/responsible Regional transportation planning Agency (RTPA) should develop and maintain a separate ITS Project Log for their County and/or jurisdiction as follows:

- Santa Cruz County Regional Transportation Commission (SCCRTC)
 - Santa Cruz County
 - Appendix A
- Council of San Benito County Governments (SBtCOG)
 - San Benito County
 - Appendix B
- Transportation Agency for Monterey County (TAMC)
 - Monterey County
 - Appendix C
- San Luis Obispo County Council of Governments (SLOCOG)
 - San Luis Obispo County
 - Appendix D



- Santa Barbara County Association of Governments (SBCAG)
 - Santa Barbara County
 - Appendix E
- Caltrans District 5
 - Central Coast's Regionally-significant ITS Project
 - Appendix F

TransCore completed/filled-out the information/details for each category per the instructions found in Section 2.2 above. To review them, please refer to the Appendices for each respective Stakeholder Agency's ITS Project Log.



3. UPDATE METHODOLOGY

3.1 Overview

Within Section 3, the steps taken to develop the Central Coast's ITS Project Log and Collaborative Projects Protocol "update methodology" are described in detail. Initially, TransCore developed an approach/ideas to update the ITS Project Logs. Such was then forwarded to the CCITS Coordinating Group for review/comment. At the next CCITS project meeting, attendees discussed/tailored the ITS Project Logs' update methodology. The results are presented in the following sections.

3.2 ITS Project Log Update

Caltrans and the responsible RTPA should update the respective ITS Project Log for their County and/or jurisdiction in the following manner:

- Notify/Indicate a "Change" to the ITS Project
 - Responsible Agency to modify existing ITS Project Log as appropriate
 - Responsible Agency to "color-code" cell(s) modified (aka shade cell in "yellow")
- Add "New" ITS Project
 - Responsible Agency to add new ITS Project to log in appropriate order
 - Responsible Agency to "color-code" row/entry (aka shade entire row in "yellow")
- Notify/Indicate that an ITS Project is "Implemented"
 - Responsible Agency to move entire ITS Project entry to a "new" row at the bottom of the ITS Project Log as appropriate
 - Responsible Agency to change all text to "italics"

3.3 Update Frequency

Caltrans and the responsible RTPA should update the respective ITS Project Log for their County and/or jurisdiction as follows:

- Monthly (every 1-month)
 - Caltrans
- Quarterly (every 4-months)
 - SCCRTC
 - SBtCOG
 - TAMC
 - SLOCOG
 - SBCAG

3.4 Notification Process

Once Caltrans and the responsible RTPA finish updating their respective ITS Project Log, they should e-mail the file (Excel spreadsheet) to one another, as well as FHWA and AMBAG.

The background image shows a vast landscape of rolling hills and mountains. The foreground features a rugged coastline with rocky cliffs and waves crashing against the shore. The middle ground is dominated by steep, forested slopes. The sky is a pale, hazy blue. A large, semi-transparent white rectangular area is centered over the image, containing the title text in a dark, serif font.

Appendix A – Santa Cruz
County ITS Project Log



APPENDIX A – SANTA CRUZ COUNTY ITS PROJECT LOG

Project Title	Project Description	Project Location	Inter-Agency Project (Yes/No)	County-Specific Project (Yes/No)	Lead Agency Roles & Responsibilities	Other Agencies Roles & Responsibilities	Applicable Cooperative Agreements	O&M Considerations	Implementation Timeframe	Cost (\$)	Funding Sources	Applicable ITS Standards	Architecture Conformance Status	Comments
Transit Automated Vehicle Location (AVL) System	<ul style="list-style-type: none"> Install an AVL system to track the transit vehicle's real-time location (including field transponders on the bus fleet & central computer system) Install AVL system software that performs schedule adherence analysis & updates the transit system's schedule in real-time 	Santa Cruz Metro Area	No	Yes	Santa Cruz Metropolitan Transit District (SCMTD) <ul style="list-style-type: none"> Determine best type of vehicle position/location system to use [e.g., global positioning satellites (GPS), dead-reckoning systems, automatic vehicle identification (AVI), beacon systems, etc.] Determine best type of connection and/or communications media to use Determine best method to process this information & update the transit schedules in real-time Ensure that real-time transit schedule information is available via the Internet, transit center(s), & selected bus stops Perform necessary O&M activities 	None	Not Applicable	<ul style="list-style-type: none"> Ensure O&M funding availability Check that AVL system components are communicating between transit vehicles & transit management center, & functioning properly, taking corrective actions as needed Check that AVL system software is functioning properly, providing realistic real-time schedules, taking corrective actions as needed Check that AVL system data/information feeds to the internet, transit centers, & selected bus stops are functioning properly Coordinate/manage transit vehicle schedule adherence 	2009	<u>AVL System (Vehicle)</u> <ul style="list-style-type: none"> \$25,875 (per transit vehicle) \$1,725 O&M (per year, per transit vehicle) <u>AVL System (Software)</u> <ul style="list-style-type: none"> \$862,500 (includes training) \$57,500 O&M (per year) <u>Transit Management Center</u> <ul style="list-style-type: none"> \$690,000 to \$1.15 million \$230,000 to \$345,000 O&M (per year) 	SCMTD	<ul style="list-style-type: none"> NTCIP 1401 [TCIP Common Public Transportation (CPT) Objects] NTCIP 1404 [TCIP Scheduling/Runcutting (SCH) Objects] NTCIP 1405 [TCIP Spatial Representation (SP) Objects] NTCIP 1407 [Control Center Objects] Advanced Traveler Information Systems (ATIS) General Use Standards Group 	<ul style="list-style-type: none"> DONE (Fall 2007) Included as an ITS Project w/in AMBAG MPO Turbo Architecture 	<ul style="list-style-type: none"> Transit Management Center Capital costs include system software, hardware, on-board devices, communications, computers, etc. O&M costs include staffing, communications, etc.
511 Telephone Call-In System	<ul style="list-style-type: none"> Establish a 511 telephone call-in system to provide travelers/motorists w/ information as to closures, major delays, congestion, incidents, construction, transit schedules, etc. 	Santa Cruz County	Yes	<ul style="list-style-type: none"> Yes Potential to tie-in w/ Regional and/or Statewide 511 Programs 	SCCRITC <ul style="list-style-type: none"> Determine business model (e.g., Public Agency, Private Sector, Public-Private partnership, etc.) Determine functionality, features, type(s) of traveler information to support, messages to provide, exact wording of each message, etc. Determine telecommunications carrier/provider Analyze expected level-of-usage & develop pricing structure Develop marketing strategy Perform O&M activities 	Caltrans, AMBAG, SBTCOG, TAMC, & MSI <ul style="list-style-type: none"> Determine business model (e.g., Public Agency, Private Sector, Public-Private partnership, etc.) Determine functionality, features, type(s) of traveler information to support, messages to provide, exact wording of each message, etc. Determine telecommunications carrier/provider Analyze expected level-of-usage & develop pricing structure Develop marketing strategy Perform O&M activities 	<ul style="list-style-type: none"> Center-to-Center (C2C) Data Sharing (Existing) 511 Content/Message Types (TBD) 	<ul style="list-style-type: none"> Reliable, accurate, & timely provision of messages via 511 re: real-time traffic conditions & transit schedules Monitor 511 system for accurate provision of content/messages Check that 511 system components are communicating w/ the "data sources" & functioning properly, taking corrective actions as needed (e.g., Caltrans D5 TMC, SCMTD transit center, etc.) Check that 511 telephone lines are functioning properly, messages are audible, & coordinate w/ telecommunications carrier/provider 	2010	<u>Statewide 511 System</u> <ul style="list-style-type: none"> \$1.2 million to \$5.2 million <u>Metropolitan 511 System</u> <ul style="list-style-type: none"> \$1.5 million to \$2.4 million <u>Average Cost per Call</u> <ul style="list-style-type: none"> Under \$0.50 to just under \$2.50 	AMBAG	<ul style="list-style-type: none"> Advanced Traveler Information Systems (ATIS) General Use Standards Group ITE TM 2.01 (Message Sets for External TMC Communication) 	<ul style="list-style-type: none"> DONE (Fall 2007) Included as an ITS Project w/in AMBAG MPO Turbo Architecture 	<ul style="list-style-type: none"> Costs include labor, equipment, 511 content preparation, telecommunications, marketing, & evaluation The volume of calls received affects the average cost per call
Internet Traveler Information System	<ul style="list-style-type: none"> Establish an internet website to provide travelers/motorists w/ information as to closures, major delays, congestion, incidents, construction, transit schedules, etc. 	Santa Cruz County	Yes	<ul style="list-style-type: none"> Yes Potential to tie-in w/ Regional and/or Statewide Internet Websites 	SCCRITC <ul style="list-style-type: none"> Determine business model (e.g., Public Agency, Private Sector, Public-Private partnership, etc.) Determine functionality, features, type(s) of traveler information to support, messages to provide, exact wording of each message, etc. Determine internet website "host" Analyze expected level-of-usage & develop pricing structure Develop marketing strategy Perform O&M activities 	Caltrans, AMBAG, SBTCOG, TAMC, & MSI <ul style="list-style-type: none"> Determine business model (e.g., Public Agency, Private Sector, Public-Private partnership, etc.) Determine functionality, features, type(s) of traveler information to support, messages to provide, exact wording of each message, etc. Determine internet website "host" Analyze expected level-of-usage & develop pricing structure Develop marketing strategy Perform O&M activities 	<ul style="list-style-type: none"> Center-to-Center (C2C) Data Sharing (Existing) Internet Content/Message Types (TBD) 	<ul style="list-style-type: none"> Reliable, accurate, & timely provision of messages via internet website re: real-time traffic conditions & transit schedules Monitor internet website for accurate provision of content/messages Check that internet website and/or system components are communicating w/ the "data sources" & functioning properly, taking corrective actions as needed (e.g., Caltrans D5 TMC, SCMTD transit center, etc.) Check that internet website is functioning properly, messages are legible, & coordinate w/ internet website "host" 	2010	<u>Website Set-Up & Connections</u> <ul style="list-style-type: none"> \$200,000 <u>O&M</u> <ul style="list-style-type: none"> \$150,000 per year 	AMBAG	<ul style="list-style-type: none"> Advanced Traveler Information Systems (ATIS) General Use Standards Group ITE TM 2.01 (Message Sets for External TMC Communication) 	<ul style="list-style-type: none"> DONE (Fall 2007) Included as an ITS Project w/in AMBAG MPO Turbo Architecture 	



APPENDIX A – SANTA CRUZ COUNTY ITS PROJECT LOG

Project Location	Inter-Agency Project	County-Specific Project (Yes/No)	Lead Agency Roles & Responsibilities	Other Agencies Roles & Responsibilities	Applicable Cooperative Agreements	O&M Considerations	Implementation Timeframe	Cost (\$)	Funding Sources	Applicable ITS Standards	Architecture Conformance Status	Comments
• City of Santa Cruz	Yes	Yes	<p><u>City of Santa Cruz</u></p> <ul style="list-style-type: none"> • Determine best type(s) of surveillance/detection equipment to use • Determine best type(s) of alerts/warnings to provide drivers (e.g., audible, visual, etc.) • Implement equipment at critical pedestrian crosswalk locations • Develop construction plans for new crosswalk installations • Coordinate pedestrian movements/activations with signal timing plans (as needed) • Perform necessary O&M activities 	<p><u>Caltrans D5</u></p> <ul style="list-style-type: none"> • Review construction plans for new crosswalk installations • Coordinate pedestrian movements/indications with signal timing plans (as necessary) • Perform necessary O&M activities 	<ul style="list-style-type: none"> • Advanced Crosswalk Coordination (TBD) • It is anticipated that pertinent/relevant portions of the following existing Agreements could be used to develop such: <ul style="list-style-type: none"> (a) Emergency Vehicle Pre-emption (b) Signal Synchronization (c) Transit Signal Priority 	<ul style="list-style-type: none"> • Ensure O&M funding availability • Check that detection & surveillance system components are communicating & functioning properly, taking corrective actions as needed • Check that pedestrian indications/warnings to drivers are communicating & functioning properly, taking corrective actions as needed • Ensure advance crosswalk system components are communicating with nearest signalized intersection & functioning properly, taking corrective actions as needed • Ensure that pedestrian movements/activations are coordinated with local signal timing plans (as needed) • Develop, maintain, & perform periodic reviews of local signal timing plans 	2011	<p><u>Advanced Crosswalk</u></p> <ul style="list-style-type: none"> • \$92,575 per location • O&M • \$3,450 per year, per location 	• City of Santa Cruz	<ul style="list-style-type: none"> • ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) • NTCIP 1210 (Field Management Stations -- Part 1: Object Definitions for Signal System Masters) • NTCIP 1211 (Object Definitions for Signal Control & Prioritization) 	<ul style="list-style-type: none"> • DONE (Fall 2007) • Included as an ITS Project w/in AMBAG MPO Turbo Architecture 	
• City of Watsonville	Yes	Yes	<p><u>City of Watsonville</u></p> <ul style="list-style-type: none"> • Determine best type(s) of surveillance/detection equipment to use • Determine best type(s) of alerts/warnings to provide drivers (e.g., audible, visual, etc.) • Implement equipment at critical pedestrian crosswalk locations • Develop construction plans for new crosswalk installations • Coordinate pedestrian movements/indications with signal timing plans (as necessary) • Perform necessary O&M activities 	<p><u>Caltrans D5</u></p> <ul style="list-style-type: none"> • Review construction plans for new crosswalk installations • Coordinate pedestrian movements/indications with signal timing plans (as necessary) • Perform necessary O&M activities 	<ul style="list-style-type: none"> • Advanced Crosswalk Coordination (TBD) • It is anticipated that pertinent/relevant portions of the following existing Agreements could be used to develop such: <ul style="list-style-type: none"> (a) Emergency Vehicle Pre-emption (b) Signal Synchronization (c) Transit Signal Priority 	<ul style="list-style-type: none"> • Ensure O&M funding availability • Check that detection & surveillance system components are communicating & functioning properly, taking corrective actions as needed • Check that pedestrian indications/warnings to drivers are communicating & functioning properly, taking corrective actions as needed • Ensure advance crosswalk system components are communicating with nearest signalized intersection & functioning properly, taking corrective actions as needed • Ensure that pedestrian movements/activations are coordinated with local signal timing plans (as needed) • Develop, maintain, & perform periodic reviews of local signal timing plans 	2011	<p><u>Advanced Crosswalk</u></p> <ul style="list-style-type: none"> • \$92,575 per location • O&M • \$3,450 per year, per location 	• City of Watsonville	<ul style="list-style-type: none"> • ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) • NTCIP 1210 (Field Management Stations -- Part 1: Object Definitions for Signal System Masters) • NTCIP 1211 (Object Definitions for Signal Control & Prioritization) 	<ul style="list-style-type: none"> • DONE (Fall 2007) • Included as an ITS Project w/in AMBAG MPO Turbo Architecture 	



Appendix B - San Benito
County ITS Project Log



APPENDIX B – SAN BENITO COUNTY ITS PROJECT LOG

Project Title	Project Description	Project Location	Inter-Agency Project (Yes/No)	County-Specific Project (Yes/No)	Lead Agency Roles & Responsibilities	Other Agencies Roles & Responsibilities	Applicable Cooperative Agreements	O&M Considerations	Implementation Timeframe	Cost \$\$	Funding Sources	Applicable ITS Standards	Architecture Conformance Status	Comments
Traffic Signal Synchronization Program	• Install communications interconnect, ensure signal clock timing synchronization, & coordinate traffic signal timing plans along roadways	• SR 25 (near Hollister)	Yes	Yes	Caltrans D5 • Determine best type of connection and/or communications media to use • Implement/establish connection and/or signal clock timing synchronization • Develop construction plans for new traffic signal or controller installations or repairs • Assist in bringing signalized intersections "on-line" • Perform necessary O&M activities	City of Hollister • Assist in bringing signalized intersections "on-line" • Perform necessary O&M activities	• Signal Synchronization (Existing)	• Ensure O&M funding availability • Check that signal system components are communicating between intersections & functioning properly, taking corrective actions as needed • Check that detection & surveillance system components are communicating & functioning properly, taking corrective actions as needed • Implement local signal timing plans (as needed) • Develop, maintain, & perform periodic reviews of local signal timing plans	2008	Communications Interconnect • \$65/meter (includes both conduit & cable) Inductive Loops • \$1,150 per loop Intersection Controllers • \$6,900 per controller Traffic Signal Timing Plans • \$5,750 per intersection (e.g., traffic counts, geometrics, etc.) System Coordination • \$28,750 per system O&M • Will vary depending upon status of existing conditions & field equipment	• Caltrans SHOPP	• ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) • NTCIP 1210 (Field Management Stations – Part 1: Object Definitions for Signal System Masters) • NTCIP 1211 (Object Definitions for Signal Control & Prioritization)	• DONE (Fall 2007) • Included as an ITS Project w/in AMBAG MPO Turbo Architecture	• Please note that intersection construction costs will vary depending upon status of existing conditions & field equipment
Traffic Signal Synchronization Program	• Install communications interconnect, ensure signal clock timing synchronization, & coordinate traffic signal timing plans along roadways	• SR 156 (near Hollister)	Yes	Yes	Caltrans D5 • Determine best type of connection and/or communications media to use • Implement/establish connection and/or signal clock timing synchronization • Develop construction plans for new traffic signal or controller installations or repairs • Assist in bringing signalized intersections "on-line" • Perform necessary O&M activities	City of Hollister • Assist in bringing signalized intersections "on-line" • Perform necessary O&M activities	• Signal Synchronization (Existing)	• Ensure O&M funding availability • Check that signal system components are communicating between intersections & functioning properly, taking corrective actions as needed • Check that detection & surveillance system components are communicating & functioning properly, taking corrective actions as needed • Implement local signal timing plans (as needed) • Develop, maintain, & perform periodic reviews of local signal timing plans	2008	Communications Interconnect • \$65/meter (includes both conduit & cable) Inductive Loops • \$1,150 per loop Intersection Controllers • \$6,900 per controller Traffic Signal Timing Plans • \$5,750 per intersection (e.g., traffic counts, geometrics, etc.) System Coordination • \$28,750 per system O&M • Will vary depending upon status of existing conditions & field equipment	• Caltrans SHOPP	• ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) • NTCIP 1210 (Field Management Stations – Part 1: Object Definitions for Signal System Masters) • NTCIP 1211 (Object Definitions for Signal Control & Prioritization)	• DONE (Fall 2007) • Included as an ITS Project w/in AMBAG MPO Turbo Architecture	• Please note that intersection construction costs will vary depending upon status of existing conditions & field equipment
Transit Automated Vehicle Location (AVL) System	• Install an AVL system to track the transit vehicle's real-time location (including field transponders on the bus fleet & central computer system) • Install AVL system software that performs schedule adherence analysis & updates the transit system's schedule in real-time	• San Benito County	No	Yes	San Benito County Local Transportation Authority (LTA) • Determine best type of vehicle position/location system to use [e.g., global positioning satellites (GPS), dead-reckoning systems, automatic vehicle identification (AVI), beacon systems, etc.] • Determine best type of connection and/or communications media to use • Determine best method to process this information & update the transit schedules in real-time • Ensure that real-time transit schedule information is available via the Internet, transit center(s), & selected bus stops • Perform necessary O&M activities	None	Not Applicable	• Ensure O&M funding availability • Check that AVL system components are communicating between transit vehicles & transit management center, & functioning properly, taking corrective actions as needed • Check that AVL system software is functioning properly, providing realistic real-time schedules, taking corrective actions as needed • Check that AVL system data/information feeds to the internet, transit centers, & selected bus stops are functioning properly • Coordinate/manage transit vehicle schedule adherence	2009	AVL System (Vehicle) • \$25,875 (per transit vehicle) • \$1,725 O&M (per year, per transit vehicle) AVL System (Software) • \$862,500 (includes training) • \$57,500 O&M (per year) Transit Management Center • \$690,000 to \$1.15 million • \$230,000 to \$345,000 O&M (per year)	• San Benito County LTA	• NTCIP 1401 (TCIP Common Public Transportation (CPT) Objects) • NTCIP 1404 (TCIP Scheduling/Runcutting (SCH) Objects) • NTCIP 1405 (TCIP Spatial Representation (SP) Objects) • NTCIP 1407 (Control Center Objects) • Advanced Traveler Information Systems (ATIS) General Use Standards Group	• DONE (Fall 2007) • Included as an ITS Project w/in AMBAG MPO Turbo Architecture	Transit Management Center • Capital costs include system software, hardware, on-board devices, communications, computers, etc. • O&M costs include staffing, communications, etc.



APPENDIX B – SAN BENITO COUNTY ITS PROJECT LOG

Project Title	Project Description	Project Location	Inter-Agency Project (Yes/No)	County-Specific Project (Yes/No)	Lead Agency Roles & Responsibilities	Other Agencies Roles & Responsibilities	Applicable Cooperative Agreements	O&M Considerations	Implementation Timeframe	Cost \$\$	Funding Sources	Applicable ITS Standards	Architecture Conformance Status	Comments
Transit Electronic Fare Collection System	<ul style="list-style-type: none"> Install an electronic fare system that "collects" payments on-board transit vehicles using "Smart" Card technology 	<ul style="list-style-type: none"> San Benito County 	Yes	Yes	San Benito County Local Transportation Authority (LTA) <ul style="list-style-type: none"> Determine best type of "Smart" Card technology to use & applicable payment method(s) supported (e.g., debit, credit, pre-paid, etc.) Determine best type of connection and/or communications media to use Determine best design to implement on the vehicle to permit fare payment or authorization to ride Determine best method to collect, process, store, etc. this information/transaction in real-time Determine the best manner to "connect/coordinate" the electronic fare collection system w/ the transit financial accounting system Coordinate potential inter-Agency transfer of funds Ensure that real-time "Smart" Card information is available re: funds available (e.g., internet, transit center, telephone call-in systems, etc.) Perform necessary O&M activities 	Other Central Coast Transit Agencies <ul style="list-style-type: none"> Determine best type of "Smart" Card technology to use Coordinate potential inter-Agency transfer of funds Ensure that real-time "Smart" Card information is available re: funds available (e.g., internet, transit center, etc.) Perform necessary O&M activities 	<ul style="list-style-type: none"> "Smart" Card Technology (TBD) Inter-Agency Transfer of Funds (TBD) Center-to-Center (C2C) Data Sharing (Existing) 	<ul style="list-style-type: none"> Ensure O&M funding availability Check that electronic fare collection system components are communicating between transit vehicles & transit management center, & functioning properly, taking corrective actions as needed Check that financial/accounting system software is functioning properly, providing accurate account balances, taking corrective actions as needed Check that electronic fare collection system data/information feeds to the internet, transit centers, & telephone call-in systems are functioning properly Coordinate/manage customer account information internally (& potentially w/ other transit Agencies) 	2010	Electronic Fare Collection System (Vehicle) <ul style="list-style-type: none"> \$17,250 (per transit vehicle) \$1,150 O&M (per year, per transit vehicle) Electronic Payment Services (Vehicle Tag/Card) <ul style="list-style-type: none"> \$28,750 to \$57,500 O&M (N/A) Electronic Payment Services (Tag/Card Reader) <ul style="list-style-type: none"> \$34,500 to \$46,000 \$9,200 to \$11,500 O&M (per year) \$46,000 to \$92,000 \$86,250 to \$115,000 O&M (per year) 	<ul style="list-style-type: none"> San Benito County LTA 	<ul style="list-style-type: none"> NTCIP 1401 [TCIP Common Public Transportation (CPT) Objects] NTCIP 1403 [TCIP Passenger Information (PI) Objects] NTCIP 1406 [TCIP On Board (OB) Objects] NTCIP 1407 (Control Center Objects) NTCIP 1408 [TCIP Fare Collection (FC) Business Area Objects] Advanced Traveler Information Systems (ATIS) General Use Standards Group 	<ul style="list-style-type: none"> DONE (Fall 2007) Included as an ITS Project win AMBAG MPO Turbo Architecture 	Electronic Fare Collection System <ul style="list-style-type: none"> Capital costs include system software, hardware, vehicle tags, tag readers, communications, system integration, etc. O&M costs include staffing, communications, power, etc. "Smart" Cards Several payment approaches can be used, but it is important that the approaches be coordinated with other "Smart" Card applications in the Central Coast & elsewhere in California in order to promote seamless operation
Advanced Crosswalk	<ul style="list-style-type: none"> Provides surveillance/detection equipment for critical pedestrian crosswalk locations Depending on the individual crosswalk, this could include audible signal change indications, security monitoring, and/or visible warnings to drivers of pedestrians in the crosswalk 	<ul style="list-style-type: none"> SR _____ City of Hollister 	Yes	Yes	City of Hollister <ul style="list-style-type: none"> Determine best type(s) of surveillance/detection equipment to use Determine best type(s) of alerts/warnings to provide drivers (e.g., audible, visual, etc.) Implement equipment at critical pedestrian crosswalk locations Develop construction plans for new crosswalk installations Coordinate pedestrian movements/indications with signal timing plans (as necessary) Perform necessary O&M activities 	Caltrans D5 <ul style="list-style-type: none"> Review construction plans for new crosswalk installations Coordinate pedestrian movements/indications with signal timing plans (as necessary) Perform necessary O&M activities 	<ul style="list-style-type: none"> Advanced Crosswalk Coordination (TBD) It is anticipated that pertinent/relevant portions of the following existing Agreements could be used to develop such: <ul style="list-style-type: none"> (a) Emergency Vehicle Pre-emption (b) Signal Synchronization (c) Transit Signal Priority 	<ul style="list-style-type: none"> Ensure O&M funding availability Check that detection & surveillance system components are communicating & functioning properly, taking corrective actions as needed Check that pedestrian indications/warnings to drivers are communicating & functioning properly, taking corrective actions as needed Ensure advance crosswalk system components are communicating with nearest signalized intersection & functioning properly, taking corrective actions as needed Ensure that pedestrian movements/activations are coordinated with local signal timing plans (as needed) Develop, maintain, & perform periodic reviews of local signal timing plans 	2011	Advanced Crosswalk <ul style="list-style-type: none"> \$92,575 per location O&M \$3,450 per year, per location 	<ul style="list-style-type: none"> City of Hollister 	<ul style="list-style-type: none"> ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) NTCIP 1210 (Field Management Stations -- Part 1: Object Definitions for Signal System Masters) NTCIP 1211 (Object Definitions for Signal Control & Prioritization) 	<ul style="list-style-type: none"> DONE (Fall 2007) Included as an ITS Project win AMBAG MPO Turbo Architecture 	



Appendix C - Monterey
County ITS Project Log



APPENDIX C – MONTEREY COUNTY ITS PROJECT LOG

Project Title	Project Description	Project Location	Inter-Agency Project (Yes/No)	County-Specific Project (Yes/No)	Lead Agency Roles & Responsibilities	Other Agencies Roles & Responsibilities	Applicable Cooperative Agreements	O&M Considerations	Implementation Timeframe	Cost (\$)	Funding Sources	Applicable ITS Standards	Architecture Conformance Status	Comments
Traffic Signal Synchronization Program	• Install communications interconnect, ensure signal clock timing synchronization, & coordinate traffic signal timing plans along roadways	• SR 183 - Castroville Sep. to SR 1 (near Salinas)	Yes	Yes	<p><u>Caltrans D5</u></p> <ul style="list-style-type: none"> Determine best type of connection and/or communications media to use Implement/establish connection and/or signal clock timing synchronization Develop construction plans for new traffic signal or controller installations or repairs Assist in bringing signalized intersections "on-line" Perform necessary O&M activities 	<p><u>City of Salinas</u></p> <ul style="list-style-type: none"> Assist in bringing signalized intersections "on-line" Perform necessary O&M activities 	• Signal Synchronization (Existing)	<ul style="list-style-type: none"> Ensure O&M funding availability Check that signal system components are communicating between intersections & functioning properly, taking corrective actions as needed Check that detection & surveillance system components are communicating & functioning properly, taking corrective actions as needed Implement local signal timing plans (as needed) Develop, maintain, & perform periodic reviews of local signal timing plans 	2008	<p><u>Communications Interconnect</u></p> <ul style="list-style-type: none"> \$65/meter (includes both conduit & cable) <u>Inductive Loops</u> \$1,150 per loop <u>Intersection Controllers</u> \$6,900 per controller <u>Traffic Signal Timing Plans</u> \$5,750 per intersection (e.g., traffic counts, geometrics, etc.) <u>System Coordination</u> \$28,750 per system O&M Will vary depending upon status of existing conditions & field equipment 	• Caltrans SHOPP	<ul style="list-style-type: none"> ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) NTCIP 1210 (Field Management Stations -- Part 1: Object Definitions for Signal System Masters) NTCIP 1211 (Object Definitions for Signal Control & Prioritization) 	<ul style="list-style-type: none"> DONE (Fall 2007) Included as an ITS Project w/in AMBAG MPO Turbo Architecture 	• Please note that intersection construction costs will vary depending upon status of existing conditions & field equipment
Traffic Signal Synchronization Program	• Install communications interconnect, ensure signal clock timing synchronization, & coordinate traffic signal timing plans along roadways	• SR 68 - York Road to Torero	Yes	Yes	<p><u>Caltrans D5</u></p> <ul style="list-style-type: none"> Determine best type of connection and/or communications media to use Implement/establish connection and/or signal clock timing synchronization Develop construction plans for new traffic signal or controller installations or repairs Assist in bringing signalized intersections "on-line" Perform necessary O&M activities 	<p><u>Monterey County</u></p> <ul style="list-style-type: none"> Assist in bringing signalized intersections "on-line" Perform necessary O&M activities 	• Signal Synchronization (Existing)	<ul style="list-style-type: none"> Ensure O&M funding availability Check that signal system components are communicating between intersections & functioning properly, taking corrective actions as needed Check that detection & surveillance system components are communicating & functioning properly, taking corrective actions as needed Implement local signal timing plans (as needed) Develop, maintain, & perform periodic reviews of local signal timing plans 	2008	<p><u>Communications Interconnect</u></p> <ul style="list-style-type: none"> \$65/meter (includes both conduit & cable) <u>Inductive Loops</u> \$1,150 per loop <u>Intersection Controllers</u> \$6,900 per controller <u>Traffic Signal Timing Plans</u> \$5,750 per intersection (e.g., traffic counts, geometrics, etc.) <u>System Coordination</u> \$28,750 per system O&M Will vary depending upon status of existing conditions & field equipment 	• Caltrans SHOPP	<ul style="list-style-type: none"> ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) NTCIP 1210 (Field Management Stations -- Part 1: Object Definitions for Signal System Masters) NTCIP 1211 (Object Definitions for Signal Control & Prioritization) 	<ul style="list-style-type: none"> DONE (Fall 2007) Included as an ITS Project w/in AMBAG MPO Turbo Architecture 	• Please note that intersection construction costs will vary depending upon status of existing conditions & field equipment
Traffic Signal Synchronization Program	• Install communications interconnect, ensure signal clock timing synchronization, & coordinate traffic signal timing plans along roadways	• SR 156 - Castroville Blvd. to US 101	Yes	Yes	<p><u>Caltrans D5</u></p> <ul style="list-style-type: none"> Determine best type of connection and/or communications media to use Implement/establish connection and/or signal clock timing synchronization Develop construction plans for new traffic signal or controller installations or repairs Assist in bringing signalized intersections "on-line" Perform necessary O&M activities 	<p><u>City of Castroville</u></p> <ul style="list-style-type: none"> Assist in bringing signalized intersections "on-line" Perform necessary O&M activities 	• Signal Synchronization (Existing)	<ul style="list-style-type: none"> Ensure O&M funding availability Check that signal system components are communicating between intersections & functioning properly, taking corrective actions as needed Check that detection & surveillance system components are communicating & functioning properly, taking corrective actions as needed Implement local signal timing plans (as needed) Develop, maintain, & perform periodic reviews of local signal timing plans 	2008	<p><u>Communications Interconnect</u></p> <ul style="list-style-type: none"> \$65/meter (includes both conduit & cable) <u>Inductive Loops</u> \$1,150 per loop <u>Intersection Controllers</u> \$6,900 per controller <u>Traffic Signal Timing Plans</u> \$5,750 per intersection (e.g., traffic counts, geometrics, etc.) <u>System Coordination</u> \$28,750 per system O&M Will vary depending upon status of existing conditions & field equipment 	• Caltrans SHOPP	<ul style="list-style-type: none"> ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) NTCIP 1210 (Field Management Stations -- Part 1: Object Definitions for Signal System Masters) NTCIP 1211 (Object Definitions for Signal Control & Prioritization) 	<ul style="list-style-type: none"> DONE (Fall 2007) Included as an ITS Project w/in AMBAG MPO Turbo Architecture 	• Please note that intersection construction costs will vary depending upon status of existing conditions & field equipment



APPENDIX C – MONTEREY COUNTY ITS PROJECT LOG

Project Title	Project Description	Project Location	Inter-Agency Project (Yes/No)	County-Specific Project (Yes/No)	Lead Agency Roles & Responsibilities	Other Agencies Roles & Responsibilities	Applicable Cooperative Agreements	O&M Considerations	Implementation Timeframe	Cost (\$)	Funding Sources	Applicable ITS Standards	Architecture Conformance Status	Comments
511 Telephone Call-In System	<ul style="list-style-type: none"> Establish a 511 telephone call-in system to provide travelers/motorists w/ information as to closures, major delays, congestion, incidents, construction, transit schedules, etc. 	Monterey County	Yes	<ul style="list-style-type: none"> Yes Potential to tie-in w/ Regional and/or Statewide 511 Programs 	MST & AMBAG <ul style="list-style-type: none"> Determine business model (e.g., Public Agency, Private Sector, Public-Private partnership, etc.) Determine functionality, features, type(s) of traveler information to support, messages to provide, exact wording of each message, etc. Determine telecommunications carrier/provider Analyze expected level-of-usage & develop pricing structure Develop marketing strategy Perform O&M activities 	Caltrans, SBICOG, TAMC, & SCCRTC <ul style="list-style-type: none"> Determine business model (e.g., Public Agency, Private Sector, Public-Private partnership, etc.) Determine functionality, features, type(s) of traveler information to support, messages to provide, exact wording of each message, etc. Determine telecommunications carrier/provider Analyze expected level-of-usage & develop pricing structure Develop marketing strategy Perform O&M activities 	<ul style="list-style-type: none"> Center-to-Center (C2C) Data Sharing (Existing) 511 Content/Message Types (TBD) 	<ul style="list-style-type: none"> Reliable, accurate, & timely provision of messages via 511 re: real-time traffic conditions & transit schedules Monitor 511 system for accurate provision of content/messages Check that 511 system components are communicating w/ the "data sources" & functioning properly, taking corrective actions as needed (e.g., Caltrans D5 TMC, MST transit center, etc.) Check that 511 telephone lines are functioning properly, messages are audible, & coordinate w/ telecommunications carrier/provider 	2010	Statewide 511 System <ul style="list-style-type: none"> \$1.2 million to \$5.2 million Metropolitan 511 System <ul style="list-style-type: none"> \$1.5 million to \$2.4 million Average Cost per Call <ul style="list-style-type: none"> Under \$0.50 to just under \$2.50 	<ul style="list-style-type: none"> AMBAG 	<ul style="list-style-type: none"> Advanced Traveler Information Systems (ATIS) General Use Standards Group ITE TM 2.01 (Message Sets for External TMC Communication) 	<ul style="list-style-type: none"> DONE (Fall 2007) Included as an ITS Project w/in AMBAG MPO Turbo Architecture 	<ul style="list-style-type: none"> Costs include labor, equipment, 511 content preparation, telecommunications, marketing, & evaluation The volume of calls received affects the average cost per call
Transit Electronic Fare Collection System	<ul style="list-style-type: none"> Install an electronic fare system that "collects" payments on-board transit vehicles using "Smart" Card technology 	Monterey County	Yes	Yes	Monterey-Salinas Transit (MST) <ul style="list-style-type: none"> Determine best type of "Smart" Card technology to use & applicable payment method(s) supported (e.g., debit, credit, pre-paid, etc.) Determine best type of connection and/or communications media to use Determine best design to implement on the transit vehicle (i.e., readers mounted on the vehicle to permit fare payment or authorization to ride) Determine best method to collect, process, store, etc. this information/transaction in real-time Determine the best manner to "connect/coordinate" the electronic fare collection system w/ the transit financial accounting system Coordinate potential inter-Agency transfer of funds Ensure that real-time "Smart" Card information is available re: funds available (e.g., internet, transit center, telephone call-in systems, etc.) Perform necessary O&M activities 	Other Central Coast Transit Agencies <ul style="list-style-type: none"> Determine best type of "Smart" Card technology to use Coordinate potential inter-Agency transfer of funds Ensure that real-time "Smart" Card information is available re: funds available (e.g., internet, transit center, etc.) Perform necessary O&M activities 	<ul style="list-style-type: none"> "Smart" Card Technology (TBD) Inter-Agency Transfer of Funds (TBD) Center-to-Center (C2C) Data Sharing (Existing) 	<ul style="list-style-type: none"> Ensure O&M funding availability Check that electronic fare collection system components are communicating between transit vehicles & transit management center, & functioning properly, taking corrective actions as needed Check that financial/accounting system software is functioning properly, providing accurate account balances, taking corrective actions as needed Check that electronic fare collection system data/information feeds to the internet, transit centers, & telephone call-in systems are functioning properly Coordinate/manage customer account information internally (& potentially w/ other transit Agencies) 	2010	Electronic Fare Collection System (Vehicle) <ul style="list-style-type: none"> \$17,250 (per transit vehicle) \$1,150 O&M (per year, per transit vehicle) Electronic Payment Services (Vehicle Tag/Card) <ul style="list-style-type: none"> \$28,750 to \$57,500 O&M (N/A) Electronic Payment Services (Tag/Card Reader) <ul style="list-style-type: none"> \$34,500 to \$46,000 \$9,200 to \$11,500 O&M (per year) Management Center <ul style="list-style-type: none"> \$46,000 to \$92,000 \$86,250 to \$115,000 O&M (per year) 	<ul style="list-style-type: none"> MST 	<ul style="list-style-type: none"> NTCIP 1401 [TCIP Common Public Transportation (CPT) Objects] NTCIP 1403 [TCIP Passenger Information (PI) Objects] NTCIP 1406 [TCIP On Board (OB) Objects] NTCIP 1407 [Control Center Objects] NTCIP 1408 [TCIP Fare Collection (FC) Business Area Objects] Advanced Traveler Information Systems (ATIS) General Use Standards Group 	<ul style="list-style-type: none"> DONE (Fall 2007) Included as an ITS Project w/in AMBAG MPO Turbo Architecture 	Electronic Fare Collection System <ul style="list-style-type: none"> Capital costs include system software, hardware, vehicle tags, tag readers, communications, system integration, etc. O&M costs include staffing, communications, power, etc. "Smart" Cards <ul style="list-style-type: none"> Several payment approaches can be used, but it is important that the approaches be coordinated with other "Smart" Card applications in the Central Coast & elsewhere in California in order to promote seamless operation

A scenic view of a coastline with mountains in the background and waves crashing against rocks in the foreground. The text is centered over the image.

Appendix D – San Luis Obispo
County ITS Project Log



APPENDIX D – SAN LUIS OBISPO COUNTY ITS PROJECT LOG

Project Title	Project Description	Project Location	Inter-Agency Project (Yes/No)	County-Specific Project (Yes/No)	Lead Agency Roles & Responsibilities	Other Agencies Roles & Responsibilities	Applicable Cooperative Agreements	O&M Considerations	Implementation Timeframe	Cost (\$)	Funding Sources	Applicable ITS Standards	Architecture Conformance Standards	Comments
Traffic Signal Synchronization Program	• Install communications interconnect, ensure signal clock timing synchronization, & coordinate traffic signal timing plans along roadways	• Grand Avenue (Cities of Arroyo Grande & Grover Beach)	Yes	Yes	<p><u>City of Arroyo Grande</u></p> <ul style="list-style-type: none"> • Determine best type of connection and/or communications media to use • Implement/establish connection and/or signal clock timing synchronization • Develop construction plans for new traffic signal or controller installations or repairs • Assist in bringing signalized intersections "on-line" • Perform necessary O&M activities 	<p><u>City of Grover Beach</u></p> <ul style="list-style-type: none"> • Determine best type of connection and/or communications media to use • Implement/establish connection and/or signal clock timing synchronization • Develop construction plans for new traffic signal or controller installations or repairs • Assist in bringing signalized intersections "on-line" • Perform necessary O&M activities 	• Signal Synchronization (Existing)	<ul style="list-style-type: none"> • Ensure O&M funding availability • Check that signal system components are communicating between intersections & functioning properly, taking corrective actions as needed • Check that detection & surveillance system components are communicating & functioning properly, taking corrective actions as needed • Implement local signal timing plans (as needed) • Develop, maintain, & perform periodic reviews of local signal timing plans 	2008	<p><u>Communications Interconnect</u></p> <ul style="list-style-type: none"> • \$65/meter (includes both conduit & cable) • <u>Inductive Loops</u> • \$1,150 per loop • <u>Intersection Controllers</u> • \$6,900 per controller • <u>Traffic Signal Timing Plans</u> • \$5,750 per intersection (e.g., traffic counts, geometrics, etc.) • <u>System Coordination</u> • \$28,750 per system • O&M • Will vary depending upon status of existing conditions & field equipment 	<ul style="list-style-type: none"> • City of Arroyo Grande • City of Grover Beach 	<ul style="list-style-type: none"> • ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) • NTCIP 1210 (Field Management Stations – Part 1: Object Definitions for Signal System Masters) • NTCIP 1211 (Object Definitions for Signal Control & Prioritization) 	<ul style="list-style-type: none"> • DONE (Fall 2007) • Included as an ITS Project w/in SLOCOG MPO Turbo Architecture 	• Please note that intersection construction costs will vary depending upon status of existing conditions & field equipment
Traffic Signal Synchronization Program	• Install communications interconnect, ensure signal clock timing synchronization, & coordinate traffic signal timing plans along roadways	• El Camino (City of Atascadero)	No	Yes	<p><u>City of Atascadero</u></p> <ul style="list-style-type: none"> • Determine best type of connection and/or communications media to use • Implement/establish connection and/or signal clock timing synchronization • Develop construction plans for new traffic signal or controller installations or repairs • Assist in bringing signalized intersections "on-line" • Perform necessary O&M activities 	None	• Signal Synchronization (Existing)	<ul style="list-style-type: none"> • Ensure O&M funding availability • Check that signal system components are communicating between intersections & functioning properly, taking corrective actions as needed • Check that detection & surveillance system components are communicating & functioning properly, taking corrective actions as needed • Implement local signal timing plans (as needed) • Develop, maintain, & perform periodic reviews of local signal timing plans 	2008	<p><u>Communications Interconnect</u></p> <ul style="list-style-type: none"> • \$65/meter (includes both conduit & cable) • <u>Inductive Loops</u> • \$1,150 per loop • <u>Intersection Controllers</u> • \$6,900 per controller • <u>Traffic Signal Timing Plans</u> • \$5,750 per intersection (e.g., traffic counts, geometrics, etc.) • <u>System Coordination</u> • \$28,750 per system • O&M • Will vary depending upon status of existing conditions & field equipment 	• City of Atascadero	<ul style="list-style-type: none"> • ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) • NTCIP 1210 (Field Management Stations – Part 1: Object Definitions for Signal System Masters) • NTCIP 1211 (Object Definitions for Signal Control & Prioritization) 	<ul style="list-style-type: none"> • DONE (Fall 2007) • Included as an ITS Project w/in SLOCOG MPO Turbo Architecture 	• Please note that intersection construction costs will vary depending upon status of existing conditions & field equipment
Motorist Aid Call Boxes	• Install call boxes to provide motorists with a direct connection to a CHP communications center or other private call answering center (PCAC)	• Rural SR 227	Yes	Yes	<p><u>SLOCOG</u></p> <ul style="list-style-type: none"> • Install call boxes & ensure power, wireless communications links, etc. • Select wireless telecommunications provider • Ensure direct wireless connection to a CHP communications center or PCAC • Perform necessary O&M activities 	<p><u>Caltrans D5</u></p> <ul style="list-style-type: none"> • Develop construction plans for new call box installations • Perform necessary O&M activities • <u>CHP/PCAC</u> • Install dedicated/direct telephone system (as necessary) • Ensure direct wireless communications links to field call boxes • Perform necessary O&M activities 	None Required	<p><u>SLOCOG</u></p> <ul style="list-style-type: none"> • Ensure O&M funding availability • Check that wireless telecommunications provider ensures that call boxes are communicating to CHP/PCAC & functioning properly, taking corrective actions as needed • <u>Caltrans D5</u> • Check that call box system components are functioning properly, taking corrective actions as needed • <u>CHP/PCAC</u> • Upon receiving a call from a call box, CHP (or PCAC) personnel to dispatch appropriate assistance, including tow service, law enforcement, fire departments, or emergency medical service (EMS) personnel • Check that telephone call answering system components are communicating & functioning properly, taking corrective actions as needed • Check that dispatching system components are communicating & functioning properly, taking corrective actions as needed 	2008	<p><u>Call Box</u></p> <ul style="list-style-type: none"> • \$6,900 per location • O&M • \$34,500 (Denotes cost to manage Call Box program for a typical County) 	• SLOCOG	None	<ul style="list-style-type: none"> • DONE (Fall 2007) • Included as an ITS Project w/in SLOCOG MPO Turbo Architecture 	• Call boxes allow motorists to report a road hazard, flat tire, mechanical breakdown, traffic accident, or other incident




APPENDIX D – SAN LUIS OBISPO COUNTY ITS PROJECT LOG

Project Title	Project Description	Project Location	Inter-Agency Project (Yes/No)	County-Specific Project (Yes/No)	Lead Agency Roles & Responsibilities	Other Agencies Roles & Responsibilities	Applicable Cooperative Agreements	O&M Considerations	Implementation Timeframe	Cost (\$)	Funding Sources	Applicable ITS Standards	Architecture Conformance Standards	Comments
Transit Automated Vehicle Location (AVL) System	<ul style="list-style-type: none"> Install an AVL system to track the transit vehicle's real-time location (including field transponders on the bus fleet & central computer system) Install AVL system software that performs schedule adherence analysis & updates the transit system's schedule in real-time 	San Luis Obispo County	No	Yes	<p><u>San Luis Obispo Regional Transit Authority (SLORTA)</u></p> <ul style="list-style-type: none"> Determine best type of vehicle position/location system to use [e.g., global positioning satellites (GPS), dead-reckoning systems, automatic vehicle identification (AVI), beacon systems, etc.] Determine best type of connection and/or communications media to use Determine best method to process this information & update the transit schedules in real-time Ensure that real-time transit schedule information is available via the Internet, transit center(s), & selected bus stops Perform necessary O&M activities 	None	Not Applicable	<ul style="list-style-type: none"> Ensure O&M funding availability Check that AVL system components are communicating between transit vehicles & transit management center, & functioning properly, taking corrective actions as needed Check that AVL system software is functioning properly, providing realistic real-time schedules, taking corrective actions as needed Check that AVL system data/information feeds to the internet, transit centers, & selected bus stops are functioning properly Coordinate/manage transit vehicle schedule adherence 	2009	<p><u>AVL System (Vehicle)</u></p> <ul style="list-style-type: none"> \$25,875 (per transit vehicle) \$1,725 O&M (per year, per transit vehicle) <p><u>AVL System (Software)</u></p> <ul style="list-style-type: none"> \$862,500 (includes training) \$57,500 O&M (per year) <p><u>Transit Management Center</u></p> <ul style="list-style-type: none"> \$690,000 to \$1.15 million \$230,000 to \$345,000 O&M (per year) 	SLORTA	<ul style="list-style-type: none"> NTCIP 1401 [TCIP Common Public Transportation (CPT) Objects] NTCIP 1404 [TCIP Scheduling/RunCutting (SCH) Objects] NTCIP 1405 [TCIP Spatial Representation (SP) Objects] NTCIP 1407 (Control Center Objects) Advanced Traveler Information Systems (ATIS) General Use Standards Group 	<ul style="list-style-type: none"> DONE (Fall 2007) Included as an ITS Project w/in SLOCOG MPO Turbo Architecture 	<p><u>Transit Management Center</u></p> <ul style="list-style-type: none"> Capital costs include system software, hardware, on-board devices, communications, computers, etc. O&M costs include staffing, communications, etc.
Transit Electronic Fare Collection System	<ul style="list-style-type: none"> Install an electronic fare system that "collects" payments on-board transit vehicles using "Smart" Card technology 	San Luis Obispo County	Yes	Yes	<p><u>San Luis Obispo Regional Transit Authority (SLORTA)</u></p> <ul style="list-style-type: none"> Determine best type of "Smart" Card technology to use & applicable payment method(s) supported (e.g., debit, credit, prepaid, etc.) Determine best type of connection and/or communications media to use Determine best design to implement on the transit vehicle (i.e., readers mounted on the vehicle to permit fare payment or authorization to ride) Determine best method to collect, process, store, etc. this information/transaction in real-time Determine the best manner to "connect/coordinate" the electronic fare collection system w/ the transit financial accounting system Coordinate potential inter-Agency transfer of funds Ensure that real-time "Smart" Card information is available re: funds available (e.g., internet, transit center, telephone call-in systems, etc.) Perform necessary O&M activities 	<p><u>Other Central Coast Transit Agencies</u></p> <ul style="list-style-type: none"> Determine best type of "Smart" Card technology to use Coordinate potential inter-Agency transfer of funds Ensure that real-time "Smart" Card information is available re: funds available (e.g., internet, transit center, etc.) Perform necessary O&M activities 	<ul style="list-style-type: none"> "Smart" Card Technology (TBD) Inter-Agency Transfer of Funds (TBD) Center-to-Center (C2C) Data Sharing (Existing) 	<ul style="list-style-type: none"> Ensure O&M funding availability Check that electronic fare collection system components are communicating between transit vehicles & transit management center, & functioning properly, taking corrective actions as needed Check that financial/accounting system software is functioning properly, providing accurate account balances, taking corrective actions as needed Check that electronic fare collection system data/information feeds to the internet, transit centers, & telephone call-in systems are functioning properly Coordinate/manage customer account information internally (& potentially w/ other transit Agencies) 	2010	<p><u>Electronic Fare Collection System (Vehicle)</u></p> <ul style="list-style-type: none"> \$17,250 (per transit vehicle) \$1,150 O&M (per year, per transit vehicle) <p><u>Electronic Payment Services (Vehicle Tag/Card)</u></p> <ul style="list-style-type: none"> \$28,750 to \$57,500 O&M (N/A) <p><u>Electronic Payment Services (Tag/Card Reader)</u></p> <ul style="list-style-type: none"> \$34,500 to \$46,000 \$9,200 to \$11,500 O&M (per year) <p><u>Management Center</u></p> <ul style="list-style-type: none"> \$46,000 to \$92,000 \$86,250 to \$115,000 O&M (per year) 	SLORTA	<ul style="list-style-type: none"> NTCIP 1401 [TCIP Common Public Transportation (CPT) Objects] NTCIP 1403 [TCIP Passenger Information (PI) Objects] NTCIP 1406 [TCIP On Board (OB) Objects] NTCIP 1407 (Control Center Objects) NTCIP 1408 [TCIP Fare Collection (FC) Business Area Objects] Advanced Traveler Information Systems (ATIS) General Use Standards Group 	<ul style="list-style-type: none"> DONE (Fall 2007) Included as an ITS Project w/in SLOCOG MPO Turbo Architecture 	<p><u>Electronic Fare Collection System</u></p> <ul style="list-style-type: none"> Capital costs include system software, hardware, vehicle tags, tag readers, communications, system integration, etc. O&M costs include staffing, communications, power, etc. "Smart" Cards Several payment approaches can be used, but it is important that the approaches be coordinated with other "Smart" Card applications in the Central Coast & elsewhere in California in order to promote seamless operation
Advanced Crosswalk	<ul style="list-style-type: none"> Provides surveillance/detection equipment for critical pedestrian crosswalk locations Depending on the individual crosswalk, this could include audible signal change indications, security monitoring, and/or visible warnings to drivers of pedestrians in the crosswalk 	Grand Avenue (Cities of Arroyo Grande & Grover Beach)	Yes	Yes	<p><u>City of Arroyo Grande</u></p> <ul style="list-style-type: none"> Determine best type(s) of surveillance/detection equipment to use Determine best type(s) of alerts/warnings to provide drivers (e.g., audible, visual, etc.) Implement equipment at critical pedestrian crosswalk locations Develop construction plans for new crosswalk installations Coordinate pedestrian movements/indications with signal timing plans (as necessary) Perform necessary O&M activities 	<p><u>City of Grover Beach</u></p> <ul style="list-style-type: none"> Determine best type(s) of surveillance/detection equipment to use Determine best type(s) of alerts/warnings to provide drivers (e.g., audible, visual, etc.) Implement equipment at critical pedestrian crosswalk locations Develop construction plans for new crosswalk installations Coordinate pedestrian movements/indications with signal timing plans (as necessary) Perform necessary O&M activities 	<ul style="list-style-type: none"> Advanced Crosswalk Coordination (TBD) It is anticipated that pertinent/relevant portions of the following existing Agreements could be used to develop such: <ul style="list-style-type: none"> (a) Emergency Vehicle Pre-emption (b) Signal Synchronization (c) Transit Signal Priority 	<ul style="list-style-type: none"> Ensure O&M funding availability Check that detection & surveillance system components are communicating & functioning properly, taking corrective actions as needed Check that pedestrian indications/warnings to drivers are communicating & functioning properly, taking corrective actions as needed Ensure advance crosswalk system components are communicating with nearest signalized intersection & functioning properly, taking corrective actions as needed Ensure that pedestrian movements/activations are coordinated with local signal timing plans (as needed) Develop, maintain, & perform periodic reviews of local signal timing plans 	2011	<p><u>Advanced Crosswalk</u></p> <ul style="list-style-type: none"> \$92,575 per location \$3,450 per year, per location 	<ul style="list-style-type: none"> City of Arroyo Grande City of Grover Beach 	<ul style="list-style-type: none"> ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) NTCIP 1210 (Field Management Stations -- Part 1: Object Definitions for Signal System Masters) NTCIP 1211 (Object Definitions for Signal Control & Prioritization) 	<ul style="list-style-type: none"> DONE (Fall 2007) Included as an ITS Project w/in SLOCOG MPO Turbo Architecture 	



APPENDIX D – SAN LUIS OBISPO COUNTY ITS PROJECT LOG

Project Title	Project Description	Project Location	Inter-Agency Project (Yes/No)	County-Specific Project (Yes/No)	Lead Agency Roles & Responsibilities	Other Agencies Roles & Responsibilities	Applicable Cooperative Agreements	O&M Considerations	Implementation Timeframe	Cost (\$)	Funding Sources	Applicable ITS Standards	Architecture Conformance Standards	Comments
511 Telephone Call-In System	• Establish a 511 telephone call-in system to provide travelers/motorists w/ information as to closures, major delays, congestion, incidents, construction, transit schedules, etc.	• San Luis Obispo County	Yes	• Yes • Potential to tie-in w/ Regional and/or Statewide 511 Programs	<u>SLOCOG</u> • Determine business model (e.g., Public Agency, Private Sector, Public-Private partnership, etc.) • Determine functionality, features, type(s) of traveler information to support, messages to provide, exact wording of each message, etc. • Determine telecommunications carrier/provider • Analyze expected level-of-usage & develop pricing structure • Develop marketing strategy • Perform O&M activities	<u>Caltrans, AMBAG & SBCAG</u> • Determine business model (e.g., Public Agency, Private Sector, Public-Private partnership, etc.) • Determine functionality, features, type(s) of traveler information to support, messages to provide, exact wording of each message, etc. • Determine telecommunications carrier/provider • Analyze expected level-of-usage & develop pricing structure • Develop marketing strategy • Perform O&M activities	• Center-to-Center (C2C) Data Sharing (Existing) • 511 Content/Message Types (TBD)	• Reliable, accurate, & timely provision of messages via 511 re: real-time traffic conditions & transit schedules • Monitor 511 system for accurate provision of content/messages • Check that 511 system components are communicating w/ the "data sources" & functioning properly, taking corrective actions as needed (e.g., Caltrans D5 TMC, MST transit center, etc.) • Check that 511 telephone lines are functioning properly, messages are audible, & coordinate w/ telecommunications carrier/provider	2008 • Early system expected 2011 • Expansion for more motorist information & tourism content expected	<u>Statewide 511 System</u> • \$1.2 million to \$5.2 million <u>Metropolitan 511 System</u> • \$1.5 million to \$2.4 million <u>Average Cost per Call</u> • Under \$0.50 to just under \$2.50	• SLOCOG	• Advanced Traveler Information Systems (ATIS) General Use Standards Group • ITE TM 2.01 (Message Sets for External TMC Communication)	• DONE (Fall 2007) • Included as an ITS Project w/in SLOCOG MPO Turbo Architecture	• Costs include labor, equipment, 511 content preparation, telecommunications, marketing, & evaluation • The volume of calls received affects the average cost per call
Signal Pre-emption Upgrades	• Upgrade all emergency vehicles' & traffic signal/intersection locations' pre-emption devices/technologies to a single system to allow for Agency inter-operability	• San Luis Obispo County	Yes	Yes	<u>SLOCOG</u> • Determine best type of emergency pre-emption system/technology to use (i.e., field/signal device, in-vehicle unit, wireless communications, etc.) • Determine best design to implement on the emergency vehicle (i.e., transponders mounted on the vehicle dashboard, windshield, front bumper, etc.) • Determine best design to implement at the traffic signal/intersection location (i.e., mount on mast arm) • Coordinate use/distribution of system to all Cities/Jurisdiction & Emergency Service Providers • Perform necessary O&M activities	<u>All Cities/Jurisdictions</u> • Determine/implement best type of emergency pre-emption system/technology to use (i.e., field/signal device, wireless communications, etc.) • Determine/implement best design to implement at the traffic signal/intersection location (i.e., mount on mast arm) • Implement local signal timing plans (as needed) • Perform necessary O&M activities <u>All Emergency Service Providers</u> • Determine/implement best type of emergency pre-emption system/technology to use (i.e., in-vehicle unit, wireless communications, etc.) • Determine/implement best design to implement on the emergency vehicle (i.e., transponders mounted on the vehicle dashboard, windshield, front bumper, etc.) • Perform necessary O&M activities	• Signal Pre-emption System (TBD)	<u>SLOCOG</u> • Ensure O&M funding availability <u>Cities/Jurisdictions & Emergency Service Providers</u> • Check that signal pre-emption system components are communicating between emergency vehicles & the traffic signal/intersection locations, & functioning properly, taking corrective actions as needed	2010	• \$400,000	• Outside Grants • SLOCOG	• NTICIP 1210 (Field Management Stations -- Part 1: Object Definitions for Signal System Masters) • NTICIP 1211 (Object Definitions for Signal Control & Prioritization) • ASTM (Dedicated Short Range Communications at 915 MHz Standards Group) • SAE/IEEE (Dedicated Short Range Communications at 5.9 GHz Standards Group) • IEEE Std 1455-1999 (Standard for Message Sets for Vehicle/Roadside Communications)	• DONE (Fall 2007) • Included as an ITS Project w/in SLOCOG MPO Turbo Architecture	• Costs include labor, equipment, programming, & project development
Transit Priority System	• Provide specially-equipped transit vehicles priority (or right-of-way preferential treatment) at traffic signalized intersections	• San Luis Obispo County	Yes	Yes	<u>SLOCOG</u> • Determine best type of transit signal priority system/technology to use (i.e., radio signals, beacon system, loop detectors, etc.) for both the transit vehicle & at the traffic signal/intersection location • Determine best type of visual verification system (either in-vehicle or installed in the field) to confirm to the transit driver that it has been given the right-of-way • Coordinate use of system with all Cities/Jurisdiction, SLORTA, & SLO Transit • Perform necessary O&M activities	<u>All Cities/Jurisdictions</u> • Determine best type of transit signal priority system/technology to use (i.e., radio signals, beacon system, loop detectors, etc.) at the traffic signal/intersection location • Determine best type of visual verification system (either in-vehicle or installed in the field) to confirm to the transit driver that it has been given the right-of-way • Implement local signal timing plans (as needed) • Perform necessary O&M activities <u>SLORTA & SLO Transit</u> • Determine best type of transit signal priority system/technology to use (i.e., radio signals, beacon system, loop detectors, etc.) for the transit vehicle • Determine best type of visual verification system (either in-vehicle or installed in the field) to confirm to the transit driver that it has been given the right-of-way • Determine best type of visual verification system (either in-vehicle or installed in the field) to confirm to the transit driver that it has been given the right-of-way	• Transit Signal Priority (Existing)	<u>SLOCOG</u> • Ensure O&M funding availability <u>Cities/Jurisdictions, SLORTA, & SLO Transit</u> • Check that transit signal priority system components are communicating between transit vehicles & the traffic signal/intersection locations, & functioning properly, taking corrective actions as needed • Check that visual verification system (either in-vehicle or installed in the field) is functioning properly, taking corrective actions as needed	2010	<u>SLOCOG Estimate</u> • \$1,500 per transit vehicle • Plus project development costs <u>Signal Priority (Vehicle)</u> • \$3,450 (per vehicle) • \$230 O&M (per year, per vehicle) <u>Signal Priority (Intersection)</u> • \$4,313 (per intersection) • \$288 O&M (per year, per intersection)	• Outside Grants • SLOCOG	• ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) • NTICIP 1210 (Field Management Stations -- Part 1: Object Definitions for Signal System Masters) • NTICIP 1211 (Object Definitions for Signal Control & Prioritization) • NTICIP 1401 [TCIP Common Public Transportation (CPT) Objects] • NTICIP 1404 [TCIP Scheduling/Run-cutting (SCH) Objects] • NTICIP 1405 [TCIP Spatial Representation (SP) Objects] • NTICIP 1407 (Control Center Objects) • Advanced Traveler Information Systems (ATIS) General Use Standards Group • ASTM (Dedicated Short Range Communications at 915 MHz Standards Group) • SAE/IEEE (Dedicated Short Range Communications at 5.9 GHz Standards Group) • IEEE Std 1455-1999 (Standard for Message Sets for Vehicle/Roadside Communications)	• DONE (Fall 2007) • Included as an ITS Project w/in SLOCOG MPO Turbo Architecture	• SLOCOG cost estimate includes labor, equipment, programming, & project development • Basically, the transit vehicle activates a signal priority phase (within an equipped intersection traffic controller), adding green time to the signal phase for the on-coming transit vehicle • Typically, the green phase is brought-on early or extended for a pre-set time between 5-45 seconds




Appendix E - Santa Barbara
County ITS Project Log



APPENDIX E – SANTA BARBARA COUNTY ITS PROJECT LOG

Project Title	Project Description	Project Location	Inter-Agency Project (Yes/No)	County-Specific Project (Yes/No)	Lead Agency Roles & Responsibilities	Other Agencies Roles & Responsibilities	Applicable Cooperative Agreements	O&M Considerations	Implementation Timeframe	Cost (\$)	Funding Sources	Applicable ITS Standards	Architecture Conformance Status	Comments
Traffic Signal Synchronization Program	• Install communications interconnect, ensure signal clock timing synchronization, & coordinate traffic signal timing plans along roadways	• Upper State Street (City of Santa Barbara)	No	Yes	<u>City of Santa Barbara</u> • Determine best type of connection and/or communications media to use • Implement/establish connection and/or signal clock timing synchronization • Develop construction plans for new traffic signal or controller installations or repairs • Assist in bringing signalized intersections "on-line" • Perform necessary O&M activities	None	• Signal Synchronization (Existing)	• Ensure O&M funding availability • Check that signal system components are communicating between intersections & functioning properly, taking corrective actions as needed • Check that detection & surveillance system components are communicating & functioning properly, taking corrective actions as needed • Implement local signal timing plans (as needed) • Develop, maintain, & perform periodic reviews of local signal timing plans	2008	<u>Communications Interconnect</u> • \$65/foot (includes both conduit & cable) <u>Inductive Loops</u> • \$1,150 per loop <u>Intersection Controllers</u> • \$6,900 per controller <u>Traffic Signal Timing Plans</u> • \$5,750 per intersection (e.g., traffic counts, geometrics, etc.) <u>System Coordination</u> • \$28,750 per system <u>O&M</u> • Will vary depending upon status of existing conditions & field equipment	• City of Santa Barbara	• ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) • NTCIP 1210 (Field Management Stations -- Part 1: Object Definitions for Signal System Masters) • NTCIP 1211 (Object Definitions for Signal Control & Prioritization)	• DONE (Fall 2007) • Included as an ITS Project w/in SBCAG MPO Turbo Architecture	• Please note that intersection construction costs will vary depending upon status of existing conditions & field equipment
Transit Automated Vehicle Location (AVL) System	• Install an AVL system to track the transit vehicle's real-time location (including field transponders on the bus fleet & central computer system) • Install AVL system software that performs schedule adherence analysis & updates the transit system's schedule in real-time	• Santa Barbara County • Initially buses along Hollister, State, & US 101 corridors	No	Yes	<u>Santa Barbara Metropolitan Transit District (SBMTD)</u> • Determine best type of vehicle position/location system to use [e.g., global positioning satellites (GPS), dead-reckoning systems, automatic vehicle identification (AVI), beacon systems, etc.] • Determine best type of connection and/or communications media to use • Determine best method to process this information & update the transit schedules in real-time • Ensure that real-time transit schedule information is available via the Internet, transit center(s), & selected bus stops • Perform necessary O&M activities	None	Not Applicable	• Ensure O&M funding availability • Check that AVL system components are communicating between transit vehicles & transit management center, & functioning properly, taking corrective actions as needed • Check that AVL system software is functioning properly, providing realistic real-time schedules, taking corrective actions as needed • Check that AVL system data/information feeds to the internet, transit centers, & selected bus stops are functioning properly • Coordinate/manage transit vehicle schedule adherence	2009	<u>AVL System (Vehicle)</u> • \$25,875 (per transit vehicle) • \$1,725 O&M (per year, per transit vehicle) <u>AVL System (Software)</u> • \$662,500 (includes training) • \$57,500 O&M (per year) <u>Transit Management Center</u> • \$690,000 to \$1.15 million • \$230,000 to \$345,000 O&M (per year)	• SBMTD	• NTCIP 1401 [TCIP Common Public Transportation (CPT) Objects] • NTCIP 1404 [TCIP Scheduling/RunCutting (SCH) Objects] • NTCIP 1405 [TCIP Spatial Representation (SP) Objects] • NTCIP 1407 (Control Center Objects) • Advanced Traveler Information Systems (ATIS) General Use Standards Group	• DONE (Fall 2007) • Included as an ITS Project w/in SBCAG MPO Turbo Architecture	<u>Transit Management Center</u> • Capital costs include system software, hardware, on-board devices, communications, computers, etc. • O&M costs include staffing, communications, etc.
Internet Traveler Information System	• Establish an internet website to provide travelers/motorists w/ information as to closures, major delays, congestion, incidents, construction, transit schedules, etc.	• Santa Barbara County	Yes	• Yes • Potential to tie-in w/ Regional and/or Statewide Internet Websites	<u>SBCAG</u> • Determine business model (e.g., Public Agency, Private Sector, Public-Private partnership, etc.) • Determine functionality, features, type(s) of traveler information to support, messages to provide, exact wording of each message, etc. • Determine internet website "host" • Analyze expected level-of-usage & develop pricing structure • Develop marketing strategy • Perform O&M activities	<u>Caltrans, AMBAG, & SLOCOG</u> • Determine business model (e.g., Public Agency, Private Sector, Public-Private partnership, etc.) • Determine functionality, features, type(s) of traveler information to support, messages to provide, exact wording of each message, etc. • Determine internet website "host" • Analyze expected level-of-usage & develop pricing structure • Develop marketing strategy • Perform O&M activities	• Center-to-Center (C2C) Data Sharing (Existing) • Internet Content/Message Types (TBD)	• Reliable, accurate, & timely provision of messages via internet website re: real-time traffic conditions & transit schedules • Monitor internet website for accurate provision of content/messages • Check that internet website and/or system components are communicating w/ the "data sources" & functioning properly, taking corrective actions as needed (e.g., Caltrans D5 TMC, SBMTD transit center, etc.) • Check that internet website is functioning properly, messages are legible, & coordinate w/ internet website "host"	2010	<u>Website Set-Up & Connections</u> • \$200,000 <u>O&M</u> • \$150,000 per year	• SBCAG	• Advanced Traveler Information Systems (ATIS) General Use Standards Group • ITE TM 2.01 (Message Sets for External TMC Communication)	• DONE (Fall 2007) • Included as an ITS Project w/in SBCAG MPO Turbo Architecture	
Highway Advisory Radio (IAR)	• Install HAR transmitters (typically AM 630 & 1610 frequencies) at strategic locations along roadways to broadcast traffic-related messages (e.g., construction, congestion, incidents, etc.) directly to the traveler/motorist	• US 101 (Montecito & Downtown Santa Barbara area)	Yes	Yes	<u>SBCAG</u> • Determine exact location, size, etc. re: HAR transmitter & "tune to" sign placement • Determine type(s) of messages to broadcast & exact wording of each message type • Identify type(s) of HAR transmitters & "tune to" signs to deploy • Determine best type of communications media to use (to connect to HAR control system) • Determine location of HAR control system • Implement HAR transmitters & "tune to" signs (field), establish connection/communications, & integrate w/ HAR control system • Perform necessary O&M activities	<u>City of Santa Barbara</u> • Determine exact location, size, etc. re: HAR transmitter & "tune to" sign placement • Determine type(s) of messages to broadcast & exact wording of each message type • Identify type(s) of HAR transmitters & "tune to" signs to deploy • Determine best type of communications media to use (to connect to HAR control system) • Determine location of HAR control system • Implement HAR transmitters & "tune to" signs (field), establish connection/communications, & integrate w/ HAR control system • Perform necessary O&M activities	• HAR Broadcasts & Message Types (TBD)	• Reliable, accurate, & timely broadcast of messages via the IAR transmitter to motorists re: real-time traffic conditions • Monitor HAR transmissions for accurate broadcast of messages • Check that HAR transmitters & "tune to" signs and/or system components are communicating w/ the HAR control system & functioning properly, taking corrective actions as needed • Check that HAR transmitters are functioning properly, broadcast are audible w/in transmission range, & coordinate w/ HAR Supplier	2011	<u>HAR Transmitter & "Tune To" Sign</u> • \$66,250 per location <u>O&M</u> • \$5,750 per year, per location	• SBCAG	• NTCIP 1407 (Control Center Objects) • NTCIP 1402 (Incident Management Objects) • ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) • Advanced Traveler Information Systems (ATIS) General Use Standards Group	• DONE (Fall 2007) • Included as a Regionally-Significant ITS Project w/in SBCAG MPO Turbo Architecture	



Appendix F – Caltrans District 5
ITS Project Log



APPENDIX F – CALTRANS DISTRICT 5 ITS PROJECT LOG

Project Title	Project Description	Project Location	Inter-Agency Project (Yes/No)	County-Specific Project (Yes/No)	Lead Agency Roles & Responsibilities	Other Agencies Roles & Responsibilities	Applicable Cooperative Agreements	O&M Considerations	Implementation Timeframe	Cost (\$)	Funding Sources	Applicable ITS Standards	Architecture Conformance Status	Comments
Caltrans D5 TMC Connection to Caltrans D4 TMC	• Establish connection and/or communications between the Caltrans D5 TMC (San Luis Obispo) & the Caltrans D4 TMC (San Francisco Bay Area) for information sharing purposes	• Caltrans D5 TMC (San Luis Obispo) • Caltrans D4 TMC (San Francisco Bay Area)	No	No	Caltrans D5 & CHP • Identify type(s) of data, information, video images, etc. to share/exchange • Determine best type of connection and/or communications media to use • Implement/establish connection & perform necessary O&M activities	Caltrans D4 • Identify type(s) of data, information, video images, etc. to share/exchange • Determine best type of connection and/or communications media to use • Implement/establish connection & perform necessary maintenance activities	• Center-to-Center (C2C) Data Sharing (Existing) • CCTV Image & Data Sharing (Existing)	• Ensure O&M funding availability • Determine/coordinate Caltrans' and/or Private Sector telecommunications service provider's O&M role • Ensure preventive maintenance activities are performed • Check that C2C communications & networking equipment are functioning properly & coordinate w/ C2C Service Provider	2009	Capital • \$172,500 per C2C link O&M • \$172,500 per year	• Caltrans SHOPP	• NTCIP C2C Standards Group • NTCIP 1205 (CCTV Object Camera Control) • NTCIP 1208 (CCTV Object Camera Switching) • NTCIP 1407 (Control Center Objects) • NTCIP 1402 (Incident Management Objects) • ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) • ITE TM 2.01 (Message Sets for External TMC Communication) • Advanced Traveler Information Systems (ATIS) General Use Standards Group	• DONE (Fall 2007) • Included as a Regionally-Significant ITS Project w/in AMBAG, SLOCOG, & SBCAG MPO Turbo Architectures	
Roadway Sensors (Detector Stations)	• Install roadway sensors/detection devices to monitor roadway conditions (e.g., volume, speed, occupancy, headway, etc.)	US 101 (Santa Barbara County) • Ventura County Line thru Goleta US 101 (San Luis Obispo County) • Grand Avenue (Arroyo Grande) to Monterey Street (San Luis Obispo) SR 1 (Monterey County) • Carmel River Bridge to Santa Cruz County Line SR 1 (Santa Cruz County) • Monterey County Line to Ocean Street (Santa Cruz) SR 156 (San Benito County) • US 101 to SR 152	No	Yes	Caltrans D5 & CHP • Identify type(s) of detection technology to deploy [e.g., inductive loops, video imaging detection systems (VIDs), radar, microwave vehicle detection systems (MVDs), etc.] • Determine best type of communications media to use (to connect to Caltrans D5 TMC) • Implement roadway sensors & establish connection to Caltrans D5 TMC • Perform necessary O&M activities	None	None	• Ensure O&M funding availability • Monitor detection devices for display/depiction of real-time traffic conditions in the field/roadways • Check that roadway sensor components are communicating with the Caltrans D5 TMC & are functioning properly, taking corrective actions as needed [Field-to-Center (F2C) communications] • Determine/coordinate Caltrans' and/or Private Sector telecommunications service provider's O&M role	2009	Inductive Loops • \$5,750 – \$17,250 per location VIDs • \$46,000 – \$57,500 per location Radar Detection • \$23,000 – \$34,500 per location MVDs • \$23,000 – \$34,500 per location O&M • \$3,450 per year, per location	• Caltrans SHOPP	• NTCIP 1201 (Global Objects Definition) • NTCIP 1205 (CCTV Object Camera Control) • NTCIP 1208 (CCTV Object Camera Switching) • ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary)	• DONE (Fall 2007) • Included as a Regionally-Significant ITS Project w/in AMBAG, SLOCOG, & SBCAG MPO Turbo Architectures	• Live traffic speed data will be available on the PeMS webpage
Changeable Message Sign (CMS)	• Install CMS signs to provide motorists w/ information as to closures, major delays, or incidents at strategic locations along state roadways where motorists have options for avoiding the delay	US 101 (Santa Barbara County) • Las Positas Road (Santa Barbara) • Facing NB Traffic (FNBT) • New Model 500 CMS US 101 (Santa Barbara County) • 2-miles north of SR 154 near Los Olivos • Facing SB Traffic (FSBT) • New Model 500 CMS SRs Adjacent to Price Canyon Drive (San Luis Obispo County) • SR 227, FSBT, south of Biddle Ranch Road • SR 101, FNBT, at Price Canyon Road • New Model 520 CMS Monterey County • US 101 SB, south of Mallory Canyon Road • Junction of SR 1 & SR 68 WB (in Pacific Grove)	Yes	Yes	Caltrans D5 & CHP • Determine exact location re: CMS sign placement • Determine type(s) of messages to display & exact wording of each message type • Identify size/type(s) of CMS signs to deploy • Determine best type of communications media to use (to connect to Caltrans D5 TMC) • Implement CMS signs (field), establish connection to Caltrans D5 TMC, & integrate w/ CMS control system (Caltrans D5 TMC) • Perform necessary O&M activities	SBCAG & SLOCOG • Determine exact location, size, etc. re: CMS sign placement • Determine type(s) of messages to display & exact wording of each message type	• CMS Displays & Message Types (TBD)	• Reliable, accurate, & timely display of messages on the CMS sign to motorists re: real-time traffic conditions • Monitor CMS signs for accurate display of messages • Check that CMS signs and/or system components are communicating w/ the Caltrans D5 TMC & functioning properly, taking corrective actions as needed • Check that CMS signs are functioning properly, clean display area, & coordinate w/ CMS Supplier	2009	CMS Sign • \$345,000 per location O&M • \$23,000 per year, per location	• Caltrans SHOPP	• NTCIP 1407 (Control Center Objects) • NTCIP 1402 (Incident Management Objects) • ITE TM 1.03 (Standard for Functional Level Traffic Management Data Dictionary) • Advanced Traveler Information Systems (ATIS) General Use Standards Group	• DONE (Fall 2007) • Included as a Regionally-Significant ITS Project w/in AMBAG, SLOCOG, & SBCAG MPO Turbo Architectures	
Closed Circuit Television (CCTV) Camera	• Install CCTV cameras to provide visual surveillance for more heavily traveled roadways	US 101 (Santa Barbara County) • Cabrillo Boulevard (Santa Barbara) • Carrillo Street (Santa Barbara) US 101 (San Luis Obispo County) • Grand Avenue (Arroyo Grande) • Camino Mercado (Arroyo Grande) • South Higuera Street (San Luis Obispo) • Los Osos Valley Road (LOVR) (San Luis Obispo) • Madonna Road (San Luis Obispo) • Marsh Street (San Luis Obispo) • Monterey Street (San Luis Obispo) Monterey County • US 101 SB, south of Mallory Canyon Road • Junction of SR 1 & SR 68 WB (in Pacific Grove) • Junction of SR 1 & SR 156 (Castroville) • SR 1 NB, north of Salinas River Bridge • SR 1 SB, Carmel River UC • SR 1 SB, near Molera Road • SR 68 WB, near Salinas River Bridge San Benito County • US 101 NB, south of SR 156 W junction • US 101 SB, north of SR 156 E junction	Yes	Yes	Caltrans D5 & CHP • Determine exact location, viewing angle, etc. re: CCTV camera placement • Identify type(s) of CCTV cameras to deploy • Determine best type of communications media to use (to connect to Caltrans D5 TMC) • Implement CCTV cameras (field), establish connection to Caltrans D5 TMC, & integrate w/ Video Control System (VCS) (Caltrans D5 TMC) • Perform necessary O&M activities	SBCAG & SLOCOG • Determine exact location, viewing angle, etc. re: CCTV camera placement	• CCTV Image & Data Sharing (Existing)	• Monitor CCTV cameras for display/depiction of real-time traffic conditions in the field/roadways • Check that CCTV cameras and/or system components are communicating w/ the Caltrans D5 TMC & functioning properly, taking corrective actions as needed • Check that CCTV cameras are functioning properly, clean lenses, & coordinate w/ CCTV Supplier	2009	CCTV Camera • \$69,000 per location O&M • \$4,600 per year, per location	• Caltrans SHOPP	• NTCIP 1201 (Global Objects Definition) • NTCIP 1205 (CCTV Object Camera Control) • NTCIP 1208 (CCTV Object Camera Switching)	• DONE (Fall 2007) • Included as a Regionally-Significant ITS Project w/in AMBAG, SLOCOG, & SBCAG MPO Turbo Architectures	